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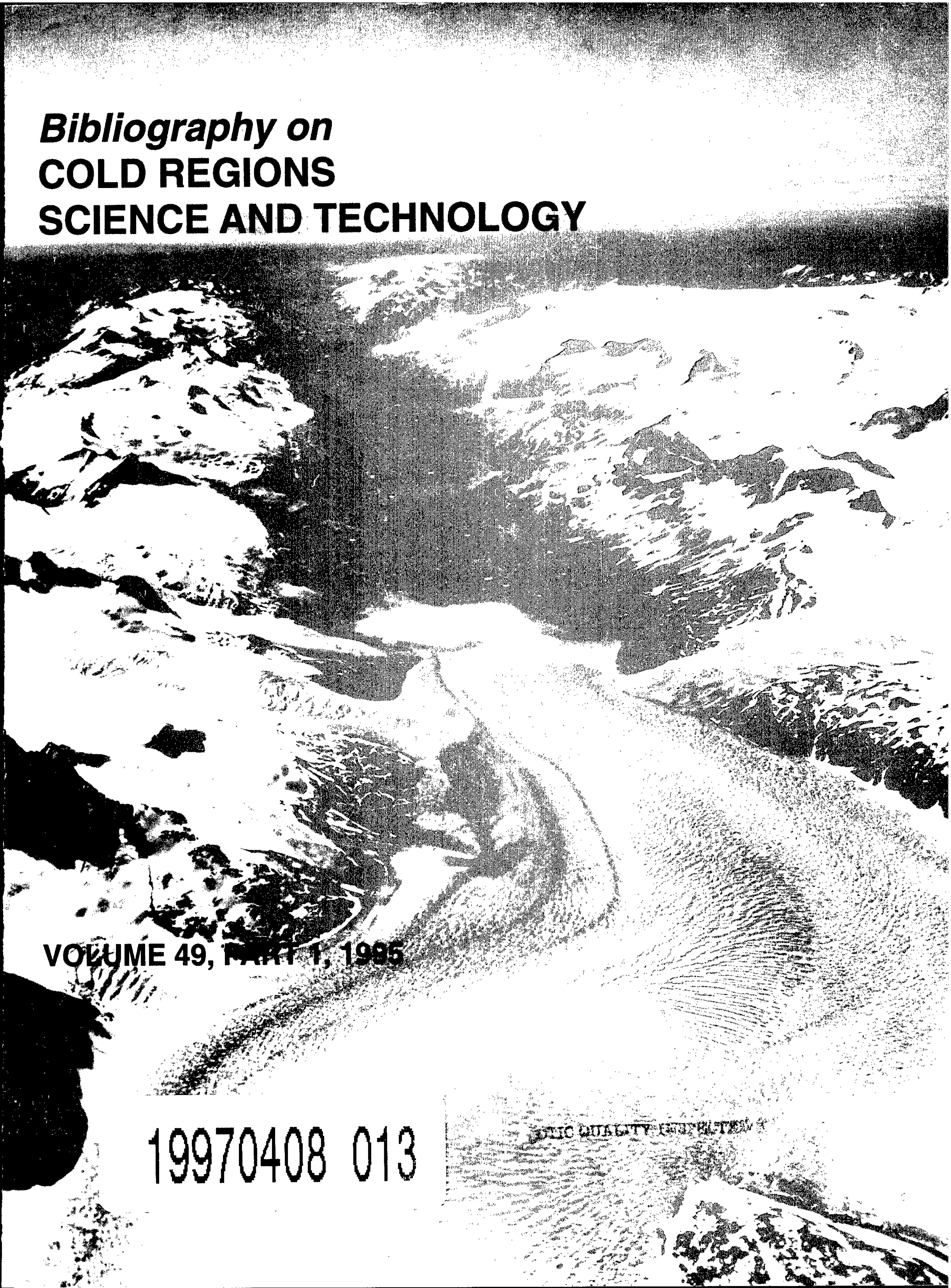

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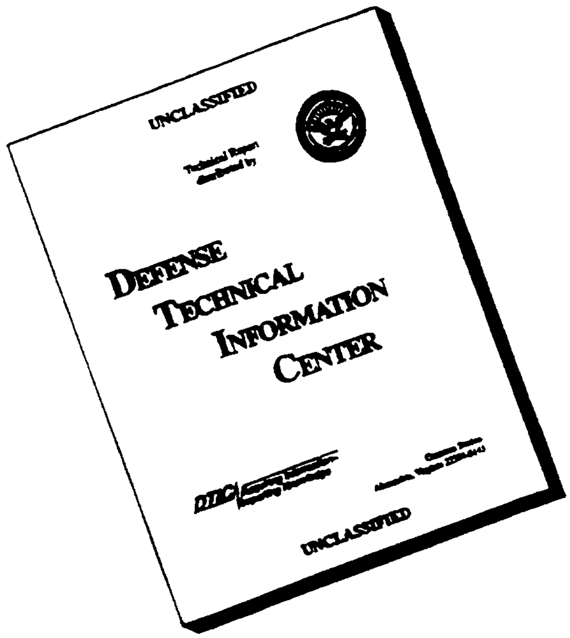

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Bibliography on COLD REGIONS SCIENCE AND TECHNOLOGY

VOLUME 49, PART 1

Stuart G. Hibben, Editor

BIBLIOGRAPHY ON COLD REGIONS SCIENCE AND TECHNOLOGY
Volume 49, Part 1

The *Bibliography on Cold Regions Science and Technology* was first published in 1951 and is a continuing publication of the Cold Regions Bibliography Project in the Science and Technology Division of the Library of Congress. It is sponsored by and prepared for the Cold Regions Research and Engineering Laboratory (formerly Snow, Ice and Permafrost Research Establishment) of the U.S. Army Corps of Engineers. Volumes 1-15 were issued as the *Bibliography on Snow, Ice, and Permafrost,* SIPRE Report 12. Beginning with volume 16 the designation was changed to CRREL Report 12. With Volume 20 the title was changed to *Bibliography on Snow, Ice and Frozen Ground, with Abstracts,* and with volume 23 the current title was adopted.

The present volume contains material accessioned between October 1994 and September 1995. It contains full citations of 6783 items, in many cases with abstracts. Indexing for the volume is issued as Volume 49, Part 2.

This publication is the result of a coordinated effort. The bibliography work was done by the Cold Regions Bibliography Project Staff who entered all data on a single computerized database that accommodates both the *Bibliography on Cold Regions Science and Technology* and the *Antarctic Bibliography,* thus eliminating duplication of effort between the two bibliographies. Citations were entered in the Cuadra STAR system, and camera-ready copy for printing was produced using the FrameMaker composition system.

This publication is available from the National Technical Information Service, Springfield, Virginia 22151. When ordering, the author and subject indexes (Part 2) should also be requested, as the usefulness of the bibliography would be severely limited without them.

The items contained herein are also available for on-line access on the ORBIT system. For information write to ORBIT Information Technologies, 8000 Westpark Drive, McLean, Virginia 22102 (800-421-7229 or 703-442-0900).

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Stuart G. Hibben, Head
Cold Regions Bibliography Project
Science and Technology Division
Library of Congress

49-1

Concentration characteristics of soluble impurities in the surface snow of Collins Ice Cap, King George Island, Antarctica.

Han, J.K., et al, *Antarctic research,* Dec. 1993, 4(2), p.29-35, 12 refs. For Chinese version see F-49600.

Snow impurities, Snow composition, Atmospheric composition, Antarctica—King George Island

Measurements carried out for the upper 10 m of firn/ice obtained at the main dome of Collins Ice Cap, King George I. revealed the direct relation of soluble impurities of snow mass to the composition of atmosphere aerosols over it. It was established that a sea-salt source dominates the atmosphere aerosol above the Collins Ice Cap. The simultaneous variation shown by the concentration profiles of Na^+, K^+, Mg^{2+}, Ca^{2+}, SO_4^{2-}, Cl^-, Br^- and very approximate EF values suggested their common marine source and a similar deposition process. Besides the possible surface contamination, NH_4^+ varied uniformly along the deeper part of the core in concentration, which could be considered as background value of ammonium. A satisfactory explanation for NO_3^- concentration profile could not be obtained at present. (Auth.)

49-2

Concentrations and distributions of free amino acids in sea and lake ice core of Antarctica.

Yang, H.F., McTaggart, A.R., Burton, H., *Antarctic research,* Dec. 1993, 4(2), p.62-74, 10 refs.

Ice cores, Sea ice, Lake ice, Ice composition, Seasonal variations, Sea water, Chemical composition, Antarctica—Vestfold Hills

A sea ice core (1.6 m) and an ice core from Ace Lake (1.5 m), taken in Oct. and Nov. 1988 in the vicinity of Davis Station, were analyzed. Results showed the following: a seasonal variation in concentration of amino acids, with the highest values of 30.92 micromol/ml in the sea ice core and about 45 micromol/ml in the lake ice core; lowest concentrations were about 8.0 micromol/ml in the former, and 14.0 micromol/ml in the latter. The authors conclude that the uniform spectrum of amino acids is probably derived from a peptide cell source and those amino acids which were not used by organisms. (Auth. mod.)

49-3

Methods for *in situ* chemical analyses of snow and ice samples.

Kamiyama, K., et al, *Antarctic record,* Mar. 1994, 38(1), p.30-40, In Japanese with English summary. 12 refs.

Ice composition, Snow composition, Chemical analysis, Measurement, Measuring instruments, Data processing, Antarctica—Mizuho Station, Antarctica—Queen Maud Land

Chemical analytical methods for snow and ice samples are discussed for the procedure *in situ,* taking field environments into consideration. The use of the ion exchange filter, for decreasing the sample volume to be carried back to the laboratory and for simplifying the pre-treatment for gross-B measurement, is discussed. Small systems for chemical determinations are also discussed. Small ion chromatography systems for measuring anions (F^-, CH_3COO^-, $HCOO^-$, $CH_3SO_3^-$, SO_4^{2-}, $C_2O_4^{2-}$, NO_3^-) with small amount of sample have been developed. A simple system, suitable for *in situ* measurement of NO_3^-, is discussed. (Auth. mod.)

49-4

Gravity survey on the Mizuho Plateau, East Antarctica along the traverse routes to Dome-F from Syowa Station.

Kamiyama, K., Kanao, M., Maeno, H., Furukawa, T., *Antarctic record,* Mar. 1994, 38(1), p.41-53, In Japanese with English summary. 15 refs.

Ice surveys, Radio echo soundings, Bottom topography, Gravity anomalies, Bedrock, Antarctica—Mizuho Plateau

Geophysical and glaciological surveys were carried out on the Mizuho Plateau from Showa Station to Dome-F in 1992 by the inland traverse team of JARE-33. Gravity values along the traverse routes were determined considering the correction of drift rates and some tears. Gravity anomalies were calculated by using data both of surface elevation from GPS positioning with some modification by atmospheric pressure, and of the ice thickness from radio-echo soundings. The free-air gravity anomaly profiles correlate well with those of bedrock elevation. The continuous data of bedrock elevation beneath the Dome-F area, obtained by radio echo soundings, revealed the basin-like topographic structure of the glacier beds surrounded by bedrocks at comparatively higher altitude, which is supported by free-air anomaly data. (Auth. mod.)

49-5

Operation and evaluation of an experimental hovercraft for antarctic use.

Murao, R., Takeuchi, S., Inaba, M., Hosoya, M., *Antarctic record,* Mar. 1994, 38(1), p.72-111, In Japanese with English summary. 5 refs.

Air cushion vehicles, Low temperature tests, Cold weather performance, Maintenance, Antarctica—Showa Station

A small (2.8 t) experimental hovercraft was unloaded near Showa Station in Jan. 1981 and left there for testing of performance, maneuverability and maintenance requirements until it was decommissioned in Feb. 1990. It was found that the yaw of this craft was very sensitive under certain ice conditions. Digital simulation of motion was attempted to understand the craft's response to steering. The operation of the experimental hovercraft was evaluated from the viewpoint of support and survey for scientists' activities in the Antarctic. For this purpose, specifications of a hovercraft, parking and storage that are feasible at Showa Station are proposed. (Auth. mod.)

49-6

Swedish polar bibliography: a guide to Swedish literature on polar research 1945-1988 with supplement 1989-1992.

Wijkström, C., ed, Svärd, K., ed, Stockholm, Swedish Polar Research Secretariat, 1993, 201p., Refs. p.9-136,170-201. Titles in English or in Swedish with English translations. For preliminary edition covering 1945-1986/87 see 44-782 or 17A-40756.

Bibliographies, Research projects

Some 1400 citations from the Swedish literature on polar research for the years 1945-1988, plus about 350 more citations for the years 1989-1992 in a separate supplement, are listed. About 250 of the citations for the years 1945-1988, and about 200 for the years 1989-1992, are pertinent to the Antarctic. Research topics include humanities, geography, expeditions, social sciences, technology, natural sciences, geophysics, meteorology, oceanography, geology, glaciology, biological sciences, and medical sciences. An author and geographic index are included for the years 1945-1988.

49-7

Use of profiler data for analysis and NOWcasting of a winter season extratropical cyclone.

Small, B.S., *U.S. National Oceanic and Atmospheric Administration. National Weather Service. NOAA technical memorandum,* June 1994, NWS CR-106, 14p., 5 refs.

Atmospheric disturbances, Snowstorms, Weather forecasting

49-8

Forecasting snowfall using mixing ratios on an isentropic surface: an empirical study.

Garcia, C., Jr., *U.S. National Oceanic and Atmospheric Administration. National Weather Service. NOAA technical memorandum,* May 1994, NWS CR-105, 31p., 12 refs.

Snowfall, Snowstorms, Weather forecasting

49-9

IVHS and rural road safety: a prototype ATIS.

O'Neill, W.A., Ullah, K., Wang, M., *Mountain-Plains Consortium. MPC report,* Sep. 1993, No.93-23, 92p., PB94-112612, Refs. passim.

Road icing, Road maintenance, Weather forecasting, Accidents, Safety, Cost analysis, United States—Utah

49-10

Report of the International Ice Patrol in the North Atlantic, 1993 season.

U.S. Coast Guard, *U.S. Coast Guard. Bulletin,* 1993, No.79, 90p., CG-188-48, 8 refs.

Ice reporting, Sea ice distribution, Icebergs, Ice surveys, Ice conditions, Ice detection, Drift

49-11

Aurora 089 No.1 OCS-Y-0943 well offshore northeast Alaska: petrography-petrology.

Mowatt, T.C., Banet, A.C., Jr., Reeder, J.W., Dygas, J.A., *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska open file report,* July 1994, No.56, 40p. + appends., 21 refs.

Exploration, Offshore drilling, Oil wells, Well logging, Lithology, Stratigraphy, United States—Alaska—Arctic National Wildlife Refuge

49-12

SOHIO Nechelik No.1 well, Colville River delta area, Alaska: petrology, diagenesis, reservoir quality in selected horizons in the Nuiqsut Unit and the Torok Formation.

Mowatt, T.C., Banet, A.C., Jr., Reeder, J.W., Dygas, J.A., *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska open file report,* July 1994, No.55, 39p. + appends., 35 refs.

Exploration, Oil wells, Well logging, Lithology, Stratigraphy, United States—Alaska—Colville River Delta

49-13

Petrographic characterization of some Precambrian crystalline rocks from the Søndre Strømfjord area, West Greenland.

Mowatt, T.C., Naidu, A.S., *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska open file report,* July 1994, No.54, 30p., 6 refs.

Ice sheets, Glacier beds, Subglacial observations, Bedrock, Geological surveys, Rock drilling, Drill core analysis, Lithology, Greenland—Søndre Strømfjord

49-14

Summary review of the geology of Greenland as related to geological and engineering aspects of sampling beneath the inland ice.

Mowatt, T.C., Naidu, A.S., *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska open file report,* July 1994, No.53, 56p., Refs. p.39-43.

Ice sheets, Glacier beds, Subglacial observations, Bedrock, Geological surveys, Rock drilling, Core samplers, Drill core analysis, Lithology, Paleoclimatology, Greenland

49-15

Comparison of crude oil chemistry on America's North Slope: Chukchi Sea-Mackenzie Delta.

Banet, A.C., Jr., *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska technical report,* May 1994, No.17, 17p. + appends., 85 refs.

Exploration, Crude oil, Offshore drilling, Well logging, Geochemistry, Stratigraphy, Natural resources, Chukchi Sea, Beaufort Sea, United States—Alaska—North Slope, Canada—Northwest Territories—Mackenzie River Delta

49-16

Fiber-optic airmeter.

Ansari, F., *U.S. Strategic Highway Research Program. Report,* 1994, SHRP-C-677, 64p.

Concrete freezing, Concrete durability, Air entrainment, Frost protection, Frost resistance

49-17

Polar and cold regions library resources, a directory. 3rd edition.

Andrews, M., ed, Brennan, A.M., ed, Kurppa, L., ed, Boulder, University of Colorado, Institute of Arctic and Alpine Research, 1994, 208p., Sponsored by the Polar Libraries Colloquy.

Bibliographies, Research projects, Organizations, Data processing

Collections on polar and cold regions including Antarctica in libraries worldwide are briefly described based on answers to questionnaires. This directory lists 149 libraries with contact persons from 20 countries: Australia, Canada, Chile, China, Denmark, Finland, France, Germany, Greenland, Iceland, Italy, Japan, Netherlands, New Zealand, Norway, Russia, Sweden, Switzerland, United Kingdom, and the United States.

49-18

Final test report for the production qualification test (PQT) of the family of medium tactical vehicle (FMTV).

Wilson, L.L., U.S. Army Test and Evaluation Command TECOM Proj No.1-VG-120-MTV-007, Fort Greely, AK, U.S. Army Cold Regions Test Center, Aug. 1994, 49p. + appends., 9 refs.

Motor vehicles, Military equipment, Engine starters, Cold weather performance, Cold weather tests

49-19

Survey of alternative road deicers.

Resource Concepts, Inc., Carson City, NV, Feb. 1992, 200p. + appends., Includes 11p. bibliography.

Chemical ice prevention, Road icing, Road maintenance, Soil pollution, Water pollution, Environmental impact, Cost analysis, United States—Nevada, United States—California

49-20

Snow and ice control on roads and runways. A bibliography of Swedish reports 1972-1992.

Gustafson, K., *Sweden. Statens väg- och transportforskningsinstitut. VTI notat,* Oct. 1993, No.16/93, 60p., 295 refs. Titles in English or in Swedish with English translations.

Road icing, Road maintenance, Snow removal, Salting, Chemical ice prevention, Bibliographies, Sweden

49-21

Climatic information for building design in Canada 1965. Supplement No.1 to the National Building Code of Canada.

National Research Council, Canada. Associate Committee on the National Building Code, Ottawa, 1965, 41p., 12 refs.

Building codes, Cold weather construction, Meteorological data, Canada

49-22

Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada.

Svoboda, J., ed, Freedman, B., ed, Toronto, Captus University Publications, 1994, 268p. + ann., Refs. passim. For individual papers see 49-23 through 49-46.

Arctic landscapes, Plant ecology, Ecosystems, Biomass, Growth, Sampling, Soil tests, Phenology, Classifications, Tundra, Canada—Northwest Territories—Ellesmere Island

49-23

Alexandra Fiord—an ecological oasis in the polar desert.

Freedman, B., Svoboda, J., Henry, G.H.R., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.1-9, 63 refs.

Arctic landscapes, Research projects, Plant ecology, Ecosystems, Vegetation patterns, Climatic factors, Biomass, Environmental impact, Canada—Northwest Territories—Ellesmere Island

49-24

Geology of the Alexandra Fiord lowland area, Ellesmere Island, N.W.T.

Sterenberg, V.Z., Stone, W.E., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.13-33, 16 refs.

Arctic landscapes, Geological surveys, Geologic structures, Geological maps, Stratigraphy, Canada—Northwest Territories—Ellesmere Island

49-25

Meteorology and climatology of the Alexandra Fiord lowland.

Labine, C., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.23-39, 20 refs.

Arctic landscapes, Climatology, Meteorological data, Radiation balance, Air temperature, Statistical analysis, Periodic variations, Canada—Northwest Territories—Ellesmere Island

49-26

Soils of an extensively vegetated polar desert oasis, Alexandra Fiord, Ellesmere Island.

Muc, M., Svoboda, J., Freedman, B., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.41-50, 54 refs.

Arctic landscapes, Soil surveys, Soil profiles, Soil classification, Soil chemistry, Ecosystems, Vegetation patterns, Cryogenic soils, Canada—Northwest Territories—Ellesmere Island

49-27

Vascular plant communities of a polar oasis at Alexandra Fiord, Ellesmere Island.

Muc, M., Freedman, B., Svoboda, J., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.53-63, 89 refs.

Arctic landscapes, Plant ecology, Vegetation patterns, Distribution, Ecosystems, Sampling, Statistical analysis, Canada—Northwest Territories—Ellesmere Island

49-28

Aboveground standing crop in plant communities of a polar desert oasis, Alexandra Fiord, Ellesmere Island.

Muc, M., Svoboda, J., Freedman, B., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.65-74, 60 refs.

Arctic landscapes, Ecosystems, Plant ecology, Biomass, Growth, Plant tissues, Sampling, Vegetation patterns, Canada—Northwest Territories—Ellesmere Island

49-29

Ecology of heath communities dominated by *Cassiope tetragona* at Alexandra Fiord, Ellesmere Island.

Nams, M.L.N., Freedman, B., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.75-84, 54 refs.

Arctic landscapes, Plant ecology, Plants (botany), Vegetation patterns, Biomass, Sampling, Snowmelt, Ground thawing, Canada—Northwest Territories—Ellesmere Island

49-30

Standing crop and net production of non-grazed sedge meadows of a polar desert oasis.

Henry, G.H.R., Svoboda, J., Freedman, B., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.85-95, 60 refs.

Arctic landscapes, Ecosystems, Plant ecology, Biomass, Meadow soils, Active layer, Vegetation patterns, Classifications, Sampling, Canada—Northwest Territories—Ellesmere Island

49-31

Plant communities on the uplands in the vicinity of the Alexandra Fiord lowland.

Batten, D.S., Svoboda, J., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.97-110, 71 refs.

Arctic landscapes, Ecosystems, Plant ecology, Vegetation patterns, Soil water, Distribution, Classifications, Sampling, Statistical analysis, Canada—Northwest Territories—Ellesmere Island

49-32

Resource allocation in high-arctic vascular plants of differing growth form.

Maessen, O., Freedman, B., Nams, M.L.N., Svoboda, J., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.113-121, 25 refs.

Arctic landscapes, Ecosystems, Plant ecology, Sampling, Growth, Vegetation patterns, Plant tissues, Biomass, Nutrient cycle, Cold weather survival, Canada—Northwest Territories—Ellesmere Island

49-33

Biomass allocation in ten *Saxifraga* species in the High Arctic.

Stewart, J., Freedman, B., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.123-135, 35 refs.

Arctic landscapes, Plant ecology, Biomass, Plant tissues, Growth, Vegetation patterns, Sampling, Cold weather survival, Phenology, Canada—Northwest Territories—Ellesmere Island

49-34

Phenology and resource allocation in a high-arctic evergreen dwarf shrub, *Cassiope tetragona.*

Nams, M.L.N., Freedman, B., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.137-144, 50 refs.

Arctic landscapes, Ecosystems, Plant ecology, Phenology, Biomass, Plant tissues, Growth, Sampling, Vegetation patterns, Canada—Northwest Territories—Ellesmere Island

49-35

Autecology of *Dryas integrifolia* in Alexandra Fiord lowland habitats.

Hart, G.T., Svoboda, J., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.145-156, 34 refs.

Arctic landscapes, Ecosystems, Plant ecology, Vegetation patterns, Distribution, Growth, Sampling, Phenology, Canada—Northwest Territories—Ellesmere Island

49-36

Effects of habitat on variations of phenology and nutrient concentration among four common plant species of the Alexandra Fiord lowland.

Woodley, E.J., Svoboda, J., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.157-175, 43 refs.

Arctic landscapes, Plant ecology, Ecosystems, Sampling, Biomass, Nutrient cycle, Phenology, Snowmelt, Seasonal variations, Climatic factors, Canada—Northwest Territories—Ellesmere Island

49-37

Mycorrhizal status of plants at Alexandra Fiord, Ellesmere Island, Canada, a high-arctic site.

Kohn, L.M., Stasovski, E., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.177-185, 30 refs.

Arctic landscapes, Plant ecology, Ecosystems, Biomass, Fungi, Distribution, Sampling, Canada—Northwest Territories—Ellesmere Island

49-38

Effects of fertilization on three tundra plant communities of a polar desert oasis.

Henry, G.H.R., Freedman, B., Svoboda, J., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.187-192, 32 refs.

Arctic landscapes, Tundra, Plant ecology, Ecosystems, Nutrient cycle, Biomass, Phenology, Cold weather tests, Canada—Northwest Territories—Ellesmere Island

49-39

Comparisons of grazed and non-grazed high-arctic sedge meadows.

Henry, G.H.R., Svoboda, J., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.193-194, 11 refs.

Arctic landscapes, Plant ecology, Meadow soils, Soil tests, Nutrient cycle, Biomass, Growth, Animals, Environmental impact, Canada—Northwest Territories—Ellesmere Island

49-40

Seed banks and seedling occurrence in a high-arctic oasis at Alexandra Fiord, Ellesmere Island, Canada.

Freedman, B., Hill, N., Svoboda, J., Henry, G.H.R., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.195-200, 24 refs.

Arctic landscapes, Ecosystems, Plant ecology, Growth, Revegetation, Sampling, Cold weather survival, Canada—Northwest Territories—Ellesmere Island

49-41

Dinitrogen fixation (acetylene reduction) in high-arctic sedge meadows.

Henry, G.H.R., Svoboda, J., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.201-206, 38 refs.

Arctic landscapes, Meadow soils, Soil tests, Sampling, Algae, Plant ecology, Ecosystems, Nutrient cycle, Canada—Northwest Territories—Ellesmere Island

49-42

Microecosystem around a large erratic boulder: a high-arctic study.

Elliott, D., Svoboda, J., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.207-213, 5 refs.

Arctic landscapes, Rocks, Topographic effects, Ecosystems, Plant ecology, Vegetation patterns, Growth, Active layer, Canada—Northwest Territories—Ellesmere Island

49-43

Entombed plant communities released by a retreating glacier at Alexandra Fiord.

Bergsma, B.M., Svoboda, J., Freedman, B., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.215-218, 7 refs.

Arctic landscapes, Plant ecology, Plants (botany), Glacier oscillation, Glacier ablation, Preserving, Ice cover effect, Canada—Northwest Territories—Ellesmere Island

49-44

List of lichens of Alexandra Fiord.

Maass, W., Nams, M.L.N., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.251-252, 32 refs.

Arctic landscapes, Lichens, Classifications, Canada—Northwest Territories—Ellesmere Island

49-45

List of bryophytes of Alexandra Fiord.

Maass, W., Hoisington, B., Nams, M.L.N., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.253-254, 4 refs.

Arctic landscapes, Mosses, Classifications, Canada—Northwest Territories—Ellesmere Island

49-46

Vascular plants at Alexandra Fiord.

Ball, P., Hill, N., Ecology of a polar oasis—Alexandra Fiord, Ellesmere Island, Canada, Toronto, Captus University Publications, 1994, p.255-256, 1 ref.

Arctic landscapes, Plants (botany), Classifications, Canada—Northwest Territories—Ellesmere Island

49-47

Contemporary periglacial environment in the polar regions.

Vtiurin, B.I., *Polar geography and geology,* Jan.-Mar. 1994, 18(1), p.44-62, Refs. p.59-62.

Periglacial processes, Permafrost, Cryogenic structures, Glacial geology, Polar regions

The present-day periglacial zones of the polar regions in both hemispheres have many features in common, caused by the peculiarities of climate, glaciological and geocryological processes, and the geomorphology of the periglacial regions. On the other hand, there exist essential differences in the general appearance of the periglacial zones in the Northern and Southern hemispheres, related mainly to particular features of continental glaciation. An analysis of the literature and of data from the author's field observations have allowed him to reach some conclusions as to the major features of the geocryology of the polar regions: the thickness, distribution, temperature, and cryogenic structure of the permafrost and of seasonally frozen materials, and the ground ice and cryogenic relief of these areas. This in turn has made it possible to identify a geocryological zonation of the polar regions and to advance a new concept as to the present-day periglacial zone. (Auth.)

49-48

Measured properties of the antarctic ice sheet derived from the SCAR Antarctic digital database.

Fox, A.J., Cooper, A.P.R., *Polar record,* July 1994, 30(174), p.201-206, 13 refs.

Ice shelves, Mapping, Data processing, Geomorphology, Polynyas, Antarctica—Ronne Ice Shelf, Antarctica—Filchner Ice Shelf

The completion of the SCAR Antarctic digital database (ADD) has provided a new basis for statistical calculations for Antarctica. Datasets are available at the scale of the original source material, and generalized to 1:1,000,000, 1:3,000,000, 1:10,000,000, and 1:30,000,000. The new descriptive statistics presented are based on the ADD 1:1,000,000 data-set since this is the largest scale at which source maps provided complete cover of the coastline and ice-free areas. The statistics include the total length and proportions of coastline types and the total area of Antarctica with the proportions of its constituent feature types. The areas of the Ross and Filchner-Ronne ice shelves have also been computed. Whilst the total area of Antarctica has remained static compared with previous studies, the relative proportions of coastline types and constituent feature types within the total area show significant changes. In particular the calculated area of ice-free ground is only about one-seventh of that often quoted from previous studies. The changes reported result from improved mapping, reinterpretation of data, and actual changes of coastline. (Auth.)

49-49

General characteristics in stratigraphy and density variation for ice cores from Collins Ice Cap, King George Island, Antarctica.

Han, J.K., et al, *Antarctic research (Chinese edition),* Mar. 1994, 6(1), p.40-46, In Chinese with English summary. 9 refs.

Ice cores, Ice density, Firn stratification, Snow accumulation, Antarctica—King George Island

Two ice cores from the Collins Ice Cap on King George I. were studied: the Main dome, elevation 700 m, and the Small dome, elevation 250 m. The density curve in the Main dome core showed regular variations corresponding to the distribution of melt features in the stratigraphic record, and annual layers were roughly determined. It was estimated that the snow accumulation rate at the summit of Main dome was 3-3.5 m, which was about 1650-1925 $kg/m^2/a$ in water equivalent, and 2.0 m/a in mean ice thickness equivalent. The transition depth of snow to ice was 38-39 m. Above it, density increased gradually downward, but at a rather high rate due to appearance of the water table, reaching 900 kg/m^3 in a 5-6 m interval. The density data of the ice core from the summit of Small dome showed a fluctuation between 800 and 900 kg/m^3. The snow accumulation rate at the summit of Small dome was about 0.7 m/a in ice equivalent, and the transition depth of snow to ice was 7-8 m, covering about 10 years of mass accumulated. Very thick volcanic deposition layers were discovered below 40 m in the ice core from the summit of Small dome. (Auth. mod.)

49-50

Primary analysis of mass balance characteristics on small dome of Collins Ice Cap, King George Island, Antarctica.

Wen, J.H., et al, *Antarctic research (Chinese edition),* Mar. 1994, 6(1), p.47-57, In Chinese with English summary. 26 refs.

Glacier mass balance, Glacier ablation, Glacier melting, Antarctica—King George Island

Analysis of data based on a year of measuring the mass balance of the small dome of the Collins Ice Cap (1991-1992) is reported. The dome is a glacial mass typical of cold seasons: periods of accumulation and ablation were clearly distinguishable; the melting at the bottom lasted two months longer than at the top; and the warm-season ablation decreased rapidly with increase of height. Mass balance characteristics showed larger mass balance gradient, lower mass balance level and smaller stability coefficient, which reflected the distinctive property of glacial mass balance under the condition of a subpolar maritime climate. (Auth. mod.)

49-51

Potential use of constructed wetlands for wastewater treatment in northern environments.

Jenssen, P.D., Maehlum, T., Krogstad, T., *Water science and technology,* 1993, 28(10), International Conference on Design and Operation of Small Wastewater Treatment Plants, 2nd, Trondheim, Norway, June 28-30, 1993. Selected proceedings, p.149-157, 20 refs.

Wetlands, Sewage treatment, Waste treatment, Water treatment, Cold weather construction, Cold weather performance, Environmental impact, Design

49-52

Cold climate sequencing batch reactor biological phosphorus removal—results 1991-92.

Marklund, S., *Water science and technology,* 1993, 28(10), International Conference on Design and Operation of Small Wastewater Treatment Plants, 2nd, Trondheim, Norway, June 28-30, 1993. Selected proceedings, p.275-282, 4 refs.

Waste treatment, Sewage treatment, Water treatment, Cold weather performance, Design, Water temperature, Temperature effects, Chemical analysis

49-53

Hydrologic effects of climatic change in west-central Canada.

Burn, D.H., *Journal of hydrology,* Aug. 1994, 160(1-4), p.53-70, 24 refs.

Snow hydrology, Climatic changes, Global warming, Snowmelt, Watersheds, Runoff, River flow, Flow measurement, Statistical analysis, Periodic variations, Canada

49-54

Causes of acidity in the River Lillån in the coastal zone of central northern Sweden.

Jansson, M., Ivarsson, H., *Journal of hydrology,* Aug. 1994, 160(1-4), p.71-87, 35 refs.

Snow hydrology, Surface waters, Streams, Water chemistry, Soil chemistry, Snow impurities, Snowmelt, Runoff, Environmental tests, Chemical properties, Sweden—Lillån, River

49-55

Studies on metal speciation in the natural environment.

Chakrabarti, C.L., et al, *Analytica chimica acta,* Apr. 15, 1993, 276(1), p.47-64, 65 refs.

Environmental tests, Chemical analysis, Surface waters, Snow composition, Snow impurities, Sampling, Meltwater, Solubility, Metals, Ion exchange

49-56

Kinetic studies of aluminum and zinc speciation in river water and snow.

Lu, Y.J., et al, *Analytica chimica acta,* July 20, 1994, 293(1-2), p.95-108, 33 refs.

Snow composition, Snow impurities, Meltwater, Surface waters, Solutions, Sampling, Metals, Chemical analysis, Statistical analysis

49-57

Effective viscosity of partially melted ice in the ammonia-water system.

Arakawa, M., Maeno, N., *Geophysical research letters,* July 1, 1994, 21(14), p.1515-1518, 12 refs.

Extraterrestrial ice, Satellites (natural), Ice physics, Rheology, Solutions, Ice water interface, Ice melting, Ice deformation, Shear stress, Viscosity, Simulation

49-58

Maps of snow-cover probability for the northern hemisphere.

Dickson, R.R., Posey, J., *Monthly weather review,* June 1967, 95(6), p.347-353, 14 refs.

Climatology, Snow cover distribution, Snow depth, Seasonal variations, Long range forecasting, Maps, Statistical analysis

49-59

Response of humic substances to soil acidification and freezing.

Shirshova, L.T., Khomutova, T.E., *Environment international,* 1994, 20(3), p.405-410, 13 refs.

Soil tests, Soil chemistry, Soil pollution, Sampling, Soil freezing, Organic soils, Environmental tests, Chemical properties, Spectroscopy

49-60

Devensian thermal contraction networks and cracks at Somersham, Cambridgeshire, UK.

West, R.G., *Permafrost and periglacial processes,* Oct.-Dec. 1993, 4(4), p.277-300, With French summary. 34 refs.

Pleistocene, Geocryology, Periglacial processes, Permafrost indicators, Ice wedges, Gravel, Soil structure, Cracks, Particle size distribution, Stratigraphy, United Kingdom—Cambridgeshire

49-61

Low-angle slushflow in the Kirgiz Range, Kirgizstan.

Elder, K., Kattelmann, R., *Permafrost and periglacial processes,* Oct.-Dec. 1993, 4(4), p.301-310, With French summary. 14 refs.

Avalanche formation, Avalanche mechanics, Snow hydrology, Runoff, Saturation, Slush, Mass flow, Slope processes, Periglacial processes, Kyrgyzstan—Kirgiz Range

49-62

Characteristics of the freezing kinetics of frozen soils. [Caractéristiques de la cinétique de congélation des sols salins]

Frolov, A.D., Seguin, M.K., *Permafrost and periglacial processes,* Oct.-Dec. 1993, 4(4), p.311-325, In French with English summary. 53 refs.

Frozen ground mechanics, Frozen ground chemistry, Soil freezing, Soil tests, Saline soils, Liquid phases, Permeability, Saturation, Ion density (concentration), Phase transformations, Spectroscopy, Ice water interface

49-63

Notes on open-system pingo ice, Adventdalen, Spitsbergen.

Yoshikawa, K., *Permafrost and periglacial processes,* Oct.-Dec. 1993, 4(4), p.327-334, With French summary. 12 ref.

Pingos, Permafrost hydrology, Continuous permafrost, Ice sampling, Ice growth, Ice structure, Ground water, Ice water interface, Physical properties, Norway—Spitsbergen

49-64

Origin of permafrost lake deposits in the Central Andes.

Gorbunov, A.P., *Permafrost and periglacial processes,* Oct.-Dec. 1993, 4(4), p.335-338, With French summary. 3 refs.

Permafrost structure, Permafrost origin, Cryogenic structures, Lacustrine deposits, Alpine landscapes, Pleistocene, Bolivia—Andes Mountains

49-65

Seasonal patterns and environmental regulation of frost hardiness in shoots of seedlings of *Thuja plicata, Chamaecyparis nootkatensis,* and *Picea glauca.*

Silim, S.N., Lavender, D.P., *Canadian journal of botany,* Mar. 1994, 72(3), p.309-316, With French summary. 30 refs.

Plant physiology, Plants (botany), Trees (plants), Plant tissues, Frost resistance, Cold tolerance, Cold weather survival, Seasonal variations, Temperature effects, Cold weather tests

49-66

Neutron and light scattering study of supercooled glycerol.

Wuttke, J., et al, *Physical review letters,* May 9, 1994, 72(19), p.3052-3055, 17 refs.

Liquids, Supercooling, Neutron scattering, Light scattering, Spectra, Molecular energy levels, Correlation, Low temperature tests, Temperature effects

49-67

Harper-Dorn creep in single crystals of lead, rutile and ice.

Wang, J.N., *Philosophical magazine letters,* Aug. 1994, 70(2), p.81-85, 38 refs.

Ice creep, Ice deformation, Ice crystals, Ice mechanics, Stresses, Strains

49-68

Impact and flexure properties of glass/vinyl ester composites in cold regions.

Karbhari, V.M., Pope, G., *Journal of cold regions engineering,* Mar. 1994, 8(1), p.1-20, 21 refs.

Composite materials, Panels, Design, Cold weather performance, Construction materials, Mechanical tests, Freezing, Saturation, Flexural strength, Impact strength, Damage, Temperature effects

49-69

Swelling behavior of shales in cold regions.

Wang, Z.W., Speck, R.C., Huang, S.L., *Journal of cold regions engineering,* Mar. 1994, 8(1), p.21-34, 18 refs.

Foundations, Rock properties, Thermal expansion, Humidity, Absorption, Low temperature tests, Temperature effects, Cold weather performance

49-70

Water vapor, condensed water, and crystal concentration in orographically influenced cirrus clouds.

Ström, J., Heintzenberg, J., *Journal of the atmospheric sciences,* Aug. 15, 1994, 51(16), p.2368-2383, 27 refs.

Cloud physics, Aerial surveys, Sampling, Cloud droplets, Ice crystals, Water content, Ice vapor interface, Humidity, Wind factors, Optical properties

49-71

Crystallization of liquid water in a molecular dynamics simulation.

Svishchev, I.M., Kusalik, P.G., *Physical review letters,* Aug. 15, 1994, 73(7), p.975-978, 26 refs.

Ice physics, Water structure, Molecular structure, Supercooling, Phase transformations, Ice crystal growth, Electric fields, Static electricity, Computerized simulation, Thermodynamics

49-72

Behavior of an inversion-based precipitation retrieval algorithm with high-resolution AMPR measurements including a low-frequency 10.7 GHz channel.

Smith, E.A., et al, *Journal of atmospheric and oceanic technology,* Aug. 1994, 11(4)pt.1, p.858-873, 34 refs.

Precipitation (meteorology), Cloud physics, Rain, Remote sensing, Radiometry, Scattering, Brightness, Resolution, Ice crystal optics, Water content

49-73

Analysis of the copolar correlation coefficient between horizontal and vertical polarizations.

Liu, L., et al, *Journal of atmospheric and oceanic technology,* Aug. 1994, 11(4)pt.1, p.950-963, 22 refs.

Precipitation (meteorology), Remote sensing, Hail, Ice detection, Radar echoes, Wave propagation, Resolution, Statistical analysis, Polarization (waves), Analysis (mathematics), Simulation

49-74

Detecting ice nuclei with a continuous-flow diffusion chamber: some exploratory tests of instrument response.

Rogers, D.C., *Journal of atmospheric and oceanic technology,* Aug. 1994, 11(4)pt.1, p.1042-1047, 14 refs.

Airborne equipment, Cloud chambers, Cloud physics, Cloud droplets, Aerosols, Ice nuclei, Heterogeneous nucleation, Thermal diffusion, Supersaturation, Ice water interface

49-75

Freeze-thaw resistance of FRC materials.

Larsen, E.S., RILEM International Symposium on Fibre Reinforced Cement and Concrete, 4th, Sheffield, England, July 20-23, 1992. Proceedings, London, E & FN Spon, 1992, p.838-850, 10 refs.

DLC TA444.F46

Concrete durability, Concrete strength, Reinforced concretes, Freeze thaw tests, Frost resistance, Air entrainment, Microstructure, Degradation, Saturation, Composite materials

49-76

Rapid assessment of trichloroethylene in ground water.

Hewitt, A.D., Shoop, S.A., MP 3472, *Ground water monitoring and remediation,* 1994, p.116-122, 21 refs.

Ground water, Water pollution, Environmental tests, Sampling, Chemical analysis, Hydrogeology, Well casings

On-site analysis of trichloroethylene (TCE) in aqueous samples by headspace sample preparation and gas chromatography (HS/GC) provides for quick and precise concentration estimates. This analytical approach is well suited for the on-site determination of volatile organic compounds (VOCs) in a variety of sample matrices, including ground water and saturated and unsaturated soils. For these reasons, HS/GC can be used to establish analyte concentrations on a near real-time basis to help select appropriate casing material during monitoring well installation. This application and the collection of multiple well samples during sampling events facilitates the hydrogeological site interpretation and the formulation of remediation strategies.

49-77

Arctic Ocean radiative fluxes and cloud forcing estimated from the ISCCP C2 cloud dataset, 1983-1990.

Schweiger, A.J., Key, J.R., *Journal of applied meteorology,* Aug. 1994, 33(8), p.948-963, 45 refs.

Climatology, Polar atmospheres, Radiometry, Ice cover effect, Marine atmospheres, Solar radiation, Radiation balance, Cloud cover, Optical properties, Periodic variations, Arctic Ocean

49-78

Energy balance model for imagery and electromagnetic propagation.

Rachele, H., Tunick, A., *Journal of applied meteorology,* Aug. 1994, 33(8), p.964-976, 47 refs.

Atmospheric boundary layer, Optical properties, Refractivity, Turbulence, Radiation balance, Heat flux, Wave propagation, Soil air interface, Snow cover effect, Mathematical models

49-79

Analytical solution and sensitivity study of sublimation-dehydration within a porous medium with volumetric heating.

Scott, E.P., *Journal of heat transfer,* Aug. 1994, 116(3), p.686-693, 19 refs.

Porous materials, Frozen liquids, Freeze drying, Ice sublimation, Microwaves, Heating, Heat transfer, Mass transfer, Temperature effects, Mathematical models

49-80

Melting of an ice shell on a heated horizontal cylinder.

Vargas, J.V.C., Bejan, A., Dobrovicescu, A., *Journal of heat transfer,* Aug. 1994, 116(3), p.702-708, 15 refs.

Ice physics, Ice melting, Ice solid interface, Defrosting, Pipes (tubes), Phase transformations, Heat transfer, Refrigeration, Analysis (mathematics)

49-81

Areal snow water equivalent values in Finland in the years 1946-1993. [Lumen aluevesiarvoja Suomessa vuosina 1946-1993]

Reuna, M., Perälä, J., Aitamurto, S., *Helsinki. Vesi- ja ympäristöhallinnon julkaisuja. Series A,* Nov. 1, 1993, No.165, 287p. + maps, In Finnish with Swedish and English summaries. 4 refs.

Snow hydrology, Snow surveys, Snow cover distribution, Snow water equivalent, River basins, Periodic variations, Finland

49-82

Determination of bromide in snow samples by ion chromatography with electrochemical detection.

Seefeld, S., Baltensperger, U., *Analytica chimica acta,* Nov. 15, 1993, 283(1), International Symposium on Microchemical Techniques, 12th, Córdoba, Spain, Sep. 7-12, 1992, p.246-250, 20 refs.

Alpine landscapes, Snow composition, Chemical composition, Chemical analysis, Sampling, Ion density (concentration), Environmental tests, Air pollution

49-83

Thermally induced fragmentation in an ice lattice.

Sonwalkar, N., Yip, S., Shyam Sunder, S., *Journal of chemical physics,* Aug. 15, 1994, 101(4), p.3216-3221, 22 refs.

Ice physics, Latticed structures, Ice structure, Molecular structure, Molecular energy levels, Heating, Hydrogen bonds, Temperature effects, Thermodynamics, Simulation

49-84

Low-energy electron-stimulated production of molecular hydrogen from amorphous water ice.
Kimmel, G.A., Orlando, T.M., Vézina, C., Sanche, L., *Journal of chemical physics,* Aug. 15, 1994, 101(4), p.3282-3286, 38 refs.
Ice physics, Amorphous ice, Deuterium oxide ice, Ice spectroscopy, Ice crystal optics, Molecular energy levels, Radiation absorption, Hydrogen, Proton transport, Ionization

49-85

Meteorological trends in the Italian Alps during the 1992-93 winter season. [L'andamento meteorologico sulle Alpi italiane durante la stagione invernale 1992-93]
Kerkmann, J., Pasquali, S., *Neve e valanghe,* Nov. 1993, No.20, p.8-17, In Italian.
Snowstorms, Snowfall, Atmospheric disturbances, Wind (meteorology), Air temperature, Meteorological data, Italy

49-86

Evolution of the snow cover and avalanche events in the Italian Alps during the 1992-93 winter season. [L'evoluzione del manto nevoso e l'attività valanghiva sulle Alpi italiane durante la stagione invernale 1992-93], *Neve e valanghe,* Nov. 1993, No.20, p.18-41, In Italian.
Avalanches, Avalanche forecasting, Snow cover stability, Snowfall, Snow surveys, Accidents

49-87

Avalanche events during the 1992-93 winter season. [Gli incidenti da valanga durante la stagione invernale 1992-93], *Neve e valanghe,* Nov. 1993, No.20, p.42-52, In Italian.
Avalanches, Snow cover stability, Accidents, Italy

49-88

RACER: The Marguerite Bay ice-edge reconnaissance.
Karl, D.M., et al, *Antarctic journal of the United States,* 1992, 27(5), p.175-177, 10 refs.
Marine biology, Ice edge, Ice cover effect, Pack ice, Nutrient cycle, Antarctica—Marguerite Bay
To date, the RACER program productivity hypotheses have been tested in the generally ice-free areas of Gerlache Strait. However, during the 1991-1992 austral summer, the measurements were extended south along the west coast of the Antarctic Peninsula and into the marginal ice-edge zone of Marguerite Bay. This brief report provides an overview of the Marguerite Bay reconnaissance, including station locations, sampling strategies, and hydrographic setting. It also presents preliminary evidence for an extensive nutrient-limited phytoplankton bloom in the meltwater-stratified portion of the ice-edge zone.

49-89

Aircraft photopolarimetric observations of the ocean, ice/snow, and clouds in coastal regions of the Antarctic Peninsula.
Frouin, R., et al, *Antarctic journal of the United States,* 1992, 27(5), p.187-190, 10 refs.
Aerial surveys, Spaceborne photography, Imaging, Polarization (waves), Remote sensing, Ice optics, Snow optics, Reflectivity
During the 1991-1992 RACER cruise, aircraft photopolarimetric observations were made with an ocean color imager, the Polarization and Directionality of the Earth's Reflectance (POLDER) instrument. The ability of POLDER to measure spectral, bidirectional, and polarization characteristics as reflected sunlight, as well as its dynamic range, high spatial resolution, and the good quality of the data acquired during the cruise, offer the opportunity to investigate many aspects of ocean color remote sensing in a highly productive, yet not easily accessible environment where the presence of ice introduces further difficulty. Optical properties of ice, snow, and clouds can be characterized and compared. The dataset is unique, and one of the very few existing on polarization characteristics of natural surfaces.

49-90

Optical properties of snow/ice derived from aircraft polarization-and-directionality-earth-reflectance (POLDER) data.
Goloub, P., Herman, M., Deuzé, J.L., Frouin, R., *Antarctic journal of the United States,* 1992, 27(5), p.191-192, 11 refs.
Aerial surveys, Imaging, Polarization (waves), Ice optics, Snow optics, Reflectivity
During the 1991-1992 RACER campaign, the authors acquired one of the few existing photopolarimetric datasets over snow and ice. The measurements were made aboard a BAS Twin Otter with the Polarization and Directionality of the Earth Reflectance (POLDER) instrument. The POLDER imaging principle allows one to obtain instantaneously the bidirectional reflectance distribution function (BRDF) of a target if this target is nearly homogeneous within the swath of the instrument (4.9 x 6.5 km). These photopolarimetric observations corroborate earlier observations that the snow/ice system is close to a Lambertian reflector and that polarization over snow-ice targets is expected to be caused mainly by the atmosphere (molecules and aerosols).

49-91

Sunphotometer measurements of aerosol optical thickness in the Gerlache Strait and Marguerite Bay, Antarctica.

Frouin, R., Panouse, M., Devaux, J.C., *Antarctic journal of the United States,* 1992, 27(5), p.193-194, 4 refs.

Aerosols, Thickness, Optical properties, Photometry, Reflectivity, Sunlight, Antarctica—Gerlache Strait, Antarctica—Marguerite Bay

During the 1991-1992 RACER cruise, aerosol optical thickness measurements were made using a three-channel sunphotometer. The objective was to verify aircraft estimates of aerosol optical thickness obtained with the Polarization and Directionality of the Earth Reflectance (POLDER) instrument, which measured the intensity of reflected sunlight at 3,962-4,572 m altitudes over the RACER study sites.

49-92

Analytical modeling of the specific intensity of sunlight backscattered by the ocean.

Frouin, R., Hermanto, R., *Antarctic journal of the United States,* 1992, 27(5), p.195-197, 8 refs.

Light scattering, Sunlight, Reflectivity, Simulation

The authors find that the approximate solutions of the radiative transfer equation proposed by Sobolev (1963) can be used to simulate the bidirectional reflectance of the ocean. Because Sobolev's solutions are not suitable for strongly anisotropic phase functions, accurate results can only be obtained by considering that the photons at scattering angles below 40 deg can only be absorbed by phytoplankton. This substantially decreases the anisotropy factor of the phase function, making Sobolev's formalism applicable. Depending on the particle phase function, the scattering angle threshold may vary, but 40 deg should provide reasonable results in most cases. The advantage of Sobolev's solutions is not only their accuracy but also their analytical nature.

49-93

Retrieval of aerosols over the Gerlache Strait from aircraft photopolarimetric observations.

Deuzé, J.L., et al, *Antarctic journal of the United States,* 1992, 27(5), p.197-199, 4 refs.

Aerial surveys, Aerosols, Optical properties, Photometry, Reflectivity, Models, Antarctica—Gerlache Strait

Photopolarimetric measurements made with the Polarization and Directionality of the Earth's Reflectance (POLDER) instrument during the 1991-1992 RACER campaign have been analyzed to determine the aerosol conditions prevailing over the Gerlache Strait on Dec. 29, 1991. In this preliminary study, the results obtained with only one POLDER scene are reported. The main objective was not precisely to retrieve the aerosols (amount and type), but rather to provide evidence for their presence and to qualitatively fit the measurements, using an aerosol model, inferred by examining the total reflectance and polarization ratio at 850 nanometers as well as the spectral change in the total reflectance.

49-94

Contrast between polarization properties of snow/ice and clouds.

Goloub, P., Herman, M., Deuzé, J.L., Frouin, R., *Antarctic journal of the United States,* 1992, 27(5), p.199-202, 5 refs.

Image processing, Polarization (waves), Ice optics, Snow optics, Clouds (meteorology), Reflectivity, Solar radiation, Antarctica—Gerlache Strait

Snow/ice and clouds affect the surface radiation balance strongly, yet differently. Confusing snow/ice with clouds may yield large errors in estimates of the solar energy reaching the surface in polar regions, with important consequences for an assessment of ice-atmosphere interactions, ice dynamics, and the carbon cycle. The photopolarimetric measurements made with the POLDER instrument during the 1991-1992 RACER campaign offer a unique opportunity to investigate whether polarization information at visible and near-infrared wavelengths can be used to make the distinction efficiently. By analyzing a few POLDER images, the authors demonstrate that polarization is a useful property of light that can be used to determine the nature of the targets.

49-95

Semi-analytical radiative transfer model to simulate the specific intensity of sunlight reflected by the atmosphere and ocean.

Frouin, R., Berthelot, B., *Antarctic journal of the United States,* 1992, 27(5), p.202-205, 10 refs.

Sunlight, Reflectivity, Models, Image processing, Light scattering

In order to retrieve near-surface phytoplankton pigment concentration from ocean color data collected during the 1991-1992 RACER campaign, a fast, yet accurate radiative transfer model of the specific intensity of sunlight reflected by the atmosphere and ocean (including backscattering by the water body) is required. This model must run fast because of the large amount of data to be processed, which prevents the use of Monte Carlo, successive orders of scattering codes, or any computer-intensive code. Although this model must include simplifying assumptions, it will retain the essential physics of the problem. The authors have built such a model. The purpose of this brief report is to present the model, to examine the relative influence of the input parameters, to use the model to simulate actual aircraft data, and to discuss improvements as well as future validation activities.

49-96

Near-surface phytoplankton pigment concentration in the Gerlache Strait derived from aircraft-polarization-and-directionality-earth-reflectance data (POLDER).

Frouin, R., *Antarctic journal of the United States,* 1992, 27(5), p.205-208, 8 refs.

Remote sensing, Biomass, Plankton, Image processing, Optical properties, Sea water, Sunlight, Reflectivity, Antarctica—Gerlache Strait

Several aircraft missions were flown over the Gerlache Strait during the 1991-1992 RACER campaign for the purpose of mapping near-surface phytoplankton pigment concentration and primary production, and hence to extend spatially the local observations made aboard R/V *Polar Duke.* The ability of the POLDER instrument to remotely sense ocean color accurately, and thus to provide quantitative estimates of near-surface phytoplankton pigment concentration, was tested. POLDER estimates of pigment concentration along the aircraft subtrack are presented and compared with values measured during fast grid C. The accuracy of the estimates and potential sources of error are discussed.

49-97

Hydraulic conductivity of compacted clay frozen and thawed *in situ*—discussion.

Paruvakat, N., Benson, C.H., Othman, M.A., *Journal of geotechnical engineering,* Aug. 1994, 120(8), p.1458-1460, Includes reply. 2 refs. For paper under discussion see 47-2545.

Clay soils, Frozen ground mechanics, Soil tests, Freeze thaw cycles, Freezing rate, Soil water migration, Ice water interface, Ground thawing

49-98

Analysis of snow from Antarctica: a critical approach to ion-chromatographic methods.

Udisti, R., Bellandi, S., Piccardi, G., *Fresenius' journal of analytical chemistry,* 1994, Vol.349, p.289-293, 18 refs.

Snow impurities, Snow composition, Chemical composition, Sampling, Chemical analysis, Ion density (concentration), Laboratory techniques, Accuracy

Ion-chromatographic methods for anion and cation determination in snow samples from Antarctica are evaluated with regard to sensitivity and selectivity. An eluent-step change method is proposed to determine simultaneously mono- and divalent cations with detection limits lower than 1 microgram/L. Special attention is given to the determination of the ammonium ion at trace levels in the presence of high sodium concentrations. The problems of sample contamination by the laboratory environment are evaluated. Two alternative methods, one using isocratic and the other a gradient elution, are proposed for the determination of fluoride, acetate, formate and methanesulphonate ions. Both methods are discussed to evaluate their use in snow sample analysis. (Auth. mod.)

49-99

Atlantic Climate Change Program.

Molinari, R.L., Battisti, D., Bryan, K., Walsh, J., *American Meteorological Society. Bulletin,* July 1994, 75(7), p.1191-1199, 20 refs.

Climatology, Climatic changes, Research projects, Global change, Marine atmospheres, Ocean currents, Long range forecasting, Sea ice distribution, Air ice water interaction, Ice cover effect

49-100

Paleogeographic significance of *Scaphites depressus* in the Kanguk Formation (Upper Cretaceous), Axel Heiberg Island, Canadian Arctic.

Hills, L.V., Braunberger, W.F., Núñez-Betelu, L.K., Hall, R.L., *Canadian journal of earth sciences,* Apr. 1994, 31(4), p.733-736, With French summary. 24 refs.

Geological surveys, Pleistocene, Quaternary deposits, Fossils, Marine geology, Geologic processes, Canada—Northwest Territories—Axel Heiberg Island

49-101

Cryostructures in permafrost, Tuktoyaktuk coastlands, western arctic Canada.

Murton, J.B., French, H.M., *Canadian journal of earth sciences,* Apr. 1994, 31(4), p.737-747, With French summary. 70 refs.

Permafrost structure, Geocryology, Cryogenic structures, Sediments, Ground ice, Classifications, Stratigraphy, Canada—Northwest Territories—Tuktoyaktuk

49-102

New occurrence of *Oldhamia* and other trace fossils in the Cambrian of the Yukon and Ellesmere Island, arctic Canada.

Hofmann, H.J., Cecile, M.P., Lane, L.S., *Canadian journal of earth sciences,* May 1994, 31(5), p.767-782, With French summary. 65 refs.

Arctic landscapes, Geological surveys, Fossils, Pleistocene, Classifications, Quaternary deposits, Stratigraphy, Canada—Northwest Territories—Ellesmere Island, Canada—Yukon Territory—British Mountains

49-103

Glacial Lake Camelsfoot: a Late Wisconsinan advance stage proglacial lake in the Fraser River valley, Gang Ranch area, British Columbia.

Huntley, D.H., Broster, B.E., *Canadian journal of earth sciences,* May 1994, 31(5), p.798-807, With French summary. 35 refs.

Pleistocene, Geological surveys, Ice sheets, Glacier oscillation, Glacial lakes, Glacial deposits, Quaternary deposits, Stratigraphy, Geomorphology, Topographic effects, Canada—British Columbia—Fraser River

49-104

Supercooling of water below the anomalous range near 226 K.

Bartell, L.S., Huang, J.F., *Journal of physical chemistry,* Aug. 4, 1994, 98(31), p.7455-7457, 34 refs.

Liquids, Water structure, Physical properties, Supercooling, Phase transformations, Low temperature tests, Spectroscopy, Temperature effects

49-105

Evidence for nitric acid pentahydrate formed under stratospheric conditions.

Marti, J.J., Mauersberger, K., *Journal of physical chemistry,* July 14, 1994, 98(28), p.6897-6899, 15 refs.

Stratosphere, Atmospheric composition, Ozone, Cloud physics, Aerosols, Polar stratospheric clouds, Chemical properties, Hydrates, Vapor pressure, Condensation, Simulation

Type I polar stratospheric clouds (PSC I) play an important role in ozone depletion reactions, and their composition may determine a key step in the heterogeneous chemistry. Formation of PSC I has been simulated by vapor depositing nitric acid and water on different substrates under conditions designed to approach those found in the polar stratosphere. Composition measurements of the resulting solids suggest the existence of a previously unreported hydrate of nitric acid, the pentahydrate. When PSC I particles condense from the vapor phase, the pentahydrate may be the nitric acid solid whose formation is favored under stratospheric temperature and pressure conditions. (Auth. mod.)

49-106

Structure sensitivity in the surface chemistry of ice: acetone adsorption on amorphous and crystalline ice films.

Schaff, J.E., Roberts, J.T., *Journal of physical chemistry,* July 14, 1994, 98(28), p.6900-6902, 30 refs.

Ice physics, Ice crystals, Amorphous ice, Water films, Surface properties, Chemical properties, Adsorption, Ice vapor interface, Hydrogen bonds, Ice spectroscopy, Infrared spectroscopy

49-107

Mechanical and hydrologic basis for the rapid motion of a large tidewater glacier. 1. Observations.

Meier, M., et al, *Journal of geophysical research,* Aug. 10, 1994, 99(B8), p.15,219-15,229, 24 refs.

Glacial hydrology, Glacier flow, Basal sliding, Velocity measurement, Subglacial observations, Ice water interface, Glacier beds, Water pressure, Water level, Boreholes, Diurnal variations, Glacier surges, United States—Alaska—Columbia Glacier

49-108

Mechanical and hydrologic basis for the rapid motion of a large tidewater glacier. 2. Interpretation.

Kamb, B., et al, *Journal of geophysical research,* Aug. 10, 1994, 99(B8), p.15,231-15,244, 30 refs.

Glacial hydrology, Glacier flow, Velocity measurement, Boreholes, Water level, Water pressure, Ice water interface, Basal sliding, Subglacial observations, Glacier surges, Diurnal variations, United States—Alaska—Columbia Glacier

49-109

Omega/VLF radio compass.

Kemp, J.F., *Journal of navigation,* Jan. 1990, 43(1), p.118-124, 7 refs.

Navigation, Orientation, Radio beacons, Transmission, Radio waves, Low frequencies, Wave propagation, Antennas, Accuracy

49-110

BIOMASS in relation to the sea-ice zone.

Hubold, G., Southern ocean ecology: the BIOMASS perspective. Edited by S.Z. El-Sayed, Cambridge, University Press, 1994, p.355-361, Refs. p.360-361. DLC QH95.58.S68

Low temperature research, Ice cover effect, Marine biology, Biomass, Sea ice distribution, Ice models

After a review of the manyfold ecological features of the antarctic sea ice and the sea ice zone, three topics in the antarctic sea ice zone system which need priority attention are suggested: the factors controlling the life cycles and survival of the biota; the impact of sea-ice and ice biota on ocean-atmosphere exchanges; and the nature of biogeochemical cycles in the water column and benthos.

49-111

Medium-sized icy satellites: thermal and structural evolution during accretion.

Kossacki, K.J., Leliwa-Kopystyński, J., *Planetary and space science,* Oct. 1993, 41(10), p.729-741, 23 refs.

Satellites (natural), Extraterrestrial ice, Geologic structures, Geologic processes, Porosity, Rheology, Cosmic dust, Mathematical models

49-112

Liquids and solids on the surface of Titan: results of a new photochemical model.

Lara, L.M., Lorenz, R.D., Rodrigo, R., *Planetary and space science,* Jan. 1994, 42(1), p.5-14, 66 refs.

Satellites (natural), Atmospheric composition, Photochemical reactions, Condensation, Extraterrestrial ice, Regolith, Ground ice, Surface properties, Geochemistry, Hydrocarbons, Models

49-113

Total ion desorption yields of H_2O, D_2O, CH_3OH, CD_3OD and water-methanol mixed ices irradiated at 584 Å.

Wu, C.Y.R., Yang, B.W., Judge, D.L., *Planetary and space science,* Apr. 1994, 42(4), p.273-277, 33 refs.

Extraterrestrial ice, Simulation, Ice physics, Solar radiation, Ultraviolet radiation, Ionization, Ice crystal optics, Ice erosion

49-114

Great hailstorm of August 1843: the severest recorded in Britain?

Webb, J.D.C., Elsom, D.M., *Weather,* Aug. 1994, 49(8), p.266-273, 7 refs.

Precipitation (meteorology), Synoptic meteorology, Hail, Ice storms, Records (extremes), Weather observations, History, United Kingdom

49-115

Airborne 95 GHz dual-polarized radar for cloud studies.

Pazmany, A.L., McIntosh, R.E., Kelly, R.D., Vali, G., *IEEE transactions on geoscience and remote sensing,* July 1994, 32(4), p.731-739, 12 refs.

Cloud physics, Airborne radar, Radar photography, Resolution, Radar echoes, Backscattering, Ice detection, Ice crystal optics, Polarization (waves)

49-116

Band-differenced angular signature technique for cirrus cloud detection.

Di Girolamo, L., Davies, R., *IEEE transactions on geoscience and remote sensing,* July 1994, 32(4), p.890-896, 21 refs.

Cloud cover, Radiance, Detection, Remote sensing, Radiometry, Image processing, Solar radiation, Spacecraft, Snow cover effect

49-117

Temperature profiles of the Greenland Sea in the summer of 1992: report of the oceanographic observation on the R/V *Lance* cruise.

Ushio, S., Honda, M., Ito, H., *Antarctic record,* Mar. 1994, 38(1), p.63-67, With Japanese summary. 2 refs.

Oceanographic surveys, Water temperature, Temperature measurement, Profiles, Ice melting, Ice edge, Ice cover effect, Air ice water interaction, Greenland Sea

49-118

Temperature profiles of the Greenland Sea in the summer of 1993: oceanographic observation on the R/V *Lance* cruise.

Ito, H., Østerhus, S., Ushio, S., *Antarctic record,* Mar. 1994, 38(1), p.68-71, With Japanese summary. 1 ref.

Oceanographic surveys, Water temperature, Temperature measurement, Profiles, Ice cover effect, Air ice water interaction, Ice edge, Greenland Sea

49-119

Glacigenic cycle of substances. [Gliatsiogennyĭ krugovorot veshchestv]

Ivanov, A.V., Khabarovsk, IVEP DVO RAN, 1993, 92p., In Russian with English summary and table of contents. 127 refs.

Geochemical cycles, Ice solid interface, Ice composition, Sea ice, Ground ice, Hydrates, River ice, Ice air interface, Snowmelt, Ice melting

49-120

Ecology of the Amguema River basin (Chukotka), Part 2. [Ekologiia basseĭna reki Amguema (Chukotka), Ch. 2]

Berman, D.I., ed, Vladivostok, Dal'nauka, 1993, 126p. (Pertinent p.3-22), In Russian with English summary and table of contents. Refs. p.113-125.

River basins, Ecology, Models, Russia—Amguema River

49-121

Ecology of the Amguema River basin (Chukotka), Part 1. [Ekologiia basseĭna reki Amguema (Chukotka), Ch. 1]

Rusova, L.A., ed, Biologicheskie problemy Severa (Biological problems of the North), Vladivostok, Dal'nauka, 1993, 235p. (Pertinent p.5-98), In Russian with English summary and table of contents. Refs. passim.

River basins, Ecology, Microclimatology, Electric power, Thermal regime, Soil physics, Soil chemistry, Peat, Meadow soils, Cryogenic soils, Russia—Amguema River

49-122

Inversion processes in soils. [Inversionnye protsessy v pochvakh]

Erukov, G.V., Pochvennye resursy Karelii, ikh ratsional'noe ispol'zovanie i okhrana (ekologicheskie problemy) (Soil resources of Karelia, their rational use and protection (ecological problems)). Edited by N.G. Fedorets and I.P. Lazareva, Petrozavodsk, Karel'skiĭ nauchnyĭ tsentr RAN, 1992, p.83-102, In Russian with English summary. 15 refs.

Taiga, Cryogenic soils, Podsol, Degradation, Soil erosion, Forest soils, Soil creep, Water erosion, Wind erosion, Russia—Karelia

49-123

Possibilities of a complex approach to local forecast of oil and gas presence in complex-formed deposits in Western Siberia. [Vozmozhnosti kompleksnogo podkhoda k lokal'nomu prognozu neftegazonosti slozhnopostroennykh zalezheĭ Zapadnoĭ Sibiri]

Bespalova, S.N., Bakuev, O.V., Aktual'nye problemy neftianoĭ gidrogeologii; sbornik nauchnykh trudov (Current problems in oil hydrogeology; collected scientific papers). Edited by E.A. Bars and E.V. Stadnik, Moscow, Nauka, 1993, p.30-39, In Russian. 3 refs.

Hydrogeology, Natural gas, Crude oil, Gas wells, Oil wells, Forecasting, Russia—Siberia

49-124

Connection between inter-layer flows and oil and gas presence (in the example of the southern Siberian platform). [Sviazi mezhplastovykh peretokov s neftegazonost'iu (na primere iuga Sibirskoĭ platformy)]

Kartsev, A.A., Popova, N.V., Serebriakova, L.K., IAvorchuk, I.V., Aktual'nye problemy neftianoĭ gidrogeologii; sbornik nauchnykh trudov (Current problems in oil hydrogeology; collected scientific papers). Edited by E.A. Bars and E.V. Stadnik, Moscow, Nauka, 1993, p.39-42, In Russian.

Hydrogeology, Natural gas, Crude oil, Russia—Siberia

49-125

Hydrogeochemical research at various stages of oil and gas exploration-prospecting (in the example of Western Siberia). [Opyt gidrogeokhimicheskikh issledovaniĭ na razlichnykh etapakh poiskovo-razvedochnykh rabot na neft i gaz (na primere Zapadnoĭ Sibiri)]

Prokop'eva, R.G., Ryl'kov, A.V., Aktual'nye problemy neftianoĭ gidrogeologii; sbornik nauchnykh trudov (Current problems in oil hydrogeology; collected scientific papers). Edited by E.A. Bars and E.V. Stadnik, Moscow, Nauka, 1993, p.46-50, In Russian. 2 refs.

Exploration, Hydrogeochemistry, Hydrogeology, Natural gas, Crude oil, Ground water, Russia—Siberia

49-126

Using data on water-soluble organic substances of sedimentary rocks at the stage of oil and gas exploration and prospecting (in the example of Western Siberia). [Ispol'zovanie dannykh o vodorastvorimykh organicheskikh veshchestvakh osadochnykh porod na etape poiskov i razvedki nefti i gaza (na primere Zapadnoĭ Sibiri)]

Bars, E.A., Skul'skaia, Z.M., Aktual'nye problemy neftianoĭ gidrogeologii; sbornik nauchnykh trudov (Current problems in oil hydrogeology; collected scientific papers). Edited by E.A. Bars and E.V. Stadnik, Moscow, Nauka, 1993, p.92-96, In Russian. 3 refs.

Exploration, Natural gas, Crude oil, Rocks, Russia—Siberia

49-127

Heat and water vapour fluxes and scalar roughness lengths over an antarctic ice shelf.

King, J.C., Anderson, P.S., *Boundary-layer meteorology,* Apr. 1994, 69(1-2), p.101-121, 40 refs.

Atmospheric boundary layer, Ice sheets, Ice shelves, Ice air interface, Ice cover effect, Heat flux, Turbulent diffusion, Surface roughness, Mass transfer, Meteorological factors, Analysis (mathematics), Antarctica—Brunt Ice Shelf

This paper presents eddy-correlation measurements of heat and water vapor fluxes made during the antarctic winter. The surface layer was stably stratified throughout the period of observation and sensible heat fluxes were always directed downwards. However, both upward and downward water vapor fluxes were observed. Their magnitude was generally small and the latent heat flux was not a significant fraction of the surface energy budget. The variation of heat and water vapor fluxes with stability is well described by Monin-Obukhov similarity theory, but the scalar roughness lengths for heat and water vapor appear to be much larger than the momentum roughness length. Possible explanations of this effect are discussed. (Auth. mod.)

49-128

Influence of stratification on heat and momentum turbulent transfer in Antarctica.

Yagüe, C., Cano, J.L., *Boundary-layer meteorology,* Apr. 1994, 69(1-2), p.123-136, 23 refs.

Polar atmospheres, Atmospheric boundary layer, Turbulent exchange, Wind factors, Friction, Stratification, Heat transfer, Ice shelves, Antarctica—Brunt Ice Shelf

Data from the antarctic winter at Halley Base have been used in order to evaluate qualitatively and quantitatively how the stratification in the lower atmosphere (evaluated with the gradient Richardson number, Ri) influences the eddy transfers of heat and momentum. Vertical profiles of wind and temperature up to 32 m, and turbulent fluxes measured from three ultrasonic thermo-anemometers installed at 5, 17 and 32 m, are employed to calculate Ri, the friction velocity (u^*) and the eddy diffusivities for heat (Kh) and momentum (Km). The results show a substantial dependence of stability on Km, Kh and u^*, with a sharp decrease in these turbulent parameters with increasing stability. The ratio of eddy diffusivities (Kh/Km) is also analyzed and exhibits a decreasing tendency as Ri increases, reaching values even less than 1, i.e., there were situations where the turbulent transfer of momentum was greater than that of heat. Possible mechanisms of turbulent mixing are discussed. (Auth. mod.)

49-129

Modelling wash-off and leaching of pollutants by spring-time flow.

Vasil'ev, A., *Journal of hydrology,* July 1994, 159(1-4), p.215-222, 6 refs.

Hydrology, River basins, Runoff, Surface waters, Leaching, Ground thawing, Water pollution, Geochemistry, Models, Estonia

49-130

Sediment source and hydroclimate inferences from glacial lake sediments: the postglacial sedimentary record of Lillooet Lake, British Columbia.

Desloges, J.R., Gilbert, R., *Journal of hydrology,* July 1994, 159(1-4), p.375-393, 26 refs.

Hydrology, Runoff, Lacustrine deposits, Bottom sediment, Sampling, Sedimentation, Sediment transport, Glacier melting, Glacial lakes, Canada—British Columbia—Lillooet Lake

49-131

Determination of ice-phase water capture temperatures using isotopic composition and habits of ice crystals—relevance to snowpack augmentation.

Warburton, J.A., *Journal of applied meteorology,* Sep. 1994, 33(9), p.1037-1049, 32 refs.

Precipitation (meteorology), Cloud physics, Supercooled clouds, Freezing points, Snow crystal growth, Ice crystal structure, Snowfall, Sampling, Oxygen isotopes, Isotope analysis, Ice vapor interface, Cloud seeding

49-132

Effect of human activities on moisture content of soils and underlying permafrost from the McMurdo Sound region, Antarctica.

Campbell, I.B., Claridge, G.G.C., Balks, M.R., *Antarctic science,* Sep. 1994, 6(3), p.307-314, 5 refs.

Soil analysis, Soil water, Human factors, Environmental impact, Permafrost hydrology, Cold weather construction, Antarctica—Marble Point, Antarctica—Pram Point

Soils and the underlying permafrost from undisturbed sites and sites that had been disturbed by construction activities at Marble Point and Pram Point were sampled from excavated pits and drill cores. Gravimetric moisture (ice) contents and particle size distribution were determined. Volumetric moisture contents were calculated from these results. At undisturbed sites, soil moisture contents within the active layer (to c. 60 cm depth) were low and ranged from 0.5% by weight at the soil surface to 10% above the permafrost. The permafrost was generally completely saturated with ice, but sometimes contained considerable excess ice, with ice contents rising as high as 80% by volume. At disturbed sites, soil moisture contents within the active layer were similar to those of the undisturbed sites (generally <10% by weight) but within the permafrost, moisture contents were lower and less variable than in the undisturbed sites, rarely exceeding 20% by weight. The release of considerable quantities of water from the permafrost as a result of land disturbance during construction activities caused stream flows, soil shrinkage, land slumping and salinization, resulting in significant permafrost environmental damage. At Marble Point there has been no significant re-establishment of icy permafrost in the disturbed soils in the 30 years since land disturbance occurred. (Auth.)

49-133

Ice-pavement bond disbonding—fundamental study.

Blackburn, R.R., Ashworth, T., Schmidt, C.G., Kinzig, B.J., *U.S. Strategic Highway Research Program. Report,* May 1993, SHRP-H-643, 433p., PB94-182466, 37 refs.

Road icing, Ice adhesion, Ice solid interface, Ice removal, Chemical ice prevention, Mathematical models

49-134

Snow damage in modern society—changes in snow damage and snow damage awareness. (1) Social effects of snow damage. [Gendai shakai no setsugai—setsugai to setsugaikan no hensen. (1) Setsugai no shakaiteki seikaku]

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.15-18, In Japanese. 8 refs. Reprinted from Yuki (Bulletin of Snow Control Research Center), 1992, No.6, p.83-86.

Snowstorms, Safety, Accidents, Japan

49-135

Snow damage in modern society—changes in snow damage and snow damage awareness. (2) Variations in snow damage. [Gendai shakai no setsugai—setsugai to setsugaikan no hensen. (2) Setsugai no henka]

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.19-22, In Japanese. 4 refs. Reprinted from Yuki (Bulletin of Snow Control Research Center), 1992, No.7, p.80-83.

Snowstorms, Safety, Accidents, Japan

49-136

Snow damage in modern society—changes in snow damage and snow damage awareness. (3) New change in snow damage awareness. [Gendai shakai no setsugai—setsugai to setsugaikan no hensen. (3) Setsugaikan no henyo]

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.23-26, In Japanese. 7 refs. Reprinted from Yuki (Bulletin of Snow Control Research Center), 1992, No.8, p.87-90.

Snowstorms, Safety, Accidents, Japan

49-137

Snow damage in modern society—changes in snow damage and snow damage awareness. (4) Snow problem present and future. [Gendai shakai no setsugai—setsugai to setsugaikan no hensen. (4) Yuki mondai no ima to korekara]

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.27-30, In Japanese. Reprinted from Yuki (Bulletin of Snow Control Research Center), 1992, No.9, p.83-86.

Snowstorms, Safety, Accidents, Japan

49-138

Changes and present state of snow damage. [Setsugai no hensen to genjo]

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.31-34, In Japanese. Reprinted from Chiho gikaijin (Local councilman), 1993, Vol.23, No.9, p.22-25.

Snowstorms, Safety, Accidents, Japan

49-139

Monitoring of snow and ice.

Kimura, T., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.35-46, In Japanese. 29 refs. Reprinted from proceedings of the 30th annual meeting of the Society of Instrument and Control Engineers, SICE '91, p.39-50.

Snow surveys, Snow depth, Blowing snow, Precipitation gages

49-140

Snow and ice studies with a sphere as the model. [Tama o moderu to shita seppyo kenkyu]

Sato, A., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.99-104, In Japanese. 8 refs. Reprinted from Yamagata oyo chishitsu (Applied geology of Yamagata), Mar. 1993, No.13, p.16-21.

Snow surveys, Snow strength, Snow thermal properties, Snow density, Metamorphism (snow), Snow cover structure

49-141

Profiles of snow cover at Shinjo City for 15 years (1973/74-1987/88 winter seasons).

Abe, O., Higashiura, M., Numano, N., Sato, A., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.192-205, In Japanese with English summary. 11 refs. Reprinted from Japan, National Research Center for Disaster Prevention, Report, Oct. 1989, No.44, p.123-136.

Snow surveys, Snow cover distribution, Snow depth, Snow density, Snow water equivalent, Statistical analysis, Japan—Shinjo

49-142

Detection of local snow hazards such as blowing snow.

Kimura, T., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.241-245, In Japanese. 6 refs. Reprinted from Nihon rimoto senshingu gakkaishi (Journal of the Remote Sensing Society of Japan), 1989, Vol.9, No.4, p.156-160.

Blowing snow, Snowstorms, Weather forecasting, Radar echoes

49-143

Synoptic observations of blowing snow. [Fubuki no koiki kansoku ni tsuite]

Higashiura, M., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.246-254, In Japanese. Reprinted from Yuki (Bulletin of Snow Control Research Center), 1993, No.12, p.74-82.

Blowing snow, Snowstorms, Weather forecasting, Radar echoes

49-144

Development of the applications and technology of snow particle counters in the Tohoku area (Part II). [Tohoku chiho ni okeru fubukikei nado no riyo gijutsu no kaihatsu (dai II ki)]

Numano, N., et al, *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.255-264, In Japanese. 5 refs. Reprinted from Kagaku gijutsu shinko choseihi seika hokokusho (Report on results of special coordination funds for promoting science and technology), 1988, p.218-227.

Blowing snow, Snowstorms, Weather forecasting, Precipitation gages, Japan

49-145

Determining the impact strength of snow blocks by an avalanche chute. [Yuki nadare jikken shuto ni yoru sekkai no shogekiriki sokutei]

Abe, O., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.407-410, In Japanese. 10 refs. Reprinted from Yuki to doro (Snow and roads), 1990, No.22, p.80-83.

Avalanche modeling, Avalanche mechanics, Snow cover stability, Snow strength

49-146

Technical means for living in snow country. [Yukiguni sumau gijutsu no kufu]

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.537-541, In Japanese. 6 refs. Reprinted from Kenchiku to machizukuri (Architecture and town planning), Feb. 1988, No.131, p.6-10.

Snow removal, Roofs, Municipal engineering, Urban planning

49-147

Using snow melting systems. [Yusetsu shisutemu e no riyo]

Nakamura, T., Nakamura, H., Abe, O., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.549-556, In Japanese. 1 ref. Reprinted from Kagaku gijutsu shinko choseihi seika hokokusho (Report on results of special coordination funds for promoting science and technology), 1986, p.273-280.

Snow removal, Snow melting, Artificial melting

49-148

Feasibility study of inland water for snow removal and snow melting in built-up areas of snowy cities in Japan.

Higashiura, M., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.667-683, With German summary. 4 refs. Reprinted from Beiträge zur Hydrologie, 1985, Vol.5, No.2, p.667-683.

Snow removal, Snow melting, Artificial melting, Drains, Ground water, Road maintenance, Japan

49-149

Study on surface and ground waters for snow removal in urban areas subject to heavy snows. [Tasetsu toshi ni okeru yuki shori yo rikusui no kenkyu]

Higashiura, M., Sato, A., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.684-689, In Japanese. 7 refs. Reprinted from Mizu shigen ni kansuru shinpojiumu maezurishu (Preprints of the symposium on water resources), 3rd, 1987, p.213-218.

Snow removal, Snow melting, Artificial melting, Drains, Ground water, Road maintenance, Japan

49-150

Study on clearing of heat diffusion mechanism of groundwater—field measurement of heat diffusion of groundwater.

Higashiura, M., Sato, T., Kimura, T., Yokoyama, T., Tanno, K., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.690-697, In Japanese with English summary. 9 refs. Reprinted from Haidororoji (Hydrology), 1991, Vol.21, No.1, p.19-26.

Snow removal, Snow melting, Artificial melting, Ground water, Thermal diffusion

49-151

Distributed channel-flow and thermal dispersion through porous media.

Yokoyama, T., Higashiura, M., Sato, T., Kimura, T., Katsuragi, K., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.718-724, 5 refs. Reprinted from proceedings of the 5th International Conference on Thermal Energy Storage, 1991, p.4.5/1-4.5/7.

Ground water, Heat transfer, Heat recovery, Thermal diffusion, Mathematical models

49-152

Study on the quantitative and thermal flow mechanism of ground water over a broad area. [Koiki chikasui no ryoteki netsuteki ryudo kiko no kenkyu]

Higashiura, M., Sato, T., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.725-740, In Japanese. 10 refs. Reprinted from Kagaku gijutsu shinko choseihi seika hokokusho (Report on results of special coordination funds for promoting science and technology), 1993, p.193-208.

Ground water, Heat transfer, Heat recovery, Snow removal, Snow melting, Artificial melting

49-153

On with the snowproofing of urban spaces. [Toshi chiiki kukan no taisekka o megutte]

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.741-748, In Japanese. 21 refs. Reprinted from Yuki kogaku kenkyukaiho (Bulletin of the Japan Society for Snow Engineering), 1986, No.2, p.3-10.

Snow removal, Urban planning, Cold weather operation, Japan

49-154

Dealing with the snow problem in urban areas. [Shigaichi no yuki mondai to machi zukuri]

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.749-753, In Japanese. 15 refs. Reprinted from Kenchiku zasshi (Journal of architecture and building science), July 1986, Vol.101, No.1248, p.28-32.

Snow removal, Urban planning, Cold weather operation, Japan

49-155

Profile of facilities for the elderly in sparsely populated areas of heavy snow—seasonal housing for old people living alone. [Gosetsu kaso chiiki ni okeru koreisha taisaku shisetsu no ichi danmen—hitorigurashi rojin no tame no kisetsu nyukyo shisetsu]

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.754-766, In Japanese. Reprinted from Yutakana kurashi (Prosperous living), 1987, No.59, p.24-36.

Houses, Residential buildings, Regional planning, Urban planning, Health, Cold weather construction, Japan

49-156

Thoughts on seasonal housing for mountainous areas of heavy snow. [Gosetsu sankan chiiki no kisetsu kyoju o kangaeru]

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.767-772, In Japanese. 8 refs. Reprinted from Chiiki shakai kenkyu (Regional social research), 1987, No.12, p.47-52.

Houses, Residential buildings, Regional planning, Cold weather construction, Japan

49-157

Raised-floor houses in snow country—progress and present status. [Yukiguni no kosho jutaku—ayumi to genjo]

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.773-778, In Japanese. 14 refs. Reprinted from Nihon kenchiku gakkai noson keikaku bumon kenkyu kyogikai shiryoshu (Papers of the Research Conference of the Rural Planning Section of the Architectural Institute of Japan), 1992, p.23-28.

Houses, Cold weather construction, Japan

49-158

Actual conditions and problems of the winter housing environment for elderly households—the case of Shinjo City in Yamagata Prefecture. [Rojin setai no toki kyoju kankyo no jittai to mondaiten—Yamagata-ken Shinjo-shi no baai]

Numano, N., Wakabayashi, Y., Mochizuki, T., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.779-784, In Japanese. Reprinted from Yuki kogaku shinpojiumu ronbun hokokushu (Proceedings of the Symposium on Snow Engineering), 4th, 1988, p.209-214.

Houses, Residential buildings, Regional planning, Urban planning, Health, Cold weather construction, Japan

49-159

Trends in winter housing for the elderly in sparsely populated areas of heavy snow. [Sekisetsu kaso chiiki ni okeru koreisha muke toki kyoju shisetsu no doko]

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.800-807, In Japanese. 9 refs. Reprinted from Yuki kogaku shinpojiumu ronbun hokokushu (Proceedings of the Symposium on Snow Engineering), 5th, 1989, p.145-152.

Houses, Residential buildings, Regional planning, Urban planning, Health, Cold weather construction, Japan

49-160

Study on the seasonal houses for the aged in snowy depopulated area. Part 2.

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.808-813, In Japanese. 3 refs. Reprinted from Nihon yuki kogakkai taikai ronbun hokokushu (Proceedings of the Japan Society for Snow Engineering), 6th, 1989, p.145-150.

Houses, Residential buildings, Regional planning, Urban planning, Health, Cold weather construction, Japan

49-161

Study on the regional expansion of snow-surmountable housing and its critical assessment—the case of local town in Yamagata Prefecture, Obanazawa.

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.814-829, In Japanese with English summary. 11 refs. Reprinted from Nihon yuki kogakkaishi (Journal of snow engineering), July 1991, Vol.7, No.3, p.2-17.

Houses, Residential buildings, Regional planning, Urban planning, Health, Cold weather construction, Japan

49-162

Regional distribution of high-floor type detached houses—a case study of Hokkaido.

Numano, N., *Japan. National Research Institute for Earth Science and Disaster Prevention. Shinjo Branch of Snow and Ice Studies. Contributions (Papers and reports, 1985-1993),* 1994, No.4, p.830-835, In Japanese. 3 refs. Reprinted from Nihon yuki kogakkai taikai ronbun hokokushu (Proceedings of the Japan Society for Snow Engineering), 8th, 1992, p.131-136.

Houses, Regional planning, Cold weather construction, Japan

49-163

Analysis of solitary disturbances over an antarctic ice shelf.

Rees, J.M., Rottman, J.W., *Boundary-layer meteorology,* May 1994, 69(3), p.285-310, 24 refs.

Polar atmospheres, Atmospheric physics, Atmospheric boundary layer, Fluid dynamics, Air flow, Gravity waves, Stratification, Wind velocity, Ice air interface, Mathematical models, Antarctica—Brunt Ice Shelf

Large amplitude, propagating, solitary disturbances have been observed in the atmospheric boundary layer over a gently sloping antarctic ice shelf. The waves are usually trapped within the lowest 40 m and are observed only when the surface layer is strongly and stably stratified and prevailing wind speeds are low. It is shown that the waves are trapped due to the combined effects of velocity curvature and stratification. The observed wavelengths can be bounded using simple heuristic arguments based on the Scorer parameter. Properties of the waves are compared with results from the weakly nonlinear numerical model of Rottman and Einaudi (1993). (Auth. mod.)

49-164

Paleosoils and peat bogs of Wrangel Island.

Oganesian, A.S., Prokhorova, T.P., Trumpe, M.A., Susekova, N.G., *Eurasian soil science,* Jan. 1994, 26(1), p.1-18, Translated from Pochvovedenie, 1993, Vol.25, No.2. 30 refs.

Pleistocene, Paleoecology, Arctic landscapes, Soil surveys, Soil analysis, Soil formation, Soil profiles, Subsurface investigations, Peat, Palynology, Russia—Wrangel Island

49-165

Physics of ice sublimation from peaty soils and the attendant heat and mass transfer.

Gamaiunov, N.I., Stotland, D.M., Shekhab, Kh.IU., *Eurasian soil science,* Jan. 1994, 26(1), p.106-115, Translated from Pochvovedenie, 1993, Vol.25, No.2. 17 refs.

Soil tests, Soil freezing, Soil physics, Freeze drying, Ice sublimation, Permafrost mass transfer, Ground ice, Phase transformations, Frozen ground thermodynamics

49-166

Model of ice shelf-ocean interaction with application to the Filchner-Ronne and Ross ice shelves.

Nøst, O.A., Foldvik, A., *Journal of geophysical research,* July 15, 1994, 99(C7), p.14,243-14,254, 23 refs.

Oceanography, Ocean currents, Ice shelves, Ice water interface, Ice melting, Water temperature, Salinity, Heat transfer, Turbulent diffusion, Mathematical models, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf, Antarctica—Ross Ice Shelf

A simple analytical model has been developed to study the formation of Ice Shelf Water (ISW). A relation between potential temperature and salinity in the ISW layer is calculated from the mass and energy balance. This temperature-salinity relation is shown to depend only on the temperature and the salinity of the source water mass and to be practically independent of entrainment and melt rates. The model is in good agreement with observations under the Ronne Ice Shelf, and it indicates that ISW in the Filchner Depression is formed from Western Shelf Water (WSW) with salinity higher than 34.75 practical salinity units. Such high-salinity water is only observed in the Ronne Depression in the western part of the continental shelf. This implies a circulation of WSW under the Filchner-Ronne Ice Shelf, from the Ronne Depression into the Filchner Depression. Similarly, the model shows that the ISW observed under J9 at the Ross Ice Shelf has been formed from Low Salinity Shelf Water (LSSW) from the eastern parts of the Ross Sea continental shelf. LSSW must therefore circulate under the eastern parts of the Ross Ice Shelf. (Auth. mod.)

49-167

Springtime microwave emissivity changes in the southern Kara Sea.

Crane, R.G., Anderson, M.R., *Journal of geophysical research,* July 15, 1994, 99(C7), p.14,303-14,309, 28 refs.

Sea ice distribution, Surface properties, Radiometry, Brightness, Radiation balance, Depth hoar, Ice melting, Snow melting, Snow cover effect, Seasonal variations, Russia—Kara Sea

49-168

Comment on "Sea spray and the turbulent air-sea heat fluxes" by Edgar L. Andreas.

Katsaros, K.B., de Leeuw, G., Andreas, E.L., MP 3473, *Journal of geophysical research,* July 15, 1994, 99(C7), p.14,339-14,343, Includes reply. 87 refs. For paper under discussion see 46-4553.

Oceanography, Sea spray, Air water interactions, Turbulent boundary layer, Heat flux, Water vapor, Turbulent diffusion, Evaporation, Mathematical models, Accuracy

49-169

Carboxylic acids in high-elevation alpine glacier snow.

Maupetit, F., Delmas, R.J., *Journal of geophysical research,* Aug. 20, 1994, 99(D8), p.16,491-16,500, 60 refs.

Precipitation (meteorology), Atmospheric composition, Cloud physics, Aerosols, Alpine landscapes, Snow composition, Firn, Chemical properties, Scavenging, Sampling, Ion density (concentration), France—Alps

49-170

Computations of diabatic descent in the stratospheric polar vortex.

Rosenfield, J.E., Newman, P.A., Schoeberl, M.R., *Journal of geophysical research,* Aug. 20, 1994, 99(D8), p.16,677-16,689, 39 refs.

Polar atmospheres, Stratosphere, Air masses, Subsidence, Air temperature, Radiation balance, Insolation, Heating

A radiation model, together with National Meteorological Center temperature observations, was used to compute daily net heating rates in the Northern Hemisphere (NH) for the arctic late fall and winter periods of both 1988-1989 and 1991-1992 and in the Southern Hemisphere (SH) for the antarctic fall and winters of 1987 and 1992. The heating rates were interpolated to potential temperature surfaces between 400 K and 2000 K and averaged within the polar vortex, the boundary of which was determined by the maximum gradient in potential vorticity. The averaged heating rates were used in a one-dimensional vortex interior descent model to compute the change in potential temperature with time of air parcels initialized at various potential temperature values, as well as to compute the descent in log pressure coordinates. In the NH vortex, air parcels which were initialized at 18 km on Nov. 1 descended about 6 km by Mar. 21, while air initially at 25 km descended 9 km in the same time period. In the SH vortex, parcels initialized at 18 km on Mar. 1 descended 3 km, while air at 25 km descended 5-7 km by the end of Oct. In both the NH and the SH, computed descent rates increased markedly with height. The descent for the NH winter of 1992-1993 and the SH winter of 1992, computed with a three-dimensional trajectory model using the same radiation code, was within 1 to 2 km of that calculated by the one-dimensional model, thus validating the vortex averaging procedure. The computed descent rates generally agree well with observations of long-lived tracers, thus validating the radiative transfer model. (Auth. mod.)

49-171

Observations of stratospheric hydrogen fluoride by Halogen Occultation Experiment (HALOE).

Luo, M., Cicerone, R.J., Russell, J.M., III, Huang, T.Y.W., *Journal of geophysical research,* Aug. 20, 1994, 99(D8), p.16,691-16,705, 40 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Chemical properties, Photochemical reactions, Air pollution, Spectroscopy

The Halogen Occultation Experiment (HALOE) Hydrogen Fluoride (HF) channel on the Upper Atmospheric Research Satellite is providing the first global measurements of stratospheric HF, the dominant fluorine reservoir in the atmosphere. This paper describes the latitudinal and seasonal variations of HALOE-observed HF in terms of vertical profiles, altitude/latitude cross sections, and column abundances. The HF global distribution shows a "tracerlike" structure and its column amount increases with latitude, in agreement with previous aircraft measurements of the HF column amount. HALOE HF measurements during the 1993 antarctic spring are briefly described. This species behaves like a conserved tracer and its distribution shows an area of enhanced mixing ratios correlated with a polar vortex that has a clear latitude boundary. Finally, simulated HF distributions by the National Center for Atmospheric Research two-dimensional model are used to compare with HALOE observations of HF. Reasonable agreements in the global structure and the absolute amount of HF are found. The differences between the model and the observed results indicate the need for improving treatment of atmospheric dynamics and fluorine-related chemical parameters in the model simulations. (Auth. mod.)

49-172

Deuterium and oxygen 18 in precipitation: isotopic model, including mixed cloud processes.

Ciais, P., Jouzel, J., *Journal of geophysical research,* Aug. 20, 1994, 99(D8), p.16,793-16,803, 34 refs.

Precipitation (meteorology), Cloud physics, Cloud droplets, Isotope analysis, Condensation, Phase transformations, Ice crystal growth, Ice vapor interface, Vapor pressure, Supersaturation, Snow composition, Mathematical models

Modeling the isotopic ratios of precipitation in cold regions meets the problem of "switching" from the vapor-liquid transition to the vapor-ice transition at the onset of snow formation. The one-dimensional model (mixed cloud isotopic model, MCIM) described in this paper focuses on the fractionation of water isotopes in mixed clouds, where both liquid droplets and ice crystals can coexist for a given range of temperatures. This feature is linked to the existence of specific saturation conditions within the cloud, allowing droplets to evaporate while the water vapor condenses onto ice crystals. The isotopic composition of the different airborne phases and the precipitation is calculated throughout the condensation history of an isolated air mass moving over the antarctic ice sheet. The results of the MCIM are compared to surface snow data both for the isotopic ratios and the deuterium excesses. The sensitivity of the model is compared to previous one-dimensional models. Thus, accounting specifically for the microphysics of mixed stratiform clouds (Bergeron-Findesein process) does not invalidate the results of earlier modeling studies. (Auth. mod.)

49-173

Stratospheric volcanic aerosols and changes in air-earth current density at solar wind magnetic sector boundaries as conditions for the Wilcox tropospheric vorticity effect.

Tinsley, B.A., Hoeksema, J.T., Baker, D.N., *Journal of geophysical research,* Aug. 20, 1994, 99(D8), p.16,805-16,813, 37 refs.

Atmospheric physics, Atmospheric electricity, Solar radiation, Stratosphere, Aerosols, Volcanic ash, Cloud electrification, Polarization (charge separation), Ice crystal growth, Heterogeneous nucleation, Latent heat, Climatic factors

49-174

Quasi-horizontal transport and mixing in the antarctic stratosphere.

Chen, P., Holton, J.R., O'Neill, A., Swinbank, R., *Journal of geophysical research,* Aug. 20, 1994, 99(D8), p.16,851-16,866, 27 refs.

Polar atmospheres, Atmospheric physics, Stratosphere, Air masses, Atmospheric pressure, Atmospheric circulation, Turbulent exchange, Advection, Mass transfer, Mathematical models

The quasi-horizontal transport and mixing properties of the antarctic stratosphere are investigated with a semi-Lagrangian transport model and a "contour advection" technique for the winter and spring of 1992, using analyzed winds from the United Kingdom Meteorological Office data assimilation system. Transport calculations show that passive tracers are well mixed inside the polar vortex as well as in the mid-latitude "surf zone." At the vortex edge, strong radial gradients in the tracer fields are well preserved, and their evolutions follow that of the potential vorticity until some time after the breakdown of the polar vortex. In the middle stratosphere there is little tracer exchange across the vortex edge in Aug. and Sep. Some vortex air is eroded into the surf zone in filamentary form in Oct., and very strong exchange of air occurs between high and middle latitudes in Nov. In the lower stratosphere the vortex is not so isolated from the mid-latitudes as in the middle stratosphere, and there is more mass exchange across the vortex edge. Calculations of the lengthening of material contours using the contour advection technique show that in the middle stratosphere, strong stirring (i.e., stretching and folding of material elements) occurs in the inner vortex, with the strongest occurring in the mid-latitude surf zone and the weakest occurring at the vortex edge. In the lower stratosphere, strong stirring occurs in the inner vortex. Stirring is moderate at the vortex edge and in the mid-latitudes. (Auth. mod.)

49-175

Origin of tropospheric NOx over subarctic eastern Canada in summer.

Fan, S.M., et al, *Journal of geophysical research,* Aug. 20, 1994, 99(D8), p.16,867-16,877, 63 refs.

Atmospheric composition, Air masses, Atmospheric boundary layer, Chemical properties, Aerosols, Subpolar regions, Aerial surveys, Sampling, Photochemical reactions, Forest fires, Models, Canada—Quebec

49-176

Concentration and ^{13}C records of atmospheric methane in New Zealand and Antarctica: evidence for changes in methane sources.

Lowe, D.C., et al, *Journal of geophysical research,* Aug. 20, 1994, 99(D8), p.16,913-16,925, 55 refs.

Polar atmospheres, Atmospheric composition, Chemical properties, Sampling, Isotope analysis, Natural gas, Geochemistry, Seasonal variations, Biomass, Mathematical models, Antarctica—Scott Base

Measurements of ^{13}C in atmospheric methane made at Baring Head, New Zealand over the period 1989-1993 display a persistent but highly variable seasonal cycle. Values for *delta*^{13}C peak in summer at about -46.9 per mill and drop to around -47.5 per mill in the late winter. Methane concentration shows a similar cycle, with winter peaks and summer minima. Similar features are observed at the New Zealand antarctic station, Scott Base. While the phase of the *delta*^{13}C cycle is consistent with a kinetic isotope effect that preferentially leaves methane enriched in ^{13}C in the atmosphere after oxidation by OH, the amplitude of the cycle is much larger than expected from published laboratory measurements of the effect. The trend in ^{13}C since mid-1991 coincided with significant changes to the methane growth rate observed at Baring Head and Scott Base: an elevated growth rate of about 15 parts per billion by volume (ppbv) during 1991 gave way to less than 3 ppbv/yr thereafter. A 2-box model of atmospheric methane (one box per hemispheric reservoir) suggests that (1) the recent decline in ^{13}C in methane observed at Baring Head and Scott Base cannot have a solely northern hemispheric origin, and (2) the most plausible origin is a recent reduction in methane released by biomass burning in the Southern Hemisphere, combined with a lower release rate of fossil methane in the Northern Hemisphere. (Auth. mod.)

49-177

Spatial patterns in the length of the sea ice season in the Southern Ocean, 1979-1986.

Parkinson, C.L., *Journal of geophysical research,* Aug. 15, 1994, 99(C8), p.16,327-16,339, 24 refs.

Sea ice distribution, Seasonal variations, Remote sensing, Radiometry, Brightness, Sensor mapping, Statistical analysis

The length of the sea ice season summarizes in one number the ice coverage conditions for an individual location for an entire year. It becomes a particularly valuable variable when mapped spatially over a large area and examined for regional and interannual differences, as is done here for the southern ocean over the years 1979-1986, using the satellite passive microwave data of the Nimbus 7 scanning multichannel microwave radiometer. Three prominent geographic anomalies in ice season lengths occur consistently in each year of the data set, countering the general tendency toward shorter ice seasons from south to north: (1) in the Weddell Sea the tendency is toward shorter ice seasons from southwest to northeast reflective of the cyclonic ice/atmosphere/ocean circulations in the Weddell Sea region. (2) Directly north of the Ross Ice Shelf anomalously short ice seasons occur, lasting only 245-270 days, in contrast to the perennial ice coverage at comparable latitudes in the southern Bellingshausen and Amundsen Seas and in the western Weddell Sea. The short ice season off the Ross Ice Shelf reflects the consistently early opening of the ice cover each spring, under the influence of upwelling along the continental slope and shelf and atmospheric forcing from winds blowing off the Antarctic continent. (3) In the southern Amundsen Sea, anomalously short ice seasons occur adjacent to the coast, owing to the frequent existence of coastal polynyas off the many small ice shelves bordering the sea. Trends in the ice season lengths over the 1979-1986 period are highly coherent spatially, with overall trends toward shorter ice seasons in the northern Weddell and Bellingshausen seas and toward longer ice seasons in the Ross Sea, around much of East Antarctica, and in a portion of the south central Weddell Sea. (Auth. mod.)

49-178

Surface characteristics of lead ice.

Perovich, D.K., Richter-Menge, J.A., MP 3474, *Journal of geophysical research,* Aug. 15, 1994, 99(C8), p.16,341-16,350, 27 refs.

Sea ice, Ice openings, Ice growth, Young ice, Surface structure, Physical properties, Ice microstructure, Ice water interface, Dendritic ice, Brines, Surface roughness

As part of the Lead Experiment held during Mar. and Apr. 1991 and 1992 in the Alaskan Beaufort Sea, ice properties and surface conditions typical of springtime leads were monitored at three sites during the initial few days of growth. Observations indicate that once the ice thickness reached approximately 2 cm, a thin (1 mm) highly saline skim of brine formed on the surface. After only a few hours of growth the initially smooth surface of the sea ice developed some small-scale roughness. Frost flowers, the result of ice grown from the vapor phase, quickly formed on the surface of the sea ice and continued to develop during the observations. Depending on the temperature, the frost flowers were composed of various ice crystal types, including clumps, stellar dendrites, and needles. The initially fresh frost flowers quickly became salty, reaching salinities as high as 100 ppt. The salinity of both the frost flowers and the surface skim decreased at night as temperatures dropped and additional hoarfrost accumulated on the surface. These decreases were also due in part to the accumulation of snow on the surface of the leads. Combining these observations with simple calculations, possible mechanisms for the development and evolution of the surface skim and frost flowers are discussed. They include the hypothesis that the source of the surface skim is brine expelled upward from the sea ice as it cools; that the surface protrusions serve as nucleation sites for the frost flowers, and that the source of the excess water vapor necessary for frost flower growth is the wet surface skim.

49-179

On the ridging of intact lead ice.

Hopkins, M.A., MP 3475, *Journal of geophysical research,* Aug. 15, 1994, 99(C8), p.16,351-16,360, 14 refs.

Sea ice, Pressure ridges, Ice growth, Ice cover thickness, Ice cover effect, Ice mechanics, Ice models, Ice friction, Mathematical models, Dynamic properties

The sea ice pressure ridging process is modeled using a two-dimensional particle simulation technique. In this model, blocks are broken from an intact sheet of relatively thin lead ice driven against a thick, multiyear floe at a constant speed. The blocks of ice rubble accumulate to form the ridge sail and keel. The energy consumed in ridge growth, including dissipation, is explicitly calculated. A series of numerical experiments are performed to establish the dependence of the energetics on the thickness of the ice sheet and the friction between blocks. The results suggest that the total energy required to create a pressure ridge is an order of magnitude greater than the potential energy in the ridge structure. The variable thickness of the ice cover is created by deformation, which simultaneously causes formation of thick ice through ridge building and thin ice through lead creation. Since the energy expended in deformation is largely determined by the ridging process, an understanding of the energetics of pressure ridging is critical to the determination of ice strength on a geophysical scale.

49-180

Observations and modeling of thermally induced stresses in first-year sea ice.

Lewis, J.K., Tucker, W.B., Stein, P.J., MP 3476, *Journal of geophysical research,* Aug. 15, 1994, 99(C8), p.16,361-16,371, 16 refs.

Sea ice, Ice mechanics, Physical properties, Thermal stresses, Ice cracks, Cracking (fracturing), Acoustic measurement, Viscoelasticity, Snow cover effect, Ice heat flux, Ice air interface, Mathematical models, Canada—Northwest Territories—Cornwallis Island

During spring 1992, ice property, geophone, meteorological, and stress data were collected on first-year ice southwest of Cornwallis I. in the Canadian archipelago. One of the goals was to specify the average characteristics of the ice, to use these characteristics in a model of thermally induced stresses in the ice, and examine the fracturing associated with the occurrence of those stresses. The results of simulations with a thermal stress model indicate that stress variations within the ice can be reasonably approximated by a viscoelastic rheology. The geophone data showed both ice-borne and water-borne propagation paths for individual fracturing events. The data imply a detection radius out to 500-600 m for the ice-borne signatures of fractures. An investigation of a region after fracturing showed that (1) fracturing occurred in an area with a 10- to 15-cm snow cover, (2) the snow cover had been scored down to the surface of the ice, and (3) cracks in the ice were found under each location where the snow had been scored. The cracks were 5-6 m long and at least 15 cm deep. A review of these and other experimental results suggests that the forces required to produce fractures in response to natural forcing is greater for first-year floes than for multiyear floes.

49-181

Doppler spectral method of identifying water and ice in marginal ice zone imagery.

Rufenach, C.L., Shuchman, R.A., *Journal of geophysical research,* Aug. 15, 1994, 99(C8), p.16,373-16,382, 19 refs. For another version see 48-1689.

Sea ice distribution, Ice edge, Airborne radar, Radar photography, Synthetic aperture radar, Backscattering, Spectra, Ocean waves, Image processing, Mathematical models, Greenland Sea

49-182

Dissolved methane distributions, sources, and sinks in the western Bransfield Strait, Antarctica.

Tilbrook, B.D., Karl, D.M., *Journal of geophysical research,* Aug. 15, 1994, 99(C8), p.16,383-16,393, 48 refs.

Oceanographic surveys, Surface waters, Water chemistry, Geochemical cycles, Hydrocarbons, Vapor diffusion, Sampling, Air water interactions, Atmospheric composition, Antarctica—Bransfield Strait

Dissolved methane (CH_4) concentrations were measured in the upper water column (0-200 m) of western Bransfield Strait and southwestern Drake Passage on four cruises between Dec. 1986 and Mar. 1987 during the Research on Antarctic Coastal Ecosystem Rates (RACER) experiment. Methane concentration profiles were similar on all four cruises and showed distinct geographic variability. The highest CH_4 concentrations were associated with the shelf waters surrounding Bransfield Strait and the South Shetland Is. In the deeper waters of central Bransfield Strait, CH_4 tended to decrease to near-saturation values. The distribution of CH_4 appears to be largely controlled by mixing, coupled with the addition of CH_4 to waters flowing over the shallow shelves in the region. On the basis of these results the net air-sea CH_4 fluxes in the southern ocean out to the edge of the seasonal ice zone are small and should not significantly alter current estimates of the oceanic source of CH_4 to the atmosphere. (Auth. mod.)

49-183

Climatic warming in the central Antarctic Peninsula area.

Stark, P., *Weather,* June 1994, 49(6), p.215-220, 7 refs.

Climatic changes, Air temperature, Ice cover effect, Antarctica—Antarctic Peninsula, Antarctica—Argentine Islands, Antarctica—Faraday Station

An analysis of the 44-year continuous temperature record from Faraday shows a statistically significant warming trend over this period of almost 2.7 C. Decadal analysis of the data has shown that the greatest warming is in the autumn and winter months, with values up to 5 C. This is probably caused by variations in the amount of sea-ice cover and associated weather, the results of which can be seen in the data for the month that is usually the coldest. In the summer and early autumn, when the sea-ice is at a minimum, these continental influences are reduced and the statistical significance of the temperature trend is very high. It is likely that the Antarctic Peninsula plays an important part in reducing the continental influences on the climate; stations further to the north are affected by weather and ice conditions associated with the Weddell Sea. The analysis of data from Signy shows no statistically significant trends. Data from stations in the Marguerite Bay area show warming trends of a similar magnitude to those observed at Faraday, although the statistical significance of these trends is considerably lower, probably due to the broken data record. The trend seen is much greater than that observed in global or Southern Hemisphere temperatures over the same period. It suggests that this is an area of high climatic sensitivity. Climate models also suggest that the marginal sea-ice zone is a region where there may be a large response to a general global warming. (Auth. mod.)

49-184

Application of GPS differential positioning for the development of the antarctic penetrator.

Shibuya, K., et al, *Journal of physics of the earth,* 1993, 41(5), p.291-304, 5 refs.

Seismic surveys, Ice navigation, Instruments, Snow permeability, Antarctica—East Antarctica

To study the effectiveness of GPS (Global Positioning System) differential positioning for the deployed antarctic penetrator, fall tests were made by changing the release altitude at 160, 330, 680, and 1,000 m above the ground. A two-blade helicopter equipped with a Trimble GPS Pathfinder was used in the experiment in Hokkaido in Apr. 1991. As compared with the precise location determined by the GPS doubly differenced phase analysis, post-processed 1 min average of the helicopter hovering GPS differential navigation data was accurate to 10 m for a horizontal location. By knowing the release time to an accuracy of 1 s, the impact location can be predicted by tracing the falling trajectory. Thus estimated position was accurate to 30 m against the precise location. As for height accuracy, there was an error of +/- 10 m in the hovering method. This error further degraded to +/- 20 m when the coordinates of the reference site were replaced by a time-average of the point-positioning results. These positioning accuracies are enough for long-range (300 km profile) seismic explosion experiments with 5-10 km station separation, because the associated errors result only in 0.2% uncertainty in the estimate of P-wave velocity structures. (Auth. mod.)

49-185

Annual cycle of planktonic ciliates in nearshore waters at Signy Island, Antarctica.

Leakey, R.J.G., Fenton, N., Clarke, A., *Journal of plankton research,* July 1994, 16(7), p.841-856, 67 refs.

Microbiology, Biomass, Sea ice, Algae, Plankton, Antarctica—Signy Island, Antarctica—Borge Bay

The abundance and biomass of marine planktonic ciliates in Borge Bay, Signy I. were determined at monthly intervals between Apr. 1990 and June 1991. At least 24 different ciliate taxa were recorded from samples preserved in Lugol's iodine, including the tintinnids *Codonellopsis balechi, Cymatocylis convallaria, Laackmaniella naviculaefera* and *Salpingella* sp., and the aloricate taxa *Didinium* sp. and *Mesodinium rubrum.* Ciliate abundance and biomass exhibited a clear seasonal cycle with high values during the austral summer and low values in the austral winter. Small ciliates dominated abundance throughout the year, and biomass during winter. Larger ciliates contributed most to biomass during summer. Aloricate ciliates were common throughout the year, while tintinnids contributed substantially to abundance and biomass only during summer. *Salpingella* sp. was the most common tintinnid, but *C. convallaria* contributed most to tintinnid biomass. The seasonal pattern of ciliate abundance and biomass matched that of chlorophyll *a* concentration and bacterial biomass, suggesting tight trophic coupling between ciliates and other components of the pelagic microbial community. (Auth. mod.)

49-186

Light and productivity of antarctic plankton during austral summer in an ice edge region in the Weddell-Scotia Sea. *Journal of plankton research,* July 1994, 16(7), p.912, The article being corrected is cited: F.G. Figueiras, F.F. Pérez, Y. Pazos, and A.F. Rios: Light and productivity of antarctic phytoplankton during austral summer in an ice edge region in the Weddell-Scotia Sea; Journal of plankton research, 16:233-253, 1994. For this article see B-51175.

Plankton, Photosynthesis, Biomass, Ice edge, Sea ice

This single page item provides corrections to Equations (2) and (5) as they appeared in the original work.

49-187

Shapes of snow crystals—fitness for purpose.

Mason, B.J., *Royal Meteorological Society. Quarterly journal A,* July 1994, 120(518), p.849-860, 17 refs.

Snow crystal structure, Snow crystal growth, Temperature effects, Supersaturation, Precipitation (meteorology)

49-188

Interaction of hydrogen chloride with an ultrathin ice film: observation of adsorbed and absorbed states.

Graham, J.D., Roberts, J.T., *Journal of physical chemistry,* June 9, 1994, 98(23), p.5974-5983, 38 refs.

Atmospheric composition, Stratosphere, Air temperature, Ice sublimation, Polar stratospheric clouds

To gain insight into how heterogeneous reactions occur in the antarctic stratosphere, adsorption and reaction of simple molecules on model polar stratospheric cloud surfaces were studied. In this work, the temperature-programmed desorption of hydrogen chloride from ultrathin (5-20 monolayers thick) water films is described. Two distinct HCl desorption states, designated *alpha*- and B-HCl, are observed at 140 and 180 K, respectively. Water sublimation occurs at 180 K and is concurrent with B-HCl evolution. B-HCl, which is formed exclusively at low HCl exposures, is derived from the thin film bulk, while *alpha*-HCl is associated with an adsorbed state. B-HCl is assigned to the sublimation of a stoichiometric phase of HCl and water, probably $HCl \cdot 6H_2O$, and *alpha*-HCl is assigned to the thermal desorption of HCl from the hexahydrate surface. Desorption spectra of HCl from ice-d_2 show that H-D exchange between HCl and D_2O is much less than would be expected for a dissociatively adsorbed state of HCl. The *alpha* state is therefore assigned to molecularly adsorbed HCl. The activation energy for *alpha*-HCl desorption is 33 +/- 5 kJ/mol, a value which is highly suggestive of formation of a hydrogen bond between HCl and the hexahydrate surface. Two possible structures of HCl adsorbed on the hexahydrate surface are considered. Implications of these results for heterogeneous polar stratospheric chemistry are discussed. (Auth. mod.)

49-189

Palmer long-term ecological research (LTER): An overview of the 1991-1992 season.

Ross, R.M., Quetin, L.B., *Antarctic journal of the United States,* 1992, 27(5), p.235-236, 5 refs.

Low temperature research, Ecology, Marine biology, Sea ice distribution, Antarctica—Palmer Station

The Palmer LTER, established in Oct. of 1990, focuses on the pelagic marine ecosystem in the Antarctic and on the ecological processes which link the extent of annual pack ice to the biological dynamics of different trophic levels. In the region around Palmer Station west of the Antarctic Peninsula, the maximum extent of pack ice varies from near zero to halfway across Drake Passage and appears to vary on a 6- to 8-year cycle. Satellite data on the maximum extent of pack ice in the Weddell Sea sector show cold winters with heavy ice pack in 1973, 1980 and 1981, and personal observations confirm that winters of 1980, 1981, 1986 and 1987 had heavy ice cover in the region around Palmer Station. During the first season the Palmer LTER staged two major research efforts: an austral spring cruise on the R/V *Polar Duke* from Nov. 7-21, 1991, and a nearshore monitoring and experimental program centered at Palmer Station from Oct. 15, 1991 to Mar. 7, 1992.

49-190

Palmer LTER program: Biomass and community composition of euphausiids within the peninsula grid, November 1991 cruise.

Quetin, L.B., et al, *Antarctic journal of the United States,* 1992, 27(5), p.244-245, 4 refs.

Ice cover effect, Biomass, Marine biology, Data processing

During the Palmer long-term ecological research program (LTER) cruise on the R/V *Polar Duke* in mid-Nov. 1991, the authors investigated the distribution, abundance, and community composition of the zooplanktonic and nektonic community along 3 transects that each intersected the ice edge. Ice cover has been cited by various investigators as one of the primary determinants of the structure and function of the antarctic ecosystem. The data from the Nov. 1991 cruise allowed the authors to investigate the validity of this presumption for larger secondary producers during the austral spring west of the Antarctic Peninsula. Abundance and community composition of 2 dominant euphausiids were compared to observations of ice cover and to measurements of phytoplankton standing-stock determined by high-pressure liquid chromatography techniques used at the same stations by other members of the Palmer LTER.

49-191

Palmer LTER program: Hydrography and optics within the peninsula grid, November 1991 cruise.

Smith, R.C., et al, *Antarctic journal of the United States,* 1992, 27(5), p.250-253, 9 refs.

Sea water, Sea ice distribution, Spaceborne photography, Ice cover effect, Biomass, Marine biology, Antarctica—Palmer Station

Controls on phytoplankton production reflect the space/time variability in ice cover, turbulent mixing, nutrient availability, and solar irradiance. The authors selected an LTER sampling strategy to elucidate the relative importance of these mechanisms. Their hydrographic and bio-optical observations provide data necessary to quantify linkages between the physical and biological components of the system. During the Palmer LTER cruise on the R/V *Polar Duke* in mid-Nov. 1991, they used the bio-optical profiling system (BOPS II) to sample and define the physical, optical, chemical, and biological characteristics of the marginal ice zone in the large-scale area surrounding Palmer Station.

49-192

Trace gases over Antarctica: Bromine, chlorine, and organic compounds involved in global change.

Khalil, M.A.K., Rasmussen, R.A., *Antarctic journal of the United States,* 1992, 27(5), p.267-269, 2 refs.

Ozone, Atmospheric composition, Climatology, Global change, Antarctica—Palmer Station, Antarctica—Amundsen-Scott Station

The seasonal averaged concentrations of 13 trace gases at Palmer and Amundsen-Scott stations are presented in a table. The average differences of the trace gas concentrations at the two sites were calculated by two methods; the difference and percent difference of concentrations for each month are shown in graphs. Among the gases reported, carbon monoxide, methane, hydrogen, and methyl chloroform have substantial seasonal variations at the two sites. The trends for all gases appear to be the same.

49-193

Decline in the accumulation rates of atmospheric chlorofluorocarbons 11 and 12 at the South Pole.

Swanson, T.H., et al, *Antarctic journal of the United States,* 1992, 27(5), p.269-271, 14 refs.

Ozone, Atmospheric composition, Air pollution, Data processing, Antarctica—Amundsen-Scott Station

Scientists from the Climate Monitoring and Diagnostic Laboratory (CMDL) in the National Oceanic and Atmospheric Administration (NOAA) have been measuring the atmospheric mixing ratios for CFCs and nitrous oxide at the Clean-Air Facility (CAF) at Amundsen-Scott Station since 1977. The most significant trend observed in data from Amundsen-Scott and other remote sites throughout the world has been the growth of the mixing ratios of CFCs in the troposphere. However, recent data from the monitoring station at South Pole and from other sites have shown a significant decrease of the accumulation rates of CFC-11 and CFC-12 during the last 2 years.

49-194

Halogen and sulfur content of volcanic emissions from Mount Erebus, Ross Island, Antarctica.

Zreda-Gostynska, G., Kyle, P.R., *Antarctic journal of the United States,* 1992, 27(5), p.271-273, 20 refs.

Atmospheric composition, Volcanoes, Atmospheric circulation, Snow impurities, Antarctica—Erebus, Mount

The purpose of this work was the characterization of the composition of volcanic gases emitted from Mount Erebus. The authors examined three components (sulfur, chlorine, and fluorine) in the gas. These components are also the most abundant species in the samples collected. The authors suggest that Erebus may be a source of the "excess" inorganic chlorine found in the snow on the antarctic plateau. There is a rapid poleward transport of tropospheric air masses during the antarctic summer months; the chlorine in the Erebus plume could thus be transported inland and deposited in the snow.

49-195

Volcanic aerosol and ozone depletion within the antarctic polar vortex during the austral spring of 1991.

Deshler, T., Adriani, A., *Antarctic journal of the United States,* 1992, 27(5), p.274-275, 6 refs.

Aerosols, Ozone, Volcanoes, Atmospheric composition, Air temperature

Fresh volcanic layers are the primary source for high concentrations of new aerosols, but these high concentrations last only a short time because of coagulation. For the volcanic aerosols in Antarctica these observations of homogeneous nucleation, along with the altitude of the observations, helped to identify the source of the volcanic aerosols as Cerro Hudson. During each antarctic spring since 1986, approximately 40 ozone profiles have been measured at McMurdo. The results of these measurements have been quite consistent, indicating that during years of severe ozone depletion—1987, 1989, 1990, 1991—approximately half the total column of ozone is lost with more than 80% of the loss occurring between 12 and 20 km. It is suggested that the measurements presented here are the first direct *in situ* measurements confirming that volcanic aerosols can play a part in ozone destruction.

49-196

Simultaneous ozone and polar stratospheric cloud observations at Amundsen-Scott South Pole Station during winter and spring 1991.

Rosen, J.M., Kjome, N.T., Oltmans, S.J., *Antarctic journal of the United States,* 1992, 27(5), p.279-280, 3 refs.

Ozone, Stratosphere, Clouds (meteorology), Atmospheric composition, Polar stratospheric clouds, Antarctica—Amundsen-Scott Station

The authors conducted a series of simultaneous polar stratospheric cloud (PSC) and ozone observations from balloon-borne sensors launched at the Amundsen-Scott Station, continuing until the initial formation of the ozone hole. These observations were augmented with frost-point soundings and additional ozone soundings. A figure shows the results of a sounding made more than one month after the beginning of extensive PSC activity. The frost-point profile illustrated in this figure was obtained on Jan. 12, 1991, and represents initial conditions in the vortex. According to the figure, by July 16 the stratospheric air temperature had cooled well below the initial frost-point and a large fraction of the water vapor would have already condensed. However, in the altitude range of 20 to 45 millibars the backscatter signal is relatively small and does not indicate the presence of significant condensed material. This suggests that the particles have already fallen out, resulting in dehydration of the stratosphere.

49-197

Antarctic ice sheet: a possible trigger for the Gondwana break-up.

Gasperini, M., Alessandrini, B., Vigliotti, L., *Bollettino di geofisica teorica ed applicata,* June 1990, 32(126), p.157-164, 17 refs.

DLC QC801.B85 32

Tectonics, Glacial geology, Continental drift, Ice sheets, Ice loads

The non-uniform distribution of continental masses around the Earth's rotational axis generates a centrifugal pole-fleeing force: the Eötvös force or Polflüchtkraft. This force is at present too low to be one of the principal driving mechanisms of plate tectonic motion, but during the Paleozoic glaciation in the austral hemisphere it could have reached an intensity sufficient to drift Gondwanaland towards the equator. According to the "membrane theory", the stress due to lithospheric movement over a non- spherical Earth's asthenosphere was sufficient to start the Gondwanaland break-up 230 My ago and the onset of the circum- antarctic rift system. (Auth.)

49-198

Study on planting technology for slopes in cold regions—use of latticework frost heave countermeasures and bamboo grass on slopes. [Kanreichi homen ryokka gijutsu no kenkyu—nori wakko no tojo taisaku to sasa no riyo]

Mizushima, T., Fukuda, M., Saito, T., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(1), p.121-126, In Japanese. 5 refs.

Slope protection, Slope stability, Soil stabilization, Frost heave, Frost protection, Protective vegetation, Japan

49-199

Tests on snowplows (continuation)—tests on improving the performance of snowplows. [Josetsu kikai ni kansuru chosa shiken (keizoku)—josetsu kikai no seino kojo ni kansuru chosa shiken]

Hokkaido Development Bureau, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(1), p.279-298, In Japanese.

Snow removal, Motor vehicles, Road maintenance, Cold weather tests

49-200

Tests on snow removal from high-standard main highways—development of (mobile instrumented) road information vehicles and (high speed) rotary snowplows. [Kokikaku kansen doro josetsu ni kansuru chosa shiken—doro johosha (ido keisokushiki) to rotari josetsusha (kosoku-kei) no kaihatsu]

Harada, N., Kurita, I., Ikeda, Y., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(1), p.319-324, In Japanese.

Snow removal, Motor vehicles, Road maintenance, Weather forecasting, Japan

49-201

Tests on the development of snowplows for designated areas. [Tokutei kasho-yo josetsu kikai no kaihatsu ni kansuru chosa shiken]

Sumita, N., Yamaguchi, H., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(1), p.325-328, In Japanese.

Snow removal, Sidewalks, Motor vehicles, Road maintenance, Japan

49-202

Development of a shear-pinless device for the 200-PS rotary snowplow. [Rotari josetsusha (200 PS-kyu)-yo shapinresu sochi no kaihatsu]

Ogami, T., Aoshima, N., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(1), p.329-334, In Japanese.

Snow removal, Motor vehicles, Road maintenance

49-203

Study on road surface countermeasures in winter. [Toki romen taisaku ni kansuru kenkyu]

Hokkaido Development Bureau, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(2), p.5-20, In Japanese. 9 refs.

Road icing, Snow removal, Road maintenance, Japan

49-204

Effect of the change to studless tires on traffic and road conditions in winter. [Sutaddoresu-ka ni yoru toki romen jokyo to kotsu gensho e no eikyo ni tsuite]

Horita, N., Takagi, H., Onuma, H., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(2), p.59-64, In Japanese.

Road icing, Road maintenance, Tires, Safety, Japan

49-205

Metal corrosion from deicers. [Toketsu boshizai no kinzoku fushoku ni tsuite]

Miyamoto, S., Takagi, H., Onuma, H., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(2), p.65-68, In Japanese. 12 refs.

Road icing, Road maintenance, Chemical ice prevention, Corrosion, Environmental impact

49-206

Tests on overflow prevention and gratings for snow removal drains. [Ryusetsuko no boshi issui chosa shiken to gurechingu chosa shiken]

Kawabata, I., Endo, Y., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(2), p.69-74, In Japanese.

Snow removal, Drains, Road maintenance

49-207

Annual variations in road surface conditions and weather conditions. [Toki romen jokyo no nenhendo to kisho joken ni tsuite]

Chiba, T., Kajiya, Y., Matsuzawa, M., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(2), p.75-80, In Japanese. 1 ref.

Road icing, Road maintenance, Ice roads, Snow compaction, Japan—Hokkaido

49-208

Performance and applicability of frost resistant pavements. [Toketsu yokusei hoso no kino to kyoyosei ni tsuite]

Ninomiya, H., Kawamura, K., Yoshino, M., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(2), p.129-134, In Japanese.

Pavements, Road icing, Frost resistance, Road maintenance, Cold weather performance

49-209

Evaluation of frost resistant pavements by ice bonding strength. [Chakuhyoryoku ni yoru toketsu yokusei hoso no hyoka ni tsuite]

Yoshino, M., Kawamura, K., Ninomiya, H., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(2), p.135-142, In Japanese. 1 ref.

Pavements, Road icing, Frost resistance, Ice adhesion, Road maintenance

49-210

Tests on windbreaks, snowbreaks, and obstructions to visibility—wind tunnel experiments on snow countermeasures in the Oyafuru district of Ishikari on National Highway 231. [Bofu bosetsu oyobi shitei shogai ni kansuru chosa shiken—ippan kokudo 231-go Ishikaricho Oyafuru chiku bosetsu taisaku no fudo jikken]

Sasaki, M., Takahashi, K., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(2), p.143-148, In Japanese.

Snow fences, Blowing snow, Snowdrifts, Windbreaks, Road maintenance, Wind tunnels, Japan

49-211

Acid precipitation in Hokkaido. [Hokkaido no sansei kokabutsu ni tsuite]

Tani, A., Yoshii, A., Sato, N., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(3), p.67-70, In Japanese. 5 refs.

Air pollution, Precipitation (meteorology), Snowfall, Snow impurities, Snow composition, Japan—Hokkaido

49-212

Numerical simulation of volcanic debris flow over a snow covered slope. [Setsumen ni okeru kasairyu suchi shimyureshon moderu ni tsuite]

Miura, A., Shimizu, Y., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai happyo gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Presentation summaries),* 1993(Pub. Feb.94), 37(3), p.263-268, In Japanese. 3 refs.

Volcanoes, Avalanche modeling, Avalanche forecasting, Snow cover effect, Snow cover stability, Mudflows, Flood forecasting, Mathematical models

49-213

Numerical simulation of an aircraft anti-icing system incorporating a rivulet model for the runback water.

Al-Khalil, K.M., Toledo, OH, University, 1991, 212p., University Microfilms order No.DA9200761, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1992, 52(7), p.3850.

Aircraft icing, Ice removal, Ice melting, Water films, Liquid solid interfaces, Heat transfer, Mathematical models

49-214

Glacial hydrology of Storglaciaren, northern Sweden.

Kohler, J.C., Minneapolis, University of Minnesota, 1992, 212p., University Microfilms order No.DA9239136, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Feb. 1993, 53(8), p.3995.

Mountain glaciers, Glacial hydrology, Subglacial drainage, Glacier surveys, Sweden

49-215

Subglacial hydraulics of South Cascade Glacier.

Fountain, A.G., Seattle, University of Washington, 1992, 282p., University Microfilms order No.DA9239447, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Feb. 1993, 53(8), p.4003.

Mountain glaciers, Glacial hydrology, Subglacial drainage, Glacier surveys, United States—Washington

49-216

Image analysis of air voids in air-entrained concrete.

Dewey, G.R., Lawrence, University of Kansas, 1991, 350p., University Microfilms order No.DA9238631, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Feb. 1993, 53(8), p.4262.

Air entrainment, Concrete durability, Frost resistance, Porosity

49-217

Voyager photometry of Triton.

Hillier, J.K., Ithaca, NY, Cornell University, 1993, 350p., University Microfilms order No.DA9406169, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Mar. 1993, 53(9), p.4725.

Satellites (natural), Extraterrestrial ice, Planetary environments, Atmospheric composition, Haze, Photometry

49-218

Climatology of leads in arctic sea ice in winter, derived from satellite imagery.

Miles, M.W., Boulder, University of Colorado, 1993, 116p., University Microfilms order No.DA9406742, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Apr. 1993, 54(10), p.5070.

Ice surveys, Sea ice distribution, Ice openings, Air ice water interaction, Spaceborne photography

49-219

Stability of in situ chemically reduced and stabilized soils contaminated with hexavalent chromium as affected by pH, co-solvents and freeze-thaw/wet-dry cycles.

Ede, K.F., Stillwater, Oklahoma State University, 1993, 176p., University Microfilms order No.DA9407240, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Apr. 1993, 54(10), p.5080.

Soil pollution, Soil chemistry, Soil stabilization, Leaching, Waste treatment, Freeze thaw cycles

49-220

Development, characterization, and fundamental investigation of latex-modified steel fiber reinforced concrete.

Tlili, A., East Lansing, Michigan State University, 1993, 340p., University Microfilms order No.DA9406565, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Apr. 1993, 54(10), p.5302.

Reinforced concretes, Concrete durability, Frost resistance, Composite materials

49-221

Natural abundance of nitrogen-15 in a subarctic lake and biogeochemical implications to nitrogen cycling.

Gu, B.H., Fairbanks, University of Alaska, 1993, 221p., University Microfilms order No.DA9410177, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, May 1993, 54(11), p.5508.

Nutrient cycle, Lakes, Limnology, Hydrogeochemistry, Ice cover effect

49-222

Paleolimnology of North Pond: lake-watershed interactions.

Huvane, J.K., Bloomington, Indiana University, 1993, 96p., University Microfilms order No.DA9410416, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, May 1993, 54(11), p.5508.

Glacial lakes, Watersheds, Paleoclimatology, Paleobotany, Limnology, Hydrogeochemistry

49-223

Studies of the geophysics of sea ice.

Wade, R.H., Fairbanks, University of Alaska, 1993, 150p., University Microfilms order No.DA9410174, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, May 1993, 54(11), p.5582.

Sea ice distribution, Ice growth, Ice forecasting, Ice heat flux, Ice thermal properties, Ice salinity, Ice models, Backscattering

49-224

Temporal and spatial analysis of snow and surface energy balance along the Mogollon Rim, Arizona.

Gwilliam, B.L., Tempe, Arizona State University, 1993, 156p., University Microfilms order No.DA9410971, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, May 1993, 54(11), p.5585.

Snow surveys, Snow cover distribution, Snow heat flux, Snow air interface, Snowmelt, Runoff forecasting, United States—Arizona—Mogollon Rim

49-225

Hydrometeor spectra and cloud electrification.

Zhao, W.H., Reno, University of Nevada, 1993, 234p., University Microfilms order No.DA9410122, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, May 1993, 54(11), p.5720.

Cloud electrification, Cloud physics, Cloud droplets, Ice crystal collision, Ice crystal growth, Precipitation (meteorology), Particle size distribution

49-226

Ka-band radar research applications for ice and water clouds.

Liao, L., Salt Lake City, University of Utah, 1993, 229p., University Microfilms order No.DA9410298, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, May 1993, 54(11), p.5721.

Cloud physics, Cloud droplets, Ice crystal growth, Precipitation (meteorology), Radar echoes, Mathematical models

49-227

Multispecies gas flows in the interior of comets.

Alexander, C.J., Ann Arbor, University of Michigan, 1993, 190p., University Microfilms order No.DA9409622, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, May 1993, 54(11), p.5727.

Planetary environments, Extraterrestrial ice, Ice sublimation

49-228

Individual-based approach to alpine plant distributions.

Humphries, H.C., Fort Collins, Colorado State University, 1993, 215p., University Microfilms order No.DA9415066, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1993, 54(12), p.6030.

Plant ecology, Introduced plants, Revegetation, Vegetation patterns, Biogeography, Snow cover effect, Mountain soils, United States—Colorado

49-229

Physical controls on methane production and flux from organic-rich wetland environments.

Kelley, C.A., Chapel Hill, University of North Carolina, 1993, 229p., University Microfilms order No.DA9415340, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1993, 54(12), p.6101.

Wetlands, Nutrient cycle, Biomass, Soil air interface

49-230

Rheology and structure of planetary near-surface materials from landform topography.

Jankowski, D.G., Ithaca, NY, Cornell University, 1993, 337p., University Microfilms order No.DA9416729, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1993, 54(12), p.6107.

Planetary environments, Satellites (natural), Topographic surveys, Terrain identification, Extraterrestrial ice, Ground ice, Spaceborne photography, Image processing

49-231

Sedimentary processes at glacial marine deltas, Glacier Bay, Alaska.

Phillips, A.C., Chicago, University of Illinois, 1993, 232p., University Microfilms order No.DA9414877, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1993, 54(12), p.6109.

Outwash, Glacial deposits, Marine deposits, Bottom sediment, Sediment transport, Deltas, United States—Alaska—Glacier Bay

49-232

Investigation of Colorado Front Range winter storms using a nonhydrostatic mesoscale numerical model designed for operational use.

Snook, J.S., Fort Collins, Colorado State University, 1993, 388p., University Microfilms order No.DA9415090, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1993, 54(12), p.6122.

Snowstorms, Atmospheric disturbances, Weather forecasting, Mathematical models, United States—Colorado

49-233

Microwave remote sensing algorithms for cirrus clouds and precipitation.

Evans, K.F., Fort Collins, Colorado State University, 1993, 243p., University Microfilms order No.DA9415054, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1993, 54(12), p.6253.

Cloud cover, Cloud physics, Ice crystal size, Ice crystal structure, Precipitation (meteorology), Radiometry, Spaceborne photography, Mathematical models

49-234

Probable maximum flood estimation in northern Utah.

Win, K.M., Logan, Utah State University, 1993, 368p., University Microfilms order No.DA9415202, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1993, 54(12), p.6365.

Snowmelt, Flood forecasting, Dams, Spillways, United States—Utah

49-235

Spatial dynamics of primary forest succession: modeling the Glacier Bay "chronosequence".

Weishampel, J.F., Charlottesville, University of Virginia, 1994, 146p., University Microfilms order No.DA9415578, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, July 1993, 55(1), p.6527.

Plant ecology, Revegetation, Vegetation patterns, Biogeography, Paleobotany, Paleoclimatology, United States—Alaska—Glacier Bay

49-236

Role of the hydrological cycle and the ocean's thermohaline circulation in climate change: a multi-component climate model study.

Wang, H.X., Evanston, IL, Northwestern University, 1993, 132p., University Microfilms order No.DA9415831, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, July 1993, 55(1), p.6569.

Air ice water interaction, Glaciation, Climatic changes, Paleoclimatology, Hydrologic cycle, Ocean currents

49-237

Polarimetric radar/aircraft observations and modelling of ice crystals in winter storms.

Benjamin, A.L., Fort Collins, Colorado State University, 1993, 132p., University Microfilms order No.DA9415043, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, July 1993, 55(1), p.6671.

Snowstorms, Ice storms, Ice crystal growth, Snow crystal growth, Weather forecasting, Radar echoes, Mathematical models

49-238

Comprehensive approach to problems with oil spills in marine environments: the Alaska story.

Molak, V., ed, Davis-Hoover, W., ed, Khan, S., ed, Mehlman, M., ed, Princeton, NJ, Princeton Scientific Publishing Co., Inc., 1992, 165p., Refs. passim. Proceedings of the Alaska story, a workshop on the various aspects of the *Valdez* oil spill, with particular emphasis on the biological cleanup efforts, Cincinnati, OH, Sep. 17-18, 1990.

Oil spills, Oil recovery, Water pollution, Environmental impact, Accidents, United States—Alaska—Prince William Sound

49-239

Greenland.

Miller, K.E., ed, World bibliographical series, Vol.125, Oxford, England, Clio Press Ltd., 1991, 111p., 375 refs.

Bibliographies, Research projects, Greenland

49-240

Frost-related sidewalk cracking mechanisms.

Sepehr, K., Goodrich, L.E., Baker, T.H.W., CSCE annual conference and Canadian Hydrotechnical Conference, 11th, Fredericton, New Brunswick, June 8-11, 1993. Proceedings. Vol.3, Montreal, Canadian Society for Civil Engineering, 1993, p.1-10, 4 refs.

Sidewalks, Frost action, Frost heave, Cracking (fracturing)

49-241

Use of directional drilling for installation of raw water supply line and sludge disposal line in Fort Smith, Northwest Territories.

Johnson, K., CSCE annual conference and Canadian Hydrotechnical Conference, 11th, Fredericton, New Brunswick, June 8-11, 1993. Proceedings. Vol.3, Montreal, Canadian Society for Civil Engineering, 1993, p.11-20, With French summary.

Water pipelines, Underground pipelines, Permafrost beneath structures, Frost protection, Water supply, Water treatment, Sewage disposal, Canada—Northwest Territories—Fort Smith

49-242

Frost protection of buried water lines: results from a finite element model study.

Goodrich, L.E., Sepehr, K., CSCE annual conference and Canadian Hydrotechnical Conference, 11th, Fredericton, New Brunswick, June 8-11, 1993. Proceedings. Vol.3, Montreal, Canadian Society for Civil Engineering, 1993, p.21-29, 6 refs.

Water pipelines, Underground pipelines, Pipeline insulation, Frost protection, Earth fills

49-243

Liquid waste sampling and analysis at CFS Alert.

Héroux, J., CSCE annual conference and Canadian Hydrotechnical Conference, 11th, Fredericton, New Brunswick, June 8-11, 1993. Proceedings. Vol.3, Montreal, Canadian Society for Civil Engineering, 1993, p.31-38, With French summary. 1 ref.

Wastes, Waste disposal, Tanks (containers), Military facilities, Canada—Northwest Territories—Ellesmere Island

49-244

Environmental impacts of three runway de-icers.

John, R.D., Rose, P.A., CSCE annual conference and Canadian Hydrotechnical Conference, 11th, Fredericton, New Brunswick, June 8-11, 1993. Proceedings. Vol.3, Montreal, Canadian Society for Civil Engineering, 1993, p.375-382, 7 refs.

Runways, Chemical ice prevention, Environmental impact

49-245

Pneumatic tyre with good ice performance, wear and cornering stability.

Makoto, Y., *European Patent Office. Patent*, Dec. 29, 1993, n.p., No.576130.

Tires, Rubber ice friction, Traction

49-246

Rubber composition for rubber chain around tyre periphery.

Toyo Rubber Industrial Co. Ltd., *Japan Patent Office. Patent*, Nov. 2, 1993, n.p., No.5287128.

Tires, Rubber, Rubber ice friction, Rubber snow friction, Skid resistance

49-247

Heavy-duty radial tyre with improved on-ice braking performance.

Sumitomo Rubber Industries Ltd., *Japan Patent Office. Patent*, Nov. 2, 1993, n.p., No.5286310.

Tires, Rubber ice friction, Skid resistance

49-248

Cap-and-base type tyre for high performance on ice and snow.

Mitsutake, T., *European Patent Office. Patent*, Dec. 1, 1993, n.p., No.572127.

Tires, Rubber ice friction, Rubber snow friction, Traction

49-249

Heat transfer type plate for protecting pipelines, roads, etc.

Lee, Y., Park, H.J., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent*, Oct. 28, 1993, n.p., No.9321490.

Heat transfer, Frost protection, Pipeline insulation

49-250

Thermosiphon with evaporator having rising and falling sections.

Long, E.L., *U.S. Patent Office. Patent*, Mar. 2, 1993, n.p., USP-5,190,098.

Heat pipes, Permafrost beneath structures, Permafrost preservation, Permafrost heat transfer, Frost protection

49-251

Directional-type fastener assembly.

Rubel, E.R., *U.S. Patent Office. Patent*, Feb. 23, 1993, n.p., USP-5,188,441.

Snow vehicles, Tracked vehicles, All terrain vehicles, Joints (junctions)

49-252

Deicing apparatus for aircraft runway wing.

Christian, D.J., Robertson, G.D., Tucci, J.M., Westcott, M.J., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent*, Nov. 26, 1992, n.p., No.9220575.

Road icing, Aircraft icing, Ice detection, Ice removal, Runways

49-253

Deicing compositions containing calcium magnesium acetate and chelating agent.

Hoenke, K.A., Rynbrandt, J.D., *European Patent Office. Patent*, Sep. 12, 1990, n.p., No.386886.

Runways, Road icing, Chemical ice prevention

49-254

Pneumatic de-icing system.

Householder, E.E., Weisend, N.A., *U.S. Patent Office. Patent*, Jan. 4, 1994, n.p., USP-5,275,362.

Aircraft icing, Ice removal

49-255

Method and device for ..ming ice structure.

Tomilin, A.A., *Russia Patent Office. Patent*, Dec. 23, 1992, n.p., No.1784056.

Artificial freezing, Ice (construction material)

49-256

Method of determining frozen ground compressibility on thawing.

Mirenburg, IU.S., Vodolazkin, V.M., *Russia Patent Office. Patent*, Dec. 23, 1992, n.p., No.1783066.

Frozen ground compression, Frozen ground strength, Thaw weakening, Soil tests, Strain tests

49-257

Pneumatic tyre, having good manoeuvre on e.g. snow roads.

Bridgestone Corporation, *Japan Patent Office. Patent*, Dec. 3, 1993, n.p., No.5319023.

Tires, Rubber snow friction, Traction

49-258

Pneumatic tyre with improved wandering-resistance and running performance.

Bridgestone Corporation, *Japan Patent Office. Patent*, Dec. 3, 1993, n.p., No.5319022.

Tires, Rubber ice friction, Skid resistance

49-259

Rubber product with good frictional performance on ice, especially studless tyre.

Bridgestone Corporation, *Japan Patent Office. Patent*, Dec. 3, 1993, n.p., No.5318621.

Tires, Rubber ice friction, Traction

49-260

Roof sealing composition for liquid application.

Beritzki, J., Netter, M., Ovaert, F., *France Patent Office. Patent*, Dec. 10, 1993, n.p., No.2691995.

Roofs, Sealing, Waterproofing

49-261

Smooth anhydrous sodium acetate particles for use as de-icing agent.

Kapfinger, J., Poellmann, K., Stankowiak, A., *Germany Patent Office. Patent*, Jan. 5, 1994, n.p., No.4221661.

Road icing, Chemical ice prevention, Road maintenance

49-262

Rubber composition for tyre tread and shoe soles.

Fukahori, Y., Fukuta, Y., Yamazaki, H., Kukuta, Y., *Germany Patent Office. Patent*, Dec. 2, 1993, n.p., No.4315919.

Tires, Rubber, Rubber ice friction, Traction

49-263

Curable fluoro-silicone resin composition of good water repellency.

Kobayashi, H., *European Patent Office. Patent*, Nov. 3, 1993, n.p., No.567969.

Protective coatings, Waterproofing, Weatherproofing, Chemical ice prevention

49-264

Fluid storage structure having a wall with an insulating protective covering.

Andrepont, J.S., Bannon, R.J., Duff, M.P., *U.S. Patent Office. Patent*, Aug. 3, 1993, n.p., USP-5,231,811.

Storage tanks, Cold storage, Thermal insulation, Vapor barriers

49-265

Pneumatic control for automated shifting of splitter transmission in a vehicle.

Graves, R.A., Mack, W.J., *European Patent Office. Patent*, July 28, 1993, n.p., No.552557.

Motor vehicles, Engines, Cold weather performance

49-266

Aircraft leading edge de-icing system.

Briscoe, J.A., Leffel, K.L., Phillips, R.W., Putt, J.C., Tenison, G.V., *European Patent Office. Patent*, July 21, 1993, n.p., No.551928.

Aircraft icing, Ice removal

49-267

Aircraft leading edge surface de-icer.

Briscoe, J.A., Leffel, K.L., Phillips, R.W., Putt, J.C., Tenison, G.V., *European Patent Office. Patent*, Jan. 18, 1989, n.p., No.299184.

Aircraft icing, Ice removal

49-268

Chattering valve for pulse pneumatic de-icer.

Briscoe, J.A., Leffel, K.L., Phillips, R.W., Putt, J.C., Tenison, G.V., *U.S. Patent Office. Patent*, May 31, 1988, n.p., USP-4,747,575.

Aircraft icing, Ice removal

49-269

Underfloor heating arrangement with two counterflow heating circuits.

Mühlbauer, K.G., *European Patent Office. Patent*, Dec. 13, 1989, n.p., No.345698.

Floors, Radiant heating, Concrete heating, Artificial melting, Ice removal, Snow removal

49-270

Trends in the development of energy production in Siberia. [Napravleniia razvitiia energetiki Sibiri]

Saneev, B.G., ed, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, 194p., In Russian. Refs. passim. For individual papers see 49-271 through 49-288.

Fuels, Electric power, Coal, Heat sources, Natural gas, Natural resources, Crude oil, Heating, Russia—Siberia

49-271

Problems in energy consumption and energy savings in Siberia. [Problemy energopotrebleniia i energosberezheniia v Sibiri]

Klimenko, S.M., Stepanov, V.S., Gorelov, V.A., Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.6-20, In Russian.

Electric power, Heat sources, Russia—Siberia

49-272

Trends and problems in the development of an energy complex in Siberia for the period up to 2010. [Napravleniia i problemy razvitiia energeticheskogo kompleksa Sibiri na period do 2010 g.]

Agafonov, G.V., et al, Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.21-29, In Russian.

Electric power, Coal, Natural gas, Fuels, Petroleum products, Heat sources, Russia—Siberia

49-273

Calculating the time-lag in energy production in Siberia when planning its development. [Uchet inertsionnosti energetiki Sibiri pri planirovanii ee razvitiia]

Kononov, IU.D., Korneev, A.G., Tkachenko, V.Z., Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.29-37, In Russian.

Fuels, Electric power, Russia—Siberia

49-274

Problems and perspectives in the development of an integrated electric power system (OEES) in Siberia and its role in the electric energy of the country. [Problemy i perspektivy razvitiia OEES Sibiri i ee rol' v elektroenergetike strany]

Bogdanov, E.V., et al, Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.37-47, In Russian.

Electric power, Economic development, Russia—Siberia

49-275

Efficient NTP trends in thermal energy equipment in power stations in Siberia. [Effektivnye napravleniia NTP v teploenergeticheskom obrudovanii elektrostantsiĭ Sibiri]

Beliaev, L.S., Burdukov, A.P., Kler, A.M., Milova, R.V., Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.47-55, In Russian. 3 refs.

Electric power, Electric equipment, Russia—Siberia

49-276

Unconventional energy production for Siberia. [Netraditsionnaia energetika dlia Sibirskogo regiona]

Gruzdkov, IU.A., Parmon, V.N., Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.56-71, In Russian. 16 refs.

Electric power, Geothermy, Wind power generation, Solar radiation, Biomass, Russia—Siberia

49-277

Status and perspectives of energy production in agricultural regions of Siberia. [Sostoianie i perspektivy energosnabzheniia sel'skikh raionov Sibiri]

Demchuk, V.M., Nikitin, V.M., IAkshina, G.A., Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.71-81, In Russian. 2 refs.

Electric power, Coal, Natural gas, Fuels, Russia—Siberia

49-278

Basic trends in the development of heat supply systems in Siberia with a view to 2010. [Osnovnye napravleniia razvitiia teplosnabzhaiushchikh sistem Sibiri na perspektivu do 2010 g.]

Viaz'min, E.G., et al, Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.82-93, In Russian.

Heating, Fuels, Electric power, Russia—Siberia

49-279

Problems in the development of heat supply systems in cities of Siberia. [Problemy razvitiia teplosnabzhaiushchikh sistem gorodov Sibiri]

Merenkov, A.P., Sennova, E.V., Stennikov, V.A., Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.94-101, In Russian.

Heating, Fuels, Cold weather operation, Russia—Siberia

49-280

Basic trends and problems in the development of the coal industry in Siberia. [Osnovnye napravleniia i problemy razvitiia ugol'noĭ promyshlennosti Sibiri]

Agafonov, G.V., Popov, S.P., Saneev, B.G., Sokolov, A.D., Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.101-110, In Russian.

Coal, Natural resources, Mining, Russia—Siberia

49-281

Problems in the development of the Kuznetsk Basin coal industry under new management conditions. [Problemy razvitiia ugol'noĭ promyshlennosti Kuzbassa v novykh usloviiakh khoziaistvovaniia]

Zviagintseva, K.M., Kuz'min, A.P., Novikova, R.A., Osipova, L.M., Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.111-121, In Russian. 4 refs.

Coal, Mining, Natural resources, Russia—Siberia, Russia—Kuznetsk Basin

49-282

Human life—the primary ecological criterion for energy production. [Zhizn' cheloveka—glavnyĭ ekologicheskiĭ kriteriĭ dlia energetiki]

Druzhinin, I.P., Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.121-134, In Russian. 10 refs.

Economic development, Natural resources, Russia—Siberia

49-283

Ecological problems in the development of energy in Siberia. [Ekologicheskie problemy razvitiia energetiki Sibiri]

Chebanenko, B.B., Koshelev, A.A., Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.135-146, In Russian.

Ecology, Air pollution, Environmental impact, Electric power, Russia—Siberia

49-284

Evaluating the alternative of major conversion of hydrocarbon resources in Western Siberia. [Otsenka al'ternativ glubokoĭ pererabotki uglevodorodnogo syr'ia v Zapadnoĭ Sibiri]

Kriukov, V.A., Starovoĭtov, S.N., Shmat, V.V., Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.147-154, In Russian.

Hydrocarbons, Natural resources, Russia—Siberia

49-285

Trends and problems in the development of a fuel-energy complex in Yakut-Sakha SSR for the 13th Five-Year-Plan and for the period up to 2010. [Napravleniia i problemy razvitiia TEK IAkutskoĭ-Sakha SSR na XIII piatiletku i na period do 2010 g.]

Burtsev, E.M., et al, Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.154-161, In Russian. 2 refs.

Fuels, Electric power, Coal, Natural resources, Natural gas, Russia—Siberia, Russia—Yakutia

49-286

Trends and problems in the formation of a Western Siberian oil and gas complex. [Napravleniia i problemy formirovaniia Vostochno-Sibirskogo neftegazovogo kompleksa]

Gukov, V.P., et al, Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.162-169, In Russian.

Natural gas, Crude oil, Petroleum industry, Natural resources, Russia—Siberia

49-287

Problems and perspectives in the development of a Western Siberia fuel-energy complex. [Problemy i perspektivy razvitiia Zapadno-Sibirskogo toplivno-energeticheskogo kompleksa]

Mel'nikov, A.V., et al, Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.170-185, In Russian.

Fuels, Natural gas, Crude oil, Electric power, Russia—Siberia

49-288

Analysis of scenarios for mining a hydrocarbon source in Western Siberia. [Analiz stsenariev dobychi uglevodorodnogo syr'ia v Zapadnoĭ Sibiri]

Pliaskina, N.I., Sevast'ianova, A.E., Kharitonova, V.N., Napravleniia razvitiia energetiki Sibiri (Trends in the development of energy production in Siberia). Edited by B.G. Saneev, Irkutsk, Sibirskiĭ energeticheskiĭ institut SO AN SSSR, 1990, p.185-193, In Russian. 2 refs.

Hydrocarbons, Mining, Natural gas, Natural resources, Russia—Siberia

49-289

Modeling ice passage through an auxiliary lock chamber with a submergible lift gate.

Zufelt, J.E., Rand, J., Gooch, G., SR 93-15, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* June 1993, 13p., ADA-268 702, 5 refs.

River ice, Ice models, Marine transportation, Locks (waterways), Ice mechanics, Models, Ice navigation, United States—Mississippi River

River ice from the Des Moines and Fox Rivers combines with that of the Mississippi during spring breakup, resulting in massive ice accumulations upstream of Lock and Dam 20 on the Mississippi River. The accumulations in the upper lock approach area cause considerable delays to navigation, as ice must be passed through the lock chamber to clear the approach. A physical model study was conducted to determine the effects of using the existing auxiliary lock chamber to pass ice. The auxiliary lock chamber was fitted with a submergible lift gate at its upstream end that could be lowered to pass ice and clear the upper lock approach area. Model tests were conducted with real and plastic ice material to simulate the brash ice conditions encountered during low-flow prototype winter conditions. The submergible lift gate worked well in clearing ice accumulations from the upper lock approach. It was necessary to disturb the accumulation and keep it from refreezing by simulating towboat movement or high volume point source air bubblers to thoroughly clear the approach area.

49-290

Solvent/water partitioning and extraction of dimethyl methylphosphonate: importance of hydrogen-bonding.

Leggett, D.C., SR 90-21, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* June 1990, 6p., ADA-226 541, 21 refs.

Water pollution, Ground water, Hydrogen bonds

Partition coefficients for dimethyl methylphosphonate (DMMP) between water or salt-saturated water and 28 organic solvents were measured. On the average the solvents extracted 7 times as much DMMP from sodium chloride-saturated water as from distilled water. The highest partition coefficients were with H-donor solvents, especially the fluorinated alcohols, trifluoroethanol and hexafluoroisopropanol. Partition coefficients for these solvents and salt-saturated water were 150 and >260, respectively. These results indicate that DMMP can be extractively preconcentrated >100-fold from water with an appropriate choice of solvent and addition of excess sodium chloride. Since DMMP is the lowest homolog of the phosphonate series, higher members are expected to have higher partition coefficients because of greater hydrophobic contributions. The principal mechanism driving extraction appears to be formation of H-bond donor-acceptor complexes which are preferentially solvated by the solvent.

49-291

Thermal conductivity of porous media and soils: a review of Soviet investigations.

Kovalenko, IU.A., Flanders, S.N., SR 91-06, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* May 1991, 12p., ADA-238 780, Refs. p.9-12.

Thermal conductivity, Porous materials, Analysis (mathematics), Soils, Bibliographies

This review concentrates on works published over the past 10- 15 years, but includes important earlier publications. The authors do not claim bibliographic completeness but only aim to embrace different trends of investigations carried out in the U.S.S.R. in the field of thermal conductivity and generalized conductivity of dispersed materials and porous media, the latter two being considered mechanical mixtures without phase changes or chemical reactions among the components.

49-292

Microwave digestion of soils and sediments for assessing contamination by hazardous waste metals.

Hewitt, A.D., Reynolds, C.M., SR 90-19, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* June 1990, 14p., ADA-226 367, 26 refs.

Microwaves, Metals, Sediments, Soil pollution

This report compares results obtained for the metals extracted with a microwave-nitric acid digestion technique to results obtained by procedure R9, a soil-sediment hot-plate digestion method certified by the United States Army Toxic and Hazardous Materials Agency (USATHAMA). In addition, microwave- nitric acid digestions were performed on a National Institute of Standards and Technology (NIST) environmental reference river sediment standard SRM-2704. Compared to existing protocols using hot-plate digestions, the microwave-heated-acid extraction of metals from soils and sediments is faster, more easily field implemented, and less subject to technician error. For Rocky Mountain Arsenal (RMA) standard soil, the average relative recoveries of Ba, Cu, Hg, Ni and Zn contained in the microwave- HNO_3 digest were within 16%, and Pb and Cr levels within 30%, of the values reported by a contract laboratory using USATHAMA digestion procedure R9. Moreover, average recoveries of analytes spiked onto the RMA standard soil were greater than 90% for Ag, Ba, Cd, Cu, Cr, Hg, Ni, Pb, Se, Tl and Zn. In addition, average recoveries greater than 94% of NIST certified values were obtained for As, Cd, Cu, Pb, Tl and Zn from the standard reference material SRM-2704, Buffalo River sediment. This microwave digestion procedure appears to be suitable for the extraction of both volatile and nonvolatile metals from hazardous-waste-contaminated soils and sediments.

49-293

Comparison of airborne electromagnetic induction and subsurface radar sounding of freshwater bathymetry.

Kovacs, A., Holladay, J.S., SR 93-07, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* May 1993, 9p., ADA-268 703, 14 refs.

Electromagnetic prospecting, Sounding, Lake ice, Ice cover thickness

A helicopter-borne electromagnetic induction (EMI) sounding system, operating at frequencies of 0.9, 4.6 and 33 kHz, was used in an attempt to profile freshwater bathymetry under an ice-covered lake. The EMI sounding results were compared with bathymetric measurements made by tape sounding and impulse radar sounding (120 and 280 MHz). As expected, the radar-measured depths were in excellent agreement with the tape measurements. The EMI bathymetry determinations were not representative of the lake bed topography. It is speculated that the EMI system was affected by an electromagnetic response from other than the freshwater/sediment interface.

49-294

Selection of cool-season grasses for revegetating well-drained fill materials.

Palazzo, A.J., SR 93-13, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* June 1993, 5p., ADA-268 459, 17 refs.

Grasses, Earth fills, Revegetation

The objective of this study was to evaluate the performance and persistence of 11 cool-season grasses growing in well-drained fill materials. Grasses were evaluated over a four-year period and grown on fill material containing 11% gravel, 61% sand, 27% silt and 1% clay at the Franklin Falls Dam in Franklin, NH. During the second season, half of each plot was refertilized. Visual observations of the sown grasses suggested that moisture stress was an important factor limiting growth. During the last two year of study, the most persistent species were Jamestown chewings fescue (*Festuca rubra* L. ssp. *commutata* Gaud.) and Canada bluegrass (*Poa compressa* L.). Refertilization helped to promote growth and increase persistence of all the sown species except for Jamestown chewings fescue. Three improved varieties of the grasses were not consistently more persistent than their common counterparts. This study demonstrates that there are major differences among cool-season grasses in their ability to tolerate well-drained, low-maintenance sites. When refertilized, varieties of tall fescue (*Festuca arundinacea* Schreb.) and Kentucky bluegrass (*Poa pratensis* L.) were more persistent, and a perennial ryegrass (*Lolium perenne* L.) provided rapid emergence.

49-295

Heat transfer from water flowing through a chilled-bed open channel.

Richmond, P.W., Lunardini, V.J., CR 90-03, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* May 1990, 52p., ADA-226 855, 30 refs.

Heat transfer, Ice cover, Water flow, Ice water interface

Observations and experiments have shown that heat transfer is greater for water flowing over ice than for water flowing over flat plates without melting. The mechanisms that contribute to this increased heat transfer are not completely understood. One possible cause is the density inversion of water at 4 C. In order to investigate this effect on heat transfer, a small open-channel flume was designed and constructed. Experiments were conducted with the flume bed at temperatures slightly above 0 C and at temperatures above 4 C. Bulk water temperatures ranged from 5 to 33 C. Flow data were obtained for $2.5 \times 10^3 < ReH < 10^5$. At high flow rates (fully developed turbulent flow) heat transfer correlations were determined and compared with other correlations. The correlations obtained from these experiments initially showed higher heat transfer rates than those obtained from experiments in larger flumes with ice present. This is thought to be due to a difference in velocity profiles caused by the flume width. Once velocity corrections were made to the data, they agreed more closely with experiments from wider flumes. The results indicate that the density inversion of water could account for most of the increased turbulent heat transfer observed between melting and nonmelting systems. The heat transfer data at low flow rates are more qualitative than quantitative due to difficulty in obtaining accurate data.

49-296

Morphometric analyses of recent channel changes on the Tanana River in the vicinity of Fairbanks, Alaska.

Collins, C.M., CR 90-04, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* June 1990, 48p., ADA-229 511, Refs. p.29-32.

Banks (waterways), Rivers, Erosion, Sedimentation, United States—Alaska—Tanana River

Long-term bank erosion rates and channel changes in a 14 km stretch of the Tanana River centered on Goose I. were documented using historical aerial photography from 1938 through 1982. The construction effects of a causeway partially blocking the river and the time required to return to equilibrium after construction were studied. Erosion, averaged over the entire study reach, was not significantly different following causeway construction compared to that prior to construction. Significant short-term increases in localized erosion rates during post- vs. pre-construction time periods were documented in south channels and islands downstream of the causeway. Deposition upstream of the river construction formed by the causeway was dramatic. The Tanana River returned to near equilibrium by 1980, five years after the construction of the causeway, with some effects continuing in 1982. Due to additional in-river construction downstream of the study area in 1981, the separate effects from the causeway could not be monitored beyond 1982.

49-297

UHF model simulation of detecting voids in a dielectric medium using HF-VHF airborne short-pulse radar.

Arcone, S.A., CR 90-11, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Dec. 1990, 12p., ADA-231 495, 23 refs.

Airborne radar, Bedrock, Ice electrical properties, Dielectric properties, Water supply, Simulation

A model study of the interaction between airborne-launched short-pulse radar signals and three sizes of rectangular voids in bedrock was conducted to see if polarization perpendicular to the strike of the voids could be used for detection, and if any characteristic waveform such as resonance could be associated with any of the void responses. Radar wavelets with frequency spectra centered at about 870 MHz illuminated three square Styrofoam (relative dielectric constant less than 1.1) strips, 5, 10 and 20 cm on a side, emplaced in a sand (relative dielectric constant of 5.9) box, 1 m deep, 4.5 m long and 2.5 m wide. This setup modeled the interaction of 22-, 44- and 87-MHz wavelets with voids having widths of 2 m and situated in a crystalline type of bedrock. The antennas traversed 23-85 cm above the sand surface and data were recorded continuously at 25.6 scans/s. Polarization both parallel and perpendicular to the long axis of the voids produced reflections with apparently undistorted wavelets and hyperbolic spatial distributions, with the strongest response for the perpendicular over the 10 cm void. Although real HF signal attenuation was not simulated in this model, the results suggest that under these nearly ideal conditions of a homogeneous void matrix of low conductivity with a flat surface, a 2 m void at a 10 m depth could be detected easily with a moderately powered transmitter at a 10 to 12 m altitude using a 40 to 50 MHz short pulse polarized perpendicular to the void axis.

49-298

SADARM captive flight tests: data report.

Boyne, H.S., et al, SR 90-41, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1990, 104p., 5 refs.

Data processing, Radar, Sensors, Military operation, Cold weather performance, Accuracy, Electromagnetic prospecting

Winter captive flight tests were conducted in Feb. and Mar. 1990 in Grayling, MI, which, along with ground-based sensor measurements, provided data for evaluating the sensor systems under development and increasing understanding of target-background interaction. These data are essential for an objective analysis of probabilities of detection and false alarm rates. The program documented the environmental conditions encountered during the test period, determined how the winter environment affects seeker-sensor performance, and developed a comprehensive data set of the background scene for use in modeling the electromagnetic response in a cold regions environment. Hypotheses of winter background conditions that would have a significant effect on sensor performance were developed and measurements were made to test these hypotheses and document the background-sensor performance.

49-299

Observational studies of Arctic Ocean ice-atmosphere interactions.

Barry, R.G., Key, J.R., *Polar geography and geology*, Jan.-Mar. 1994, 18(1), p.1-14, Refs. p.9-14.

Climatology, Polar atmospheres, Sea ice distribution, Air ice water interaction, Drift, Snowmelt, Ice cover effect, Snow cover effect, Remote sensing, Simulation, Arctic Ocean

49-300

Drumlin fields of the Novaya Zemlya-Urals region and the Kara Sea center of glaciation.

Grosval'd, M.G., *Polar geography and geology*, Jan.-Mar. 1994, 18(1), p.15-32, 38 refs.

Pleistocene, Arctic landscapes, Glacial geology, Glaciation, Glacial erosion, Landforms, Marine geology, Classifications, Russia—Novaya Zemlya, Russia—Kara Sea

49-301

Supergenesis of carboniferous anhydrites of Novaya Zemlya.

IUshkin, N.P., *Polar geography and geology*, Jan.-Mar. 1994, 18(1), p.33-43, 12 refs.

Arctic landscapes, Geologic processes, Bedrock, Weathering, Rock properties, Surface properties, Periglacial processes, Russia—Novaya Zemlya

49-302

Climatological data base of arctic water vapor characteristics.

Serreze, M.C., Rehder, M.C., Barry, R.G., Kahl, J.D., *Polar geography and geology*, Jan.-Mar. 1994, 18(1), p.63-75, 23 refs.

Climatology, Polar atmospheres, Atmospheric composition, Water vapor, Meteorological data, Statistical analysis, Data processing, Seasonal variations

49-303

Collection of accurate experimental data for testing the performance of simple methods for food freezing time prediction.

Cleland, D.J., Cleland, A.C., Jones, R.S., *Journal of food process engineering*, Feb. 1994, 17(1), p.93-119, 35 refs.

Solids, Phase transformations, Freezing rate, Heat transfer coefficient, Temperature control, Temperature measurement, Forecasting, Accuracy, Models

49-304

Transgressions: rethinking Beringian glaciation.

Hughes, B.A., Hughes, T.J., *Palaeogeography, palaeoclimatology, palaeoecology*, Aug. 1994, 110(3-4), p.275-294, Refs. p.290-294.

Pleistocene, Glaciation, Sea ice, Ice sheets, Glacier oscillation, Marine geology, Glacial geology, Snow line, Models, Bering Sea, Chukchi Sea

49-305

Thaw modification of frost-fissure wedges, Richards Island, Pleistocene Mackenzie Delta, western arctic Canada.

Murton, J.B., French, H.M., *Journal of Quaternary science*, Sep. 1993, 8(3), p.185-196, 51 refs.

Pleistocene, Arctic landscapes, Continuous permafrost, Permafrost structure, Ice wedges, Ground thawing, Frozen ground mechanics, Permafrost transformation, Periglacial processes, Canada—Northwest Territories—Mackenzie Delta

49-306

Glacier readvances in the Andes at 12,500-10,000 yr BP: implications for mechanism of Late-glacial climatic change.

Clapperton, C.M., *Journal of Quaternary science*, Sep. 1993, 8(3), p.197-215, 84 refs.

Pleistocene, Paleoclimatology, Climatic changes, Mountain glaciers, Glacier oscillation, Moraines, Quaternary deposits, Radioactive age determination, Peru—Andes Mountains

49-307

On the history of the Late Devensian Lake Sparks in southern Fenland, Cambridgeshire, England.

West, R.G., *Journal of Quaternary science*, Sep. 1993, 8(3), p.217-234, 33 refs.

Pleistocene, Ice sheets, Glacier oscillation, Quaternary deposits, Lacustrine deposits, Stratigraphy, Glacial lakes, Permafrost indicators, Radioactive age determination, United Kingdom—Cambridgeshire

49-308

Pattern of deglaciation of the last (Late Devensian) Scottish ice sheet: evidence from ice-marginal deposits in the Dee valley, northeast Scotland.

Brown, I.M., *Journal of Quaternary science*, Sep. 1993, 8(3), p.235-250, 100 refs.

Pleistocene, Ice sheets, Glacier melting, Glacial geology, Quaternary deposits, Outwash, Geomorphology, Paleoclimatology, United Kingdom—Scotland

49-309

Stratigraphy and palaeoecology of a possible interglacial site, northernmost Ellesmere Island, Canada.

Evans, D.J.A., Mott, R.J., *Journal of Quaternary science*, Sep. 1993, 8(3), p.251-262, 47 refs.

Arctic landscapes, Paleoecology, Glaciation, Glacier oscillation, Quaternary deposits, Glacial deposits, Stratigraphy, Palynology, Radioactive age determination, Canada—Northwest Territories—Ellesmere Island

49-310

Positive cloud-to-ground lightning in tornadic storms and hailstorms.

McGorman, D.R., Burgess, D.W., *Monthly weather review*, Aug. 1994, 122(8), p.1671-1697, 68 refs.

Precipitation (meteorology), Synoptic meteorology, Storms, Lightning, Hail, Ice crystal collision, Polarization (charge separation), Sounding, Radar echoes

49-311

Modeling study on the early electrical development of tropical convection: continental and oceanic (monsoon) storms.

Randell, S.C., Rutledge, S.A., Farley, R.D., Helsdon, J.H., Jr., *Monthly weather review*, Aug. 1994, 122(8), p.1852-1877, 42 refs.

Precipitation (meteorology), Cloud physics, Storms, Convection, Cloud electrification, Snow pellets, Charge transfer, Polarization (charge separation), Ice electrical properties, Mathematical models

49-312

Measuring nutrient availability in arctic soils using ion exchange resins: a field test.

Giblin, A.E., Laundre, J.A., Nadelhoffer, K.J., Shaver, G.R., *Soil Science Society of America. Journal*, July-Aug. 1994, 58(4), p.1154-1162, 20 refs.

Arctic landscapes, Ecosystems, Soil tests, Soil chemistry, Nutrient cycle, Soil microbiology, Ion exchange, Seasonal variations, United States—Alaska—Brooks Range

49-313

Loading capacity of anchors in avalanche fence.

Kurokawa, K., Kanno, M., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, June 1990, No.445, p.11-18, In Japanese with English summary. 5 refs.

Avalanche engineering, Snow fences, Snow loads, Anchors

49-314

Chemicals for icy roads in Hokkaido—determining the deicing and anti-icing effect of the compounds. [Hokkaido ni okeru seppyo romen-yo yakuzai ni tsuite—kongo yakuzai yuhyo toketsu boshi-men kara no koka sokutei]

Miyamoto, S., Abe, Y., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, June 1990, No.445, p.29-33, In Japanese. 3 refs.

Road icing, Chemical ice prevention, Road maintenance, Japan—Hokkaido

49-315

Traffic accident in the mountain district of cold regions.

Hirasawa, M., Konagai, N., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Oct. 1990, No.449, p.10-18, In Japanese with English summary. 3 refs.

Road maintenance, Highway planning, Accidents, Safety, Japan—Hokkaido

49-316

Improved methods for frost heave tests.

Saito, T., Nohara, T., Kawamura, K., Mizushima, T., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Nov. 1990, No.450, p.2-11, In Japanese with English summary. 5 refs.

Pavements, Subgrade soils, Frost heave, Frost forecasting, Frost resistance, Freeze thaw tests, Soil tests

49-317

Possibilities and limits to deriving winter road conditions in Hokkaido from existing weather data. [Hokkaido no toki romen jokyo o kison kisho shiryo kara suitei suru kanosei to sono genkai]

Ishimoto, K., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Nov. 1990, No.450, p.21-24, In Japanese. 3 refs.

Road icing, Weather forecasting, Road maintenance, Japan—Hokkaido

49-318

Features of national expressway traffic in winter.

Sato, M., Konagai, N., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Dec. 1990, No.451, p.8-16, In Japanese with English summary. 4 refs.

Road icing, Road maintenance, Highway planning, Safety, Japan—Hokkaido

49-319

Location in acoustic emission measurement of mortar subjected to freezing and thawing.

Shimada, H., Sakai, K., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Jan. 1991, No.452, p.2-8, In Japanese with English summary. 2 refs.

Concrete freezing, Concrete durability, Mortars, Frost resistance, Freeze thaw tests, Acoustic measurement

49-320

Frost resistant pavements. [Toketsu yokusei hoso ni tsuite]

Ninomiya, H., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Jan. 1991, No.452, p.17-20, In Japanese. 2 refs.

Pavements, Frost resistance, Road maintenance

49-321

Trends in court cases on winter road management. [Toki romen kanri ni kansuru hanrei no keiko]

Chiba, T., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Jan. 1991, No.452, p.23-27, In Japanese. 5 refs.

Road icing, Road maintenance, Accidents, Safety, Japan—Hokkaido

49-322

Newly developed ice gauge for field surveys of thin sea ice.

Takashima, K., Omori, Y., Takeuchi, T., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Feb. 1991, No.453, p.2-9, In Japanese with English summary. 5 refs.

Ice surveys, Ice cover thickness, Ice acoustics, Ice formation indicators, Thickness gages

49-323

Axial forces on torque-shear high strength bolts—temperature and time dependence.

Ono, Y., Nakano, O., Kaneko, M., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Sep. 1991, No.460, p.18-30, In Japanese with English summary. 4 refs.

Bridges, Steel structures, Joints (junctions), Frost resistance, Cold weather performance, Temperature effects

49-324

Winter road management, testing and research trends in Europe and the United States. [O-Bei ni okeru toki romen kanri to chosa kenkyu no doko]

Kajiya, Y., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Sep. 1991, No.460, p.42-47, In Japanese. 7 refs. For another version also in Japanese see 47-2541.

Road icing, Road maintenance, Highway planning, Research projects

49-325

Road snow melting and anti-icing technology—part 1: current status of road heating. [Doro no shoyusetsu toketsu boshi gijutsu—sono 1: rodo hitingu no genjo]

Miyamoto, S., Konagai, N., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Sep. 1991, No.460, p.48-58, In Japanese. 5 refs.

Road icing, Artificial melting, Snow removal, Road maintenance

49-326

Basic research on underwater concrete with admixtures.

Naito, I., Sakai, K., Uozumi, K., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Oct. 1991, No.461, p.2-12, In Japanese with English summary. 4 refs.

Concrete admixtures, Concrete durability, Frost resistance, Freeze thaw tests, Offshore structures, Hydraulic structures

49-327

Design guidelines for additional lanes in cold regions.

Hirasawa, M., Konagai, N., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Oct. 1991, No.461, p.13-25, In Japanese with English summary. 3 refs.

Highway planning, Cold weather operation, Safety, Japan—Hokkaido

49-328

Report on experiments to determine properties of ice-retardant asphalt mixtures.

Ninomiya, H., Kawamura, K., Sawada, S., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Nov. 1991, No.462, p.11-18, In Japanese with English summary. 3 refs.

Bitumens, Pavements, Frost resistance, Road maintenance

49-329

Investigation of sea spray icing on offshore structure.

Mizuno, Y., Yano, K., Yamamoto, Y., Hirasawa, M., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Dec. 1991, No.463, p.17-26, In Japanese with English summary. 9 refs.

Offshore structures, Ice accretion, Icing, Ice solid interface, Ice loads, Sea spray

49-330

Inspection method of the condition of snow deposit in mountainous area in early winter used with the degree-day factor.

Hideshima, Y., Hoshi, K., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Feb. 1992, No.465, p.2-12, In Japanese with English summary. 4 refs.

Snow surveys, Snow cover distribution, Snowmelt, Snow water equivalent, Runoff forecasting, Degree days, Japan—Hokkaido

49-331

Characteristics of ice-covered rivers in Hokkaido.

Yamashita, S., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Feb. 1992, No.465, p.13-20, In Japanese with English summary. 8 refs.

River ice, Ice surveys, Ice water interface, Ice cover effect, Frazil ice, River flow, Japan—Hokkaido

49-332

Suggestions for thickness and length of heat insulation to prevent frost heave of road tunnels in Hokkaido.

Suzuki, T., Okazaki, K., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Oct. 1992, No.473, p.20-27, In Japanese with English summary. 5 refs.

Tunnels, Frost heave, Frost protection, Thermal insulation, Linings, Japan—Hokkaido

49-333

Study of asphalt mats for cold ocean gravity structures.

Sugimoto, Y., Mizuno, Y., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Jan. 1993, No.476, p.2-15, In Japanese with English summary. 4 refs.

Offshore structures, Foundations, Bituminous concretes, Frost resistance

49-334

Evaluation of anti-icing pavement performance.

Ninomiya, H., Kawamura, K., Yoshino, M., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Jan. 1993, No.476, p.16-21, In Japanese with English summary. 3 refs.

Road icing, Pavements, Frost resistance, Skid resistance, Road maintenance

49-335

Effect of the popularization of studless tires on winter roads (2nd report). [Sutaddoresu taiya no fukyu ni tomonau toki romen e no eikyo (dai-2 ho)]

Horita, N., Konagai, N., Asano, M., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Jan. 1993, No.476, p.51-56, In Japanese. 9 refs.

Road icing, Rubber snow friction, Tires, Road maintenance, Japan

49-336

Thermal mapping and winter road conditions in Nakayama Pass.

Matsuzawa, M., Kajiya, Y., Takahashi, K., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Apr. 1993, No.479, p.12-22, In Japanese with English summary. 4 refs.

Road icing, Frost forecasting, Ice detection, Infrared mapping, Road maintenance, Japan—Hokkaido

49-337

Characteristics of ice covered rivers in Hokkaido.

Yamashita, S., Kobayashi, M., Miya, A., Hirayama, K., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, May 1993, No.480, p.2-16, In Japanese with English summary. 5 refs.

River ice, Ice surveys, Ice water interface, Ice cover effect, Frazil ice, River flow, Runoff forecasting, Japan—Hokkaido

49-338

Special lecture by L. David Minsk at the Snow and Road Research Meeting: Current status and future trends for snow and ice countermeasures in North America. [Yuki to doro no kenkyu happyokai L. David Minsk shi tokubetsu koen: Hokubei ni okeru doro seppyo taisaku no genjo to sorai no hoko]

Kajiya, Y., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, May 1993, No.480, p.38-47, In Japanese. For the original lecture also in Japanese see 47-4795.

Road icing, Snow removal, Chemical ice prevention, Road maintenance, Research projects

49-339

Designs of traffic signs, markings and snow pole.

Takeuchi, M., Takagi, H., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, July 1993, No.482, p.3-11, In Japanese with English summary. 6 refs.

Road icing, Road maintenance, Highway planning, Safety, Japan—Hokkaido

49-340

Winter weather around Chitose. [Chitose shuhen ni okeru toki kisho ni tsuite]

Okuya, T., Fukuzawa, Y., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, July 1993, No.482, p.38-47, In Japanese. 3 refs.

Snowfall, Snow depth, Air temperature, Wind velocity, Degree days, Meteorological data, Japan—Hokkaido

49-341

Influences and problems of studded-tire regulation in Hokkaido.

Takagi, H., Horita, N., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Aug. 1993, No.483, p.20-38, In Japanese with English summary. 10 refs.

Road icing, Road maintenance, Highway planning, Tires, Accidents, Safety, Environmental protection, Legislation, Japan—Hokkaido

49-342

Properties of super-ground granulated blast-furnace slag cement concrete.

Watanabe, H., Sakai, K., *Kaihatsu doboku kenkyujo geppo (Civil Engineering Research Institute. Monthly report)*, Aug. 1993, No.483, p.39-54, In Japanese with English summary. 7 refs.

Concrete admixtures, Concrete strength, Winter concreting, Cold weather performance

49-343

United States antarctic research report to the Scientific Committee on Antarctic Research (SCAR) No.32, 1990. Record of activities 1 April 1989-31 March 1990. Planned activities 1 April 1990-31 March 1991.

National Research Council. Polar Research Board, Washington, D.C., National Academy Press, 1991, 97p., Bibliography of U.S. antarctic research publications from Apr. 1989 through Mar. 1990, p.62-89.

Research projects, Low temperature research, Polar regions

This report was prepared and distributed by the Polar Research Board, acting as the U.S. National Committee for SCAR, in response to SCAR's request. It contains information on the United States Antarctic Program and other U.S. research conducted in antarctic waters completed during the period Apr. 1989 through Mar. 1990 and planned for the period Apr. 1990 through Mar. 1991. The material is presented in 3 main sections: highlights of science activities; prospectus of planned activities 1 Apr. 1990-31 Mar. 1991; and future activities planned. A list of principal investigators and responsible authorities is included.

49-344

Rock mapping of glaciated areas of satellite image processing.

Salvini, F., della Maggiore, R., Fortunati, L., Mazzarini, F., *Polar research*, June 1994, 13(1), Circumpolar Symposium on Remote Sensing of Arctic Environments, 2nd, Tromsø, Norway, May 4-6, 1992. Proceedings, p.23-33, 18 refs.

Geophysical surveys, Spaceborne photography, LANDSAT, Image processing, Sensor mapping, Geological maps, Rocks, Classifications, Glacier surfaces, Antarctica—Victoria Land

A model is presented that performs spectral deicing of mixed pixels in satellite images of glaciated areas. The model was tested in Northern Victoria Land. Naturally mixed ice and rock pixels are present in satellite images; these were recomputed to separate the spectral component related to the rock fraction. Landsat TM images were used as input data and aerial photographs, maps and field surveys as reference data. By making use of sample populations of pixels corresponding to pure ice and to pure rock groundels (i.e. ground elements, the ground portions corresponding to each pixel), the linear correlations between pairs of bands were detected and the two most suitable bands selected. For every pixel falling between the correlation lines of the two categories, the rock fraction in the corresponding groundel was computed. In the utilized antarctic image, this process increases by about 2.7 times the number of pixels in the pure rock category, allowing the production of enhanced images and, as a side product, a thematic map of rock percentage in the groundels. (Auth. mod.)

49-345

Modeling synthetic aperture radar (SAR) scattering from a seasonally varying snow-covered sea ice volume at 5.3 and 9.25 GHz.

Barber, D.G., LeDrew, E.F., *Polar research*, June 1994, 13(1), Circumpolar Symposium on Remote Sensing of Arctic Environments, 2nd, Tromsø, Norway, May 4-6, 1992. Proceedings, p.35-54, 23 refs.

Sea ice, Geophysical surveys, Remote sensing, Synthetic aperture radar, Scattering, Ice optics, Snow cover effect, Surface roughness, Ice volume, Dielectric properties, Seasonal variations, Mathematical models

49-346

Ice drift series from the Fram Strait January-March 1992 based on ERS-1 SAR data.

Korsnes, R., *Polar research*, June 1994, 13(1), Circumpolar Symposium on Remote Sensing of Arctic Environments, 2nd, Tromsø, Norway, May 4-6, 1992. Proceedings, p.55-58, 5 refs.

Sea ice distribution, Ice surveys, Spaceborne photography, Synthetic aperture radar, Image processing, Ice floes, Drift, Velocity measurement, Fram Strait

49-347

Flow speed and calving rate of Kongsbreen glacier, Svalbard, using SPOT images.

Lefauconnier, B., Hagen, J.O., Rudant, J.P., *Polar research*, June 1994, 13(1), Circumpolar Symposium on Remote Sensing of Arctic Environments, 2nd, Tromsø, Norway, May 4-6, 1992. Proceedings, p.59-65, 11 refs.

Glacier surveys, Spaceborne photography, Glacier flow, Glacier oscillation, Glacier tongues, Velocity measurement, Calving, Ice water interface, Norway—Svalbard

49-348

Weather influence on passive microwave brightness temperatures.

Løvås, S.M., Rubinstein, I., Ulstad, C., *Polar research*, June 1994, 13(1), Circumpolar Symposium on Remote Sensing of Arctic Environments, 2nd, Tromsø, Norway, May 4-6, 1992. Proceedings, p.67-81, 10 refs.

Sea ice distribution, Ice surveys, Ice forecasting, Ice conditions, Remote sensing, Radiometry, Brightness, Classifications, Meteorological factors, Analysis (mathematics)

49-349

Influence of river discharge on the thawing of sea ice, Mackenzie River Delta: albedo and temperature analyses.

Dean, K.G., et al, *Polar research*, June 1994, 13(1), Circumpolar Symposium on Remote Sensing of Arctic Environments, 2nd, Tromsø, Norway, May 4-6, 1992. Proceedings, p.83-94, 18 refs.

Sea ice, Fast ice, Ice surveys, Spaceborne photography, Radiometry, Ice melting, Deltas, River flow, Flooding, Surface temperature, Ice water interface, Albedo, United States—Alaska—Mackenzie River

49-350

Studies of sea surface temperatures in selected northern Norwegian fjords using Landsat TM data.

Haakstad, M., Kögeler, J.W., Dahle, S., *Polar research*, June 1994, 13(1), Circumpolar Symposium on Remote Sensing of Arctic Environments, 2nd, Tromsø, Norway, May 4-6, 1992. Proceedings, p.95-104, 14 refs.

Oceanography, Shores, Sea water, Water temperature, Surface temperature, Stratification, LANDSAT, Radiometry, Air water interactions, Wind factors, Norway

49-351

Use of NOAA-AVHRR data to monitor snow cover and spring meltoff in the wildlife habitats in Jameson Land, East Greenland.

Hansen, B.U., Mosbech, A., *Polar research*, June 1994, 13(1), Circumpolar Symposium on Remote Sensing of Arctic Environments, 2nd, Tromsø, Norway, May 4-6, 1992. Proceedings, p.125-137, 28 refs.

Spaceborne photography, Infrared photography, Radiometry, Image processing, Snow surveys, Snow cover distribution, Snowmelt, Seasonal variations, Ecology, Greenland

49-352

Comparison of satellite imagery and infrared aerial photography as vegetation mapping methods in an arctic study area; Jameson Land, East Greenland.

Mosbech, A., Hansen, B.U., *Polar research*, June 1994, 13(1), Circumpolar Symposium on Remote Sensing of Arctic Environments, 2nd, Tromsø, Norway, May 4-6, 1992. Proceedings, p.139-152, 25 refs.

Arctic landscapes, Vegetation patterns, Classifications, Sensor mapping, Spaceborne photography, Aerial surveys, Infrared photography, Performance, Greenland

49-353

Probability models, remote sensing and field observation: test for mapping some plant distributions in the Kongsfjord area, Svalbard.

Brossard, T., Joly, D., *Polar research*, June 1994, 13(1), Circumpolar Symposium on Remote Sensing of Arctic Environments, 2nd, Tromsø, Norway, May 4-6, 1992. Proceedings, p.153-161, 17 refs.

Arctic landscapes, Vegetation patterns, Landscape types, Classifications, Sensor mapping, LANDSAT, Spaceborne photography, Image processing, Statistical analysis, Norway—Svalbard

49-354

Recession of tropical glaciers.

Hastenrath, S., Oerlemans, J., *Science*, Sep. 23, 1994, 265(5180), [p.1790-1791], 10 refs. For the article under discussion see 48-3302.

Glacier oscillation, Global warming, Air temperature

49-355

Greenland ice evidence of hemispheric lead pollution two millennia ago by Greek and Roman civilizations.

Hong, S.M., Candelone, J.P., Patterson, C.C., Boutron, C.F., *Science*, Sep. 23, 1994, 265(5180), p.1841-1843, 27 refs.

Air pollution, Atmospheric composition, Ice cores, Greenland

49-356

ERS-1 altimeter fast delivery data quality flagging over land surfaces.

Strawbridge, F., Laxon, S.W., *Geophysical research letters*, Sep. 1, 1994, 21(18), p.1995-1998, 10 refs.

Height finding, Measuring instruments, Ice sheets

49-357

Ice nucleation in the upper troposphere: sensitivity to aerosol number density, temperature, and cooling rate.

Jensen, E.J., Toon, O.B., *Geophysical research letters*, Sep. 1, 1994, 21(18), p.2019-2022, 16 refs.

Nucleation, Ice crystals, Clouds (meteorology), Mathematical models, Troposphere

49-358

Impact of present aircraft emissions of nitrogen oxides on tropospheric ozone and climate forcing.

Hauglustaine, D.A., Granier, C., Brasseur, G.P., Mégie, G., *Geophysical research letters*, Sep. 1, 1994, 21(18), p.2031-2034, 18 refs.

Ozone, Climatic changes, Models, Atmospheric composition, Troposphere

49-359

Global radiative-convective feedback.

Fowler, L.D., Randall, D.A., *Geophysical research letters*, Sep. 1, 1994, 21(18), p.2035-2038, 18 refs.

Models, Cloud physics, Radiation, Troposphere

49-360

Role of the deep ocean in North Atlantic climate change between 70 and 130 kyr ago.

Kelgwin, L.D., Curry, W.B., Lehman, S.J., Johnsen, S., *Nature*, Sep. 22, 1994, 371(6495), p.323-326, 32 refs.

Climatic changes, Oceans, Ice cores, Paleoclimatology, Sediments, Greenland, North Atlantic Ocean

49-361

High-resolution climate records from the North Atlantic during the last interglacial.

McManus, J.F., et al, *Nature*, Sep. 22, 1994, 371(6495), p.326-329, 25 refs.

Climatic changes, Ice cores, Paleoclimatology, Greenland, North Atlantic Ocean

49-362

Global decrease in atmospheric carbon monoxide concentration.

Khalil, M.A.K., Rasmussen, R.A., *Nature*, Aug. 25, 1994, 370(6491), p.639-641, 16 refs.

Atmospheric composition, Air pollution, Antarctica—Amundsen-Scott Station

A brief review is given of the kinds and distributions of CO and other chemical agents in the global atmosphere along with the sources and trends of these pollutants. The continuation of the study for the period 1988 through 1992 presented in this paper shows a rapid decline at a rate of about 2.6%/yr. An especially rapid decrease in the Southern Hemisphere is attributed to a reduction in tropical biomass burning. Data from Amundsen-Scott Station is included.

49-363

Image analysis of an air-void system in hardened concrete.

Ayuta, K., Sakurai, H., Tanabe, K., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Aug. 1990, No.420, p.81-86, In Japanese with English summary. 6 refs.

Air entrainment, Concrete durability, Frost resistance, Porosity

49-364

Deformation and deterioration of concrete at low temperatures.

Miura, T., Lee, D.H., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Aug. 1990, No.420, p.191-200, In Japanese with English summary. 20 refs.

Concrete freezing, Concrete durability, Frost resistance, Frost action

49-365

Experimental study on the vertical percolation of snowmelt water within snowcover.

Hata, T., Takase, N., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Nov. 1990, No.423, p.101-109, In Japanese with English summary. 21 refs.

Snowmelt, Snow hydrology, Seepage

49-366

Proposition of margin length for heat insulator width in an adiabatic icicle prevention of an existing tunnel.

Okada, K., Matsumoto, Y., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Dec. 1990, No.424, p.145-152, In Japanese with English summary. 11 refs.

Tunnels, Thermal insulation, Linings, Icicles, Ice prevention, Conduction, Mathematical models

49-367

Actual state of frost penetration depth in railway tunnel and its analysis against periodic change of atmospheric temperature.

Okada, K., Matsumoto, Y., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Dec. 1990, No.424, p.179-186, In Japanese with English summary. 22 refs.

Railroad tunnels, Frost penetration, Frost forecasting, Air temperature

49-368

Influence of freezing and thawing on suction of unsaturated cohesive soils.

Nishimura, T., Ogawa, S., Wada, T., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Dec. 1990, No.424, p.243-250, In Japanese with English summary. 27 refs.

Soil freezing, Freezing front, Frost heave, Frozen ground compression, Frozen ground strength, Freeze thaw tests, Soil water migration

49-369

Volume change and strength parameters of unsaturated cohesive soils subjected to three dimensional freezing and thawing.

Ogawa, S., Nishimura, T., Wada, T., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, June 1991, No.430, p.21-28, In Japanese with English summary. 17 refs.

Soil freezing, Frozen ground compression, Frozen ground strength, Freeze thaw tests, Soil water, Unfrozen water content

49-370

Field tests on frost heaving characteristics of ground.

Suzuki, T., Sawada, S., Onaka, T., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, June 1991, No.430, p.107-114, In Japanese with English summary. 13 refs.

Frost heave, Soil freezing, Soil strength, Frost resistance, Soil tests, Water table

49-371

Study on the method of evaluating the freeze-thaw resistance of concrete at early ages.

Choai, T., Yamamoto, Y., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Aug. 1991, No.433, p.71-80, In Japanese with English summary. 17 refs.

Concrete freezing, Concrete strength, Frost resistance, Freeze thaw tests

49-372

Detailed estimation of snow covered area with NOAA-AVHRR data using LANDSAT-MSS knowledge base.

Rikimaru, A., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Nov. 1991, No.438, p.13-22, In Japanese with English summary. 13 refs.

Snow surveys, Snow cover distribution, Spaceborne photography, Radiometry, Image processing

49-373

Approximate estimating method for narrowing amplitude of atmospheric temperature and heat insulator depth in tunnel with adiabatic icicle prevention.

Okada, K., Matsumoto, Y., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Dec. 1991, No.439, p.37-44, In Japanese with English summary. 15 refs.

Tunnels, Thermal insulation, Linings, Icicles, Ice prevention, Heat transfer, Air temperature, Mathematical models

49-374

Preventing measure of frost heaving damage on small sized U-trough using gravel backfill.

Suzuki, T., Ueno, K., Hayashi, K., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Dec. 1991, No.439, p.89-96, In Japanese with English summary. 7 refs.

Concrete freezing, Frost heave, Frost protection, Earth fills

49-375

Data analysis on the transient performance of pavement distresses in cold regions.

Takeyama, Y., Uchimura, S., Fukuda, T., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Feb. 1992, No.442, p.147-152, In Japanese with English summary. 5 refs.

Pavements, Cold weather performance, Road maintenance, Data processing, Statistical analysis

49-376

Basic research on preventive measures against leakage of liquid and cold air from cracks due to storage of low temperature materials in opening excavated in mountain.

Inada, Y., Komura, Y., Fujiwara, T., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Mar. 1992, No.445, p.65-73, In Japanese with English summary. 9 refs.

Cold storage, Underground storage, Linings, Ice (construction material), Artificial freezing, Liquefied gases

49-377

Development of the new solar snowmelting system.

Sera, I., Mishima, N., Ito, Y., Mochizuki, M., Saito, Y., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Sep. 1992, No.453, p.27-29, In Japanese.

Artificial melting, Snow melting, Snow removal, Road maintenance, Solar radiation

49-378

Frost damage of concrete used in road bridges and structural detail for preventing its damage.

Fujiwara, T., Katabira, K., Kawamura, H., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Sep. 1992, No.453, p.97-106, In Japanese with English summary. 2 refs.

Bridges, Concrete freezing, Frost action, Frost protection

49-379

Interfacial debonding of ice-asphalt concrete.

Tazawa, E., Mizoue, Y., Kojima, T., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings)*, Sep. 1992, No.453, p.125-134, With Japanese summary. 6 refs.

Bituminous concretes, Ice adhesion, Ice prevention, Ice removal, Ice solid interface, Road icing, Road maintenance

49-380

Polar and alpine glaciers as different cryospheric sectors in global change studies. [Ghiacciai polari e ghiacciai montani: contributo e complementarietá dei diversi ambiti criosferici nello studio dei cambiamenti globali]

Smiraglia, C., Italy. Consiglio Nazionale delle Ricerche. Direzione Centrale Attivitá Scientifiche. Commissione Scientifica Polare. Atti del Seminario su "Il ruolo delle aree remote nello studio dei cambiamenti globali" (Role of remote areas in the study of global changes. Seminar proceedings), Rome, 1993, p.27-35, In Italian with English summary. 13 refs.

Glaciers, Glacier surveys, Global change, Paleoclimatology, Climatic changes, Research projects

Glaciers are an essential component of the present environmental and climatic equilibria; moreover, the remote regions glaciers, especially polar glaciers, form a reliable archive of the composition of the atmosphere in the past and can give important paleoclimatic information up to 200,000 years ago. Because of differences in physical properties and in geographical location, mountain glaciers provide different environmental records than those derived from polar glaciers; the information from both sources is very important. This is confirmed by recent studies carried out by Italian researchers in Antarctica and in Greenland as well as in Asiatic mountain chains during national and international projects. (Auth. mod.)

49-381

Limnological and meteorological investigations of fresh-water lakes near the Terra Nova Bay Station. [Osservazioni fisico-limnologiche su un lago antartico nell'ambito di una ricognizione dei corpi d'acqua dolce nell'area di Baia Terra Nova]

Libera, V., Italy. Consiglio Nazionale delle Ricerche. Direzione Centrale Attivitá Scientifiche. Commissione Scientifica Polare. Atti del Seminario su "Il ruolo delle aree remote nello studio dei cambiamenti globali" (Role of remote areas in the study of global changes. Seminar proceedings), Rome, 1993, p.133-139, In Italian with English summary. 7 refs.

Limnology, Lake ice, Lake water, Glacial meteorology, Geochemistry

Physical and limnological data from an antarctic lake situated in the Terra Nova Bay area are reported and discussed. The data, which are part of a survey of freshwater bodies in the area, were recorded by an hydrometeorological station and indicate annual trends of air temperature and humidity, wind speed, solar radiation, lake level, water temperature, Ph and conductivity. (Auth.)

49-382

Transit management in the Northwest Passage: problems and prospects.

Lamson, C., ed, VanderZwaag, D.L., ed, Cambridge University Press, 1988, 316p., Refs. passim. For selected papers see 44-1121, 44-1122, and 49-383 through 49-385.

Marine transportation, Ice navigation, Icebreakers, Natural resources, Economic development, Northwest passage

49-383

Environment of the Northwest Passage.

Mills, H., Transit management in the Northwest Passage: problems and prospects. Edited by C. Lamson and D.L. VanderZwaag, Cambridge University Press, 1988, p.8-64, Refs. p.60-64.

Ocean environments, Ice conditions, Natural resources, Northwest passage

49-384

Development of Northern ocean industries.

Mitchell, C.L., Transit management in the Northwest Passage: problems and prospects. Edited by C. Lamson and D.L. VanderZwaag, Cambridge University Press, 1988, p.65-99, Refs. p.97-99.

Economic development, Gas wells, Oil wells, Mining, Exploration, Natural resources, Northwest passage

49-385

Northern decision making: a drifting net in a restless sea.

VanderZwaag, D.L., Lamson, C., Transit management in the Northwest Passage: problems and prospects. Edited by C. Lamson and D.L. VanderZwaag, Cambridge University Press, 1988, p.153-250, Refs. p.230-250.

International cooperation, History, Gas pipelines, Oil wells, Northwest passage

49-386

Suitability of three intrusion-detection systems for cold regions use.

Peck, L., CR 89-24, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Dec. 1989, 37p.

Detection, Sensors, Cold weather operation, Environmental impact, Accuracy

The detection capabilities of two video motion-detection systems (Adpro, DAVID) and a fence-mounted capacitance sensor (Multiwire G-Line) have been determined under cold regions conditions at an intrusion detection system (IDS) test site in South Royalton, VT. Environmental effects on the performance of the IDS are reviewed. Alarm histories, including controlled intrusions and nuisance and false alarms, are presented.

49-387

Winter and transitional environmental effects on the reliability of exterior intrusion detection systems.

Peck, L., CR 92-10, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* May 1992, 44p.

Detection, Sensors, Accuracy, Cold weather operation, Snow cover effect, Temperature effects, Frozen ground

Environmentally induced changes in the detection capability of several commercially available intrusion detection systems (IDSs) were determined through long-term monitoring and controlled intrusions during Nov. 1990-Apr. 1991 and June-July 1991. The suite of IDSs included passive infrared, ported coaxial cable, microwave, vertical taut wire and fence vibration systems. Probabilities of detection and nuisance alarm occurrences were determined for conditions of unfrozen and frozen ground; snow depth of 0-27 cm; air temperatures of -25 to 30 C; and rain and snow storms. For selected IDSs, sensor/environment interaction was directly monitored.

49-388

Evaluation of SW846 method 8330 for characterization of sites contaminated with residues of high explosives.

Walsh, M.E., Jenkins, T.F., Schnitker, P.S., Elwell, J.W., Stutz, M.H., CR 93-05, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* June 1993, 17p., ADA-268 700, Refs. p.13-17.

Explosives, Soil pollution, Water pollution, Chemical analysis, Military research

A large body of analytical results from CRREL and the Missouri River Division Laboratory was used to assess how well EPA SW846 Method 8330 satisfies the Army need for characterization of explosives-contaminated water and soil samples. About 97% of the explosives-contaminated soils contained TNT, RDX and/or, 2,4-DNT, and these were the compounds found at highest concentrations. Environmental transformation products such as TNB, 2-amino- and 4-amino-DNT and 3,5-dinitroaniline (3,5-DNA) were also frequently observed. Explosives-contaminated water samples generally contained RDX, HMX and/or TNT. Transformation products commonly found included TNB, DNB, 2,4- and 2,6-DNT, 3,5-DNA and the two isomers of amino-DNT. Limitations of the primary and confirmatory RP-HPLC methods are discussed.

49-389

Experimental study on mechanical properties of circular slabs of frozen soils for starting of shield.

Izuta, H., Yamamoto, H., Ohrai, T., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings),* Sep. 1992, No.454, p.47-54, In Japanese with English summary. 13 refs.

Soil freezing, Artificial freezing, Frozen ground strength, Soil stabilization, Earthwork, Walls

49-390

Elasto-viscoplastic constitutive model for frozen sand.

Adachi, T., Oka, F., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings),* Sep. 1992, No.454, p.75-81, In Japanese with English summary. 16 refs.

Frozen ground strength, Frozen ground compression, Sands, Soil creep, Rheology, Viscoelasticity, Mathematical models

49-391

Method of evaluating the freeze-thaw resistance of early-age concrete utilizing the characteristics of its residual expansive strain.

Yamamoto, Y., Choai, T., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings),* Feb. 1993, No.460, p.75-84, In Japanese with English summary. 9 refs.

Concrete freezing, Concrete strength, Frost resistance, Freeze thaw tests

49-392

Studies on strength developing characteristics and freeze-thaw resistance of regulated set cement concrete at low temperature.

Nakashima, K., Yoshida, H., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings),* May 1993, No.466, p.21-30, In Japanese with English summary. 11 refs.

Concrete freezing, Concrete durability, Frost resistance, Freeze thaw tests, Winter concreting, Cements

49-393

Studies on pavement freezing predictions.

Takeichi, K., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings),* July 1993, No.470, p.175-184, In Japanese with English summary. 20 refs.

Road icing, Pavements, Frost forecasting, Road maintenance, Mathematical models

49-394

Fundamental study on the frost resistance of dam concrete based on long-term exposure test.

Egawa, K., Chiyoda, M., Nomoto, T., Noguchi, H., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings),* Aug. 1993, No.472, p.39-48, In Japanese with English summary. 14 refs.

Concrete freezing, Concrete durability, Frost resistance, Freeze thaw tests, Dams

49-395

Development of the new solar snowmelting system.

Mishima, N., Hoshino, K., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings),* Sep. 1993, No.474, p.33-36, In Japanese.

Artificial melting, Snow melting, Snow removal, Road maintenance, Solar radiation

49-396

Research on soil water behavior during unsaturated sandy ground freezing.

Nishigaki, M., Umeda, Y., Kono, I., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings),* Sep. 1993, No.475, p.39-48, In Japanese with English summary. 25 refs.

Soil freezing, Freezing front, Soil water migration, Sands, Mathematical models

49-397

Influence of freezing and thawing on suction and shearing strength of unsaturated soils.

Nishimura, T., Ogawa, S., Wada, T., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings),* Sep. 1993, No.475, p.59-67, In Japanese with English summary. 20 refs.

Soil freezing, Freezing front, Frost heave, Frozen ground compression, Frozen ground strength, Freeze thaw cycles, Soil water migration

49-398

Research on prediction of soil water behavior during ground freezing under closed system condition.

Umeda, Y., Nishigaki, M., Kono, I., *Doboku gakkai ronbunshu (Japan Society of Civil Engineers. Proceedings),* Dec. 1993, No.481, p.165-173, In Japanese with English summary. 13 refs.

Soil freezing, Freezing front, Soil water migration, Mathematical models

49-399

Observational and theoretical study of the radiative properties of cirrus: some results from ICE'89.

Francis, P.N., et al, *Royal Meteorological Society. Quarterly journal A,* July 1994, 120(518), p.809-848, 59 refs.

Cloud physics, Aerial surveys, Probes, Infrared radiation, Physical properties, Optical properties, Radiance, Water content, Ice crystal optics, Ice crystal size, Mathematical models

49-400

Multivariate analysis of arctic climate in GCMS.

McGinnis, D.L., Crane, R.G., *Journal of climate,* Aug. 1994, 7(8), p.1240-1250, 25 refs.

Polar atmospheres, Climatology, Global warming, Climatic changes, Climatic factors, Seasonal variations, Correlation, Ice cover effect, Statistical analysis, Mathematical models

49-401

Snow hydrology in a general circulation model.

Marshall, S., Roads, J.O., Glatzmaier, G., *Journal of climate,* Aug. 1994, 7(8), p.1251-1269, 52 refs.

Snow hydrology, Climatology, Hydrologic cycle, Snow cover distribution, Snow air interface, Snow cover effect, Surface temperature, Seasonal variations, Mathematical models

49-402

Prediction of ice accretion with viscous effects on aircraft wings.

Paraschivoiu, I., Tran, P., Brahimi, M.T., *Journal of aircraft,* July-Aug. 1994, 31(4), p.855-861, 12 refs.

Aircraft icing, Ice accretion, Glaze, Ice forecasting, Air flow, Viscous flow, Cloud droplets, Ice air interface, Computerized simulation

49-403

Sea-ice albedo experiment with the NMC Medium Range Forecast Model.

Grumbine, R.W., *Weather and forecasting,* Sep. 1994, 9(3), p.453-456, 10 refs.

Weather forecasting, Air temperature, Surface temperature, Sea ice distribution, Ice cover effect, Snow cover effect, Albedo, Diurnal variations, Accuracy, Mathematical models

49-404

Regime and mass energy exchange of subtropical latitude glaciers under monsoon climatic conditions: Gongga Shan, Sichuan, China.

Aizin, V.B., Aizin, H.M., *Mountain research and development,* May 1994, 14(2), p.101-118, 20 refs.

Mountain glaciers, Glacier surveys, Glacier mass balance, Glacial meteorology, Atmospheric circulation, Air masses, Precipitation (meteorology), Moisture transfer, Meteorological factors, Ice air interface, China—Sichuan

49-405

Contrast transfer for frozen-hydrated specimens. 2. Amplitude contrast at very low frequencies.

Toyoshima, C., Yonekura, K., *Ultramicroscopy,* Jan. 1993, 48(1-2), p.165-176, 35 refs.

Cryobiology, Hydrates, Frozen liquids, Electron microscopy, Imaging, Resolution, Amorphous ice, Ice microstructure, Microanalysis, Low frequencies

49-406

Late Pleistocene deposits at Broughton Bay, Gower, South Wales: evidence for deposition at a non-marine Devensian ice margin.

Campbell, S., Shakesby, R.A., *Geologists' Association. Proceedings,* July 1994, 105(3), p.167-185, 94 refs.

Pleistocene, Ice sheets, Land ice, Glacial geology, Glacial deposits, Sediment transport, Soil analysis, Lithology, Periglacial processes, United Kingdom—Wales

49-407

Discharge, water temperature and glaciers in the Aurland river basin.

Tvede, A.M., *Norsk geografisk tidsskrift,* May 1994, 48(1-2), p.23-28, 7 refs.

River basins, Electric power, River flow, Flow control, Water temperature, Glacier mass balance, Wind factors, Norway—Aurland Valley

49-408

Life cycle and precipitation formation in a hybrid-type hailstorm revealed by polarimetric and Doppler radar measurements.

Höller, H., et al, *Journal of the atmospheric sciences,* Sep. 1, 1994, 51(17), p.2500-2522, 43 refs.

Precipitation (meteorology), Remote sensing, Radar echoes, Classifications, Ice detection, Thunderstorms, Hailstone growth, Snow pellets

49-409
Tertiary plutons monitor climate change in East Greenland.
Nevle, R.J., et al, *Geology*, Sep. 1994, 22(9), p.775-778, 32 refs.
Paleoclimatology, Subpolar regions, Climatic changes, Tectonics, Hydrogeochemistry, Geologic structures, Mineralogy, Isotope analysis, Precipitation (meteorology), Greenland

49-410
Observation of submicron aerosol, black carbon and visibility degradation in remote area at temperature range from -24 to 20 C.
Raunemaa, T., Kikas, U., Bernotas, T., *Atmospheric environment*, Mar. 1994, 28(5), Conference on Visibility and Fine Particles, Vienna, Austria, Sep. 15-18, 1992, p.865-871, 15 refs.
Atmospheric composition, Sampling, Subpolar regions, Aerosols, Carbon black, Haze, Visibility, Solar radiation, Air temperature, Temperature effects, Correlation, Finland

49-411
Microscopic pattern of ice crystal growth in the presence of thermal hysteresis proteins.
Coger, R., Rubinsky, B., Fletcher, G., *Journal of offshore mechanics and arctic engineering*, Aug. 1994, 116(3), p.173-179, 26 refs.
Marine biology, Antifreezes, Solutions, Ice water interface, Ice crystal growth, Ice crystal structure, Phase transformations, Adsorption

49-412
Stochastic modeling of icicle formation.
Szilder, K., Lozowski, E.P., *Journal of offshore mechanics and arctic engineering*, Aug. 1994, 116(3), p.180-184, 7 refs. For another version see 47-4231.
Icicles, Ice formation, Ice water interface, Fluid dynamics, Simulation, Mathematical models

49-413
Hydrodynamic performance and cavitation of an open propeller in a simulated ice-blocked flow.
Walker, D., Bose, N., Yamaguchi, H., *Journal of offshore mechanics and arctic engineering*, Aug. 1994, 116(3), p.185-189, 13 refs.
Icebreakers, Propellers, Mechanical tests, Performance, Cavitation, Ice cover effect, Hydrodynamics

49-414
Fluxes of chemical species to the Greenland ice sheet at Summit by fog and dry deposition.
Bergin, M.H., et al, *Geochimica et cosmochimica acta*, Aug. 1994, 58(15), p.3207-3215, 30 refs.
Ice sheets, Atmospheric composition, Aerosols, Fog, Condensation nuclei, Scavenging, Snow air interface, Snow surface, Snow composition, Chemical composition, Greenland—Summit

49-415
Past and recent changes in the large-scale tropospheric cycles of lead and other heavy metals as documented in antarctic and Greenland snow and ice: a review.
Boutron, C.F., Candelone, J.P., Hong, S.M., *Geochimica et cosmochimica acta*, Aug. 1994, 58(15), p.3217-3225, 37 refs.
Ice sheets, Ice composition, Snow impurities, Metals, Air pollution, Paleoclimatology, Sampling, Environmental tests, Chemical analysis, Periodic variations, Greenland, Antarctica—East Antarctica
The investigation of the occurrence of lead and other heavy metals in antarctic and Greenland ancient ice and recent snow is of great interest in reconstructing the past natural tropospheric cycles of these metals and determining to what extent these cycles have now been altered by man. Because concentrations to be measured are exceedingly low, down to the sub pg/g level, reliable data can be obtained only if full control of contamination is achieved from field sampling to laboratory analysis. The available data show that the past natural concentrations of Pb, Cd, Zn, Cu, and Hg in antarctic ancient ice are highly dependent upon climatic conditions, the highest values occurring during the coldest periods of the ice ages, especially during the Last Glacial Maximum about 18,000 years ago. Human activity has led to an increase in lead concentrations during recent centuries both in Antarctica (tenfold increase) and in Greenland (two hundredfold increase). This last increase was followed by a 7.5-fold decrease during the past two decades, mainly as a consequence of the rapid fall in the use of lead alkyl additives in the USA as confirmed by recent isotopic data. (Auth. mod.)

49-416
Lead variability in the western North Atlantic Ocean and central Greenland ice: implications for the search for decadal trends in anthropogenic emissions.
Boyle, E.A., Sherrell, R.M., Bacon, M.P., *Geochimica et cosmochimica acta*, Aug. 1994, 58(15), p.3227-3238, 29 refs.
Surface waters, Ice sheets, Snow impurities, Periodic variations, Metals, Air pollution, Sampling, Isotope analysis, Environmental tests, Greenland

49-417
Composition and sources of atmospheric dusts in snow at 3200 meters in the St. Elias Range, southeastern Alaska, USA.
Hinkley, T.K., *Geochimica et cosmochimica acta*, Aug. 1994, 58(15), p.3245-3254, 57 refs.
Snow cover, Snow composition, Glacier surfaces, Atmospheric composition, Sampling, Dust, Metals, Rock properties, Origin, Geochemistry, Seasonal variations, Dusting, United States—Alaska—St. Elias Range

49-418
Isotopic evidence to account for changes in the concentration of lead in Greenland snow between 1960 and 1988.
Rosman, K.J.R., et al, *Geochimica et cosmochimica acta*, Aug. 1994, 58(15), p.3265-3269, 30 refs.
Ice sheets, Snow impurities, Sampling, Metals, Environmental tests, Air pollution, Isotope analysis, Periodic variations, Origin, Greenland—Summit

49-419
Numerical simulation of electromagnetic heating of Alaskan tar sands using horizontal wells.
Waddar, S.S., Islam, M.R., *Journal of Canadian petroleum technology*, Sep. 1994, 33(7), p.37-43, 13 refs.
Petroleum industry, Oil recovery, Oil wells, Sands, Rock properties, Electric heating, Permafrost bases, Mathematical models, United States—Alaska—Ugnu

49-420
Arctic sea ice concentrations from special sensor microwave imager and advanced very high resolution radiometer satellite data.
Emery, W.J., Fowler, C., Maslanik, J.A., *Journal of geophysical research*, Sep. 15, 1994, 99(C9), p.18,329-18,342, 25 refs.
Sea ice distribution, Seasonal variations, Remote sensing, Radiometry, Sensor mapping, Microwaves, Correlation, Accuracy, Data processing, Arctic Ocean

49-421
Contribution of Alaskan, Siberian, and Canadian coastal polynyas to the cold halocline layer of the Arctic Ocean.
Cavalieri, D.J., Martin, S., *Journal of geophysical research*, Sep. 15, 1994, 99(C9), p.18,343-18,362, 37 refs.
Oceanography, Geochemistry, Sea ice distribution, Polynyas, Ice growth, Sea water, Salinity, Brines, Water transport, Seasonal variations, Mathematical models, Bering Sea, Beaufort Sea, Chukchi Sea

49-422
Model of a drifting ice cover.
Marchenko, A.V., *Journal of applied mathematics and mechanics*, 1994, 58(1), p.43-58, Translated from Prikladnaia matematika i mekhanika. 20 refs.
Sea ice distribution, Drift, Pack ice, Ice mechanics, Ice water interface, Ice deformation, Rheology, Ice models, Mathematical models

49-423
Polycyclic aromatic hydrocarbons in the polar ice of Greenland. Geochemical use of these atmospheric tracers.
Jaffrezo, J.L., Clain, M.P., Masclet, P., *Atmospheric environment*, Apr. 1994, 28(6), p.1139-1145, 36 refs.
Atmospheric composition, Geochemistry, Air pollution, Aerosols, Hydrocarbons, Ice sheets, Snow composition, Seasonal variations, Sampling, Greenland

49-424
Noise spectrum of sea seismic prospecting in an ice environment.
Buravtsev, V.IU., *Acoustical physics*, Mar.-Apr. 1994, 40(2), p.272, Translated from Akuticheskii zhurnal.
Sea ice, Underwater acoustics, Seismic surveys, Noise (sound), Wave propagation, Ice cover effect, Seismic reflection, Propellers

49-425
Particulate carbonate matter in snow from selected sites in the south-central Rocky Mountains.
Clow, D.W., Ingersoll, G.P., *Atmospheric environment*, Feb. 1994, 28(4), p.575-584, 38 refs.
Precipitation (meteorology), Snow hydrology, Snowmelt, Hydrogeochemistry, Eolian soils, Particles, Snow composition, Ion density (concentration), Sampling, Environmental tests, United States—Colorado, United States—Utah, United States—Wyoming

49-426
Chemical composition of aerosols over the eastern Himalayas and Tibetan Plateau during low dust periods.
Wake, C.P., et al, *Atmospheric environment*, Feb. 1994, 28(4), p.695-704, 59 refs.
Atmospheric composition, Aerosols, Chemical composition, Snow composition, Sampling, Ion density (concentration), Mountains, Tibet—Himalaya Mountains

49-427
Clay cutting trials improve Midgard ploughmark picture.
Cottrill, A., *Offshore engineer*, Aug. 1994, p.23-26.
Marine geology, Ice scoring, Offshore structures, Pipe laying, Pipeline supports, Trenching, Clay soils, Hydraulic jets, Bottom topography, Norway—Haltenbanken

49-428
Evaporation of intercepted snow: analysis of governing factors.
Lundberg, A., Halldin, S., *Water resources research*, Sep. 1994, 30(9), p.2587-2598, 41 refs.
Snowfall, Forest canopy, Interception, Snow evaporation, Snow physics, Snow air interface, Meteorological factors, Forecasting, Analysis (mathematics)

49-429
How Burlington County controls bridge ice. *Better roads*, Sep. 1994, 64(9), p.39-40.
Road maintenance, Winter maintenance, Bridges, Protection, Ice control, Ice removal, Salting, United States—New Jersey

49-430
SHRP research yields snow plow technology. *Better roads*, Sep. 1994, 64(9), p.44.
Road maintenance, Winter maintenance, Snow removal, Equipment, Design

49-431
Regeneration of subalpine fir *(Abies lasiocarpa)* following fire: effects of climate and other factors.
Little, R.L., Peterson, D.L., Conquest, L.L., *Canadian journal of forest research*, May 1994, 24(5), p.934-944, With French summary. 54 refs.
Trees (plants), Growth, Plant ecology, Revegetation, Forest fires, Environmental impact, Climatic factors, Snow cover effect, Seasonal variations, United States—Washington—Rainier, Mt.

49-432
Viability tests for estimating root cold tolerance of black spruce seedlings.
Bigras, F.J., Calmé, S., *Canadian journal of forest research*, May 1994, 24(5), p.1039-1048, With French summary. 51 refs.
Forestry, Trees (plants), Plant tissues, Damage, Cold tolerance, Frost resistance, Viability, Cold weather tests, Temperature effects

49-433
Global radiation within subarctic open forest canopies.
Lafleur, P.M., Mantha, B.K., *Canadian journal of forest research*, May 1994, 24(5), p.1062-1066, With French summary. 9 refs.
Subarctic landscapes, Forest canopy, Solar radiation, Interception, Photometry, Radiation balance, Environmental tests, Statistical analysis, Mathematical models, Canada—Manitoba—Churchill

49-434
Seasonal and geographic origin effects on cold hardiness of white spruce buds, foliage, and stems.
Simpson, D.G., *Canadian journal of forest research*, May 1994, 24(5), p.1066-1070, With French summary. 23 refs.
Trees (plants), Plant tissues, Growth, Acclimatization, Cold tolerance, Frost resistance, Cold weather tests, Temperature effects, Seasonal variations, Canada—British Columbia

49-435
1993 Northeast Water Expedition data report of RV *Polarstern* Arctic cruises ARK IX/2 and 3. [Die Nordostwasser-Polynja-Expedition 1993 Datenband der Arktis-Reisen ARK IX/2 und 3 mit FS *Polarstern*]
Kattner, G., ed, Hirche, H.J., ed, *Berichte zur Polarforschung*, 1994, No.145, 267p., For the single individual report see 49-436.
Expeditions, Sea water, Ecosystems, Water chemistry, Marine biology, Greenland Sea

49-436
Zooplankton grazing.
Acuña, J.L., Deibel, D., *Berichte zur Polarforschung*, 1994, No.145, p.250-254, 4 refs.
Plankton, Polynyas, Laboratory techniques, Ecosystems

49-437
Russian-German cooperation in the Siberian Shelf seas: Geosystem Laptev Sea.
Kassens, H., ed, Hubberten, H.W., ed, Priamikov, S.M., ed, Stein, R., ed, *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993, 133p., Refs. passim. For individual papers see 49-438 through 49-452.
Meetings, Oceanography, Marine biology, Climatology, Sea ice, Russia—Laptev Sea, Russia—East Siberian Sea

49-438
Arctic seas in the Arctic climate system.
Alekseev, G.V., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.3-8, 17 refs.
Sea water, Chemical composition, Sea ice, Arctic Ocean

49-439
Arctic Shelves: their role in water mass.
Schauer, U., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.9-13, 8 refs.
Sea water, Water balance, Bottom topography, Salt water

49-440
Regional characteristics of the Laptev and the East Siberian Seas: climate, topography, ice phases, thermohaline regime, circulation.
Timokhov, L.A., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.15-31, 5 refs.
Climate, Sea ice, Ocean currents, Bottom topography, Drift, Wind (meteorology), Water temperature

49-441
On the character of cause and effect relationships between sea ice and thermal conditions in the atmosphere.
Zakharov, V.F., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.33-43, 4 refs.
Climatic changes, Air temperature, Sea ice distribution, Heat flux

49-442
Laptev Sea shelf ice regime from a western perspective.
Reimnitz, R., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.45-47, 3 refs.
Sea ice, Ice physics, Russia—Laptev Sea

49-443
Dynamics of the Laptev Sea flaw lead.
Dethleff, D., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.49-54, 8 refs.
Sea ice, Floating ice, Ice mechanics, Russia—Laptev Sea

49-444
Sea ice variation and biological productivity in the Polar Basin.
Abramov, V.A., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.55-68, 2 refs.
Biomass, Sea ice, Seasonal variations, Arctic Ocean, Barents Sea

49-445
Current knowledge on biodiversity and benthic zonation patterns of Eurasian Arctic shelf seas, with special reference to the Laptev Sea.
Sirenko, B.I., Piepenburg, D., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.69-77, 6 refs.
Marine biology, Biomass, Benthos, Russia—Laptev Sea

49-446
Climatological significance of Arctic sea ice at present and in the past.
Kassens, H., Thiede, J., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.81-85, 20 refs.
Sea ice, Climatic changes, Sediments, Arctic Ocean

49-447
Shelf-to-basin sediment transport in the eastern Arctic Ocean.
Stein, R., Korolev, S., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.87-100, 35 refs.
Sediment transport, Sea ice, Ocean currents, Arctic Ocean

49-448
Late Quaternary changes in the Arctic Ocean ice cover.
Spielhagen, R.F., Thiede, J., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.101-105, 9 refs.
Sea ice, Ice cover, Sediments, Coring

49-449
Evolution peculiarities of the Laptev Sea geosystem as a key region in the Arctic.
Ivanov, V.L., et al, *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.107-110.
Oceans, Geosystem model, Russia—Laptev Sea

49-450
Nansen Arctic drilling programme (NAD).
Thiede, J., Fütterer, D.K., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.111-113.
Offshore drilling, Sediments, Coring, Arctic Ocean

49-451
Structure and plate tectonics of Laptev Shelf: drilling of the geological record.
Drachev, S.S., Savostin, L.A., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.115-116.
Drilling, Russia—Laptev Sea

49-452
Sedimentation in the Norwegian-Greenland Basin and in the region of Iceland.
Emel'ianov, E.M., *Berichte zur Polarforschung*, 1994, No.144, Russian-German Cooperation In and Around the Laptev Sea, Workshop, St. Petersburg, Russia, May 1993. Edited by H. Kassens, H.W. Hubberten, S.M. Priamikov, and R. Stein, p.117-133, 11 refs.
Bottom sediment, Sea ice, Icebergs, Greenland Sea, Norwegian Sea, Iceland

49-453
Detailed seismic refraction investigations, inner Scoresby Sound/East Greenland. [Detaillierte refraktionsseismische Untersuchungen im inneren Scorseby Sund/Ost-Grönland]
Fechner, N., *Berichte zur Polarforschung*, 1994, No.143, 186p., In German with English summary. Refs. p.159-163.
Geophysical surveys, Seismic refraction, Bottom topography, Sediments, Marine geology, Norwegian Sea, Greenland—Scoresby Sund

49-454
1993 Northeast Water Expedition scientific cruise report of RV *Polarstern* Arctic cruises ARK IX/2 and 3, USCG *Polar Sea* NEWP and the NEW-Land Expedition. [Die Nordostwasser-Polynya-Expedition 1993 Wissenschaftlicher Fahrtbericht über die *Polarstern* Reisen ARK IX/2 und 3, die USCG *Polar Sea* Reise NEWP und die NEWLand Expedition]
Hirche, H.J., ed, Kattner, G., ed, *Berichte zur Polarforschung*, 1994, No.142, 190p., Refs. passim.
Expeditions, Polynyas, Ecosystems, Sea water, Chemical composition, Sea ice, Marine biology, Marine geology, Marine meteorology, Greenland, Greenland Sea

49-455

Transient processes and overvoltages in Northern power system elements. [Perekhodnye protsessy i perenapriazheniia v elementakh elektroenergosistem Severa]

Zarkhi, I.M., ed, Apatity, Kol'ski-i nauchny-i tsentr RAN, 1992, 113p., In Russian with English summary and table of contents. Refs. passim. For selected papers see 49-456 through 49-465.

Electrical grounding, Electric power, Transmission lines, Power lines, Cold weather operation

49-456

Influence of the skin effect in soil on the parameters of overhead transmission lines and the deformation of lightning surges on wires. [Vliianie poverkhnostnogo effekta v zemle na parametry LEP i deformatsiiu grozovykh voln na provodakh]

Danilin, A.N., Dergaev, IU.M., Efimov, B.V., Perekhodnye protsessy i perenapriazheniia v elementakh elektroenergosistem Severa (Transient processes and overvoltages in Northern power system elements). Edited by I.M. Zarkhi, Apatity, Kol'ski-i nauchny-i tsentr RAN, 1992, p.5-15, In Russian. 2 refs.

Transmission lines, Analysis (mathematics), Cold weather operation

49-457

Method of calculating the number of lightning disconnections of overhead transmission lines. [Metodika rascheta chisla grozovykh otkliucheni-i LEP]

Dergaev, IU.M., Efimov, B.V., Perekhodnye protsessy i perenapriazheniia v elementakh elektroenergosistem Severa (Transient processes and overvoltages in Northern power system elements). Edited by I.M. Zarkhi, Apatity, Kol'ski-i nauchny-i tsentr RAN, 1992, p.15-23, In Russian. 7 refs.

Transmission lines, Analysis (mathematics), Cold weather operation

49-458

Characteristics of mathematical modeling of transient processes in high tension supplies. [Osobennosti matematicheskogo modelirovaniia perekhodnykh protsessov v setiakh vysokogo napriazheniia]

Deeva, T.E., Nevretdinov, IU.M., Perekhodnye protsessy i perenapriazheniia v elementakh elektroenergosistem Severa (Transient processes and overvoltages in Northern power system elements). Edited by I.M. Zarkhi, Apatity, Kol'ski-i nauchny-i tsentr RAN, 1992, p.24-40, In Russian. 7 refs.

Mathematical models, Electrical grounding, Protection, Lightning, Cold weather operation

49-459

Results of experimental investigations of lightning protection for 110 kilovolt substations. [Rezul'taty eksperimental'nykh issledovani-i grozozashchity podstantsi-i 110 kV]

Nevretdinov, IU.M., Deeva, T.E., Petrov, E.P., Seniushina, L.V., Perekhodnye protsessy i perenapriazheniia v elementakh elektroenergosistem Severa (Transient processes and overvoltages in Northern power system elements). Edited by I.M. Zarkhi, Apatity, Kol'ski-i nauchny-i tsentr RAN, 1992, p.40-50, In Russian. 4 refs.

Protection, Lightning, Electric power, Cold weather operation

49-460

Using fiber optic cables for high voltage impulse measurements. [Ispol'zovanie volokonnoopticheskikh kabele-i v vysokovol'tnykh impul'snykh izmereniiakh]

Danilin, A.N., Perekhodnye protsessy i perenapriazheniia v elementakh elektroenergosistem Severa (Transient processes and overvoltages in Northern power system elements). Edited by I.M. Zarkhi, Apatity, Kol'ski-i nauchny-i tsentr RAN, 1992, p.51-55, In Russian. 2 refs.

Electrical measurement, Power lines, Transmission lines, Cold weather operation

49-461

Characteristics of the development of internal overvoltage processes in the 10 kilovolt systems of the "Nikel" Plant. [Osobennosti razvitiia vnutrennikh perenapriazheni-i v seti 10 kV PO "Nikel"]

Nevretdinov, IU.M., Khalipov, F.Kh., Perekhodnye protsessy i perenapriazheniia v elementakh elektroenergosistem Severa (Transient processes and overvoltages in Northern power system elements). Edited by I.M. Zarkhi, Apatity, Kol'ski-i nauchny-i tsentr RAN, 1992, p.56-62, In Russian. 3 refs.

Electric power, Accidents, Safety, Cold weather operation

49-462

Method of calculating quasi-stationary overvoltages in underground communications cables with protective lines. [Metodika rascheta kvazistatsionarnykh perenapriazheni-i v podzemnykh kabel'nykh sviazi s zashchitnymi trosami]

Zarkhi, I.M., Kontorovich, A.M., Fasti-i, G.P., Perekhodnye protsessy i perenapriazheniia v elementakh elektroenergosistem Severa (Transient processes and overvoltages in Northern power system elements). Edited by I.M. Zarkhi, Apatity, Kol'ski-i nauchny-i tsentr RAN, 1992, p.63-77, In Russian. 7 refs.

Analysis (mathematics), Underground cables, Transmission lines, Cold weather operation

49-463

Calculating discrete non-homogeneity while calculating quasi-stationary overvoltages in underground communications cables. [Uchet diskretnykh neodnorodnoste-i pri raschete kvazistatsionarnykh perenapriazhenii v podzemnykh kabeliakh sviazi]

Zarkhi, I.M., Kontorovich, A.M., Fasti-i, G.P., Perekhodnye protsessy i perenapriazheniia v elementakh elektroenergosistem Severa (Transient processes and overvoltages in Northern power system elements). Edited by I.M. Zarkhi, Apatity, Kol'ski-i nauchny-i tsentr RAN, 1992, p.78-87, In Russian. 2 refs.

Analysis (mathematics), Underground cables, Transmission lines, Cold weather operation

49-464

Calculating energy regimes during electrically discharging softening ore. [Raschet energeticheskikh rezhimov pri elektrorazriadnom razuprochnenii rud]

Usov, A.F., Deeva, M.E., Perekhodnye protsessy i perenapriazheniia v elementakh elektroenergosistem Severa (Transient processes and overvoltages in Northern power system elements). Edited by I.M. Zarkhi, Apatity, Kol'ski-i nauchny-i tsentr RAN, 1992, p.88-98, In Russian. 4 refs.

Analysis (mathematics), Electric power, Cold weather operation

49-465

Rating the category of high-voltage electro-physical equipment with respect to safety measures. [Ustanovlenie kategorii vysokovol'tnykh elektrofizicheskikh ustanovok v otnoshenii mer bezopasnosti]

Usov, A.F., Deeva, M.E., Perekhodnye protsessy i perenapriazheniia v elementakh elektroenergosistem Severa (Transient processes and overvoltages in Northern power system elements). Edited by I.M. Zarkhi, Apatity, Kol'ski-i nauchny-i tsentr RAN, 1992, p.98-103, In Russian. 2 refs.

Safety, Electric equipment, Electrical grounding, Cold weather operation

49-466

Thermal regime of saline compound soils. [Teplovo-i rezhim pochv solontsovykh kompleksov]

Voronina, L.V., Novosibirsk, Nauka, 1992, 142p., In Russian. Refs. p.130-142.

Saline soils, Cryogenic soils, Thermal regime, Forest soils, Heat balance, Steppes, Frozen ground temperature, Soil temperature, Russia—Siberia

49-467

Soil variability in space and time. [Izmenchivost' pochvy v prostranstve i vo vremeni]

Kerzhentsev, A.S., Moscow, Nauka, 1992, 109p., In Russian. Refs. p.108-109.

Cryogenic soils, Soil formation, Frozen ground mechanics, Frozen ground physics, Frozen ground temperature, Thermal regime, Soil water migration, Ecosystems, Russia—Transbaikal

49-468

Diene polymer rubbers with better low temperature characteristics.

Imai, A., Seki, T., *European Patent Office. Patent*, Sep. 27, 1989, n.p., No.334042.

Tires, Rubber, Rubber ice friction, Rubber snow friction, Traction

49-469

Electrical anti-icer for a turbomachine.

Dooley, K.A., Morris, E.A., *U.S. Patent Office. Patent*, Jan. 25, 1994, n.p., USP-5,281,091.

Aircraft icing, Ice prevention, Artificial melting, Jet engines, Electric heating

49-470

Non-skid snow chain ramps.

Summey, K., *U.S. Patent Office. Patent*, Jan. 18, 1994, n.p., USP-5,279,346.

Vehicle wheels, Tires, Skid resistance, Road icing, Tire chains

49-471

Gas turbine engine variable bleed pivotal flow splitter.

Hines, W.R., Liu, H.T., *U.S. Patent Office. Patent*, Jan. 18, 1994, n.p., USP-5,279,109.

Aircraft icing, Jet engines, Ice removal, Air flow, Flow control

49-472

Reduced icing low friction air valve.

Powers, F.A., *U.S. Patent Office. Patent*, Jan. 11, 1994, n.p., USP-5,277,099.

Compressors, Engines, Valves, Ice prevention

49-473

Exposed high voltage outdoor disconnector for operation under icing conditions.

Daigneault, G., Demissy, D., *U.S. Patent Office. Patent*, Jan. 4, 1994, n.p., USP-5,276,286.

Power line icing, Ice removal, Electric equipment

49-474

Ice deformation measurement device.

Shushlebin, A.I., Smirnov, V.N., *Russia Patent Office. Patent*, Dec. 30, 1992, n.p., No.1784888.

Ice surveys, Ice deformation, Ice cover strength, Measuring instruments

49-475

Underground pipe-laying procedure, especially in permafrost ground.

Luntovski-i, E.A., Perel'miter, A.D., Stasev, V.V., *Russia Patent Office. Patent*, Dec. 30, 1992, n.p., No.1784795.

Pipe laying, Underground pipelines, Permafrost beneath structures, Permafrost preservation, Trenching, Artificial freezing

49-476

Method of reducing heat loss from quarry water area.

Roshchupkin, D.V., *Russia Patent Office. Patent*, Dec. 30, 1992, n.p., No.1784712.

Quarries, Ice control, Thermal insulation

49-477

Electric pulse anti-icing system.

Fomenko, A.T., Nikulin, V.I., *Russia Patent Office. Patent*, Dec. 30, 1992, n.p., No.1784712.

Aircraft icing, Ice prevention, Jet engines, Electric equipment

49-478

Pneumatic tyre for wear resistance, steering stability and ice performance.

Bridgestone Corporation, *Japan Patent Office. Patent*, Dec. 14, 1993, n.p., No.5330312.

Tires, Rubber ice friction, Traction

49-479

Chipping resistant paint composition for superior de-icing and anti-icing performance.

Kanto Auto Works Ltd., Shinto Paint Co. Ltd., *Japan Patent Office. Patent,* Dec. 14, 1993, n.p., No.5331407.

Motor vehicles, Protective coatings, Chemical ice prevention

49-480

Tyre tread pattern of good appearance and free from irregular wear.

Kato, Y., *European Patent Office. Patent,* Jan. 19, 1994, n.p., No.579436.

Tires, Rubber ice friction, Rubber snow friction, Traction

49-481

Pneumatic tyre having series of blocks each with two sides.

Aoki, N., Ichiki, Y., Tanabe, C., *European Patent Office. Patent,* May 5, 1993, n.p., No.540339.

Tires, Rubber ice friction, Traction

49-482

Vehicle body for containing separate road treatment materials.

Jansen, J., *European Patent Office. Patent,* Jan. 19, 1994, n.p., No.579311.

Road icing, Road maintenance, Motor vehicles, Salting, Sanding, Chemical ice prevention

49-483

Gummy polymer composition for all season tyres with good abrasion resistance.

Asahi Chemical Industry Co. Ltd., *Japan Patent Office. Patent,* Nov. 9, 1993, n.p., No.5295174.

Tires, Rubber, Rubber ice friction, Traction

49-484

Augmenting rainfall by cloud seeding.

Gavish, M., Lahav, M., Leiserowitz, L., Popovitz-Biro, R., *Austria Patent Office. Patent,* July 18, 1991, n.p., No.9169398.

Cloud seeding, Artificial nucleation, Artificial precipitation, Weather modification, Ice nuclei, Organic nuclei

49-485

Rainwater flow ensuring device especially on flat roofs.

Johnsen, A., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Jan. 20, 1994, n.p., No.9401637.

Roofs, Artificial melting, Ice melting, Ice prevention, Electric heating

49-486

Method of caving hard-to-cave mine roof.

Chernukha, IU.I., Ovchinnikov, V.F., Valukonis, G.IU., *Russia Patent Office. Patent,* Jan. 7, 1993, n.p., No.1786265.

Mine shafts, Rock excavation, Artificial freezing, Frost shattering

49-487

Destruction of rigid materials.

Levertov, M.G., Liubarskii, B.S., Valukonis, G.IU., *Russia Patent Office. Patent,* Jan. 7, 1993, n.p., No.1786256.

Rock excavation, Artificial freezing, Frost shattering

49-488

Vegetable store, for use in zones with a severe continental climate.

Ermokhin, V.G., *Russia Patent Office. Patent,* Jan. 7, 1993, n.p., No.1785607.

Cold storage, Artificial freezing, Ice (construction material), Ice thermal properties

49-489

Auger drilling unit.

Eresko, S.P., Eresko, T.T., *Russia Patent Office. Patent,* Jan. 7, 1993, n.p., No.1786237.

Augers, Rock drilling, Frozen rock strength, Frozen ground strength

49-490

Studless tyre with projected fibres on its tread surface.

Bando Chemical Industries Ltd., Railway Technical Research Institute, *Japan Patent Office. Patent,* Dec. 21, 1993, n.p., No.5339427.

Tires, Rubber, Rubber ice friction, Rubber snow friction, Traction

49-491

Anti-aquaplaning system for road vehicle.

Bodier, R., Schmidt, H., *European Patent Office. Patent,* Jan. 26, 1994, n.p., No.580006.

Motor vehicles, Vehicle wheels, Road icing, Skid resistance

49-492

Optical sensor for chemical species or ice.

Klainer, S.M., Milanovich, F.P., Klainer, J.S., Milanovich, F.F., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Sep. 8, 1989, n.p., No.8908273.

Ice detection, Ice optics, Ice formation indicators

49-493

Wintering of JARE-34 (1992-1994): drilling at Dome F.

Enomoto, H., *Polar news,* Aug. 1994, No.59, p.18-22, In Japanese.

Expeditions, Research projects, Ice cores

A trip by 9 members of the 34th Japanese Antarctic Research Expedition to the deep core drilling site at Dome F about 1000 km south of Showa Station is described. The team left Showa Station Oct. 21, 1993, arrived at the site Nov. 28, and returned to Showa Station Jan. 10, 1994. The site is on a snowfield at an elevation of 3800 m a.s.l. where the ice sheet is over 2000 m thick and should contain a record of over 100,000 years. The first trial core was obtained from 112 m.

49-494

What's happening in Siberia? A report on Japan-Russia joint research on the Siberian permafrost.

Fukuda, M., Inoue, G., Takahashi, K., Ota, Y., *Polar news,* Mar. 1994, No.58, p.6-10, In Japanese.

Permafrost surveys, Permafrost distribution, Permafrost forecasting, Soil air interface, Global warming, Research projects, Russia—Siberia

49-495

Ice navigation in Lützow-Holm Bay in the Antarctic.

Saito, K., *Polar news,* Mar. 1994, No.58, p.16-21, In Japanese.

Ice navigation, Sea ice distribution, Ice conditions, Ice cover thickness, Snow ice interface, Antarctica—Lützow-Holm Bay

This is mainly a personal account of the author's experiences on three Japanese cruises through Lützow-Holm Bay to Showa Station, the 30th in the summer of 1988/89, the 32nd in the summer of 1990/91, and the 33rd in the summer of 1991/92. Two tables are included comparing the conditions of the pack ice and fast ice on each of the three cruises. The table for the pack ice shows the coordinates of the ice edge, the percentage of ice coverage, the ice thickness, and the snow depth on the ice; and the table for the fast ice shows the coordinates of entry into the fast ice, and also the ice thickness and snow depth on the ice.

49-496

35th Japanese Antarctic Research Expedition in 1993-1995.

Watanabe, O., *Polar news,* Mar. 1994, No.58, p.27-30, In Japanese.

Expeditions, Research projects, Antarctica

Activities of the 35th Japanese Antarctic Research Expedition with 56 members (40 in the wintering team and 16 in the summer team), scheduled for Dec. 1993-Feb. 1995, are summarized. A table is included listing the names, fields of interest, ages, and affiliations of the expedition members. Planned research activities include studies on the sea ice biota, paleomagnetism, quaternary fluctuations in the ice sheet, ozone, and evidence of global change. The largest operation involves continuation of construction of facilities and transport of supplies for deep core drilling at the site designated Dome F (Fuji). The initiation of drilling is scheduled for the next Japanese expedition, the 36th.

49-497

Cenozoic margin development and erosion of the Barents Sea: core evidence from southwest of Bjørnøya.

Saettem, J., et al, *Marine geology,* May 1994, 118(3-4), p.257-281, Refs. p.279-281.

Marine geology, Pleistocene, Ocean bottom, Seismic surveys, Boreholes, Drill core analysis, Sedimentation, Stratigraphy, Tectonics, Glacial erosion, Barents Sea

49-498

Mud-flat cycles, incised channels, and relative sea-level changes on a Paleocene mud-dominated coast, Ellesmere Island, arctic Canada.

Ricketts, B.D., *Journal of sedimentary research,* May 16, 1994, B64(2), p.211-218, 27 refs.

Arctic landscapes, Geologic processes, Marine geology, Shores, Sedimentation, Mud, Stratigraphy, Stratification, Sea level, Canada—Northwest Territories—Ellesmere Island

49-499

Negative cluster ion formation from water ice in high electric fields.

Stintz, A., Panitz, J.A., *International journal of mass spectrometry and ion processes,* Apr. 21, 1994, 133(1), p.59-64, 40 refs.

Ice physics, Amorphous ice, Ice solid interface, Electric fields, Ionization, Polarization (charge separation), Ice spectroscopy, Ice sublimation

49-500

Differentiated estimate of structure-mechanical properties of peat under phase transitions.

Gamaiunov, N.I., Mironov, V.A., Stotland, D.M., Shekhab, Kh.IU., *Colloid journal,* May-June 1994, 56(3), p.280-286, Translated from Kolloidnyi zhurnal. 20 refs.

Peat, Geocryology, Mechanical properties, Phase transformations, Ice sublimation, Frozen ground strength, Frozen ground mechanics, Mechanical tests, Deformation

49-501

Formation of inhomogeneity in pore spaces in heavy swelling soils upon freezing-thawing.

Domzhal, Kh., Us'iarov, O.G., *Colloid journal,* May-June 1994, 56(3), p.287-292, Translated from Kolloidnyi zhurnal. 23 refs.

Soil mechanics, Geocryology, Soil tests, Soil structure, Porosity, Frozen ground expansion, Phase transformations, Freeze thaw cycles, Water transport, Permeability

49-502

Nucleation of crystals under Langmuir monolayers: kinetic and morphological data for the nucleation of ice.

Davey, R.J., et al, *Langmuir,* June 1994, 10(6), p.1673-1675, 12 refs.

Ice physics, Ice crystal growth, Heterogeneous nucleation, Interfacial tension, Monomolecular films, Hydrocarbons, Ice water interface, Nucleation rate

49-503

Determining the phase transition of condensate formed by heterogeneous nucleation of condensable vapors onto a cold substrate.

Shinagawa, H., et al, *Journal of chemical engineering of Japan,* June 1994, 27(3), p.284-290, 12 refs.

Heterogeneous nucleation, Vapor transfer, Water vapor, Vapor pressure, Phase transformations, Liquid solid interfaces, Condensation, Freezing, Supersaturation, Temperature effects

49-504

Extrinsic premelting at the ice-glass interface.

Beaglehole, D., Wilson, P., *Journal of physical chemistry,* Aug. 18, 1994, 98(33), p.8096-8100, 24 refs.

Ice physics, Ice solid interface, Ice water interface, Ice melting, Water films, Surface energy, Surface roughness, Wettability, Temperature effects

49-505

Arctic-alpine flora at low elevation in Marble Canyon, Kootenay National Park, British Columbia.

Hogg, E.H., *Canadian field-naturalist,* July-Sep. 1993, 107(3), p.283-292, 13 refs.

Plant ecology, Ecosystems, Vegetation patterns, Altitude, Distribution, Classifications, Climatic factors, Microclimatology, Canada—British Columbia—Kootenay National Park

49-506

Importance of electrostatic interactions between nonbonded molecules in ice.

Silvi, B., *Physical review letters,* Aug. 8, 1994, 73(6), p.842-845, 25 refs.

Ice physics, High pressure ice, Molecular structure, Molecular energy levels, Hydrogen bonds, Electric charge, Polarization (charge separation), Ice electrical properties, Simulation

49-507

Channelized subglacial drainage over a deformable bed.

Walder, J.S., Fowler, A., *Journal of glaciology,* 1994, 140(134), p.3-15, 53 refs.

Glaciology, Glacial hydrology, Glacial geology, Subglacial drainage, Glacier beds, Creep, Shear stress, Ice solid interface, Meltwater, Water pressure, Mathematical models

49-508

Temporal evolution of physical and dielectric properties of sea ice and snow during the early melt season: observations from SIMS '90 experiment.

Shokr, M.E., Barber, D.G., *Journal of glaciology,* 1994, 140(134), p.16-30, 37 refs.

Sea ice, Ice surveys, Geophysical surveys, Ice melting, Snow melting, Snow cover effect, Physical properties, Dielectric properties, Salinity, Seasonal variations, Canada—Northwest Territories—Cornwallis Island

49-509

Winter sea-ice mapping from multi-parameter synthetic-aperture radar data.

Rignot, E.J.M., Drinkwater, M.R., *Journal of glaciology,* 1994, 140(134), p.31-45, 52 refs.

Sea ice distribution, Spaceborne photography, Synthetic aperture radar, Ice surveys, Sensor mapping, Ice conditions, Classifications, Winter, Beaufort Sea

49-510

Comparison between experiment and computer modelling of plane-strain simple-shear ice deformation.

Wilson, C.J.L., Zhang, Y., *Journal of glaciology,* 1994, 140(134), p.46-55, 21 refs.

Ice mechanics, Ice deformation, Plastic deformation, Ice microstructure, Grain size, Orientation, Shear strain, Temperature effects, Mechanical tests, Computerized simulation

49-511

Accumulation-rate variations around Summit, Greenland.

Bolzan, J.F., Strobel, M., *Journal of glaciology,* 1994, 140(134), p.56-66, 16 refs.

Ice sheets, Glacier mass balance, Glacier oscillation, Glacier surveys, Glacial meteorology, Ice cores, Sampling, Isotope analysis, Stratigraphy, Periodic variations, Greenland—Summit

49-512

Short-term velocity variations and basal coupling near a bergschrund, Storglaciären, Sweden.

Hanson, B., Hooke, R.L., *Journal of glaciology,* 1994, 140(134), p.67-74, 10 refs.

Glaciology, Cirque glaciers, Glacier flow, Glacial hydrology, Meltwater, Basal sliding, Ice solid interface, Velocity measurement, Diurnal variations, Sweden

49-513

Observation of roll waves in a supraglacial meltwater channel, Harlech Gletscher, East Greenland.

Carver, S., Sear, D., Valentine, E., *Journal of glaciology,* 1994, 140(134), p.75-78, 10 refs.

Glaciology, Glacial hydrology, Glacier surfaces, Meltwater, Water flow, Unsteady flow, Water waves, Wave propagation, Ice water interface, Diurnal variations, Greenland—Harlech Gletscher

49-514

Air-hydrate crystals in deep ice-core samples from Vostok Station, Antarctica.

Uchida, T., et al, *Journal of glaciology,* 1994, 140(134), p.79-86, 17 refs.

Ice sheets, Paleoclimatology, Ice cores, Sampling, Profiles, Hydrates, Clathrates, Ice crystal growth, Ice crystal structure, Ice microstructure, Ice density, Greenland—Dye 3, Antarctica—Vostok Station

Microscopic observation of air-hydrate crystals was carried out using 34 deep ice-core samples retrieved at Vostok Station. Samples were obtained from depths between 1050 and 2542 m, which correspond to Wisconsin/Sangamon/Illinoian ice. It was found that the volume and number of air-hydrate crystals varied with the climatic changes. The volume concentration of air-hydrate in the interglacial ice was about 30% larger than that in the glacial ice. In the interglacial ice, the number concentration of air-hydrate was about half and the mean volume of air-hydrate was nearly three times larger than that in the glacial-age ice. The air-hydrate crystals were found to grow in the ice sheet, at about 6.7×10^{-12} cm^3/year, in compensation for the disappearance of smaller ones. The volume concentration of air-hydrate was related to the total gas content by a geometrical equation with a proportional parameter *alpha*. The mean value of *alpha* below 1250 m, where no air bubbles were found, was about 0.79. This coincided with an experimentally determined value of the crystalline site occupancy of the air-hydrate in a 1500 m core obtained at Dye 3, Greenland. In the depth profile of calculated *alpha* for many samples, *alpha* in the interglacial ice was about 30% smaller than that in the glacial ice. (Auth. mod.)

49-515

^{137}Cs gamma-ray detection at Summit, Greenland.

Dunphy, P.P., Dibb, J.E., *Journal of glaciology,* 1994, 140(134), p.87-92, 24 refs.

Glaciology, Ice sheets, Ice composition, Boreholes, Fallout, Periodic variations, Radioactive isotopes, Isotope analysis, Ice spectroscopy, Greenland—Summit

49-516

Measuring glacier outflows using a computerized conductivity system.

Kite, G., *Journal of glaciology,* 1994, 140(134), p.93-96, 6 refs.

Glacial hydrology, Glacial rivers, Stream flow, Flow measurement, Velocity measurement, Electrical resistivity, Electrical measurement, Computer applications, Computer programs

49-517

Ploughing of subglacial sediment.

Fischer, U.H., Clarke, G.K.C., *Journal of glaciology,* 1994, 140(134), p.97-106, 30 refs.

Glaciology, Subglacial observations, Glacier flow, Glacier beds, Deformation, Basal sliding, Glacial erosion, Ice solid interface, Strain tests, Strain measuring instruments

49-518

Distribution of stable isotopes in surface snow along the route of the 1990 International Trans-Antarctica Expedition.

Qin, D.H., Petit, J.R., Jouzel, J., Stiévenard, M., *Journal of glaciology,* 1994, 140(134), p.107-118, 57 refs.

Ice sheets, Snow surveys, Surface temperature, Temperature variations, Snow composition, Isotope analysis, Altitude, Distribution, Precipitation (meteorology)

This paper presents the distribution of average *delta*D and *delta*^{18}O values for the top 1 m of surface snow for a large area of Antarctica. The samples were collected on the 1990 International Trans-Antarctica Expedition which crossed the continent from the northern tip of the Antarctic Peninsula to Mirnyy Station. The empirical relationships among the isotopes, temperature and elevation are computed. The slopes of *delta*D with respect to the surface temperature for the segments west and east of Vostok are not significantly different from those observed between Dumont d'Urville and Dome C which are often used to interpret deep ice-core isotopic profiles. There is, however, a noticeable shift between the two regression lines with, for a given temperature, higher isotopic values west of Vostok. The deuterium excess values (d=*delta*D-8 x *delta*^{18}O) increase sharply at 3000 m a.s.l. on the plateau, confirming the results of Petit and others. (Auth. mod.)

49-519

Melt-layer thickness measurements during crushing experiments on fresh-water ice.

Gagnon, R.E., *Journal of glaciology,* 1994, 140(134), p.119-124, 14 refs.

Ice mechanics, Ice solid interface, Ice water interface, Dynamic loads, Ice breaking, Meltwater, Water films, Thickness, Mechanical tests, Electrical measurement

49-520

Glaciological model of the Younger Dryas event in Scandinavia.

Fastook, J.L., Holmlund, P., *Journal of glaciology,* 1994, 140(134), p.125-131, 21 refs.

Glaciology, Ice sheets, Pleistocene, Paleoclimatology, Glacier oscillation, Glacial geology, Ice volume, Basal sliding, Climatic factors, Mathematical models, Baltic Sea

49-521

Internal melt figures in ice by rapid adiabatic compression.

Gagnon, R.E., Tulk, C.A., Kiefte, H., *Journal of glaciology,* 1994, 140(134), p.132-134, 8 refs.

Ice physics, Ice melting, Phase transformations, High pressure tests, Ice crystal growth, Ice crystal structure, High pressure ice, Dendritic ice, Transparence, Earthquakes

49-522

Strain in the ice sheet deduced from the crystal-orientation fabrics from bare icefields adjacent to the Sør-Rondane Mountains, Dronning Maud Land, East Antarctica.

Fujita, S., Mae, S., *Journal of glaciology,* 1994, 140(134), p.135-139, 13 refs.

Glaciology, Ice mechanics, Ice sheets, Surface structure, Structural analysis, Ice crystal structure, Orientation, Shear strain, Nunataks, Antarctica—Queen Maud Land

Structural analyses of ice collected from the bare ice surface in the region of the Sør Rondane Mountains were carried out. Crystal-orientation fabrics and the disposition of surface cracks were investigated to determine the stress/strain configuration in the ice sheet near the mountains. Single-maximum fabric patterns with the axis of the maximum roughly perpendicular to the flow line on the horizontal plane were observed. It was deduced from the observations that the ice exhibits a fabric pattern indicating that the ice sheet is subjected to vertical shear strain between the ice flow and the nunataks. (Auth. mod.)

49-523

Hydrology of a segment of a glacier situated in an overdeepening, Storglaciären, Sweden.

Hooke, R.L., Pohjola, V.A., *Journal of glaciology,* 1994, 140(134), p.140-148, 27 refs.

Glaciology, Glacial hydrology, Subglacial drainage, Subglacial observations, Boreholes, Water flow, Flow rate, Water pressure, Glacier beds, Ice water interface, Sweden

49-524

Evolution of glaciation in the Pamiro-Alti mountains and its effect on river run-off.

Konovalov, V.G., Shchetinnikov, A.S., *Journal of glaciology,* 1994, 140(134), p.149-157, 6 refs.

Glaciology, Glacier surveys, Mountain glaciers, River basins, Glacial hydrology, Glacier oscillation, Glacier melting, Runoff, Periodic variations, Uzbekistan

49-525

Thermoluminescence in suspended sediment of glacier meltwater streams.

Gemmell, A.M.D., *Journal of glaciology,* 1994, 140(134), p.158-166, 21 refs.

Glaciology, Glacial hydrology, Glacial rivers, Meltwater, Sediment transport, Suspended sediments, Age determination, Hydrogeochemistry, Luminescence, Diurnal variations, Iceland

49-526
Finite-element model of Antarctica: sensitivity test for meteorological mass-balance relationship.
Fastook, J.L., Prentice, M., *Journal of glaciology,* 1994, 140(134), p.167-175, 25 refs.
Glaciology, Ice sheets, Glacier mass balance, Glacier thickness, Glacier oscillation, Climatic changes, Ice cover effect, Global warming, Surface temperature, Ice air interface, Mathematical models
A finite-element solution of the time-dependent mass-continuity equation for column-averaged ice-sheet flow and sliding is applied to the antarctic ice sheet. First, a calibration of the model to the steady-state present ice-sheet configuration is presented. With fitted values of the parameters describing the regions of sliding, the degree of bed coupling and the ice hardness, a change in the mean annual sea-level temperature is used to simulate variation of the climatic conditions over Antarctica for both warming and cooling of the climate. Paradoxically, a climate warming of up to 9 deg leads to an increase in ice volume, while cooling leads to decreasing ice volume as long as the present margins of Antarctica are maintained. Some extreme simulations of the antarctic ice sheet for "maximum overriding" and "minimum warm climate" are shown for situations where the present bed conditions are altered. Finally, a time-dependent simulation shows the response of the ice-sheet system to cyclical variations in the simulated climate, demonstrating the lag of the ice-sheet response to be approximately 2700 years. (Auth.)

49-527
Unusual flood events from an alpine glacier: observations and deductions on generating mechanisms.
Warburton, J.A., Fenn, C.R., *Journal of glaciology,* 1994, 140(134), p.176-186, 26 refs.
Glaciology, Alpine glaciation, Precipitation (meteorology), Glacial hydrology, Floods, Surface drainage, Subglacial drainage, Ice water interface, Switzerland

49-528
Observations of a rift in the Ronne Ice Shelf, Antarctica.
King, E.C., *Journal of glaciology,* 1994, 140(134), p.187-189, 1 ref.
Glaciology, Ice shelves, Ice structure, Profiles, Crevasses, Glacier surveys, Seismic surveys, Calving, Antarctica—Ronne Ice Shelf
During seismic profiling on the northwest Ronne Ice Shelf, a rift in the ice shelf was encountered. The rift trends southeast to northwest and is located approximately 30 km inland from the present-day ice front. The rift is 340 m wide and the surface elevation of the ice shelf drops by 14.65 m over the axis of the rift. The rift has an asymmetrical base with a near-vertical ice-water interface on its northeast flank and a more gently dipping ice-water interface forming its southeastern flank. The ice shelf thins from a thickness of 350 m away from the rift to a thickness of 225 m at the rift axis. The rift is the probable location of a future major calving event on this section of the Ronne Ice Shelf, an event which would release an iceberg of up to 30 km by 180 km into the Weddell Sea. (Auth.)

49-529
Miniature high-power impulse transmitter for radio-echo sounding.
Narod, B.B., Clarke, G.K.C., *Journal of glaciology,* 1994, 140(134), p.190-194, 16 refs.
Glaciology, Glacier surveys, Glacier thickness, Radio echo soundings, Electronic equipment, Portable equipment, Design, Performance

49-530
Capture and scanning electron microscopy of individual snow crystals.
Wolff, E.W., Reid, A.P., *Journal of glaciology,* 1994, 140(134), p.195-197, 9 refs.
Glaciology, Ice sheets, Sampling, Snow crystal structure, Scanning electron microscopy, Preserving

49-531
Glaciers in Picos de Europa, Cordillera Cantábrica, northwest Spain.
Suárez, J.J.G., Alonso, V., *Journal of glaciology,* 1994, 140(134), p.198-199, 6 refs.
Glaciology, Mountain glaciers, Detection, Snow cover effect, Geomorphology, Spain

49-532
Comments on "Subglacial floods and the origin of low-relief ice-sheet lobes" by E.M. Shoemaker.
Walder, J.S., Shoemaker, E.M., *Journal of glaciology,* 1994, 140(134), p.199-202, Includes reply. 20 refs. For paper under discussion see 46-4110.
Glaciology, Pleistocene, Ice sheets, Floods, Glacial hydrology, Subglacial drainage, Hydrography

49-533
Comments on "Analysis of glacier facies using satellite techniques" by Williams and others.
Sigurdsson, O., *Journal of glaciology,* 1994, 140(134), p.202-203, 7 refs. For paper under discussion see 46-516.
Glaciology, Glacier surveys, Glacier surfaces, Reflection, Spaceborne photography, Classifications, Resolution

49-534
Onset of oscillatory convection in binary mixtures with Sorét effects and solidification.
Karcher, C., Müller, U., *International journal of heat and mass transfer,* Nov. 1994, 37(16), p.2517-2523, 16 refs.
Solutions, Phase transformations, Solidification, Ice formation, Chemical composition, Liquid solid interfaces, Thermal diffusion, Stability, Analysis (mathematics)

49-535
Double diffusive and direct instabilities below growing sea ice.
Molemaker, M.J., Dijkstra, H.A., *International journal of heat and mass transfer,* Nov. 1994, 37(16), p.2547-2559, 18 refs.
Oceanography, Salt water, Sea water freezing, Sea ice, Ice formation, Convection, Self diffusion, Stability, Stefan problem, Ice water interface, Ice cover effect

49-536
Frost hardiness and cold-storage tolerance of the root system of *Picea sitchensis, Pseudotsuga menziesii, Larix kaempferi* and *Pinus sylvestris* bare-root seedlings.
McKay, H.M., *Scandinavian journal of forest research,* 1994, 9(3), p.203-213, 33 refs.
Forestry, Trees (plants), Acclimatization, Cold storage, Frost resistance, Cold tolerance, Roots, Seasonal variations, Temperature effects

49-537
Nitrogen and phosphorus stores in peatlands drained for forestry in Finland.
Laiho, R., Laine, J., *Scandinavian journal of forest research,* 1994, 9(3), p.251-260, 32 refs.
Forestry, Forest ecosystems, Subarctic landscapes, Peat, Wetlands, Drainage, Soil microbiology, Soil chemistry, Soil tests, Nutrient cycle, Finland

49-538
Micromechanics-based constitutive model for polycrystalline ice.
Premachandran, R., Horii, H., *Journal of engineering materials and technology,* July 1994, 116(3), p.392-397, 9 refs.
Ice mechanics, Ice crystal structure, Ice microstructure, Ice creep, Ice deformation, Elastic properties, Cracking (fracturing), Shear strain, Rheology, Mathematical models

49-539
***In situ* measurements of the ice-forming activity of metal oxide aerosols with controlled amounts of surface active groups.**
Gorbunov, B., Safatov, A., *Journal of aerosol science,* June 1994, 25(4), p.673-682, 70 refs.
Cloud physics, Simulation, Cloud chambers, Aerosols, Artificial nucleation, Ice formation, Heterogeneous nucleation, Particle size distribution, Surfactants

49-540
Application of remote sensing methods to hydrology and water resources.
Rango, A., *Hydrological sciences journal,* Aug. 1994, 39(4), p.309-320, With French summary. 58 refs.
Water reserves, Remote sensing, Snow hydrology, Runoff forecasting, Climatology

49-541
Role of water in sludge dewatering.
Vesilind, P.A., *Water environment research,* Jan.-Feb. 1994, 66(1), p.4-11, 46 refs.
Sludges, Waste treatment, Suspended sediments, Sedimentation, Hygroscopic water, Hygroscopic nuclei, Particle size distribution, Liquid solid interfaces, Physical properties

49-542
Relative importance of snow accumulation and monsoon rainfall data for estimating annual runoff, Jhelum basin, Pakistan.
De Scally, F.A., *Hydrological sciences journal,* June 1994, 39(3), p.199-216, With French summary. 31 refs.
Meteorological data, Runoff forecasting, River basins, Snow hydrology, Snow accumulation, Snowmelt, Snow water equivalent, Precipitation (meteorology), Pakistan

49-543
Model for cloud chemistry processes suitable for use in long range transport models: a sensitivity study.
De Valk, J.P.J.M.M., Van der Hage, J.C.H., *Atmospheric environment,* May 1994, 28(9), p.1653-1663, 29 refs.
Precipitation (meteorology), Cloud physics, Cloud droplets, Aerosols, Phase transformations, Chemical properties, Ice vapor interface, Heterogeneous nucleation, Mathematical models

49-544
Intercomparison of four methods to determine size distributions of low-concentration (approx. $100/cm^3$), ultrafine aerosols ($3 < D(p) < 10$ nm) with illustrative data from the Arctic.
Wiedensohler, A., et al, *Aerosol science and technology,* Aug. 1994, 21(2), p.95-109, 30 refs.
Atmospheric composition, Polar atmospheres, Aerosols, Sampling, Particle size distribution, Measuring instruments, Performance

49-545
Freeze-cracking in foods as affected by physical properties.
Kim, N.K., Hung, Y.C., *Journal of food science,* May-June 1994, 59(3), p.669-674, 27 refs.
Cryogenics, Solids, Porous materials, Freezing, Liquefied gases, Cracking (fracturing), Forecasting, Physical properties, Analysis (mathematics)

49-546
Elastic constants of ice III by Brillouin spectroscopy.
Tulk, C.A., Gagnon, R.E., Kiefte, H., Clouter, M.J., *Journal of chemical physics,* Aug. 1, 1994, 101(3), p.2350-2354, 25 refs.
Ice physics, High pressure ice, Ice spectroscopy, Ice crystal growth, Ice crystal structure, Ice crystal optics, Ice elasticity, Elastic properties

49-547
Freezing of water droplets seeded with atmospheric aerosols and ice nucleation activity of the aerosols.
Stoianova, V., Kashchiev, D., Kupenova, T., *Journal of aerosol science,* July 1994, 25(5), p.867-877, 33 refs.
Cloud physics, Cloud droplets, Cloud seeding, Aerosols, Heterogeneous nucleation, Nucleation rate, Unfrozen water content, Liquid solid interfaces, Simulation, Analysis (mathematics)

49-548
Organo- and lithofacies of glacial-interglacial deposits in the Norwegian-Greenland Sea: responses to paleoceanographic and paleoclimatic changes.
Wagner, T., Henrich, R., *Marine geology,* Sep. 1994, 120(3-4), p.335-364, 58 refs.
Pleistocene, Marine geology, Ocean currents, Paleoclimatology, Marine deposits, Glacial deposits, Bottom sediment, Stratigraphy, Isotope analysis, Greenland Sea, Norwegian Sea

49-549

Climate change: numerical modelling of sedimentation and coastal processes, eastern Canadian Arctic.

Syvitski, J.P.M., Andrews, J.T., *Arctic and alpine research*, Aug. 1994, 26(3), p.199-212, 56 refs.

Climatic changes, Global warming, Hydrologic cycle, Runoff, Marine deposits, Estuaries, Sedimentation, Sea level, Glacier melting, Shoreline modification, Mathematical models, Canada—Northwest Territories

49-550

Sediment transport in Hot Weather Creek, Ellesmere Island, N.W.T., Canada, 1990-1991.

Lewkowicz, A.G., Wolfe, P.M., *Arctic and alpine research*, Aug. 1994, 26(3), p.213-226, 35 refs.

Arctic landscapes, River basins, Runoff, Stream flow, Sampling, Snowmelt, Sediment transport, Suspended sediments, Seasonal variations, Canada—Northwest Territories—Ellesmere Island

49-551

Glacioclimatological study of perennial ice in the Fuji ice cave, Japan. Part 1. Seasonal variation and mechanism of maintenance.

Ohata, T., Furukawa, T., Higuchi, K., *Arctic and alpine research*, Aug. 1994, 26(3), p.227-237, 17 refs.

Ice caves, Glaciology, Mass balance, Seasonal variations, Climatic factors, Air flow, Topographic effects, Ice air interface, Japan—Fuji, Mt.

49-552

Glacioclimatological study of perennial ice in the Fuji ice cave, Japan. Part 2. Interannual variation and relation to climate.

Ohata, T., Furukawa, T., Osada, K., *Arctic and alpine research*, Aug. 1994, 26(3), p.238-244, 6 refs.

Ice caves, Glaciology, Mass balance, Ice conditions, Ice surface, Periodic variations, Meteorological factors, Air temperature, Ice air interface, Wind factors, Japan—Fuji, Mt.

49-553

Continuous recording of frost heave and creep on a Japanese alpine slope.

Matsuoka, N., *Arctic and alpine research*, Aug. 1994, 26(3), p.245-254, 25 refs.

Alpine landscapes, Geocryology, Slope processes, Periglacial processes, Freeze thaw cycles, Frost heave, Diurnal variations, Soil creep, Recording, Japan—Akaishi Range

49-554

Paraglacial slope adjustment and resedimentation following recent glacier retreat, Fåbergstølsdalen, Norway.

Ballantyne, C.K., Benn, D.I., *Arctic and alpine research*, Aug. 1994, 26(3), p.255-269, 45 refs.

Geomorphology, Glacial geology, Glacier melting, Glacial deposits, Slope processes, Snowmelt, Soil erosion, Mass flow, Sediment transport, Soil profiles, Norway—Fåbergstølsdalen

49-555

Patterned ground activity in a southern New Zealand high-alpine cushion field.

Mark, A.F., *Arctic and alpine research*, Aug. 1994, 26(3), p.270-280, 26 refs.

Alpine landscapes, Periglacial processes, Patterned ground, Soil tests, Geocryology, Solifluction, Soil water migration, Soil temperature, Frozen ground mechanics, New Zealand—Old Man Range

49-556

Comparative reproductive biology of two alpine primrose species.

Miller, J., Litvak, M., Kelso, S., Vargo, A., *Arctic and alpine research*, Aug. 1994, 26(3), p.297-303, 40 refs.

Alpine tundra, Plant ecology, Ecosystems, Plants (botany), Growth, Pollen, United States—Colorado

49-557

Ectomycorrhizae, arbuscular mycorrhizae, *Rhizoctonia* sp. of alpine and boreal *Salix* spp. in Norway.

Dhillion, S.S., *Arctic and alpine research*, Aug. 1994, 26(3), p.304-307, 28 refs.

Alpine landscapes, Trees (plants), Plant physiology, Plant ecology, Soil microbiology, Fungi, Roots, Norway—Hedmark

49-558

Anoxia tolerance in high arctic vegetation.

Crawford, R.M.M., Chapman, H.M., Hodge, H., *Arctic and alpine research*, Aug. 1994, 26(3), p.308-312, 23 refs.

Arctic landscapes, Plant ecology, Plant physiology, Plant tissues, Oxygen, Survival, Global warming, Environmental impact, Norway—Spitsbergen

49-559

Determination of size, evaporation rate and freezing of water droplets using light scattering and radiation pressure.

Roth, N., Anders, K., Frohn, A., *Particle & particle systems characterization*, June 1994, 11(3), p.207-211, 7 refs.

Cloud physics, Aircraft, Condensation trails, Simulation, Cloud droplets, Supercooling, Freezing points, Lasers, Light scattering, Light effects

49-560

Influence of grain sintering on the thermoconductivity of porous ice.

Kossacki, K.J., Kömle, N.I., Kargl, G., Steiner, G., *Planetary and space science*, May 1994, 42(5), p.383-389, 13 refs.

Extraterrestrial ice, Ice physics, Ice sintering, Ice surface, Ice solid interface, Thermal conductivity, Porous materials, Cohesion, Mathematical models

49-561

***In situ* observation of vapor-grown ice crystals by laser two-beam interferometry.**

Gonda, T., Matsuura, Y., Sei, T., *Journal of crystal growth*, Sep. 1, 1994, 142(1-2), p.171-176, 9 refs.

Ice physics, Ice crystal growth, Ice crystal optics, Ice microstructure, Surface structure, Supersaturation, Molecular energy levels, Lasers, Imaging

49-562

Remarks on frost heave.

Tsuneto, T., *Physical Society of Japan. Journal*, June 1994, 63(6), p.2231-2234, 6 refs.

Frozen ground mechanics, Frost heave, Porosity, Liquid solid interfaces, Analysis (mathematics)

49-563

Radioactive contamination of the Yamal Peninsula and evaluation of the radiation danger for the population.

Liubashevskii, N.M., et al, *Russian journal of ecology*, Mar. 1994, 24(4), p.239-244, Translated from Ekologiia. 19 refs.

Subpolar regions, Ecology, Radioactivity, Fallout, Soil tests, Soil pollution, Environmental tests, Environmental impact, Russia—Yamal Peninsula

49-564

Weatherwatch.

Ludlum, D.M., et al, *Weatherwise*, Apr.-May 1994, 47(2), p.44-52.

Weather observations, Meteorological data, Seasonal variations, Air temperature, Records (extremes), United States, Canada

49-565

Muon spin-lattice relaxation and muonium diffusion in ice.

Cox, S.F.J., et al, *Hyperfine interactions*, July 1994, 85(1-4), International Conference on Muon Spin Rotation/Relaxation/Resonance, Maui, HI, May 31-June 11, 1993. Proceedings, Pt.1, p.67-72, 11 refs.

Ice physics, Ice structure, Molecular energy levels, Ice electrical properties, Electron paramagnetic resonance, Diffusion

49-566

H and Mu diffusion in ice.

Percival, P.W., Brodovitch, J.C., Bartels, D.M., *Hyperfine interactions*, July 1994, 85(1-4), International Conference on Muon Spin Rotation/Relaxation/Resonance, Maui, HI, May 31-June 11, 1993. Proceedings, Pt.1, p.91-96, 8 refs.

Ice physics, Ice structure, Molecular energy levels, Electron paramagnetic resonance, Ice electrical properties, Diffusion

49-567

Level crossing resonance in ice: identification of two diamagnetic muon states.

Cox, S.F.J., et al, *Hyperfine interactions*, July 1994, 85(1-4), International Conference on Muon Spin Rotation/Relaxation/Resonance, Maui, HI, May 31-June 11, 1993. Proceedings, Pt.2, p.747-752, 12 refs.

Ice physics, Doped ice, Ice structure, Defects, Molecular energy levels, Electron paramagnetic resonance, Oxygen isotopes, Spectra, Ice electrical properties

49-568

Applications of Quaternary geology to placer deposit investigations in glaciated areas; a case study, Atlin, British Columbia.

Levson, V.M., Blyth, H., *Quaternary international*, 1993, Vol.20, p.93-105, Refs. p.103-105.

Pleistocene, Quaternary deposits, Glacial deposits, Glacial geology, Exploration, Placer mining, Geological surveys, Stratigraphy, Canada—British Columbia—Atlin

49-569

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Ground observations of snowfall. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Chijo kosetsu kansoku]

Mizuno, H., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report)*, Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.31-43, In Japanese. 10 refs.

Snowfall, Cloud seeding, Cloud physics, Weather forecasting, Japan

49-570

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Doppler radar observations. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Doppura reda kansoku]

Nakai, S., Maki, M., Yagi, T., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report)*, Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.44-57, In Japanese. 2 refs.

Snowfall, Cloud physics, Weather forecasting, Radar echoes, Japan

49-571

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Doppler radar observations. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Doppura reda kansoku]

Endoh, T., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.58-81, In Japanese. 4 refs.

Snowfall, Cloud physics, Weather forecasting, Radar echoes, Japan

49-572

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Doppler radar observations. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Doppura reda kansoku]

Yamada, Y., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.82-95, In Japanese. 1 ref.

Snowfall, Cloud physics, Weather forecasting, Radar echoes, Japan

49-573

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Dual polarization radar observations. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Niju henpa reda kansoku]

Masukura, K., Matsuzaki, N., Fukami, K., Mizuno, H., Ikawa, T., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.96-108, In Japanese. 1 ref.

Snowfall, Cloud physics, Weather forecasting, Radar echoes, Japan

49-574

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Sonde observations. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Zonde kansoku]

Murakami, M., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.109-123, In Japanese. 1 ref.

Snowfall, Snow crystal structure, Cloud physics, Weather forecasting, Radar echoes, Japan

49-575

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Development of mechanical models of snow clouds. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun rikigaku moderu no kaihatsu]

Ikawa, M., Matsuo, T., Murakami, M., Mizuno, H., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.124-146, In Japanese. 6 refs.

Snowfall, Snow pellets, Snow crystal growth, Cloud seeding, Cloud physics, Weather forecasting

49-576

Studies on improving snow management technology in living spaces. Studies on improving snow melting technology. Studies on geothermal mechanisms. Studies on the development of technology for measuring ground water flow in the microscale and methods for estimating the heat capacity of ground heat storage devices. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Yusetsu gijutsu no kodoka ni kansuru kenkyu. Chichu ni okeru netsuteki kiko ni kansuru kenkyu. Mikurona ryoiki ni okeru chikasui ryudo keisoku gijutsu no kaihatsu to chichu shunetsu sochi e no shunetsuryo no hyoka hoho ni kansuru kenkyu]

Kimura, S., Yoneya, M., Ikeshoji, T., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.147-160, In Japanese. 13 refs.

Snow melting, Artificial melting, Ground water, Heat pipes, Heat transfer, Heat recovery, Mathematical models

49-577

Studies on improving snow management technology in living spaces. Studies on improving snow melting technology. Studies on geothermal mechanisms. Studies on quantifying the heat transfer in aquifers. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Yusetsu gijutsu no kodoka ni kansuru kenkyu. Chichu ni okeru netsuteki kiko ni kansuru kenkyu. Taisuiso naka no netsu ido no teiryoka ni kansuru kenkyu]

Fujinawa, K., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.161-178, In Japanese. 4 refs.

Snow melting, Artificial melting, Ground water, Heat transfer, Heat recovery, Mathematical models

49-578

Studies on improving snow management technology in living spaces. Studies on improving snow melting technology. Studies on geothermal mechanisms. Studies on quantifying the heat loss to the unsaturated zone. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Yusetsu gijutsu no kodoka ni kansuru kenkyu. Chichu ni okeru netsuteki kiko ni kansuru kenkyu. Fuhowatai e no netsu sonshitsu no teiryoka ni kansuru kenkyu]

Maruyama, T., Watanabe, T., Horino, H., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.179-192, In Japanese. 9 refs.

Snow melting, Artificial melting, Ground water, Heat transfer, Heat recovery, Heat loss

49-579

Studies on improving snow management technology in living spaces. Studies on improving snow melting technology. Studies on improving geothermal applications technology. Development of technology for extracting near surface geothermy. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Yusetsu gijutsu no kodoka ni kansuru kenkyu. Chinetsu riyo gijutsu no kodoka ni kansuru kenkyu. Senso chinetsu no chushutsu gijutsu no kaihatsu]

Shiraishi, M., Kikuchi, K., Yamashita, I., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.209-220, In Japanese. 4 refs.

Snow melting, Artificial melting, Geothermy, Heat pipes, Heat transfer, Heat recovery

49-580

Studies on improving snow management technology in living spaces. Studies on improving snow melting technology. Studies on improving geothermal applications technology. Studies on year-around roof snow management systems. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Yusetsu gijutsu no kodoka ni kansuru kenkyu. Chinetsu riyo gijutsu no kodoka ni kansuru kenkyu. Yane yuki shori shisutemu no tsunenteki riyoho no kenkyu]

Kimura, T., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.221-231, In Japanese. 2 refs.

Roofs, Snow removal, Snow melting, Artificial melting, Heat pumps

49-581

Studies on improving snow management technology in living spaces. Studies on the development of snow removal technology. Studies on duct transport of powdered snow. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Johaisetsu gijutsu no kaihatsu ni kansuru kenkyu. Kansetsu no funtai kanro yuso ni kansuru kenkyu]

Ishimoto, K., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.232-246, In Japanese. 2 refs.

Snow removal, Road maintenance, Air flow

49-582

Studies on improving snow management technology in living spaces. Studies on the development of snow removal technology. Studies on air duct transport of wet snow. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Johaisetsu gijutsu no kaihatsu ni kansuru kenkyu. Shissetsu no kukiriki kanro yuso ni kansuru kenkyu]

Sugiyama, A., Muramatsu, T., Kitajima, K., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, p.247-260, In Japanese. 4 refs.

Snow removal, Wet snow, Road maintenance, Air flow

49-583

Studies on improving snow management technology in living spaces. Studies on the development of snow removal technology. Studies on air duct transport of solidified wet snow. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Johaisetsu gijutsu no kaihatsu ni kansuru kenkyu. Kokeika shissetsu no kukiriki kanro yuso ni kansuru kenkyu]

Kumagai, M., Kobayashi, T., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Aug. 1992, p.261-270, In Japanese. 2 refs.

Snow removal, Wet snow, Road maintenance, Air flow

49-584

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Ground observations of snowfall. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Chijo kosetsu kansoku]

Mizuno, H., Matsuo, T., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.33-43, In Japanese. 1 ref.

Snowfall, Snow pellets, Cloud physics, Weather forecasting, Japan

49-585

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Ground observations of snowfall. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Chijo kosetsu kansoku]

Kajikawa, M., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.44-50, In Japanese. 3 refs.

Snowfall, Cloud physics, Weather forecasting, Japan

49-586

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Doppler radar observations. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Doppura reda kansoku]

Nakai, S., Maki, M., Iwanami, K., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.51-62, In Japanese. 5 refs.

Snowfall, Cloud physics, Weather forecasting, Radar echoes, Japan

49-587

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Doppler radar observations. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Doppura reda kansoku]

Yamada, Y., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.63-78, In Japanese. 1 ref.

Snowfall, Cloud physics, Weather forecasting, Radar echoes, Japan

49-588

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Dual polarization radar observations. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Niju henpa reda kansoku]

Masukura, K., et al, *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.79-98, In Japanese. 1 ref.

Snowfall, Cloud physics, Weather forecasting, Radar echoes, Japan

49-589

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Sonde observations. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Zonde kansoku]

Murakami, M., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.99-116, In Japanese. 3 refs.

Snowfall, Snow crystal structure, Cloud physics, Weather forecasting, Radar echoes, Japan

49-590

Basic research on explaining the mechanisms of snowfall and the possibilities of snow cloud modification. Observations to grasp the actual conditions of snow clouds. Sonde observations. [Kosetsu kiko no kaimei to kosetsuun chosetsu no kanosei ni kansuru kisoteki kenkyu. Kosetsuun jittai haaku kansoku. Zonde kansoku]

Ishizaka, Y., Bernadia Irawati, T., Sato, N., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.117-129, In Japanese. 8 refs.

Snowfall, Nucleus counters, Cloud physics, Weather forecasting, Radar echoes, Japan

49-591

Studies on improving snow countermeasure technology. Studies on models of snowfall mechanisms. [Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu. Kosetsu kiko moderu ni kansuru kenkyu]

Saito, K., Ikawa, M., Matsuo, T., Murakami, M., Mizuno, H., Yamada, Y., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.130-142, In Japanese. 4 refs.

Snowfall, Cloud seeding, Cloud physics, Weather forecasting, Japan

49-592

Studies on improving snow management technology in living spaces. Studies on improving snow melting technology. Studies on geothermal mechanisms. Studies on the development of technology for measuring ground water flow in the microscale and methods for estimating the heat capacity of ground heat storage devices. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Yusetsu gijutsu no kodoka ni kansuru kenkyu. Chichu ni okeru netsuteki kiko ni kansuru kenkyu. Mikurona ryoiki ni okeru chikasui ryudo keisoku gijutsu no kaihatsu to chichu shunetsu sochi e no shunetsuryo no hyoka hoho ni kansuru kenkyu]

Kimura, S., Yoneya, M., Ikeshoji, T., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.143-154, In Japanese. 9 refs.

Snow melting, Artificial melting, Ground water, Heat pipes, Heat transfer, Heat recovery

49-593

Studies on improving snow management technology in living spaces. Studies on improving snow melting technology. Studies on geothermal mechanisms. Studies on quantifying the heat transfer in aquifers. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Yusetsu gijutsu no kodoka ni kansuru kenkyu. Chichu ni okeru netsuteki kiko ni kansuru kenkyu. Taisuiso naka no netsu ido no teiryoka ni kansuru kenkyu]

Fujinawa, K., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.155-176, In Japanese. 2 refs.

Snow melting, Artificial melting, Ground water, Heat transfer, Heat recovery, Mathematical models

49-594

Studies on improving snow management technology in living spaces. Studies on improving snow melting technology. Studies on geothermal mechanisms. Studies on quantifying the heat loss to the unsaturated zone. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Yusetsu gijutsu no kodoka ni kansuru kenkyu. Chichu ni okeru netsuteki kiko ni kansuru kenkyu. Fuhowatai e no netsu sonshitsu no teiryoka ni kansuru kenkyu]

Maruyama, T., Watanabe, T., Horino, H., Nakamura, K., Moroizumi, T., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.177-192, In Japanese. 10 refs.

Snow melting, Artificial melting, Ground water, Heat transfer, Heat recovery, Heat loss

49-595

Studies on improving snow management technology in living spaces. Studies on improving snow melting technology. Studies on geothermal mechanisms. Study on the quantitative and thermal flow mechanism of ground water over a broad area. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Yusetsu gijutsu no kodoka ni kansuru kenkyu. Chichu ni okeru netsuteki kiko ni kansuru kenkyu. Koiki chikasui no ryoteki netsuteki ryudo kiko no kenkyu]

Higashiura, M., Sato, T., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.193-208, In Japanese. 11 refs.

Snow melting, Artificial melting, Ground water, Heat transfer, Heat recovery

49-596

Studies on improving snow management technology in living spaces. Studies on improving snow melting technology. Studies on improving geothermal applications technology. Development of technology for extracting near surface geothermy. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Yusetsu gijutsu no kodoka ni kansuru kenkyu. Chinetsu riyo gijutsu no kodoka ni kansuru kenkyu. Senso chinetsu no chushutsu gijutsu no kaihatsu]

Shiraishi, M., Kikuchi, K., Yamashita, I., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.209-218, In Japanese. 2 refs.

Snow melting, Artificial melting, Geothermy, Heat pipes, Heat transfer, Heat recovery

49-597

Studies on improving snow management technology in living spaces. Studies on improving snow melting technology. Studies on improving geothermal applications technology. Studies on year-around roof snow management systems. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Yusetsu gijutsu no kodoka ni kansuru kenkyu. Chinetsu riyo gijutsu no kodoka ni kansuru kenkyu. Yane yuki shori shisutemu no tsunenteki riyoho no kenkyu]

Kimura, T., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.219-223, In Japanese. 2 refs.

Roofs, Snow removal, Snow melting, Artificial melting, Heat pumps

49-598

Studies on improving snow management technology in living spaces. Studies on the development of snow removal technology. Studies on duct transport of powdered snow. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Johaisetsu gijutsu no kaihatsu ni kansuru kenkyu. Kansetsu no funtai kanro yuso ni kansuru kenkyu]

Ishimoto, K., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.224-243, In Japanese. 2 refs.

Snow removal, Ducts, Air flow

49-599

Studies on improving snow management technology in living spaces. Studies on the development of snow removal technology. Studies on air duct transport of wet snow. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Johaisetsu gijutsu no kaihatsu ni kansuru kenkyu. Shissetsu no kukiriki kanro yuso ni kansuru kenkyu]

Sugiyama, A., Miyatake, I., Yonemura, K., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.244-254, In Japanese. 3 refs.

Snow removal, Wet snow, Road maintenance, Air flow

49-600

Studies on improving snow management technology in living spaces. Studies on the development of snow removal technology. Studies on air duct transport of solidified wet snow. [Seikatsu kukan ni okeru yuki shori gijutsu no kodoka no kansuru kenkyu. Johaisetsu gijutsu no kaihatsu ni kansuru kenkyu. Kokeika shissetsu no kukiriki kanro yuso ni kansuru kenkyu]

Kobayashi, T., Nohguchi, Y., Nakamura, T., *Kagaku gijutsucho kenkyu kaihatsukyoku. Kagaku gijutsu shinko choseihi seika hokokusho (Science and Technology Agency. Research and Development Bureau. Coordination funds for promoting science and technology. Progress report),* Dec. 1993, Kosekisetsu taisaku gijutsu no kodoka ni kansuru kenkyu (Studies on improving snow countermeasure technology), p.255-266, In Japanese. 2 refs.

Snow removal, Wet snow, Road maintenance, Ducts, Air flow

49-601

Earth Sciences. IX ItaliAntartide Expedition, 1993-94: field data reports.

Italian Antarctic Research Programme, [Rome,], 1994, 80p., Refs. passim. For selected papers see E-51258 through E-51263, E-51266, E-51267, E-51269, E-51270, E-51275, E-51277, F-51271 through F-51274, F-51276, L-51264, L-51265, L-51268, L-51278, and L-51279, or 49-602 through 49-609.

Geological surveys, Glaciology, Geophysical surveys

This is the first publication of collected data reports of field activities carried out during the 9th Italian Antarctic Expedition in 1993-1994. The research was carried out mostly in northern Victoria Land; the brief reports are grouped as follows: structure and evolution of the lithosphere in the Ross Sea area; periantarctic basins and antarctic plate margins; glaciology and paleoclimate; and geophysical observatories.

49-602

Glaciological research on Hells Gate Ice Shelf (Terra Nova Bay, Antarctica).

Bondesan, A., Tison, J.L., Italian Antarctic Research Programme. Earth Sciences. IX ItaliAntartide Expedition, 1993-94: field data reports, [Rome, 1994], p.54-56, 4 refs.

Ice shelves, Ice water interface, Sea ice, Antarctica—Terra Nova Bay

The glaciological joint research program (Italy-Belgium) on Hells Gate Ice Shelf (HGIS), carried out during the 1993-94 Italian Antarctic Expedition, is the continuation of former studies executed during the 1989-90 expedition. The research aimed to reach a better understanding of the processes occurring at the ice/sea water interface under ice shelves; of the formation and evolution of marine ice accreting under the ice shelf, and of the ice shelf behavior under potential future global changes.

49-603

Glaciological investigations in the Terra Nova Bay area.

Bondesan, A., Libera, V., Meneghel, M., Salvatore, M.C., Italian Antarctic Research Programme. Earth Sciences. IX ItaliAntartide Expedition, 1993-94: field data reports, [Rome, 1994], p.57-58.

Glacier mass balance, Limnology, Rheology, Patterned ground, Geomorphology, Antarctica—Terra Nova Bay

The fieldwork carried out by the authors is part of the Research Program 2a 'Glaciology and Palaeoclimate of the IX Antarctic Expedition'. It includes mass balance measurements for the strandline and tarn flat glaciers and the monitoring of the two lakes in the area; study of the morphology of glacial drift in blue ice areas and of periglacial polygons of till deposits; observations on lakes at tarn flat, Inexpressible I. and Edmonson Point; geomorphological surveys on the southern portion of the Northern Foothills, and field checks for thematic cartography performed in Italy by remote sensing.

49-604

Integrated geophysical surveys of the Hells Gate Ice Shelf and the Enigma Lake basin (northern Victoria Land).

Caneva, G., Lozej, A., Merlanti, F., Tabacco, I., Italian Antarctic Research Programme. Earth Sciences. IX ItaliAntartide Expedition, 1993-94: field data reports, [Rome, 1994], p.59-60.

Geophysical surveys, Ice shelves, Limnology, Ice water interface, Antarctica—Victoria Land

In the course of the 1993-94 Italian Antarctic Expedition, as part of Glaciology and Paleoclimatic Project, item 2a: Ice Physics and Geophysical Exploration, geophysical surveys were undertaken to define the geometrical and physical characteristics of the ice shelf near Hells Gate and the small basin of Enigma Lake. An objective of the work was also to provide information about adequacy of the different techniques applied and about potential requirements for future surveys.

49-605

Glaciological investigation in northern Victoria Land: preliminary results.

Maggi, V., Barbante, C., Laj, P., Udisti, R., Italian Antarctic Research Programme. Earth Sciences. IX ItaliAntartide Expedition, 1993-94: field data reports, [Rome, 1994], p.61-62, 3 refs.

Ice cores, Snow density, Snow accumulation, Antarctica—Victoria Land

During the 9th Italian Antarctic Expedition, nine shallow snow/firn cores were drilled in different sites of northern Victoria Land. Drilling sites were selected on the basis of the wind patterns and of glacier flow conditions inferred from satellite data. Selected sites, elevation and corresponding depths of the recovered cores are listed in a table. For each core, the authors calculated the firn density by direct weighing of the core bags. Measured densities for five of the drilling sites are shown in a figure. There is a significant variability of the density within each firn core, possibly indicative of changes in the snow grain size.

49-606

EUROMET/PNRA meteorite collection expedition to Frontier Mountain northern Victoria Land, Antarctica.

Folco, L., Franchi, I.A., Fioretti, A.M., Meneghel, M., Italian Antarctic Research Programme. Earth Sciences. IX ItaliAntartide Expedition, 1993-94: field data reports, [Rome, 1994], p.63-66, 5 refs.

Geological surveys, Ice surface, Antarctica—Frontier Mountain

There were three objectives for the 1993-94 EUROMET/PNRA meteorite collection expedition to Frontier Mountain (FM): to complete the collection of meteorites in the known productive sites and extend systematic searches into unexplored areas at FM; to initiate a thorough study of the meteorite concentration mechanism operative at FM; and to reconnoitre other productive areas in the nearby blue ice fields of the Outback Nunataks region. The project was carried out within the framework of the IX PNRA Antarctic Expedition, as part of the Glaciology and Paleoclimatology Program.

49-607

Station Concordia oversnow traverse programme, 1993-94.

Frezzotti, M., Tabacco, I., Vincent, C., Vittuari, L., Italian Antarctic Research Programme. Earth Sciences. IX ItaliAntartide Expedition, 1993-94: field data reports, [Rome, 1994], p.68.

Low temperature research, Ice cores, Traverses, Antarctica—Charlie, Dome

During the 1993-94 season two oversnow traverses were performed as part of the Franco-Italian program Station Concordia in the framework of EPICA (European Programme on Ice Coring in Antarctica) and of ITASE (International Trans-Antarctic Scientific Expedition) programs. The French antarctic program undertook the first oversnow traverse from Dumont d'Urville to Dome C. This traverse was performed from Nov. 10 to Dec. 18, 1993. The Italian Antarctic Research Programme (PNRA) undertook a field survey of the first leg of the Terra Nova Bay Station-Concordia Station (Dome C) traverse. This survey was performed during the 1993-94 season. The distance covered was 280 km, while the total distance between Terra Nova Bay and Dome C is about 1,200 km. The purpose of this preliminary traverse was to verify the accessibility of the plateau from Terra Nova Bay Station with heavy vehicles.

49-608

Cruise NBP94-01 in the Ross Sea.

Anderson, J.B., Taviani, M., Trincardi, F., Italian Antarctic Research Programme. Earth Sciences. IX ItaliAntartide Expedition, 1993-94: field data reports, [Rome, 1994], p.70.

Geological surveys, Glacial geology, Seismic surveys, Ice sheets, Antarctica—Ross Sea

The R/V *Nathaniel B. Palmer* left McMurdo on Feb. 20, 1994 for a three-week geological cruise in the Ross Sea. The primary objective of the cruise was to obtain marine geological data on the behavior of the West Antarctic Ice Sheet since the end of the last glaciation and, in particular, to test the hypothesis of its rapid collapse in response to sea level rise. The cruise is the first leg devoted to this scientific purpose. The second leg will take place aboard the R/V *Nathaniel B. Palmer* in summer 1995.

49-609

Technical improvements of the very-broadband seismographic station at Terra Nova Bay.

Romeo, G., Palangio, P., Cerrone, M., Morelli, A., Italian Antarctic Research Programme. Earth Sciences. IX ItaliAntartide Expedition, 1993-94: field data reports, [Rome, 1994], p.71-74, 2 refs.

Cold weather construction, Seismology, Low temperature research, Equipment, Antarctica—Terra Nova Bay

The construction of the Terra Nova Bay seismic station started in 1989, when the site of the station was drilled in a compact granite rock, using 400 kg of explosive. The drilling work was done with several low power explosions in order to avoid fracturing the rock, obtaining a 8 m deep tunnel with a platform for sensor installation at the end. The sensors were placed over the rock using a concrete interface. The nucleus of the station heart is a Streckeisen vbb set, connected to a Quanterra acquisition system. The problems of low temperature effects on equipment found during the 1993-1994 expedition, and their solutions, are described.

49-610

Low-temperature cracking: Field validation of the thermal stress restrained specimen test.

Kanerva, H.K., Vinson, T.S., Zeng, H.Y., *U.S. Strategic Highway Research Program. Report,* June 1994, SHRP-A-401, 116p., 21 refs.

Bitumens, Bituminous concretes, Concrete pavements, Frost resistance, Low temperature tests, Cold weather performance, Thermal stresses, Crack propagation, Road maintenance

49-611

Low-temperature cracking: test selection.

Jung, D.H., Vinson, T.S., *U.S. Strategic Highway Research Program. Report,* June 1994, SHRP-A-400, 106p., 33 refs.

Bitumens, Bituminous concretes, Concrete pavements, Frost resistance, Low temperature tests, Cold weather performance, Thermal stresses, Crack propagation, Road maintenance

49-612

Low-temperature cracking: binder validation.

Jung, D.H., Vinson, T.S., *U.S. Strategic Highway Research Program. Report,* June 1994, SHRP-A-399, 106p., 9 refs.

Bitumens, Bituminous concretes, Concrete pavements, Frost resistance, Low temperature tests, Cold weather performance, Thermal stresses, Crack propagation, Road maintenance

49-613

Darkened waters: a review of the history, science and technology associated with the *Exxon Valdez* oil spill and cleanup.

Lord, N., Homer, AK, Homer Society of Natural History/Pratt Museum, 1992, 59p., 27 refs.

Oil spills, Oil recovery, Accidents, Water pollution, Environmental impact, United States—Alaska—Prince William Sound

49-614

Ice detection and highway weather information systems: FHWA Experimental Project No.13.

Woodham, D., *Colorado Department of Transportation. Report,* May 1993, CDOT-DTD-R-93-10, 12p. + appends., 3 refs.

Road icing, Ice detection, Frost forecasting, Road maintenance, Bridges, United States—Colorado

49-615

Meeting the role of a modern geological survey: GGU's publications and data service.

Dawes, P.R., *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.10-17, 18 refs.

Research projects, Organizations, Geological surveys, Exploration, Data processing, Bibliographies, Greenland

49-616

Mineral resource activities 1993: spectrum of research and services.

Schønwandt, H.K., *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.18-21, 17 refs.

Research projects, Organizations, Geological surveys, Exploration, Minerals, Natural resources, Economic development, Greenland

49-617

Themes in the promotion of Greenland's mineral resource potential.

Dawes, P.R., *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.22-27, 27 refs.

Exploration, Minerals, Economic development, Natural resources, Greenland

49-618

Project SUPRASYD 1993—granitic rocks and shear zones with possible gold potential, Julianehåb batholith, South Greenland.

Garde, A.A., Schønwandt, H.K., *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.28-31, 9 refs.

Exploration, Minerals, Gold, Economic development, Natural resources, Greenland

49-619

GREENMIN—database system for the registration of Greenland mineral occurrences.

Lind, M., Tukiainen, T., Thomassen, B., *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.32-36, 7 refs.

Exploration, Minerals, Economic development, Natural resources, Data processing, Greenland

49-620

Archaean and early Proterozoic basement provinces in Greenland.

Kalsbeek, F., *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.37-40.

Exploration, Minerals, Geochronology, Geologic structures, Tectonics, Greenland

49-621

Large scale geochemical variation in the Precambrian of West and South Greenland.

Steenfelt, A., *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.41-44, 13 refs.

Exploration, Minerals, Geochronology, Hydrogeochemistry, Geochemistry, Greenland

49-622

Eastern North Greenland 1993-1995—a new 1:500,000 mapping project.

Henriksen, N., *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.47-51, 15 refs.

Geological surveys, Exploration, Mapping, Geological maps, Greenland

49-623

Petroleum-geological activities in 1993: oil source rocks the dominant theme of the season's field programme.

Christiansen, F.G., Pulvertaft, T.C.R., *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.52-56, 14 refs.

Exploration, Crude oil, Petroleum industry, Greenland

49-624

Discovery of live oil at Marraat, Nuussuaq: field work, drilling and logging.

Christiansen, F.G., Dam, G., Pedersen, A.K., *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.57-63, 17 refs.

Exploration, Crude oil, Petroleum industry, Well logging, Greenland

49-625

Sequence stratigraphic studies in the Jameson Land basin, East Greenland.

Piasecki, S., et al, *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.64-67, 13 refs.

Exploration, Hydrocarbons, Stratigraphy, Geochronology, Greenland

49-626

ODP activities on the South-East Greenland margin: Leg 152 drilling and continued site surveying.

Larsen, H.C., et al, *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.73-79, 15 refs.

Offshore drilling, Drill core analysis, Seismic surveys, Stratigraphy, Geochronology, Glaciation, Paleoclimatology, Greenland

49-627

Greenland glaciers and the "greenhouse effect", activities 1993.

Braithwaite, R.J., Olesen, O.B., Reeh, N., Weidick, A., *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.80-82, 10 refs.

Ice sheets, Glacier surveys, Glacier oscillation, Global warming, Greenhouse effect, Greenland

49-628

Glaciological research in Antarctica.

Thomsen, H.H., Hagen, J.O., *Grønlands Geologiske Undersøgelse. Rapport,* 1994, No.160, p.83-86, 22 refs.

Ice sheets, Fossil ice, Ice sampling, Ice dating, Ice composition, Isotope analysis, Paleoclimatology, Research projects, Expeditions, Antarctica—Troll Station

During 1991 and 1992 the Geological Survey of Greenland (GGU) was observer on behalf of the Danish Polar Center in and preparation of a common Nordic research effort in Antarctica. The Nordic Antarctic Research Programme (NARP) involves Norway, Sweden and Finland, which are all Antarctic Treaty Consultative Partners, whereas Denmark is an observer. A natural continuation of this work was Danish participation in the antarctic research, and a GGU glaciologist took part in the Norwegian Antarctic Research Expedition (NARE) 1992-93 arranged by the Norwegian Polar Research Institute. The expedition started from Cape Town in South Africa, Dec. 8, 1992 and ended at the same place on Mar. 9, 1993. The Danish glaciological work in Antarctica took the form of stable isotope studies on blue ice areas near the Norwegian research station Troll in Queen Maud Land. (Auth. mod.)

49-629

Simulation of the Atlantic circulation with a coupled sea ice-mixed layer-isopycnal general circulation model.

Oberhuber, J.M., *Max-Planck-Institut für Meteorologie, Hamburg. Report,* Nov. 1990, No.59, 86p., Refs. p.76-81.

DLC GC228.6.A8O24 1990

Air ice water interaction, Ice cover effect, Ocean currents, Atmospheric circulation, Water transport, Computerized simulation, Mathematical models

49-630

Factors affecting the behaviour of tropospheric and stratospheric ozone in the European Arctic and in Antarctica.

Taalas, P., *Finnish Meteorological Institute. Contributions,* 1993, No.10, 31p., 9 refs.

Ozone, Polar atmospheres, Polar stratospheric clouds, Atmospheric composition

Three papers dealing with new ozone observations made in the European Arctic and at the Antarctic Peninsula since 1987 are reviewed here. An update including the year 1992 is also made. Total ozone and ozone sounding observations made in the European Arctic and in Antarctica in 1987-92 and meteorological sounding observations made at Sodankylä, Finland in 1965-92 have been studied. No regular ozone soundings had been performed in the European Arctic and on the Antarctic Peninsula prior to 1988. Ozone observations have been interpreted using global analysis fields from the European Centre for Medium Range Weather Forecasts. These allow one to calculate potential vorticity maps and three-dimensional trajectories. The use of such tools in ozone research is a recent development. Pronounced stratospheric ozone loss has been observed in Antarctica in springtime; no similar loss has been observed in the European Arctic, although large negative anomalies of short duration have been detected. It has been discovered that meteorological factors, i.e. subtropical advection of ozone-poor air towards the poles and rising motion in the lower stratosphere, lead to low total ozone columns over Europe. Interhemispheric comparison of the behavior of tropospheric ozone at high latitudes has revealed that the spring peak of tropospheric ozone in the Northern Hemisphere is most probably caused by general photochemical activation of nitric and hydrocarbon compounds. (Auth. mod.)

49-631

Frozen ground. *International Permafrost Association. News bulletin,* Dec. 1993, No.14, 26p., Refs. passim.

Research projects, Organizations, Meetings, Permafrost

49-632

Frozen ground. *International Permafrost Association. News bulletin,* June 1994, No.15, 32p., Refs. passim.

Research projects, Organizations, Meetings, Permafrost

49-633

Seismic wavefield recorded on an antarctic ice shelf.

Jarvis, E.P., King, E.C., *Journal of seismic exploration,* 1993, Vol.2, p.69-86, 21 refs.

Ice shelves, Ice cover thickness, Subglacial observations, Bottom topography, Marine geology, Seismic surveys, Seismic reflection, Antarctica—Larsen Ice Shelf

A description is given of the seismic wavefield recorded on the Larsen Ice Shelf from a walkaway experiment. The experiment used a 2 km receiver spread with single geophones at 5.2 m intervals. The source was buried explosive charges. On the recorded wavefield individual phases are identified. These include diving waves and their multiples, dispersive ground roll, mode converted reflections and multi-path multiple reflections. The velocities of propagation, amplitudes and the frequency content of the different phases are described. The data have been analyzed to determine the physical properties of the firn and ice layers of the ice shelf as they affect the propagation of seismic energy. (Auth.)

49-634

North to Alaska.

Coates, K., Fairbanks, University of Alaska Press, 1992, 304p., Refs. passim.

Highway planning, Cold weather construction, History, Canada—British Columbia, Canada—Yukon Territory, United States—Alaska

49-635

Alaska science nuggets.

Davis, N., Fairbanks, University of Alaska, Geophysical Institute, 1982, 233p., Collection of 400 short newspaper articles on science topics related to Alaska and the north.

DLC Q158.5.A43 1982

Geography, Education, Manuals, United States—Alaska

49-636

Effects of low temperature thermal cycles on micro-creep and other mechanical properties of composites.

Bhatacharya, R.K., Dutta, P.K., MP 3477, International Conference on Composites Engineering, 1st, New Orleans, Aug. 28-31, 1994. Proceedings. ICCE/1. Edited by D. Hui, 1994, p.49-50.

Composite materials, Low temperature tests, Thermal stresses

49-637

Graphite epoxy laminate penetration at low temperatures.

Sivapuram, S.K., Nwosu, S.N., Dutta, P.K., Hui, D., MP 3478, International Conference on Composites Engineering, 1st, New Orleans, Aug. 28-31, 1994. Proceedings. ICCE/1. Edited by D. Hui, 1994, p.137-138, 8 refs.

Composite materials, Low temperature tests, Cold weather tests, Penetration tests, Thermal stresses

49-638

Corps of Engineers research on composites in infrastructures.

Dutta, P.K., Lampo, R.G., O'Neil, E.F., Fehl, B.D., Hartman, J.P., MP 3479, International Conference on Composites Engineering, 1st, New Orleans, Aug. 28-31, 1994. Proceedings. ICCE/1. Edited by D. Hui, 1994, p.195-196, 4 refs.

Composite materials, Research projects, Cold weather construction, Cold weather performance

49-639

Fracture model of polymer composites at low temperature.

Lu, G.Y., Hui, D., Dutta, P.K., MP 3480, International Conference on Composites Engineering, 1st, New Orleans, Aug. 28-31, 1994. Proceedings. ICCE/1. Edited by D. Hui, 1994, p.311-312, 4 refs.

Composite materials, Low temperature tests, Cold weather performance, Thermal stresses, Crack propagation

49-640

Application of advanced composite crashworthy designs for highway guardrails.

Dutta, P.K., McDevitt, C.F., MP 3481, International Conference on Composites Engineering, 1st, New Orleans, Aug. 28-31, 1994. Proceedings. ICCE/1. Edited by D. Hui, 1994, p.337-338, 1 ref.

Composite materials, Road maintenance, Highway planning, Impact strength, Safety

49-641

Stress waves propagation in rocks and unconsolidated soil samples by vertical dynamic Hopkinson Bar.

Nwosu, S.N., Dutta, P.K., Hui, D., MP 3482, International Conference on Composites Engineering, 1st, New Orleans, Aug. 28-31, 1994. Proceedings. ICCE/1. Edited by D. Hui, 1994, p.373-374, 2 refs.

Composite materials, Soil strength, Impact tests, Shock waves

49-642

Some effects of different cloud parameterizations in a mesoscale model and a chemistry transport model.

Mölders, N., et al, *Journal of applied meteorology,* Apr. 1994, 33(4), p.527-545, 28 refs.

Precipitation (meteorology), Cloud physics, Atmospheric composition, Ice formation, Supercooling, Scavenging, Ice water interface, Weather forecasting, Simulation, Mathematical models

49-643

Glacier modeling and the climate of Patagonia during the last glacial maximum.

Hulton, N.R.J., Sugden, D.E., Payne, A., Clapperton, C.M., *Quaternary research,* July 1994, 42(1), p.1-19, 42 refs.

Pleistocene, Paleoclimatology, Air temperature, Glacier oscillation, Glacier mass balance, Simulation, Ice models, Mathematical models, Climatic factors, Argentina—Patagonia

49-644

Numerical simulations of cirrus properties.

Zhang, Y., Laube, M., Raschke, E., *Contributions to atmospheric physics,* May 1994, 67(2), p.109-120, With German summary. 34 refs.

Cloud cover, Climatic factors, Cloud physics, Physical properties, Ice water interface, Ice growth, Radiant heating, Particle size distribution, Water content, Albedo, Mathematical models

49-645

Three-dimensional description of the stratospheric polar vortex.

Dameris, M., Grewe, V., *Contributions to atmospheric physics,* May 1994, 67(2), p.157-160, With German summary. 4 refs.

Polar atmospheres, Stratosphere, Atmospheric physics, Structural analysis, Computerized simulation, Computer programs

49-646

Mechanisms of primary succession following deglaciation at Glacier Bay, Alaska.

Chapin, F.S., III, Walker, L.R., Fastie, C.L., Sharman, L.C., *Ecological monographs,* May 1994, 64(2), p.149-175, Refs. p.172-175.

Moraines, Ecosystems, Plant ecology, Trees (plants), Revegetation, Soil microbiology, Nutrient cycle, Vegetation patterns, Growth, United States—Alaska—Glacier Bay

49-647

Origins of freeze-thaw instability in concentrated water-in-oil emulsions.

Aronson, M.P., Ananthapadmanabhan, K., Petko, M.F., Palatini, D.J., *Colloids and surfaces A,* June 28, 1994, 85(2-3), p.199-210, 34 refs.

Colloids, Surfactants, Cold storage, Stability, Freeze thaw cycles, Phase transformations, Ice formation, Nucleation rate, Ice water interface, Thermal expansion, Electron paramagnetic resonance

49-648

Uppermost Wenlock and lower Luclow plectograptine graptolites, Arctic Islands, Canada: new isolated material.

Lenz, A.C., *Journal of paleontology,* July 1994, 68(4), p.851-860, 19 refs.

Arctic landscapes, Stratigraphy, Pleistocene, Fossils, Scanning electron microscopy, Classifications, Canada—Northwest Territories—Cornwallis Island, Canada—Northwest Territories—Baillie Hamilton Island

49-649

Albedo of temperate and boreal forest and the Northern Hemisphere climate: a sensitivity experiment using the LMD GCM.

Chalita, S., Le Treut, H., *Climate dynamics,* Sep. 1994, 10(4-5), p.231-240, 32 refs.

Climatology, Climatic changes, Cooling, Albedo, Vegetation factors, Vegetation patterns, Environmental impact, Snow cover distribution, Snow cover effect, Soil temperature, Simulation

49-650
Grid transformation for incorporating the Arctic in a global ocean model.
Eby, M., Holloway, G., *Climate dynamics,* Sep. 1994, 10(4-5), p.241-247, 23 refs.
Climatology, Oceanography, Ocean currents, Heat flux, Simulation, Arctic Ocean

49-651
Ozone variations in the Scandinavian sector of the Arctic during the AASE campaign and 1989.
Henriksen, K., Larsen, S.H.H., Shumilov, O.I., Thorkelsson, B., *Geophysical research letters,* Aug. 15, 1994, 21(17), p.1775-1778, 15 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Atmospheric attenuation, Ozone, Periodic variations, Photometry

49-652
Stratospheric denitrification due to polar aerosol formation: implications for a future atmosphere with increased CO_2.
Pitari, G., Ricciardulli, L., *Geophysical research letters,* Aug. 15, 1994, 21(17), p.1791-1794, 9 refs.
Polar atmospheres, Stratosphere, Atmospheric density, Photochemical reactions, Ice formation, Aerosols, Heterogeneous nucleation, Ozone, Carbon dioxide, Mathematical models

49-653
Flows of frost-coated clasts: a recently discovered scree slope grain-flow type. [Les coulées de pierres glacées: un nouveau type de coulées de pierraille sur les talus d'éboulis]
Hétu, B., Van Steijn, H., Vandelac, P., *Géographie physique et Quaternaire,* 1994, 48(1), p.3-22, In French with English and German summaries. 37 refs.
Talus, Slope processes, Sediment transport, Geomorphology, Periglacial processes, Mass flow, Friction, Glaze, Ice cover effect, Ice solid interface

49-654
Later Quaternary sea level changes on Brock and Prince Patrick Islands, western Canadian arctic archipelago.
Hodgson, D.A., Taylor, R.B., Fyles, J.G., *Géographie physique et Quaternaire,* 1994, 48(1), p.69-84, With French and German summaries. 75 refs.
Pleistocene, Arctic landscapes, Quaternary deposits, Geomorphology, Glacial geology, Glacier oscillation, Marine geology, Marine deposits, Ice pileup, Sea level, Radioactive age determination, Canada—Northwest Territories—Prince Patrick Island, Canada—Northwest Territories—Brock Island

49-655
Late Quaternary marine and terrestrial environments, northwestern Baffin Island, Northwest Territories.
Short, S.K., et al, *Géographie physique et Quaternaire,* 1994, 48(1), p.85-95, With French and German summaries. 57 refs.
Pleistocene, Paleoecology, Paleoclimatology, Arctic landscapes, Quaternary deposits, Marine deposits, Palynology, Radioactive age determination, Canada—Northwest Territories—Baffin Island

49-656
Species assemblages in saltmarsh ponds in western Iceland in relation to environmental variables.
Ingólfsson, A., *Estuarine, coastal and shelf science,* Mar. 1994, 38(3), p.235-248, 20 refs.
Limnology, Ponds, Subarctic landscapes, Wetlands, Salinity, Ecosystems, Ecology, Classifications, Iceland

49-657
Mesoscale structure of precipitation bands in a North Atlantic winter storm.
Raga, G.B., Stewart, R.E., Strapp, J.W., *Monthly weather review,* Sep. 1994, 122(9), p.2039-2051, 31 refs.
Synoptic meteorology, Storms, Fronts (meteorology), Precipitation (meteorology), Atmospheric physics, Radar echoes, Snow melting, Ice water interface, Cooling

49-658
Hail recognition through the combined use of radar reflectivity and cloud-top temperatures.
Auer, A.H., Jr., *Monthly weather review,* Sep. 1994, 122(9), p.2218-2221, 2 refs.
Precipitation (meteorology), Clouds (meteorology), Rain, Hail, Ice detection, Radar echoes, Air temperature, Weather forecasting

49-659
Freeze-sampling technique for the collection of active stream sediments used in mineral exploration and environmental studies.
Thoms, M.C., *Journal of geochemical exploration,* July 1994, 51(2), p.131-141, 20 refs.
Geochemistry, Geophysical surveys, Mineralogy, Streams, Bottom sediment, Sampling, Samplers, Cryogenics, Soil freezing, Accuracy

49-660
Arctic river-runoff: mean residence time on the shelves and in the halocline.
Schlosser, P., Bauch, D., Fairbanks, R., Bönisch, G., *Deep-sea research I,* July 1994, 41(7), p.1053-1068, 23 refs.
Oceanographic surveys, Hydrography, Surface waters, Water transport, Sampling, Runoff, Salinity, Stratification, Water chemistry, Radioactive age determination, Arctic Ocean

49-661
Holocene glacial activity and climatic variations in the Swiss Alps: reconstructing a continuous record from proglacial lake sediments.
Leemann, A., Niessen, F., *Holocene,* 1994, 4(3), p.259-268, 67 refs.
Paleoclimatology, Glacial geology, Mountain glaciers, Glacier oscillation, Climatic changes, Air temperature, Glacial deposits, Lacustrine deposits, Sedimentation, Radioactive age determination, Switzerland—Alps

49-662
Holocene glacier fluctuations at Hardangerjøkulen, central-southern Norway: a high-resolution composite chronology from lacustrine and terrestrial deposits.
Dahl, S.O., Nesje, A., *Holocene,* 1994, 4(3), p.269-277, 36 refs.
Pleistocene, Glacial geology, Glacier oscillation, Glacial deposits, Lacustrine deposits, Sedimentation, Stratigraphy, Geochronology, Radioactive age determination, Norway

49-663
Neoglaciation and an early 'Little Ice Age' in western Norway: lichenometric evidence from the Sandane area.
Evans, D.J.A., Butcher, C., Kirthisingha, A.V., *Holocene,* 1994, 4(3), p.278-289, 28 refs.
Glaciation, Glacial geology, Glacier oscillation, Geomorphology, Moraines, Lichens, Vegetation patterns, Age determination, Norway

49-664
Kinetic compensation during homogeneous and heterogeneous nucleation of ice in aqueous systems.
Øzilgen, S., Øzilgen, M., Reid, D.S., *Lebensmittel-Wissenschaft & Technologie,* 1994, 27(4), p.319-323, 21 refs.
Ice water interface, Solutions, Ice formation, Heterogeneous nucleation, Homogeneous nucleation, Nucleation rate, Forecasting, Temperature measurement, Analysis (mathematics), Statistical analysis

49-665
Monte Carlo calculation of ice cluster energy on the substrate with a similar structure.
Zapadinskiĭ, E., Gorbunov, B., Voloshin, V., Kulmala, M., *Journal of colloid and interface science,* Sep. 1994, 166(2), p.286-293, 35 refs.
Ice physics, Colloids, Molecular structure, Molecular energy levels, Interfacial tension, Ice solid interface, Substrates, Statistical analysis

49-666
Modeling of low-frequency transmission loss in the central Arctic.
LePage, K., Schmidt, H., *Acoustical Society of America. Journal,* Sep. 1994, 96(3), p.1783-1795, 18 refs.
Underwater acoustics, Wave propagation, Scattering, Attenuation, Ice bottom surface, Ice cover effect, Ice water interface, Ice elasticity, Surface roughness, Mathematical models, Low frequencies

49-667
Arctic aerosol factor models: validation by marginally detected elements.
Heidam, N.Z., *Atmospheric environment,* May 1994, 28(8), p.1549-1555, 11 refs.
Polar atmospheres, Atmospheric composition, Aerosols, Haze, Air pollution, Sampling, Chemical composition, Statistical analysis, Correlation, Greenland

49-668
Flux of anthropogenic trace metals into the Arctic from the mid-latitudes in 1979-80.
Akeredolu, F.A., et al, *Atmospheric environment,* May 1994, 28(8), p.1557-1572, 36 refs.
Polar atmospheres, Air pollution, Atmospheric composition, Sampling, Metals, Atmospheric circulation, Wind direction

49-669
Autumn frost hardening of one-year-old *Pinus sylvestris* (L.) seedlings: effect of origin and parent trees.
Aho, M.L., *Scandinavian journal of forest research,* 1994, 9(1), p.17-24, 26 refs.
Forestry, Trees (plants), Viability, Plant tissues, Acclimatization, Frost resistance, Damage, Cold weather tests

49-670
Timing of cold temperature exposure affects root and shoot frost hardiness of *Picea mariana* container seedlings.
Colombo, S.J., *Scandinavian journal of forest research,* 1994, 9(1), p.52-59, 29 refs.
Forestry, Trees (plants), Acclimatization, Frost resistance, Roots, Plant physiology, Cold weather tests, Temperature effects

49-671
Distribution of water frost on Charon.
Buie, M.W., Shriver, S.K., *Icarus,* Apr. 1994, 108(2)pt.1, p.225-233, 10 refs.
Satellites (natural), Extraterrestrial ice, Ice optics, Remote sensing, Infrared photography, Photometry, Frost, Ice detection

49-672
Charon: more than water ice?
Roush, T.L., *Icarus,* Apr. 1994, 108(2)pt.1, p.243-254, 29 refs.
Satellites (natural), Extraterrestrial ice, Ice optics, Photometry, Albedo, Spectra, Chemical composition, Geochemistry, Mathematical models

49-673
Mapping of forest types in Alaskan boreal forests using SAR imagery.
Rignot, E.J.M., Williams, C.L., Way, J.B., Viereck, L.A., *IEEE transactions on geoscience and remote sensing,* Sep. 1994, 32(5), p.1051-1059, 23 refs.
Remote sensing, Aerial surveys, Radar photography, Synthetic aperture radar, Subarctic landscapes, Floodplains, Forest land, Classifications, Sensor mapping, United States—Alaska—Bonanza Creek Experimental Forest

49-674
Radar estimates of aboveground biomass in boreal forests of interior Alaska.
Rignot, E.J.M., Way, J.B., Williams, C.L., Viereck, L.A., *IEEE transactions on geoscience and remote sensing,* Sep. 1994, 32(5), p.1117-1124, 25 refs.
Forest land, Subarctic landscapes, Airborne radar, Synthetic aperture radar, Backscattering, Trees (plants), Biomass, Sensor mapping, Vegetation patterns, Accuracy, United States—Alaska—Bonanza Creek Experimental Forest

49-675

Model investigation of wave formation in solid ice cover from the motion of a submarine.

Kozin, V.M., Onishchuk, A.V., *Journal of applied mechanics and technical physics,* Sep. 1994, 35(2), p.235-238, Translated from Prikladnaia mekhanika i tekhnicheskaia fizika. 7 refs.

Sea ice, Submarines, Ice breaking, Ice mechanics, Ice water interface, Ice cover effect, Gravity waves, Elastic waves, Wave propagation, Resonance, Simulation

49-676

Historical and present glacier oscillations of Vernagt Glacier, Ötztal Alps, and their impact on the glacier forefield. [Frührezente und rezente Gletscherstandsschwankungen des Vernagtferners/ Ötztaler Alpen und ihre Auswirkungen auf das Gletschervorfeld]

Winkler, S., Hagedorn, H., *Petermanns Geographische Mitteilungen,* 1994, 138(1), p.19-34, In German with English and Russian summaries. 38 refs.

Alpine glaciation, Glacier surveys, Glacier oscillation, Glacial geology, Sediment transport, Moraines, Landforms, Geomorphology, Periodic variations, Austria—Alps

49-677

Relation of growth and equilibrium crystal shapes.

Elbaum, M., Wettlaufer, J.S., *Physical review E,* Oct. 1993, 48(4), p.3180-3183, 21 refs.

Crystal growth, Phase transformations, Surface energy, Evaporation, Surface properties

49-678

Comparison of esker morphology and sedimentology with former ice-surface topography, Burroughs Glacier, Alaska.

Syverson, K.M., Gaffield, S.J., Mickelson, D.M., *Geological Society of America. Bulletin,* Sep. 1994, 106(9), p.1130-1142, 40 refs.

Glacial hydrology, Glacial geology, Subglacial drainage, Glacial deposits, Glacier beds, Ice tunnels, Sedimentation, Nunataks, Topographic effects, United States—Alaska—Burroughs Glacier

49-679

Further evidence for the existence of two kinds of H-bonds in ice Ih.

Li, J.C., Bennington, S.M., Ross, D.K., *Physics letters A,* Sep. 5, 1994, 192(2-3-4), p.295-300, 17 refs.

Ice physics, Ice structure, Molecular structure, Deuterium oxide ice, Defects, Hydrogen bonds, Ice spectroscopy, Neutron cross sections, Spectra

49-680

Antarctic ozone hole fails to recover.

Kerr, R.A., *Science,* Oct. 14, 1994, 266(5183), p.217.

Atmospheric composition, Ozone

With most of the Pinatubo debris dispersed, the size of the ozone hole over Antarctica was expected to diminish considerably. However, the hole continues nearly as wide and deep as ever, and the hole watchers are puzzled as to why. Three factors are suggested as possible reasons for the continued near-record severity: a colder than usual stratosphere; lingering debris from the Pinatubo explosion; and the still increasing amounts of chlorine and bromine in the stratosphere. If the third factor is in fact the primary reason for the nonrecovery of the ozone hole, it may mean several more years before the destruction hits bottom because the amount of these chemicals entering the atmosphere continues to increase at a rate of about 2%/year.

49-681

Spring phytoplankton production in the western Ross Sea.

Arrigo, K.R., McClain, C.R., *Science,* Oct. 14, 1994, 266(5183), p.261-263, 20 refs.

Plankton, Ice edge, Polynyas, Biomass, Antarctica—Ross Sea

Coastal zone color scanner (CZCS) imagery of the western Ross Sea revealed the presence of an intense phytoplankton bloom covering >106,000 sq km in early Dec. 1978. This bloom developed inside the Ross Sea polynya, within 2 weeks of initial polynya formation in late Nov. Primary productivity calculated from Dec. imagery (3.9 grams of carbon/sq m/day) was up to four times the values measured during *in situ* studies in mid-Jan. to Feb. 1979. Inclusion of this early season production yields a spring-to-summer estimate of 141 to 171 grams of carbon/sq m, three to four times the values previously reported for the western Ross Sea. (Auth.)

49-682

Effect of ozone depletion on atmospheric CH_4 and CO concentrations.

Bekki, S., Law, K.S., Pyle, J.A., *Nature,* Oct. 13, 1994, 371(6498), p.595-597, 22 refs.

Ozone, Atmospheric composition, Chemical composition, Models, Stratosphere

49-683

Marked post-18th century environmental change in high-Arctic ecosystems.

Douglas, M.S.V., Smol, J.P., Blake, W., Jr., *Science,* Oct. 21, 1994, 266(5184), p.416-419, 26 refs.

Ecosystems, Core samplers, Ponds, Climatic changes, Freeze thaw cycles, Canada—Northwest Territories—Ellesmere Island

49-684

Supernumerary ice-crystal halos?

Berry, M.V., *Applied optics,* July 20, 1994, 33(21), p.4563-4568, 19 refs.

Meteorology, Optical phenomena, Sunlight, Light scattering, Ice crystal optics, Orientation, Refraction, Analysis (mathematics)

49-685

Halo polarization profiles and the interfacial angles of ice crystals.

Können, G.P., Muller, S.H., Tinbergen, J., *Applied optics,* July 20, 1994, 33(21), p.4569-4579, 19 refs.

Polar atmospheres, Optical phenomena, Ice crystal optics, Orientation, Radiance, Refraction, Light scattering, Polarization (waves), Analysis (mathematics), Antarctica—Amundsen-Scott Station

Polarization and radiance of various types of refraction halo in ice-crystal swarms that extend to ground level were measured as a function of scattering angle. Simultaneously, samples of the crystals that produce these halos were collected and replicated. Measurements were conducted at Amundsen-Scott and Vostok Stations. The halo polarization peaks are wider than the Fraunhofer theory of diffraction predicts for the observed size distribution of the replicated crystals. The explanation put forward is that the angles between crystal prism faces are not always exact integer multiples of 60 deg, and the basal faces are not always exactly parallel, as is usually assumed. The collected crystals confirm this. The widths of the halo polarization peaks can be explained if the distributions of the interfacial angles around their means reach their half-maximum values at a deviation of 0.49 deg. This corresponds to a deviation of 0.35 deg of the face normals from their crystallographic positions. The presence of variation in interfacial angles in low-level halos seems to arise from the fact that the crystals are growing. (Auth. mod.)

49-686

Subsuns, Bottlinger's rings, and elliptical halos.

Lynch, D.K., Gedzelman, S.D., Fraser, A.B., *Applied optics,* July 20, 1994, 33(21), p.4580-4589, 30 refs.

Precipitation (meteorology), Cloud physics, Optical phenomena, Ice crystal optics, Orientation, Sunlight, Specular reflection, Mathematical models, Theories

49-687

Effects of ice-crystal structure on halo formation: cirrus cloud experimental and ray-tracing modeling studies.

Sassen, K., Knight, N.C., Takano, Y., Heymsfield, A.J., *Applied optics,* July 20, 1994, 33(21), p.4590-4601, 20 refs.

Cloud physics, Optical phenomena, Light scattering, Ice crystal optics, Ice crystal structure, Ice microstructure, Refraction, Orientation, Sampling, Lidar

49-688

Volcanic Bishop's ring: evidence for a sulfuric acid tetrahydrate particle aureole.

Sassen, K., Peter, T., Luo, B.P.P., Crutzen, P.J., *Applied optics,* July 20, 1994, 33(21), p.4602-4606, 24 refs.

Optical phenomena, Cloud physics, Polar stratospheric clouds, Light scattering, Aerosols, Volcanic ash, Chemical properties, Ice crystal optics, Heterogeneous nucleation

49-689

Simulating rainbows and halos in color.

Gedzelman, S.D., *Applied optics,* July 20, 1994, 33(21), p.4607-4613, 21 refs.

Meteorology, Cloud physics, Optical phenomena, Light scattering, Ice crystal optics, Orientation, Computerized simulation

49-690

Short-term variations of Pb, Zn and Cu in recent Greenland snow.

Savarino, J., Boutron, C.F., Jaffrezo, J.L., *Atmospheric environment,* June 1994, 28(10), p.1731-1737, 46 refs.

Air pollution, Environmental tests, Atmospheric composition, Ice sheets, Sampling, Snow composition, Snow impurities, Chemical analysis, Metals, Seasonal variations, Greenland—Summit

49-691

Reflection of solar radiation by the antarctic snow surface at ultraviolet, visible, and near-infrared wavelengths.

Grenfell, T.C., Warren, S.G., Mullen, P.C., *Journal of geophysical research,* Sep. 20, 1994, 99(D9), p.18,669-18,684, 56 refs.

Climatology, Ice sheets, Snow surveys, Surface energy, Radiation balance, Solar radiation, Snow optics, Grain size, Albedo, Spectra, Snow cover effect, Antarctica—Amundsen-Scott Station, Antarctica—Vostok Station

The variation of snow albedo with wavelength across the solar spectrum from 0.3 micron in the ultraviolet (UV) to 2.5 microns in the near infrared (IR) was measured at Amundsen-Scott South Pole Station during the antarctic summers of 1985-86 and 1990-91. Similar results were obtained at Vostok Station in summer 1990-91. The albedo has a uniformly high value of 0.96-0.98 across the UV and visible spectrum, nearly independent of snow grain size and solar zenith angle, and this value probably applies throughout the interior of Antarctica. The albedo in the near IR is lower, dropping below 0.15 in the strong absorption bands at 1.5 and 2.0 microns; and it is quite sensitive to grain size and somewhat sensitive to zenith angle. Near-IR albedos were slightly lower at Vostok than at South Pole, but day-to-day variations in the measured grain size due to precipitation, drifting, and metamorphism were found to cause temporal variations in near-IR albedo larger than those due to any systematic geographical change from South Pole to Vostok. The spectrally averaged albedos ranged from 0.80 to 0.85 for both overcast and clear skies, in agreement with measurements by others at South Pole and elsewhere in Antarctica. By using a two-layer radiative transfer model, the albedo can be explained over the full wavelength range. Tests were made to correct for systematic errors in determining spectral albedo. (Auth. mod.)

49-692

Solute effects on the evaporation of ice particles.

Chen, J.P., Crutzen, P.J., *Journal of geophysical research,* Sep. 20, 1994, 99(D9), p.18,847-18,859, 66 refs.

Cloud physics, Chemical properties, Ice crystal growth, Ice water interface, Solubility, Evaporation, Monomolecular films, Mass transfer, Surface properties, Mathematical models

49-693

Denitrification mechanism of the polar winter stratosphere by major volcanic eruptions.

Bekki, S., *Journal of geophysical research,* Sep. 20, 1994, 99(D9), p.18,871-18,878, 25 refs.

Polar atmospheres, Stratosphere, Cloud physics, Atmospheric composition, Polar stratospheric clouds, Aerosols, Condensation nuclei, Volcanic ash, Chemical properties, Sedimentation

49-694

Effects of a polar stratospheric cloud parameterization on ozone depletion due to stratospheric aircraft in a two-dimensional model.

Considine, D.B., Douglass, A.R., Jackman, C.H., *Journal of geophysical research,* Sep. 20, 1994, 99(D9), p.18,879-18,894, 38 refs.

Climatology, Polar stratospheric clouds, Cloud physics, Chemical properties, Atmospheric attenuation, Ozone, Temperature variations, Aircraft, Condensation trails, Environmental impact, Models

49-695

Evolution of the concentrations of trace species in an aircraft plume: trajectory study.

Danilin, M.Y., Ebel, A., Elbern, H., Petry, H., *Journal of geophysical research,* Sep. 20, 1994, 99(D9), p.18,951-18,972, 58 refs.

Atmospheric composition, Air pollution, Ozone, Aircraft, Condensation trails, Turbulent diffusion, Aerosols, Environmental impact, Heterogeneous nucleation, Models

49-696

Catagenic evolution of organic matter in the bottom sediment of the Arctic continental margin of the world ocean. [Katagennaia evoliutsiia organicheskogo veshchestva v donnoǐ osadochnoǐ tolshche arkticheskoǐ kontinental'noǐ okrainy Mirovogo okeana]

Daniushevskaia, A.I., Petrova, V.I., Modelirovanie neftegazoobrazovaniia; sbornik nauchnykh trudov (Modeling oil and gas formation; collected scientific papers). Edited by S.G. Neruchev, O.K. Bazhenova and N.V. Marasanova, Moscow, Nauka, 1992, p.50-55, In Russian.

Bottom sediment, Ocean bottom, Geochemistry, Crude oil, Natural gas, Natural resources

49-697

Geochemical characteristics of the organic matter in the bottom sediment of the Weddell Sea. [Geokhimicheskie osobennosti organicheskogo veshchestva donnykh otlozheniǐ moria Ueddella]

Petrova, V.I., Daniushevskaia, A.I., Modelirovanie neftegazoobrazovaniia; sbornik nauchnykh trudov (Modeling oil and gas formation; collected scientific papers). Edited by S.G. Neruchev, O.K. Bazhenova and N.V. Marasanova, Moscow, Nauka, 1992, p.181-185, In Russian. 10 refs.

Bottom sediment, Ocean bottom, Geochemistry, Marine geology, Hydrocarbons, Antarctica—Weddell Sea

Obtained data appear to show that the content and individual composition of polycyclic areas in sediments of the Weddell Sea are due chiefly to the genesis of organic matter and only in isolated cases to secondary processes. The results reflect the information content of the geochemical investigations of the polycyclic areas during the monitoring of bottom sediments. Differences, revealed during the correlation of the distribution of polycyclic areas in sediments of the southern and northern polar zones of the world ocean, confirm that revealing the geochemical background during the analysis of the ecological condition of the waters is indispensable. It is also important for the genetic diagnosis of hydrocarbon anomalies. (Auth. mod.)

49-698

Siberia and the Soviet Far East.

Collins, D.N., ed, World bibliographical series, vol.127, Oxford, Clio Press, 1991, 217p., 735 refs.

Bibliographies, Natural resources, Economic development, Marine transportation, Water transport, Railroads, Transportation, Russia—Siberia

49-699

Alaska A to Z.

Herb, A.M., Bellevue, WA, Vernon Publications Inc., 1993, 189p.

Dictionaries, Geography, United States—Alaska

49-700

Some characteristics of cryogenic migration of chemical elements in urban technogenic landscapes. [Nekotorye osobennosti kriogennoǐ migratsii khimicheskikh elementov v gorodskikh tekhnogennykh landshaftakh]

Makarov, V.N., Ekologo-geokhimicheskiǐ analiz tekhnogennogo zagriazneniia; sbornik nauchnykh stateǐ (Ecological-geochemical analysis of technogenic contamination; collected scientific articles). Edited by A.A. Golovin and E.P. Sorokina, Moscow, Institut mineralogii, geokhimii i kristallokhimii redkikh elementov, 1992, p.89-95, In Russian. 4 refs.

Geocryology, Geochemistry, Migration, Frozen ground physics, Permafrost physics, Soil pollution

49-701

Distribution of nickel in the soil and snow cover of a large city. [Raspredelenie nikelia v pochve i snezhnom pokrove krupnogo goroda]

Baltakis, V.I., Tarashkiavichius, R.M., Ekologo-geokhimicheskiǐ analiz tekhnogennogo zagriazneniia; sbornik nauchnykh stateǐ (Ecological-geochemical analysis of technogenic contamination; collected scientific articles). Edited by A.A. Golovin and E.P. Sorokina, Moscow, Institut mineralogii, geokhimii i kristallokhimii redkikh elementov, 1992, p.95-104, In Russian. 1 ref.

Soil pollution, Snow impurities, Snow cover, Environmental impact, Urban planning

49-702

Great Russian navigator, A.I. Chirikov.

Divin, V.A., Rasmuson Library Historical Translation Series, vol. 6, Fairbanks, University of Alaska, 1993, 319p., Refs. p.279-300.

History, Expeditions, Maps

49-703

Bereza strato-zone of Pleistocene Belarus. [Berezovskiǐ stratoraǐon Pleǐstotsena Belorussii]

Velichkevich, F.IU., Rylova, T.B., San'ko, A.F., Fedenia, V.M., Minsk, Navuka i tekhnika, 1993, 146p., In Russian. Refs. p.142-146.

Pleistocene, Glacial geology, Glacial deposits, Quaternary deposits, Paleobotany, Stratigraphy, Belarus—Bereza

49-704

Field screening method for TNT and RDX in groundwater.

Jenkins, T.F., Thorne, P.G., Walsh, M.E., SR 94-14, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* May 1994, 12p., 27 refs.

Explosives, Ground water, Soil pollution, Environmental impact, Military operation

Two field screening methods were developed to determine TNT and RDX in groundwater. Both methods rely on solid phase extraction to remove analytes from the water and effect preconcentration. For the first method, a 500 mL water sample is passed through a 3 mL solid phase extraction cartridge packed with HayeSep R. TNT and RDX are then eluted from the cartridge with acetone and the extract divided into two portions. One portion of the extract is reacted with acetic acid and zinc to convert RDX to nitrous acid. The nitrous acid is converted to an azo dye with a Griess reagent and the concentration estimated by the absorbance at 507 nm (Griess method). The second portion of the extract is reacted with a pellet of KOH and about 0.3 mg of sodium sulfite. The concentration of TNT is estimated from the absorbance at 540 nm of the Janowsky anion (Janowsky method). Using these methods, and visual detection of the colored solutions produced, samples containing 5 micrograms/L of either TNT or RDX can be reliably distinguished from uncontaminated water. In the second method, a 2-L water sample is passed through a stack of two 47 mm Empore SDVB disks to preconcentrate TNT and RDX. The top disk is removed, the bottom disk eluted with 5 mL of acetone and the extracted RDX determined using the Griess method described above. The top disk is then replaced and eluted with 20 mL of acetone and the extracted TNT determined by the Janowsky method described above. Using these methods and visual detection of the colored solutions, water samples containing 2 micrograms/L of either TNT or RDX can be reliably distinguished from uncontaminated water. For quantitative analysis, use of these methods and absorbance measurements with a spectrophotometer resulted in Method Detection Limits (MDL) of 0.9 micrograms/L for TNT, but a higher value of 3.8 micrograms/L for RDX. The higher MDL for RDX is caused by poor reproducibility in RDX recovery from the bottom membrane.

49-705

Model for avalanches in three spatial dimensions: comparison of theory to experiments.

Lang, R.M., Leo, B.R., CR 94-05, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* April 1994, 23p., Refs. p.21-23.

Mathematical models, Avalanches, Theories, Avalanche modeling, Avalanche mechanics

A three-dimensional theory is derived to describe the temporal behavior of gravity currents of cohesionless granular media, in an attempt to model the motion of dense, flow-type snow avalanches, ice and rock slides. A Mohr-Coulomb yield criterion is assumed to describe the constitutive behavior of the material, and the basal bed friction is described similarly by a Coulomb type of friction. A drag term is included in order to model the occurrence of flow regimes where boundary drag becomes non-negligible. Data from laboratory simulations are compared to a series of numerical studies based on the aforementioned theory. A nondimensional, depth and width averaged form of the theory is considered. A Lagrangian finite difference scheme is then applied to numerically model some limiting cases of the governing equations. Two different numerical models are developed, tested and compared to experimental values. The results indicate that the model can account for flow transitions by inclusion of the drag term when the initial inclination angle is large enough to affect boundary drag. Furthermore, the temporal and spatial evolution of the granulate and final runout position can be predicted to values well within the experimental error.

49-706

Sorption of trace-level organics by ABS, FEP, FRE and FRP well casings.

Ranney, T.A., Parker, L.V., SR 94-15, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* June 1994, 31p., 23 refs.

Ground water, Well casings, Water pollution

The first part of this report contains the results of a literature review on whether four polymeric materials [acrylonitrile butadiene styrene (ABS), fluorinated ethylene propylene (FEP), fiberglass-reinforced epoxy (FRE) and fiberglass-reinforced plastic (FRP)] should be used in well casings when monitoring groundwater. The second part of this report contains the results of a laboratory study that compares sorption of low (mg/L) levels of dissolved organics by these four materials with sorption by two commonly used polymeric well casing materials [polyvinyl chloride (PVC) and polytetrafluoroethylene (PTFE)]. During the six-week laboratory study, ABS sorbed analytes much more rapidly and to a greater extent than the other materials, and PVC and FRE sorbed analytes the most slowly and to the least extent of the materials tested. As the study progressed there were an increasing number of unidentified peaks in the HPLC chromatograms of some of the samples. By the end of the study (1000 hours), there were 11 additional peaks in the ABS samples, 5 in the FRP samples and 1 in the FRE samples. Analysis by purge-and-trap GC/MS of the 1000 hour samples and 500 hour samples from a leaching study revealed the identity of some of these peaks.

49-707

Abrasive properties of test and training site soils: relative hardness of fine particle fraction.

Hogan, A.W., SR 94-16, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* June 1994, 11p., ADA-285 240, 13 refs.

Abrasion, Hardness tests, Soil mechanics, Military equipment

The experiment reported here shows that fine soil particles contribute to abrasion, wear and ultimate failure of parachute materials in a manner somewhat analogous to "three-body abrasion" in metals. The "hardness" of the particles collected at several test, training and maneuver areas is examined and scaled to known natural materials and commercial abrasives. The geometric diameters of the soil grains that enter and imbed in the fibers are primary factors for understanding the abrasion mechanism. In the case of cordage abrasion, the fraction of soil grains less than 0.2 mm was dominant within the strands and among the fibers. The particles were applied to designated surface grids on relatively large (3 x 3 to 7 x 7 cm) Mohs hardness specimens, glass photographic plates and steel cutting tools. All of the fine particles abraded glass photographic plates, with the exception of a soft, nonmagnetic, black fraction found in Camp Blanding fines. None of the materials scratched corundum, although it was possible to make a few scratches in Topaz with almost all specimens. The general upper limit of hardness was similar to that of quartz, which showed some detectable abrasion by five specimens. Fines from the Riyadh, Saudi Arabia, area easily scratched quartz, and this material is the hardest measured to date.

49-708

Sorption-desorption and transport of TNT and RDX in soils.

Selim, H.M., Iskandar, I.K., CR 94-07, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* May 1994, 25p., ADA-285 570, 36 refs.

Explosives, Military operation, Soil pollution, Adsorption, Soil mechanics

Batch and miscible-displacement experiments were conducted to determine the extent of adsorption-desorption and transport of 2,4,6-trinitrotoluene (TNT) and 2,3,5-trinitro-1,3,5-triazine (RDX) in soils. A reference bentonite clay, contaminated (Kolin) soil from the Louisiana Army Ammunition Plant, and two uncontaminated soils were used. The TNT isotherm for bentonite clay was described equally well using linear, Freundlich, Langmuir and modified Langmuir models. TNT adsorption and desorption isotherms showed a lack of hysteric behavior, with TNT retention as a fully reversible mechanism. Transport results from bentonite clay columns indicated that TNT was a highly mobile contaminant and fully conservative in the presence of methanol as the background solution. Mobility of TNT was strongly retarded, with some 50% of the applied TNT retained in the bentonite clay column when 0.005-M $Ca(NO_3)_2$ was the background solution. Transport results in Norwood (fine silty) soil columns revealed that TNT was strongly retained in this low-organic-matter and low-clay-content soil. The use of a transport model with either Freundlich or linear retention and an irreversible mechanism predicted the TNT transport data well. Poor predictions were obtained when model parameters based on batch retention data were used. Reasons for model failure may be attributable to TNT sorption-kinetics and retention because of diffusion into clay lattices. Transport results indicated high mobility of RDX with limited retardation, which is consistent with release and transport data from the contaminated soil.

49-709

Theoretical and experimental studies on sequential freezing solar water heater.

Jiang, X.N., Tao, Z., Lu, J.S., Ge, H.C., *Solar energy,* Aug. 1994, 53(2), p.139-146, 7 refs.

Heat pipes, Water pipes, Thermal expansion, Damage, Freezing, Protection, Design, Ice water interface, Mathematical models

49-710

Glacial and sea level history of Lowther and Griffith Islands, Northwest Territories: a hint of tectonics.

Dyke, A.S., *Géographie physique et Quaternaire,* 1993, 47(2), p.133-145, With French and German summaries. 29 refs.

Arctic landscapes, Pleistocene, Geological surveys, Glacial geology, Geologic processes, Shoreline modification, Marine deposits, Radioactive age determination, Tectonics, Isostasy, Sea level, Canada—Northwest Territories—Lowther Island, Canada—Northwest Territories—Griffith Island

49-711

Quantitative data on coarse debris on the surface of the ice cover, Saint-Lawrence Estuary. [Données quantitatives sur les cailloux á la surface du couvert glacial, estuaire du Saint-Laurent]

Dionne, J.C., *Géographie physique et Quaternaire,* 1993, 47(2), p.181-192, In French with English and German summaries. 50 refs.

Estuaries, Shores, River ice, Fast ice, Shore erosion, Periglacial processes, Sediments, Ice rafting, Lithology, Rocks, Canada—Quebec—St. Lawrence River

49-712

Polyphase glacigenic deformation of advance glaciofluvial sediments near Big Creek, British Columbia.

Huntley, D.H., Broster, B.E., *Géographie physique et Quaternaire,* 1993, 47(2), p.211-219, With French and German summaries. 30 refs.

Pleistocene, Glaciation, Glacial geology, Glacial deposits, Quaternary deposits, Sediment transport, Ice solid interface, Glacier beds, Deformation, Canada—British Columbia

49-713

Protected nature areas in the Russian Arctic.

Volkov, A.E., de Korte, J., *Polar record,* Oct. 1994, 30(175), p.299-310, 30 refs.

Arctic landscapes, Natural resources, Ecosystems, Environmental protection, International cooperation, Russia

49-714

Prospects for use of PDP pour-depressant additive in diesel fuels.

Bashkatova, S.T., et al, *Chemistry and technology of fuels and oils,* May 1994, 29(9-10), p.464-467, Translated from Khimiia i tekhnologioia topliv i masel. 7 refs.

Fuels, Solidification, Temperature effects, Countermeasures, Fuel additives, Polymers, Cold weather performance, Low temperature tests, Diesel engines

49-715

Microscopic evidence of subglacial deformation.

Van der Meer, J.J.M., *Quaternary science reviews,* Sep. 1993, 12(7), p.553-587, 80 refs.

Pleistocene, Glacial geology, Subglacial observations, Quaternary deposits, Glacier beds, Glacial deposits, Ice solid interface, Deformation, Microstructure, Thin sections

49-716

Deep circulation of groundwater in overpressured subglacial aquifers and its geological consequences.

Boulton, G.S., et al, *Quaternary science reviews,* Nov. 1993, 12(9), p.739-745, 22 refs.

Pleistocene, Ice sheets, Glacial hydrology, Glacier melting, Subglacial drainage, Ground water, Water pressure, Water flow, Mathematical models, Netherlands

49-717

CASP annual report for the period 1 February 1993 to 31 January 1994.

Cambridge Arctic Shelf Programme, Cambridge, United Kingdom, 1994, 19p.

Research projects, Marine geology, Geological surveys, Hydrocarbons, Exploration

49-718

Against the grain.

Warren, C., *Geographical,* Sep. 1994, 66(9), p.26-30.

Climatology, Climatic changes, Glacier flow, Glacier oscillation, Calving, Long range forecasting, Chile—Pio XI Glacier

49-719

Interatomic potential model for H_2O: applications to water and ice polymorphs.

Kumagai, N., Kawamura, K., Yokokawa, T., *Molecular simulation,* 1994, 12(3-6), p.177-186, 21 refs.

Water structure, Ice structure, High pressure ice, Solutions, Molecular structure, Molecular energy levels, Simulation, Mathematical models

49-720

Gel permeation chromatographic properties of poly)vinyl alcohol) gel particles prepared by freezing and thawing.

Murakami, R., Hachisako, H., Yamada, K., Motozato, Y., *Journal of chromatography A,* 1994, Vol.678, p.180-182, 6 refs.

Polymers, Particles, Freeze thaw cycles, Chemical analysis, X ray diffraction, Porosity, Mechanical properties, Temperature effects

49-721

Direct imaging of polysaccharide aggregates in frozen aqueous dilute systems.

Sugiyama, J., et al, *Carbohydrate polymers,* 1994, Vol.23, p.261-264, 31 refs.

Cryogenics, Electron microscopy, Solutions, Hydrates, Polymers, Vitreous ice, Aggregates, Microstructure, Imaging

49-722

Origin and development of textures and fabrics in basal ice at Summit, central Greenland.

Tison, J.L., Thorsteinsson, T., Lorrain, R.D., Kipfstuhl, J., *Earth and planetary science letters,* 1994, Vol.125, p.421-437, 41 refs.

Glaciology, Ice sheets, Ice cores, Bottom ice, Drill core analysis, Glacier flow, Ice mechanics, Sediments, Ice crystal size, Orientation, Ice solid interface, Greenland—Summit

49-723

Effect of test method on winter traction measurements.

Shoop, S.A., Young, B., Alger, R., Davis, J., MP 3483, *Journal of terramechanics,* May 1994, 31(3), p.153-161, 10 refs.

Vehicles, Tires, Traction, Skid resistance, Mechanical tests, Measuring instruments, Rubber snow friction, Correlation, Accuracy

Traction on winter surfaces was measured using three instrumented vehicles, each designed to measure traction for a different purpose: vehicle mobility research (CRREL instrumented vehicle), commercial tire testing (Uniroyal-Goodrich traction tester), and airport runway safety (Saab friction tester). The traction measured with each method is comparable but there are systematic differences due to the effects of the surface materials and test and analysis techniques. This comparison serves as the basis for collaboration between the various traction testing communities and illustrates the need for well documented, standard test and analysis procedures for traction testing and evaluation.

49-724

Atmospheric correction for satellite infrared radiometer data in polar regions.

Bamber, J.L., Harris, A.R., *Geophysical research letters,* Sep. 15, 1994, 21(19), p.2111-2114, 16 refs.

Polar atmospheres, Snow cover, Snow optics, Snow surface temperature, Radiance, Remote sensing, Radiometry, Data processing, Accuracy, Greenland

Mie scattering models suggest that the thermal infrared emissivity of snow is relatively insensitive to variations in its properties and is dependent primarily on viewing angle. This gives rise to the possibility of accurately measuring snow surface temperatures over the polar ice sheets, using satellite infrared radiometers operating in the window region at 10-13 microns. These instruments were designed primarily to measure sea surface temperature and a substantial body of work has been undertaken on correcting for the effects of variable absorption by the atmosphere over oceans. The atmospheric conditions over the antarctic and Greenland ice sheets are significantly different, however, and require special treatment. A three year dataset of radiosonde measurements, collected from six antarctic stations, is used to investigate the behavior of the "split-window" algorithm. The same dataset has been used to test the performance of a dual-view algorithm that can be used with the Along Track Scanning Radiometer onboard ERS-1. It is shown that, given accurate emissivity estimates, the atmospheric correction has an rms error of 0.015 K using the dual-view method. Combined with the excellent calibration and stability of the Along Track Scanning Radiometer and pixel averaging to reduce the detector noise, it is possible to derive snow surface "skin" temperature to an accuracy of about 0.1 K. (Auth. mod.)

49-725

Unified theory of electrical conduction in firn and ice: site percolation and conduction in snow and firn.

Shabtaie, S., Bentley, C.R., *Journal of geophysical research,* Oct. 10, 1994, 99(B10), p.19,757-19,769, 49 refs.

Snow physics, Glaciology, Firn, Electrical resistivity, Snow electrical properties, Porosity, Statistical analysis, Theories, Antarctica—Charlie, Dome

In a study derived from ice sheet resistivity soundings from Dome C, East Antarctica, the conduction process in firn is modeled by the theory of percolation and conduction in disordered systems. In effect, firn is an infinite cluster of ice crystals with a statistically defined geometry. The properties of such clusters can be studied by random resistor network lattices, where the connectivity of the continuous conducting material can be controlled stochastically. These mixtures of conducting and insulating materials show a percolation threshold at which the conduction abruptly ceases. The structure of cold polar solid ice shows one ice crystal packed by 14 to 16 neighbors. As the density decreases, the number of nearest neighbors diminishes, which reduces the number of clusters that could contribute to the conduction process. From the volume fraction of ice at pore closeoff and the symmetry of the firn a critical volume fraction 0.08 (density equal to 0.07 Mg/m^3) at which the conductivity should vanish is obtained. These experimental observations and analyses explain why Looyenga's empirical mixture equation approximates the transport properties of firn. Furthermore, the analyses indicate that for the current to be transported from one crystal to up to 14 to 16 neighbors the ionic impurities must either be located in the ice lattice by substitution (i.e., with bulk conduction taking place) or from a coating of impurities that surround the crystal like a shell. (Auth. mod.)

49-726

Structure fabric defined by topographic lineaments: correlation with Tertiary deformation of Ellesmere and Axel Heiberg Islands, Canadian Arctic.

Oakey, G., *Journal of geophysical research,* Oct. 10, 1994, 99(B10), p.20,311-20,321, 33 refs.

Arctic landscapes, Marine geology, Geological surveys, Geological maps, Tectonics, Geologic structures, Geologic processes, Canada—Northwest Territories—Ellesmere Island, Canada—Northwest Territories—Axel Heiberg Island

49-727

Analytical and numerical modeling of steady periodic heat transfer in extended surfaces.

Aziz, A., Lunardini, V.J., MP 3484, *Computational mechanics,* 1994, Vol.14, p.387-410, 33 refs.

Heat transfer, Pipes (tubes), Heat pipes, Interfaces, Thermal radiation, Surface temperature, Temperature variations, Oscillations, Mathematical models, Thermal analysis

This paper deals with the analytical and numerical approaches that have been used to study periodic or oscillatory heat transfer processes occurring in extended surfaces. The details pertain to harmonic oscillations but many of the methods can be applied to more general periodic functions. For linear problems, the techniques include complex combination, Laplace transforms, finite differences, and boundary elements. For the nonlinear situations, approaches such as finite differences, finite elements, and different combinations of complex temperature, perturbation, series expansions, straightline, and finite differences have proved effective. Following a brief introduction, the applications of each approach are discussed in detail.

49-728

Determination of anion concentrations in individual snow crystals and snowflakes.

Hewitt, A.D., Cragin, J.H., MP 3485, *Atmospheric environment,* 1994, 28(15), p.2545-2547, 17 refs.

Precipitation (meteorology), Snow composition, Snowflakes, Meltwater, Chemical analysis, Sampling, Ion density (concentration), Laboratory techniques

Capillary electrophoresis was used to measure the concentration of chloride, sulfate and nitrate in snowflakes and in individual snow crystals. Present handling operations allow analyses to be performed on sample volumes as small as 0.3 microl (e.g. approx. 1 mm dia. spatial dendrite). Preliminary findings suggest that the anion composition of snowflakes varies both temporally and with crystal habit.

49-729

Predation of ducks poisoned by white phosphorus: exposure and risk to predators.

Roebuck, B.D., Walsh, M.E., Racine, C.H., Reitsma, L., Steele, B., Nam, S.I., MP 3486, *Environmental toxicology and chemistry,* 1994, 13(10), p.1613-1618, 24 refs.

Wetlands, Bottom sediment, Water pollution, Ecosystems, Ecology, Explosives, Animals, Exposure, Chemical analysis, Environmental impact, Environmental tests, United States—Alaska—Eagle River

White phosphorus (P_4) has been identified as the cause of mortality for dabbling ducks and swans at an estuarine salt marsh in Alaska. Predation of ducks poisoned by P_4 was monitored to assess the extent and range of predator exposures to P_4. Avian tissues were analyzed for P_4 by gas chromatography. It was observed that both sick and dead dabbling ducks were common prey of bald eagles, herring gulls, and common ravens. Frank signs of P_4 intoxication attracted predators and rendered the ducks easy prey. White phosphorus was found in the tissue remains of ducks that had been preyed upon, thus providing positive evidence that predators were exposed to P_4. Although P_4 varied widely among individuals, it was generally highest in the gizzard contents followed by fatty tissues such as fat depots and the skin. White phosphorus was identified in fatty tissues of one eagle and in one herring gull egg, thus providing direct evidence of absorption of P_4 by predators.

49-730

Proceedings; Arctic geology and petroleum potential.

Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990, Vorren, T.O., ed, *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, 751p., Refs. passim. For selected papers see 49-731 through 49-760.

DLC TN870.5.A73 1990

Geology, Hydrocarbons, Crude oil, Natural gas, Seismic surveys, Sediments, Sedimentation, Pleistocene, Oil wells, Lithology, Arctic Ocean, Barents Sea

49-731

Mesozoic hydrocarbon source-rocks of the Arctic region.

Leith, T.L., et al, *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.1-25, Refs. p.22-25.

Hydrocarbons, Lithology, Sediments, Geology, Barents Sea, Canada—Northwest Territories—Sverdrup Basin

49-732

Natural gas hydrates: Arctic and Nordic Sea potential.

Max, M.D., Lowrie, A., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.27-53, Refs. p.49-53.

Hydrates, Heat transfer, Hydrocarbons, Natural gas, Geology, Arctic Ocean, Greenland Sea, Norwegian Sea, Fram Strait

49-733

Southern West Greenland continental shelf—was petroleum exploration abandoned prematurely?

Chalmers, J.A., Pulvertaft, T.C.R., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.55-66, 22 refs.

Wells, Drilling, Seismic surveys, Geothermal prospecting, Geology, Crude oil, Greenland

49-734

Depositional history and petroleum geology of the Carboniferous to Cretaceous sediments in the northern part of East Greenland.

Stemmerik, L., et al, *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.67-87, Refs. p.85-87.

Geology, Sediments, Sedimentation, Hydrocarbons, Stratification, Greenland

49-735

Sedimentology and diagenesis of the Upper Permian Wegener Halvø Formation carbonates along the margins of the Jameson Land Basin, East Greenland.

Stemmerik, L., et al, *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.107-119, 16 refs.

Geology, Sedimentation, Diagenesis, Sediments, Stratigraphy, Hydrocarbons, Stratification, Greenland

49-736

T-R sequence stratigraphy, facies analysis and reservoir distribution in the uppermost Triassic-Lower Jurassic succession, western Sverdrup Basin, Arctic Canada.

Embry, A.F., Johannessen, E.P., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.121-146, 29 refs.

Sediments, Stratigraphy, Hydrocarbons, Crude oil, Natural gas, Geology, Canada—Northwest Territories—Arctic Islands

49-737

Evaluation of maturity and source rock potential in the Lougheed Island area of the central Sverdrup Basin, Arctic Canada.

Goodarzi, F., et al, *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.147-157, 19 refs.

Hydrocarbons, Stratigraphy, Geology, Canada—Northwest Territories—Lougheed Island, Canada—Northwest Territories—Sverdrup Basin

49-738

Source-rock potential and thermal maturity of the sedimentary succession in the Drake and Hecla hydrocarbon fields, Melville Island, Canadian Arctic Archipelago.

Gentzis, T., Goodarzi, F., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.159-171, 20 refs.

Hydrocarbons, Stratigraphy, Sediments, Natural gas, Diagenesis, Geology, Stratification, Canada—Northwest Territories—Arctic Archipelago, Canada—Northwest Territories—Melville Island

49-739

Hydrocarbon potential of the St. George Basin, Bering Sea, Alaska.

Carter, K., Lerche, I., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.173-194, 30 refs.

Hydrocarbons, Fluid flow, Models, Geology, Bering Sea, United States—Alaska—St. George Basin

49-740

Hydrocarbon loss from oil and gas fields of the Sverdrup Basin, Canadian Arctic Islands.

Waylett, D.C., Embry, A.F., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.195-204, 6 refs.

Hydrocarbons, Natural gas, Crude oil, Geology, Canada—Northwest Territories—Arctic Islands, Canada—Northwest Territories—Sverdrup Basin

49-741

Main results of oil and gas prospecting in the Barents and Kara Sea inspire optimism.

Ostistyĭ, B.K., Fedorovskiĭ, E.F., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.243-252, 1 ref.

Crude oil, Natural gas, Geophysical surveys, Geological surveys, Hydrocarbons, Geology, Barents Sea, Russia—Kara Sea

49-742

Main petroliferous Mesozoic complexes of the Arctic regions of western Siberia.

Nesterov, I.I., et al, *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.253-255.

Crude oil, Natural gas, Hydrocarbons, Geology, Russia—Siberia, Arctic Ocean

49-743

Jurassic complex is an object of oil and gas prospecting in the Barents Sea.

Zakharov, E.V., Kulibakina, I.B., Bogoslovskaia, G.N., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.257-260, 2 refs.

Crude oil, Natural gas, Sediments, Hydrocarbons, Geology, Barents Sea, Arctic Ocean

49-744

Geology of Palaeozoic hydrocarbons in the eastern European USSR and their relevance to the Barents Shelf.

Heafford, A., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.261-271, 54 refs.

Hydrocarbons, Geology, Stratigraphy, Barents Sea, CIS

49-745

Hydrocarbon potential in the Barents Sea region: play distribution and potential.

Johansen, S.E., et al, *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.273-320, Refs. p.318-320.

Geology, Hydrocarbons, Crude oil, Natural gas, Barents Sea

49-746

Hydrocarbon potential of the Norwegian Barents Sea based on recent well results.

Larsen, R.M., Fjaeran, T., Skarpnes, O., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.321-331, 16 refs.

Hydrocarbons, Gas wells, Oil wells, Exploration, Geology, Barents Sea

49-747

Hydrocarbon potential of the Central Spitsbergen Basin.

Nøttvedt, A., Livbjerg, F., Midbøe, P.S., Rasmussen, E., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.333-361, Refs. p.360-361.

Hydrocarbons, Exploration, Geology, Norway—Spitsbergen

49-748

Svalbard-Barents Sea correlation: a short review.

Nøttvedt, A., et al, *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.363-375, Refs. p.373-375.

Geology, Geochronology, Sediments, Glaciation, Stratigraphy, Barents Sea, Norway—Svalbard, Arctic Ocean

49-749

Late Palaeozoic bioherm occurrences of the Finnmark Shelf, Norwegian Barents Sea: analogues and regional significance.

Bruce, J.R., Toomey, D.F., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.377-392, 21 refs.

Exploration, Models, Geophysical surveys, Hydrocarbons, Diagenesis, Geology, Barents Sea, Norway—Finnmark Shelf, Arctic Ocean

49-750

Exploration of the Late Palaeozoic carbonates in the southern Barents Sea—a seismic stratigraphic study.

Nilsen, K.T., Hendriksen, E., Larssen, G.B., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.393-403, 31 refs.

Seismic surveys, Sedimentation, Stratigraphy, Exploration, Geology, Marine geology, Barents Sea

49-751

Eastern Barents Sea Late Palaeozoic setting and potential source rocks.

Alsgaard, P.C., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.405-418, Refs. p.415-418.

Marine geology, Geography, Natural resources, Geology, Hydrocarbons, Barents Sea

49-752

Use of sequence stratigraphy to define a semi-stratigraphic play in Anisian sequences, southwestern Barents Sea.

Rasmussen, A., et al, *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.439-455, 31 refs.

Stratigraphy, Oil wells, Geology, Barents Sea

49-753

Triassic rocks in Svalbard, the Arctic Soviet islands and the Barents Shelf: bearing on their correlations.

Mørk, A., et al, *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.457-479, Refs. p.475-479.

Hydrocarbons, Stratigraphy, Correlation, Palynology, Geology, Norway—Svalbard, Barents Sea, Russia—Franz Josef Land, Russia—Novaya Zemlya, Russia—Kolguyev Island

49-754

Mid-Late Miocene sedimentation on the southwestern Barents Shelf margin.

Richardsen, G., Knutsen, S.M., Vail, P.R., Vorren, T.O., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.539-571, Refs. p.569-571.

Sedimentation, Stratigraphy, Hydrocarbons, Pleistocene, Glacial erosion, Geology, Seismic surveys, Barents Sea, Arctic Ocean

49-755

Late Miocene-Pleistocene sequence stratigraphy and mass-movements on the western Barents Sea margin.

Knutsen, S.M., Richardsen, G., Vorren, T.O., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.573-606, Refs. p.604-606.

Pleistocene, Stratigraphy, Sediments, Glaciation, Sedimentation, Geology, Seismic surveys, Barents Sea

49-756

Cenozoic uplift and erosion of the Barents Sea—evidence from the Svalis Dome area.

Løseth, H., et al, *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.643-664, Refs. p.662-664.

Glacial erosion, Drill core analysis, Erosion, Geology, Tectonics, Barents Sea, Arctic Ocean

49-757

Application of horizontal stress directions interpreted from borehole breakouts recorded by four-arm dipmeter tools.

Linjordet, A., Skarpnes, O., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.681-690, 4 refs.

Geology, Hydrocarbons, Boreholes, Borehole instruments, Barents Sea

49-758

Method on classification of oil traps based on heavy oil content in cores with relevance to filling and drainage of Barents Sea oil-bearing structures.

Augustson, J.H., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.691-702, 7 refs.

Geology, Hydrocarbons, Crude oil, Porosity, Analysis (mathematics), Lithology, Oil wells, Classifications, Barents Sea

49-759

Snowstreamer—a new device for acquisition of seismic data on land.

Rygg, E., et al, *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.703-709, 5 refs.

Geology, Seismic surveys, Snow cover

49-760

Effects on hydrocarbon potential caused by Tertiary uplift and erosion in the Barents Sea.

Skagen, J.I., *Norwegian Petroleum Society (NPF). Special publication,* 1993, No.2, Norwegian Petroleum Society Conference, Tromsø, Norway, 15-17 August 1990. Proceedings. Edited by T.O. Vorren, et al, p.711-719, 14 refs.

Models, Oil wells, Hydrocarbons, Mathematical models, Barents Sea

49-761

Water resources data for Alaska, water year 1993.

Linn, K.R., Kemnitz, R.T., Bailey, B.J., Rickman, R.L., Swanner, W.C., *U.S. Geological Survey. Water-data report,* 1994, AK-93-1, 373p., PB94-196094, Refs. p.38-41.

Water reserves, River flow, Stream flow, Water level, Water chemistry, Ground water, Water table, Suspended sediments, United States—Alaska

49-762

Mobility has reached a new dimension—the Bv 206.

Rinke, W., European ISTVS [International Society for Terrain-Vehicle Systems] Conference, 6th, Vienna, Sep. 28-30, 1994. Off road vehicles in theory and practice. Appendix, Vienna, Austrian Society of Automotive Engineers (Österreichischer Verein für Kraftfahrzeugtechnik), 1994, 10p.

Tracked vehicles, All terrain vehicles, Amphibious vehicles, Snow vehicles

49-763

Melting heat transfer from a horizontal ice cylinder immersed in saline water (effect of ambient saline water concentration).

Fukusako, S., Yamada, M., Watanabe, C., *Japan Society of Mechanical Engineers. Transactions,* Jan. 1994, 60(569), p.276-283, In Japanese with English summary. 16 refs.

Ice melting, Ice water interface, Heat transfer, Phase transformations, Salt water

49-764

Erosion control engineering in snowy areas.

Aoki, S., Marui, H., Sato, O., *Niigata. University. Research Institute for Hazards in Snowy Areas. Annual report,* 1993, No.15, p.29-45, In Japanese with English summary. 24 refs.

Slope stability, Avalanche engineering, Avalanche forecasting, Avalanches, Flood forecasting, Snow cover stability, Snowmelt, Slush, Japan

49-765

Slushflow disaster occurred at Tugaike ski field, Nagano Prefecture in 1990.

Kobayashi, S., Izumi, K., Nagasawa, T., Maruyama, M., Kamiishi, T., *Niigata. University. Research Institute for Hazards in Snowy Areas. Annual report,* 1993, No.15, p.47-53, In Japanese with English summary. 4 refs.

Avalanches, Accidents, Snowmelt, Slush, Japan

49-766

Meteorological data at Yamakoshi, Niigata Prefecture, during the winter of 1988-1989.

Izumi, K., Kobayashi, S., *Niigata. University. Research Institute for Hazards in Snowy Areas. Annual report,* 1993, No.15, p.63-69, In Japanese. 6 refs.

Meteorological data, Snow depth, Air temperature, Dew point, Japan

49-767

Progress in the research field of landslides. [Jisuberi kenkyu bunya no ayumi]

Aoki, S., *Niigata. University. Research Institute for Hazards in Snowy Areas. Annual report,* 1992, No.14, p.1-32, In Japanese. Refs. passim.

Landslides, Slope stability, Snowmelt, Avalanche forecasting, Research projects, Japan

49-768

Abbreviated test report for the ski/binding soldier enhancement program and improved skis, poles, and binding.

Hoger, S.E., U.S. Army Test and Evaluation Command TECOM Project No.8-EI-515-000-051/052, Fort Greely, AK, U.S. Army Cold Regions Test Center, Sep. 1994, 18p. + appends., 7 refs.

Skis, Clothing, Military equipment

49-769

Hydrologic data for the lower Copper River, Alaska, May to September 1992.

Brabets, T.P., *U.S. Geological Survey. Open-file report,* 1993, No.93-162, 26p., 3 refs.

Glacial rivers, River flow, Suspended sediments, Sediment transport, Alluvium, United States—Alaska—Copper River

49-770

Hydrologic conditions and low-flow investigations of the lower Bradley River near Homer, Alaska, October 1991 to February 1992.

Rickman, R.L., *U.S. Geological Survey. Open-file report,* 1993, No.93-95, 17p., 11 refs.

Dams, River flow, Flow measurement, Flow control, Ice cover effect, United States—Alaska—Bradley River

49-771

SAAM—an operational snow accumulation-ablation model for areal distribution of shallow ephemeral snowpacks.

Schroeter, H.O., Whiteley, H.R., CSCE Centennial Conference, Montreal, May 19-22, 1987, Montreal, Canadian Society for Civil Engineering, 1987, p.482-500, 12 refs.

Snow surveys, Snow cover distribution, Snow accumulation, Snowmelt, Runoff forecasting, Flood forecasting, Stream flow, Computerized simulation, Canada

49-772

Effects of frost action on covers and liners constructed in cold environments.

Erickson, A.E., Chamberlain, E.J., Benson, C.H., MP 3487, International Madison Waste Conference, 17th, Sep. 21-22, 1994, Madison, University of Wisconsin, Department of Engineering Professional Development, 1994, p.198-220, 16 refs.

Waste disposal, Linings, Earth fills, Permeability, Freeze thaw tests, Frost resistance, Frost action, Cold weather performance

The effects of freezing and thawing were examined on the hydraulic conductivity of two compacted natural clay soils, one compacted sand-bentonite mixture, and three geosynthetic clay liners (GCLs). Field and laboratory tests were performed on these materials. The goal of the study was to improve the understanding of how freeze-thaw affects these liner materials and therefore improve the design and construction process. A field test site was constructed at a landfill near Milwaukee, WI. The field test site consisted of five test pads (four of clay and one of sand-bentonite), and nine test pans containing three different GCLs. Results of the investigation showed that freeze-thaw caused large increases in hydraulic conductivity in compacted natural clay, but no measurable change in hydraulic conductivity of the sand-bentonite mixture. Field and laboratory tests on the GCLs showed no significant increase in hydraulic conductivity after freeze-thaw. However, the tests on GCLs provided limited data. In addition, some questions are raised regarding seepage through seams and the hydraulic conductivity of GCLs under low confining pressures. These points warrant further study.

49-773

Methods for assessing freeze-thaw damage in compacted clay liners.

Benson, C.H., Chamberlain, E.J., Erickson, A.E., MP 3488, International Madison Waste Conference, 17th, Sep. 21-22, 1994, Madison, University of Wisconsin, Department of Engineering Professional Development, 1994, p.185-197, 12 refs.

Waste disposal, Linings, Clay soils, Earth fills, Permeability, Freeze thaw tests, Frost resistance, Frost action, Cold weather performance

Two approaches to assess whether freeze-thaw adversely affects compacted clay liners are compared. The approaches are: (1) comparing measurements of water content and dry unit weight made before and after winter and (2) comparing hydraulic conductivities measured before and after winter. Both approaches were used to assess whether freeze-thaw affected two instrumented test pads exposed to winter weather. The hydraulic conductivity tests were conducted using specimens collected in thin-wall sampling tubes, a frozen soil core barrel, and as large blocks. The comparison showed that misleading conclusions can be drawn if an assessment is based on measurements of water content and dry unit weight or the results of hydraulic conductivity tests conducted on specimens removed in thin-wall sampling tubes. A more accurate evaluation can be made using results of hydraulic conductivity tests on specimens removed with a frozen soil core barrel or as large blocks.

49-774

Hyperspectral classification using optimal parallel architectures.

LaPotin, P.J., McKim, H.L., MP 3489, Airborne Remote Sensing Conference, 1st, Strasbourg, France, Sep. 11-15, 1994. Vol.2, Ann Arbor, Environmental Research Institute of Michigan, 1994, p.601-609, 17 refs.

Image processing, Data processing, Computer applications, Computer programs

Hyperspectral scanners produce significant data volumes that are not easily or efficiently managed using existing image processing systems. Although current image processors do employ parallel architectures, few software tools have been developed that are capable of managing hyperspectral data in real time. As a result, hybrid systems have been developed as research tools with little focus toward commercial users of multi/hyperspectral data. In this paper, algorithms are developed for discrete hyperspectral classification using parallel distributed processors (PDP). The architectures are arranged in layers, where each layer represents a unique sequential operation. During the process of spectral characterization, features are extracted by each architectural layer. As a result, there are commonly as many layers in the PDP as there are bands or sub-regions in the data set. This approach yields specific advantages over the traditional threshold methods of binary encoding and Spectral Angle Mapping (SAM). Unlike binary encoding, the PDP applies an optimal two-step discriminant function. The discriminant function is optimal for band combinations in the hyperspectral volume and can be extended to both parametric and nonparametric data quantization. Unlike the Kruskal (E-S) algorithm, the PDP discriminant function does not require a priori data segmentation, nor does the approach require specific a priori spectral class organization. However, the PDP architecture does employ training methods to help sensitize the algorithm to changes in spectral measures. The training sequence can be eliminated if a complete spectral library is available for the selected spectral bands in the hyperspectral data volume. Since this is seldom the case, PDP architectures should be suitably trained using either representative data volumes (e.g., similar data sets from previous acquisitions) or spectrally equivalent data sets (e.g., data volumes from two or more sensors with similar bandwidth characteristics). In either case, optimal feature discrimination can be achieved using limited training sequences.

49-775

Influence of subfreezing temperatures on the flexural behavior of thick composites.

Dutta, P.K., Hui, D., Prasad, Y., MP 3490, Integrated design and manufacturing of composites, New York, American Society of Mechanical Engineers, 1994, p.131-139, 20 refs.

Composite materials, Frost resistance, Low temperature tests, Cold stress, Thermal stresses, Flexural strength

The influence of low temperatures and low-temperature thermal cycling on the Young's modulus and transverse shear modulus of two glass-reinforced polyester composites has been investigated. The results were obtained experimentally by three-point bending, using a procedure to determine the "form factor of shear" for different span-to-depth ratios, and then obtaining the Young's and shear moduli simultaneously. For the first composite, which has a plain weave and glass reinforcement, the moduli were obtained at 27, -40, and -60 C. Within this range of temperatures, no significant effects on moduli were observed. The materials were then subjected to 250 thermal cycles between 50 and -60 C, following which their moduli values at room temperature were found to be degraded. The second batch of pultruded fiber composites showed a consistent increase of their moduli with temperature reduction.

49-776

Changes in snow and ice storage: measurement and simulation.

Braun, L.N., Reynaud, L., Valla, F., Paris, Société Hydrotechnique de France, [1993], 11p., With French summary. 24 refs. Presented at the SHF-Glaciology meeting, Grenoble, Mar. 11-12, 1993.

Mountain glaciers, Glacier surveys, Glacier mass balance, Glacier alimentation, Glacial hydrology, Ice (water storage), Meltwater, Runoff forecasting, France, Switzerland

49-777

Application of the MAGIC model to the Glacier Lakes catchments.

Reuss, J.O., *U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Research paper,* June 1994, RM-315, 19p., 11 refs.

Snowmelt, Lake water, Hydrogeochemistry, Water pollution, Soil pollution, Water chemistry, Soil chemistry, United States—Wyoming

49-778

Glacial Lake Agassiz: legacy of the ice age.

Buchner, A.P., *Musk-ox,* 1994, No.40, p.70-72, 5 refs.

Glaciation, Glacial lakes, Paleoclimatology, Pleistocene, Lacustrine deposits, Canada—Manitoba

49-779

Technical Research Area 6: snow and ice control on highways and bridges.

Minsk, L.D., Abele, G., Itagaki, K., MP 3491, *U.S. Strategic Highway Research Program. SHRP research plans,* 1986, 26p. + appends., 13 refs.

Research projects, Road icing, Ice removal, Snow removal, Chemical ice prevention, Salting, Road maintenance, Highway planning

The great dependence on highway transportation for the movement of goods and people in the United States has led to the demand for rapid, effective clearance of snow and ice from roads. This in turn has led to the use of large quantities of environmentally undesirable chemicals to assist in improving traction between rubber tire and pavement. Concern about the effects of the most heavily used deicing chemical, salt (sodium chloride), on the roadside environment, water supplies, and highway structures, has increased along with the increase in quantities applied, now over 10,000,000 tons per year. A research plan is presented which has as its primary objective the reduction of the dependence on environmentally undesirable chemicals. Reducing the quantity of deicing chemicals applied to the nation's highways can be accomplished by the development of innovative products and techniques and the incorporation of some existing sophisticated technology in snow and ice control organizations. The principal approach to achieving this is the development of physical methods of disbonding ice from pavements, or preventing the bond from developing. Fundamental studies of bond formation and prevention are proposed as the most promising and cost-effective initial attacks on the problem rather than pursuing the largely empirical approaches of past research on snow and ice control. These fundamental studies will provide the background for developing pavement modifications to reduce or eliminate ice adhesion. Increased reliance on physical methods will require improvements in the backbone of the snow and ice control organization: the displacement plow and its cutting edge. Research is also proposed to improve control of snow and ice removal operations by providing management with real-time information on pavement and weather conditions over the entire system, improving storm warning capabilities and timeliness, and developing a communications system to ensure rapid and thorough response to changing conditions.

49-780

Snow and avalanches in the Swiss Alps, winter 1992/93. [Schnee und Lawinen in den Schweizer Alpen, Winter 1992/93], *Davos, Switzerland. Eidgenössisches Institut für Schnee- und Lawinenforschung. Winterbericht,* 1994, No.57, 186p., In German. 28 refs.

Snow surveys, Snowfall, Snow depth, Snow accumulation, Snow cover stability, Avalanches, Accidents, Switzerland

49-781

Instrumentation of an avalanche site. Using snow acoustic properties and imaging techniques to measure the physical parameters of a dense flow avalanche. [Instrumentation d'un site avalancheux. De l'utilisation des propriétés acoustiques de la neige et des techniques d'imageries pour la mesure de paramètres physiques d'une avalanche dense]

Marco, O., Grenoble, Université Joseph Fourier, 1994, 218p., Ph.D. thesis. In French with English summary. Refs. p.167-176.

Avalanche mechanics, Avalanche modeling, Snow density, Snow acoustics, Acoustic measurement, Mathematical models

49-782

Glaciers of the Swiss Alps 1989/90 and 1990/91. [Die Gletscher der Schweizer Alpen 1989/90 und 1990/91]

Aellen, M., Herren, E., *Schweizerische Akademie der Naturwissenschaften. Gletscherkommission. Jahrbuch. Bericht,* 1994, No.111/112, 126p., In German and French with English summary. 45 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Switzerland

49-783

Sarennes: a closely monitored glacier. [Sarennes: un glacier sous haute surveillance]

Valla, F., *Neige et avalanches,* Sep. 1994, No.67, p.2-12, In French. 13 refs. For another version also in French see 48-3139.

Cirque glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, France

49-784

Avalanche statistics. [Bilan des avalanches]

Tuaillon, J.L., *Neige et avalanches,* Sep. 1994, No.67, p.19-21, In French.

Avalanches, Accidents, France

49-785

ARVA 94. [ARVA 94]

Good, W., Zuanon, J.P., *Neige et avalanches,* Sep. 1994, No.67, p.33-37, In French.

Avalanches, Accidents, Rescue equipment, Radio beacons

49-786

Avalanches. [Les avalanches]

Valla, F., *Société Languedocienne de Géographie. Bulletin,* Jan.-June 1990, No.1/2, p.89-94, In French with English summary. 8 refs.

Avalanches, Avalanche modeling, Accidents, France

49-787

Sarennes, a monitored glacier in France.

Valla, F., Grenoble, CEMAGREF-Nivologie, Centre d'Étude du Machinisme Agricole, du Génie Rural, des Eaux et des Forêts (French National Institute of Agricultural and Environmental Engineering Research, Snow Science Division), [1993], 14p., 10 refs.

Cirque glaciers, Glacier surveys, Glacier mass balance, Glacier oscillation, Glacial hydrology, France

49-788

Ice thickness measurements by radar on the Sarennes Glacier. [Mesures des épaisseurs de glace par la méthode radar au glacier de Sarennes]

Funk, M., Bösch, H., Valla, F., Grenoble, CEMAGREF-Nivologie, Centre d'Étude du Machinisme Agricole, du Génie Rural, des Eaux et des Forêts (French National Institute of Agricultural and Environmental Engineering Research, Snow Science Division), [1993], 13p., In French. 1 ref.

Cirque glaciers, Glacier surveys, Glacier thickness, Glacier beds, Subglacial observations, Radio echo soundings, France

49-789

Avalanche accidents in France in the last 20 years. [Les accidents d'avalanche en France au cours des 20 dernières années]

Valla, F., Université européene d'été sur les risques naturels (European Summer University on Natural Hazards), Chamonix, France, Sep. 14-25, 1992, [1992], 9p., In French with English summary. 8 refs.

Avalanches, Accidents, Rescue equipment, Rescue operations, Radio beacons, France

49-790

Expedition ANTARKTIS X/4 of RV *Polarstern* in 1992.

Lemke, P., ed, *Berichte zur Polarforschung,* 1994, No.140, 90p., With German summary of cruise weather.

Expeditions, Sediments, Sea ice, Plankton

Following a resumé of the weather conditions experienced throughout the cruise, an account is given of the research activities undertaken at sea. These include sea water chemistry; marine meteorology from radiosonde and AWS instrumentation; remote sensing of sea ice conditions; marine biology; plankton in and under sea ice; bird and seal observations; lipid investigations of copepods; and sediment sampling. The report closes with a station list showing the station number, date, start position, work depth, and type of work; a listing of participating institutions, cruise participants, and ship's crew.

49-791

Satellite altimetry over ice—application of the GEOSAT altimeter over the Ekström Ice Shelf, Antarctica. [Satellitenaltimetrie über Eis—Anwendung des GEOSAT-Altimeters über dem Ekströmisen, Antarktis]

Heidland, K., *Berichte zur Polarforschung,* 1994, No.141, 144p., In German with English and German summaries. Refs. p.125-137.

Height finding, Remote sensing, Ice shelves, Spacecraft, Antarctica—Ekström Ice Shelf

In this thesis, radar altimeter measurements over ice sheets carried out by the satellite GEOSAT between 1987 and 1989 are analyzed for the Ekström Ice Shelf. The altimeter was designed specifically for operation over the ocean; signal tracking over ice sheets is often insufficient. The altimeter loses the signal over ice sheets with more than 1 deg slope of the ice surface and the consequence is data gaps. The plausibility control of the GEOSAT data indicates that 15% of all measurements in Antarctica are valid especially over flat ice sheets. Valid measurements over Ekström Ice Shelf are concentrated in the flat western part. The accuracy of the height of the satellite orbit directly affects the accuracy of the height profiles. The adjustment uses the exact repeating satellite orbits for the computation of an additional constant for every height profile. The improved height profiles are used for the adjustment of an averaged height profile. The accuracy of the height profiles is given by the root mean square which is determined by the adjustment at 0.8 +/- 0.5 m. The remaining differences after the adjustment between the height profiles and the crosspoints of the ascending and descending satellite orbits vary in the range between 0.5 and 3.0 m. The footprint over ice has a diameter of more than 5 km. The variation of the surface heights inside the footprint can be a few meters. (Auth. mod.)

49-792

North Atlantic oscillation signature in deuterium and deuterium excess signals in the Greenland Ice Sheet Project 2 ice core, 1840-1970.

Barlow, L.K., et al, *Geophysical research letters,* Dec. 23, 1993, 20(24), p.2901-2904, 13 refs.

Ice cores, Isotopes, Deuterium oxide ice, Greenland

49-793

Aeronomy of infrared ozone fluorescence measured during an aurora by the SPIRIT 1 rocket-borne interferometer.

Rawlins, W.T., Woodward, A.M., Smith, D.R., *Journal of geophysical research,* Mar. 1, 1993, 98(A3), p.3677-3691, 48 refs.

Ozone, Remote sensing, Infrared radiation, Polar regions, United States—Alaska—Poker Flat

49-794

Geochemical processes affecting meltwater chemistry and the formation of saline ponds in the Victoria Valley and Bull Pass region, Antarctica.

Webster, J.G., Brown, K.L., Vincent, W.F., *Hydrobiologia,* Apr. 22, 1994, 281(3), p.171-186, 25 refs.

Frozen lakes, Salt lakes, Water chemistry, Geochemistry, Meltwater, Antarctica—Victoria Valley, Antarctica—Bull Pass

Major ion, trace element and nutrient concentrations have been determined in meltwater streams, frozen lakes and isolated saline ponds of the Victoria Valley and Bull Pass regions in Victoria Land. Geochemical processes affecting glacial meltwater composition with time and distance from the source glaciers include solute acquisition by soil salt leaching and solute concentrations by evaporation. Evaporation in the marginal lake melt and in isolated saline ponds appears to increase the Mg/Ca ratio of these meltwaters relative to that of meltwater streams. With progressive evaporation gypsum and calcite may precipitate, leading to the development of Na-Cl and $Na-HCO_3$ brine ponds. These ponds may be vertically stratified with respect to temperature and salinity if they experience partial or complete freezing over the winter season. The chemical characteristics and nutrient concentrations of meltwaters in the Victoria Valley are similar to those of other drainage systems in the region, although the Ca-Cl brines reported from the Wright Valley immediately to the south were not observed. Trace element (Cu, Pb, Zn, Cd, Mn and Fe) concentrations measured in the lakes and large ponds do not show any evidence of unusual enrichment in the drainage. (Auth.)

49-795

Bacterial activity in sea ice and open water of the Weddell Sea, Antarctica: a microautoradiographic study.

Grossmann, S., *Microbial ecology,* July-Aug. 1994, 28(1), p.1-18, 53 refs.

Sea ice, Microbiology, Bacteria, Water chemistry, Biomass, Plankton, Antarctica—Weddell Sea

Relation of [^{3}H]leucine incorporation to the biomass of active bacteria provides information about changes of specific metabolic activity of cells. During a phytoplankton bloom in an ice-free, stratified water column, total numbers of bacteria in the euphotic zone averaged 2.3 x 10^5/ml, but only about 13% showed activity via leucine uptake. When sea ice was forming in high concentrations of phytoplankton, bacterial biomass in the newly formed ice was 49.1 ng C/ml, exceeding that in open water by about one order of magnitude. Attachment of large bacteria to algal cells seems to cause their enrichment in the new ice, since specific bacterial activity was reduced during ice formation, and enrichment of bacteria was not observed when ice formed at low algal concentration. During growth of pack ice, biomass of bacteria increased within the brine channel system. Specific activity was still reduced at these later stages of ice development, and percentages of active cells were as low as 3-5%. In old, thick pack ice, bacterial activity was high and about 30% of cells were active. However, biomass-specific activity of bacteria remained significantly lower than that in open water. It is concluded that bacterial assemblages different from those of open water developed within the ice and were dominated by bacteria with lower average metabolic activity than those of ice-free water. (Auth. mod.)

49-796

Microflora of the antarctic continental and marine ice (with regard to the problem of using icebergs as resources of fresh water).

Abyzov, S.S., Mitskevich, I.N., *Microbiology,* May 1994, 62(6), p.582-593, Translation of Mikrobiologiia 62(6):994-1017, Nov.-Dec. 1993. 186 refs.

Ice sheets, Sea ice, Icebergs, Cryobiology, Plants (botany), Water supply

This paper gives a review of the research into the microflora of antarctic continental and marine ice sheets with particular reference to the potential utilization of icebergs as sources of high-quality fresh water. Microbiological research methods applicable to investigating continental and marine ice are considered. Data on the qualitative and quantitative composition of the microflora of polar and oceanic ice are given. (Auth.)

49-797

Paleogene glacial history of Antarctica in light of Leg 120 drilling results.

Wise, S.W., Jr., et al, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 2. Central Kerguelen Plateau, edited by E.M. Barbu, College Station, TX, Texas A and M University, 1992, p.1001-1030, Refs. p.1025-1028.

DLC QE39.T49b

Marine geology, Glacial geology, Glaciation, Paleoecology, Ice rafting, Paleoclimatology, Ice sheets, —Kerguelen Plateau

The Paleogene glacial history of Antarctica has been inferred largely from indirect evidence of glaciation gathered from the oceans beyond that continent. This evidence includes the "proxy" stable isotopic record from the world's oceans; the occurrence of ice-rafted debris (IRD) in the southern ocean; inflections in sea-level curves; the presence of hiatuses in the deep-sea record; and changes in clay mineral assemblages, in the diversities of microfossil assemblages, and in the steepness of latitudinal biotic gradients. ODP Leg 120 has added an important dimension to this growing body of evidence through the discovery of lowest Oligocene IRD at Site 740 on the southern Kerguelen Plateau, at a record distance north of the antarctic continent and within a pelagic biosiliceous-carbonate ooze sequence that has yielded a complementary oxygen isotope record of the cryospheric event. The authors deduce that an ice sheet reached sea level during the earliest Oligocene (35.8-36.0 Ma) and that the effect was immediate and profound. In addition to the IRD, this event was manifested at Site 748 by a dramatic cooling of the surface waters surrounding the continent as indicated by a sharp increase in the percentage of cold-water calcareous nannoplankton, an increase in planktonic foraminiferal *delta*^{18}O values, and an increase in the percentage of biosiliceous material in the sediment. (Auth. mod.)

49-798

Are wetlands the key to the ice-age cycle enigma.

Franzén, L.G., *Ambio,* July 1994, 23(4-5), p.300-308, 80 refs.

Wetlands, Peat, Decomposition, Carbon dioxide, Soil air interface, Greenhouse effect, Climatic factors, Glacier oscillation, Glaciation, Theories

49-799

Fast freeze/thaw treatment on excess activated sludges: floc structure and sludge dewaterability.

Lee, D.J., Hsu, Y.H., *Environmental science & technology,* Aug. 1994, 28(8), p.1444-1449, 51 refs.

Waste treatment, Sludges, Freeze thaw cycles, Freeze drying, Physical properties, Microstructure, Density (mass/volume), Fractals

49-800

Northern hemispheric organic lead emissions in fresh Greenland snow.

Lobiński, R., et al, *Environmental science & technology,* Aug. 1994, 28(8), p.1459-1466, 41 refs.

Air pollution, Aerosols, Fuel additives, Ice sheets, Snow surface, Snow impurities, Sampling, Environmental tests, Environmental impact, Wind factors, Greenland

49-801

Present century snow core record of organolead pollution in Greenland.

Lobiński, R., et al, *Environmental science & technology,* Aug. 1994, 28(8), p.1467-1471, 22 refs.

Air pollution, Fuel additives, Subpolar regions, Ice sheets, Snow composition, Snow impurities, Drill core analysis, Sampling, Periodic variations, Greenland

49-802

Dynamics and thermodynamics of volcanic clouds: theory and observations from the April 15 and April 21, 1990 eruptions of Redoubt Volcano, Alaska.

Woods, A.W., Kienle, J., *Journal of volcanology and geothermal research,* Aug. 1994, 62(1-4), p.273-299, 20 refs.

Volcanoes, Volcanic ash, Magma, Mass flow, Glacier ice, Ice melting, Water vapor, Vapor diffusion, Cloud physics, Buoyancy, Thermodynamics, Mathematical models, United States—Alaska—Redoubt Volcano

49-803

Influence of Redoubt Volcano emissions on snow chemistry.

Jaffe, D.A., Cerundolo, B., Kelley, J., *Journal of volcanology and geothermal research,* Aug. 1994, 62(1-4), p.359-367, 17 refs.

Volcanic ash, Aerosols, Chemical properties, Glacier surfaces, Snow composition, Snow impurities, Ion density (concentration), Sampling, Snow air interface, United States—Alaska—Redoubt Volcano

49-804

Disruption of Drift glacier and origin of floods during the 1989-1990 eruptions of Redoubt Volcano, Alaska.

Trabant, D.C., Waitt, R.B., Major, J.J., *Journal of volcanology and geothermal research,* Aug. 1994, 62(1-4), p.369-385, 10 refs.

Volcanoes, Magma, Mass flow, Glacier melting, Snow melting, Snow cover stability, Glacial hydrology, Ice erosion, Runoff, Flooding, United States—Alaska—Redoubt Volcano

49-805

Hydrologic hazards in the lower Drift River basin associated with the 1989-1990 eruptions of Redoubt Volcano, Alaska.

Dorava, J.M., Meyer, D.F., *Journal of volcanology and geothermal research,* Aug. 1994, 62(1-4), p.387-407, 37 refs.

River basins, River flow, Flooding, Volcanoes, Magma, Mass flow, Glacier melting, Meltwater, Ice erosion, Sediment transport, United States—Alaska—Redoubt Volcano

49-806

Unusual ice diamicts emplaced during the December 15, 1989 eruption of Redoubt Volcano, Alaska.

Waitt, R.B., et al, *Journal of volcanology and geothermal research,* Aug. 1994, 62(1-4), p.409-428, 24 refs.

Volcanoes, Mass flow, Magma, Glacial geology, Glacier ice, Glacial deposits, Ice composition, Sediment transport, Grain size, Lithology, United States—Alaska—Redoubt Volcano

49-807

Evidence, age, and thickness of a frozen paleolake in Utopia Planitia, Mars.

Chapman, M.G., *Icarus,* June 1994, 109(2), p.393-406, 45 refs.

Mars (planet), Extraterrestrial ice, Geologic processes, Ground ice, Ice sheets, Subglacial observations, Hydrologic cycle, Geomorphology, Ice cover effect

49-808

Analysis of supercooled liquid water measurements using microwave radiometry and vibrating wire devices.

Hill, G.E., *Journal of atmospheric and oceanic technology,* Oct. 1994, 11(5), p.1242-1252, 19 refs.

Cloud physics, Supercooled clouds, Unfrozen water content, Radiometry, Sounding, Sensors, Ice formation, Ice cover effect, Vibration, Correlation

49-809

Method for rescaling humidity sensors at temperatures well below freezing.

Anderson, P.S., *Journal of atmospheric and oceanic technology,* Oct. 1994, 11(5), p.1388-1391, 2 refs.

Polar atmospheres, Humidity, Sensors, Temperature effects, Cold weather performance

49-810

Differences between radiosonde and dropsonde temperature profiles over the Arctic Ocean.

Skony, S.M., Kahl, J.D.W., Zaitseva, N.A., *Journal of atmospheric and oceanic technology,* Oct. 1994, 11(5), p.1400-1408, 21 refs.

Polar atmospheres, Marine atmospheres, Atmospheric boundary layer, Air temperature, Temperature inversions, Sounding, Profiles, Temperature measurement, Correlation, Accuracy

49-811

"Downward control" of the mean meridional circulation and temperature distribution of the polar winter stratosphere.

Garcia, R.R., Boville, B.A., *Journal of the atmospheric sciences,* Aug. 1, 1994, 51(15), p.2238-2245, 25 refs.

Polar atmospheres, Atmospheric circulation, Atmospheric physics, Gravity waves, Wave propagation, Stratosphere, Air temperature, Temperature distribution, Mathematical models

In this paper, a simple numerical model that includes parameterizations of both planetary and gravity wave breaking is used to explore the influence of gravity wave breaking in the mesosphere on the mean meridional circulation and temperature distribution at lower levels in the polar winter stratosphere. The results of these calculations suggest that gravity wave drag in the mesosphere can affect the state of the polar winter stratosphere down to altitudes below 30 km. The effect is most important when planetary wave driving is relatively weak: that is, during southern winter and in early northern winter. In southern winter, downwelling weakens by a factor of 2 near the stratopause and by 20% at 30 km when gravity wave drag is not included in the calculations. As a consequence, temperatures decrease considerably throughout the polar winter stratosphere (over 20 K above 40 km and as much as 8 K at 30 km, where the effect is enhanced by the long radiative relaxation timescale). The polar winter states obtained when gravity wave drag is omitted in this simple model resemble the results of simulations with some general circulation models and suggest that some of the shortcomings of the latter may be due to a deficit in mesospheric momentum deposition by small-scale gravity waves. (Auth. mod.)

49-812

Barents Sea ice sheet—a model of its growth and decay during the last ice maximum.

Elverhøi, A., et al, *Quaternary science reviews,* Dec. 1993, 12(10), p.863-873, 42 refs.

Pleistocene, Marine geology, Quaternary deposits, Geomorphology, Glaciation, Ice sheets, Calving, Grounded ice, Glacier oscillation, Isostasy, Barents Sea

49-813

Late Quaternary evolution of a subantarctic paleofjord, Tierra del Fuego.

Gordillo, S., Coronato, A.M.J., Rabassa, J.O., *Quaternary science reviews,* Dec. 1993, 12(10), p.889-897, 37 refs.

Subpolar regions, Pleistocene, Quaternary deposits, Marine deposits, Radioactive age determination, Geomorphology, Paleoecology, —Tierra del Fuego

Lago Roca-Lapataia valley, Tierra del Fuego, is a paleofjord that was occupied by a valley-glacier system during the glacial maximum of the late Pleistocene (estimated ca. 18-20 ky BP). Deglaciation began before 10,080 +/- 270 BP. The marine fauna in several marine terraces found in the area shows that early-middle Holocene climatic conditions were basically the same as at present. Species found are characteristic of cold and shallow waters, although minor temperature fluctuations cannot be ruled out for this period. A recent radiocarbon date of 7518 +/- 58 BP on *Chlamys patagonica* confirms that Lago Roca was transformed into a fjord ca. 7500-8000 BP. The sea reached its maximum level of 8-10 m a.s.l. around 6000 BP and at 4000-4500 BP was at least above 6 m a.s.l. Later, when sea level fell, Lago Roca was occupied by fresh water and was no longer tidal. The relative land-sea positions during this period are a consequence of combined eustatic and neotectonic processes. (Auth. mod.)

49-814

Cryothermodynamics: the chaotic dynamics of paleoclimate.

Ghil, M., *Physica D,* Oct. 1, 1994, 77(1-3), p.130-159, 124 refs.

Paleoclimatology, Climatic changes, Climatic factors, Glacier oscillation, Ice volume, Ice cover effect, Ice air interface, Thermodynamics, Mathematical models, Antarctica—Vostok Station

The evidence for irregular climatic change between warm and cold extremes is reviewed, concentrating on the last two million years, the Quaternary. The suspects in generating this irregular evolution of temperature and ice volume are the climatic subsystems, atmosphere, oceans, ice sheets, bedrock and biota. Processes within each subsystem are briefly described, including major feedback mechanisms that characterize their collective behavior. Simple semi-empirical models are formulated and shown to have irregular behavior with both quasi-periodic and aperiodic components. Antarctic ice core analysis is used to amplify climatic variation hypotheses. (Auth. mod.)

49-815

Measurements of cosmic-ray produced ^{14}C in firn and ice from Antarctica.

Jull, A.J.T., et al, *Nuclear instruments and methods in physics research B,* June 1994, 92(1-4), International Conference on Accelerator Mass Spectrometry, 6th, Canberra-Sydney, Australia, Sep. 27-Oct. 1, 1993. Proceedings, p.326-330, 17 refs.

Ice sheets, Firn, Ice cores, Ice dating, Ice spectroscopy, Isotope analysis, Carbon isotopes, Radioactive isotopes, Antarctica—Newall Glacier, Antarctica—Charlie, Dome

In this paper the levels of ^{14}C in firn and ice from two regions accumulating ice in Antarctica, Dome C and Newall Glacier, are analyzed. The observed concentrations indicate variable amounts of *in-situ* ^{14}C from cosmic-ray spallation of oxygen. ^{14}C appears to be produced as both CO and CO_2 in variable amounts, but results suggest rapid conversion of ^{14}CO to $^{14}CO_2$. Much of the *in-situ* ^{14}C is retained, which results in a significant modification of the $^{14}C/^{12}C$ in ice derived from trapping of air at and below the firn-ice transition zone. This means that direct dating of accumulating ice cannot be used without correction for the *in-situ* ^{14}C. In Newall ice, some evidence for an enhancement in *in-situ* ^{14}C at or near the time of the Maunder Minimum is seen. Results for Dome C firn and ice indicate higher levels of *in-situ* in older ice. This is due either to a reduced accumulation rate in the past, or possible variations in cosmogenic ^{14}C production. The levels of *in-situ* ^{14}C in firn and ice and its impact on ^{14}C dates on trapped CO_2 in ice are discussed. (Auth. mod.)

49-816

Dry extraction of $^{14}CO/72$ and ^{14}CO from antarctic ice.

Van Roijen, J.J., et al, *Nuclear instruments and methods in physics research B,* June 1994, 92(1-4), International Conference on Accelerator Mass Spectrometry, 6th, Canberra-Sydney, Australia, Sep. 27-Oct. 1, 1993. Proceedings, p.331-334, 14 refs.

Glaciology, Ice sheets, Ice cores, Ice dating, Ice spectroscopy, Isotope analysis, Carbon isotopes, Accuracy, Antarctica—Queen Maud Land

A dry extraction method was used to obtain trapped CO_2 in 2-5 kg ice samples from a blue ice zone in East Antarctica. In situ tests produced ^{14}C, which was also extracted in $^{14}CO_2$ and ^{14}CO concentrations at a ratio of 3.4 +/- 0.9. Correction of trapped $^{14}CO_2$ resulted in ice dates in the range of 5-15 ka. The realistic rates for accumulation and ablation of ice indicate the high efficiency of the dry extraction method. (Auth. mod.)

49-817

High-precision AMS radiocarbon measurements of central Arctic Ocean sea waters.

Jones, G.A., et al, *Nuclear instruments and methods in physics research B,* June 1994, 92(1-4), International Conference on Accelerator Mass Spectrometry, 6th, Canberra-Sydney, Australia, Sep. 27-Oct. 1, 1993. Proceedings, p.426-430, 15 refs.

Oceanographic surveys, Sea water, Sampling, Isotope analysis, Carbon isotopes, Radioactive age determination, Ocean currents, Spectroscopy, Arctic Ocean

49-818

Dynamic observations of grain boundaries and dislocations in ice.

Baker, I., Liu, F., Dudley, M., *Materials science forum,* 1993, Vol.126-128, International Congress on Intergranular and Interphase Boundaries, 6th, Thessaloniki, Greece, June 21-26, 1992. Proceedings, p.543-546, 7 refs.

Ice physics, Ice crystal structure, Ice crystal optics, Orientation, X ray diffraction, Topographic features, Defects

49-819

Substance composition of surface deposits of the Rusanov Peninsula (Novaya Zemlya). [Veshchestvennyĭ sostav poverkhnostnykh otlozheniĭ p-ova Rusanova (Novaia Zemlia)]

Serebriannyĭ, L.R., Kolosova, G.N., *Moscow. Universitet. Vestnik,* May-June 1994, No.3, p.83-87, In Russian with English summary. 4 refs.

Surface structure, Clays, Sands, Peat, Lacustrine deposits, Russia—Novaya Zemlya, Russia—Rusanov Peninsula

49-820

Introduction of conifers into the subarctic. [Introduktsiia khvoĭnykh v Subarktiku]

Kazakov, L.A., St. Petersburg, Nauka, 1993, 143p., In Russian with English summary. Refs. p.133-141.

Subarctic landscapes, Introduced plants, Trees (plants)

49-821

Polymers in friction nodes and seals at low temperatures: a handbook. [Polimery v uzlakh treniia i uplotneniiakh pri nizkikh temperaturakh; spravochnik]

Makushin, A.P., Moscow, Mashinostroenie, 1993, 287p., In Russian. 48 refs.

Polymers, Valves, Sealing, Friction, Manuals, Low temperature tests, Low temperature research, Cold weather operation, Mathematical models

49-822

Development of marine hydrochemical research (Black, Azov and Arctic seas). [Razvitie morskikh gidrokhimicheskikh issledovaniĭ (Chernoe, Azovskoe i Arkticheskie moria)]

Siniukov, V.V., Moscow, Nauka, 1993, 223p. (Pertinent p.43-56, 116-223), In Russian with English summary and table of contents. 146 refs.

Water chemistry, Oceanography, Expeditions, History, Icebreakers, Salinity, Surface waters, Microelement content, Arctic Ocean, Barents Sea, Chukchi Sea, Russia—East Siberian Sea, Russia—Kara Sea, Russia—Laptev Sea

49-823

Safety in ice navigation. [Bezopasnost' plavaniia vo l'dakh]

Smirnov, A.P., ed, Moscow, Transport, 1993, 334p., In Russian. Refs. p.330-332.

Ice navigation, Icebreakers, Sea ice, Safety, Marine transportation

49-824

Improving the effectiveness of the underground development of ore deposits in Siberia and the Far East. [Povyshenie effektivnosti podzemnoĭ razrabotki rudnykh mestorozhdeniĭ Sibiri i Dal'nego Vostoka]

Kurlenia, M.V., ed, Novosibirsk, Nauka, 1992, 175p., In Russian. Refs. passim.

Mining, Cold weather operation, Engineering geology, Russia—Siberia, Russia—Far East

49-825

Controlling the regime of mountain glaciers and river runoff. [Upravlenie rezhimom gornykh lednikov i stokom rek]

Bakalov, V.D., Groman, D.S., Zalikhanov, M.Ch., Panov, V.D., Leningrad, Gidrometeoizdat, 1990, 237p., In Russian with English summary and table of contents. 184 refs.

Mountain glaciers, Runoff, Glacial rivers, Glacier alimentation, Glacier ablation, Glacier mass balance, Water reserves, Ecology, Economic analysis, Environmental impact, Russia—Greater Caucasus, Russia—Pamir-Alay, Russia—Dzhungarian-Alatau, Russia—Tian Shan

49-826

Structure and variability of large scale oceanographic processes and fields in the Norwegian energy-active zone. [Struktura i izmenchivost' krupnomasshtabnykh okeanologicheskikh protsessov i poleĭ v Norvezhskoĭ energoaktivnoĭ zone]

Nikolaev, IU.V., ed, Alekseev, G.V., ed, Leningrad, Gidrometeoizdat, 1989, 128p., In Russian. 77 refs.

Oceanography, Air water interactions, Ocean currents, Seasonal variations, Temperature distribution, Salinity, Enthalpy, Sea ice, Norwegian Sea

49-827

Electromagnetically transparent structure.

Sassa, R.L., *European Patent Office. Patent,* Feb. 8, 1989, n.p., No.302596.

Radomes, Ice adhesion, Ice prevention

49-828

Highly flexible composite material.

Buckley, T.M., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Feb. 3, 1994, n.p., No.9402257.

Composite materials, Thermal insulation, Clothing, Cold weather survival

49-829

Pneumatic tyre with good performance on icy roads.

Bridgestone Corporation, *Japan Patent Office. Patent,* Dec. 21, 1993, n.p., No.5338416.

Tires, Rubber ice friction, Traction

49-830

Pneumatic tyre.

Bridgestone Corporation, *Japan Patent Office. Patent,* Dec. 21, 1993, n.p., No.5338410.

Tires, Rubber, Rubber ice friction, Traction

49-831

Viscous aircraft anti-icing fluid which thins under wind shear forces at take-off.

Bassett, D.R., Boluk, M.Y., Jenkins, R.D., Lightfoot, R.H., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Dec. 9, 1993, n.p., No.9324543.

Aircraft icing, Chemical ice prevention

49-832

Non-flammable, pseudo-plastic deicing composition.

Bohrer, T.C., Chung, K., Fusiak, F., *U.S. Patent Office. Patent,* Dec. 7, 1993, n.p., USP-5,268,117.

Chemical ice prevention, Ice removal, Windows

49-833

Biodegradable, non-flammable, pseudo-plastic deicing composition.

Bohrer, T.C., Chung, K., Fusiak, F., *U.S. Patent Office. Patent,* Dec. 7, 1993, n.p., USP-5,268,116.

Chemical ice prevention, Ice removal, Windows

49-834

Method for stabilising aqueous dispersion of finely divided solids.

Eberlein, T.H., Olson, A.H., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Nov. 11, 1993, n.p., No.9322395.

Aerosols, Antifreezes, Frost protection

49-835

Freeze and/or thaw stabilisers for aqueous dispersions of fine particles.

Eberlein, T.H., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Nov. 11, 1993, n.p., No.9322394.

Aerosols, Antifreezes, Frost protection

49-836

Tyre for use on icy roads.

Sumitomo Rubber Industries Ltd., *Japan Patent Office. Patent,* Nov. 16, 1993, n.p., No.5301501.

Tires, Rubber, Rubber ice friction, Road maintenance, Environmental protection

49-837

Rubber composition with high weather resistance.

Sumitomo Rubber Industries Ltd., *Japan Patent Office. Patent,* Oct. 19, 1993, n.p., No.5271496.

Rubber, Frost resistance, Cold weather performance

49-838

Dam made from earthen material.

Dentiaev, L.D., Landau, IU.A., Nazarov, R.I., *Russia Patent Office. Patent,* Jan. 15, 1993, n.p., No.1788132.

Earth dams, Rock fills, Ice (construction material), Soil stabilization

49-839

Magnetic rail brake for railway vehicle.

Bogner, W., *Germany Patent Office. Patent,* May 25, 1989, n.p., No.3738955.

Railroad equipment, Brakes (motion arresters), Ice prevention

49-840

Rubber composition for production of automobile tyres.

Inui, A., Nagasaki, H., Sasaki, M., Yachigo, H., Yamamoto, K., *European Patent Office. Patent,* Feb. 2, 1994, n.p., No.581618.

Tires, Rubber, Rubber ice friction, Traction

49-841

Non-skid tyre treads.

Miura, R., *Germany Patent Office. Patent,* May 27, 1987, n.p., No.3640384.

Tires, Rubber, Rubber ice friction, Skid resistance

49-842

Aerodynamic data sensing probe for aircraft to sense pitot and/or static pressure.

Hedberg, E.A., Setterholm, J.M., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Feb. 3, 1994, n.p., No.9402858.

Aircraft icing, Ice detection, Ice removal

49-843

Combined bulk material stacking and reclaim plant for cold weather conditions.

Nilsson, B.A., Zrelov, P.J., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Feb. 3, 1994, n.p., No.9402247.

Wood, Ice breaking, Cold weather performance

49-844

Flexible surface covering preventing coating build-up.

Kronberg, J.W., *U.S. Patent Office. Patent,* Jan. 15, 1994, n.p., USP-7,730,423.

Aircraft icing, Ice prevention, Protective coatings

49-845

Building heating boiler system.

Smelcer, J.C., Weaver, J.H., *U.S. Patent Office. Patent,* Feb. 1, 1994, n.p., USP-5,282,456.

Buildings, Radiant heating, Heat pipes, Ducts, Ventilation, Ice prevention

49-846

Determination of condition of ice covering.

Bukharov, M.V., Nikitin, P.A., Spiridonov, IU.G., *Russia Patent Office. Patent,* Jan. 15, 1993, n.p., No.1788487.

Ice surveys, Ice conditions, Glacier surveys, Spaceborne photography, Radar photography

49-847

Ice platform.

Mel'nikov, V.P., Shirikhin, IU.N., *Russia Patent Office. Patent,* Aug. 30, 1992, n.p., No.1758155.

Ice (construction material), Artificial freezing, Artificial islands, Offshore structures, Heat pipes

49-848

Method of forming canal in ice covering of water area.

Roshchupkin, D.V., *Russia Patent Office. Patent,* Aug. 30, 1992, n.p., No.1758140.

Channels (waterways), Ice control, Ice navigation

49-849

Junction unit of floating object to bank support.

Baranov, V.M., *Russia Patent Office. Patent,* Aug. 30, 1992, n.p., No.1758139.

Bank protection (waterways), Ice control, Floating structures, Joints (junctions)

49-850

Device for protecting buildings against snow avalanches.

Talanov, B.P., *Russia Patent Office. Patent,* Sep. 7, 1993, n.p., No.2000381.

Avalanche engineering, Snow fences, Ice (construction material)

49-851

Barrier for protection against flooding and other natural disaster.

Talanov, B.P., *Russia Patent Office. Patent,* Sep. 7, 1993, n.p., No.2000383.

Flood control, Avalanche engineering, Ice (construction material)

49-852
State of research on winter maintenance of roads with porous asphalt surface layers. [Stand der Forschung zum Winterdienst auf offenporigen Deckschichten]
Durth, W., *Strasse und Autobahn,* Oct. 1994, 45(10), p.581-586, In German. 4 refs.
Road maintenance, Winter maintenance, Cold weather performance, Road icing, Bitumens, Surface properties, Porosity

49-853
Methods for measuring discharge under ice cover.
Walker, J.F., *Journal of hydraulic engineering,* Nov. 1994, 120(11), p.1327-1336, 4 refs.
Stream flow, Flow measurement, Velocity measurement, Subglacial observations, River ice, Ice cover effect, Ice water interface, Accuracy, Statistical analysis

49-854
High-resolution electron microscopy of biological specimens in cubic ice.
Cyrklaff, M., Kühlbrandt, W., *Ultramicroscopy,* Aug. 1994, 55(2), p.141-153, 31 refs.
Cryobiology, Preserving, Cubic ice, Ice optics, Ice microstructure, Electron microscopy, Imaging, Resolution

49-855
High-density morphologies of ice in high-pressure frozen biological specimens.
Richter, K., *Ultramicroscopy,* Mar. 1994, 53(3), p.237-249, 30 refs.
Cryobiology, Electron microscopy, High pressure ice, Preserving, Ice optics, Ice microstructure, Ice density, Vitreous ice, Transparence

49-856
Variations of snow cover in North and East Tyrol, 1895-1991. [Über Veränderungen der Schneedecki in Nord- und Osttirol in der Periode 1895-1991]
Fliri, F., *Zeitschrift fur Gletscherkunde und Glazialgeologie,* 1990, 26(2), p.145-154, In German with English summary. 13 refs.
Alpine landscapes, Snow cover distribution, Snow depth, Snow surveys, Seasonal variations, Meteorological data, Statistical analysis, Austria—Tyrol

49-857
Determination of surface velocities, strain and mass flow rates on the Taku Glacier, Juneau Icefield, Alaska.
Daellenbach, K.K., Welsch, W.M., *Zeitschrift fur Gletscherkunde und Glazialgeologie,* 1990, 26(2), p.169-177, With German summary. 10 refs.
Glaciology, Glacier flow, Mass flow, Ice mechanics, Velocity measurement, Strain tests, United States—Alaska—Taku Glacier

49-858
Secondary survey of the field of the Pasterze (Glockner Group) in 1989. [Nachmessungen im Bereich der Pasterze (Glocknergruppe) im Jahre 1989]
Wakonigg, H., *Zeitschrift fur Gletscherkunde und Glazialgeologie,* 1990, 26(2), p.203-209, In German.
Glacier surveys, Glacier tongues, Glacier oscillation, Seasonal variations, Austria—Alps

49-859
Glaciers of the Austrian Alps—1988/89. [Die Gletscher der österreichischen Alpen 1988/89]
Patzelt, G., *Zeitschrift fur Gletscherkunde und Glazialgeologie,* 1990, 26(2), p.189-201, In German.
Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Seasonal variations, Austria—Alps

49-860
Acoustic reflection from smooth ice: a calculation technique and results.
Aleksandrov, M.A., *Acoustical physics,* July-Aug. 1994, 40(4), p.597-599, Translated from Akusticheskiĭ zhurnal. 8 refs.
Sea ice, Ice acoustics, Underwater acoustics, Sound waves, Reflectivity, Scattering, Wave propagation, Ice cover thickness, Ice cover effect, Analysis (mathematics)

49-861
Submarine debris flows and continental slope evolution in front of Quaternary ice sheets, Baffin Bay, Canadian Arctic.
Hiscott, R.N., Aksu, A.E., *American Association of Petroleum Geologists. Bulletin,* Mar. 1994, 78(3), p.445-460, 32 refs.
Pleistocene, Seismic surveys, Marine geology, Marine deposits, Ocean bottom, Ice sheets, Glacial deposits, Mass flow, Slope processes, Baffin Bay

49-862
Application of 3-D depth migration to the development of an Alaskan offshore oil field.
Whitcombe, D.N., Murray, E.H., Jr., St. Aubin, L.A., Carroll, R.J., *Geophysics,* Oct. 1994, 59(10), p.1551-1560, 11 refs.
Oil wells, Offshore drilling, Geophysical surveys, Ocean bottom, Seismic surveys, Seismic refraction, Seismic velocity, Migration, Accuracy, Subsea permafrost, Permafrost thickness, United States—Alaska—North Slope

49-863
Chemical weathering of phosphate and germanium in glacial meltwater streams: effects of subglacial pyrite oxidation.
Chillrud, S.N., et al, *Limnology and oceanography,* July 1994, 39(5), p.1130-1140, 43 refs.
Hydrogeochemistry, Limnology, Glacial geology, Glacial hydrology, Meltwater, Weathering, Subglacial drainage, Mountain glaciers, Argentina—Andes

49-864
Simulations of the effects of water vapor, cloud liquid water, and ice on AMSU moisture channel brightness temperatures.
Muller, B.M., Fuelberg, H.E., Xiang, X.W., *Journal of applied meteorology,* Oct. 1994, 33(10), p.1133-1154, 64 refs.
Cloud physics, Radiometry, Radiation balance, Microwaves, Sounding, Brightness, Upwelling, Ice crystal optics, Scattering, Mathematical models

49-865
Development of a cold hardiness model for deciduous woody plants.
Aniśko, T., Lindstrom, O.M., Hoogenboom, G., *Physiologia plantarum,* July 1994, 91(3), p.375-382, 23 refs.
Plant physiology, Trees (plants), Cold tolerance, Acclimatization, Cold weather survival, Temperature effects, Mathematical models

49-866
Photosynthesis in cold acclimated leaves of plants with various degrees of freezing tolerance.
Bauer, H., et al, *Physiologia plantarum,* July 1994, 91(3), p.403-412, 47 refs.
Plant physiology, Plant tissues, Photosynthesis, Frost resistance, Acclimatization, Trees (plants), Cold weather tests, Temperature effects

49-867
Consequences of freezing temperatures followed by high irradiance on in vivo chlorophyll fluorescence and growth in *Picea abies*.
Welander, N.T., Gemmel, P., Hellgren, O., Ottosson, B., *Physiologia plantarum,* May 1994, 91(1), p.121-127, 20 refs.
Plant physiology, Frost resistance, Trees (plants), Cold weather tests, Chlorophylls, Growth, Photosynthesis, Temperature effects, Light effects

49-868
Pathogen reduction capabilities of freeze/thaw sludge conditioning.
Sanin, F.D., Vesilind, P.A., Martel, C.J., MP 3492, *Water research,* Nov. 1994, 28(11), p.2393-2398, 22 refs.
Waste treatment, Sludges, Waste disposal, Freeze thaw cycles, Microbiology, Bacteria, Survival, Freezing rate, Temperature effects, Health

If freeze/thaw conditioning can be shown to reduce pathogenic microorganisms, then sludges treated in this fashion can be disposed of on land with less risk of health effects. In this paper, the effects of freezing rate, temperature and time in the frozen state on the removal of pathogens are tested. The response of seven indicators of microbial contamination—fecal coliforms, *Salmonella;* plaque forming units, fecal streptococci, poliovirus, helminths and protozoa—to the freeze/thawing of both aerobically and anaerobically digested sludges is examined. Fecal coliforms, fecal streptococci, and plaque forming units are chosen as the commonly used indicators of bacteria and viruses in wastewater sludges. Pathogenic bacteria, virus and parasites tested in the second phase are chosen as sample microorganisms in their respective classes. Freeze/thaw sludge conditioning is proven to be an effective means of removing most pathogenic microorganisms. Fecal streptococci are found to be the best indicator of the effectiveness of freeze/thawing on enteric bacteria. Results of this study indicate that freeze/thaw conditioning coupled with sludge digestion can significantly enhance the overall pathogenic microorganism reduction achieved in a wastewater treatment plant. Added effectiveness by freeze/thaw treatment may become critical for a plant in meeting the pathogen reduction requirements by U.S. regulations prior to any practice of land application or land disposal of sludge.

49-869

Wind speed, wind direction, and air temperature at Pegasus North during 1991.

Stearns, C.R., Weidner, G.A., *Antarctic journal of the United States,* 1992, 27(5), p.285-287, 3 refs.

Wind factors, Air temperature, Ice air interface, Ice sublimation, Antarctica—Ross Ice Shelf, Antarctica—Minna Bluff

Automatic weather stations (AWS) units are installed at the north and south ends of Pegasus blue-ice runway on the Ross Ice Shelf near Ross I., and at Minna Bluff and Linda sites in support of the meteorology of the runway. The purpose of the AWS units is to determine the reason for the blue ice and to learn to forecast the extreme wind speeds observed in the area. Meteorological data at three hourly intervals are used to prepare the results presented here. A table presents the monthly means and extremes of temperature, wind, and the surface sensible and latent heat fluxes for Pegasus North site. Data are available only for the first 10 months of 1991 at the present time.

49-870

Photopolarimetry of halos and ice-crystal sizing.

Können, G.P., *Antarctic journal of the United States,* 1992, 27(5), p.293-296, 3 refs.

Ice crystal optics, Remote sensing, Polar atmospheres, Ice crystal size, Photometry, Antarctica—Amundsen-Scott Station, Antarctica—Vostok Station

During nearby displays the author recorded the linear polarization and intensity distributions of halos and simultaneously made replicas of the halo-generating ice crystals. His purpose was to explore halopolarimetry as a tool of remote sensing for crystals and to relate the diffraction broadening of the halo polarization and intensity directly to the sizes of the collected crystals. It is concluded that halo polarimetry is a sensitive tool for detecting birefringent crystals in the terrestrial atmosphere or in the atmospheres of other planets. However, for certain halos, including the parhelion, the optically determined crystal size bears no obvious relationship to the real crystal dimensions in the halo-generating cloud. At South Pole and Vostok, the polarization of several other types of halo have been recorded. Some findings are summarized.

49-871

Spectral reflectance of antarctic snow: "Ground truth" and spacecraft measurements.

Carlson, R.W., Arakelian, T., Smythe, W.D., *Antarctic journal of the United States,* 1992, 27(5), p.296-298, 4 refs.

Snow, Grain size, Remote sensing, Albedo, Solar radiation, Climatology, Antarctica—Vostok Station, Antarctica—Amundsen-Scott Station

The authors briefly describe field measurements of the spectral reflectance of snow at two sites, and compare the optically derived snow grain sizes with photographic measurements of the surface grains. These "ground-truth" data are then used to corroborate spacecraft remote-sensing measurements, thereby extending the localized measurements to continental scales. Spectra obtained at the Amundsen-Scott and Vostok stations are shown in a figure. The well-known water-ice absorption features occurring at 0.81, 0.90, 1.04, 1.25, 1.50, 1.65, and 2.0 microns are quite evident. All of these absorption features are stronger in the Vostok spectrum than at South Pole. This can be explained as longer path lengths for light passing through the absorbing ice grains, i.e., the snow particles at Vostok are larger than those at Amundsen-Scott Station. The mean grain size appears to vary across the continent, but the observed distribution shows no immediately obvious correlation with topographical or meteorological parameters. Because the rate of solar energy absorption depends upon grain size, this spatial variability must be considered in climatological estimates of the net albedo of Antarctica.

49-872

High-resolution ultraviolet spectral irradiance monitoring program in polar regions: five years (and growing) of data available to polar researchers in ozone- and ultraviolet-related studies.

Booth, C.R., Lucas, T.B., Morrow, J.H., *Antarctic journal of the United States,* 1992, 27(5), p.338-341, 16 refs.

Data processing, Ozone, Ultraviolet radiation, Research projects, Polar regions, Meteorological instruments

In the fall of 1987, responding to the serious ozone depletion reported in Antarctica, the Office of Polar Programs of the National Science Foundation called for the establishment of an ultraviolet monitoring system in Antarctica. The network was brought on-line in 1988, and the authors present the details of its operation and examples of recent data products. This is the first automated high-resolution ultraviolet scanning spectroradiometer network installed in the world. Spectroradiometers were installed in four antarctic locations between Feb. and Nov. 1988. A table lists the positions and the period of data referred to in this report for these sites. From 2 figures, the effect of ozone depletion over the South Pole can be clearly seen.

49-873

Surveying and mapping in Antarctica.

Mullen, R.R., Mullins, J.L., *Antarctic journal of the United States,* 1992, 27(5), p.342-343.

Geodetic surveys, Glacier flow, Mapping, Research projects, Antarctica—Amundsen-Scott Station

The U.S. Geological Survey (USGS) Antarctic Surveying and Mapping Program focused its activities during the 1991-1992 season on the acquisition of global positioning system (GPS) geodetic mapping control, Doppler satellite surveying, seismology, Doppler satellite tracking, and an international GPS campaign. During the 1991-1992 field season the USGS's geodetic control crews employed GPS positioning as the means of establishing geodetic mapping control in Antarctica. In Jan. 1992 the USGS team conducted a geodetic survey to establish the position of the true South Pole marker at Amundsen-Scott Station. Based on this season's observations and data from previous surveys, it was found that the ice sheet at South Pole continues to move approximately 10 m per year in a northwesterly direction. The team installed a permanent brass marker identifying the 1991-1992 austral summer position.

49-874

Integrated offshore studies on antarctic Cenozoic history, glaciation, and sea-level change: the ANTOSTRAT project.

Cooper, A.K., Webb, P.N., *Antarctic journal of the United States,* 1992, 27(5), p.343-346, 15 refs.

Glacial geology, Sea level, Research projects, Glaciation, Glacier flow, Models

The Antarctic Offshore Acoustic Stratigraphy project (ANTOSTRAT) is a recent international cooperative effort to coordinate and integrate all existing acoustic and geologic sample data from the antarctic continental margin to study Cenozoic glacial history and the offshore geologic impacts of the antarctic ice sheet. Five segments of the antarctic continental margin that have thick glacial sedimentary deposits (Ross Sea, Wilkes Land, Prydz Bay, Weddell Sea, and Antarctic Peninsula) have been targeted for detailed studies of existing seismic and geologic data by regional working groups. The aim of the ANTOSTRAT studies is a unified model for circumantarctic glaciation and global sea-level changes. The model would be the basis for future testing by scientific drilling of the antarctic continental margin.

49-875

Field photosynthetic activity of lichens in the Windmill Islands oasis, Wilkes Land, continental Antarctica.

Hovenden, M.J., Jackson, A.E., Seppelt, R.D., *Physiologia plantarum,* Mar. 1994, 90(3), p.567-576, 32 refs.

Plant ecology, Plant physiology, Lichens, Photosynthesis, Water balance, Snowmelt, Meltwater, Microclimatology, Antarctica—Windmill Islands

In order to ascertain whether the major species of continental antarctic macrolichens are photosynthetically active during summer conditions, the chlorophyll fluorescence of three lichen species was monitored in the vicinity of Casey Station, Wilkes Land using a PAM-2000 modulated fluorescence system. Lichens were studied when in equilibrium with the atmosphere as well as when moistened by snow showers. Photochemical quantum yield was estimated and related to thallus water content as well as microclimatic conditions. Lichens were photosynthetically active only when moistened by snowfall or by run-off from snow melt. The levels of photosynthetic activity in the field for all species were influenced by microenvironmental conditions, and patterns in response were site and species specific. The highest levels of photosynthetic activity were reduced by cold as well as warm, bright conditions. Highest thallus water contents occurred during the middle of the day after substantial snowfalls. The results indicate that the lichens are photosynthetically inactive for most of the summer period and are totally reliant on snow as a water supply. This is important when modelling carbon gain and growth rates of continental antarctic lichens. (Auth. mod.)

49-876

Observations of a street of cyclonic eddies in the Indian Ocean sector of the Antarctic Divergence.

Wakatsuchi, M., Ohshima, K.I., Hishida, M., Naganobu, M., *Journal of geophysical research,* Oct. 15, 1994, 99(C10), p.20,417-20,426, 18 refs.

Oceanography, Ocean currents, Hydrography, Heat flux, Upwelling, Polynyas, Sea ice distribution, Ice cover effect

Hydrographic and drifting buoy data from Japanese cruises show that the Antarctic Divergence in the Indian Ocean sector is composed of a street of cyclonic eddies. These eddies measure about 500 km in the zonal direction and 200 km in the meridional. Part of the eastward flowing Antarctic Circumpolar Current (ACC) meanders southward in the regions between the eddies. In the eddy regions, warm, saline Circumpolar Deep Water is upwelled into the shallow layers, while cold, dense coastal water advects into the deep layers; the advection occurs along the isobaths of ridges which extend north from the coast. The combination of the advection with the upwelling produces a water column denser than the surrounding water and leads to the formation and maintenance of the cyclonic eddies. The presence of the northward extending ridges approximately governs the location of eddy formation. The eddy formation recurs yearly, although eddy locations can vary. (Auth. mod.)

49-877

Light transmission and reflection in perennially ice-covered Lake Hoare, Antarctica.

McKay, C.P., Clow, G.D., Andersen, D.T., Wharton, R.A., Jr., *Journal of geophysical research,* Oct. 15, 1994, 99(C10), p.20,427-20,444, 31 refs.

Limnology, Lake ice, Optical properties, Sunlight, Radiation absorption, Light transmission, Seasonal variations, Scattering, Ice cover effect, Albedo, Antarctica—Hoare, Lake

The transmission and albedo of the perennial ice cover on Lake Hoare was investigated, using year-round measurements of the photosynthetically active radiation (400-700 nm) under the ice, measurements of the spatial variation of the under-ice light in midsummer and spectrally resolved measurements from 400 to 700 nm of the albedo and transmission of the ice cover in early (Nov.) and in midsummer (Jan.). Results show that the transmission decreases in early summer, dropping by a factor of about 4 from Nov. to Jan. due to heating in the upper layers of the ice cover and the formation of Tyndall figures. The spectrally resolved measurements from 400 to 700 nm show that about 2-5% of the incident light in this spectral region penetrates the 3.5 m thick ice cover. The spectral data were analyzed using a two-stream scattering solution to the radiative transfer equation with three vertical layers in the ice cover. A surficial glaze of scattering ice 1 cm thick overlies a layer of sandy, bubbly ice about a meter thick, and below this is a thick layer of sand-free ice with bubbles. Significant changes in the thickness of the ice cover have been reported at Lake Hoare, due primarily to changes in the thickness of the bottom layer only. Because this layer is relatively clear, the effect on the transmission through the ice cover from these changes is less than would be predicted by assuming a homogeneous ice cover. (Auth. mod.)

49-878

Temperature adaptation of the photosynthetic apparatus of arctic tundra plants *Oxyria digyna* and *Alopecurus alpinus* from Wrangel Island.

P'iankov, V.I., Vas'kovskiĭ, M.D., *Russian journal of plant physiology,* July-Aug. 1994, 41(4), p.454-461, Translated from Fiziologiia rasteniĭ. 26 refs.

Plant physiology, Plant ecology, Tundra, Arctic landscapes, Photosynthesis, Cold tolerance, Acclimatization, Temperature effects, Cold weather tests, Russia—Wrangel Island

49-879

Processes responsible for plant cell damage by extracellular ice.

Samygin, G.A., *Russian journal of plant physiology,* July-Aug. 1994, 41(4), p.539-549, Translated from Fiziologiia rasteniĭ. 92 refs.

Plant physiology, Plant tissues, Freezing, Ice formation, Ice water interface, Damage, Water transport, Water balance, Desiccation, Temperature effects

49-880

Role of hydrogen-bond cooperativity and free-volume fluctuations in the non-Arrhenius behavior of water self-diffusion: a continuity-of-states model.

Lamanna, R., Delmelle, M., Cannistraro, S., *Physical review B,* Apr. 1994, 49(4)pt.A, p.2841-2850, 43 refs.

Water, Phase transformations, Molecular energy levels, Supercooling, Thermodynamic properties, Hydrogen bonds, Low temperature research, Temperature effects, Self diffusion, Mathematical models

49-881

Oxygen and carbon isotope composition of Quaternary bivalve shells as a water mass indicator: last interglacial and Holocene, East Greenland.

Israelson, C., Buchardt, B., Funder, S., Hubberten, H.W., *Palaeogeography, palaeoclimatology, palaeoecology,* Sep. 1994, 111(1-2), p.119-134, 46 refs.

Oceanography, Paleoecology, Paleoclimatology, Surface waters, Surface temperature, Salinity, Marine deposits, Quaternary deposits, Fossils, Radioactive age determination, Isotope analysis, Greenland—Scoresby Sund

49-882

Correlation of frequency shifts with other properties in ice: a periodic Hartree-Fock study.

Silvi, B., *Journal of molecular structure,* Sep. 8, 1994, Vol.325, National Conference on Molecular Spectroscopy with International Participation, 2nd Wroclaw, Poland, Sep. 27-30, 1993. Proceedings, p.77-84, 23 refs.

Ice physics, Ice spectroscopy, High pressure ice, Molecular structure, Hydrogen bonds, Molecular energy levels, Proton transport, Neutron diffraction, Spectra

49-883

Absorption by dissociative continua in condensed matter: H_2O in rare gas and ice matrices.

Chergui, M., Schwentner, N., Stepanenko, V., *Chemical physics,* Sep. 15, 1994, 187(1-2), p.153-162, 32 refs.

Ice physics, Ice spectroscopy, Radiation absorption, Spectra, Molecular energy levels, Photochemical reactions, Water chemistry

49-884

Diffusion of H_2 in hexagonal ice at low temperatures.

Strauss, H.L., Chan, Z., Loong, C.K., *Journal of chemical physics,* Oct. 15, 1994, 101(8), p.7177-7180, 24 refs.

Ice physics, Ice spectroscopy, Hydrogen, Solubility, Diffusion, Deuterium oxide ice, Neutron scattering, Neutron diffraction, Spectra, Low temperature tests

49-885

Electron correlation effects in the cohesive properties of ice.

Suhai, S., *Chemical physics letters,* Oct. 7, 1994, 228(4-5), p.471-477, 35 refs.

Ice physics, Ice structure, Polymers, Molecular structure, Hydrogen bonds, Cohesion, Molecular energy levels, Ice models, Computerized simulation

49-886

Effect of electrode ice layer on prebreakdown current in liquid nitrogen.

Hanaoka, R., Ishibashi, R., Usui, Y., Inagaki, D., *IEEE transactions on dielectrics and electrical insulation,* Aug. 1994, 1(4), p.741-746, 5 refs.

Cryogenics, Liquefied gases, Electric equipment, Electrical resistivity, Ice electrical properties, Dielectric properties, Ice cover effect, Electrical measurement

49-887

Rigorous explanation for the resonances observed in the scattering from spherical ice particles.

Papatsoris, A.D., Watson, P.A., *IEEE transactions on antennas and propagation,* Sep. 1994, 42(9), p.1350-1354, 16 refs.

Ice physics, Ice optics, Spheres, Particles, Electromagnetic properties, Radio waves, Wave propagation, Scattering, Resonance, Analysis (mathematics)

49-888

Thermal conductivity of low-density amorphous ice.

Andersson, O., Suga, H., *Solid state communications,* Sep. 1994, 91(12), p.985-988, 13 refs.

Cryogenics, Amorphous ice, Ice physics, Thermal conductivity, High pressure tests, High pressure ice, Temperature effects, Phase transformations

49-889
Calculated Ångström's turbidity coefficients for Fairbanks, Alaska.
Fox, J.D., *Journal of climate,* Oct. 1994, 7(10), p.1506-1512, 38 refs.
Climatology, Atmospheric composition, Radiance, Turbidity, Photometry, Solar radiation, Haze, Aerosols, Seasonal variations, Statistical analysis, United States—Alaska—Fairbanks

49-890
Extended abstracts.
International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994, Manali, India, Snow and Avalanche Study Establishment, 1994, 377p., Refs. passim. For selected papers see 49-891 through 49-965.
Snow strength, Snow cover stability, Snow cover structure, Snow deformation, Snow hydrology, Snow surveys, Snow loads, Metamorphism (snow), Avalanche forecasting, Avalanche engineering, Avalanche mechanics, Avalanche modeling

49-891
Non-equilibrium thermodynamics applied to metamorphism of snow.
Brown, R.L., Adams, E.E., Barber, M., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.1-4, 6 refs.
Snow thermal properties, Metamorphism (snow), Snow strength, Snow deformation, Snow cover stability

49-892
Grain growth under temperature gradient: a simple approach.
Satyawali, P.K., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.5-8.
Snow thermal properties, Metamorphism (snow), Snow cover structure, Snow strength, Snow density, Snow cover stability

49-893
Measurement of microstructure from surface sections.
Edens, M.Q., Brown, R.L., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.9-12, 6 refs.
Snow cover structure, Snow strength, Snow deformation, Snow cover stability, Microstructure

49-894
Influence of microstructure on mechanical properties.
Agrawal, K.C., Mittal, R.K., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.13-23.
Snow cover structure, Snow strength, Snow deformation, Snow cover stability, Microstructure

49-895
New technique for estimation of coordination number from single section: graphical approach.
Mahapatra, G., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.24-26.
Snow cover structure, Snow density

49-896
Ice grain orientation in processed snow.
Adams, E.E., Vandervoort, D.C., Edens, M.Q., Lang, R.M., MP 3493, International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.27-30, 2 refs.
Snow compaction, Snow (construction material), Snow roads, Snow cover structure, Snow density, Snow strength, Microstructure

49-897
Pressure sintering, microstructural evolution and deformation of snow.
Bhargava, S., Sangal, S., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.31-33.
Metamorphism (snow), Snow strength, Snow deformation, Ice sintering, Microstructure

49-898
Crystallographic characterization of a core from the Ward Hunt ice shelf, Canada.
Barrette, P.D., Sinha, N.K., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.34-37, 9 refs.
Ice shelves, Ice islands, Ice cores, Ice structure, Metamorphism (snow), Canada—Northwest Territories—Ellesmere Island

49-899
Morphological studies of weak layers in regard to avalanche release.
Akitaya, E., Fukuzawa, T., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.38-40.
Snow stratigraphy, Snow cover stability, Avalanche forecasting, Avalanche triggering

49-900
Albedo variations in a snow field.
Vashisth, P., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.41-44.
Snow optics, Snow heat flux, Albedo

49-901
Effective medium approximation for snow thermal conductivity.
Arons, E.M., Colbeck, S.C., McGilvary, W.R., Petrenko, V.F., MP 3494, International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.45-48, 13 refs.
Snow thermal properties, Snow heat flux, Snow cover structure, Metamorphism (snow), Thermal conductivity, Microstructure

49-902
Mathematical model for the study of temperature profile within a snowcover.
Singh, A.K., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.49-52.
Snow thermal properties, Snow temperature, Snow heat flux, Snow air interface, Mathematical models

49-903
Effects of capillary discontinuities on water flow and water retention in layered snow covers.
Jordan, R., MP 3495, International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.53-56, 9 refs.
Snow hydrology, Snowmelt, Snow permeability, Snow stratigraphy, Seepage, Runoff forecasting, Water retention, Capillarity

49-904
Travelling waves in wet snow.
Gray, J.M.N.T., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.57-62, 8 refs.
Wet snow, Snow hydrology, Snowmelt, Snow permeability, Seepage, Mathematical models

49-905
Physics of snow friction.
Colbeck, S.C., MP 3496, International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.63-65, 8 refs.
Plastics snow friction, Skis, Ice solid interface, Sliding, Water films

49-906
Effects of aging, cloudcover and surfacial melting on temporal variations of snow surface albedo in Himalayan snowpacks.
Bhutiyani, M.R., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.67-69.
Snow surface, Albedo, Himalaya Mountains

49-907
Nonlinear model for snow creep.
Jazbutis, T.G., Adams, E.E., Brown, R.L., Lang, T.E., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.70-73, 13 refs.
Snow creep, Snow cover stability, Snow strength, Avalanche formation, Mathematical models

49-908
Study of the visco-elastic behaviour of snow under simple and multi-step loading conditions.
Tamrakar, R., Agrawal, K.C., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.74-77.
Snow creep, Snow cover stability, Snow strength, Viscoelasticity

49-909
Dependence of snow-strength on microstructural parameters.
Sethi, D.N., Das, H.N., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.78-81.
Snow cover stability, Snow strength, Snow deformation, Snow cover structure, Microstructure

49-910
Experimental study of glide pressure of snow cover on a slope.
Teratani, T., Kawada, K., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.82-84.
Snow loads, Snow cover stability, Snow slides, Snow strength, Snow deformation

49-911
Field investigations on meltwater percolation and its effect on shear strength of wet snow.
Bhutiyani, M.R., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.85-88.
Wet snow, Snowmelt, Snow hydrology, Snow permeability, Seepage, Snow cover stability, Snow strength

49-912
New constitutive law for snow.
Agrawal, K.C., Mittal, R.K., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.90-94.
Snow creep, Snow strength, Snow deformation, Snow cover structure, Microstructure, Viscoelasticity, Mathematical models

49-913

Two constitutive models for snow.

Mahajan, P., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.95-98, 3 refs.

Snow strength, Snow deformation, Snow cover structure, Microstructure, Mathematical models

49-914

Constitutive equation for deformation of snow: a state variable approach.

Kalra, M., Jain, P.C., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.99-101.

Snow strength, Snow deformation, Snow cover structure, Microstructure, Mathematical models

49-915

Snow fracture micromechanics.

Epifanov, V.P., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.102-105, 3 refs.

Snow strength, Snow deformation, Snow cover structure, Microstructure

49-916

Regional variations in extreme avalanche runout distance.

Mears, A.I., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.109-112, 10 refs.

Avalanche tracks, Avalanche forecasting, Avalanche modeling

49-917

Velocity measurements in a dry snow avalanche.

Dent, J.D., Schmidt, D.S., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.113-116, 1 ref.

Avalanche mechanics, Avalanche tracks, Avalanche modeling

49-918

Shock-capturing scheme for avalanche modelling.

Bhallamudi, S.M., Eswaran, V., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.117-119.

Avalanche mechanics, Avalanche modeling, Mathematical models

49-919

Continuum approach to avalanche dynamics.

Kumar, A., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.120-122.

Avalanche mechanics, Avalanche modeling, Mathematical models

49-920

Statistical approach to quantitative precipitation forecasting.

De, B., Dimri, A.P., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.135-138.

Snowfall, Snow water equivalent, Weather forecasting, Statistical analysis

49-921

Behaviour of seasonal anticyclone in winter in relation to moving westerly systems and its effects on weather over NW India.

Dhuliya, R., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.143-149.

Snowstorms, Atmospheric disturbances, Weather forecasting, Avalanche forecasting, Himalaya Mountains

49-922

Snow liquid water measurements: methods, instrumentation, results.

Denoth, A., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.150-153, 21 refs.

Snow surveys, Snow water content, Snow hydrology, Moisture detection

49-923

Snow mechanics and soil mechanics: in situ and laboratory testing.

Flavigny, E., Gourves, R., Daudon, D., Navarre, J.P., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.161-164, 6 refs.

Snow strength, Snow cover stability, Soil strength, Soil tests, Penetration tests

49-924

Determination of snow properties on the basis of field penetration tests.

Samoĭlov, R.S., Zhidkov, V.A., Osokin, N.I., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.168-171.

Snow strength, Snow cover stability, Penetration tests

49-925

Snow dielectric measurements using active microwave techniques.

Giovannini, A., Achammer, T., Denoth, A., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.172-175, 9 refs.

Snow electrical properties, Snow cover structure, Snow water content, Dielectric properties

49-926

Automatic weather data reception system.

Agrawal, R.K., Jain, R.M., Maurya, S.L., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.176-179.

Snow surveys, Avalanche forecasting, Weather stations, Data transmission

49-927

Design of a snow surface temperature sensor.

Singh, R.N., Rajeshwar, V., Tyagi, R.P., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.180-182.

Snow surface temperature, Temperature measurement, Remote sensing

49-928

Doppler radar for measurement of snow avalanche velocity.

Limaye, K.U., Krishnan, S., Easwaran, M.S., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.183-186, 3 refs.

Avalanche mechanics, Flow measurement, Velocity measurement, Radar tracking

49-929

Timer based avalanche velocity measuring system.

Kumar, V., Bindal, A., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.187-189, 6 refs.

Avalanche mechanics, Flow measurement, Velocity measurement

49-930

Telemetry system for automatic acquisition and transmission of snow and meteorological data.

Tiwari, A.K., Garg, R.K., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.190-193.

Snow surveys, Avalanche forecasting, Weather stations, Data transmission

49-931

Avalanche victim detector (AVD).

Sharma, S.V.L.N., Rao, K.S., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.197-201.

Avalanches, Rescue equipment, Radio beacons, Subsurface investigations

49-932

Streamlined collector for precipitation (ASCOP).

Wiesinger, T., Kroneis, W., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.202-205, 5 refs.

Snowfall, Precipitation gages

49-933

Drifting snow phenomena and slab avalanches.

Castelle, T., Sivardière, F., Guyomarc'h, G., Buisson, L., Merindol, L., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.206-210, 4 refs.

Snowdrifts, Blowing snow, Snow erosion, Snow cover stability, Avalanche forecasting

49-934

Drifting snow and snowdrifts.

Kobayashi, D., Tanaka, Y., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.213-216.

Snowdrifts, Snow erosion, Snow fences, Snow hedges

49-935

Modelling local avalanche forecast, a review.

Ammann, W., Good, W., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.217-220, 14 refs.

Avalanche forecasting, Avalanche modeling

49-936

Snowcover model.

Ganju, A., Agrawal, K.C., Rao, D.L.S., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.221-226.

Snow cover structure, Snow cover stability, Snow hydrology, Metamorphism (snow), Avalanche forecasting

49-937

Objective models to simulate snow cover stratigraphy and avalanche risk for operational avalanche forecasting.

Giraud, G., Brun, E., Durand, Y., Martin, E., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.227-230, 9 refs.

Snow stratigraphy, Snow cover stability, Avalanche forecasting, Computerized simulation

49-938

Forecasting high continental avalanches: a field worker's perspective.

Hartman, H., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.234-237, 7 refs.

Snow cover stability, Avalanche forecasting

49-939

Semi quantitative approach of forecasting avalanche.

Agrawal, K.C., Ganju, A., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.238-243.

Snow cover stability, Avalanche forecasting

49-940

Spatial variability of physical parameters of the Alpine snow cover.

Staudinger, M., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.244-247, 5 refs.

Snow cover structure, Snow cover stability, Snow erosion

49-941

US Highway 550 avalanche reduction project, San Juan Mountains of Colorado, USA.

Bachman, D., Hogan, D., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.250-253, 3 refs.

Snow cover stability, Avalanche forecasting, Avalanches, Accidents, Road maintenance, United States—Colorado

49-942

Avalanche hazard mapping with satellite data and a digital elevation model.

Gruber, U., Haefner, H., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.254-257, 5 refs.

Snow surveys, Avalanche forecasting, Spaceborne photography, Mapping

49-943

Avalanche control measures for roads in Norway.

Larsen, J.O., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.258-260.

Avalanche forecasting, Avalanche engineering, Road maintenance, Highway planning, Norway

49-944

Summary of French avalanche protection techniques.

Rapin, F., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.261-266.

Avalanche engineering, Snow stabilization, Safety, Avalanche protection, France

49-945

Snow gallery—a typical design.

Ganju, V.K., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.267-272.

Avalanche engineering, Snowsheds, Snow loads, Road maintenance, Highway planning

49-946

Design of snow rakes using high strength low alloy steel for control of avalanches in formation zone.

Kumar, N., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.273-276.

Avalanche engineering, Snow fences, Snow stabilization, Snow loads, Steel structures

49-947

Snow avalanche protection forests in Japan.

Nitta, R., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.277-280.

Avalanche engineering, Snow hedges, Forest strips, Protective vegetation, Avalanche protection, Japan

49-948

Census of Gazex.

Rapin, F., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.282-295.

Avalanche triggering, Blasting

49-949

Artificial triggering of avalanches: Gaz-Ex avalanche release system.

Schippers, J., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.297-299.

Avalanche triggering, Blasting

49-950

Avalanche control in Austria.

Hoffer, P., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.300-303.

Avalanche engineering, Snow stabilization, Safety, Austria

49-951

Some geotechnical aspects and construction techniques in the cold regions.

Pathak, R.C., Gaikwad, S.S., Deshpande, P.D., Bose, C., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.304-306.

Stations, Buildings, Cold weather construction, Antarctica—Maitri Station

The firm of R & DE (Engrs) Pune over a decade has successfully undertaken construction of various types of accommodation and related structures in the cold regions of the Himalayas as well as in Antarctica. In the present paper the authors briefly enumerate the latest structural techniques for the extreme cold regions and also touch upon the usage of some important available materials for the purpose. (Auth. mod.)

49-952

Strength characteristics of snow as a paving material: some considerations.

Srivastava, R.K., Muraleedharan, T., Sharma, A.K., Nanda, P.K., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.309-312.

Snow roads, Snow (construction material), Snow compaction, Snow strength

49-953

Appropriate technology for the freeze-thaw related problems for Indian Himalayas.

Baba, H.U., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.313-316.

Soil freezing, Frost heave, Artificial freezing, Freeze thaw tests, Soil tests, India—Himalaya Mountains

49-954

Human waste disposal at low temperature areas.

Singh, L., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.317-320.

Sewage disposal, Sewage treatment, Sanitary engineering, Health, Soil microbiology, Decomposition

49-955

Seismic studies on antarctic ice shelf and viscoelastic properties of ice.

Sastry, H.R.S., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.321-326, 3 refs.

Ice shelves, Ice elasticity, Ice cover effect, Subglacial observations, Marine geology, Earth crust, Seismic surveys, Seismic refraction, Antarctica—Princess Astrid Coast

Seismic explosion studies were carried out on the antarctic ice shelf near Indian Base Camp during the second Indian expedition to Antarctica. Seismic refraction techniques were employed to obtain stratigraphic features of some bottom layers. The results are presented with a qualitative explanation of unaccounted arrivals through some viscoelastic studies on ice. The limited and exploratory seismic studies carried out on the antarctic ice shelf indicate the presence of a layer of granite rock below the ice and sedimentary layers, conforming to the concept of a continental crust which includes the antarctic shelf. (Auth. mod.)

49-956

Construction of pavements, airfields and helipads over glacier and snow bound areas.

Pathak, R.C., Gaikwad, S.S., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.327-329.

Snow (construction material), Snow compaction, Snow strength, Aircraft landing areas, Ice runways

Construction of airstrips, helipads and snow roads over a glaciated surface poses some complex problems in spite of improved techniques of snow compaction. The problems of maintaining them at relatively high ambient temperatures (0 +/- 5 C), when processed snow tends to become cohesionless due to destruction of inter-granular bonds combined with agitation by traffic, is a multidisciplinary area requiring more consistent study. Surface stabilization and covering or reinforcement with composite binder materials are some possible potential solutions. At very low temperatures, e.g. -20 to -40 C, laboratory work and field studies in the Antarctic have revealed that heat or free water must be added to the snow to promote the process of binding of snow grains so as to achieve the desired strength for supporting heavy wheeled aircraft. (Auth.)

49-957

Glacier mass balance and recession trend of hydrographs.

Singh, P., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.331-335, 7 refs.

Mountain glaciers, Glacial hydrology, Glacier alimentation, Glacier mass balance, Glacier oscillation, Himalaya Mountains

49-958

Geographic information systems for mass balance studies of a Himalayan glacier and part of antarctic shelf ice.

Saraf, A.K., Jain, S.K., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.336-339, 4 refs.

Glacier surveys, Mountain glaciers, Ice shelves, Glacier mass balance, Glacier oscillation

One of the most important aspects of glacier studies is to assess the regime of its ice body, i.e. to evaluate whether the ice body has increased or decreased in volume during the study period. The present study demonstrates the capabilities of GIS to handle spatial data in the form of point data, isolines, sections, etc. available from various stake readings, and to estimate more accurately the total water equivalent, ablation and mass associated with the Chhota Shigri glacier in the Himalayas and part of the antarctic shelf ice. Digital elevation models were generated using GIS to calculate ice/snow thickness and ice/snow density associated with different points. The present study is based on data available in published reports. (Auth.)

49-959

New approach in operational long-term snowmelt runoff forecasting in Sutlej basin using snow-cover depletion patterns.

Paul, P.R., Rao, C.L.V.R., Sankar, E.S., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.340-342.

Snow surveys, Snowmelt, Snow hydrology, Runoff forecasting, Himalaya Mountains

49-960

Data observation for snowmelt runoff assessment.

Singh, R.N.P., Alagh, P.K., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.345-349.

Snow surveys, Snowmelt, Snow hydrology, Runoff forecasting

49-961

Study on snow distribution with altitude in the Chenab basin.

Singh, P., Ramasastri, K.S., Kumar, N., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.350-354.

Snow surveys, Snow cover distribution, Snowfall, Snow water equivalent, Himalaya Mountains

49-962

Contribution of Survey of India in the field of glaciology.

Roy, B.C., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.355-358.

Glacier surveys, Mountain glaciers, Glacier thickness, Glacier oscillation, India

49-963

Geodetic and Research Branch participation in past glacier expeditions.

Mohan, R., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.359-362.

Glacier surveys, Mountain glaciers, Glacier oscillation, Expeditions, India

49-964

Avalanche studies in Dhauliganga valley, district Pithoragarh, U.P. A prerequisite for engineering structures in snow bound Himalaya.

Sangewar, C.V., Roy, D., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.364-367.

Avalanches, Snowfall, Snow loads, Himalaya Mountains

49-965

Modified design of formation zone control structures.

Ganju, V.K., Kalra, M., International Symposium on Snow and Related Manifestations, Manali, India, Sep. 26-28, 1994. Extended abstracts, Manali, India, Snow and Avalanche Study Establishment, 1994, p.368-376.

Avalanche engineering, Avalanche formation, Snow fences, Snow stabilization, Snow loads

49-966

Nutrient depletion and particulate matter near the ice-edge in the Weddell Sea.

Pérez, F.F., Figueiras, F.G., Ríos, A.F., *Marine ecology progress series*, Sep. 8, 1994, 112(1-2), p.143-153, Refs. p.151-153.

Ice melting, Nutrient cycle, Sea water, Chemical composition, Ice edge, Biomass, Antarctica—Weddell Sea

The region between Elephant I. and the South Orkney Is. was occupied by winter Weddell Sea water and a thick layer of summer and surface modified Weddell water. High correlations between nutrients (nitrate, total inorganic carbon, silicate) and oxygen with salinity were found in the upper 150 m near the ice edge. Nutrient depletion was calculated and correlated with the melting ice processes. When 1 m of ice melts, the average amount of total carbonate and nutrients removed is equivalent to a production of 33 g $C/m^2/yr$. Increases of oxygen were detected with high rates of nutrient and carbon depletion. However, significant oxygen losses in the melting water body were estimated from the conservative 'NO' parameter. The amount of nutrients removed during pack-ice melting was about 3 times higher than that taken up in the water column. Analyses of particulate material in the ice samples showed similar C:N ratios to those estimated by the decrease of nutrients in the water column. (Auth.)

49-967

Polar stratospheric clouds over McMurdo, Antarctica, during the 1991 spring: lidar and particle counter measurements.

Adriani, A., et al, *Geophysical research letters*, Sep. 4, 1992, 19(17), p.1755-1758, 10 refs.

Ozone, Stratosphere, Atmospheric composition, Clouds (meteorology), Polar atmospheres, Polar stratospheric clouds, Antarctica—McMurdo Station

Lidar and balloonborne particle counter measurements were performed simultaneously on two days when polar stratospheric clouds were observed in late Aug. 1991 at McMurdo Station. Both nitric acid trihydrate and ice clouds were observed in the lower stratosphere between 10 and 23 km in different formation stages and with different cooling rates; however, in all cases the size distributions were bimodal. Comparison of scattering ratios measured by lidar and calculated from particle size distributions are in good agreement; however, discrepancies were observed when the lower stratosphere was highly perturbed by wave activity. Lee waves generated by air flowing over the Transantarctic Mountains induced ice cloud formation at altitudes as high as 20 km. No PSCs were observed after the end of Aug., 1991. (Auth.)

49-968

Variation in aerosol concentration associated with a polar climatic iteration.

Hogan, A., Riley, D., Murphey, B.B., Barnard, S.C., Samson, J.A., MP 3499, *American Geophysical Union. Antarctic research series,* 1993, Vol.61, Antarctic meteorology and climatology: studies based on automatic weather stations, p.175-199, Refs. p.196-199.

Aerosols, Marine deposits, Seasonal variations, Wind (meteorology), Climatic factors, Ice composition, Antarctica—Ross Ice Shelf

This paper presents analyses which follow warm, aerosol-laden cyclonic systems across the Ross Ice Shelf, using automatic weather station data. Subsequent discussion indicates that marine aerosol deposits in the interior antarctic ice may reflect a recent climatic iteration of surface temperature aerosol concentration. The antarctic continental (cA) air mass is rarely displaced from the south polar plateau, but is frequently modified by exchange with antarctic maritime (mA) air advected from the ice shelves or frozen seas or with polar maritime (mP) air advected from the southern oceans. Because the cA air mass resides over an uninhabited and relatively static ice-covered surface, the concentration of aerosol particles in this unique air mass may reflect aerosol variation in the global atmosphere. A continuous series of surface observations were begun at Amundsen-Scott Station in 1974 and have continued to the present. The decrease in aerosol concentration was greatest in late winter and spring, concurrent with decreases in mean air temperature and mean wind speed. This paper describes analytical techniques used to examine these apparent trends. It is concluded that the diminution in temperature, aerosol concentration, and sodium deposition are a consequence of a diminution in the frequency of cyclonic-related warming events. (Auth.)

49-969

Viral and bacterial dynamics in Arctic sea ice during the spring algal bloom near Resolute, N.W.T., Canada.

Maranger, R., Bird, D.F., Juniper, S.K., *Marine ecology progress series,* Aug. 11, 1994, 111(1-2), p.121-127, Refs. p.126-127.

Sea ice, Bacteria, Microbiology, Algae, Cryobiology, Canada—Northwest Territories—Resolute

49-970

Implications of global climate warming for Canadian east coast sea-ice and iceberg regimes over the next 50-100 years.

Brown, R.D., *Environment Canada. Climate change digest,* 1993, No.93-03, 16p., In English and French. 21 refs.

Climatic changes, Global warming, Greenhouse effect, Sea ice distribution, Icebergs, Drift, Calving, Long range forecasting, Environmental impact, Labrador Sea

49-971

Arctic/Cold Weather Operations of Surface Ships. Proceedings, Vol.1.

U.S. Navy Symposium on Arctic/Cold Weather Operations of Surface Ships, Nov. 19-20, 1987, Washington, D.C., Department of the Navy, 1987, 468p., Refs. passim. For selected papers see 49-972 through 49-995.

Meetings, Ships, Cold weather performance, Cold weather operation, Military operation, Military research, Ship icing, Ice forecasting, Ice control, Ice conditions, Ice navigation, Clothing, Logistics, Design, Polar regions

49-972

Keynote address.

Hernandez, D.E., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.21-30.

Ships, Military operation, Cold weather operation, Cold weather performance, Sea states, Meteorological factors, Weather forecasting, Bering Sea

49-973

U.S. Navy's Arctic/Cold Weather Program for Surface Ships.

Barr, R.K., Kordenbrock, J.U., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.31-39.

Research projects, Ships, Cold weather performance, Cold weather operation, Military operation, Military research, Education, Ice control

49-974

Winter aircraft carrier operations in the Bering Sea.

Brown, J.E., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.59-64.

Ships, Cold weather operation, Cold weather performance, Military operation, Aircraft, Aircraft icing, Aircraft landing areas, Ice control, Skid resistance, Ice removal, Bering Sea

49-975

U.S. Coast Guard operating experience.

Marsh, S.I., Jr., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.65-72.

Ships, Icebreakers, Cold weather operation, Cold weather performance, Ice navigation, Ice breaking, Meteorological factors

49-976

Combat systems operational and environmental effects.

Budai, D.M., DeMattia, H.J., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.73-106.

Ships, Military operation, Cold weather operation, Cold weather tests, Research projects, Ship icing, Computer applications

49-977

Ship Response Tactical Decision Aid.

Silver, A.L., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.107-115, 8 refs.

Ships, Stability, Navigation, Cold weather operation, Cold weather performance, Sea states, Ship icing, Ice loads, Ice control

49-978

Ice-phobic/low adhesion coatings for ship superstructure surfaces.

Kenney, W.P., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.117-125.

Ship icing, Protective coatings, Ice prevention, Ice solid interface, Ice adhesion, Cold weather tests, Simulation

49-979

Underway replenishment in northern latitudes.

Mackes, J.F., Vaughters, T.G., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.127-148, 6 refs.

Ships, Military operation, Cold weather operation, Cold weather performance, Logistics, Ship icing, Ice prevention, Ice removal

49-980

Soviet studies of cold weather phenomena in subarctic seas.

Assur, A., MP 3497, U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.197-210, 43 refs.

Ships, Ship icing, Cold weather operation, Ice control, Ice prevention, Ice removal, Bibliographies, Russia

49-981

Survey of Soviet literature on extended range forecasting of arctic ice conditions.

Englebretson, R.E., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.211-226, 40 refs.

Sea ice distribution, Ice surveys, Ice conditions, Ice forecasting, Long range forecasting, Bibliographies, Research projects, Arctic Ocean, Russia

49-982

Design implications of cold weather: shipbuilders' perspective.

Price, W., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.227-240.

Ships, Cold weather operation, Cold weather performance, Military operation, Ship icing, Cold weather tests, Design criteria

49-983

Shipboard ice removal techniques.

Winegrad, D.L., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.241-270, 11 refs.

Ship icing, Aircraft landing areas, Cold weather operation, Ice removal, Ice loads, Ice cover effect, Superstructures

49-984

Sea ice conditions in arctic marginal ice zones.

Tucker, W.B., MP 3498, U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.271-281, 10 refs.

Sea ice distribution, Ice edge, Ice conditions, Ice growth, Seasonal variations, Bering Sea, Chukchi Sea

49-985

Naval Polar Oceanography Center capabilities and limitations in sea ice analysis and forecasting.

Rosner, H.S., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.283-296, 6 refs.

Sea ice distribution, Ice surveys, Ice conditions, Ice forecasting, Long range forecasting, Ice navigation

49-986

New concepts for spray ice removal from ship superstructures.

Sackinger, W.M., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.297-303, 8 refs.

Ship icing, Sea spray, Spray freezing, Superstructures, Ice removal, Chemical ice prevention, Ice solid interface, Sound waves, Projectile penetration

49-987

Data collection in the Bering Sea MIZ—April 1986.

Zahn, P.B., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.305-320.

Oceanographic surveys, Sea ice distribution, Ice surveys, Ice conditions, Ice edge, Ice navigation, Trafficability, Icebreakers, Cold weather operation, Bering Sea

49-988

Ice impact model for U.S. Navy surface combatant ships operating in the marginal ice zone.

St. John, J.W., Devine, E.A., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.321-336, 6 refs.

Ships, Cold weather operation, Ice edge, Ice solid interface, Ice loads, Damage, Impact strength, Impact tests, Models, Design criteria

49-989

Areas of operation for alternate ABS ice classes.

DeBord, F., Jr., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.337-366, 13 refs.

Ships, Classifications, Sea ice distribution, Ice navigation, Ice conditions, Cold weather operation, Cold weather performance, Standards, Design criteria

49-990

Cold weather clothing availability—what's available and where.

Spadone, D.M., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.367-374.

Ships, Cold weather operation, Cold weather survival, Cold weather performance, Clothing, Thermal insulation, Design, Buoyancy

49-991

Assessment of cold weather clothing.

Avellini, B.A., Giblo, J., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.375-389, 13 refs.

Clothing, Cold weather performance, Cold weather tests, Cold stress, Cold exposure, Cold tolerance, Heat transfer, Thermal insulation

49-992

Effects of icing on Navy aircraft.

Jeck, R.K., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.395-403, 2 refs.

Aircraft icing, Ocean environments, Accidents, Statistical analysis

49-993

NEWICE: sea spray icing simulation.

Zahn, P.B., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.415-424.

Ship icing, Offshore structures, Ice loads, Sea spray, Spray freezing, Ice models, Ice forecasting, Computerized simulation, Computer programs

49-994

Ergonomics and hypothermia capabilities in protective clothing.

Askew, R.J., Crosick, K.J., Jr., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.431-448, 7 refs.

Cold exposure, Clothing, Safety, Ocean environments, Water temperature, Cold weather survival, Design criteria, Human factors engineering

49-995

Provisioning and outfitting of combat systems for arctic/cold weather operations.

Kolar, M.J., Johnson, R.C., U.S. Navy Symposium on Arctic/Cold Weather Operations on Surface Ships, Nov. 19-20, 1987. Proceedings, Vol.1, Washington, D.C., Department of the Navy, 1987, p.449-468, 10 refs.

Ships, Military operation, Military equipment, Cold weather operation, Logistics, Materials, Distribution

49-996

Groundwater monitoring well casings.

Parker, L.V., Hewitt, A.D., Jenkins, T.F., Ranney, T.A., Leggett, D.C., MP 3500, *Military engineer,* 1993, No.565, p.15-16.

Ground water, Water pollution, Sampling, Environmental tests, Accuracy, Well casings, Materials, Leaching, Standards

49-997

Suppression of bottom water formation in the southeastern Weddell Sea.

Fahrbach, E., et al, *Deep-sea research I,* Feb. 1994, 41(2), p.389-411, 50 refs.

Oceanography, Ocean currents, Ocean bottom, Ice shelves, Polynyas, Ice melting, Air ice water interaction, Water transport, Salinity, Turbulent diffusion, Antarctica—Weddell Sea

The lack of bottom water formation in the southeastern Weddell Sea is investigated on the basis of CTD, current meter, and oxygen isotope data obtained in 1986 during the Winter Weddell Sea Project and in summer 1989 during the European Polarstern Study. The principal underlying factor in suppressing the formation of bottom water is the narrow continental shelf in the region. This leads to two consequences not obtained in the western Weddell Sea: (1) the coastal polynya is able to extend out well over deep water and over the swift-moving Antarctic Coastal Current, which acts to inhibit the accumulation of salt released by surface freezing in the polynya; and (2) the upper portions of Warm Deep Water come into close proximity with the glacial ice shelf floating above the continental shelf, thus providing heat for melting at the base of the ice shelf. Budgets for heat and salt derived from the winter data, along with measurements of *delta*^{18}O, indicate that this melting occurs at rates more than sufficient to compensate the combined effects of brine released by freezing in the polynya and the upward flux of salt from the Warm Deep Water. As a result, the Eastern Shelf Water cannot acquire the salt concentrations needed for the formation of bottom water. (Auth.)

49-998

Transfer of polarized infrared radiation in optically anisotropic media: application to horizontally oriented ice crystals—comment.

Mishchenko, M.I., Takano, Y., Liou, K.N., *Optical Society of America. Journal A,* Apr. 1994, 11(4), p.1376-1378, Includes reply. 24 refs. For paper under discussion see 47-4737.

Cloud physics, Light scattering, Ice crystal optics, Orientation, Infrared radiation, Anisotropy, Radiation balance, Analysis (mathematics)

49-999

Stefan problem around a refrigerated buried cylinder: identification of principal parameters and development of a simple prediction method.

Haoulani, H., Cames-Pintaux, A.M., Aguirre-Puente, J., *International journal of refrigeration,* June 1994, 17(5), p.302-308, With French summary. 11 refs.

Refrigeration, Pipes (tubes), Subsurface investigations, Stefan problem, Soil freezing, Frozen ground thermodynamics, Phase transformations, Freezing front, Frost forecasting, Enthalpy, Mathematical models

49-1000

Use of the equivalent volumetric enthalpy variation in nonlinear phase-change processes: freezing-zone progression and thawing-time determination.

Ramos, M., Sanz, P.D., Aguirre-Puente, J., Posado, R., *International journal of refrigeration,* July 1994, 17(6), p.374-380, With French summary. 22 refs.

Refrigeration, Solutions, Frozen liquids, Solidification, Phase transformations, Freezing front, Enthalpy, Stefan problem, Thawing rate, Analysis (mathematics)

49-1001

Stagnation-line melting of ice cylinders transverse to warm air flow.

Ameen, F.R., *International journal of refrigeration,* July 1994, 17(6), p.381-390, With French summary. 15 refs.

Heat pumps, Defrosting, Pipes (tubes), Ice formation, Ice melting, Air flow, Heat transfer, Ice solid interface, Ice air interface, Mathematical models

49-1002

Modeling of global change phenomena with GIS using the global change data base. II: Prototype synthesis of the AVHRR-based vegetation index from terrestrial data.

Hastings, D.A., Di, L.P., *Remote sensing of environment,* July 1994, 49(1), p.13-24, 15 refs.

Remote sensing, Radiometry, Global change, Environmental impact, Ecosystems, Classifications, Vegetation patterns, Image processing, Data processing, Indexes (ratios), Statistical analysis, Models

49-1003

Spectral, spatial, and geomorphometric variables for the remote sensing of slope processes.

McDermid, G.J., Franklin, S.E., *Remote sensing of environment,* July 1994, 49(1), p.57-71, 66 refs.

Remote sensing, Spaceborne photography, Geomorphology, Classifications, Slope processes, Subarctic landscapes, Terrain identification, Image processing, Stereomapping, Canada—Yukon Territory—Front Range

49-1004

Area coverage of geophysical fields as a function of sensor field-of-view.

Key, J.R., *Remote sensing of environment,* June 1994, 48(3), p.339-346, 17 refs.

Geophysical surveys, Spaceborne photography, Image processing, Resolution, Sea ice distribution, Ice openings, Detection, Sensor mapping, Analysis (mathematics)

49-1005

Effects of sensor field-of-view on the geometrical characteristics of sea ice leads and implications for large-area heat flux estimates.

Key, J., Maslanik, J.A., Ellefsen, J.A., *Remote sensing of environment,* June 1994, 48(3), p.347-357, 19 refs.

Sea ice distribution, Ice openings, Detection, Ice surveys, Sensor mapping, Spaceborne photography, Resolution, Image processing, LANDSAT, Ice heat flux, Ice air interface

49-1006

Preliminary ERS-1 observations of Alaskan and Aleutian volcanoes.

Rowland, S.K., Smith, G.A., Mouginis-Mark, P.J., *Remote sensing of environment,* June 1994, 48(3), p.358-369, 25 refs.

Volcanoes, Magma, Mass flow, Landforms, Spaceborne photography, Radar photography, Synthetic aperture radar, Glacier surfaces, Glacier melting, United States—Alaska—Aleutian Islands

49-1007

Ecological similarity and coexistence of epiphytic ice-nucleating (ice$_+$) *Pseudomonas syringae* strains and a non-ice-nucleating (ice$_-$) biological control agent.

Wilson, M., Lindow, S.E., *Applied and environmental microbiology,* Sep. 1994, 60(9), p.3128-3137, 58 refs.

Microbiology, Bacteria, Ecology, Plant physiology, Plant tissues, Frost protection, Chemical ice prevention, Heterogeneous nucleation, Nucleating agents

49-1008

Viscoelastic perturbations of the earth: significance of the incremental gravitational force in models of glacial isostasy.

Amelung, F., Wolf, D., *Geophysical journal international,* June 1994, 117(3), p.864-879, 26 refs.

Pleistocene, Glaciology, Ice sheets, Ice loads, Glacier oscillation, Glacial geology, Isostasy, Viscoelasticity, Gravity, Mathematical models

49-1009

Role of ice scouring and goose grubbing in marsh plant dynamics.

Bélanger, L., Bédard, J., *Journal of ecology,* Sep. 1994, 82(3), p.437-445, 38 refs.

Estuaries, Swamps, Wetlands, Littoral zone, Ecosystems, Plant ecology, River ice, Ice scoring, Environmental impact, Canada—Quebec—Montmagny

49-1010

Big freeze hits polluted ground.

Gould, R., *New scientist,* Sep. 17, 1994, 143(1943), p.21.

Soil pollution, Soil freezing, Environmental tests, Environmental protection, Boreholes, Sampling, Liquefied gases, Cryogenics

49-1011

Measurement of sea ice conductivity by electromagnetic induction.

Becker, A., Echert, D.C., White, G.B., Oceans'92 Conference, Newport, RI, Oct. 26-29, 1992. Proceedings. Vol.2. Mastering the oceans through technology, New York, Institute of Electrical and Electronics Engineers, 1992, p.748-752, 9 refs.
DLC TC1505.O33198 1992

Ice surveys, Ice electrical properties, Ice cover thickness, Thickness gages, Radio echo soundings, Electromagnetic prospecting

49-1012

Electromagnetic induction sensing of sea ice thickness using the EM31 ground conductivity meter.

Echert, D.C., White, G.B., Becker, A., Oceans'92 Conference, Newport, RI, Oct. 26-29, 1992. Proceedings. Vol.2. Mastering the oceans through technology, New York, Institute of Electrical and Electronics Engineers, 1992, p.753-758, 12 refs.
DLC TC1505.O33198 1992

Ice surveys, Ice electrical properties, Ice cover thickness, Thickness gages, Radio echo soundings, Electromagnetic prospecting

49-1013

Bergy-bit chaos.

Hinchey, M.J., Muggeridge, D.B., Marshall, M., Oceans'92 Conference, Newport, RI, Oct. 26-29, 1992. Proceedings. Vol.2. Mastering the oceans through technology, New York, Institute of Electrical and Electronics Engineers, 1992, p.759-763, 7 refs.
DLC TC1505.O33198 1992

Icebergs, Ice solid interface, Ice loads, Ice forecasting, Ocean waves, Statistical analysis

49-1014

Rule-based system to help reduce offshore downtime due to encroaching icebergs.

Pang, C., El-Tahan, M., Oceans'92 Conference, Newport, RI, Oct. 26-29, 1992. Proceedings. Vol.2. Mastering the oceans through technology, New York, Institute of Electrical and Electronics Engineers, 1992, p.770-775, 12 refs.
DLC TC1505.O33198 1992

Icebergs, Ice forecasting, Ice control, Offshore drilling, Computer applications

49-1015

Use of synthetic aperture radar to map the polar oceans.

Shuchman, R.A., Oceans'90 Conference, Washington, D.C., Sep. 24-26, 1990. Proceedings. Engineering in the ocean environment, New York, Institute of Electrical and Electronics Engineers, 1990, p.402-409, 17 refs.
DLC TC1657.O25 1990

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice edge, Synthetic aperture radar, Spaceborne photography

49-1016

Optical disk recorders in arctic instrumentation.

Peal, K.R., Prada, K.E., Oceans'90 Conference, Washington, D.C., Sep. 24-26, 1990. Proceedings. Engineering in the ocean environment, New York, Institute of Electrical and Electronics Engineers, 1990, p.550-555, 5 refs.
DLC TC1657.O25 1990

Telemetering equipment, Data transmission, Data processing, Drift stations, Weather stations, Computers, Recording instruments

49-1017

Development of the Arctic Remote Autonomous Measurement Platform.

Peal, K.R., Prada, K.E., Oceans'90 Conference, Washington, D.C., Sep. 24-26, 1990. Proceedings. Engineering in the ocean environment, New York, Institute of Electrical and Electronics Engineers, 1990, p.556-561, 4 refs.
DLC TC1657.O25 1990

Telemetering equipment, Data transmission, Drift stations, Weather stations, Meteorological instruments, Underwater acoustics

49-1018

Hydrographic probe developed to obtain marine survey data from the ice.

Kaustinen, O.M., Duggan, L.A., Lanziner, H.H., Offshore Mechanics, Arctic Engineering, Deepsea Systems Symposium, 1st, New Orleans, Mar. 7-10, 1982. Proceedings. Vol.2. Edited by J.S. Chung and J.W. Galate, New York, American Society of Mechanical Engineers, 1982, p.229-236.
DLC TC1505.O345 1982

Gas pipelines, Route surveys, Subglacial observations, Echo sounding, Bottom topography, Ocean bottom, Pipe laying, Canada

49-1019

Assessment of iceberg recurrence intervals in the Grand Banks.

Miller, J.D., Offshore Mechanics, Arctic Engineering, Deepsea Systems Symposium, 1st, New Orleans, Mar. 7-10, 1982. Proceedings. Vol.2. Edited by J.S. Chung and J.W. Galate, New York, American Society of Mechanical Engineers, 1982, p.237-242, 5 refs.
DLC TC1505.O345 1982

Icebergs, Ice forecasting, Drift, Statistical analysis, Canada—Newfoundland—Grand Banks

49-1020

Ice forces on offshore structures.

Karr, D.G., Das, S.C., Offshore Mechanics, Arctic Engineering, Deepsea Systems Symposium, 1st, New Orleans, Mar. 7-10, 1982. Proceedings. Vol.2. Edited by J.S. Chung and J.W. Galate, New York, American Society of Mechanical Engineers, 1982, p.249-257, 83 refs.
DLC TC1505.O345 1982

Ice solid interface, Ice loads, Ice pressure, Ice cover strength, Ice deformation, Offshore structures, Mathematical models

49-1021

Solar assisted culvert thawing device.

Zarling, J.P., Miller, F.A., Offshore Mechanics, Arctic Engineering, Deepsea Systems Symposium, 1st, New Orleans, Mar. 7-10, 1982. Proceedings. Vol.2. Edited by J.S. Chung and J.W. Galate, New York, American Society of Mechanical Engineers, 1982, p.265-270, 7 refs.

DLC TC1505.O345 1982

Culverts, Road maintenance, Road icing, Ice melting, Ice prevention, Artificial melting, Artificial thawing, Solar radiation

49-1022

Using time domain reflectometry to measure frost depth and unfrozen water content in soil.

Mulla, D.J., *Washington Water Research Center. Report,* June 1985, No.64, 80p., PB86-157419, 14 refs.

Frost penetration, Frozen ground temperature, Soil water, Unfrozen water content

49-1023

Northwest arctic coal development combustion technology study. Orville, OH, Energy and Environmental Research Corporation, May 1994, 2 vols. (Pertinent, Vol.1, p.1/1-1/32).

Coal, Electric power, Cost analysis, United States—Alaska

49-1024

National winter storms operations plan. *U.S. National Oceanic and Atmospheric Administration. Federal Coordinator for Meteorological Services and Supporting Research. Report,* Oct. 1994, FCM-P13-1994, Var. p.

Snowstorms, Ice storms, Weather forecasting, Marine meteorology

49-1025

Glacial deposits, their electrical properties and surveying by image interpretation and ground penetrating radar.

Sutinen, R., *Finland. Geological Survey. Bulletin,* 1992, No.359, 123p., Refs. p.117-123.

DLC QE697.S96 1992

Glacial deposits, Moraines, Outwash, Quaternary deposits, Soil surveys, Soil mapping, Stratigraphy, Paleoclimatology, Subsurface investigations, Electromagnetic prospecting, Finland, United States—Wisconsin, United States—Alaska—Glacier Bay

49-1026

Rapid stabilization of thawing soils.

Kestler, M.A., Henry, K.S., Shoop, S.A., MP 3501, 17th annual meeting, Corvallis, OR, July 24-29, 1994. Proceedings. Advanced technology in forest operations: applied ecology in action, Corvallis, Council on Forest Engineering, 1994, p.291-306, 29 refs.

Ground thawing, Thaw weakening, Soil trafficability, Soil stabilization, Geotextiles

While seasonally frozen soils undergoing thawing must be able to support the loads imposed by both civilian and military equipment and vehicles, at present the US Army lacks a procedure for addressing methods of handling thaw-induced immobilization. In response to this lack of guidance, the US Army Corps of Engineers Cold Regions Research and Engineering Laboratory (USA CRREL) recently commenced a study to assess a variety of environmentally safe chemical and mechanical stabilization techniques. The stabilized surface must be capable of supporting both wheeled and tracked transport of materials, supplies, and personnel and must withstand at least limited repeated traffic. Additional criteria include simplicity of construction, expediency, material availability, and economics. The research project is being conducted in phases over a period of two or three years. This paper focuses on Phase I, a review of current stabilization practices used by forestry industries and/or tested by the military or USDA Forest Service. It discusses a variety of mechanical and chemical stabilization techniques including debris mat/slash, wooden mats, chuckwood, tire mats, grating, military aircraft landing mats, geogrids, geotextiles, geocells, and chemical admixtures. Future phases, including plans for the development of a demonstration project, are also discussed briefly.

49-1027

Response of natural snow to explosive shock waves.

Solie, D.J., Johnson, J.B., Barrett, S.A., MP 3502, Joint AIRAPT/APS Topical Group on Shock Compression of Condensed Matter Conference, Colorado Springs, CO, June 28-July 2, 1993. Proceedings. High-pressure science and technology-1993, New York, American Institute of Physics, 1994, p.1139-1142, 9 refs.

Snow strength, Snow compression, Snow cover effect, Shock waves, Detonation waves, Blasting, Explosion effects, Attenuation

Field measurements of shock waves in snow with initial densities from 100 kg/m^3 to 555 kg/m^3 were made in situ in a natural snow cover. A high amplitude, short duration, uniaxial shock impulse (about 0.6 GPa for 10 microseconds) was imparted to the snow using sheet explosive, and the shock arrival time and stress histories were measured at depth in the snow. For dry snow (po=250 +/- 30 kg/m^3), the shock velocity can be described by a power law and decays rapidly with depth, from over 1000 m/s near the snow/explosive interface to 120 +/- 20 m/s at 0.20 m. The shock stress attenuation factor at a propagation depth of 0.20 m is about 4 x 10^{-3}. Tests in which explosive gases were excluded from the snow had higher shock velocities and pressures than tests where the gases penetrated the snow.

49-1028

Experimental technique for studying shock propagation in large-scale samples of snow and other highly-porous materials.

Erlich, D.C., Curran, D.R., Joint AIRAPT/APS Topical Group on Shock Compression of Condensed Matter Conference, Colorado Springs, CO, June 28-July 2, 1993. Proceedings. High-pressure science and technology-1993, New York, American Institute of Physics, 1994, p.1135-1138, 8 refs.

Snow strength, Snow compression, Snow cover effect, Shock waves, Attenuation

49-1029

Evaluation procedures for deicing chemicals and improved sodium chloride.

Chappelow, C.C., et al, *U.S. Strategic Highway Research Program. Report,* June 1993, SHRP-H-647, Var. p., PB94-189495, Refs. passim.

Road icing, Road maintenance, Chemical ice prevention, Salting, Environmental impact

49-1030

Annual report 1993.

Danish Polar Center, Copenhagen, 1994, 40p., 33 refs.

Organizations, Research projects

49-1031

Observations on ice navigation performance of ships in the Baltic in winter 1994.

Lehtinen, P., *Helsinki University of Technology. Arctic Offshore Research Centre. Report,* 1994, M-187, 35p. + appends., 4 refs.

Ice navigation, Ice routing, Ice conditions, Baltic Sea

49-1032

Ship in compressive ice: results of model scale tests to study pile-up process of ice. Report from the joint Finnish-Russian research project.

Kujala, P., Ralph, S., *Helsinki University of Technology. Ship Laboratory. Report,* 1994, M-191, 56p., 3 refs.

Ice solid interface, Ice loads, Metal ice friction, Ice pressure, Ice navigation, Ice cover strength, Ice pileup, Ships, Environmental tests

49-1033

Description of ice conditions along the North-East Passage.

Riska, K., Salmela, O., *Helsinki University of Technology. Arctic Offshore Research Centre. Memorandum,* 1994, M-192, 26p. + appends., 33 refs.

Ice navigation, Ice routing, Ice conditions, Ice surveys, Sea ice distribution, Route surveys, Northern Sea Route

49-1034

Correction.

Parker, L.V., MP 3503, *Ground water monitoring & remediation,* 1994, 14(3), p.275, 4 refs.

Ground water, Well casings, Sampling, Bibliographies, Accuracy

49-1035

Winter traction testing.

Shoop, S.A., Young, B., Alger, R., Davis, J., MP 3504, *Automotive engineering,* Jan. 1994, 102(1), p.75-78.

Tires, Mechanical tests, Cold weather tests, Test equipment, Traction, Rubber snow friction, Rubber ice friction, Skid resistance, Correlation, Standards

49-1036

Techniques for controlling ice at dams and hydroplants.

Haynes, F.D., MP 3505, *Hydro review,* Oct. 1994, 13(6), p.86-88.

Dams, Electric power, Water intakes, River ice, Ice control, Ice melting, Hydraulic jets, Heat sources, Design, Cold weather tests

49-1037

Effects of ground water sampling devices on water quality: a literature review.

Parker, L.V., MP 3506, *Ground water monitoring & remediation,* 1994, 14(2), p.130-141, 46 refs.

Ground water, Water pollution, Environmental tests, Sampling, Samplers, Performance, Accuracy, Impurities

This paper reviews both field and laboratory studies that tested or compared the ability of various types of sampling devices to deliver representative ground water samples. Several types of grab samplers, positive displacement devices, and suction-lift devices were evaluated. Gas-lift and inertial-lift pumps were also evaluated. This study found that most of these devices can, under certain circumstances, alter the chemistry of ground water samples. Gas-lift pumps, older types of submersible centrifugal pumps, and suction-lift devices are not recommended when sampling for sensitive constituents such as volatile organics and inorganics, or inorganics that are subject to oxidation/precipitation reactions. In general, of the devices reviewed in this paper, bladder pumps gave the best recovery of sensitive constituents. However, better performance could be achieved for several devices if improved operational guidelines were developed by additional testing, especially at lower flow rates.

49-1038

Effect of concentration on sorption and dissolved organics by PVC, PTFE, and stainless steel well casings.

Parker, L.V., Ranney, T.A., MP 3507, *Ground water monitoring & remediation,* 1994, 14(3), p.139-149, 25 refs.

Ground water, Water pollution, Sampling, Accuracy, Environmental tests, Well casings, Absorption, Steels, Polymers, Chemical analysis

This report examines sorption of low ppb levels of organic solutions by polytetrafluoroethylene (PTFE), rigid polyvinyl chloride (PVC), and stainless steel 304 and 316 well casings. Nineteen organics were selected, including several munitions and chlorinated solvents. Compounds were selected to offer a range of physical properties, such as solubility in water, octanol/water partition coefficient, and molecular structure. When these results were compared with the results from a similar study conducted at ppm levels, the rate and extent of sorption by PTFE and PVC were the same as seen previously for almost all analytes. There were no losses of any compounds associated with stainless steel. At these low levels (ppm and ppb), the rate of diffusion within the polymer (PVC and PTFE) is independent of concentration. Only with PTFE are the rates rapid enough to be of concern when monitoring for some contaminants in ground water. Tetrachloroethylene was the compound PTFE sorbed the most rapidly. The study showed the PVC well casings are suitable for monitoring low levels (ppm and ppb) of organics.

49-1039

Volcanic mixed avalanches: a distinct eruption-triggered mass-flow process at snow-clad volcanoes.

Pierson, T.C., Janda, R.J., *Geological Society of America. Bulletin,* Oct. 1994, 106(10), p.1351-1358, 31 refs.

Volcanoes, Magma, Mass flow, Avalanche triggering, Avalanche deposits, Avalanche mechanics, Rocks, Sedimentation, Snow cover stability, Periglacial processes

49-1040

Influence of climate change on the productivity of Scots pine, Norway spruce, Pendula birch and Pubescent birch in southern and northern Finland.

Kellomäki, S., Kolström, M., *Forest ecology and management,* June 1994, 6(2-3), p.201-217, 33 refs.

Forest ecosystems, Plant ecology, Trees (plants), Subarctic landscapes, Growth, Climatic changes, Global warming, Temperature effects, Simulation, Mathematical models, Finland

49-1041
Some physical factors affecting contaminant hydrology in cold environments.
Grant, S.A., MP 3508, *Transportation research record,* 1994, No.1434, p.61-69, 13 refs.
Soil pollution, Water pollution, Hydrology, Temperature effects, Subpermafrost ground water, Water transport, Soil water migration, Snow cover effect, Frozen ground chemistry, Frozen ground thermodynamics, Mathematical models
Some of the physical effects of cold temperatures that should be considered when developing a contaminant-transport model are surveyed in this paper. The discussion begins with the following working definition of the term cold region for the purpose of contaminant hydrology modeling: an area with appreciable frozen ground and a substantial fraction of the annual precipitation as snow. Models that estimate the liquid water content and hydraulic conductivity of frozen ground are discussed.

49-1042
Freeze protection assessment at Rocky Flats.
U.S. Department of Energy. Office of the Assistant Secretary for Defense Programs, Washington, D.C., Jan. 1992, 19p. + append., DOE/DP-0096T.
Nuclear power, Cold weather operation, Winter maintenance, Freezing, Countermeasures, Frost protection

49-1043
Glacier Lakes Ecosystem Experiments Site.
Musselman, R.C., et al, *U.S. Department of Agriculture. Forest Service. Rocky Mountain Forest and Range Experiment Station. General technical report,* July 1994, RM-249, 94p., Var. refs.
Watersheds, Forest ecosystems, Research projects, Plant ecology, Vegetation patterns, Alpine landscapes, Air pollution, Snow cover effect, Environmental impact, Environmental tests, United States—Wyoming—Snow Range

49-1044
Tillage of compacted haul roads and landings in the boreal forests of Alberta, Canada.
McNabb, D.H., *Forest ecology and management,* July 1994, 66(1-3), p.179-194, 27 refs.
Forest ecology, Revegetation, Roads, Forest soils, Soil physics, Soil texture, Soil compaction, Countermeasures, Fracturing, Frost action, Canada—Alberta

49-1045
Bud demography of the mountain birch *Betula pubescens* ssp. *tortuosa* near tree line.
Lehtilä, K., Tuomi, J., Sulkinoja, M., *Ecology,* June 1994, 75(4), p.945-955, 50 refs.
Forest ecology, Subarctic landscapes, Trees (plants), Growth, Plant ecology, Plant physiology, Forest lines

49-1046
Effects of interannual climate variation on aboveground phytomass in alpine vegetation.
Walker, M.D., Webber, P.J., Arnold, E.H., Ebert-May, D., *Ecology,* Mar. 1994, 75(3), p.393-408, 62 refs.
Alpine landscapes, Alpine tundra, Plant ecology, Biomass, Growth, Climatic changes, Seasonal variations, Snow cover effect, Snowmelt, Soil water, Degree days, United States—Colorado—Niwot Ridge

49-1047
Induced freezing of supercooled water into ice by self-assembled crystalline monolayers of amphiphilic alcohols at the air-water interface.
Popovitz-Biro, R., et al, *America Chemical Society. Journal,* Feb. 23, 1994, 116(4), p.1179-1191, 49 refs.
Ice physics, Phase transformations, Supercooling, Ice formation, Heterogeneous nucleation, Hydrocarbons, Molecular structure, Monomolecular films, Freezing points, X ray diffraction

49-1048
Simulation of gas-condensate well blowout under permafrost conditions.
Astrakhan, I.M., et al, *Fluid dynamics,* Nov. 1994, 29(3), p.380-385, Translated from Izvestiia Rossiiskoĭ Akademiĭ nauk, Mekhanika zhidkosti i gaza. 9 refs.
Gas wells, Shafts (excavations), Fluid flow, Fluid dynamics, Frozen rock temperature, Permafrost transformation, Frozen ground thermodynamics, Ground thawing, Heat transfer, Mathematical models

49-1049
Role of scientific assessments on climate change and ozone depletion for negotiations of international agreements.
Isaksen, I.S.A., *International challenges,* 1993, 13(2), p.76-84.
Ozone, Climatic changes, International cooperation, Greenhouse effect
Scientists agree that the dramatic reduction in ozone observed over Antarctica this last decade is man-induced. It can be attributed to the increasing use of CFCs and bromine (halons) compounds throughout the seventies and eighties. The Montreal Protocol on global reductions of emissions of ozone-depleting substances (ODS) has led to pronounced reductions in ODS. However, measures to reduce man-made climate impact, particularly reductions of CO_2 emissions, will have far-reaching political consequences, and hence economic consequences for society. Political considerations therefore play a significant role in the negotiations on measures to reduce greenhouse gas emissions, and are making it harder to reach an agreement than in the successful negotiations on reductions of ODS.

49-1050
Retrieval of ozone profiles over Antarctica using laser heterodyne system.
Jain, S.L., *Indian journal of radio and space physics,* Apr. 1992, 21(2), p.110-115, 31 refs.
DLC QC801.I42
Ozone, Meteorological data, Data processing, Antarctica—McMurdo Station
A retrieval technique developed and tested to obtain vertical profiles of ozone from laser heterodyne system measurements using inversion technique, based on inverse solution of radiative transfer equation for antarctic environmental conditions, is discussed. The inverse technique was tested using actual vertical profiles of ozone obtained on Aug. 23, 1989 and Oct. 20, 1989 at McMurdo Station. The ozone absorption line selected is 1043.1175/cm, which is near the P(24) line of a CO_2 laser in the 9.6 micron band. Various line parameters, such as half-width, line strength, low energy level, etc. were computed using the AFGL HITRAN database, 1986. In all, 16 frequency channels were selected and spectral intensity for each channel was computed using O_3 profiles obtained at McMurdo. An initial guess profile was assumed and, corresponding to this profile, the spectral intensity of each channel was computed and compared with those obtained by actual profiles. The initial guess profile was modified until the two sets of spectral intensities matched each other. The retrieval profiles compare well with the actual O_3 profiles. (Auth. mod.)

49-1051
Ice sheet retreat from the Antarctic Peninsula shelf.
Pudsey, C.J., Barker, P.F., Larter, R.D., *Continental shelf research,* Dec. 1994, 14(15), p.1647-1675, 62 refs.
Ice sheets, Pleistocene, Grounded ice, Glacier oscillation, Sediment transport, Bottom sediment, Sampling, Marine deposits, Radioactive age determination, Ice solid interface, Glacial erosion, Antarctica—Antarctic Peninsula
Side-scan sonar and sub-bottom acoustic profiler data and sediment cores reveal the processes that controlled sediment transport and deposition on the continental shelf of the Antarctic Peninsula Pacific margin off Anvers I., during deglaciation over the last 11,000 years or more. Glacial flutes and striations mark the flow of low-profile ice streams draining the interior, across the middle and outer shelf. Most probably, ice sheets were grounded to the continental shelf edge along this margin during the last glacial maximum. Iceberg furrows overwrite the ice sheet record in areas between 500 and 350 m water depth, and reflect calving from a retreating ice shelf front. Cores show open marine sedimentation replacing diamicton deposition close to the grounding line during this retreat, which rapidly cleared the outer and middle shelf shortly before 11,000 years BP (from AMS ^{14}C dates on organic carbon). The shallower, scoured and largely sediment-free inner shelf cleared later, probably before 6000 years BP. (Auth. mod.)

49-1052
Halocarbons in antarctic surface waters.
Zoccolillo, L., Rellori, M., *International journal of environmental and analytical chemistry,* 1994, Vol.55, p.27-32, 2 refs.
Environmental tests, Surface waters, Water pollution, Sampling, Glacier ice, Meltwater, Hydrocarbons
Surface water samples taken during the 1988-89, 1989-90 and 1990-91 Italian antarctic expeditions were analyzed for the presence of carbon tetrachloride, trichloroethylene and tetrachloroethylene. The sample analysis was carried out by solvent extraction and capillary GC-ECD-MS determination. The above-mentioned halocarbons were at ng/l levels in all water samples investigated. (Auth. mod.)

49-1053
Organic compounds in surface and deep antarctic snow.
Desideri, P.G., Lepri, L., Checchini, L., Santianni, D., *International journal of environmental and analytical chemistry,* 1994, Vol.55, p.33-46, 11 refs.
Snow surveys, Snow composition, Sampling, Hydrocarbons, Snow impurities, Air pollution, Snow air interface, Environmental tests
Eight surface snow samples taken during the 1987-88, 1988-89 and 1990-91 Italian antarctic expeditions and six samples collected at different depths from two dissimilar sites during the 1990-91 expeditions were analyzed for the non-chlorinated organic content using the GC capillary columns technique and GC-MS. Several biogenic and anthropogenic classes of organic compounds were identified and quantitatively determined. The data obtained give a more complete picture of the pollution level in Antarctica. (Auth.)

49-1054
Pattern of annual snow accumulation along a west Greenland flow line: no significant change observed during recent decades.
Anklin, M., Stauffer, B., Geis, K., Wagenbach, D., *Tellus,* Sep. 1994, 46B(4), p.294-303, 25 refs.
Ice sheets, Snow surveys, Snow accumulation, Snow water equivalent, Snow stratigraphy, Firn, Sampling, Seasonal variations, Glacier mass balance, Greenland

49-1055
Snow chemistry of high altitude glaciers in the French Alps.
Maupetit, F., Delmas, R.J., *Tellus,* Sep. 1994, 46B(4), p.304-324, 64 refs.
Alpine glaciation, Mountain glaciers, Snow composition, Sampling, Snow impurities, Dust, Chemical properties, Ion density (concentration), Seasonal variations, Atmospheric circulation, Dusting, France—Alps

49-1056
Structural geology of a surge-type glacier.
Lawson, W.J., Sharp, M.J., Hambrey, M.J., *Journal of structural geology,* Oct. 1994, 16(10), p.1447-1462, 43 refs.
Glacier flow, Glacier surges, Ice mechanics, Ice deformation, Ice structure, Structural changes, Crevasses, Geologic structures, Geologic processes, Tectonics, Correlation, United States—Alaska—Variegated Glacier

49-1057
Measurement of ice accretion using ultrasonic pulse-echo techniques.
Hansman, R.J., Jr., Kirby, M.S., *Journal of aircraft,* June 1985, 22(6), p.530-535, 5 refs.
Aircraft icing, Ice detection, Ice accretion, Ice cover thickness, Ice acoustics, Ultrasonic tests, Acoustic measurement, Sound waves, Reflectivity

49-1058
Signal and noise in four ice-core records from the Agassiz Ice Cap, Ellesmere Island, Canada: details of the last millennium for stable isotopes, melt and solid conductivity.
Fisher, D.A., Koerner, R.M., *Holocene,* 1994, 4(2), p.113-120, 21 refs.
Glaciology, Ice sheets, Ice cores, Snow stratigraphy, Isotope analysis, Snowmelt, Regelation, Snow erosion, Wind factors, Correlation, Periodic variations, Canada—Northwest Territories—Ellesmere Island

49-1059
Tracer release in melting snow: diurnal and seasonal patterns.
Bales, R.C., Davis, R.E., Williams, M.W., *Hydrological processes,* Oct.-Dec. 1993, 7(4), p.389-401, 22 refs.
Snow hydrology, Snowmelt, Meltwater, Ion diffusion, Seasonal variations, Diurnal variations, Chemical analysis, Ion density (concentration), Alpine landscapes, Hydrogeochemistry

49-1060
Till fabric associated with deformable beds.
Hart, J.K., *Earth surface processes and landforms,* Feb. 1994, 19(1), p.15-32, 57 refs.
Glacial geology, Glacier flow, Glacier beds, Glacial deposits, Subglacial observations, Deformation, Shear strain, Sedimentation, Soil texture, Ice solid interface

49-1061
Hydrochemistry of carbonate terrains in alpine glacial settings.
Fairchild, I.J., Bradby, L., Sharp, M.J., Tison, J.L., *Earth surface processes and landforms,* Feb. 1994, 19(1), p.33-54, 38 refs.
Alpine glaciation, Glacial hydrology, Glacial geology, Glacier melting, Bedrock, Weathering, Hydrogeochemistry, Solubility

49-1062
Dielectric spectra of fresh cement paste below freezing point using an insulated electrode.
Yoon, S.S., Kim, S.Y., Kim, H.C., *Journal of materials science,* Apr. 1, 1994, 29(7), p.1910-1914, 19 refs.
Cement admixtures, Freezing, Polarization (charge separation), Dielectric properties, Electrical resistivity, Low temperature tests, Electrical measurement, Temperature effects, Spectra

49-1063
Impacts of spatially and temporally varying snowmelt on subsurface flow in a mountainous watershed: 1. Snowmelt simulation.
Flerchinger, G.N., Cooley, K.R., Deng, Y., *Hydrological sciences journal,* Oct. 1994, 39(5), p.507-520, With French summary. 25 refs.
Snow hydrology, Snowmelt, Watersheds, Ground water, Subsurface drainage, Water flow, Periodic variations, Simulation, Heat balance

49-1064
Impacts of spatially and temporally varying snowmelt on subsurface flow in a mountainous watershed: 2. Subsurface processes.
Deng, Y., Flerchinger, G.N., Cooley, K.R., *Hydrological sciences journal,* Oct. 1994, 39(5), p.521-533, With French summary. 14 refs.
Snow hydrology, Hydrogeology, Watersheds, Snowmelt, Seepage, Subsurface drainage, Ground water, Water level, Water flow, Simulation, Periodic variations

49-1065
Role of the thermohaline circulation in the abrupt warming after Heinrich events.
Paillard, D., Labeyrie, L., *Nature,* Nov. 10, 1994, 372(6502), p.162-164, 23 refs.
Ocean currents, Climatic changes, Ice cores, Salinity, Icebergs, Models

49-1066
Transient nature of CO_2 fertilization in Arctic tundra.
Oechel, W.C., et al, *Nature,* Oct. 6, 1994, 371(6497), p.500-502, 58 refs.
Carbon dioxide, Tundra, United States—Alaska—Toolik Lake

49-1067
Climate variations in Europe over the past 140 kyr deduced from rock magnetism.
Thouveny, N., et al, *Nature,* Oct. 6, 1994, 371(6497), p.503-506, 34 refs.
Climatic changes, Rock magnetism, Ice cores

49-1068
High abundance of Archea in antarctic marine picoplankton.
DeLong, E.F., Wu, K.Y., Prézelin, B.B., Jovine, R.V.M., *Nature,* Oct. 20, 1994, 371(6499), p.695-697, 24 refs.
Marine biology, Plankton, Microbiology, Sea ice, Antarctica—Arthur Harbor
Archaea (archaebacteria) constitute one of the three major evolutionary lineages of life on Earth. Recently, novel (uncultivated) phylotypes of Archaea have been detected in coastal and subsurface marine waters, but their abundance, distribution, physiology and ecology remain largely undescribed. Reported here is the exceptionally high archaeal abundance in frigid marine surface waters of Antarctica. Pelagic Archaea constituted up to 34% of the prokaryotic biomass in coastal antarctic surface waters, and they were also abundant in a variety of other cold, pelagic marine environments. Because they can make up a significant fraction of picoplankton biomass in the vast habitats encompassed by cold and deep marine waters, these pelagic Archaea represent an unexpectedly abundant component of the Earth's biota. (Auth. mod.)

49-1069
Autumn bloom of antarctic pack ice algae.
Fritsen, C.H., Lytle, V.I., Ackley, S.F., Sullivan, C.W., MP 3512, *Science,* Nov. 4, 1994, 266(5186), p.782-784, 26 refs.
Sea ice, Algae, Sea water, Chemical composition, Nutrient cycle, Antarctica—Weddell Sea
An autumn bloom of sea-ice algae was observed from Feb. to June of 1992 within the upper 0.4 m of multiyear ice in the western Weddell Sea. The bloom was reliant on the freezing of porous areas within the ice that initiated a vertical exchange of nutrient-depleted brine with nutrient-rich seawater. This replenishment of nutrients to the algal community allowed the net production of 1760 mg of carbon and 200 mg of nitrogen per sq m of ice. The location of this autumn bloom is unlike that of spring blooms previously observed in both polar regions. (Auth.)

49-1070
***Synedropsis* gen.nov., a genus of araphid diatoms associated with sea ice.**
Hasle, G.R., Medlin, L.K., Syvertsen, E.E., *Phycologia,* July 1994, 33(4), p.248-270, 40 refs.
Algae, Plankton, Sea ice, Microbiology, Antarctica—Weddell Sea, Antarctica—Ross Sea
A new araphid diatom genus, *Synedropsis* Hasle, Medlin et Syvertsen, is described from sea ice. The generitype, *Synedropsis hyperborea* (Grunow) Hasle, Medlin et Syvertsen from the Arctic was first described as a species of *Synedra,* as was the antarctic *Synedropsis fragilis* (Manguin) Hasle, Syvertsen et Medlin. A second antarctic species of *Synedropsis* is a new combination of *Cymatosira laevis* Heiden in Heiden & Kolbe. In addition four new taxa, *S. hyperboreoides* Hasle, Syvertsen et Medlin, *S. recta* Hasle, Medlin et Syvertsen, *S. lata* Hasle, Medlin et Syvertsen and *S. lata* var. *angustata* Hasle, Medlin et Syvertsen are described from the Antarctic. The valve wall is laminar with uniseriate, often poorly developed striae and a wide sternum. Each valve possesses apical fields composed of slits. A labiate process is positioned near one apical slit field. The valve outline for most species exhibits considerable stadial variation. The girdle has several bands, most with one row of poroids close to the pars interior. Thus *Synedropsis* is closely related to the marine *Fragilaria striatula* Lyngbye except in the structure of the apical fields and the number of bands. (Auth. mod.)

49-1071
PORSEC '92.
Conference for Pacific Ocean Environments and Probing, Okinawa, Aug. 25-31, 1992, Shimizu, Shizuoka, Japan, PORSEC (Pacific Ocean Remote Sensing Conference) Secretariat, 1992, 1292p. (2 vols.), Refs. passim. For selected papers see 49-1072 through 49-1080, or F-51474, F-51476, F-51477, J-51473 and J-51475.
DLC GC771.C66 1992
Oceanographic surveys, Ocean currents, Water transport, Ice surveys, Sea ice distribution, Ice conditions
This is the first of a series of conferences on satellite remote sensing of the Pacific Ocean. Some 200 papers were presented, and though most deal with low or mid latitudes or with the Pacific as a whole, five deal with the Arctic, and five are pertinent to Antarctica. Those pertinent to Antarctica deal with chlorophyll distribution, satellite radiometer observations of sea ice, deep convection in the Weddell Sea, disintegration of the Shirase Glacier tongue, and an ice forecasting data center.

49-1072
Ocean-ice interaction study of waves and mesoscale features.
Liu, A.K., Peng, C.Y., Conference for Pacific Ocean Environments and Probing, Okinawa, Aug. 25-31, 1992. PORSEC '92. Proceedings. Vol.1, Shimizu, Shizuoka, Japan, PORSEC (Pacific Ocean Remote Sensing Conference) Secretariat, 1992, p.237-242, 7 refs.
Ice water interface, Ice edge, Ice surveys, Oceanographic surveys, Ocean waves, Ocean currents, Synthetic aperture radar, Spaceborne photography

49-1073
Pacific rim sea ice as observed with the Nimbus-7 SMMR.
Gloersen, P., Campbell, W.J., Cavalieri, D.J., Comiso, J.C., Parkinson, C.L., Zwally, H.J., Conference for Pacific Ocean Environments and Probing, Okinawa, Aug. 25-31, 1992. PORSEC '92. Proceedings. Vol.2, Shimizu, Shizuoka, Japan, PORSEC (Pacific Ocean Remote Sensing Conference) Secretariat, 1992, p.639-644, 1 ref.
Ice surveys, Sea ice distribution, Ice conditions, Radiometry, Spaceborne photography
Data collected by the Scanning Multi-channel Microwave Radiometer (SMMR) on the Nimbus-7 spacecraft have been analyzed to provide spatial and temporal coverage of sea ice in the polar regions from Oct. 28, 1978 through Aug. 20, 1987. The region selected includes the Seas of Japan and Okhotsk, as well as the Bering Sea and, in the South Pacific, the Amundsen, Bellingshausen, and Ross Seas. Monthly averages of the sea ice concentration in all of these seas are presented, as are time series of single-day records, obtained every other day on the average, of the area enclosed by the ice boundaries, the areal coverage of ocean by ice, and the open water area within the ice boundaries. Interannual variability and the 8.8-year trends are also described, as well as the contribution of the Pacific-rim regions to the overall negative trend of ice coverage in the Arctic, and the lack of trend in the Antarctic during this period.

49-1074
Numerical study of deep convection at high latitudes.
Akitomo, K., Awaji, T., Imasato, N., Conference for Pacific Ocean Environments and Probing, Okinawa, Aug. 25-31, 1992. PORSEC '92. Proceedings. Vol.2, Shimizu, Shizuoka, Japan, PORSEC (Pacific Ocean Remote Sensing Conference) Secretariat, 1992, p.645-650, 18 refs.
Ice water interface, Ice cover effect, Polynyas, Ocean currents, Water transport, Upwelling, Convection, Antarctica—Weddell Sea
Numerical experiments have been carried out to investigate the formation process and the properties of deep convection in the Weddell Sea. The thermobaric effect, i.e. the increase in value of the thermal expansion coefficient of sea water with pressure (depth) at low temperatures, makes the mixed layer unstable, and deep convection catastrophically occurs as a "thermal" plume. As the colder (less-saline) mixed-layer water intrudes into the warmer (more-saline) underlying layer, the thermocline (halocline) at the base of the mixed layer gradually ascends to disappear at the sea surface. It takes only a few days for the thermocline to disappear if the sea surface is not covered with ice. On the other hand, it takes more than 20 days owing to the reduction of cooling rate if the sea surface is covered with ice. The latter implies that the vertical transport of heat and materials will be modified in the interannual time scale by such a moderate overturning process.

49-1075
Ice studies in the Barents Sea by ERS-1 during SIZEX 92.
Sandven, S., Johannessen, O.M., Conference for Pacific Ocean Environments and Probing, Okinawa, Aug. 25-31, 1992. PORSEC '92. Proceedings. Vol.2, Shimizu, Shizuoka, Japan, PORSEC (Pacific Ocean Remote Sensing Conference) Secretariat, 1992, p.651-657, 10 refs.
Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Synthetic aperture radar, Spaceborne photography, Barents Sea

49-1076
Disintegrating ice front of Shirase Glacier, East Antarctica.
Nishio, F., Cho, K., Conference for Pacific Ocean Environments and Probing, Okinawa, Aug. 25-31, 1992. PORSEC '92. Proceedings. Vol.2, Shimizu, Shizuoka, Japan, PORSEC (Pacific Ocean Remote Sensing Conference) Secretariat, 1992, p.658-662, 8 refs. For another version see 48-1061 or 21F-49301.
Glacier surveys, Glacier tongues, Glacier oscillation, Glacier ablation, Antarctica—Shirase Glacier
At the mouth of the Shirase Glacier, a 15 km wide floating ice tongue extending 70 km to the north at its longest extent was recorded in 1961. At the grounding line the mean velocity is 2.5 km per year; the ice thickness is about 500 m and gradually decreases towards the front. The positions of the front of the ice tongue have been determined since 1957 by ground survey and recently by LANDSAT MSS and TM, and MOS-1 MESSR satellite images. Since 1957 the ice tongue has been disintegrating the ice front to the mouth of Shirase Glacier and at present there is no ice tongue evident in MOS-1 MESSR imagery obtained in Jan. 1990 and 1991 by the Multi-purpose Satellite Receiving System at Showa Station. Since 1957 the floating ice tongue has disintegrated three times: in the mid-1960s, 1980 and 1988. (Auth. mod.)

49-1077
Microwave radiometry of ice cover in polar regions.
Keshari, A.K., Singh, R.P., Rastogi, A., Conference for Pacific Ocean Environments and Probing, Okinawa, Aug. 25-31, 1992. PORSEC '92. Proceedings. Vol.2, Shimizu, Shizuoka, Japan, PORSEC (Pacific Ocean Remote Sensing Conference) Secretariat, 1992, p.663-668, 15 refs.
Ice surveys, Ice cover effect, Ice electrical properties, Dielectric properties, Radiometry, Microwaves

49-1078

Migration of operational ice analysis and forecasting to a workstation platform at the Joint Ice Center.

Warner, R.A., Kniskern, F.E., Conference for Pacific Ocean Environments and Probing, Okinawa, Aug. 25-31, 1992. PORSEC '92. Proceedings. Vol.2, Shimizu, Shizuoka, Japan, PORSEC (Pacific Ocean Remote Sensing Conference) Secretariat, 1992, p.727-730.

Ice surveys, Ice forecasting, Ice reporting, Computer applications, Data processing

The Joint Ice Center (JIC) is responsible for producing global, regional, and local ice analyses and forecasts for the Arctic, Antarctic, and the Great Lakes. Traditional hard copy/grease pencil methods of manual analysis have been the principal model of ice analysis until recently. The JIC now has a prototype Digital Ice Analysis and Forecast System (DIFAS-version 0) that has been used to demonstrate the applicability of computer science as a tool for the interactive production of ice analyses. This paper discusses the suite of products produced at the JIC, the interim use of manual drafting techniques blended with DIFAS-0, and the future plans for integration of interactive digital techniques as well as the computer systems necessary to meet these goals.

49-1079

Pacific Subarctic Frontal Zone: structure and dynamics.

Kil'matov, T.R., Kuz'min, V.A., Conference for Pacific Ocean Environments and Probing, Okinawa, Aug. 25-31, 1992. PORSEC '92. Proceedings. Vol.2, Shimizu, Shizuoka, Japan, PORSEC (Pacific Ocean Remote Sensing Conference) Secretariat, 1992, p.1095-1100, 3 refs.

Oceanographic surveys, Ocean currents, Water transport, Water temperature, Salinity

49-1080

Mesoscale dynamic structures of the Subarctic Frontal Zone in the Pacific Ocean.

Vasil'ev, A.S., Makashin, V.P., Conference for Pacific Ocean Environments and Probing, Okinawa, Aug. 25-31, 1992. PORSEC '92. Proceedings. Vol.2, Shimizu, Shizuoka, Japan, PORSEC (Pacific Ocean Remote Sensing Conference) Secretariat, 1992, p.1219-1224, 24 refs.

Oceanographic surveys, Ocean currents, Water transport, Water temperature, Salinity

49-1081

Proceedings.

Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993, *Annals of glaciology,* 1994, Vol.19, 168p., Refs. passim. For individual papers see 49-1082 through 49-1107.

Glaciology, Ice physics, Snow physics, Ice mechanics, Snow mechanics, Mechanical tests, Ice solid interface, Rheology, Mathematical models, Meetings

49-1082

Climatic influence on the composition of snow cover at Austre Okstindbreen, Norway, 1989 and 1990.

He, Y.Q., Theakstone, W.H., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.1-6, 6 refs.

Glacier surfaces, Snow composition, Snow stratigraphy, Chemical composition, Sampling, Isotope analysis, Air masses, Atmospheric circulation, Snow air interface, Snow impurities, Climatic factors, Norway—Okstindan

49-1083

Friction of melting ice.

Jones, S.J., Kitagawa, H., Izumiyama, K., Shimoda, H., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.7-12, 7 refs.

Glaciology, Ice friction, Ice melting, Meltwater, Mechanical tests, Metal ice friction, Plastics ice friction, Ice solid interface, Surface roughness, Sliding

49-1084

Elastic modulus of columnar-grain fresh-water ice.

Gold, L.W., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.13-18, 10 refs.

Ice mechanics, Ice elasticity, Elastic properties, Strain tests, Ice deformation, Ice cracks, Crack propagation, Stress concentration, Rheology, Temperature effects

49-1085

Error analysis of the techniques used in the measurement of high-speed friction on snow.

Colbeck, S.C., MP 3513, *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.19-24, 13 refs.

Plastics snow friction, Mechanical tests, Ice solid interface, Sliding, Measurement, Accuracy, Skis, Sleds, Design

Controlled tests are needed to find the coefficient of friction of snow as a function of speed. An error analysis shows how the test must be designed to give accurate answers. It seems necessary to use a remotely controlled, aerodynamical sled in place of a skier to get accurate results. Otherwise, two sets of tests are necessary, one to determine air drag versus speed and one to determine the frictional force versus speed, and even these tests would probably not give satisfactory results. The slope used for testing should be steep for a quick acceleration and then uniform, but not flat, where the actual measurements are taken. A continuously reading speed sensor is needed, not discrete measuring points. Even with the underlying principles understood, there will still be many practical problems to be solved before accurate results can be obtained.

49-1086

Two-dimensional analysis of ice ridging in the Beaufort Sea using aerial photography.

Lewis, J.E., et al, *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.25-32, 13 refs.

Sea ice, Ice surveys, Surface structure, Pressure ridges, Detection, Aerial surveys, Photointerpretation, Image processing, Computer programs, Beaufort Sea

49-1087

Preliminary observations of brittle compressive failure of columnar saline ice under triaxial loading.

Gratz, E.T., Schulson, E.M., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.33-38, 15 refs.

Sea ice, Salt ice, Ice mechanics, Ice strength, Strain tests, Loading, Brittleness, Compressive properties, Stress concentration, Cracking (fracturing)

49-1088

Mechanical properties of saline ice under uniaxial compression.

Kuehn, G.A., Schulson, E.M., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.39-48, 28 refs.

Sea ice, Salt ice, Ice strength, Strain tests, Phase transformations, Loading, Cracking (fracturing), Mechanical properties, Temperature effects

49-1089

Response of a seasonal snow cover to explosive loading.

Johnson, J.B., Solie, D.J., Barrett, S.A., MP 3514, *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.49-54, 17 refs.

Snow cover stability, Snow mechanics, Snow air interface, Explosives, Explosion effects, Shock waves, Sound waves, Wave propagation, Attenuation, Stresses

An explosive detonation in snow produces high intensity shock waves that are rapidly attenuated by momentum spreading as the snow is compacted. Experimental measurements and numerical calculations presented here indicate that the maximum shock-wave attenuation in seasonal snow (250 kg/m^3) is proportional to between x(sup -1.6) and x(sup -1.5) for plane waves and x^{-3} for spherical waves (x is the propagation distance). Outside the region of shock-compacted snow or in air over snow, stresses are transmitted as acoustic/seismic waves. Attenuation of these waves depends on snow permeability and the effective modulus of the ice frame and is proportional to about x(sup -0.7) for plane waves in seasonal snow and to about x^{-1} for spherical waves in air over seasonal snow. Increasing the scaled detonation height of an explosive up to 2 m kgf (sup -1/3) above a snow cover increases the far field (scaled distances greater than about 8 m kgf (sup -1/3)) snow surface pressures. Scaled detonation heights greater than about 2 m kgf (sup -1/3) have little additional effect.

49-1090

Transient creep of polycrystalline ice under uniaxial compression: an assessment of internal state variable models.

Meyssonnier, J., Goubert, A., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.55-62, 18 refs.

Ice mechanics, Ice strength, Ice deformation, Ice creep, Rheology, Loading, Strain tests, Ice solid interface, Ice models, Mathematical models

49-1091

Effects of microtopography on texture, temperature and heat flow in arctic and sub-arctic snow.

Sturm, M., Holmgren, J., MP 3515, *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.63-68, 25 refs.

Snow physics, Snow thermal properties, Tundra, Snow temperature, Soil temperature, Heat flux, Topographic effects, Microrelief, Ice solid interface, Temperature measurement

Arctic and sub-arctic snow is deposited on ground that can have significant microrelief due to tundra hummocks and tussocks. The microrelief, a substantial fraction of the total snow depth, causes basal layers of snow (usually depth hoar) to be discontinuous. In-situ measurements made at four locations in Alaska indicate lateral temperature gradients up to 60 C/m exist at the snow/ground interface due to the microtopography. For all sites, the winter average range of temperature along a 1.5 m transect at the interface varied from 4 C to greater than 7 C. Heat-flux transducers placed at the tops and bases of tussocks indicated that vertical heat flow was consistently 1.4 m to 2.1 times higher at the top than the base. Results of a conductive model based on tussock height are consistent with these measurements.

49-1092

Metamorphism of fine-grained snow due to surface curvature differences.

Brown, R.L., Edens, M.Q., Sato, A., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.69-76, 19 refs.

Metamorphism (snow), Snow physics, Snow crystal structure, Snow air interface, Microstructure, Grain size, Sintering, Mass transfer, Vapor transfer, Thermodynamics

49-1093

Snowfall series of Turin, 1784-1992: climatological analysis and action on structures.

Leporati, E., Mercalli, L., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.77-84, 20 refs.

Snowfall, Snow accumulation, Snow depth, Snow loads, Records (extremes), Roofs, Periodic variations, Statistical analysis, Climatology, Italy—Turin

49-1094

Isotopic and ionic changes in a snow cover at different altitudes: observations at Austre Okstindbreen in 1991.

Raben, P., Theakstone, W.H., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.85-91, 9 refs.

Glacial hydrology, Snow physics, Snow composition, Snowmelt, Chemical composition, Snow stratigraphy, Sampling, Isotope analysis, Ion density (concentration), Ion diffusion, Ice water interface, Norway—Austre Okstindbreen

49-1095

Snow dielectric properties from DC to microwave X-band.

Achammer, T., Denoth, A., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.92-96, 9 refs.

Snow physics, Snow electrical properties, Dielectric properties, Grain size, Porosity, Electrical measurement, Microwaves, Wave propagation, Spectra

49-1096

Characteristics of snow gliding on rock.

McClung, D.M., Walker, S., Golley, W., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.97-103, 12 refs.

Snow mechanics, Snow cover stability, Snow slides, Ice solid interface, Roofs, Stresses, Velocity measurement, Surface roughness, Diurnal variations, Seasonal variations

49-1097

Electronic device for long-term snow wetness recording.

Denoth, A., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.104-106, 5 refs.

Snow physics, Snow hydrology, Snow water content, Sensors, Electrical measurement, Electronic equipment, Recording instruments, Computer applications, Design

49-1098

Distributed snowmelt prediction model in mountain areas based on an energy balance method.

Ohta, T., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.107-113, 16 refs.

Snow hydrology, Watersheds, Snowmelt, Runoff, Forecasting, Topographic effects, Vegetation factors, Albedo, Radiation balance, Mathematical models

49-1099

Finite ice failure depth in penetration of a vertical indentor into an ice edge.

Kärnä, T., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.114-120, 24 refs.

Ice mechanics, Ice strength, Ice sheets, Ice solid interface, Ice edge, Dynamic loads, Cracking (fracturing), Penetration tests

49-1100

Ice charting based on multispectral satellite data in the Baltic Sea.

Golovko, V.A., et al, *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.121-125, 8 refs.

Sea ice distribution, Ice surveys, Ice conditions, Classifications, Spaceborne photography, Side looking radar, Radiometry, Sensor mapping, Image processing, Baltic Sea

49-1101

Melting characteristics of ice blocks immersed in quiescent saline water.

Fukusako, S., Yamada, M., Watanabe, C., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.126-130, 4 refs.

Glaciology, Glacier melting, Ice melting, Ice water interface, Salt water, Ice heat flux, Simulation, Temperature effects, Analysis (mathematics)

49-1102

Microcracking and shear fracture in ice.

Rist, M.A., Jones, S.J., Slade, T.D., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.131-137, 23 refs.

Ice mechanics, Ice strength, Shear strength, Cracking (fracturing), Ice microstructure, Mechanical tests, Ice solid interface, Ice deformation

49-1103

Bent icicles and spikes.

Maeno, N., Makkonen, L., Takahashi, T., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.138-140, 14 refs.

Ice physics, Ice growth, Icicles, Ice formation, Deformation, Ice air interface, Ice water interface, Wind factors

49-1104

Analytical model of icicle growth.

Szilder, K., Lozowski, E.P., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.141-145, 5 refs.

Ice physics, Icicles, Ice growth, Ice water interface, Ice heat flux, Mass balance, Mathematical models

49-1105

Investigations of discrepancies between laboratory studies of the flow of ice: density, sample shape and size, and grain-size.

Jacka, T.H., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.146-154, 30 refs.

Ice mechanics, Ice creep, Ice density, Ice deformation, Strain tests, Accuracy, Standards, Laboratory techniques

49-1106

Application of a new friction theory to ice and snow.

Makkonen, L., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.155-157, 13 refs.

Ice physics, Ice solid interface, Sliding, Ice friction, Surface roughness, Surface energy, Theories, Skis, Plastics snow friction

49-1107

Modelling of the ice-edge failure process with curved failure surfaces.

Kujala, P., *Annals of glaciology,* 1994, Vol.19, Symposium on Applied Ice and Snow Research, Rovaniemi, Finland, Apr. 18-23, 1993. Proceedings. Edited by S.J. Jones et al, p.158-164, 20 refs.

Ice mechanics, Ice sheets, Ice solid interface, Ice strength, Ice edge, Cracking (fracturing), Fracture zones, Stress concentration, Analysis (mathematics)

49-1108

ISSW '92. Merging of theory and practice.

International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992, Denver, Colorado Avalanche Information Center, [1992], 385p., Refs. passim. For selected papers see 49-1109 through 49-1151.

Snow surveys, Snow cover stability, Snow strength, Avalanches, Avalanche forecasting, Avalanche modeling, Avalanche triggering

49-1109

Micro- and macro-analyses of stratigraphic snow profiles.

Good, W., Krüsi, G., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.1-9, 7 refs.

Snow surveys, Snow stratigraphy, Snow cover structure, Snow optics, Snow cover stability, Microanalysis

49-1110

Sublimation of snow—the basics.

Schmidt, R.A., Gluns, D.R., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.11-17, 9 refs.

Snow evaporation, Snow air interface, Ice sublimation

49-1111

Friction of snow skis.

Colbeck, S.C., MP 3516, International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.18-27, 16 refs.

Skis, Plastics snow friction, Snow surface, Ice solid interface, Sliding, Water films

Snow friction results from a mixture of processes. Usually the snow and ski surfaces are partially separated by melt water, but when too much water is present, the contact area and friction increase. Ski thermal conductivity and color are very important. Heat is generated by friction and solar radiation absorption and is conducted away by both ski and ice particles. The remaining heat generates melt water, which acts as a lubricant. The important processes operate not at the air temperature, but at the ski base temperature, which is highly dependent on such things as snow-surface temperature, load, and speed.

49-1112

Measurements of snow temperature during rain.

Conway, H., Benedict, R., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.28-36, 12 refs. For another version see 47-1888.

Snow temperature, Snow hydrology, Wet snow, Snow permeability, Snow cover stability, Rain, Seepage, Thermistors

49-1113

Snow temperature patterns and artificial avalanche release.

Logan, N., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.37-46, 7 refs.

Snow temperature, Snow strength, Snow cover stability, Avalanche triggering, Avalanches, Accidents, United States—Colorado

49-1114

Aquatic ecology as a function of avalanche runout into an alpine lake.

Williams, M.W., Elder, K., Soiseth, C., Kattelmann, R., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.47-56, 29 refs.

Avalanche tracks, Avalanche deposits, Avalanche erosion, Snow cover effect, Lakes, Hydrogeochemistry, Ecology, United States—California—Sierra Nevada

49-1115

Study of wind drift snow phenomena on an Alpine site.

Guyomarc'h, G., Castelle, T., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.57-67, 8 refs.

Snow surveys, Snowdrifts, Snow erosion, Snow air interface, Avalanche forecasting, Wind factors, Photogrammetric surveys, France

49-1116

GAZ-EX avalanche control system.

Schippers, J., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.72-79.

Avalanche triggering, Blasting, Explosives

49-1117

User-friendly avalanche beacons.

Ramer, P., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.80-87.

Avalanches, Accidents, Rescue equipment, Radio beacons

49-1118

Fiber optic probe for indexing snowpack properties.

Sensoy, B., Decker, R., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.88-92, 8 refs.

Snow stratigraphy, Snow cover structure, Snow cover stability, Snow surveys, Snow optics, Avalanche forecasting

49-1119

Probability analysis of avalanche forecasting variables.

McClung, D.M., Tweedy, J., Weir, P., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.93-95, 5 refs.

Avalanche forecasting, Snow surveys, Snow cover stability, Statistical analysis, Canada—British Columbia

49-1120

MEPRA: an expert system for avalanche risk forecasting.

Giraud, G., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.97-104, 6 refs.

Avalanche forecasting, Avalanche modeling, Snow cover stability, Computerized simulation

49-1121

Computer applications for avalanche forecasting.

Tremper, B., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.105-115, 8 refs.

Avalanche forecasting, Avalanche modeling, Snow cover stability, Computer applications, Computer programs

49-1122

Computer graphics applications in avalanche forecasting.

Atkins, R., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.116-125, 3 refs.

Avalanche forecasting, Avalanche modeling, Snow cover stability, Computer applications

49-1123

Applications of classification tree methodology to avalanche data management and forecasting.

Davis, R.E., Elder, K., Bouzaglou, E., MP 3517, International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.126-133, 11 refs.

Avalanche forecasting, Avalanche modeling, Snow cover stability, Data processing, Computer applications, Statistical analysis, United States—California—Sierra Nevada

A common problem for avalanche-prone areas subject to forecasting and control responsibility is the identification of a set of critical meteorological parameters. While storm snowfall and snowfall intensity are generally accepted as among the most important, the complex interplay among terrain, wind, temperature, solar radiation and other meteorological variables makes identifying the next most important parameters difficult. Classification tree methodology is introduced as a potential tool for identifying critical meteorological parameters associated with avalanche and control activities. The application of this methodology is described in the context of exploring a subset of the Mammoth Mountain avalanche and meteorology database. The meteorological parameters most important to avalanche occurrence in two years of data were identified from a set of thirteen variables from one observation site. It is shown how this information could be used to provide inputs to forecasting programs and guidance in establishing observation priorities.

49-1124

Slab avalanche formation, new measurements and results.

Gubler, H., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.134-149, 14 refs.

Avalanche formation, Avalanche forecasting, Avalanche modeling, Snow strength, Snow cover stability

49-1125

Experience with rutschblocks.

Jamieson, J.B., Johnston, C.D., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.150-159, 5 refs. For another version see 47-1886.

Avalanche forecasting, Snow strength, Snow cover stability, Snow surveys, Snow samplers

49-1126

Characteristics of weak snow layers or interfaces.

Föhn, P.M.B., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.160-170, 10 refs.

Avalanche forecasting, Avalanche modeling, Snow strength, Snow cover stability, Snow surveys

49-1127

Experimental study on the mechanical behavior of a depth hoar layer under shear stress.

Fukuzawa, T., Narita, H., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.171-175, 5 refs.

Depth hoar, Snow deformation, Snow strength, Snow cover stability, Avalanche triggering, Avalanche mechanics

49-1128

Avalanche starting zones below the timber line—structure of forest.

Schneebeli, M., Meyer-Grass, M., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.176-181, 4 refs.

Avalanche triggering, Avalanche forecasting, Snow cover stability, Forest land, Vegetation patterns, Vegetation factors, Protective vegetation

49-1129

Installation design of the avalanche impact pylon facility; Alta, Utah.

Clayton, A., Decker, R., Richardson, C., Abe, O., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.182-190, 2 refs.

Avalanche engineering, Avalanche mechanics, Avalanche modeling, Snow loads, Pile load tests, Impact tests

49-1130

Ski area avalanche control: a summary of methods, procedures and manpower.

Heywood, L., Craig, C., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.191-204.

Avalanche triggering, Blasting, Safety, Rescue operations, Cost analysis

49-1131

Effects of explosives on the mountain snowpack.

Ueland, J., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.205-213, 2 refs. For another version see 47-2820.

Avalanche triggering, Blasting, Explosives, Detonation waves, Cost analysis

49-1132

Proposed avalanche control alternatives: Stanley avalanche, Berthoud Pass, Colorado.

Ueblacker, H., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.214-224, 10 refs.

Avalanche engineering, Avalanche triggering, Blasting, Snowsheds, Cost analysis, United States—Colorado

49-1133

New French avalanche map.

Borrel, G., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.225-228, 3 refs.

Avalanche forecasting, Snow cover stability, Maps, France

49-1134

Analysis of avalanche prediction from meteorological data at Berthoud Pass, Colorado.

Boyne, H.S., Williams, K., MP 3518, International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.229-235, 18 refs.

Avalanche forecasting, Avalanche modeling, Avalanche triggering, Snow cover stability, Meteorological factors, Data processing, Statistical analysis, United States—Colorado

In an attempt to identify the most critical meteorological parameters influencing the temporal behavior of avalanche release in a continental snowpack, the authors analyze a nineteen-year chronological record of meteorological measurements and avalanche occurrence at Berthoud Pass, CO, in a classification tree approach.

49-1135

Political dilemma of avalanche hazard zoning; a comparative analysis of four Sierra Nevada counties.

Penniman, D., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.236-245, 16 refs.

Avalanche forecasting, Safety, Regional planning, Legislation, United States—California—Sierra Nevada, United States—Nevada—Sierra Nevada

49-1136

East Riverside avalanche accident of 1992: engineering and snow-safety considerations.

Mears, A.I., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.246-257, 5 refs.

Avalanches, Avalanche forecasting, Avalanche engineering, Snowsheds, Accidents, Safety, Road maintenance, Cost analysis, United States—Colorado

49-1137

Traffic management for avalanche safety—Trans-Canada Highway, Rogers Pass, British Columbia.

Skjonsberg, D., Morrall, J., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.258-268, 8 refs.

Avalanche forecasting, Snow cover stability, Safety, Highway planning, Road maintenance, Canada—British Columbia—Glacier National Park

49-1138

What do ski mountaineers know about snow cover and avalanche formation—results of an inquiry.

Höller, P., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.270-275, 11 refs.

Avalanches, Accidents, Safety, Education, Austria

49-1139

Growth of avalanche education in Japan.

Nitta, R., Ziskin, C., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.276-284, 7 refs. For another version see 48-3277.

Avalanches, Accidents, Safety, Education, Japan

49-1140

Avalanche risk forecasting organisation during the winter Olympic games of Albertville (France).

Giraud, G., Pahaut, E., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.285-294, 4 refs.

Avalanche forecasting, Snow cover stability, Safety, Data processing, France

49-1141

Measurement of snow hardness in snow pits using a resistometer.

Birkeland, K.W., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.296-298, 2 refs.

Snow hardness, Snow strength, Snow cover stability, Snow survey tools, Hardness tests

49-1142

Detection and registration of water waves in a natural snow cover.

Denoth, A., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.303-308, 4 refs.

Snow surveys, Snow hydrology, Snow water content, Snow permeability, Snow cover stability, Moisture detection, Seepage

49-1143

Observations of a slushflow on a low-angle slope in west Karakol Valley, Kirgizstan, Middle Asia.

Elder, K., Kattelmann, R., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.309-316, 9 refs.

Avalanches, Avalanche mechanics, Slush, Mudflows, Snow cover stability, Kyrgyzstan

49-1144

Snow fence do's and don'ts.

Jairell, R.L., Schmidt, R.A., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.318-322, 3 refs.

Snow fences, Snowdrifts, Road maintenance

49-1145

Computer system for avalanche hazard analysis at Rogers Pass, British Columbia.

Malenko, B., Skjonsberg, D., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.323-325.

Avalanche forecasting, Road maintenance, Data processing, Computer applications, Canada—British Columbia—Glacier National Park

49-1146

Observations from a statistical model for maximum avalanche run-out distances in southwest Montana.

McKittrick, L.R., Brown, R.L., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.326-334, 7 refs.

Avalanche forecasting, Avalanche modeling, Avalanche tracks, Avalanche deposits, Statistical analysis, United States—Montana

49-1147

Broken River avalanche of August 1992; Craigieburn Range, New Zealand.

Owens, I., Weir, P., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.335-341.

Avalanches, Accidents, New Zealand

49-1148

Investigation of sun crust formation using field data and laboratory experiments.

Ozeki, T., Akitaya, E., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.342-350, 2 refs. For a Japanese version see 48-3203.

Snow crust, Depth hoar, Snow surface, Snow cover stability, Snow heat flux

49-1149

Sign of electrostatic charge on drifting snow.

Schmidt, S., Schmidt, R.A., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.351-360, 18 refs.

Snow electrical properties, Blowing snow, Snowdrifts, Snow erosion, Snow air interface, Charge transfer

49-1150

Time-domain-reflectometry as a method to measure snow wetness and density.

Schneebeli, M., Davis, R.E., MP 3519, International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.361-364, 4 refs.

Snow surveys, Snow hydrology, Snow water content, Snow electrical properties, Moisture detection

49-1151

Transport of water and dye tracers through snow.

Wilhelm, T., Rechenmacher, J., Denoth, A., International Snow Science Workshop, Breckenridge, CO, Oct. 4-8, 1992. ISSW '92. Proceedings, Denver, Colorado Avalanche Information Center, [1992], p.365-370, 5 refs.

Snow surveys, Snow hydrology, Snow permeability, Seepage

49-1152

Gravel road test sections insulated with scrap tire chips: construction and first year's results.

Eaton, R.A., Roberts, R.J., Humphrey, D.N., SR 94-21, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1994, 41p., ADA-286 163, 5 refs.

Frost heave, Tires, Road maintenance, Roads, Gravel, Insulation

A test project that uses tire chips as an insulating layer to limit frost penetration beneath a gravel-surfaced road is described. Tire chips, which are waste tires that have been cut into 2-in. pieces, are an attractive alternative to conventional insulation boards because they have moderate thermal resistance and are durable, free-draining and low cost. Furthermore, this application has the potential to make an important contribution to disposing of the more than 2 billion waste tires that are currently sitting in huge open piles across the U.S. The project was constructed in Richmond, ME, in Aug. 1992. It is 750 ft long, consisting of five sections with different thicknesses of tire chips and overlying soil cover and two control sections. Over 20,000 waste tires were used on this project. The primary goals were to determine the necessary thickness of tire chips to provide effective insulation and the minimum thickness of overlying soil cover needed to produce a stable riding surface. The thickness of the tire chip layers ranges from 6 to 12 in., while the thickness of the granular soil cover ranges from 12 to 24 in. The project is instrumented with thermocouples, resistivity gauges, groundwater monitoring wells and a weather station. In addition, the strength of the road surface is periodically measured with a heavy weight deflectometer. Results from the first year of service have shown that a 6-in. tire chip layer can reduce frost penetration by up to 25% and the gravel cover should be 12 to 18 in. thick to provide a stable riding surface.

49-1153

Nature of rhythmic layering in the Pansky Tundra intrusion, Kola Peninsula. [Priroda ritmicheskoĭ rassloennosti intruziva Panskikh tundr, Kol'skiĭ poluostrov]

Latypov, R.M., *Akademiia nauk. Doklady,* June 1994, 336(5), p.643-646, In Russian. 7 refs.

Geologic processes, Geologic structures, Quaternary deposits, Tundra, Russia—Kola Peninsula

49-1154

Northern Sea Route and icebreaking technology: an overview of current conditions.

Mulherin, N.D., Sodhi, D.S., Smallidge, E., MP 3520, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, June 1994, 162p., ADA-285 943, Refs. p.55-60, 75-121.

Icebreakers, Ice breaking, Marine transportation, Navigation, Ice navigation, Geography, Northern Sea Route, Russia

The Northern Sea Route (NSR) follows the Eurasian coastline between the Atlantic and Pacific oceans. The USSR developed a marine transportation infrastructure along their northern coastline that includes a fleet of the world's most powerful icebreakers and ice-strengthened cargo ships, port facilities, and navigation, communication, and environmental forecasting aids. In 1987, the USSR announced it would open the NSR to foreign vessels for peaceful and commercial purposes. Navigational difficulties are considerable, due to bitter weather conditions, the short daylight season, ice-infested waters, and isolation. However, shorter distances between north Pacific and European ports, an existing cargo base, a currently underutilized transportation infrastructure, potential stimulation and strengthening of the Russian economy, and the prospect for economic benefits from international investment in Russia make the NSR attractive. The challenging physical environment requires advances in ship design and ship operations. Modern polar ships are larger, stronger, and more powerful, their propulsion systems have been improved, and the resistance encountered during icebreaking has been reduced. The existing shallow-draft northern fleet may be undesirable for use where larger ships can move cargo more efficiently. More northerly route options would enable larger and perhaps more efficient ship passage but would also require greater icebreaking capabilities; however, it will be difficult to attract greater foreign interest unless the navigation season can be extended.

49-1155

Northern Sea Route.

Ramsland, T.R., London, City University Business School, 1992, 68p., Ph.D. thesis. 41 refs.

Marine transportation, Ice navigation, Ice conditions, Icebreakers, Ships, Cost analysis, Northern Sea Route

49-1156

Extended abstracts for an International Conference in "The Development of the North and Problems of Recultivation," July 8-14, 1991, Syktyvkar, Russia. *Ohio State University. Byrd Polar Research Center. BPRC miscellaneous series,* July 1991, M-334, 151p., 125 abstracts.

Revegetation, Environmental impact, Forest tundra, Air pollution, Soil pollution, Ecosystems, Tundra, Lichens, Russia—Siberia, United States—Alaska, Russia—Ob' River, Russia—Yakutia, Belarus, Russia—Chukotskiy Peninsula, Russia—Yamal Peninsula, Russia—Kola Peninsula, Russia—Komi

49-1157

Structural adaptation of plants to cold climate. [Strukturnye adaptatsii rasteniĭ k kholodnomu klimatu]

Miroslavov, E.A., *Botanicheskiĭ zhurnal,* Feb. 1994, 79(2), p.20-26, In Russian with English summary. 22 refs.

Plant physiology, Plants (botany), Russia—Kola Peninsula, Kazakhstan—Zailiyskiy Alatau, Russia—Wrangel Island

49-1158

Vascular flora from the vicinity of the Cherskiy settlement (Northern Yakutia). [Flora sosudistykh rasteniĭ okrestnosteĭ pos. Cherskiĭ (Severnaia IAkutiia)]

Zaslavskaia, T.M., Petrovskiĭ, V.V., *Botanicheskiĭ zhurnal,* Feb. 1994, 79(2), p.65-79, In Russian with English summary. 15 refs.

Site surveys, Plants (botany), Russia—Yakutia, Russia—Kolyma River

49-1159

Ecological analysis of pigment contents in the leaves of mountain-tundra herbs. [Ekologicheskiĭ analiz soderzhaniia pigmentov v list'iakh gorno-tundrovykh trav]

Korniushenko, G.A., Solov'eva, L.V., *Botanicheskiĭ zhurnal,* Feb. 1994, 79(2), p.80-101, In Russian with English summary. 40 refs.

Plant physiology, Plants (botany), Plant tissues, Russia—Khibiny Mountains

49-1160

Notes on mosses of Chukotka. 1. Species of the genus *Pohlia* (Bryaceae) with proliferous buds. [Zametki o mkhakh Chukotki. 1. Vidy roda *Pohlia (Bryaceae)* s vyvodkovymi pochkami]

Afonina, O.M., *Botanicheskiĭ zhurnal,* Feb. 1994, 79(2), p.102-106, In Russian with English summary. 7 refs.

Mosses, Plants (botany), Site surveys, Russia—Chukotskiy Peninsula

49-1161

Bridges of the Science between North America and the Russian Far East; abstracts, book 2.

Arctic Science Conference, 45th, Aug. 25-27, 1994, Anchorage, AK; Aug. 29-Sep. 2, 1994, Vladivostok, Russia, Vladivostok, Dalnauka, 1994, 217p. (Pertinent p.6-10, 214-216 and others).

Pleistocene, Glaciation, Plants (botany), Loess, Data processing, International cooperation, Russia—Far East, United States—Alaska

49-1162

Filchner-Ronne Ice Shelf Programme. Report No.7.

Oerter, H., comp., Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1994, 55p., Refs. passim. For individual papers see 49-1163 through 49-1173 or C-51484, C-51485, C-51490, F-51486 through F-51489, F-51491, F-51494, J-51492 and J-51493.

Ice shelves, Sea water, Polynyas, Height finding, Mapping, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

This report contains 11 written summaries of talks presented during the course of the Workshop. The meeting was held in the UK at Cambridge on June 10-11, 1993. A total of 31 participants attended from Germany, Norway, the United Kingdom and the USA. On the first day, talks on recent work were presented and on the second day national field plans of the future were discussed. Ocean-ice interactions and processes at the grounding line continue as the main topics for future research. There is still the need for deep hot water drillings to obtain measurements in the water column under the ice to prove or disprove theories about ocean circulation and the formation of marine ice under the ice shelf.

49-1163

Thematic map series 1:2,000,000 Filchner-Ronne Schelfeis.

Sievers, J., *Filchner-Ronne Ice Shelf Programme (FRISP). Report,* 1994, No.7, International Workshop on the Filchner-Ronne Ice Shelf Programme (FRISP), 8th, June 1993. H. Oerter, comp., p.1-8.

DLC G890.F55R47 No.7 1994

Ice shelves, Maps, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The concept of this mapping project was put forth at the 5th FRISP workshop in 1990. Since then two thematic maps have been published: MAP 2: Satellite image map, 1992; and MAP 3: Topographic Map, 1993. A map issued in 1987 on the glaciology of the region was designated as MAP 1 of the series. Planned for issuance between 1994 and 1996 are four others: MAP 4: Seabed and bedrock topography; MAP 5: Ice thickness map; MAP 6: Topographic map (2nd edition); and MAP 7: Glaciological map (2nd edition).

49-1164

Digital terrain model in the Filchner Ronne Ice Shelf derived from ERS-1 radar altimeter data.

Ihde, J., Eck, J., Reinhold, A., Schirmer, U., *Filchner-Ronne Ice Shelf Programme (FRISP). Report,* 1994, No.7, International Workshop on the Filchner-Ronne Ice Shelf Programme (FRISP), 8th, June 1993. H. Oerter, comp., p.9-15, 10 refs.

DLC G890.F55R47 No.7 1994

Ice shelves, Height finding, Models, Remote sensing, Terrain, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The first results of the derivation of orthometric heights (sea heights) for ice sheets of the Filchner Ronne Ice Shelf area from ERS-1 radar altimeter data up to latitude 82S are presented. An algorithm for profile adjustment of repeated observations along the ERS-1 subsatellite track is developed. Analysis of the ERS-1 radar altimeter measurements of the 35-day repeat cycle shows a high potential of accuracy and resolution for the determination of ice sheet elevations. The result is a slope-corrected digital terrain ice model. (Auth.)

49-1165

Satellite observations of the Filchner/Ronne Ice Shelf front and their implications for bottom water formation.

Van Woert, M.L., *Filchner-Ronne Ice Shelf Programme (FRISP). Report,* 1994, No.7, International Workshop on the Filchner-Ronne Ice Shelf Programme (FRISP), 8th, June 1993. H. Oerter, comp., p.16-19, 12 refs.

DLC G890.F55R47 No.7 1994

Ice shelves, Remote sensing, Sea water, Polynyas, Radiometry, Antarctica—Weddell Sea, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

In this study sea ice concentrations for the polynya region are derived from Nimbus-7 scanning multichannel microwave radiometer (SMMR) and the Defense Meteorological Satellite Program special sensor microwave imager (SSM/I) data. The combined data set spans the period Oct. 1978 to June 1991 and allows temporal changes in ice concentration along the FRIS to be examined.

49-1166

BAS hot water drill.

Makinson, K., *Filchner-Ronne Ice Shelf Programme (FRISP). Report,* 1994, No.7, International Workshop on the Filchner-Ronne Ice Shelf Programme (FRISP), 8th, June 1993. H. Oerter, comp., p.20-26, 5 refs.

DLC G890.F55R47 No.7 1994

Thermal drills, Ice shelves, Ice temperature, Antarctica—Ronne Ice Shelf

To date, BAS hot water drilling carried out on Ronne Ice Shelf has been used to provide and maintain access holes to the sub-ice shelf oceanographic environment for periods of several days until fuel supplies have become exhausted. Throughout the whole operation constant refreezing of the hole is a major problem, placing pressure upon operators and testing the reliability of equipment; careful planning is required if hot water drilling is to be successful. Parameters such as ice temperature profile, refreezing rates, hole diameter and the heat loss characteristics of the drilling hose have to be taken into consideration to determine fuel requirements, logistical support for the project and the time period available for oceanographic work. In total, approximately four tonnes of aviation fuel were burned at each of two sites, allowing a hole 0.2-0.25 m in diameter to be drilled over a period of 1 to 3 days, and maintaining it, through repeated reaming, for a further five days. Ice temperatures of -26 C caused rapid refreezing of the hole and successive borehole caliper profiles indicated initial closure rates of 11 mm/hr, decreasing to 5 mm/hr after the hole had been open for a number of days.

49-1167

Hot water drilling on Ekströmisen 1993.

Nixdorf, U., Oerter, H., Drücker, C., Miller, H., *Filchner-Ronne Ice Shelf Programme (FRISP). Report,* 1994, No.7, International Workshop on the Filchner-Ronne Ice Shelf Programme (FRISP), 8th, June 1993. H. Oerter, comp., p.27-28.

DLC G890.F55R47 No.7 1994

Ice shelves, Thermal drills, Ice temperature, Antarctica—Ekström Ice Shelf

A hot-water drill developed during the past 2 years at Alfred Wegener Institute was used to penetrate the Ekström ice shelf several times near Neumayer Station in Jan. 1993. The drilling operation was successful and the initial large diameter (35 cm) allowed for easy access to the ocean. One hole was used to install an ultrasonic echo-sounder to measure the ablation at the ice shelf bottom directly. The upward looking sounder continuously records its own distance to the ice shelf bottom; this distance varies periodically with time. From a spectrum analysis it is concluded that the sounder follows the tidal current. Because the actual motion of the sounder is complex, melting rates are deduced from the variation in the maximum distances. This yields melting rates of 23 cm/month during Mar. and Apr. Another hole carried a thermistor string throughout the 237 m thick ice shelf for ice temperature measurements. This will provide a second possibility to deduce ablation rates.

49-1168

Comparison between ice core B13 and B15.

Oerter, H., et al, *Filchner-Ronne Ice Shelf Programme (FRISP). Report,* 1994, No.7, International Workshop on the Filchner-Ronne Ice Shelf Programme (FRISP), 8th, June 1993. H. Oerter, comp., p.29-36, 9 refs.

DLC G890.F55R47 No.7 1994

Ice cores, Sea ice, Thermal conductivity, Ice temperature, Isotopes, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Glaciological investigations have been carried out on the Filchner-Ronne Ice Shelf as part of German antarctic research work since 1979. During the austral seasons 1989/90 and 1992 ice cores B13 and B15 were recovered. Comparison of both cores focuses on snow and firn density, temperature distribution, 2-H and 18-O contents, and electrolytical conductivity. Special emphasis was given to the transition between meteoric and marine ice over a depth of about 2 m in each core. Comparison of the vertical profiles provides information about the variability of marine ice accumulation rate, its mode of accretion, the position where accumulation sets in along the flowline, and the ice shelf deformation rate. In the general approach taken here it is assumed that the last two factors do not vary appreciably for B13 and B15. The variability of the first two factors is assessed by comparing electrolytical conductivity, isotope content, and the microstructure of the ice in both cores. (Auth. mod.)

49-1169

Glacier geophysics fieldwork on Ronne Ice Shelf in 1992/93.

Vaughan, D.G., *Filchner-Ronne Ice Shelf Programme (FRISP). Report,* 1994, No.7, International Workshop on the Filchner-Ronne Ice Shelf Programme (FRISP), 8th, June 1993. H. Oerter, comp., p.37-38, 3 refs.

DLC G890.F55R47 No.7 1994

Geodetic surveys, Glaciology, Antarctica—Ronne Ice Shelf, Antarctica—Rutford Ice Stream, Antarctica—Korff Ice Rise, Antarctica—Fletcher Ice Rise

A series of glaciological investigations was performed during the austral summer of 1992/93 on Rutford Ice Stream and Ronne Ice Shelf, including GPS profiling over the crest of Fletcher Ice Rise; investigation of tidal flexing at the grounding line of Rutford Ice Stream; remeasurement of six velocity and strain rosettes on Ronne Ice Shelf; measurement of elevation profile along the predicted track for ERS-1 between Ronne Ice Shelf and Fletcher Ice Rise; measurement of the elevation profile through the buckling zone upstream of Korff Ice Rise; and downloading of data from transistors installed at the 1990 hot-water drill sites.

49-1170

Introduction to high resolution seismic surveys on the Rutford Ice Stream.

Smith, A.M., *Filchner-Ronne Ice Shelf Programme (FRISP). Report,* 1994, No.7, International Workshop on the Filchner-Ronne Ice Shelf Programme (FRISP), 8th, June 1993. H. Oerter, comp., p.39-41, 1 ref.

DLC G890.F55R47 No.7 1994

Seismic surveys, Ice sheets, Ice creep, Antarctica—Rutford Ice Stream

The aim of these surveys of Rutford Ice Stream was to investigate the bed of the ice stream and the properties of the ice itself to understand more of the basal processes affecting ice flow. Two main sites were selected for this initial study. The first site lies upstream of a prominent surface (and bedrock) knoll where survey data, bedrock profiles and the smooth ice surface seen on satellite images indicate an area of relatively low basal shear. The first field season concentrated on this area. A second site 50 km farther upstream shows a much more variable surface and bed topography, and was visited during the second season to investigate a variable bed, more characteristic of the upper reaches of the ice stream. Surveys were also done at a number of other sites, including one 12 km upstream of the first area. Reflection profiling and wide angle reflection were the two methods used to collect most of the seismic data. A brief preliminary assessment is given of the data collected. (Auth. mod.)

49-1171

Water mass distribution and tides along the Filchner-Ronne Ice Shelf. Preliminary results from the Norwegian Antarctic Expedition 1992/93.

Gammelsrød, T., *Filchner-Ronne Ice Shelf Programme (FRISP). Report,* 1994, No.7, International Workshop on the Filchner-Ronne Ice Shelf Programme (FRISP), 8th, June 1993. H. Oerter, comp., p.42-45.

DLC G890.F55R47 No.7 1994

Sea water, Ice shelves, Water chemistry, Tides, Antarctica—Weddell Sea, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The southwestern Weddell Sea is normally hard to access due to heavy sea ice conditions. During the survey presented here an oceanographic section was obtained along both the Ronne and Filchner Ice Shelves all the way to the Antarctic Peninsula. In addition to the traditional CTD-data, a major chemical observation program was introduced on this expedition, including measurements of oxygen, nutrients, the carbonate system, CFC, tritium, helium-3, and O-18. Some of the observational results are presented here in graph form. Several stations were also obtained on the shallow shelf north of Berkner I., in addition to a few stations on the continental slope at 74S.

49-1172

Ocean circulation beneath Ronne Ice Shelf.

Robinson, A., Mackinson, K., *Filchner-Ronne Ice Shelf Programme (FRISP). Report,* 1994, No.7, International Workshop on the Filchner-Ronne Ice Shelf Programme (FRISP), 8th, June 1993. H. Oerter, comp., p.47-52, 6 refs.

DLC G890.F55R47 No.7 1994

Sea water, Tides, Water chemistry, Ocean currents, Ice shelves, Antarctica—Ronne Ice Shelf

The first and most important result of this work is the discovery that Western Shelf Water (WSW) can penetrate 200 km underneath Ronne Ice Shelf without undergoing modification. This has implications for the modelling of the sub-ice circulation regime. The next result is that there are significant tidal currents at this site. This was surprising because there was no indication of tidal activity at a previous drill site 100 km to the south, and because normally, strong tidal currents would generate mixing within the column. The last result is the variability in the water column which recurs periodically, especially with different temperatures in Ice Shelf Water (ISW) being seen. Given that ISW emerges at the ice front as separate plumes, it is suggested that this indicates that more than one plume flows from the vicinity of the drill site within the Ronne Depression, and that some roughly periodic motion is bringing water from the plumes, or the plumes themselves beneath the drill site. (Auth. mod.)

49-1173

Modelling the formation and deposition of frazil ice beneath the Filchner-Ronne Ice Shelf.

Bombosch, A., Jenkins, A., *Filchner-Ronne Ice Shelf Programme (FRISP). Report,* 1994, No.7, International Workshop on the Filchner-Ronne Ice Shelf Programme (FRISP), 8th, June 1993. H. Oerter, comp., p.53-55, 11 refs.

DLC G890.F55R47 No.7 1994

Sea ice, Ice shelves, Mathematical models, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The numerical model of ice shelf-ocean interactions to be discussed in this presentation is based on the theory of turbulent gravity currents. It is suggested that melt water rises along the highest negative gradient of the ice shelf base, cooling and diluting a part of the surrounding ocean and forming a buoyant Ice Shelf Water plume. As a result of its upward motion, the plume water is subjected to a continuously decreasing pressure, and a depth is reached at which the water becomes supercooled. Assuming that seed crystals exist, the plume water now fulfills the conditions for the rapid growth of small, disc-shaped ice crystals within the water. The growth and multiplication of the ice crystals prevents further supercooling of the plume water, so that direct freezing onto the ice shelf base is a secondary process. Under varying conditions of motion, ice crystal deposition takes place. The results of the model applications to the area beneath Filchner-Ronne Ice Shelf show how the physics of crystal growth and deposition naturally leads to the localized regions of intense accumulation, which are needed to explain the formation of the different marine ice bodies found.

49-1174

Engineering in harmony with the ocean.

Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993, New York, Institute of Electrical and Electronics Engineers, 1993, 3 vols., Refs. passim. For selected papers see 49-1175 through 49-1189.

DLC TC1505.O33198 1993

Ice surveys, Subglacial observations, Sea ice distribution, Ice deformation, Ice cover effect, Ice acoustics, Oceanographic surveys, Ocean currents, Underwater acoustics

49-1175

Ocean-bottom geoacoustic measurements in the ice-covered Lincoln Sea.

Dosso, S.E., Brooke, G.H., Huston, R.D., Todoeschuck, J.P., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1993, p.I119-I124, 8 refs.

Ocean bottom, Bottom sediment, Marine geology, Underwater acoustics, Subglacial observations, Oceanographic surveys, Seismic surveys, Lincoln Sea

49-1176

Acoustic navigation for arctic under-ice AUV missions.

Deffenbaugh, M., Schmidt, H., Bellingham, J.G., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1993, p.I204-I209, 4 refs.

Ice surveys, Subglacial observations, Subglacial navigation, Ice bottom surface, Pressure ridges, Ice acoustics, Underwater acoustics, Beaufort Sea

49-1177

Theseus: a cable-laying AUV.

Butler, B., Den Hertog, V., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1993, p.I210-I213, 2 refs.

Subglacial navigation, Cables (ropes), Pipe laying

49-1178

Acoustic thermometry for Arctic Ocean climate.

Mikhalevsky, P.N., Muench, R., Baggeroer, A.B., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1993, p.I263-I266, 29 refs.

Air ice water interaction, Ice cover effect, Ice acoustics, Underwater acoustics, Ocean currents, Polar atmospheres, Global change

49-1179

Recent development in Doppler sonar technology.

Pinkel, R., Merrifield, M., Smith, J., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1993, p.I282-I286, 8 refs.

Subglacial observations, Ice openings, Underwater acoustics, Ocean currents, Oceanographic surveys

49-1180

Acoustical remote sensing of energy dissipation using scintillation analysis.

Menemenlis, D., Farmer, D.M., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1993, p.I293-I297, 17 refs.

Ice water interface, Ice acoustics, Underwater acoustics, Ocean currents, Turbulent flow, Statistical analysis, Mathematical models

49-1181

Particle-in-cell model for ice edge forecasting.

Flato, G.M., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1993, p.I325-I329, 13 refs.

Sea ice distribution, Ice edge, Ice growth, Ice forecasting, Ice models, Mathematical models

49-1182

Horizontal magnetic field fluctuations measured in the Lincoln Sea.

Sotirin, B.J., Newton, J.L., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1993, p.II30-II34, 6 refs.

Geomagnetism, Magnetic surveys, Drift stations, Ice cover effect

49-1183

Use of an innovative solid towed array for exploring the antarctic marine environment.

Marschall, R.A., Stinson, D.L., Pearce, R.E., Boyer, E., Embry, B., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1993, p.II35-II40, 5 refs.

Subglacial observations, Underwater acoustics, Ocean bottom, Marine geology, Oceanographic surveys

A recent marine seismic survey conducted in the Antarctic gathered data using a variable diameter solid towed hydrophone array. This array placed each polyvinylidene fluoride hydrophone forward in a hydrodynamically shaped housing designed to maintain laminar fluid flow along most of its length and to prevent boundary layer separation for the remainder. The sensors were external to the strain bearing members. Individual hydrophones enclosed in the hydrodynamic casings were connected in a sequential array by a cable of small diameter encased in flexible soft polyurethane, resulting in a very small average diameter array. This compact, robust towed hydrophone array was well-suited to antarctic exploration where (1) the levels of ambient noise could range from Knudsen Sea State 4 down to below Sea State Zero, (2) array repair would be extraordinarily difficult, and (3) oil-filled array leakage would be particularly damaging to this unique and pristine environment. (Auth.)

49-1184

Multi-season acoustic tomography experiment in the Arctic.

Peal, K.R., Rajan, S.D., Frisk, G.V., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1993, p.II41-II46, 1 ref.

Ice cover effect, Ice acoustics, Ice cracks, Ice deformation, Underwater acoustics

49-1185

Automated Ice-Ocean Environmental Buoys (IOEBs) for the telemetry of air, ice and ocean data from the polar oceans.

Krishfield, R., Honjo, S., Tucker, W.B., Nakanishi, T., Takizawa, T., MP 3521, Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1993, p.II47-II52, 7 refs.

Air ice water interaction, Ice surveys, Ice cover thickness, Ice temperature, Ice deformation, Drift stations, Subglacial observations, Oceanographic surveys, Ocean currents, Telemetering equipment

The Ice-Ocean Environmental Buoy (IOEB) was developed to acquire and telemeter in near real-time inter-relatable time-series data on atmospheric, oceanographic and ice physics in ice-covered oceans during all seasons. Mechanically, the IOEB consists of an extremely durable surface flotation package and an underwater mooring line of instruments and sensors. The apex contains data loggers for meteorological, ice physics and engineering measurements, microcontroller modules for accumulating the data, and ARGOS platform transmit terminals (PTTs) for broadcasting the data. The ocean sensors include conductivity/temperature recorders, an Acoustic Doppler Current Profiler (ADCP), a dissolved oxygen sensor, a transmissometer and two fluorometers. Furthermore, a suspended particle collector and sediment trap collect biogeochemical samples at the bottom of the 110 m suspended mooring. In Apr. 1992, two IOEBs were successfully deployed at two separate ice camps in the Arctic Ocean with battery power adequate to sustain the systems for over two years.

49-1186

Seasonal climatology of Atlantic and polar arctic water types for the Greenland-Iceland-Norwegian seas from volumetric analysis.

Tanis, F.J., Manley, T.O., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1993, p.II207-II212, 6 refs.

Oceanographic surveys, Ocean currents, Water transport, Water temperature, Salinity, Air water interactions

49-1187

Sea ice observed at enhanced resolution by spaceborne scatterometers.

Long, D.G., Early, D.S., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1993, p.III25-III30, 6 refs.

Ice surveys, Sea ice distribution, Ice edge, Ice conditions, Backscattering, Spaceborne photography, Image processing

Spaceborne scatterometers such as the Seasat-A (SASS) and the ERS-1 Active Microwave Instrument (AMI) scatterometers measure the radar backscatter of the earth's surface at a resolution of approximately 50 km. While adequate for studying winds over the ocean, the low resolution limits the utility of the scatterometer data for land and ice studies. However, by using a recently developed resolution enhancement algorithm the authors have been able to produce a time series of enhanced resolution radar backscatter of sea ice in the southern polar region. The images dramatically reveal seasonal change in the sea ice. Large-scale circulation and mixing patterns are evident and the ice edge is readily discernible. Comparisons between Ku-band (SASS) images and C-band (ERS-1) images are made. The results suggest that scatterometer data coupled with the resolution enhancement technique is useful in sea ice studies. The frequent multiple- incidence angle revisits may provide the capability to map ice age and snow cover. (Auth. mod.)

49-1188

Contemporaneous field measurements of pack ice stress and ice strain measurements from SAR imagery.

Coon, M.D., Knoke, G.S., Echert, D.C., Stern, H.L., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1993, p.III31-III36, 14 refs.

Pack ice, Ice surveys, Sea ice distribution, Ice cover thickness, Ice cover strength, Ice deformation, Synthetic aperture radar, Spaceborne photography

49-1189

Broadband measurements of acoustic noise under a deteriorating fast ice cover.

Marko, J.R., Lemon, D.D., Oceans'93 Conference, Victoria, British Columbia, Oct. 18-21, 1993. Proceedings. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1993, p.III274-III279, 13 refs.

Fast ice, Ice acoustics, Ice cracks, Ice deformation, Ice breakup, Ice forecasting, Subglacial observations, Underwater acoustics, Canada—Northwest Territories—Barrow Strait

49-1190

Record-breaking low temperatures of January 1994 in the USA and Canada.

Brugge, R., *Weather,* Oct. 1994, 49(10), p.337-346.

Weather observations, Air temperature, Records (extremes), Snowfall, Atmospheric pressure, Synoptic meteorology, United States, Canada

49-1191

Relationship between air and road minimum temperatures during a cold spell.

Wood, N.L.H., *Weather,* Oct. 1994, 49(10), p.349-354, 4 refs.

Road icing, Ice forecasting, Air temperature, Surface temperature, Temperature measurement, Correlation, Monitors, Topographic effects

49-1192

Present and past geocryogenic processes in Mexico.

Heine, K., *Permafrost and periglacial processes,* Apr.-June 1994, 5(1), p.1-12, With French summary. 35 refs.

Geocryology, Pleistocene, Alpine landscapes, Periglacial processes, Landforms, Geomorphology, Permafrost distribution, Discontinuous permafrost, Altitude, Mexico—Cordillera Neovolcánica

49-1193

Gravimetrical investigation of ice-rich permafrost within the rock glacier Murtèl-Corvatsch (Upper Engadin, Swiss Alps).

Vonder Mühll, D.S., Klingelè, E.E., *Permafrost and periglacial processes,* Apr.-June 1994, 5(1), p.13-24, With French summary. 30 refs.

Alpine landscapes, Discontinuous permafrost, Permafrost structure, Periglacial processes, Geocryology, Rock glaciers, Ground ice, Boreholes, Stratigraphy, Gravity anomalies, Profiles, Switzerland—Alps

49-1194

Permafrost distribution and rock glaciers in the Livigno area (northern Italy).

Guglielmin, M., Lozej, A., Tellini, C., *Permafrost and periglacial processes,* Apr.-June 1994, 5(1), p.25-36, With French summary. 25 refs.

Alpine landscapes, Geophysical surveys, Permafrost distribution, Permafrost indicators, Permafrost structure, Rock glaciers, Active layer, Electrical resistivity, Geocryology, Periglacial processes, Italy—Livigno

49-1195

Rheological models of active rock glaciers: evaluation, critique and a possible test.

Whalley, W.B., Azizi, F., *Permafrost and periglacial processes,* Apr.-June 1994, 5(1), p.37-51, With French summary. 47 refs.

Geocryology, Periglacial processes, Rock glaciers, Origin, Rheology, Flow rate, Velocity, Rock mechanics, Ice creep, Ice solid interface, Mathematical models

49-1196

Fabric analysis of rock glacier debris mantles, La Sal Mountains, Utah.

Nicholas, J.W., *Permafrost and periglacial processes,* Apr.-June 1994, 5(1), p.53-66, With French summary. 40 refs.

Periglacial processes, Rock glaciers, Rock mechanics, Rock properties, Structural analysis, Sediment transport, Topographic features, Geomorphology, United States—Utah

49-1197

Quantitative estimation of cryogenic weathering energy.

Vasil'ev, A.A., *Permafrost and periglacial processes,* Apr.-June 1994, 5(1), p.67-70, With French summary. 5 refs.

Geocryology, Permafrost heat balance, Permafrost bases, Bedrock, Frozen rock temperature, Heat flux, Weathering, Ice solid interface, Freeze thaw cycles, Surface energy

49-1198

Zonally averaged, three-basin ocean circulation model for climate studies.

Hovine, S., Fichefet, T., *Climate dynamics,* Sep. 1994, 10(6-7), p.313-331, 59 refs.

Climatology, Oceanography, Ocean currents, Air water interactions, Heat flux, Upwelling, Bottom topography, Seasonal variations, Climatic factors, Mathematical models, Antarctica—Weddell Sea, Antarctica—Ross Sea

A two-dimensional, three-basin ocean model suitable for long-term climate studies is developed. The model is based on the zonally averaged form of primitive equations written in spherical coordinates. The east-west density difference which arises upon averaging the momentum equations is taken to be proportional to the meridional density gradient. Lateral exchanges of heat and salt between the basins are explicitly resolved. Moreover, the model includes bottom topography and has representations of the Arctic Ocean and of the Weddell and Ross seas. Under realistic restoring boundary conditions, the model reproduces the global conveyor belt: deep water is formed in the Atlantic between 60 and 70N at a rate of about 17 Sv in the vicinity of the antarctic continent, while the Indian and Pacific basins show broad upwelling. A series of perturbation experiments illustrates the ability of the model to reproduce different steady-state circulations under mixed boundary conditions. Finally, the model sensitivity to various factors is examined. This sensitivity study reveals that the bottom topography and the presence of a submarine meridional ridge in the zone of the Drake Passage play a crucial role in determining the properties of the model bottom-water masses. (Auth. mod.)

49-1199

Spatial variability in the seasonal south polar cap of Mars.

Calvin, W.M., Martin, T.Z., *Journal of geophysical research,* Oct. 25, 1994, 99(E10), p.21,143-21,152, 26 refs.

Mars (planet), Extraterrestrial ice, Polar regions, Infrared spectroscopy, Ice optics, Carbon dioxide, Frost, Surface properties, Seasonal variations, Grain size, Spectra

49-1200

Formation of a hot proto-atmosphere on the accreting giant icy satellite: implications for the origin and evolution of Titan, Ganymede, and Callisto.

Kuramoto, K., Matsui, T., *Journal of geophysical research,* Oct. 25, 1994, 99(E10), p.21,183-21,200, 58 refs.

Satellites (natural), Extraterrestrial ice, Atmospheric physics, Ice vapor interface, Geologic processes, Surface temperature, Ground ice, Ice melting, Evaporation

49-1201

Simulation of cloud microphysical and chemical processes using a multicomponent framework. Part 1: description of the microphysical model.

Chen, J.P., Lamb, D., *Journal of the atmospheric sciences,* Sep. 15, 1994, 51(18), p.2613-2630, 120 refs.

Clouds (meteorology), Cloud physics, Particles, Classifications, Chemical properties, Heterogeneous nucleation, Ice crystal growth, Ice vapor interface, Simulation, Mathematical models

49-1202

Variation of albedo of fresh snow.

Kumar, V., Negi, B.S., *Mausam,* Oct. 1993, 44(4), p.391-393, 3 refs.

Snow hydrology, Snow cover, Snow optics, Albedo, Seasonal variations, Meteorological factors

49-1203

Non-uniform dissipation of the antarctic ozone hole.

Kane, R.P., *Mausam,* Jan. 1994, 45(1), p.23-28, With Hindi summary. 21 refs.

Polar atmospheres, Stratosphere, Ozone, Atmospheric attenuation, Atmospheric physics, Seasonal variations

The springtime evolution of the antarctic ozone hole is illustrated for 1985-1989 and 1990. A detailed study of 1986-1989 and 1990 events indicates that the evolution, which occurs in early Oct., is fairly uniform over the South Pole. Hence the fluctuations observed at Showa, McMurdo and Palmer during this period are mostly due to the vortex wall passing in and out over these peripheral locations. However, later in Nov. when the hole is dissipating, the vortex may shift from the South Pole in any direction and may also intensify before finally disappearing. At South Pole, the recovery started by October ended in 1985, 1986 and 1988 but later in 1987 (Nov. end), 1989 (Nov. beginning) and 1990 (Nov. end). (Auth. mod.)

49-1204

Theoretical and numerical investigations of the intensity of the lidar signal specular reflected from a set of oriented ice plates.

Popov, A.A., Shefer, O.V., *Applied optics,* Oct. 20, 1994, 33(30), p.7038-7044, 11 refs.

Cloud physics, Microstructure, Lidar, Ice crystal optics, Specular reflection, Plates, Orientation, Oscillations, Backscattering, Polarization (waves), Analysis (mathematics)

49-1205

Prediction of floods from a mountain river with glacierized and snow covered areas.

Fernández, P., Maza, J., Aranibar, A.V., International Conference on River Flood Hydraulics, 2nd, York, England, Mar. 22-25, 1994. Edited by M.R. White et al, Chichester, John Wiley & Sons, 1994, p.27-35, 19 refs.

DLC GB1399.I574

Watersheds, River flow, Flood forecasting, Runoff forecasting, Snowmelt, Glacier surges, Glacier melting, Glacial lakes, Lake bursts, Argentina—Mendoza River

49-1206

Enhancement of surface ultraviolet radiation related to ozone depletion. [Aumentos en la irradiancia ultravioleta en la superficie de la Antártida asociados a la disminución de ozono estratosférico]

Cacho, J., Gil, M., Sainz de Aja, M.J., Actas del cuarto Simposio Español de Estudios Antárticos, Puerto de la Cruz, 20-25 de octubre de 1991. (Spanish Symposium on Antarctic Studies, 4th, Puerto de la Cruz, Oct. 20-25, 1991. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1991, p.9-16, In Spanish with English summary. 10 refs.

Ultraviolet radiation, Ozone, Meteorological instruments, Measuring instruments

Hypothetical enhancement of surface ultraviolet radiation related to the ozone deflection is nowadays of great concern. In order to evaluate those estimated increases, the Laboratorio de Estudios de la Atmosfera (INTA) has developed an instrument to measure accurately the ultraviolet direct radiation. This instrument was operated in Antarctica during the 1989 austral spring. Observations show great irradiance enhancement in the central range of UVB, related to decreases in the total ozone content. Longer wavelengths in the irradiance were not noted. (Auth.)

49-1207

Antarctic cryosphere and climatic change. [La criosfera antártica y el cambio climático]

Marroquín, A., Amérigo, C., Actas del cuarto Simposio Español de Estudios Antárticos, Puerto de la Cruz, 20-25 de octubre de 1991. (Spanish Symposium on Antarctic Studies, 4th, Puerto de la Cruz, Oct. 20-25, 1991. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1991, p.17-23, In Spanish with English summary. 12 refs.

Climatic changes, Air temperature, Air ice water interaction, Mass balance, Sea ice, Sea level

The fact that the registered tropospheric temperatures from antarctic observatories do not show the global tendency towards heating, as do data gathered in other areas of the Southern Hemisphere, leads one to believe that the Antarctic is acting as a thermic drain; i.e. it transforms sensible heat into latent heat. This gives rise to a direct loss of ice mass through fusion and an even greater loss due to an increase in the shedding of massive blocks of ice. According to the models, if this climatic change continues it could cause an increase in sea level of up 2 m by the end of the next century. The most recent data from the IPCC (Intergovernmental Panel of Climatic Change) estimated a likely sea level increase of 65 cm. (Auth.)

49-1208

Three summer campaigns on Livingston I. measuring ozone. [Tres campañas de verano en la isla Livingston midiendo ozono]

Cisneros, J.M., Hoevel, R., Manzano, J., Orbe, J., Actas del cuarto Simposio Español de Estudios Antárticos, Puerto de la Cruz, 20-25 de octubre de 1991. (Spanish Symposium on Antarctic Studies, 4th, Puerto de la Cruz, Oct. 20-25, 1991. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1991, p.41-47, In Spanish with English summary. 4 refs.

Ozone, Meteorological instruments, Antarctica—Juan Carlos I Station

Vertical ozone distribution measurements were obtained between 22.00 and 02.00 hours (UT) with balloonborne sonde at an altitude of 30 km above the Juan Carlos I Station. The instruments used (ECC type) are described. Some features of these vertical ozone distribution profiles are compared with the vertical mean distributions from diverse latitude bands obtained in both hemispheres during different seasons. (Auth. mod.)

49-1209

Iceberg severity off eastern North America: its relationship to sea ice variability and climate change.

Marko, J.R., et al, *Journal of climate,* Sep. 1994, 7(9), p.1335-1351, 64 refs.

Climatology, Oceanography, Climatic changes, Global warming, Sea ice distribution, Ice cover effect, Ice conditions, Drift, Periodic variations

49-1210

Pneumatic tyre with improved on-snow and on-ice running.

Sumitomo Rubber Industries Ltd., *Japan Patent Office. Patent,* Jan. 11, 1994, n.p., No.6001120.

Tires, Rubber ice friction, Traction

49-1211

Design and performance of pulsed-field magnets with an optimized ice/fibre reinforcement.

Machel, G., et al, *Physica B,* July-Aug. 1994, Vol.201, Todai International Symposium and 4th ISSP International Symposium on Frontiers in High Magnetic Fields, Tokyo, Japan, Nov. 10-12, 1993. Proceedings. Edited by N. Miura, p.575-578, 7 refs.

Electromagnetic properties, Electronic equipment, Electric charge, Electrical resistivity, Composite materials, Ice solid interface, Cooling rate, Ice (construction material), Design

49-1212

Thermal conductivity of the Ih and XI phases of ice.

Andersson, O., Suga, H., *Physical review B,* Sep. 1, 1994, 50(10)II, p.6583-6588, 25 refs.

Ice physics, Thermal conductivity, High pressure ice, Doped ice, Molecular structure, Phase transformations, Proton transport, Hydrogen bonds, Low temperature tests, Temperature measurement

49-1213

Repeatability of ice shapes in the NASA Lewis Icing Research Tunnel.

Shin, J.W., Bond, T.H., *Journal of aircraft,* Sep.-Oct. 1994, 31(5), p.1057-1063, 3 refs.

Aircraft icing, Simulation, Wind tunnels, Ice accretion, Ice surface, Surface structure, Ice air interface, Accuracy

49-1214

Evolution of the stratosphere during northern winter 1991/92 as diagnosed from U.K. Meteorological Office analyses.

O'Neill, A., et al, *Journal of the atmospheric sciences,* Oct. 15, 1994, 51(10), p.2800-2817, 35 refs.

Climatology, Synoptic meteorology, Wind direction, Stratosphere, Polar atmospheres, Atmospheric physics, Atmospheric circulation, Air entrainment

49-1215

Observations of lower-stratospheric $ClONO_2$, HNO_3, and aerosol by the *UARS* CLAES experiment between January 1992 and April 1993.

Roche, A.E., et al, *Journal of the atmospheric sciences,* Oct. 15, 1994, 51(10), p.2877-2902, 33 refs.

Polar atmospheres, Stratosphere, Polar stratospheric clouds, Cloud physics, Atmospheric composition, Atmospheric attenuation, Ozone, Aerosols, Chemical properties, Spectroscopy

This paper discusses simultaneous measurements of stratospheric $ClONO_2$, HNO_3, temperature, and aerosol extinction coefficient by the Cryogenic Limb Array Etalon Spectrometer (CLAES) on the NASA Upper Atmosphere Research Satellite (UARS), obtained over the period Jan. 9, 1992 through Apr. 23, 1993. The discussion concentrates on the stratosphere region near 21 km as of particular interest to heterogeneously driven ozone depletion. For periods between June 12 and Sep. 1, 1992 at latitudes poleward of about 60S, when temperatures were below type I polar stratospheric cloud (PSC) formation thresholds throughout the lower stratosphere, CLAES observed high levels of PSCs coincident with highly depleted fields of both HNO_3 and $ClONO_2$. By Sep. 17 the incidence of PSCs had greatly diminished in the lower stratosphere, but both $ClONO_2$ and HNO_3 remained highly depleted. These observations are consistent with the removal of gaseous HNO_3 through the formation of nitric acid trihydrate (NAT) particles and the removal of $ClONO_2$ through heterogeneous reactions on the particle surfaces. They also suggest substantial denitrification of the lower antarctic vortex through sedimentation of PSC particles. (Auth. mod.)

49-1216

Summer polar chemistry observations in the stratosphere made by HALOE.

Park, J.H., Russell, J.M., III, *Journal of the atmospheric sciences,* Oct. 15, 1994, 51(20), p.2903-2913, 21 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Atmospheric attenuation, Chemical properties, Cloud physics, Ozone, Turbulent diffusion, Radiometry

Regions of low stratospheric ozone that are anticorrelated with HCl, NO, and NO_2 levels were observed in the arctic and antarctic summers of 1992 and 1993 by the Halogen Occultation Experiment on the Upper Atmospheric Research Satellite platform. The low ozone areas are confined to the 8-45 mb (33-21 km) region and poleward of 60 deg in each hemisphere. While low polar summer ozone has been observed before, this is the first time simultaneous observations of relevant nitrogen and chlorine chemical species have been made. The phenomenon appears to be a recurring geophysical feature; the satellite data should provide an excellent opportunity to improve understanding of the chemistry causing these conditions. (Auth. mod.)

49-1217

Spring dehydration in the antarctic stratospheric vortex observed by HALOE.

Pierce, R.B., et al, *Journal of the atmospheric sciences,* Oct. 15, 1994, 51(10), p.2931-2941, 13 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Turbulent diffusion, Water vapor, Air masses, Wind velocity, Advection, Radiometry, Desiccation

The distribution of dehydrated air in the middle and lower stratosphere during the 1992 Southern Hemisphere spring is investigated using Halogen Occultation Experiment (HALOE) observations and trajectory techniques. Comparisons between previously published Version 9 and the improved Version 16 retrievals on the 700-K isentropic surface show very slight (0.05 ppmv) increases in Version 16 CH_4 relative to Version 9 within the polar vortex. Version 16 H_2O mixing ratios show a reduction of 0.5 ppmv relative to Version 9 within the polar night jet and a reduction of nearly 1.0 ppmv in middle latitudes when compared to Version 9. The Version 16 HALOE retrievals show low mixing ratios of total hydrogen ($2CH_4 + H_2O$) within the polar vortex on both 700 and 425 K isentropic surfaces relative to typical middle-stratospheric $2CH_4 + H_2O$ mixing ratios. The low $2CH_4 + H_2O$ mixing ratios are associated with dehydration. Slight reductions in total hydrogen, relative to typical middle-stratospheric values, are found at these levels throughout the Southern Hemisphere during this period. (Auth. mod.)

49-1218

Synoptic interpretation of measurements from HALOE.

Bithell, M., et al, *Journal of the atmospheric sciences,* Oct. 15, 1994, 51(10), p.2942-2956, 41 refs.

Polar atmospheres, Synoptic meteorology, Atmospheric composition, Atmospheric circulation, Turbulent diffusion, Advection, Radiometry, Chemical analysis

The degree to which the Southern Hemisphere polar vortex is isolated against horizontal (isentropic) mixing is investigated using data from the Halogen Occultation Experiment (HALOE), U.K. Meteorological Office (UKMO) potential vorticity (PV), and contour advection diagnostics. Measurements of methane and water vapor taken by HALOE during a disturbed period in the Southern Hemisphere springtime (Sep. 21-Oct. 15, 1992) are interpreted in light of the prevailing synoptic meteorology. Daily fields of winds and PV are shown to be essential in the interpretation of the data. A climatological high pressure region is responsible for a distorted vortex, and a substantial "vortex stripping" event is present, associated with the early stages of vortex breakdown. This leads to significant temporal, zonal, and altitudinal variations in the distribution of tracers. Longitude-height methane distributions from two days during the period are examined. Both days show substantial variations in abundance around a latitude circle. In particular, the authors investigated HALOE measurements at 77S on Oct. 15, 1992, which indicated an abundance of methane in the height region 600-2000 K that is more typical of mid-latitude air. Similar distributions observed in the 1991 HALOE data have previously been interpreted as evidence for the penetration of mid-latitude air into the vortex. The authors show that the high-latitude HALOE abundances that are typical of mid-latitude air were observed in a region of extensive filamentation and mixing, rather than within the inner more isolated core. (Auth. mod.)

49-1219

Mixing processes within the polar night jet.

Pierce, R.B., et al, *Journal of the atmospheric sciences,* Oct. 15, 1994, 51(10), p.2957-2972, 21 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Atmospheric circulation, Wind direction, Turbulent diffusion, Advection, Mass transfer

Lagrangian material line simulations are performed using U.K. Meteorological Office assimilated winds and temperatures to examine mixing processes in the middle- and lower-stratospheric polar night jet during the 1992 Southern Hemisphere spring and Northern Hemisphere winter. The Lagrangian simulations provide insight into the effects of mixing within the polar night jet on observations of the polar vortex made by instruments onboard the Upper Atmosphere Research Satellite during these periods. A moderate to strong kinematic barrier to large-scale isentropic exchange, similar to the barrier identified in GCM simulations, is identified during both of these periods. Characteristic timescales for mixing by large-scale isentropic motions within the polar night jet range from 20 days in the Southern Hemisphere lower stratosphere to years in the Northern Hemisphere middle stratosphere. The long mixing timescales found in the Northern Hemisphere polar night jet do not persist. Instead, the Northern Hemisphere kinematic barriers are broken down as part of the large-scale stratospheric response to a strong tropospheric blocking event. A series of Lagrangian experiments are conducted to investigate the sensitivity of the kinematic barrier to diabatic effects and to small-scale inertial gravity wave motions. Differential diabatic descent is found to have a significant impact on mixing processes within the Southern Hemisphere middle-stratospheric jet core. (Auth. mod.)

49-1220

On the motion of air through the stratospheric polar vortex.

Manney, G.L., Zurek, R.W., O'Neill, A., Swinbank, R., *Journal of the atmospheric sciences,* Oct. 15, 1994, 51(10), p.2973-2994, 44 refs.

Polar atmospheres, Atmospheric circulation, Atmospheric physics, Air masses, Wind direction, Stratosphere, Turbulent diffusion, Seasonal variations

Trajectory calculations using horizontal winds from the U.K. Meteorological Office data assimilation system and vertical velocities from a radiation calculation are used to simulate the three-dimensional motion of air through the stratospheric polar vortex for Northern Hemisphere (NH) and Southern Hemisphere (SH) winters since the launch of the Upper Atmosphere Research Satellite. Throughout the winter, air from the upper stratosphere moves poleward and descends into the middle stratosphere. In the SH lower to middle stratosphere, strongest descent occurs near the edge of the polar vortex, with that edge defined by mixing characteristics. The NH shows a similar pattern in late winter, but in early winter strongest descent is near the center of the vortex, except when wave activity is particularly strong. Strong barriers to latitudinal mixing exist above about 420 K throughout the winter. Below this, the polar night jet is weak in early winter, so air descending below that level mixes between polar and middle latitudes. In late winter, parcels descend less and the polar night jet moves downward, so there is less latitudinal mixing. The degree of mixing in the lower stratosphere thus depends strongly on the position and evolution of the polar night jet and on the amount of descent experienced by the air parcels; these characteristics show considerable interannual variability in both hemispheres. (Auth. mod.)

49-1221

Properties of northern hemisphere polar stratospheric clouds and volcanic aerosol in 1991/92 from *UARS*/ISAMS satellite measurements.

Taylor, F.W., et al, *Journal of the atmospheric sciences,* Oct. 15, 1994, 51(10), p.3019-3026, 17 refs.

Polar atmospheres, Polar stratospheric clouds, Stratosphere, Cloud physics, Chemical properties, Aerosols, Volcanic ash, Radiometry

49-1222

Spectral signatures of polar stratospheric clouds and sulfate aerosol.

Massie, S.T., et al, *Journal of the atmospheric sciences,* Oct. 15, 1994, 51(10), p.3027-3044, 47 refs.

Polar atmospheres, Stratosphere, Polar stratospheric clouds, Detection, Cloud physics, Aerosols, Ozone, Chemical properties, Spectroscopy

Multiwavelength observations of antarctic and mid-latitude aerosol by the Cryogenic Limb Array Etalon Spectrometer (CLAES) experiment on the Upper Atmosphere Research Satellite are used to demonstrate a technique that identifies the location of polar stratospheric clouds. The technique discussed uses the normalized area of the triangle formed by the aerosol extinctions at 925, 1257, and 1605/cm (10.8, 8.0, and 6.2 microns) to derive a spectral aerosol measure M of the aerosol spectrum. Mie calculations for spherical particles and T-matrix calculations for spheroidal particles are used to generate theoretical spectral extinction curves for sulfate and polar stratospheric cloud particles. The values of the spectral aerosol measure M for the sulfate and polar stratospheric cloud particles are shown to be different. Aerosol extinction data corresponding to temperatures between 180 and 220 K at a pressure of 46 hPa (near 21 km altitude) for Aug. 18, 1992 are used to demonstrate the technique. (Auth. mod.)

49-1223

Climate instabilities: Greenland and Antarctic records.

Jouzel, J., Lorius, C., Johnsen, S., Grootes, P.M., *Académie des sciences, Paris. Comptes rendus. Série II,* July 7, 1994, 319(1), p.65-77, With French summary. Refs. p.76-77.

Paleoclimatology, Ice cores, Ice composition, Ice dating, Snow composition, Climatic changes, Greenland—Summit, Antarctica—Vostok Station

The study of the two Summit Greenland ice cores GRIP and GISP2 has provided a wealth of information about climate variability in the North Atlantic region over the last glacial-interglacial cycle (the last ca. 150,000 years). The results are largely based on the isotopic composition of the ice which provides an estimate of local temperature changes. The aim of this Note is to put the Summit records in a global perspective through a comparison with the antarctic isotopic record from Vostok. As in Greenland, the last deglaciation warming is in Antarctica a two-step process interrupted by a return to colder conditions. However, the antarctic cooling appears to precede the Younger-Dryas Northern Hemisphere event and is much weaker. The most prominent of the interstadials observed in Greenland during the glacial may be identified in the Vostok record whereas the less accentuated ones are eliminated. The situation differs during the last interglacial: no antarctic counterpart to the rapid changes observed in Greenland has yet been detected. (Auth.)

49-1224

Source-receptor modeling of PAHs using deposition levels in winter-long urban snowpack.

Sharma, M., McBean, E., Thomson, N., Marsalek, H., *Journal of environmental engineering,* Sep.-Oct. 1994, 120(5), p.1248-1265, 35 refs.

Environmental tests, Air pollution, Origin, Hydrocarbons, Aerosols, Snow air interface, Snow cover, Snow impurities, Sampling, Correlation, Mathematical models

49-1225

Theoretical prediction of vitrification and devitrification tendencies for cryoprotective solutions.

Ren, H.S., Wei, Y., Hua, T.C., Zhang, J., *Cryobiology,* Feb. 1994, 31(1), p.47-56, 16 refs.

Cryobiology, Solutions, Stability, Ice formation, Ice melting, Vitreous ice, Cooling rate, Phase transformations, Temperature effects, Mathematical models

49-1226

Role of methanesulphonic acid in snow samples from Terra Nova Bay (Antarctica).

Udisti, R., Casella, F., Piccardi, G., International Symposium, Belgirate, Italy, Oct. 13-15, 1992. Proceedings. Dimethylsulphide: oceans, atmosphere and climate, edited by G. Restelli and G. Angeletti and Air Pollution Research Report 43, Dordrecht, Kluwer Academic Publishers, 1993, p.153-162, 31 refs.

DLC QC879.6.D56

Snow composition, Aerosols, Climatic factors, Antarctica—Terra Nova Bay

Concentration profiles of Cl^-, total SO_4^{2-}, nss-SO_4^{2-} and MSA for two snowpits at Terra Nova Bay are reported. The spatial distribution of these compounds is correlated with the altitude and geographic position. On the basis of H_2O_2 determination, the seasonal trends of nss-SO_4^{2-}, MSA and MSA/nss-SO_4^{2-} ratio are discussed. A sharp seasonal trend with summer maxima and winter minima is observed and demonstrates their common origin from DMS. A lower seasonal signal and lower concentration levels are found for the higher station. The MSA/nss-SO_4^{2-} ratio at low MSA values and the correlations between MSA and nss-SO_4^{2-} may evidence the existence of an extra-DMS nss-SO_4^{2-} source, which becomes more important in the winter period when the DMS contribution is lower. (Auth.)

49-1227

Permeability of the antarctic vortex wedge.

Chen, P., *Journal of geophysical research,* Oct. 20, 1994, 99(D10), p.20,563-20,571, 27 refs.

Polar atmospheres, Atmospheric circulation, Stratosphere, Temperature gradients, Turbulent diffusion, Permeability, Mass transfer, Advection, Wind direction, Simulation

Mixing and cross-vortex mass transport along isentropic surfaces in the lower stratosphere are investigated with a "contour advection" technique and semi-Lagrangian transport model for the antarctic winter of 1993, using analyzed winds from the United Kingdom Meteorological Office data assimilation system. Results from the "contour advection" technique show that at the vortex edge there exists a potential vorticity (PV) contour that has the smallest lengthening rate. This PV contour is referred to as the "line of separation" because it essentially separates the inner and outer vortex. The average e-folding time for the lengthening of the "line of separation" increases monotonically with altitude, ranging from about 7 days on the 350 K isentropic surface to about 105 days on the 500 K isentropic surface. The results also suggest the existence of a transition layer around the 400 K isentropic surface, above which the vortex is almost completely isolated from the mid-latitudes and below which the vortex is less isolated. (Auth. mod.)

49-1228

Spread of denitrification from 1987 antarctic and 1988-1989 arctic stratospheric vortices.

Tuck, A.F., et al, *Journal of geophysical research,* Oct. 20, 1994, 99(D10), p.20,573-20,583, 52 refs.

Polar atmospheres, Aerial surveys, Stratosphere, Atmospheric composition, Air masses, Mass transfer, Chemical properties, Profiles, Turbulent diffusion, Desiccation

Vertical profiles of N_2O and NOy taken by the ER-2 aircraft outside both polar vortices are used to construct average vertical profiles of F(NOy)=NOy/(A-N_2O), where A is the tropospheric content of N_2O three years prior to the measurements. The Southern Hemisphere had less nitrous oxide in the range 400 <theta<470 K, by up to 25% relative to the Northern Hemisphere. F(NOy) is the ratio of NOy produced to N_2O lost in a stratospheric air mass since entry from the troposphere. The profiles of F(NOy) have the following characteristics: (1) relative to 1991-92, a year without denitrification inside or outside the vortex, the Northern Hemisphere in 1988-89 showed denitrification outside the vortex ranging up to 25% and averaging 17% above theta=425 K. (2) Relative to the Northern Hemisphere in 1991-92, the Southern Hemisphere in 1987 showed denitrification outside the vortex ranging up to 32% and averaging 20% above theta=400 K. (3) Below theta=400 K the Southern Hemisphere showed enhancements of F(NOy) relative to the Northern Hemisphere in 1991-92 ranging up to 200% at theta=375 K, outside the vortex. Comparison of F(NOy) and R(H_2O) below 400 K outside the antarctic vortex leads to the suggestion that dehydration in the antarctic vortex occurs by the sedimentation of ice crystals large enough to fall out of the stratosphere, whereas denitrification occurs mainly on mixed nitric acid-water crystals which evaporate below the base of the vortex at theta=400 K but above the tropopause. (Auth. mod.)

49-1229

Climatology of large-scale isentropic mixing in the arctic winter stratosphere from analyzed winds.

Dahlberg, S.P., Bowman, K.P., *Journal of geophysical research,* Oct. 20, 1994, 99(D10), p.20,585-20,599, 25 refs.

Polar atmospheres, Climatology, Atmospheric composition, Atmospheric circulation, Stratosphere, Turbulent diffusion, Wind direction, Air entrainment

49-1230

Evolution of the 1991-1992 arctic vortex and comparison with the Geophysical Fluid Dynamics Laboratory SKYHI general circulation model.

Strahan, S.E., et al, *Journal of geophysical research,* Oct. 20, 1994, 99(D10), p.20,713-20,723, 13 refs.

Polar atmospheres, Atmospheric circulation, Stratosphere, Profiles, Air temperature, Ozone, Seasonal variations, Fluid dynamics, Simulation

49-1231

Analysis of snow feedbacks in 14 general circulation models.

Randall, D.A., et al, *Journal of geophysical research,* Oct. 20, 1994, 99(D10), p.20,757-20,771, 21 refs.

Climatology, Snow cover distribution, Snow cover effect, Snow melting, Albedo, Cloud cover, Surface temperature, Temperature variations, Mathematical models, Simulation

49-1232

Evidence for ice clouds causing polar mesospheric summer echoes.

Inhester, B., Klostermeyer, J., Lübken, F.J., von Zahn, U., *Journal of geophysical research,* Oct. 20, 1994, 99(D10), p.20,937-20,954, 40 refs.

Polar atmospheres, Cloud physics, Radar echoes, Wave propagation, Scattering, Heterogeneous nucleation, Ice crystal size, Ice electrical properties

49-1233

Stratospheric ozone variability in high latitudes from microwave observations.

Kulikov, IU.IU., et al, *Journal of geophysical research,* Oct. 20, 1994, 99(D10), p.21,109-21,116, 24 refs.

Polar atmospheres, Atmospheric density, Stratosphere, Profiles, Ozone, Spectroscopy, Sounding, Microwaves, Radiation absorption, Periodic variations, Antarctica—Mirnyy Station

Results of microwave studies of stratospheric ozone above ca. 20 km in both arctic and antarctic regions in the years 1986-1990 are presented. Measurements were performed with a ground-based spectral heterodyne receiver. The technique is based on the measurements of atmospheric ozone emission in lines of rotational transitions corresponding to frequencies of about 102 and 142 GHz. The main result of the investigations is the detection of rather strong stratospheric ozone variability above 20 km. The characteristic timescales of these variations extend from a few hours in some periods of observation to periods of days, weeks, or months. (Auth. mod.)

49-1234

Arctic bioremediation—a case study.

Liddell, B.V., Smallbeck, D.R., Ramert, P.C., *SPE production & facilities,* May 1994, p.132-136, 3 refs.

Arctic landscapes, Oil spills, Gravel, Soil pollution, Soil microbiology, Soil tests, Hydrocarbons, Degradation, Environmental tests, Simulation, United States—Alaska—Point Thomson

49-1235

Transition from winter to early spring in the eastern Weddell Sea, Antarctica: plankton biomass and composition in relation to hydrography and nutrients.

Scharek, R., et al, *Deep-sea research I,* Aug. 1994, 41(8), p.1231-1250, 55 refs.

Oceanographic surveys, Marine biology, Hydrography, Plankton, Biomass, Seasonal variations, Ice cover effect, Ice melting, Subglacial observations, Antarctica—Weddell Sea

Hydrography and nutrient distribution in relation to plankton biomass and composition were studied during two transects (Oct. and Dec.) that crossed the ice-covered eastern Weddell Sea (approximately along the Greenwich Meridian) from the ice edge at 58S to the continental margin at 70 deg 30'S in 1986. Despite the very low levels of plankton biomass encountered under sea ice in late winter, distinct differences, particularly in diatom abundance and species composition, were present between the northern, eastward-flowing and southern, westward-flowing limbs of the Weddell Gyre. On the basis of species composition and physiological state of diatom assemblages, the higher biomass of the northern limb is attributed to entrainment of plankton-rich water from the ice-free Circumpolar Current rather than to *in situ* growth. The pelagic community characteristic of the region under the pack ice throughout the study was dominated by nanoflagellates, ciliates and heterotrophic dinoflagellates. Break-up and melt of the ice cover in early Dec. occurred simultaneously over an extensive area yet did not elicit biomass build-up, even at the northern ice edge where favorable growth conditions appeared to prevail. (Auth. mod.)

49-1236

Chronostratigraphy of glaciations and permafrost episodes in the Cordillera of western North America.

Harris, S.A., *Progress in physical geography,* Sep. 1994, 18(3), p.366-395, Refs. p.389-395.

Pleistocene, Quaternary deposits, Glaciation, Glacial geology, Geocryology, Permafrost distribution, Permafrost indicators, Stratigraphy, Soil dating, Geochronology

49-1237

Qualitative view of sub-ice-sheet landscape evolution.

Shaw, J., *Progress in physical geography,* June 1994, 18(2), p.159-184, Refs. p.181-184.

Ice sheets, Glacial geology, Glacial erosion, Glacial hydrology, Geomorphology, Landscape development, Subglacial observations, Ice solid interface, Bedrock, Sediment transport

49-1238
Study of the charge distribution in winter thunderclouds by means of network recording of surface electric fields and radar observation of cloud structure in the Hokuriku District.
Michimoto, K., *Journal of atmospheric electricity,* Jan. 1993, 13(1), p.33-46, 15 refs.
Atmospheric electricity, Cloud electrification, Cloud physics, Polarization (charge separation), Electric fields, Ice crystals, Snowflakes, Ice electrical properties, Radar echoes, Japan—Hokuriku

49-1239
Geomorphological mapping in alpine environments—an example of a region near Salzburg. [Geomorphologische Kartierung alpiner Gebiete—Erfahrungen an einem Beispiel aus dem Voralpengebiet bei Salzburg]
Stocker, E., *Österreichischen Geographischen Gesellschaft. Mitteilungen,* 1993, Vol.135, p.161-174, In German with English summary. 34 refs.
Alpine landscapes, Geomorphology, Landforms, Mapping, Landscape types, Classifications, Austria—Alps

49-1240
Road weather information systems. Volume 1: research report.
Boselly, S.E., III, Doore, G.S., Thornes, J.E., Ulberg, C., Ernst, D.D., *U.S. Strategic Highway Research Program. Report,* 1993, SHRP-H-350, 219p., PB94-190287, Refs. p.193-219.
Road icing, Road maintenance, Ice detection, Ice forecasting, Frost forecasting, Weather forecasting, Cost analysis

49-1241
Road weather information systems. Volume 2: implementation guide.
Boselly, S.E., III, Doore, G.S., Ernst, D.D., *U.S. Strategic Highway Research Program. Report,* 1993, SHRP-H-351, 82p., PB94-190295.
Road icing, Road maintenance, Weather forecasting, Data processing

49-1242
Combined Detailed Test Plan for the Preproduction Qualification Test (PPQT) of the High Mobility Multipurpose Wheeled Vehicle (HMMWV), Block II Mod (arctic phase) and the Production Qualification Test (PQT) of the High Mobility Multipurpose Wheeled Vehicle (HMMWV), Expanded Capacity Vehicle (ECV).
Patyk, G.L., U.S. Army Test and Evaluation Command TECOM Project No.1-VG-HMV-078/086, Fort Greely, AK, U.S. Army Cold Regions Test Activity, Oct. 1994, 24p. + appends., 17 refs.
Motor vehicles, Engine starters, Military equipment, Cold weather tests

49-1243
Ice loads on offshore structures: a software development.
Derradji-Aouat, A., *National Research Council Canada. Institute for Marine Dynamics. Institute report,* May 1994, IR-1994-10, p.507-517, 18 refs. Presented at the 26th Annual Offshore Technology Conference, Houston, May 2-5, 1994.
Ice solid interface, Ice loads, Ice pressure, Ice cover strength, Ice creep, Offshore structures, Computer programs

49-1244
Ice features in Northumberland Strait.
Williams, F.M., Kirby, C.S., *National Research Council Canada. Institute for Marine Dynamics. Test report,* June 1994, TR-1994-08, 14p. + appends., 8 refs.
Ice surveys, Ice cover thickness, Pressure ridges, Ice override, Ice pileup, Canada—Northumberland Strait

49-1245
Phytosociological study of the vegetation in the Ny-Ålesund area, Spitsbergen.
Kobayashi, K., *Antarctic record,* July 1994, 38(2), p.157-177, With Japanese summary. 15 refs.
Plant ecology, Vegetation patterns, Biogeography, Norway—Spitsbergen

49-1246
Field measurement of the photosynthesis of mosses with a portable CO_2 porometer at Langhovde, East Antarctica.
Ino, Y., *Antarctic record,* July 1994, 38(2), p.178-184, With Japanese summary. 14 refs.
Mosses, Plant ecology, Plant physiology, Photosynthesis, Antarctica—Langhovde Hills
The photosynthesis of mosses was measured with a portable CO_2 porometer (modified Koito KIP9000) at Langhovde, East Antarctica in Jan. 1988. An assimilation chamber, 10 cm x 10 cm x 6.5 cm, which was made for this measurement, was used in collecting data for 9 h in Sample 1 and 11 h in Sample 2. Samples were mixed communities of *Bryum pseudotriquetrum* and *Ceratodon purpureus* (Sample 1) and *C. purpureus* (Sample 2) collected in the Yukidori Valley, Langhovde. Both samples had high respiration rates. Net photosynthetic rates were negative at low irradiance and changed to positive rates at high irradiance. Maximum photosynthetic rates were higher than those of other mosses measured with other equipment (analyzer: Horiba VIA-300, assimilation chamber: Koito MC-A3W) in the Yukidori Valley in the same period. (Auth.)

49-1247
1994 weather in the Southeast. The February ice storm and the July flooding.
Lott, N., Ross, T., *U.S. National Climatic Data Center. Research Customer Service Group. Technical report,* Oct. 12, 1994, No.94-03, n.p.
Ice storms, Floods, Accidents, Cost analysis, United States

49-1248
Polar ozone.
Solomon, S., et al, *World Meteorological Organization. Global Ozone Research and Monitoring Project. Report,* [1990], No.20, Scientific assessment of stratospheric ozone: 1989. Volume 1., p.1-161, Refs. p.145-161.
DLC QC881.2.O9S35 1990
Polar atmospheres, Ozone, Atmospheric composition, Polar stratospheric clouds
Ozone depletion, or the ozone hole, has been observed with the return of sunlight in the early antarctic spring every September since 1978. Though some loss has also been detected in the Arctic where the atmosphere begins to warm prior to the return of sunlight, the loss is much less than in the Antarctic, averaging about 5% as opposed to 50% with losses as much as 95% recorded locally at altitudes of 10-25 km, and apparently occurs relatively earlier, in January or February of the arctic winter. It is proposed that the ozone hole, especially in the Antarctic, is due to a process where polar stratospheric clouds (PSCs) consisting of nitric acid trihydrate ($HNO_3 3/3H_2O$) ice particles provide surfaces on which chlorine released from the breakdown of chlorofluorocarbons (CFCs) by sunlight forms hydrogen chloride (HCl) and chlorine nitrate ($ClONO_2$) which then, also in the presence of sunlight, undergo heterogeneous chemical reactions yielding chlorine monoxide (ClO) which initiates the catalytic destruction of ozone.

49-1249
Trends '93: a compendium of data on global change.
Boden, T.A., ed, Kaiser, D.P., ed, Sepanski, R.J., ed, Stoss, F.W., ed, Oak Ridge, TN, Oak Ridge National Laboratory, Carbon Dioxide Information Analysis Center, 1994, 984p. + appends., Refs. passim.
Global change, Atmospheric composition, Air pollution, Carbon dioxide, Ice cores, Paleoclimatology
This document provides synopses of frequently used global-change data. This third issue of the Trends series presents historical and modern records of atmospheric concentrations of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), two chlorofluorocarbons (CFC-11 and CFC-12), a hydrochlorofluorocarbon (HCFC-22), and two halons (H-1301 and H-1211) from an expanded number of globally distributed data sets. Virtually all of the modern records extend into the 1990s, some into 1994. Additional trace gas data presented in Trends '93 include historical atmospheric CO_2, CH_4, and N_2O records derived from ice cores. Updated global emissions estimates through 1992 are also presented for CFC-11 and CFC-12. In addition, Trends '93 updates and expands the presentation of long-term temperature records, whose spatial coverage ranges from an individual antarctic (ice core) site to the entire globe and from the Earth's surface to the lower stratosphere. The data records from Antarctica were obtained from the Amundsen-Scott, Byrd, Halley, Palmer, Showa, Siple, and Vostok stations and Law Dome ice cores. (Auth. mod.)

49-1250
Expedition Noril'sk/Taymyr 1993 of the AWI research unit Potsdam.
Melles, M., et al, *Berichte zur Polarforschung,* 1994 ld No.148, p.3-25, 8 refs.
Expeditions, Lacustrine deposits, Sediments, Hydrogeochemistry, Russia—Noril'sk, Russia—Taymyr Peninsula, Russia—Severnaya Zemlya

49-1251
Expedition Bunger Oasis 1993/94 of the AWI research unit Potsdam.
Melles, M., Kulbe, T., Overduin, V.V., Verkulich, S., *Berichte zur Polarforschung,* 1994, No.148, p.27-80, 40 refs.
Expeditions, Sediments, Lacustrine deposits, Hydrology, Antarctica—Bunger Hills, Antarctica—Edisto Channel, Antarctica—Thomas Island, Antarctica—Geologists Island
The field work in Bunger Oasis was part of a bilateral research project, now running for about 3 years, with the Arctic and Antarctic Research Institute (AARI), St. Petersburg. The objective of the project is a contribution to the understanding of the late Quaternary environmental history of East Antarctica. For this purpose different natural data archives of the palaeoenvironmental conditions, such as marine and lacustrine sediments, other terrestrial deposits, water bodies, and ice masses, will be sampled and investigated in four ice-free coastal areas (oases) of East Antarctica, namely: (1) Schirmacher Oasis, (2) Untersee Oasis, (3) Bunger Oasis, and (4) Jetty Oasis. The expedition to Bunger Oasis, Wilkes Land, during the 1993-94 summer season was the second within the scope of the bilateral project. The first joint expedition was carried out in the Schirmacher and Untersee Oases, Queen Maud Land, in 1991-92; the sample and datum sets from these areas will be completed in 1994-95. An expedition to Jetty Oasis, Mac. Robertson Land, will be undertaken within the next five years. (Auth.)

49-1252
Expedition ARCTIC '93 Leg ARK-IX/4 of RV *Polarstern*. [Die Expedition ARCTIC '93 der Fahrtabschnitt ARK-IX/4 mit FS *Polarstern* 1993]
Fütterer, D.K., ed, *Berichte zur Polarforschung,* 1994, No.149, 244p, 18 refs.
Expeditions, Sea ice, Water chemistry, Marine biology, Marine geology, Arctic Ocean, Barents Sea, Russia—Laptev Sea

49-1253
Role of polar deep water formation in global climate change.
Hay, W.W., *Annual review of earth and planetary sciences,* 1993, Vol.21, p.227-254, 74 refs.
DLC QE1.A674
Sea water, Chemical composition, Climatic changes, Ocean currents, Antarctica—Weddell Sea
The processes and conditions under which deep water is formed in the open ocean and on continental shelves are reviewed. Favored locations in both arctic and antarctic regions are identified and characterized as being few in number, small in size, but strong in influence. Research milestones in which the controlling mechanisms were identified and described are highlighted. Significant deep water formation processes between continental shelf and open ocean are compared and contrasted, and the dominant influence of sea water temperature and chemistry is explained.

49-1254
Meltwater input to the southern ocean during the last glacial maximum.
Shemesh, A., Burckle, L.H., Hays, J.D., *Science,* Dec. 2, 1994, 266(5190), p.1542-1544, 25 refs.
Algae, Hydrogeochemistry, Sediments, Meltwater, —South Atlantic Ocean, —South Indian Ocean
Three records of oxygen isotopes in biogenic silica from deep-sea sediment cores from the Atlantic and Indian sectors of the southern ocean reveal the presence of isotopically depleted diatomaceous opal in sediment from the last glacial maximum. This depletion is attributed to the presence of lids of meltwater that mixed with surface water along certain trajectories in the southern ocean. An increase in the drainage from Antarctica or extensive northward transport of icebergs are among the main mechanisms that could have produced the increase in meltwater input to the glacial southern ocean. Similar isotopic trends were observed in older climatic cycles at the same cores. (Auth.)

49-1255
Variation of major trace elements in some lakes at Terra Nova Bay (Antarctica): December 1990-February 1991.
Caprioli, R., Falchi, G., Gragnani, R., Torcini, S., Casaccia (Italy), Ente per l'Nuove Tecnologie l'Energia e l'Ambiente, 1993, 22p., DE94775295, 11 refs.
Lake water, Salinity, Hydrogeochemistry, Antarctica—Terra Nova Bay, Antarctica—Inexpressible Island, Antarctica—Edmonson Point
The chemical composition data on lake waters sampled in the area of Edmonson Point, Carezza, Inexpressible I., Andersson Ridge and Tarn Flat are presented and discussed. The averages of total dissolved solids (TDS) of each lake range from 95 mg/l to 3765 mg/l. The chemical composition is characterized by high contents of Na and Cl. During the sampling period, the salinity showed constant or increasing values. The processes that condition this behavior are examined and discussed. In general, the concentration of trace elements does not reveal any significant trend over time, and only the nickel content in the lakes changes with increase in salinity. (Auth.)

49-1256

Ice-rafted debris associated with binge/purge oscillations of the Laurentide Ice Sheet.

Alley, R.B., MacAyeal, D.R., *Paleoceanography,* Aug. 1994, 9(4), p.503-511, 26 refs.

Sediments, Ice rafting, Models, Canada—Northwest Territories—Hudson Strait

49-1257

Global chemical erosion during the last glacial maximum and the present: sensitivity to changes in lithology and hydrology.

Gibbs, M.T., Kump, L.R., *Paleoceanography,* Aug. 1994, 9(4), p.529-543, 56 refs.

Chemical composition, Erosion, Lithology, Hydrology, Global change

49-1258

Indirect influence of ozone depletion on climate forcing by clouds.

Toumi, R., Bekki, S., Law, K.S., *Nature,* Nov. 24, 1994, 372(6504), p.348-351, 30 refs.

Ozone, Climatic changes, Clouds (meteorology), Atmospheric composition

It is shown that ozone depletion may also exert an indirect effect on radiative forcing via its effect on the oxidation state of the atmosphere. Hydroxyl (OH) radicals in the troposphere are produced by photodissociation of tropospheric ozone in the presence of water vapor, and this process is enhanced if the absorption of ultraviolet radiation by the overlying stratospheric ozone column decreases. As OH oxidizes SO_2 to sulphuric acid, which then forms cloud condensation nuclei, variations in tropospheric OH concentration can influence cloud albedo. The authors use a global two-dimensional model forced by observed changes in stratospheric ozone to calculate the consequent changes in production of sulphuric acid over the past decade, and thus to estimate the effect on cloud albedo. It appears that this indirect effect of ozone depletion may decrease radiative forcing (via increased cloud reflectively) by at least as much as the direct effect. Graphic displays included with this essay depict global changes of hydroxyl radicals and sulphuric acid to about 85 deg N and S latitudes at altitudes to 300 hPa. (Auth. mod.)

49-1259

Stop-and-go GPS in Antarctica.

Hulbe, C.L., Whillans, I.M., *Surveying and land information systems,* Sep. 1993, 53(3), p.150-158, 10 refs.

Rheology, Ice creep, Strain measuring instruments, Radio communication, Ice surveys, Mapping, Antarctica—West Antarctica

A strain grid on the surface of the West Antarctic Ice Sheet was surveyed by continuously tracking phase from antennas on moving sleds towed by snowmobiles. The grid covers a 25 km by 10 km region on a fast-flowing stream of ice within the ice sheet. At least four such anomalous currents are now active. Their origins and implications are yet to be determined, but they may indicate the collapse of the ice sheet. The objective of this work is to study horizontal gradients in strain rate to determine the internal mechanical controls on the streaming ice flow. In operation, geodetic-quality Global Positioning System (GPS) receivers acted as reference bases. Two similar receivers were towed on sleds to each of the stations of the grid. The stations were steel conduit poles set vertically in the snow. The sled was pulled next to the station, and the GPS antenna was placed on top of the pole for 25 seconds or longer. At least two GPS vectors to each station were obtained. (Auth.)

49-1260

Secular changes in rotation and gravity: evidence of post-glacial rebound or of changes in polar ice?

Wahr, J., Han, D.Z., Trupin, A., Lindqvist, V., *Advances in space research,* Nov. 1993, 13(11), p.(11)257-(11)269, 35 refs.

Gravity, Periodic variations, Glaciology, Polar regions, Land ice

Observed linear trends in the position of the Earth's rotation axis, in the length-of- day, and in the Earth's gravity field have often been interpreted as evidence of post-glacial rebound. These observations have been used, together with dynamical models of the rebound, to provide constraints on the Earth's viscosity profile. The authors use results from a numerical rebound model to discuss these constraints. They also discuss the possibility that some of the observed secular effects could be due to on-going or recent changes in ice sheet volumes. For Antarctica, they conclude that the effects could easily be as large as, or larger than, the effects of post-glacial rebound. (Auth.)

49-1261

Earth rotation and global change.

Jochmann, H., et al, *Advances in space research,* Nov. 1993, 13(11), p.(11)271-(11)280, 8 refs.

Global change, Sea level, Climatic factors, Ice sheets, Seasonal variations

Investigations of global change require information from different fields of geosciences. Since global change is accompanied by mass redistribution in the atmosphere, the hydrosphere and the cryosphere, influences on the Earth's rotation can be expected. Studies of relations between climate change and Earth rotation showed a statistical correlation between the variation of different climate parameters and the length of day; However, a physical proof failed. This fact induced the authors to use the results of theoretical climate models for estimating possible influences on Earth rotation. Therefore, the excitation of polar motion and the antarctic ice sheet were studied. A further subject discussed is the influence of climate change on the parameters of the seasonal variations of polar motion. (Auth.)

49-1262

Monitoring continental ice sheets by satellite altimetry.

Rémy, F., Minster, J.F., Féménias, P., *Advances in space research,* Nov. 1993, 13(11), p.(11)353-(11)359, 32 refs.

Ice sheets, Ice surface, Mapping, Spaceborne photography, Height finding

Altimeter data are helpful in monitoring the evolution of polar caps as well as in constraining their dynamics. In recent years the authors have quantified the impact of the so-called volume echo in the determination of the surface height, analyzed the effect of surface roughness on the intensity of the radar signal, adapted an inverse technique for mapping the topography of the ice sheets and its error, including correction of the surface slope effect and, finally, used the antarctic ice sheet topography deduced from Seasat data to estimate the rheological parameters of the ice flow. (Auth.)

49-1263

Bacterial standing stock, activity, and carbon production during formation and growth of sea ice in the Weddell Sea, Antarctica.

Grossmann, S., Dieckmann, G.S., *Applied and environmental microbiology,* Aug. 1994, 60(8), p.2746-2753, 59 refs.

Sea ice, Ice formation, Bacteria, Microbiology, Antarctica—Weddell Sea

During initial ice formation, concentrations of bacterial cells in the order of 1×10^8 to 3×10^8/liter were not enhanced within the ice matrix. This suggests that physical enrichment of bacteria by ice crystals is not effective. As soon as the ice had formed, the general metabolic activity of bacterial populations was strongly suppressed. Furthermore, the ratio of [^{3}H] leucine incorporation into proteins to [^{3}H] thymidine incorporation into DNA changed during ice growth. In thick pack ice, bacterial activity recovered and growth rates up to 0.6/day indicated actively dividing populations. However, biomass-specific utilization of organic compounds remained lower than in open water. Bacterial concentrations of up to 2.8×10^9 cells/liter along with considerably enlarged cell volumes accumulated within thick pack ice, suggesting reduced mortality rates of bacteria within the small brine pores. In the course of ice development, bacterial carbon production increased from about 0.01 to 0.4 microgram C/liter/h. In thick ice, bacterial secondary production exceeded primary production of microalgae. (Auth. mod.)

49-1264

Survival, physical response, and recovery of enteric bacteria exposed to a polar marine environment.

Smith, J.J., Howington, J.P., McFeters, G.A., *Applied and environmental microbiology,* Aug. 1994, 60(8), p.2977-2984, 54 refs.

Low temperature research, Bacteria, Microbiology, Ecology, Antarctica—McMurdo Station

Survival, sublethal injury, and recoverability of *Escherichia coli, Enterococcus faecalis, Salmonella typhimurium,* and *Yersinia enterocolitica* were investigated by using diffusion chambers over 54 to 56 days of *in situ* exposure to a polar marine environment (-1.8 C; salinity, 34.5 ppt) at McMurdo Station. Plate counts were used to assess recoverability and injury, whereas direct viable counts (DVCs) and 5-cyano-2,3- ditolyl tetrazolium chloride (CTC) reduction were used to determine substrate responsiveness and respiratory activity, respectively. Sublethal injury was greater in populations of indicator bacteria than in pathogens. DVCs, CTC reduction, and plate counts indicated progressive increases in viable but nonculturable cells in *E. coli, S. typhimurium,* and *Y. enterocolitica* cultures throughout the 54-day exposure. Forty-eight day exposure of *E. coli, S. typhimurium,* and *Y. enterocolitica* resulted in decreased optimal incubation temperatures for colony formation and inability to form colonies at 37 C. Percentages of respiring *E. coli* and *S. typhimurium* increased significantly upon addition of nutrients at all temperatures tested, indicating that nutrient availability rather than temperature limited the enteric bacterial activity in this very cold environment. Large nutrient inputs to low-temperature marine environments may thus allow for long-term persistence of enteric bacteria in a nonrecoverable state. (Auth. mod.)

49-1265

Holocene glacier variations in the Terra Nova Bay area (Victoria Land, Antarctica).

Baroni, C., Orombelli, G., *Antarctic science,* Dec. 1994, 6(4), p.497-506, Refs. p.504-505.

Glacier oscillation, Glaciation, Ice volume, Pleistocene, Antarctica—Terra Nova Bay

Information on Holocene glacier variations in Antarctica is limited and sometimes contradictory. However, if the behavior of the glaciers during the recent past can be clarified, their sensitivity to climatic changes can be evaluated and their contribution to sea level variation may be predicted. Through the study of local glaciers and floating ice shelves in the Terra Nova Bay area, new information has been gathered. Between 7500 and 5000 BP, after the glacial retreat which followed the Last Glacial Maximum, the Nansen Ice Sheet and the Hells Gate ice shelf were a few km less extensive than they are now. During the second half of the Holocene, both the local glaciers and the ice shelves advanced to positions that were more extensive than their present ones, although not all the variations are adequately dated. A retreat phase of the Edmonson Point glacier occurred during the late Middle Ages between 920-1050 A.D. and 1270-1400 A.D., as documented by ten ^{14}C dates obtained from shells in ice-cored moraines. A subsequent advance occurred after the 15th century in a period corresponding to the Little Ice Age. (Auth.)

49-1266

Snow surface temperatures in West Antarctica.

Morris, E.M., Vaughan, D.G., *Antarctic science,* Dec. 1994, 6(4), p.529-535, 23 refs.

Snow temperature, Ice shelves, Ice sheets, Climatic changes, Antarctica—Antarctic Peninsula, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Snow temperatures measured at ca. 10 m depth over the period 1957-1992 have been used to derive a map of mean annual snow surface temperature corrected to sea level over the Antarctic Peninsula and Filchner-Ronne Ice Shelf. Multiple linear regression analysis was used to calculate rates of change with latitude, longitude, altitude and time, for data to the west and east of the topographic divide running along the spine of the Antarctic Peninsula. Climate warming on the Filchner-Ronne Ice Shelf follows the trend observed at Halley Bay, a coastal station nearby. High spatial variability leads to uncertainty in the temporal trend for mean annual snow surface temperature in the Antarctic Peninsula, but there is some indication that the large trends observed at Faraday and Marguerite Bay, two stations on the west coast of the peninsula, are attenuated inland. (Auth.)

49-1267

Monitoring of katabatic wind-coastal polynya interaction using AVHRR imagery.

Cotton, J.H., Michael, K.J., *Antarctic science,* Dec. 1994, 6(4), p.537-540, 23 refs.

Wind factors, Polynyas, Sea ice distribution, Imaging, Air water interactions, Radiometry

Coastal polynyas, which form around the antarctic coast due to persistent katabatic winds, play an important role in enhancing air-sea interaction. This paper discusses how thermal imagery from the Advanced Very High Resolution Radiometer (AVHRR) can be used to track the direction of katabatic winds, and hence to facilitate research into air-sea interaction. (Auth.)

49-1268

Proceedings.

European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990, Pyle, J.A., ed, Harris, N.R.P., ed, Air pollution research report 34, Brussels, Commission of the European Communities, [1991], 306p., Refs. passim. For selected papers see 49-1269 through 49-1306 or I-51628 through I-51637.

DLC QC879.73.P6P65 1991

Polar atmospheres, Stratosphere, Polar stratospheric clouds, Atmospheric composition, Atmospheric circulation, Ozone

Most of the more than 50 papers deal mainly with ozone in the northern polar stratosphere, including both field observations and laboratory experiments, but 10 papers are pertinent to Antarctica. The workshop was divided into four sessions: polar ozone, chemical processes, polar stratospheric clouds, and modeling. Currently the most widely accepted theory is that ozone is destroyed by reactions involving chlorine and to a lesser extent bromine compounds, and that polar stratospheric clouds play important roles in chemical conversion, dehydration and denitrification.

49-1269

Column amounts of trace gases derived from ground based IR-spectroscopic measurements in the north polar winter.

Adrian, G.P., et al, European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.25-28, 4 refs.

Polar atmospheres, Atmospheric composition, Ozone, Infrared spectroscopy

49-1270
In situ profile observations of long-lived trace gases in the lower arctic stratosphere during winter.
Schmidt, U., Bauer, R., Brod, M., Khedim, A., Klein, E., Kulessa, G., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.29-32, 8 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Ozone

49-1271
Airborne measurements of column abundances of NO_2, OClO, and BrO in the arctic winter during AASE 1989.
Schiller, C., Wahner, A., Platt, U., Dorn, H.P., Callies, J., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.33-36, 8 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Ozone

49-1272
Comparison of ground-based SAOZ and satellite TOMS total ozone observations at polar latitudes.
Goutail, F., Pommereau, J.P., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.37-40, 3 refs.
Polar atmospheres, Atmospheric composition, Ozone, Solar radiation

Global total ozone distributions have been observed by TOMS since 1978, in particular above Antarctica where the experiment provided most of the knowledge of the geographic and time extension of the ozone hole. However, because ultraviolet ground-based instruments like Dobson and Brewer spectrophotometers are not operating at solar zenith angles larger than 80-82 deg SZA, no validation of TOMS data at high latitude in winter, the time of the ozone hole, is available. Total ozone measurements in the visible Chappuis bands with a diode array spectrometer now make observations possible up to 91 deg SZA throughout the year at the polar circle. Long series of data from instruments installed at three different polar stations: Dumont d'Urville since Jan. 1988, Søndre Strømfjord in Greenland since Nov. 1988, Kiruna in Sweden and Sodankyla in Finland during winter campaigns in 1988 and 1990, are now available. They have been systematically compared to TOMS overhead observations. (Auth.)

49-1273
Ground-based total ozone measurements in the visible Chappuis bands.
Pommereau, J.P., Goutail, F., Pinharanda, M., Piquard, J., Sarkissian, A., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.41-44, 6 refs.
Polar atmospheres, Atmospheric composition, Ozone, Solar radiation

49-1274
Stratospheric O_3, NO_2, OClO, and BrO measured by ground-based UV-Vis spectroscopy at Søndre Strømfjord Greenland during winter 1989/1990.
Perner, D., Klüpfel, T., Parchatka, U., Roth, A., Jörgensen, T., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.45-48, 4 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Ozone, Greenland—Søndre Strømfjord

49-1275
Variations in stratospheric ozone concentrations at Spitsbergen in summer 1989 and spring 1990.
Hakola, H., Junila, P., Laurila, T., Joffre, S.M., Damski, J., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.49-52, 4 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Ozone, Norway—Spitsbergen

49-1276
Atmospheric ozone abundances measured in Ny-Ålesund/Spitsbergen in winter 89/90.
Fabian, R., Neuber, R., Krüger, B.C., Braathen, G., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.53-56, 3 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Ozone, Norway—Spitsbergen

49-1277
Recent ozone sounding and total ozone observations from northern Europe and Antarctic Peninsula and the long-term climatology of the lower stratosphere in northern Finland.
Taalas, P., Kyrö, E., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.57-60, 10 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Ozone, Finland

49-1278
Groundbased spectroscopic trace gas measurements in the arctic stratosphere during winter 1989/90.
Fiedler, M., Frank, H., Gomer, T., Hausmann, M., Pfeilsticker, K., Platt, U., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.61-64, 5 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Ozone

49-1279
Overnight decay of NO_2 as observed at Halley Bay and calculated from ozone and temperature profiles.
Keys, J.G., Gardiner, B.G., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.69-72, 4 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Ozone, Diurnal variations, Antarctica—Halley Station

The decay of NO_2 after sunset is governed by the temperature and the local concentration of ozone, as NO_2 is converted first to NO_3 by reaction with ozone, and thence to N_2O_5. Calculations of the sunrise-to-sunset ratio of NO_2 have been made for Halley Bay, based on balloon-borne ozone and temperature profiles in the autumn and spring of 1987, a year in which the ozone depletion was particularly marked. In regions where the ozone and temperature profiles show a steep vertical gradient, the calculated sunrise-to-sunset ratios of NO_2 will be rather sensitive to altitude. These calculations can be reconciled with simultaneous measurements of column NO_2 by ground-based visible spectrometry at Halley Bay, provided that the bulk of the NO_2 layer is assumed to lie at a height of about 25 km, well above the center of the ozone depletion region. (Auth.)

49-1280
Positive correlation of total column of nitrogen dioxide with ozone in the boundary zone of the antarctic polar vortex during the spring time.
Gil, M., Cacho, J., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.73-76, 11 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Atmospheric circulation, Ozone, Antarctica—Marambio Station

A high positive correlation of NO_2 with ozone has been found in the Antarctic Peninsula (Marambio Station) during the ozone depletion period. Observations were carried out from Sep. to Nov. of 1989 by ground-based differential absorption spectrometry. NO_2 total amounts remained at low levels until the end of Oct. From that date, a steady increase occurred, doubling in value in less than one month. Oscillation with an 11 day period and amplitudes of 30% of total column in both NO_2 and ozone show the strong modulation of these constituents by planetary wave activity in the late stages of vortex life.

49-1281
Star-pointing UV-visible spectrometer for ground-based measurements of constituents in the polar stratosphere.
Roscoe, H.K., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.91-94, 6 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Ozone

49-1282
Proposed ground-based microwave radiometer (GMR) at 278 GHz, to measure N_2O, ClO, HNO_3, O_3 and HCN in the antarctic stratosphere.
Roscoe, H.K., Farman, J.C., Waters, J.W., Kerridge, B.J., Matheson, D.N., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.95-98, 6 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Ozone, Radiometry

Because significant antarctic ozone depletion occurs below 20 km, a radiometer with sufficient bandwidth to measure ClO down to 18 km simultaneously with other constituents which emit near 278 GHz would be especially useful during winter and spring in Antarctica, because by observing N_2O and HCN, the timing and extent of downward motion (descent) would be determined. Descent of stratospheric air is necessary for the high levels of HCl and $ClNO_3$ which give rise to the observed high levels of ClO in the spring; HNO_3 is important to the creation of the ozone hole; and there are no measurements of ozone throughout winter in Antarctica. Microwave radiometers have important advantages over other ground-based sensors for the following reasons: they can observe throughout the winter night; signals are negligibly attenuated by ice clouds and PSCs; signals are only weakly dependent on atmospheric temperature; measurements of ClO are possible; and profiles of concentration can be retrieved, with a vertical resolution of about 10 km or better. (Auth. mod.)

49-1283
Soviet investigations of the ozone layer in the Arctic and Antarctic during winter- spring time.
Kokin, G.A., Khattatov, V.U., IUshkov, V.A., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.119-121.
Polar atmospheres, Stratosphere, Atmospheric composition, Ozone, Antarctica—Molodezhnaya Station, Antarctica—Mirnyy Station

Regular studies of the ozone layer in spring at Molodezhnaya and Mirnyy stations were initiated in 1987. Four spring-time campaigns have been conducted during which ozone vertical distribution was measured using balloon and rocket-borne ozonometers, while for total ozone measurements ground-based spectrophotometers were used. Comparisons with data from other antarctic stations have shown good agreement of the observational results, with the general picture of the detected abnormal ozone depletion and its relationship with thermobaric structure and circulation. Analysis of the sets of total ozone observations has demonstrated that, as a rule, maximum ozone values are simultaneous with the periods of stratospheric warmings. In Oct. in the Indian sector of the Antarctic a large meridional total ozone gradient was observed, resulting in total ozone increase from 350 up to 450 DU, with subsequent decrease within the circumpolar vortex. Such investigations seem to be important for the study of the global balance of ozone and of processes responsible for its redistribution. (Auth. mod.)

49-1284
Reactions related to "ozone hole" chemistry in low temperature solids.
Sodeau, J.R., Johnstone, D.E., Thomas, D.A., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.129-132, 13 refs.
Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Ozone, Photochemical reactions

49-1285

Recent studies of chlorine oxide radical reactions potentially important for polar ozone chemistry.

Hayman, G.D., Jenkin, M.E., Cox, R.A., Parr, A.D., Wayne, R.P., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.133-136, 12 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Ozone

Elevated concentrations of the ClO radical and the OClO molecule have been measured in the springtime polar stratospheres. Renewed interest in the gas-phase chemistry of halogen oxide radicals has resulted from these measurements because of their role in the major losses of ozone observed over Antarctica at these times. OClO itself does not cause ozone depletion but acts as a tracer for BrO radicals which are involved in ozone depletion. The reaction between BrO and ClO radicals is the only known source for OClO in the atmosphere. The UV-absorption spectrum of Cl_2O_3 has been recorded and quantified using chemical mass balance. The spectral parameters were then used to derive thermochemical data for the reaction forming Cl_2O_3. (Auth. mod.)

49-1286

Quantitative analysis of the products of the ClO self reaction at low temperatures.

Birk, M., Friedl, R.R., Cohen, E.A., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.137-140, 8 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Ozone

The relative intensities of individual rotational absorption lines of ClOCl (precursor), ClO, ClOOCl and OClO have been measured in the submillimeter wave region around 400 GHz. Stark measurements were taken to estimate the dipole moments of ClOCl and ClOOCl thus allowing calculation of relative concentrations. At low initial ClO concentrations, ClOOCl product accounts entirely for the reacted ClO within experimental uncertainty. It follows that ClOOCl is the major product of the ClO self reaction at polar stratospheric conditions. (Auth. mod.)

49-1287

Rate constants and branching ratios for the reactions BrO + BrO and BrO + ClO at 298 K.

Lancar, I.T., Laverdet, G., Le Bras, G., Poulet, G., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.141-142.

Polar atmospheres, Stratosphere, Atmospheric composition, Ozone

49-1288

Studies of the ClO absorption cross-section between 240 and 310 nm, the ClO self- reaction and the ClO reaction with CH_3O_2 at 300 K.

Simon, F.G., Schneider, W., Moortgat, G.K., Burrows, J.P., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.143-146, 2 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Ozone

49-1289

Temperature dependence of the reaction between NO_3 and ClO.

Biggs, P., Canosa-Mas, C.E., Parr, A.D., Wayne, R.P., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.147-150, 1 ref.

Polar atmospheres, Stratosphere, Atmospheric composition, Ozone

49-1290

Chloryl chloride, $ClClO_2$—a novel chlorine oxide.

Müller, H.S.P., Willner, H., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.157-161, 20 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Ozone

49-1291

Photochemical investigations on the atmospheric chlorine-reservoir compounds HOCl and Cl_2O_2.

Vogt, R., Schindler, R.N., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.167-171, 10 refs.

Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Ozone, Photochemical reactions

49-1292

Identification of polar stratospheric clouds from the ground by visible spectrometry.

Sarkissian, A., Pommereau, J.P., Goutail, F., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.193-196, 11 refs.

Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Ozone

49-1293

Observation of polar stratospheric clouds above Spitsbergen.

Neuber, R., Krüger, B.C., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.197-202, 9 refs.

Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Ozone, Norway—Spitsbergen

49-1294

Polar stratospheric cloud observations over the antarctic continent at Dumont d'Urville.

Godin, S., Mégie, G., Stefanutti, L., Morandi, M., Del Guasta, M., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.203-206, 4 refs.

Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Ozone, Antarctica—Dumont d'Urville Station

The Polar Ozone Lidar Experiment (POLE) is organized under an Italian-French cooperation program for antarctic research, in the framework of the Italian National Program for Antarctic Research (PNRA) and the Territories des Terres Australes et Antarctiques Françaises (TAAF). The first step in this program was the implementation at Dumont d'Urville of a lidar designed for both tropospheric cloud and stratospheric aerosol measurements. The system operates at 0.53 micron, with a linearly polarized laser pulse and a repetition rate of 4 Hz. Both the signals in the parallel and perpendicularly polarized planes relative to the emitted laser radiation are collected; thus depolarization induced by non-spherical particles, such as ice crystals, is measured. The system was transported to Dumont d'Urville in Dec. 1988 and started operation in Jan. 1989. The lidar was operated twice a week until the end of Apr. 1989 for stratospheric aerosol measurements. The frequency of these measurements was then increased throughout the winter and spring in order to provide an appropriate database on PSCs. Typically during the polar night, averaging was performed over 500 shots (2.5 minutes), while 2000 shots (10 minutes) were necessary during daytime conditions. Beginning with June, whenever stratospheric lidar measurements were performed daily the meteorological conditions were favorable. (Auth. mod.)

49-1295

Temperature measurement in the presence of PSCs by rotational Raman lidar.

Chanin, M.L., Hauchecorne, A., Nedeljkovic, D., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.207-210, 2 refs.

Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Air temperature, Lidar, Ozone

49-1296

In-situ particle measurements in the lower stratosphere: design and first results of a measuring system.

Below, M., Georgi, B., Krasenbrink, A., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.211-214.

Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Ozone

49-1297

Modelling of orographically forced, stratospheric waves over northern Scandinavia.

Volkert, H., Schumann, U., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.215-218, 9 refs.

Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Topographic effects, Ozone

49-1298

Simulation model for the formation of polar stratospheric clouds.

Larsen, N., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.219-222.

Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Cloud physics, Nucleation, Ozone

49-1299

Aerosol induced ozone depletion.

Pitari, G., Visconti, G., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.223-226, 5 refs.

Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Ozone, Volcanic ash, Aerosols

49-1300

Heterogeneous ozone reduction in the arctic stratosphere. A model study of long term changes.

Rognerud, B., Stordal, F., Isaksen, I.S.A., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.235-238, 6 refs.

Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Atmospheric circulation, Ozone, Global change

49-1301

On the interannual variability of the stratospheric polar region in winter.

Labitzke, K., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.239-242, 4 refs.

Polar atmospheres, Stratosphere, Atmospheric circulation, Air temperature, Ozone

49-1302

Stratospheric ozone observations in Antarctica since 1985.

Gernandt, H., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.249-253.

Polar atmospheres, Stratosphere, Atmospheric composition, Ozone, Antarctica—Georg Forster Station

Regular balloon-borne ozone observations have been performed at Georg Forster (GF) Station since 1985. These long-term data are considered with similar measurements between 1986 and 1990 made at other antarctic stations. The long-term mean stratospheric ozone distribution calculated from GF data is shown graphically. In regard to the polar night vertical ozone distribution, two depleted regions can be identified: one as the spring depletion and the other appearing with increasing solar radiation during the polar day. (Auth.)

49-1303

Influence of reduced polar ozone on the stratospheric circulation: a three- dimensional model study.

Dameris, M., Berger, U., Günther, G., Müller, S., Ebel, A., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.255-262, 2 refs.

Polar atmospheres, Stratosphere, Atmospheric circulation, Ozone

49-1304

Seasonal behavior of NO_2 total column at polar circle.

Pirre, M., Le Texier, H., Goutail, F., Pommereau, J.P., Ramaroson, R., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.263-266, 7 refs.

Polar atmospheres, Atmospheric composition, Atmospheric circulation, Diurnal variations, Seasonal variations, Ozone, Antarctica—Dumont d'Urville Station

NO_2 and O_3 total column have been monitored for almost 3 years at Dumont d'Urville and for 2 years at Søndre Strømfjord, Greenland by ground-based visible spectrometry. NO_2 total column and its "diurnal variation" display repeated seasonal behavior. Seasonal variations of the NO_2 column are very similar in both hemispheres, even though seasonal variations of ozone total column are very different. Discussion here is limited to the Southern Hemisphere. First comparisons with model simulations are shown for the seasonal variation of the total column of NO_2 and of its "diurnal variation". (Auth.)

49-1305

Simulation of Noxon Cliff in a three-dimensional model with diurnal variations during an unperturbed winter.

Ramaroson, R., Cariolle, D., Pirre, M., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.267-270, 10 refs.

Polar atmospheres, Atmospheric composition, Atmospheric circulation, Diurnal variations, Computerized simulation, Ozone

49-1306

Backward trajectories for measurements of long-lived species in a strong flow around the polar vortex during the development of a midwinter warming.

Petzoldt, K., Schmidt, U., European Workshop on Polar Stratospheric Ozone Research, 1st, Schliersee, Germany, Oct. 3-5, 1990. Proceedings. Edited by J.A. Pyle and N.R.P. Harris, Brussels, Commission of the European Communities, [1991], p.271-274.

Polar atmospheres, Atmospheric composition, Atmospheric circulation, Ozone

49-1307

Global snow depth climatology.

Foster, D.J., Jr., Davy, R.D., *U.S. Air Force Environmental Technical Applications Center. Report,* Dec. 1988, USAFETAC/TN-88/006, 45p., Refs. p.9-17.

Snow surveys, Snow depth

49-1308

North Warning Airship Program. Final overview.

Bailey, D., Mueller, W., Warminster, PA, Naval Air Development Center, Apr. 6, 1987, n.p.

Aircraft, Logistics, Military equipment, Military operation, Cold weather operation, Cold weather performance, Warning systems, Radar, Stations, Cost analysis

49-1309

Considering moisture when deciding what to do with a problematic low-slope roof.

Tobiasson, W., MP 3510, Low-Slope Reroofing Workshop, Oak Ridge, TN, May, 24-25, 1994. Proceedings, Oak Ridge, TN, Oak Ridge National Laboratory, 1994, p.65-76, 17 refs.

Roofs, Moisture detection, Waterproofing, Vapor barriers, Thermal insulation, Ventilation

Moisture is particularly important to consider when selecting a reroofing option. In order to make an intelligent selection, it should be determined if moisture is present in the existing system. Some moisture can be detected non-destructively by nuclear, capacitance, or infrared roof moisture surveys. Such findings should be verified by core samples taken in areas expected to be wet and others expected to be dry. Since the roof may have been damaged in the past by moisture that has since dissipated, roof moisture surveys will not find all moisture-related problems in all roofs. Visual inspections and test cuts are needed to determine if corrosion, delamination, or other problems exist. Other tests (e.g., in-place wind uplift tests) may also be needed to determine the extent to which moisture has damaged the existing system. Test cuts and cores used to verify roof moisture survey findings provide evidence on the composition of the roof. All this information should influence the selection of a reroofing option.

49-1310

Reroofing the windiest place on earth with a modified bitumen protected membrane.

Tobiasson, W., Buska, J., MP 3509, Low-Slope Reroofing Workshop, Oak Ridge, TN, May, 24-25, 1994. Proceedings, Oak Ridge, TN, Oak Ridge National Laboratory, 1994, p.207-220, 15 refs. For another version see 48-3962.

Roofs, Waterproofing, Vapor barriers, Thermal insulation, Weatherproofing, Wind factors, Bitumens

In a protected membrane roofing system, insulation is placed above the membrane to keep the waterproofing layer out of harm's way. Ballast holds the extruded polystyrene insulation in place and protects it from the sun and traffic. Such a roof was installed several years ago for a building on the windy summit of Mt. Washington in New Hampshire. The loose-laid membrane leaked. Recently it was replaced with a fully- adhered modified-bitumen protected membrane. The design rationale and installation of the new system at this wet, windy place are discussed. The installation was successful and the new roofing system is performing well.

49-1311

Frost-heave phenomena of ^{4}He on porous glasses.

Hiroi, M., Mizusaki, T., Tsuneto, T., Hirai, A., Eguchi, K., *Physical review B. Condensed matter,* Oct. 1, 1989, 40(10), p.6581-6590, 33 refs.

DLC QC176.A1P513

Cryogenics, Low temperature research, Frost heave, Liquefied gases, Phase transformations, Porous materials

49-1312

Use of drainage wicks for the mitigation of frost effects on existing roadways.

D'Andrea, R.A., Sage, J.D., Geosynthetics '89 Conference, San Diego, CA, St. Paul, MN, Industrial Fabrics Association International, [1989], p.305-315, 5 refs.

Road maintenance, Subgrade maintenance, Subgrade soils, Frost resistance, Frost protection, Thaw consolidation, Soil stabilization, Drains, Subsurface drainage, Geotextiles

49-1313

Technetium-99 and cesium-134 as long distance tracers in arctic waters.

Aarkrog, A., et al, *Estuarine, coastal and shelf science,* 1987, Vol.24, p.637-647, 23 refs.

Radioactive isotopes, Radioactive wastes, Water pollution, Ocean currents

49-1314

Search for latitudinal trends in the effective half-life of fallout ^{137}Cs in vegetation of the Canadian Arctic.

Taylor, H.W., Hutchison-Benson, E., Svoboda, J., *Canadian journal of botany,* 1985, Vol.63, p.792-796, With French summary. 24 refs.

Fallout, Air pollution, Soil pollution, Tundra, Plant ecology, Plant physiology, Plant tissues, Nutrient cycle, Canada

49-1315

Examination of the thermal behavior of a gravel background and its influence on passive infrared intrusion detection.

Lacombe, J., MP 3511, 35th annual meeting, Naples, FL, July 17-20, 1994. Proceedings, Northbrook, IL, Institute of Nuclear Materials Management, 1994, p.324-329, 7 refs.

Infrared reconnaissance, Warning systems, Detection, Sensors

A paper presented by the author at the 1993 INMM annual meeting described a study which compared the suitability of five different surface types (sand, asphalt, grass, concrete and gravel) as backgrounds for a passive thermal infrared intrusion detection system (IDS). Experimental surface temperature and meteorological data recorded during July '92 at a test site in New Hampshire were utilized in the study as well as models for predicting intruder surface temperature and infrared IDS performance. For the period investigated, the predicted number of "missed" intruder crossings was lowest for the gravel surface. This raised the question as to whether gravel backgrounds are preferable in general for such an IDS application. A follow-up investigation was initiated at a test site in Vermont to address this issue. This study examines the thermal behavior of a gravel bed and how it influences both the nuisance alarm rate and the intruder detection capability of an infrared IDS. Experimental results for this gravel bed and an adjacent grassy area are presented in this paper. A simple model is also described which is used to examine the influence of gravel aggregate size, vegetative and structural "clutter" and wind speed on gravel surface temperatures.

49-1316

Impact of the winter environment on intrusion detection systems buried in soil or gravel.

Peck, L., MP 3522, 35th annual meeting, Naples, FL, July 17-20, 1994. Proceedings, Northbrook, IL, Institute of Nuclear Materials Management, 1994, p.358-365, 6 refs.

Warning systems, Detection, Sensors, Underground cables, Snow cover effect, Frozen ground thermodynamics, Cold weather performance

Buried intrusion detection systems (IDSs) are commonly emplaced in soil or gravel, with perhaps a layer of sand surrounding the IDS. The detection capabilities of ground-motion IDSs, such as optical fiber systems and ported coaxial cable IDSs depend on the elastic properties and unfrozen moisture content of the burial media, respectively, which in turn depend on the frozen-unfrozen status of the media. Results of controlled intrusions against ported coaxial cable and optical fiber IDSs are presented to show the magnitude of changes in detection capability associated with the freezeup of the burial media. Numerical simulations of heat transfer and freeze-thaw penetration in soil, done for several moisture contents, show that the presence of a sand layer surrounding the sensor cable is beneficial for ported coaxial cable IDSs. Optical fiber IDSs have better and more consistent detection capability year-round when buried in gravel than in soil.

49-1317

Alaska research sites. Juneau, Office of the Governor, Alaska Science and Engineering Advisory Commission, 1989, 263p.

Research projects, Stations, Regional planning, United States—Alaska

49-1318

Late winter microbial communities in the western Weddell Sea (Antarctica).

Kivi, K., Kuosa, H., *Polar biology,* Aug. 1994, 14(6), p.389-399, Refs. p.398-399.

Microbiology, Cryobiology, Sea water, Sea ice, Antarctica—Weddell Sea

Microbial communities in the water column and sea ice were studied during the EPOS cruise on R/V *Polarstern* in the western Weddell Sea in late winter (Oct.-Nov. 1988). Samples were taken in 4 transects from heavy pack-ice to open water. The results indicated the important role of protozoans, especially in the ice-edge area. Heterotrophic nanoflagellates, dinoflagellates, ciliates and sarcodines showed significant positive correlations with chlorophyll *a*. Autotrophic picoplankton and autotrophic flagellates, which were probably motile zooids of *Phaeocystis pouchetii,* were most abundant in the areas of low to medium chlorophyll *a* concentration. Sea ice contained high numbers of heterotrophic organisms, and the distribution of the different groups showed distinct vertical zonation. At two sites, the microbial assembly beneath the ice was clearly influenced by communities from the melting ice. (Auth.)

49-1319

Ice margins and deglaciation in the Berlin area between Brandenburg and Frankfurt end moraines—a review.

Böse, M., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.1-6, With German summary. 33 refs.

Pleistocene, Geomorphology, Ice sheets, Glacier oscillation, Meltwater, Glacial deposits, Moraines, Landforms, Landscape development, Germany

49-1320

Late-Glacial landscape evolution in the Bjergsted area, Denmark.

Christiansen, H.H., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.7-17, With German summary. 11 refs.

Pleistocene, Geomorphology, Ice sheets, Glacier oscillation, Glacier melting, Glacial deposits, Landscape development, Landforms, Periglacial processes, Denmark

49-1321

Late Weichselian deglaciation of Denmark: some general problems.

Humlum, O., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.19-33, With German summary. 52 refs.

Pleistocene, Ice sheets, Glacier oscillation, Glacier ablation, Glacier beds, Shear strength, Snow air interface, Wind factors, Radiation balance, Denmark

49-1322

Morpho- and lithogenetic diversification of the Pomeranian Phase in western and central Pomerania.

Karczewski, A., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.35-48, With German summary. 15 refs.

Pleistocene, Glaciation, Glacial geology, Moraines, Geomorphology, Landforms, Outwash, Glacier beds, Stratigraphy, Poland

49-1323

Dynamics of the last Scandinavian ice-sheet and glaciodislocation metamorphism of unconsolidated deposits in west central Poland: a terminological approach.

Kozarski, S., Kasprzak, L., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.49-58, With German summary. 30 refs.

Pleistocene, Ice sheets, Glacial geology, Geomorphology, Glacial deposits, Stratigraphy, Classifications, Terminology, Poland

49-1324

New approach to Late Weichselian ice sheet dynamics in western Poland.

Krzyszkowski, D., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.59-67, With German summary. 24 refs.

Pleistocene, Ice sheets, Glacial geology, Glacier oscillation, Glacial deposits, Periodic variations, Moraines, Stratigraphy, Geomorphology, Poland

49-1325

Lithostratigraphy and sedimentology of a coastal cliff, NW Poland.

Persson, K.M., Lagerlund, E., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.69-76, With German summary. 12 refs.

Pleistocene, Ice sheets, Glacier oscillation, Glacial geology, Glacial deposits, Stratigraphy, Lithology, Poland

49-1326

Dead-ice features at the maximum extent of the last glaciation in northeastern Poland.

Marks, L., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.77-83, With German summary. 18 refs.

Pleistocene, Ice sheets, Glacier oscillation, Glacial deposits, Moraines, Geomorphology, Poland

49-1327

Dynamics of the last ice sheet within the territory of Belarus.

Matveev, A.V., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.85-89, With German summary. 6 refs.

Pleistocene, Ice sheets, Glacier oscillation, Glacial geology, Geomorphology, Stratigraphy, Glacial deposits, Belarus

49-1328

Geomorphological sedimentological and structural records of ice front dynamics during the Upper Plenivistulian: an example from the southeastern part of the Chelmno- Dobrzyn Lakeland.

Niewiarowski, W., Wysota, W., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.95-104, With German summary. 20 refs.

Pleistocene, Ice sheets, Glacier oscillation, Glacial geology, Geomorphology, Landforms, Glacial deposits, Poland

49-1329

Autoplastic gravity structures in Mecklenburg-Vorpommern (Germany).

Peterss, K., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.105-118, With German summary. 19 refs.

Pleistocene, Glacial deposits, Sediment transport, Lithology, Geomorphology, Soil mechanics, Deformation, Germany

49-1330

Stagnant ice features in the eastern Baltic.

Raukas, A., Karukäpp, R., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.119-125, With German summary. 20 refs.

Pleistocene, Ice sheets, Glacier ablation, Geomorphology, Glacial deposits, Landforms

49-1331

Simrishamn diamicton—a glacioaquatic sediment in southeastern Skåne, Sweden.

Sorby, L., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.127-140, With German summary. 19 refs.

Pleistocene, Ice sheets, Glacial deposits, Glacial geology, Glacier ablation, Sedimentation, Stratigraphy, Glacial lakes, Sweden

49-1332

Problem of the Warsaw ice-dammed lake drainage through the Warsaw-Berlin Pradolina at the last ice-sheet maximum.

Wiśniewski, E., Andrzejewski, L., *Zeitschrift für Geomorphologie,* Sep. 1994, Vol.95-suppl., International Symposium on Last Ice Sheet Dynamics and Deglaciation in the North European Plain, Poznań, Poland, May 4-9, 1992. Edited by M. Böse et al, p.141-149, With German summary. 13 refs.

Pleistocene, Ice sheets, Glacier ablation, Glacial lakes, Ice dams, Subglacial drainage, Sedimentation, Geomorphology, Germany

49-1333

Hydrological cycle model for global research.

IUshkov, V.P., *Russian meteorology and hydrology,* 1993, No.6, p.19-26, Translated from Meteorologiia i gidrologiia. 7 refs.

Climatology, Global change, Hydrologic cycle, Precipitation (meteorology), Moisture transfer, Snow hydrology, Snowmelt, Runoff, Mathematical models, Long range forecasting

49-1334

Variability in extreme air frost dates in the Russian plain.

Minin, A.A., *Russian meteorology and hydrology,* 1993, No.6, p.82-86, Translated from Meteorologiia i gidrologiia. 5 refs.

Air temperature, Plains, Meteorological data, Frost, Seasonal variations, Statistical analysis, Records (extremes), Russia

49-1335

Interfacial kinetics effect in planar solidification problems without initial undercooling.

Charach, C., Zaltzman, B., Götz, I.G., *Mathematical models and methods in applied sciences,* June 1994, 4(3), p.331-354, 28 refs.

Stefan problem, Solutions, Solidification, Liquid solid interfaces, Phase transformations, Freezing front, Freezing points, Thermodynamics, Mathematical models

49-1336

Numerical study of convection heat transfer during the melting of ice in a porous layer.

Zhang, X.L., Nguyen, T.H., *Numerical heat transfer A,* May 1994, 25(5), p.559-574, 10 refs.

Ice physics, Ice melting, Phase transformations, Heat transfer, Convection, Ice water interface, Liquid phases, Stratification, Mathematical models

49-1337

Use of control specimens in freezing and thawing testing of concrete.

Rutherford, J.H., Langan, B.W., Ward, M.A., *Cement, concrete, and aggregates,* June 1994, 16(1), p.78-82, 1 ref.

Concrete durability, Frost resistance, Concrete admixtures, Freeze thaw tests, Freeze thaw cycles, Degradation, Cold weather tests, Standards, Accuracy

49-1338

Bacterial magnetite and the magnetic properties of sediments in a Swedish lake.

Snowball, I.F., *Earth and planetary science letters,* Aug. 1994, 126(1-3), p.129-142, 26 refs.

Limnology, Subpolar regions, Paleoecology, Icebound lakes, Lacustrine deposits, Bottom sediment, Diagenesis, Microbiology, Magnetic properties, Remanent magnetism, Sweden—Abisko

49-1339

Climatic adaptation of Norway spruce *(Picea abies* (L.) Karsten) in Finland based on male flowering phenology.

Kuomajoki, A., *Acta Forestalia Fennica,* 1993, No.242, 28p., With Finnish summary. 61 refs.

Trees (plants), Phenology, Plant ecology, Biogeography, Pollen, Subarctic landscapes, Acclimatization, Cold tolerance, Temperature effects, Degree days, Finland

49-1340
Ice cover influence on transverse bed slopes in a curved alluvial channel.
Tsai, W.F., Ettema, R., *Journal of hydraulic research,* 1994, 3(4), p.561-581, With French summary. 30 refs.
River flow, River ice, Channels (waterways), Ice cover effect, Ice water interface, Hydraulics, Bottom sediment, Sediment transport, Topographic effects, Simulation, Analysis (mathematics)

49-1341
Occurrence of photosynthetic flagellates in an ice-covered fishpond.
Polorný, J., Elster, J., Hammer, L., *Archiv für Hydrobiologie,* June 1994, Suppl.73, p.99-110, 19 refs.
Limnology, Ponds, Algae, Ecology, Sampling, Water chemistry, Subglacial observations, Ice cover effect, Snow cover effect, Photosynthesis, Light effects

49-1342
Winter phytoplankton dynamics in a subalpine lake, Colorado, U.S.A.
Spaulding, S.A., Ward, J.V., Baron, J., *Archiv für Hydrobiologie,* Dec. 1993, 129(2), p.179-198, 59 refs.
Limnology, Plankton, Biomass, Sampling, Growth, Water chemistry, Nutrient cycle, Seasonal variations, Subglacial observations, Ice cover effect, United States—Colorado—Rocky Mountain National Park

49-1343
Principal regulating mechanism on the structure of the phytoplankton community in a high mountain lake.
Reche, I., Sanchez-Castillo, P., Carrillo, P., *Archiv für Hydrobiologie,* Apr. 1994, 130(2), p.163-178, 60 refs.
Limnology, Algae, Ecology, Biomass, Growth, Sampling, Nutrient cycle, Meltwater, Water chemistry, Seasonal variations, Spain—Sierra Nevada

49-1344
Reefal coralline algal build-ups within the Arctic Circle: morphology and sedimentary dynamics under extreme environmental seasonality.
Freiwald, A., Henrich, R., *Sedimentology,* Oct. 1994, 41(5), p.963-984, 72 refs.
Marine biology, Marine deposits, Sedimentation, Ocean bottom, Algae, Growth, Ecology, Seasonal variations, Norwegian Sea

49-1345
Effects of a polymeric, nonequilibrium "antifreeze" upon ice growth from water.
Knight, C.A., DeVries, A.L., *Journal of crystal growth,* Oct. 1994, 143(3-4), p.301-310, 28 refs.
Ice physics, Marine biology, Ice growth, Solutions, Antifreezes, Polymers, Ice water interface, Adsorption, Molecular structure, Orientation

49-1346
Growth of an intermittent ice sheet in Iceland during the Late Pliocene and Early Pleistocene.
Geirsdóttir, A., Eiríksson, J., *Quaternary research,* Sep. 1994, 42(2), p.115-130, 72 refs.
Pleistocene, Ice sheets, Glaciation, Glacier oscillation, Quaternary deposits, Age determination, Paleoclimatology, Climatic changes, Stratigraphy, Iceland

49-1347
Extent and timing of the last glacial maximum in southwestern Alaska.
Mann, D.H., Peteet, D.M., *Quaternary research,* Sep. 1994, 42(2), p.136-148, 69 refs.
Pleistocene, Glaciation, Glacier oscillation, Glacial geology, Glacier thickness, Moraines, Quaternary deposits, Radioactive age determination, Stratigraphy, United States—Alaska—Alaska Peninsula

49-1348
Maryland's strategies for fighting winter storms.
Keseling, J.R., *Public works,* Apr. 1994, 125(4), p.40-42.
Winter maintenance, Road maintenance, Snowstorms, Snow removal, Cold weather operation

49-1349
Snow and ice control excellence with routing software.
Waddell, B., *Public works,* Sep. 1994, 125(10), p.72-74.
Road maintenance, Winter maintenance, Snow removal, Ice control, Logistics, Cost analysis, Computer programs, Computer applications

49-1350
Deicer plays vital role in winter bridge maintenance. *Public works,* July 1994, 125(8), p.33-35.
Bridges, Road maintenance, Winter maintenance, Salting, Sensors, Chemical ice prevention, Cold weather performance, Environmental protection

49-1351
Setting up that snowplow—a pro looks at the do's and don'ts. *Public works,* July 1994, 125(8), p.34-35.
Winter maintenance, Road maintenance, Snow removal, Cold weather operation

49-1352
Retreaded tires keep the plows moving. *Public works,* July 1994, 125(8), p.45.
Winter maintenance, Road maintenance, Snow removal, Tires, Traction

49-1353
Road Weather Information System improves traffic safety.
Juhl, G.M., *Public works,* July 1994, 125(8), p.50-51.
Road maintenance, Winter maintenance, Ice control, Ice forecasting, Safety, Meteorological data, Sensors, Data processing, Computer programs

49-1354
Temperature and the biogeographical distributions of species.
Jeffree, E.P., Jeffree, C.E., *Functional ecology,* Oct. 1994, 8(5), p.640-650, 35 refs.
Biogeography, Ecology, Cold weather survival, Air temperature, Temperature distribution, Seasonal variations, Statistical analysis, Correlation

49-1355
Glancing angle X-ray scattering from single crystal ice surfaces.
Lied, A., Dosch, H., Bilgram, J.H., *Physica B,* Apr. 1, 1994, 198(1-3), International Conference on Surface X-ray and Neutron Scattering, 3rd, Dubna, Russia, June 24-29, 1993. Proceedings. Edited by H.J. Lauter et al, p.92-96, 13 refs.
Ice physics, Ice crystal structure, Ice crystal optics, Ice microstructure, Surface structure, X ray analysis, Specular reflection, Scattering, Analysis (mathematics)

49-1356
Effects of crustal structure under the Barents and Kara Seas on shore-period regional wave propagation for Novaya Zemlya explosions: empirical relations.
Zhang, T.R., Lay, T., *Seismological Society of America. Bulletin,* Aug. 1994, 84(4), p.1132-1147, 44 refs.
Oceanography, Seismology, Ocean bottom, Geologic structures, Sounding, Seismic reflection, Wave propagation, Attenuation, Explosion effects, Nuclear explosions, Barents Sea, Russia—Kara Sea, Russia—Novaya Zemlya

49-1357
Study of the solid-liquid state diagram of the water-glycine-sucrose system.
Shalaev, E.IU., Kanev, A.N., *Cryobiology,* Aug. 1994, 31(4), p.374-382, 18 refs.
Cryobiology, Freeze drying, Solutions, Frozen liquids, Phase transformations, Ice sublimation, Cooling rate, Temperature measurement, X ray diffraction, Chemical properties

49-1358
Model for thermal hysteresis utilizing the anisotropic interfacial energy of ice crystals.
Wilson, P.W., *Cryobiology,* Aug. 1994, 31(4), p.406-412, 29 refs.
Cryobiology, Ice physics, Antifreezes, Solutions, Ice water interface, Freezing points, Ice crystal structure, Anisotropy, Interfacial tension, Surface energy, Models

49-1359
Phase equilibrium for methane hydrate from 190 to 262 K.
Makogon, T.Y., Sloan, E.D., Jr., *Journal of chemical & engineering data,* Apr. 1994, 39(2), p.351-353, 14 refs.
Natural gas, Clathrates, Hydrates, Thermodynamic properties, Stability, Freezing points, Ice vapor interface, Phase transformations, Low temperature tests

49-1360
On the possibility of monitoring the moisture content and temperature of frozen soils.
Poliakov, V.M., Tishchenko, IU.G., Chukhlantsev, A.A., *Journal of communications technology and electronics,* Sep. 1994, 39(7), p.59-63, Translated from Radiotekhnika i elektronika. 7 refs.
Frozen ground physics, Frozen ground temperature, Permafrost depth, Dielectric properties, Microwaves, Radiometry, Brightness, Temperature measurement, Water content

49-1361
Development of a physiologically mechanistic model for use at the alpine treeline ecotone.
Cairns, D.M., *Physical geography,* Mar.-Apr. 1994, 15(2), p.104-124, 53 refs.
Forest ecosystems, Alpine tundra, Forest lines, Trees (plants), Growth, Plant physiology, Desiccation, Snow cover effect, Soil freezing, Models, United States—Montana—Glacier National Park

49-1362
Comparison of vegetation-topography relationships at the alpine treeline ecotone.
Brown, D.G., *Physical geography,* Mar.-Apr. 1994, 15(2), p.125-145, 47 refs.
Alpine landscapes, Forest ecosystems, Forest lines, Remote sensing, Vegetation patterns, Classifications, Topographic effects, Insolation, Altitude, Snow cover effect, United States—Montana—Glacier National Park, United States—Colorado—Rocky Mountain National Park

49-1363
Solar influences on Holocene treeline altitude variability in the Sierra Nevada.
Scuderi, L.A., *Physical geography,* Mar.-Apr. 1994, 15(2), p.146-165, 64 refs.
Alpine landscapes, Forest ecosystems, Forest lines, Altitude, Vegetation patterns, Growth, Insolation, Climatic changes, Periodic variations, United States—California—Sierra Nevada

49-1364
Tree-tundra competitive hierarchies, soil fertility gradients, and treeline elevation in Glacier National Park, Montana.
Malanson, G.P., Butler, D.R., *Physical geography,* Mar.-Apr. 1994, 15(2), p.166-180, 35 refs.
Alpine landscapes, Alpine tundra, Forest ecosystems, Forest lines, Altitude, Growth, Soil chemistry, Nutrient cycle, Plant ecology, United States—Montana—Glacier National Park

49-1365
Site characteristics of debris flows and their relationship to alpine treeline.
Butler, D.R., Walsh, S.J., *Physical geography,* Mar.-Apr. 1994, 15(2), p.181-199, 41 refs.
Alpine landscapes, Forest lines, Altitude, Mass flow, Geomorphology, Avalanche tracks, Sediment transport, Snow cover distribution, Topographic effects, United States—Montana—Glacier National Park

49-1366
Heterogeneous reaction of HOBr with HBr and HCl on ice surfaces at 228 K.
Abbatt, J.P.D., *Geophysical research letters,* Apr. 15, 1994, 21(8), p.665-668, 17 refs.
Atmospheric boundary layer, Ozone, Cloud physics, Atmospheric attenuation, Aerosols, Adsorption, Photochemical reactions, Ice vapor interface, Chemical properties, Simulation

49-1367
Stable isotopes in the basal silty ice preserved in the Greenland ice sheet at Summit; environmental implications.
Souchez, R., et al, *Geophysical research letters,* Apr. 15, 1994, 21(8), p.693-696, 17 refs.
Pleistocene, Ice sheets, Ice composition, Ice cores, Bottom ice, Ice growth, Isotope analysis, Origin, Greenland—Summit

49-1368
Experimental and numerical study of microwave thawing heat transfer for food materials.
Zeng, X., Faghri, A., *Journal of heat transfer,* May 1994, 116(2), p.446-455, 18 refs.
Microwaves, Colloids, Frozen liquids, Artificial thawing, Heat transfer, Thermal diffusion, Phase transformations, Liquid phases, Mathematical models

49-1369
Movements of Antarctic Circumpolar Current eddies at the eastern boundary of the Weddell Gyre according to satellite altimetry data. [Dvizhenie vikhrevykh obrazovaniĭ antarkticheskogo tsirkumpoliarnogo techeniia na vostochnoĭ granitse krugovorota Ueddella po dannym sputnikovoĭ al'timetrii]
Guretskiĭ, V.V., Danilov, A.I., Shtammer, D., *Akademiia nauk. Doklady,* May-June 1992, 324(1), p.191-195, In Russian. 10 refs.
Ocean currents, Oceanography, Ice water interface, Antarctica—Weddell Sea
The obtained data allow a more thorough understanding and assessment of the effect of the active eddy formation zone in the Antarctic Circumpolar Current on the distribution of drifting ice south of the area. One can propose an analogous eddy regime in similar regions of the circumpolar current (Kerguelen Plateau, south of New Zealand, and in the Pacific Ocean sector east of the Udintsev fracture zone). (Auth mod.)

49-1370
On a theory of ice ages. [K teorii lednikovykh periodov]
Monin, A.S., *Akademiia nauk. Doklady,* Oct. 1992, 326(5), p.811-816, In Russian. 10 refs.
Ice age theory, Mathematical models

49-1371
Geological history of the Innuitian fold belt basement on Ellesmere Island (Canadian Arctic Archipelago). [K istorii razvitiia osnovaniia innuitskogo skladchatogo poiasa na o. Elsmir (Kanadskiĭ Arkticheskiĭ arkhipelag)]
Lopatin, B.G., Chukhonin, A.P., Kos'ko, M.K., *Akademiia nauk. Doklady,* Jan. 1993, 328(2), p.217-220, In Russian. 11 refs.
Geology, Glacial geology, Isotope analysis, Geochemistry, Canada—Northwest Territories—Arctic Archipelago, Canada—Northwest Territories—Ellesmere Island

49-1372
Paleogeography of the Kerch Peninsula in the Holocene and Late Pleistocene. [K paleogeografii Kerchenskogo poluostrova v golotsene i kontse pozdnego pleĭstotsena]
Nikonov, A.A., Pakhomov, M.M., Cherkinskiĭ, A.E., Chichagova, O.A., *Akademiia nauk. Doklady,* Jan. 1993, 328(2), p.221-225, In Russian. 7 refs.
Pleistocene, Paleoclimatology, Soil formation, Soil surveys, Russia—Kerch Peninsula

49-1373
Petrology of nephrite deposits in southern Siberia. [Petrologiia nefritovykh mestorozhdeniĭ iuga Sibiri]
Sekerina, N.V., *Akademiia nauk. Doklady,* Apr. 1993, 329(4), p.493-496, In Russian. 13 refs.
Lithology, Chemical composition, Russia—Siberia

49-1374
Silver minerals in the layered intrusion complex of the Fedorova-Pansky tundra area, Kola Peninsula. [Mineraly serebra v rassloennom intruzivnom komplekse Federovoĭ-Panskikh tundr, Kol'skiĭ poluostrov]
Abzalov, M.Z., et al, *Akademiia nauk. Doklady,* Apr. 1993, 329(4), p.497-499, In Russian. 7 refs.
Minerals, Natural resources, Lithology, Tundra, Russia—Kola Peninsula

49-1375
New data on the geochemistry of magmatic rock in the Verkhnaya Talnakh intrusion, Northern Siberia. [Novye dannye po geokhimii magmaticheskikh porod Verkhneĭ Talnakhskoĭ intruzii (Sever Sibiri)]
Gladkikh, V.S., Gusev, G.S., Peskov, A.I., Tarnovetskiĭ, L.L., *Akademiia nauk. Doklady,* Apr. 1993, 329(5), P.631-633, In Russian. 5 refs.
Geochemistry, Lithology, Russia—Siberia

49-1376
Temperature threshold in the development of microbial communities from tundra soil. [Temperaturnyĭ porog pri razvitii metanogennogo ili atsetogennogo mikrobnogo soobshchestva iz pochvy tundry]
Zavarzin, G.A., Kotsiurbenko, O.R., Solov'eva, T.I., Nozhevnikova, A.N., *Akademiia nauk. Doklady,* Apr. 1993, 329(6), p.792-794, In Russian. 8 refs.
Soil microbiology, Tundra, Temperature effects

49-1377
Primary productivity and distribution of plankton in the Lena River estuary and adjacent region of the Laptev Sea. [Pervichnaia produktsiia i raspredelenie planktona v estuarii reki Leny i prilegaiushchem raĭone moria Laptevykh]
Sorokin, IU.I., Sorokin, P.IU., Protkova, IU.V., *Akademiia nauk. Doklady,* Dec. 1993, 333(4), p.522-525, In Russian. 13 refs.
Plankton, Biomass, Marine biology, Distribution, Russia—Lena River, Russia—Laptev Sea

49-1378
Energetics and the end of the current interglacial. [Energetika i konets sovremennogo intergliatsiala]
Klimenko, V.V., *Akademiia nauk. Doklady,* Jan. 1994, 334(1), p.54-56, In Russian. 10 refs.
Global change, Global warming, Climatic changes, Air temperature, Environmental impact

49-1379
Hydrocarbon source of large oil concentrations in the Neocomian deposits of Western Siberia. [Istochnik uglevodorodov gigantskikh skopleniĭ nefti v neokomskikh otlozheniiakh Zapadnoĭ Sibiri]
Karogodin, IU.N., *Akademiia nauk. Doklady,* Feb. 1994, 334(4), p.484-487, In Russian. 15 refs.
Crude oil, Hydrocarbons, Natural resources, Russia—Siberia

49-1380
Phase diagram of heavy ice at low temperatures and high pressures. [Fazovaia diagramma tiazhelogo l'da pri nizkikh temperaturakh i vysokikh davleniiakh]
Sirota, N.N., Zhapparov, K.T., *Akademiia nauk. Doklady,* Feb. 1994, 334(5), p.577-580, In Russian. 12 refs.
Deuterium oxide ice, Phase transformations

49-1381
Characteristics of the formation of mineral associations of cryogenic and subsurface supergene. [Osobennosti obrazovaniia mineral'nykh assotsiatsiĭ kriogennogo i glubinnogo gipergeneza]
Chernikov, A.A., Dorfman, M.D., Dvurechenskaia, S.S., *Akademiia nauk. Doklady,* Apr. 1994, 335(4), p.485-488, In Russian. 15 refs.
Permafrost, Chemical composition, Minerals, Geology, Lithology

49-1382
Model reconstruction of the global tropospheric and stratospheric composition and temperature in the last glacial and interglacial periods. [Model'naia rekonstruktsiia sostava i temperatury global'nykh troposfery i stratosfery v poslednie lednikovyĭ i mezhlednikovyĭ periody]
Karol', I.L., Kiselev, A.A., Frol'kis, V.A., *Akademiia nauk. Doklady,* June 1994, 336(4), p.525-528, In Russian. 12 refs.
Models, Ozone, Stratosphere, Paleoclimatology, Air temperature, Atmospheric composition

49-1383
Primary productivity and bacterioplankton in the Bering Sea and in the northern Pacific Ocean. [Pervichnaia produktsiia i bakterioplankton v Beringovom more i v severnoĭ chasti Tikhogo okeana]
Sorokin, IU.I., Sorokina, O.V., Mamaeva, T.I., Sorokin, P.IU., Grishin, IU.I., *Akademiia nauk. Doklady,* June 1994, 336(4), p.542-545, In Russian. 11 refs.
Biomass, Plankton, Bacteria, Marine biology, Microbiology, Bering Sea, Pacific Ocean

49-1384
Characteristics and mitigation of the snow avalanche hazard in Kaghan Valley, Pakistan Himalaya.
De Scally, F.A., Gardner, J.S., *Natural hazards,* Mar. 1994, 9(1-2), p.197-213, 34 refs.
Snow hydrology, Avalanche tracks, Damage, Safety, Countermeasures, Pakistan—Himalaya Mountains

49-1385
Oil-gas prospects of the Cretaceous complexes of the shelves of the Russian arctic seas.
Riabukhin, G.E., Zinin, V.A., *Petroleum geology,* May-June 1994, 28(5-6), p.141-144, Translated from Geologiia nefti i gaza.
Hydrocarbons, Natural gas, Ocean bottom, Geologic structures, Tectonics, Sediments, Exploration, Arctic Ocean

49-1386
Seed dispersal, seedling survival and habitat affinity in a snowbed plant: limits to the distribution of the snow buttercup, *Ranunculus adoneus*.
Scherff, E.J., Galen, C., Stanton, M.L., *Oikos,* Apr. 1994, 69(3), p.405-413, 60 refs.
Plant ecology, Plants (botany), Mountain soils, Meadow soils, Vegetation patterns, Distribution, Viability, Snowmelt, Snow cover effect

49-1387
Ion dependent luminescence of pulse-irradiated aqueous electrolyte solutions at very low temperatures. 1. Cation influence on the emission of polycrystalline chloride ices.
Wypych, M., Kroh, J., *Polish Academy of Sciences. Bulletin. Chemistry,* 1993, 41(4), p.279-285, 13 refs.
Ice physics, Radiation absorption, Low temperature tests, Luminescence, Solutions, Frozen liquids, Ion diffusion, Temperature effects, Spectra, Latticed structures

49-1388
Effects of temperature on fatigue and fracture.
Young, D.G., Danik, J.A., *Rubber chemistry and technology,* Mar.-Apr. 1994, 67(1), p.137-147, 15 refs.
Tires, Rubber, Fatigue (materials), Crack propagation, Low temperature tests, Shear strain, Temperature effects

49-1389
High benthic bacteria standing stock in deep arctic basins.
Kröncke, I., Tan, T.L., Stein, R., *Polar biology,* Aug. 1994, 14(6), p.423-428, 21 refs.
Marine biology, Oceanographic surveys, Bacteria, Sampling, Biomass, Sedimentation, Ecology, Barents Sea

49-1390
North East Water polynya (Greenland Sea). 2. Mechanisms of nutrient supply and influence on phytoplankton distribution.
Lara, R.J., Kattner, G., Tillmann, U., Hirche, H.J., *Polar biology,* Oct. 1994, 14(7), p.483-490, 25 refs.
Marine biology, Oceanographic surveys, Plankton, Distribution, Biomass, Growth, Nutrient cycle, Polynyas, Chlorophylls, Upwelling, Greenland Sea

49-1391
Northeast Water polynya, Greenland Sea. 3. Meso- and macrozooplankton distribution and production of dominant herbivorous copepods during spring.
Hirche, H.J., Hagen, W., Mumm, N., Richter, C., *Polar biology,* Oct. 1994, 14(7), p.491-503, 55 refs.
Marine biology, Oceanographic surveys, Plankton, Biomass, Distribution, Classifications, Ecology, Polynyas, Seasonal variations, Greenland Sea

49-1392
Interaction of acetylene, ethylene, and benzene with ice surfaces.
Silva, S.C., Devlin, J.P., *Journal of physical chemistry,* 1994, 98(42), p.10,847-10,852, 28 refs.
Ice physics, Ice spectroscopy, Hydrogen bonds, Amorphous ice, Hydrocarbons, Adsorption, Molecular structure, Molecular energy levels, Protons

49-1393
Measurements of the elasticity parameters and thickness of an ice cover along a hydroacoustic path.
Turchin, V.I., Khil'ko, A.I., Shirokov, V.N., *Acoustical physics,* 1994, 40(3), p.452-453, 2 refs.
Sea ice, Ice cover thickness, Ice elasticity, Underwater acoustics, Acoustic measurement, Wave propagation, Ice water interface, Ice cover effect

49-1394
'Blizzard of the century'—the storm of 12-14 March 1993 over the eastern United States.
Forbes, G.S., Blackall, R.M., Taylor, P.L., *Meteorological magazine,* July 1993, 122(1452), p.153-162, 4 refs.
Snowstorms, Precipitation (meteorology), Synoptic meteorology, Records (extremes), Atmospheric physics, Atmospheric circulation, Advection, United States

49-1395
Meteorological Office forecast road surface temperature model.
Rayer, P.J., *Meteorological magazine,* 1987, Vol.116, p.180-191, 6 refs.
Road icing, Ice forecasting, Surface temperature, Temperature variations, Meteorological factors, Mathematical models

49-1396
Enthalpy of frozen foods determined by differential compensated calorimetry.
Kerr, W.L., Ju, J., Reid, D.S., *Journal of food science,* May-June 1993, 58(3), p.675-679, 21 refs.
Freezers, Frozen liquids, Freezing points, Enthalpy, Temperature measurement, Thermodynamics, Accuracy

49-1397
Clay aerosols and arctic ice algae.
Tazaki, K., et al, *Clays and clay minerals,* Aug. 1994, 42(4), p.402-408, 35 refs.
Microbiology, Clay minerals, Aerosols, Algae, Sampling, Alimentation, Scanning electron microscopy, Microstructure, Snow composition, Snow impurities, Canada—Northwest Territories—Resolute

49-1398
Monitoring freeze-thaw cycles along north-south Alaskan transects using ERS-1 SAR.
Rignot, E.J.M., Way, J.B., *Remote sensing of environment,* Aug. 1994, 49(2), p.131-137, 22 refs.
Remote sensing, Forest ecosystems, Freeze thaw cycles, Detection, Spaceborne photography, Synthetic aperture radar, Backscattering, Sensor mapping, Growth, Seasonal variations, United States—Alaska

49-1399
Monitoring of environmental conditions in taiga forests using ERS-1 SAR.
Rignot, E.J.M., et al, *Remote sensing of environment,* Aug. 1994, 49(2), p.145-154, 20 refs.
Remote sensing, Spaceborne photography, Synthetic aperture radar, Taiga, Forest ecosystems, Forest canopy, Backscattering, Snow optics, Snow cover structure, Snow cover effect, Dielectric properties, Seasonal variations, United States—Alaska

49-1400
Ice clouds over Martian volcanoes: KRFM experimental data (Phobos Project).
Petrova, E.V., *Solar system research,* July 1993, 27(1), p.14-19, Translated from Astronomicheskii vestnik. 13 refs.
Mars (planet), Remote sensing, Extraterrestrial ice, Atmospheric composition, Cloud cover, Cloud physics, Ice crystal size, Ice volume, Aerosols, Photometry, Spectra, Brightness

49-1401
Small and planetary bodies of the solar system: the critical mass for icy bodies.
Sliuta, E.N., Voropaev, S.A., *Solar system research,* July 1993, 27(1), p.55-64, Translated from Astronomicheskii vestnik. 28 refs.
Extraterrestrial ice, Satellites (natural), Geomorphology, Geologic processes, Ice strength, Deformation, Gravity, Mechanical properties, Analysis (mathematics), Rheology

49-1402
Depth profiles of the dielectric permittivity for the cryolithosphere of Mars.
Andrianov, V.A., Kibardina, I.N., Kuz'min, R.O., *Solar system research,* May 1994, 27(6), p.505-511, Translated from Astronomicheskii vestnik. 13 refs.
Mars (planet), Geocryology, Extraterrestrial ice, Regolith, Cryogenic soils, Ground ice, Soil profiles, Radiation absorption, Dielectric properties, Computerized simulation

49-1403
Gas, oil and ice.
Kolesnikov, IU., *Science in Russia,* May-June 1994, No.3, p.21-25.
Petroleum industry, Economic development, Offshore drilling, Floating structures, Subsurface structures, Caissons, Arctic Ocean, Russia

49-1404
Water sprinkler spraying rectangularly and keeping tracks snow-wet.
Sawase, K., Kojima, T., *Railway Technical Research Institute. Quarterly report,* 1994, 35(1), p.47-54, 3 refs.
Railroad tracks, Railroad equipment, Blowing snow, Snow stabilization, Wet snow, Water transport, Design

49-1405
Last interglacial-glacial period on Spitsbergen, Svalbard.
Mangerud, J., Svendsen, J.I., *Quaternary science reviews,* Sep. 1992, 11(6), p.633-664, 73 refs.
Pleistocene, Glaciation, Glacier oscillation, Glacial geology, Marine geology, Glacial deposits, Stratigraphy, Radioactive age determination, Insolation, Norway—Spitsbergen

49-1406
Phosphate uptake in arctic plants in relation to phosphate supply: the role of spatial and temporal variability.
Kielland, K., Chapin, F.S., III, *Oikos,* Sep. 1994, 70(3), p.443-448, 24 refs.
Tundra, Arctic landscapes, Active layer, Plant physiology, Plants (botany), Plant tissues, Nutrient cycle, Soil tests, Soil chemistry, Acclimatization, United States—Alaska—Toolik Lake

49-1407
Arctic biogeography: the paradox of the marine benthic fauna and flora.
Dunton, K., *Trends in ecology & evolution,* June 1992, 7(6), p.183-189, 58 refs.
Biogeography, Marine biology, Biomass, Distribution, Classifications, Origin, Pleistocene, Arctic Ocean

49-1408
Effects of climate change on land-atmosphere feedbacks in arctic tundra regions.
Oechel, W.C., Vourlitis, G.L., *Trends in ecology & evolution,* Sep. 1994, 9(9), p.324-329, 50 refs.
Tundra, Arctic landscapes, Ecosystems, Global change, Global warming, Vegetation factors, Plant physiology, Soil air interface, Water balance, Climatic changes, Carbon dioxide

49-1409
Effects of storage temperature and time on sediment toxicity.
Dillon, T.M., Moore, D.W., Jarvis, A.S., *Archives of environmental contamination and toxicology,* July 1994, 27(1), p.51-53, 14 refs.
Estuaries, Bottom sediment, Water pollution, Dredging, Environmental tests, Sampling, Cold storage, Freezing, Chemical properties, Temperature effects

49-1410
Quantitative modeling of soil forming processes in deserts: the CALDEP and CALGYP models.
Marion, G.M., Schlesinger, W.H., MP 3523, Quantitative modeling of soil forming processes. SSSA special publication, No.39, Madison, WI, Soil Science Society of America, 1994, p.129-145, 44 refs. Presented at a symposium, Minneapolis, Nov. 2, 1992.
DLC S592.4.Q36 1994
Desert soils, Soil formation, Soil chemistry, Soil dating, Geochemical cycles, Weathering, Paleoclimatology

49-1411
KRMS SSM/I validation March 1988: quick look report.
Farmer, L.D., Eppler, D.T., Heydlauff, B., Olsen, D.A., MP 3524, *U.S. Naval Ocean Research and Development Activity. NORDA technical note,* Jan. 1989, No.385, 43p., ADA-205 606.
Ice surveys, Sea ice distribution, Ice reporting, Drift, Aerial surveys, Radiometry
The Ka-band Radiometric Mapping System (KRMS) was flown in support of the NASA SSM/I validation program from Mar. 6-14, 1988. Data were collected on each of four days during this period. This report provides the flight and navigation records required to reconstruct the missions. Flight tracks, compiled from the primary navigation system, indicate areas of coverage. The system logs provide the sensor settings and pertinent flight data, such as altitude and ground speed. The navigation logs provide specifics as to location of data and time of collection. A flight track chart is provided for each day's mission. Several examples of KRMS imagery are also provided.

49-1412
Evaluation of the geothermal heat pump installation at the Naval Air Station, Patuxent River.
Garg, S., Phetteplace, G., MP 3525, *U.S. Naval Facilities Engineering Service Center. Technical memorandum,* Oct. 1994, TM-2093-ENG, 9p. + append., 2 refs.
Heat pumps, Heat transfer, Geothermy, Military facilities

49-1413
Spacing of snowplowable raised pavement markers. Final report.
Hopson, S.R., *Utah Department of Transportation. Research Division. Report,* June 1993, UT-93.06, 31p., 8 refs.
Road maintenance, Highway planning, Safety, Markers, Snow removal

49-1414
Motor grader and snowplow cutting edge durability study.
Gillis, H.J., Zollars, J., *Minnesota Department of Transportation. Report,* Jan. 1993, MN/RD-93-02, 8p., PB93-208973.
Snow removal, Motor vehicles, Road maintenance

49-1415

Use of sewage sludge on park and recreational lands.

Palazzo, A.J., Iskandar, I.K., MP 3534, Sewage sludge: land utilization and the environment, Madison, WI, American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America (ASA-CSSA-SSSA), 1994, p.101-103, 10 refs.

Sludges, Sewage disposal, Soil conservation, Soil chemistry, Land reclamation, Revegetation, Nutrient cycle

49-1416

Current issues in hydrology. [Aktuelle Aspekte in der Hydrologie]

Grebner, D., et al, *Zürcher geographische Schriften,* 1993, No.53, 259p., In German. Refs. passim. For selected papers see 49-1417 through 49-1422.

DLC GB662.4.A43 1993

Glacier surveys, Glacial hydrology, Glacier alimentation, Snow hydrology, Snow water equivalent, Runoff forecasting

49-1417

Forty years of snow hydrology research at the Hydrology Section of the Geography Institute of the Federal Technical University in Zurich: current status and prospects of the research. [Vierzig Jahre schneehydrologische Forschung an der Abteilung Hydrologie des Geographischen Institutes der ETH: Stand der Forschung und Ausblick]

Rohrer, M.B., Steinegger, U., Lorenzi, D., *Zürcher geographische Schriften,* 1993, No.53, Aktuelle Aspekte in der Hydrologie (Current issues in hydrology). Edited by D. Grebner, p.121-130, In German with English summary. 28 refs.

Research projects, Organizations, Snow hydrology, Snow water equivalent, Snowmelt, Runoff forecasting, Switzerland

49-1418

Changes in snow and ice storage: measurement and simulation.

Braun, L.N., Reynaud, L., Valla, F., *Zürcher geographische Schriften,* 1993, No.53, Aktuelle Aspekte in der Hydrologie (Current issues in hydrology). Edited by D. Grebner, p.131-142, With French summary. 31 refs.

Glacier surveys, Glacial hydrology, Glacier mass balance, Glacier alimentation, Snow water equivalent, Water balance, Runoff forecasting, Switzerland

49-1419

Analysis of multiyear snow measurements on the Limmer Glacier, Glarner Alps. [Analyse langjähriger Schneemessungen auf dem Limmerngletscher, Glarner Alpen]

Hock, R., Funk, M., Müller-Lemans, H., *Zürcher geographische Schriften,* 1993, No.53, Aktuelle Aspekte in der Hydrologie (Current issues in hydrology). Edited by D. Grebner, p.143-152, In German with English summary. 10 refs.

Glacier surveys, Glacier alimentation, Glacial hydrology, Snow surveys, Snow depth, Snow ice interface, Snow water equivalent, Runoff forecasting, Switzerland

49-1420

Fluctuations of Swiss glacier termini from 1782/83 to 1990/91 estimated from summer temperatures and annual precipitation at Geneva. [Längenänderungen der Schweizer Gletscher 1782/83 bis 1990/91 geschätzt auf grund der Sommertemperaturen und der Jahresniederschläge von Genf]

Kasser, P., *Zürcher geographische Schriften,* 1993, No.53, Aktuelle Aspekte in der Hydrologie (Current issues in hydrology). Edited by D. Grebner, p.153-168, In German with English summary. 23 refs.

Glacier surveys, Glacier oscillation, Glacier tongues, Meteorological factors, Air temperature, Precipitation (meteorology), Statistical analysis, Switzerland

49-1421

On the complexities of glacier hazards.

Röthlisberger, H., *Zürcher geographische Schriften,* 1993, No.53, Aktuelle Aspekte in der Hydrologie (Current issues in hydrology). Edited by D. Grebner, p.169-176, With German summary. 13 refs.

Glacial lakes, Icebound lakes, Ice dams, Lake bursts, Flood forecasting, Glacier surges, Avalanches, Avalanche forecasting, Accidents, Switzerland

49-1422

Depth profile of the effective viscosity of temperate firn determined from strain rate measurements at two firn pits (Kesselwandferner, Ötztal Alps, 1967-1989). [Tiefenprofile effektiver Viskositäten von temperierten Firn ermittelt aus Verformungsmessungen an 2 Firnschaächten (Kesselwandferner, Ötztaler Alpen, 1967-1989)]

Ambach, W., Huber, J., Eisner, H., Schneider, H., *Zürcher geographische Schriften,* 1993, No.53, Aktuelle Aspekte in der Hydrologie (Current issues in hydrology). Edited by D. Grebner, p.177-184, In German with English summary. 14 refs.

Glacier flow, Glacier friction, Glacier ice, Firn, Snow creep, Snow deformation, Snow compression, Viscosity, Strain tests, Austria

49-1423

Snow cover in the Swiss Alps and its modeling. [Die Schneedecke im Schweizer Alpenraum und ihre Modellierung]

Rohrer, M.B., *Zürcher geographische Schriften,* 1992, No.49, 178p., In German with English summary. Refs. p.170-178.

DLC GB2524.A47R64 1992

Snow surveys, Snow depth, Snow hydrology, Snow water equivalent, Snowmelt, Runoff forecasting, Switzerland

49-1424

Geology of Alaska.

Plafker, G., ed, Berg, H.C., ed, Geology of North America, Vol. G-1, Boulder, CO, Geological Society of America, 1994, 1055p. + plates and maps in separate box, Refs. passim. For selected papers see 49-1425 through 49-1432.

DLC QE71.G48 1986 vol. G-1

Geological surveys, Exploration, Tectonics, Stratigraphy, Geologic structures, Geomorphology, Geochronology

49-1425

Interior basins of Alaska.

Kirschner, C.E., Geology of North America, Vol. G-1. Geology of Alaska. Edited by G. Plafker and H.C. Berg, Boulder, CO, Geological Society of America, 1994, p.469-493, Refs. p.491-493.

Geological surveys, Tectonics, Stratigraphy, Geologic structures, Geomorphology, Geochronology, Exploration, United States—Alaska

49-1426

Late Cenozoic glaciation of Alaska.

Hamilton, T.D., Geology of North America, Vol. G-1. Geology of Alaska. Edited by G. Plafker and H.C. Berg, Boulder, CO, Geological Society of America, 1994, p.813-844, Refs. p.837-844.

Glaciation, Glacial deposits, Glacial geology, Paleoclimatology, Pleistocene, Geochronology, Geological surveys, United States—Alaska

49-1427

Permafrost in Alaska.

Ferrians, O.J., Jr., Geology of North America, Vol. G-1. Geology of Alaska. Edited by G. Plafker and H.C. Berg, Boulder, CO, Geological Society of America, 1994, p.845-854, Refs. p.852-854.

Permafrost surveys, Permafrost distribution, Permafrost thickness, Ground ice, United States—Alaska

49-1428

Metallogeny and major mineral deposits of Alaska.

Nokleberg, W.J., et al, Geology of North America, Vol. G-1. Geology of Alaska. Edited by G. Plafker and H.C. Berg, Boulder, CO, Geological Society of America, 1994, p.855-903, Refs. p.898-903.

Exploration, Geological surveys, Minerals, Placer mining, Natural resources, Geochemistry, Geomorphology, Stratigraphy, United States—Alaska

49-1429

Petroleum resources in Alaska.

Magoon, L.B., III, Geology of North America, Vol. G-1. Geology of Alaska. Edited by G. Plafker and H.C. Berg, Boulder, CO, Geological Society of America, 1994, p.905-936, Refs. p.933-936.

Exploration, Geological surveys, Crude oil, Natural gas, Petroleum industry, Natural resources, Geochemistry, Stratigraphy, United States—Alaska

49-1430

Coal in Alaska.

Wahrhaftig, C., Bartsch-Winkler, S., Stricker, G.D., Geology of North America, Vol. G-1. Geology of Alaska. Edited by G. Plafker and H.C. Berg, Boulder, CO, Geological Society of America, 1994, p.937-978, Refs. p.974-978.

Exploration, Geological surveys, Coal, Natural resources, Geomorphology, Stratigraphy, United States—Alaska

49-1431

Geothermal resources of Alaska.

Miller, T.P., Geology of North America, Vol. G-1. Geology of Alaska. Edited by G. Plafker and H.C. Berg, Boulder, CO, Geological Society of America, 1994, p.979-987, 37 refs.

Geothermal prospecting, Geological surveys, Geothermy, Natural resources, Hot springs, Volcanoes, United States—Alaska

49-1432

Overview of the geology and tectonic evolution of Alaska.

Plafker, G., Berg, H.C., Geology of North America, Vol. G-1. Geology of Alaska. Edited by G. Plafker and H.C. Berg, Boulder, CO, Geological Society of America, 1994, p.989-1021, Refs. p.1017-1021.

Tectonics, Geologic structures, Geomorphology, Geochronology, Geological surveys, United States—Alaska

49-1433

Low-temperature compressive strength of glass-fiber-reinforced polymer composites.

Dutta, P.K., MP 3526, *Journal of offshore mechanics and arctic engineering,* Aug. 1994, Vol.116, p.167-172, 10 refs.

Construction materials, Composite materials, Polymers, Ultimate strength, Compressive properties, Thermal expansion, Deformation, Stress concentration, Brittleness, Cracking (fracturing), Low temperature tests

Polymeric composites are relatively inexpensive materials of high strength, in which deformation of the matrix is used to transfer stress by means of shear traction at the fiber-matrix interface to the embedded high-strength fibers. At low temperatures, complex stresses are set up within the microstructure of the material as a result of matrix stiffening and mismatch of thermal expansion coefficients of the constituents of the composites. These stresses in turn affect the strength and deformation characteristics of the composites. This is demonstrated by compression testing of a unidirectional glass-fiber-reinforced polymer composite at room and low temperatures. The increase of compressive strength matched the analytical prediction of strength increase modeled from the consideration of increase in matrix stiffness and thermal residual stresses at low temperatures. Additional compression tests performed on a batch of low-temperature thermally cycled specimens confirmed the predictable reduction of brittleness due to suspected increase of microcrack density.

49-1434

High-resolution uranium-series dating of Norwegian-Greenland Sea sediments: ^{230}Th vs. *delta*^{18}O stratigraphy.

Scholten, J.C., et al, *Marine geology,* Oct. 1994, 121(1-2), p.77-85, 29 refs.

Paleoclimatology, Marine geology, Marine deposits, Sedimentation, Bottom sediment, Radioactive age determination, Isotope analysis, Sampling, Stratigraphy, Greenland Sea, Norwegian Sea

49-1435
Allochthonous versus autochthonous organic matter in Cenozoic sediments of the Norwegian Sea: evidence for the onset of glaciations in the northern hemisphere.
Hölemann, J.A., Henrich, R., *Marine geology,* Oct. 1994, 121(1-2), p.87-103, 52 refs.
Marine geology, Marine deposits, Pleistocene, Paleoclimatology, Glaciation, Ice rafting, Bottom sediment, Stratigraphy, Organic soils, Geochemistry, Norwegian Sea

49-1436
Geochemistry of surface sediments from the mid-oceanic Kolbeinsey Ridge, north of Iceland.
Lackschewitz, K.S., Wallrabe-Adams, H.J., Garbe-Schönberg, D., *Marine geology,* Oct. 1994, 121(1-2), p.105-119, 42 refs.
Marine geology, Marine deposits, Bottom sediment, Sedimentation, Geochemistry, Sampling, Ice rafting, Hydrothermal processes, Volcanoes, Iceland Sea

49-1437
Armoured and unarmoured till balls from the Greenland Sea floor.
Goldschmidt, P.M., *Marine geology,* Oct. 1994, 121(1-2), p.121-128, 44 refs.
Marine geology, Marine deposits, Bottom sediment, Sediment transport, Ice rafting, Sampling, Lithology, Grain size, Mineralogy, Greenland Sea

49-1438
Significance of variability in *Turborotalita quinqueloba* (Natland) test size and abundance for paleoceanographic interpretations in the Norwegian-Greenland Sea.
Bauch, H.A., *Marine geology,* Oct. 1994, 121(1-2), p.129-141, 36 refs.
Pleistocene, Oceanography, Ocean currents, Marine deposits, Marine biology, Bottom sediment, Plankton, Sampling, Radioactive age determination, Greenland Sea, Norwegian Sea

49-1439
Radionuclide contamination of environment and biota on the islands of Novaya Zemlya after nuclear weapon tests.
Matishov, G.G., Matishov, D.G., Shchipa, E., Pavlova, L.G., *Doklady biological sciences,* July-Aug. 1994, 337(1-6), p.390-391, Translated from Akademii nauk. Doklady. 10 refs.
Nuclear explosions, Ocean environments, Environmental impact, Environmental protection, Ecosystems, Radioactivity, Radioactive isotopes, Fallout, Russia—Novaya Zemlya

49-1440
C-band SAR backscatter from northern terrain with discontinuous permafrost: the Schefferville digital transect.
Granberg, H.B., Judge, A.S., Fadaie, K., Simard, R., *Canadian journal of remote sensing,* Sep. 1994, 20(3), p.245-256, With French summary. 48 refs.
Permafrost distribution, Discontinuous permafrost, Sensor mapping, Airborne radar, Radar photography, Synthetic aperture radar, Backscattering, Image processing, Resolution, Terrain identification, Terrain, Canada—Quebec—Schefferville

49-1441
Two-facies interpretation of the basal layer of the Greenland ice sheet contributes to a unified model of basal ice formation.
Knight, P.G., *Geology,* Nov. 1994, 22(11), p.971-974, 19 refs.
Ice sheets, Glacial geology, Glacier beds, Sedimentation, Ice solid interface, Regelation, Ice composition, Stratification, Classifications, Greenland, United States—Alaska—Matanuska Glacier

49-1442
Extracellular enzyme activity in the arctic Northeast Water polynya.
Vetter, Y.A., Deming, J.W., *Marine ecology progress series,* Nov. 3, 1994, 114(1-2), p.23-34, 47 refs.
Marine biology, Microbiology, Polynyas, Biomass, Bacteria, Ecology, Suspended sediments, Bottom sediment, Sampling, Temperature effects, Arctic Ocean

49-1443
Metabolism of antarctic micronektonic crustacea as a function of depth of occurrence and season.
Torres, J.J., et al, *Marine ecology progress series,* Oct. 27, 1994, 113(3), p.207-219, 40 refs.
Marine biology, Biomass, Sampling, Ecology, Ice edge, Seasonal variations, —Scotia Sea, Antarctica—Weddell Sea
Oxygen consumption rates were determined on 21 species of crustaceans typical of the southern ocean micronektonic crustacean assemblage during spring, fall and winter. Specimens were collected in the Scotia-Weddell Sea region in the vicinity of 60S, 40W in the upper 1000 m of the water column. Respiration declined with depth of occurrence despite the isothermal character of the water column, suggesting that lower metabolic rates are a temperature-dependent adaptation to life in the deep sea. Three species of crustacea showed a lowered metabolism during the winter season: krill and the 2 hyperiid amphipods *Cyllopus lucasii* and *Vibilia stebbingi.* Critical oxygen partial pressure varied between 29 and 52 mm Hg, well below the lowest such levels found in the water column. It is suggested that the long nights of the antarctic winter decrease the effectiveness of visual predation in the epipelagic zone, allowing lowered metabolic rates to be a viable overwintering strategy for some species. (Auth. mod.)

49-1444
Proximate composition and overwintering strategies of antarctic micronektonic crustacea.
Torres, J.J., et al, *Marine ecology progress series,* Oct. 27, 1994, 113(3), p.221-232, 32 refs.
Marine biology, Biomass, Ecology, Ice edge, Sampling, —Scotia Sea, Antarctica—Weddell Sea
Proximate (protein, lipid, carbohydrate and chitin) and elemental (carbon and nitrogen) composition were determined for 18 species of antarctic micronektonic crustacea, representing the majority of species found in the antarctic water column. Individuals used in the analyses were captured during fall and winter; for 8 species data were collected in both seasons. Seven of the 8 species showed some evidence that combustion of body stores was an aid to surviving the winter months; comparison with data from other investigators suggests that most of the species inhabiting shallow and mid-depths exhibit some degree of combustion of body stores during winter. Three types of overwintering strategies are proposed for antarctic zooplankton and micronekton. Type 1, exhibited by some calanoid copepods, is characterized by accumulation of large lipid deposits and a true dormancy, or diapause, during winter. Type 2, exhibited by euphausiids and hyperiid amphipods, is characterized by a marked reduction in metabolic rate, combustion of body substance, opportunistic feeding, but no true dormancy. Type 3 is exhibited by decapods and gammarid amphipods; it is characterized by an absence of a winter reduction in metabolic rate, combustion of body stores in some species but a lack of combustion or accumulation of energy in others, and opportunistic feeding. Overwintering scenarios computed for krill suggest that the impact of the winter season is most severe in the smaller size classes. (Auth. mod.)

49-1445
Snow and avalanche. 1993-94 annual report.
Colorado Avalanche Information Center, Denver, Colorado Geological Survey, June 1994, 48p. + encl.
Safety, Education, Avalanche protection, Avalanche forecasting, Snow accumulation, Accidents, Seasonal variations, United States—Colorado

49-1446
CASERTZ 1991-1992: airborne gravity and surface topography measurement.
Brozena, J.M., et al, *Antarctic journal of the United States,* 1993, 28(5), p.1-3, 16 refs.
Topographic surveys, Airborne equipment, Remote sensing, Gravity, Mapping, Ice sheets
CASERTZ (corridor aerogeophysics of the southeast Ross transect zone) is a multiyear program to study the geology, geophysics, and glaciology of the west antarctic rift system by means of data collected from an integrated airborne remote-sensing package installed on a Twin-Otter aircraft. The interior Ross embayment portion of the rift system was surveyed during the 1991-92 field season of the CASERTZ program. This article presents preliminary results of the airborne gravity and GPS positioning segments of the experiment, with a short discussion of the topographic mapping capabilities of the aircraft.

49-1447
Fault kinematic studies in the Transantarctic Mountains, southern Victoria Land.
Wilson, T.J., Braddock, P., Janosy, R.J., Elliot, R.J., *Antarctic journal of the United States,* 1993, 28(5), p.26-29, 21 refs.
Mapping, Glacial geology, Glaciers, Antarctica—Transantarctic Mountains
Determining the structural development of the Discovery accommodation zone is the principal focus of the ongoing research described here. Structural kinematic analysis of brittle fault and dike arrays is being used to map the displacement patterns along and across the zone. During the 1992-93 field season, brittle fault studies were undertaken at Ferrar Glacier, Radian Glacier, Skelton Glacier, Skelton Névé, the Royal Society Range, and in the Mount Discovery area. Specific scientific objectives and a preliminary summary of results are described for each of the regions covered during the season.

49-1448
Origin of the moraines between Griffin Nunatak and Brimstone Peak, southern Victoria Land.
Mensing, T.M., Faure, G., Place, M.C., Reed, D.B., *Antarctic journal of the United States,* 1993, 28(5), p.30-31, 3 refs.
Ice composition, Moraines, Antarctica—Griffin Nunatak, Antarctica—Brimstone Peak
During the 1992-93 field season, the Crescent Moraine (informal name) was investigated to determine its origin. For this purpose, a suite of till samples was collected at 1 km intervals along the Crescent Moraine using the global positioning system to establish the coordinates of each site. In addition, a suite of ice samples was collected at 20 m intervals along a surveyed line extending across the moraine to determine the isotope composition of oxygen in the ice. The character of the ice under the moraine was examined in a shallow trench cut across the moraine to detect the presence of sediment embedded in the ice. Only a few scattered streaks of sediment were found in the ice under the Crescent Moraine, however. The pebbles and boulders that make up the Crescent Moraine consist primarily of basalt and dolerite derived from the Kirkpatrick Basalt and the Ferrar Dolerite, respectively.

49-1449
Antarctic science: global concerns.
Hempel, G., ed, Berlin, Springer Verlag, 1994, 287p., Refs. passim. For individual papers see A-51686, A-51692, A-51693, A-51700, A-51701, B-51685, B-51691, B-51694, B-51699, E-51696, E-51697, F-51688 through F-51690, G-51698, J-51695, K-51687 or 49-1450 through 49-1461.
DLC G845.5.A54 1994
Meetings, Sea ice, Climatic changes, Marine biology, Ocean currents
The title of this book stems from an international conference held in Bremen, Germany, in Sep. 1991 under the auspices of the Scientific Committee on Antarctic Research (SCAR). Its main objectives were to increase public awareness of the importance of antarctic science, particularly in relation to global problems, and to foster the interaction of antarctic scientists working in different disciplines. About 500 scientists, students and engineers, as well as politicians and media from all over the world attended the conference. The first 2 days of the conference were concerned with current scientific programs and results; the last 2 days addressed policy matters and the future directions of antarctic science. This volume presents revised and up-dated texts of key lectures given at the conference by some of the leading antarctic researchers, spanning a broad spectrum of antarctic science from the "ozone hole" to the microbiology of sea ice. Nevertheless, some fields are missing, e.g. geophysics of the antarctic continent, terrestrial ecology, and biology of seals, whales and birds. The main focus is on the role of Antarctica and the southern ocean in the world climate system, a topic of great importance and heated debate. (Auth. mod.)

49-1450
Environmental protection and science in the Antarctic.
Bonner, W.N., Antarctic science: global concerns. Edited by G. Hempel, Berlin, Springer Verlag, 1994, p.6-11.
DLC G845.5.A54 1994
Environmental protection, Research projects
The author examines the conflicts of interest between the environmentalist and science communities, noting that while it has a high priority in Antarctica, environmental protection is not the only or even the main concern. Antarctica has been shown to have considerable effect on many global natural processes and human activities. With over-restrictive environmental policies, the scientific research effort to discover the extent of the antarctic effect is likely to be curtailed to the detriment of the rest of the world. It is pointed out that damage to the environment by human presence is highly localized, extending to only a short radius around the bases and stations. In effect, most of the environmental damage has been in the form of eyesores rather than real or extensive destruction. Enforcement of overly-restrictive environmental policies has always been difficult or impossible to achieve, resting as it does on the consent of the governed. The ultimate aim in Antarctica must be to control human activities so as to preserve scientific, wilderness, and esthetic values for the use and enjoyment both by present and future generations of mankind, for they are the values that are integral to our whole environment.

49-1451
Conflicts of interest in the use of Antarctica.
Drewry, D.J., Antarctic science: global concerns. Edited by G. Hempel, Berlin, Springer Verlag, 1994, p.12-30, 35 refs.
DLC G845.5.A54 1994
Economic development, Natural resources, International cooperation, Research projects, Environmental protection

Examples of the impact of antarctic science on political processes and the achievements obtained through scientific efforts are noted: the discovery of the ozone hole; the detection of background levels of pollution; reading the climate record stored in ice cores; and the importance of the antarctic region in global climate changes. Notwithstanding these successes, conflicts in interests have surfaced: exploitation of renewable and non-renewable natural resources; tourism; national sovereignty over portions of Antarctica; international politics; the quantity and quality of scientific output. These aspects are briefly examined.

49-1452

Antarctica—where space meets Planet Earth.

Rycroft, M.J., Antarctic science: global concerns. Edited by G. Hempel, Berlin, Springer Verlag, 1994, p.31-44, 48 refs.

DLC G845.5.A54 1994

Ozone, Geomagnetism, Stratosphere, Atmospheric physics

This paper gives some examples of topical problems relating to antarctic research where measurements made from satellites are complemented by observations made from the Earth's surface. The field has been restricted to studies of the atmosphere and near-Earth space environment, concentrating upon the ozone hole and solar-terrestrial physics. The several unique aspects of Antarctica for such research should be further capitalized upon in future studies.

49-1453

Antarctic sea ice cover.

Wadhams, P., Antarctic science: global concerns. Edited by G. Hempel, Berlin, Springer Verlag, 1994, p.45-59, 30 refs.

DLC G845.5.A54 1994

Sea ice, Ice formation indicators, Climatic changes, Remote sensing, Sea water

The presence of a sea ice cover has an enormous effect on the exchanges of heat, moisture and momentum between ocean and atmosphere. The motion of sea ice leads to water mass modification both in the region of generation (where fresh water is removed) and in the region of melt (where fresh water is injected into the ocean), which may be hundreds or thousands of kilometers away. Since antarctic sea ice and its huge seasonal cycle are of central importance to the climate and energy budgets of the southern ocean, it is vital to understand the mechanisms leading to ice formation, transport and melt. Some of the various conditions and processes associated with antarctic sea ice include: the pancake-frazil ice cycle; first- and multi-year ice; snow loading; pressure ridging; polynyas; interactions between climate change and sea ice; remote sensing of sea ice; sea ice and bottom water production; and sea ice and biology. (Auth. mod.)

49-1454

Ecological significance of the sea ice biota.

Spindler, M., Dieckmann, G.S., Antarctic science: global concerns. Edited by G. Hempel, Berlin, Springer Verlag, 1994, p.60-68, 25 refs.

DLC G845.5.A54 1994

Sea ice, Marine biology, Ecosystems, Algae, Biomass

The antarctic sea ice cover and biota associated with it play a key role in the marine ecosystems of the southern ocean. Due to the high biomass of autotrophic algae living at the ice/water interface and within the brine channel system of the sea ice, a large proportion of the total primary production in these regions can be attributed to these autotrophs. During winter the algae survive the harsh conditions of low temperatures, high salinities and low irradiance levels. It is during this time that they become an important food source for a number of pelagic animals, particularly the southern krill. During the ice melt, algae are released to the water column where they may contribute to the initiation of the phytoplankton spring bloom, while sedimentation of sea ice organisms provides the benthos with food. The above statements on the ecological role of sea ice biota are based on recent findings and are summarized. (Auth.)

49-1455

Polar ice sheets: a chronicle of climate and environment.

Oeschger, H., Antarctic science: global concerns. Edited by G. Hempel, Berlin, Springer Verlag, 1994, p.69-94, 34 refs.

DLC G845.5.A54 1994

Ice sheets, Ice cores, Climatic changes, Atmospheric composition, Carbon dioxide

A wealth of information is recorded in ocean and continental sediments, in geomorphological features, in peat bogs, tree-rings and in natural ice. In this paper the concentration is mainly on polar ice which can be regarded as a chronicle of the history of climate and environment. To date only a small portion of the available information has been retrieved. The main advances in global change science have come from the analysis of deep ice cores drilled in Greenland and Antarctica. A short overview on the present knowledge of anticipated climate change is given and questions are listed concerning information on Earth system history. Special emphasis is given to results from ice core studies. Finally, an outlook is presented based on important recent results from studies on newly drilled ice cores. (Auth. mod.)

49-1456

Biological impacts of seasonal ozone depletion.

Marchant, H.J., Antarctic science: global concerns. Edited by G. Hempel, Berlin, Springer Verlag, 1994, p.95-109, 79 refs.

DLC G845.5.A54 1994

Ozone, Ice edge, Ecology, Biomass, Ultraviolet radiation, Microbiology

The concentration of stratospheric ozone in springtime over the Antarctic has been decreasing since the mid-1970s. Also, there have also been occasions in the past when stratospheric ozone concentrations have declined as a result of "natural" perturbations to the stratosphere by volcanic eruptions and massive meteor impacts such as the Tunguska impact on Siberia in 1908. It has been reported that the likely loss of stratospheric ozone in the Northern Hemisphere resulting from the Tunguska impact was 30% which persisted for some years. Despite experimental evidence of antarctic organisms being under UV-B stress, and that there has been stratospheric ozone depletion occurring for at least the last decade, and evidence of past incidents when there has been ozone depletion, there is no clear evidence of unequivocal changes in the marine ecosystem. This is hardly surprising considering that UV exposure is just one of a suite of environmental stresses to which these organisms are exposed. While there is a pattern of annual species succession, there is also interannual variability in the timing and abundance of individual species, and it is not possible to ascribe this heterogeneity to a single stress. In addition, quantitative information on spatial and temporal antarctic phytoplankton and populations of other organisms before the development of the ozone hole is sparse, making comparisons with present-day assemblages difficult. (Auth.)

49-1457

Southern ocean: biogeochemical cycles and climate changes.

Tréguer, P., Antarctic science: global concerns. Edited by G. Hempel, Berlin, Springer Verlag, 1994, p.110-128, 53 refs.

DLC G845.5.A54 1994

Research projects, Climatic changes, Ecosystems, Marine biology

A significant part of the CO_2 exchanges between atmosphere and ocean is determined by biogeochemical processes, the so-called biological pump. Modelling these CO_2 exchanges needs quantification of biogenic fluxes. Present knowledge of these processes and estimates of the fluxes are still very rudimentary. For example, it is not known why the exceptional nutrient richness of the southern ocean is not used. Because of this non-used richness, the southern ocean is a huge source of nutrients for the surface waters of the rest of the world ocean. Every year considerable amounts of nutrients are transported northwards, indirectly supporting the very large productivity of coastal upwellings in the Southern Hemisphere. Any modification in the yield of photosynthetic activity in the southern ocean indirectly entrained by climate change should have marked consequences for remote economically important marine ecosystems. To understand and to model the direct and/or indirect impact of climate change on biogeochemical processes and fluxes in the southern ocean is a major concern for the International Geosphere-Biosphere Program (IGBP). The current functioning of this biogeosystem is explained and related to changes experienced in the world and southern oceans in the past as a way to help understand expected future changes.

49-1458

Detection of change in Antarctica.

Zwally, H.J., Antarctic science: global concerns. Edited by G. Hempel, Berlin, Springer Verlag, 1994, p.126-143, 38 refs.

DLC G845.5.A54 1994

Measurement, Ice sheets, Sea ice, Mass balance, Sea level, Ozone, Research projects

Research on detection of change in Antarctica is likely to be an important part of the international program on global change. A number of important measurements and scientific studies have begun, largely as a result of the continuing research program conducted by many nations in the Antarctic as well as the interests of scientists working on antarctic science. To accomplish the desired goals of a global change detection program, conventional measurements at selected locations need to be expanded. A new emphasis on the systematic collection of well-calibrated data and the attention to these factors in the data analysis are especially important. Some of the work may require considerable efforts and may not yield much new information for some time. However, failure to commence better measurements will insure that the inability to determine current trends of key environmental parameters, due to a paucity of well-calibrated data records with adequate spatial and temporal sampling, will continue. Today's routine measurements will provide the baseline data sets for the future. (Auth.)

49-1459

Impact of shelf and sea ice on water mass modifications and large-scale oceanic circulation in the Weddell Sea.

Fahrbach, E., Augstein, E., Olbers, D., Antarctic science: global concerns. Edited by G. Hempel, Berlin, Springer Verlag, 1994, p.167-187, 54 refs.

DLC G845.5.A54 1994

Sea ice, Ice shelves, Ocean currents, Mass transfer, Models, Antarctica—Weddell Sea, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Following a review of the water masses and circulation in the global ocean, the focus shifts to some of the unique physical conditions of Weddell Sea waters. This portion of the review includes accounts of what is known of the Weddell Sea water mass modifications and the mechanics of the Weddell Gyre. Comparisons between observations and numerical models of these waters are discussed. There are also displayed contrasting illustrations showing stream function of the total mass transport in the South Atlantic Ocean and the southern Indian Ocean. Additional figures show the mean annual freezing and melting rates with a coupled ice-ocean-atmosphere model in the Weddell Sea. A final figure shows a two-dimensional model of the circulation under the Filchner-Ronne Ice Shelves.

49-1460

Future ocean-atmosphere research in the antarctic region.

Augstein, E., Antarctic science: global concerns. Edited by G. Hempel, Berlin, Springer Verlag, 1994, p.278-282, 12 refs.

DLC G845.5.A54 1994

Research projects, Climate, Oceans, Sea ice

Set forth here is an outline of the direction and emphasis for antarctic scientific research which the author believes is necessary during the remainder of the 20th century. The primary thrust is toward topics dealing with the interrelationships between Antarctica and global climate, emphasizing the principal climate shapers: the atmosphere, the ocean, and the sea ice and ice shelves. Investigations of antarctic geophysical processes should ideally cover a wide range of time and space scales and should include all important interacting climatic elements. But in reality, individual field observations and model studies have to be limited with respect to space and time due to technical, logistic and financial restrictions as well as to the lack of experienced personnel. Consequently, international programs are needed to create joint research projects in such a way that the various single contributions may provide a satisfactory basis for reasonable syntheses.

49-1461

Future of antarctic science—biosphere.

Hubold, G., Antarctic science: global concerns. Edited by G. Hempel, Berlin, Springer Verlag, 1994, p.283-287, 5 refs.

DLC G845.5.A54 1994

Marine biology, Research projects

It is not within the scope of this short presentation to evaluate the different viewpoints regarding the development of Antarctica, i. e. exploitation or conservation, nor to cover both terrestrial and marine antarctic systems. The focus is rather on some biological features which are of basic importance for the understanding of antarctic marine biology. These may contribute to a rational development of future antarctic biological research as an input to the developing global environmental research under the International Geosphere Biosphere Program (IGBP).

49-1462

Traction device penetrating surface.

Rubel, E.R., *Canada Patent Office. Patent,* Jan. 16, 1993, n.p., No.2072432.

All terrain vehicles, Snow vehicles, Traction

49-1463

Cold weather protector for the face.

Lock, C., *Canada Patent Office. Patent,* Oct. 23, 1993, n.p., No.2066858.

Clothing, Cold weather survival

49-1464

Off road amphibian vehicle.

Larson, R.M., *Canada Patent Office. Patent,* Nov. 27, 1993, n.p., No.2069584.

Amphibious vehicles, All terrain vehicles, Snow vehicles

49-1465

Pneumatic tyre tread with high grip on ice.

Bridgestone Corporation, *Japan Patent Office. Patent,* Jan. 18, 1994, n.p., No.6008709.

Tires, Rubber ice friction, Traction

49-1466
Pneumatic tyre for icy and snowy roads.
Yokohama Rubber Company Ltd., *Japan Patent Office. Patent,* Jan. 18, 1994, n.p., No.6008710.
Tires, Rubber ice friction, Traction

49-1467
Hole making device for research on icy surface.
Talanov, B.P., *Russia Patent Office. Patent,* Jan. 15, 1993, n.p., No.2000992.
Ice drills, Thermal drills, Drift stations, Weather stations

49-1468
Anti-icing heater for an engine carburetor.
King, J.L., Will, L.N., *U.S. Patent Office. Patent,* Feb. 8, 1994, n.p., USP-5,284,122.
Motor vehicles, Engines, Carburetors, Defrosting, Ice prevention

49-1469
Defrosting equipment for heat pump evaporator.
Korsmeier, W., Klein, K., *Germany Patent Office. Patent,* Aug. 2, 1984, n.p., No.3303054.
Defrosting, Ice prevention, Heat pumps

49-1470
Branched block copolymer rubber for type tread.
Saito, Y., Yabuta, T., Takao, H., Imai, A., Tsuji, M., *European Patent Office. Patent,* June 15, 1988, n.p., No.270927.
Tires, Rubber, Rubber ice friction, Skid resistance

49-1471
Adaptive surface ice reduction method using energy transducer.
Mork, R.P., *U.S. Patent Office. Patent,* Apr. 20, 1993, n.p., USP-5,203,643.
Ice control, Ice prevention, Bubbling, Docks

49-1472
Thawing agent spray nozzle head.
Weber, T., *European Patent Office. Patent,* Dec. 18, 1991, n.p., No.461295.
Chemical ice prevention, Road maintenance, Hydraulic jets

49-1473
Blind ice dam assembly.
Hoyeck, R.H., *Canada Patent Office. Patent,* Nov. 8, 1993, n.p., No.2068201.
Ice (construction material), Ice dams, Artificial freezing

49-1474
Thawing-liquid spreading machine for road surface.
Rosenstihl, P., *Germany Patent Office. Patent,* Feb. 10, 1994, n.p., No.4235426.
Chemical ice prevention, Road maintenance, Machinery

49-1475
Ice guards for stabilised apparatus platforms used in ships etc.
Lindberg, T.G., *European Patent Office. Patent,* Feb. 9, 1994, n.p., No.582558.
Ship icing, Ice prevention, Ice control, Inflatable structures

49-1476
Pneumatic tyre used on ice and snow covered road.
Yokohama Rubber Company Ltd., *Japan Patent Office. Patent,* Jan. 11, 1994, n.p., No.6001119.
Tires, Rubber ice friction, Traction

49-1477
Detector for measuring icing on aircraft wings.
Luukkala, M., *Finland Patent Office. Patent,* Jan. 14, 1994, n.p., No.90957, Citation only, no abstract.
Aircraft icing, Ice detection

49-1478
Temperature dependence of unfrozen water film thickness in frozen soils.
Ishizaki, T., *Seppyo,* Mar. 1994, 56(1), p.3-9, In Japanese with English summary. 9 refs.
Soil freezing, Frozen ground temperature, Frozen ground thermodynamics, Freezing front, Unfrozen water content, Soil water migration, Water films, Mathematical models

49-1479
Estimation of the snow surface temperature.
Taguchi, B., Yamazaki, T., Kondo, J., *Seppyo,* Mar. 1994, 56(1), p.11-18, In Japanese with English summary. 4 refs.
Snow surface temperature, Snow air interface, Snow heat flux, Snow thermal properties, Mathematical models

49-1480
Acid snow in Lake Biwa catchment area, Japan. (1) Microscopic distribution structures of acidic materials.
Fushimi, H., *Seppyo,* Mar. 1994, 56(1), p.19-29, With Japanese summary. 16 refs.
Air pollution, Water pollution, Snow composition, Snowmelt, Snow cover structure, Metamorphism (snow), Water chemistry, Watersheds, Japan

49-1481
Heat balance study on snowmelt in a small watershed.
Ishikawa, N., Nakatani, C., Kodama, Y., Kobayashi, D., *Seppyo,* Mar. 1994, 56(1), p.31-43, In Japanese with English summary. 11 refs.
Snowmelt, Snow heat flux, Heat balance, Watersheds, Runoff forecasting, Mathematical models

49-1482
Climatological study of seasonal snow depth change in Japan.
Nishimori, M., *Seppyo,* Mar. 1994, 56(1), p.45-55, In Japanese with English summary. 11 refs.
Snow cover distribution, Snow depth, Snowfall, Atmospheric circulation, Climatic changes, Global warming, Japan

49-1483
Studies on characteristics of snow in Mts. Hakkoda.
Bokura, T., Fukuchi, T., *Seppyo,* Mar. 1994, 56(1), p.57-62, In Japanese. 6 refs.
Snow surveys, Snow cover distribution, Snow depth, Snowfall, Weather forecasting, Mountains, Japan

49-1484
Origin and evolution of interstellar amorphous icy grain.
Kouchi, A., *Seppyo,* Mar. 1994, 56(1), p.63-70, In Japanese. 23 refs.
Extraterrestrial ice, Amorphous ice, Cosmic dust

49-1485
Experimental study on avalanche dynamics by gravity current.
Kamiishi, I., Kawada, K., *Seppyo,* June 1994, 56(2), p.109-118, In Japanese with English summary. 10 refs.
Avalanche mechanics, Avalanche modeling, Snow cover stability, Snow density, Snow water content

49-1486
On the genesis of local fronts and snow accretion in the Kanto Plain accompanied by cyclones passing along the south of Honshu Island.
Hasemi, T., Baba, K., *Seppyo,* June 1994, 56(2), p.119-126, In Japanese with English summary. 12 refs.
Snowstorms, Snow loads, Power line icing, Fronts (meteorology), Atmospheric disturbances, Weather forecasting, Japan

49-1487
Avalanche release using an avalanche blaster "GAZ. EX".
Kamiishi, I., Hayakawa, N., Kawada, K., Chiba, K., *Seppyo,* June 1994, 56(2), p.127-136, In Japanese with English summary. 6 refs.
Avalanche triggering, Avalanche mechanics, Blasting

49-1488
Experiments on formation of water channels in a glacier.
Koizumi, K., Naruse, R., *Seppyo,* June 1994, 56(2), p.137-144, In Japanese with English summary. 19 refs.
Glacial hydrology, Subglacial drainage, Glacier melting

49-1489
Geomorphological features and distribution of slopes in heavy snow regions in Japan where full-depth avalanches occur.
Sekiguchi, T., *Seppyo,* June 1994, 56(2), p.145-157, In Japanese with English summary. 29 refs.
Avalanche forecasting, Avalanche tracks, Snow cover stability, Slope stability, Topographic features, Japan

49-1490
Characteristics of snow/water mixture flow and techniques for its measurement and control.
Shirakashi, M., *Seppyo,* June 1994, 56(2), p.159-167, In Japanese. 25 refs.
Snow removal, Slush, Drains, Water pipelines, Flow control

49-1491
District cooling system utilizing latent heat of ice.
Kawada, Y., Hattori, M., *Seppyo,* June 1994, 56(2), p.169-179, In Japanese. 24 refs.
Ice thermal properties, Ice heat flux, Slush, Latent heat, Cooling systems

49-1492
Fundamental study on AE characteristics of fresh-water ice.
Uchida, T., Kusumoto, S., Takase, T., *Seppyo,* Sep. 1994, 56(3), p.207-214, In Japanese with English summary. 15 refs.
Ice acoustics, Ice cover strength, Ice deformation, Ice cracks

49-1493
Fundamental study on control of snow load on the roof. Part 1. Adfreezing properties between roofing materials and snow on the roof.
Tomabechi, T., Ito, T., *Seppyo,* Sep. 1994, 56(3), p.215-222, In Japanese with English summary. 12 refs.
Roofs, Snow loads, Snow removal, Snow slides, Ice adhesion

49-1494
Heat transfer model for thick snow and ice masses.
Ohno, H., Takami, S., *Seppyo,* Sep. 1994, 56(3), p.223-231, In Japanese with English summary. 20 refs.
Glacier heat balance, Snow ice, Ice heat flux, Snow heat flux, Heat transfer, Mathematical models

49-1495
Sea salt originated material in winter precipitation and weather condition.
Suzuki, K., Endo, Y., *Seppyo,* Sep. 1994, 56(3), p.233-241, In Japanese with English summary. 17 refs.
Snowfall, Snow composition, Snow impurities, Snow air interface, Scavenging, Marine meteorology, Air water interactions, Japan

49-1496
Observational study on snowfall over the Shinjo basin.
Yagi, T., Maki, M., *Seppyo,* Sep. 1994, 56(3), p.243-249, In Japanese with English summary. 9 refs.
Snowfall, Snowstorms, Mountains, Topographic effects, Clouds (meteorology), Weather forecasting, Japan

49-1497
Studies on freezing and thawing of flat ice on top of the water surface (Part II).
Nakatsuka, S., Ando, M., *Seppyo,* Sep. 1994, 56(3), p.251-255, In Japanese. 2 refs.
Ice water interface, Ice formation, Ice melting, Ice heat flux, Freezing front, Stefan problem, Mathematical models

49-1498
Regional difference of snow types in southern Niigata Prefecture—research from 1983 to 1992.
Takeda, H., Noomote, M., Ito, S., Miguchi, H., *Seppyo,* Sep. 1994, 56(3), p.257-263, In Japanese. 5 refs.
Snow surveys, Snow depth, Snow density, Snow water equivalent, Snow cover structure, Japan—Niigata Prefecture

49-1499
Study of snow avalanche travelling length.
Matsuda, H., Fujimoto, T., Takeshi, T., Tunaki, R., *Seppyo,* Sep. 1994, 56(3), p.265-269, In Japanese. 5 refs.
Avalanche tracks, Avalanche mechanics, Avalanche forecasting

49-1500
Study on surface layer avalanche run-out limit by probable linear regression analysis.
Terada, H., Oura, J., Suhara, S., *Seppyo,* Dec. 1994, 56(4), p.315-323, In Japanese with English summary. 10 refs.
Avalanche tracks, Avalanche mechanics, Avalanche modeling, Avalanche forecasting, Snow cover stability, Statistical analysis, Mathematical models

49-1501
Experimental study on frost heaving of water-saturated soil under tri-axial stress.
Yamamoto, H., Ueda, Y., Izuta, H., *Seppyo,* Dec. 1994, 56(4), p.325-333, In Japanese with English summary. 10 refs.
Soil freezing, Frozen ground thermodynamics, Frozen ground strength, Frost heave, Frost forecasting, Unfrozen water content, Mathematical models

49-1502
Development of machines for hydraulic transportation of snow. Part 3: ditch end snow mixing machine.
Umemura, T., et al, *Seppyo,* Dec. 1994, 56(4), p.335-340, In Japanese with English summary. 6 refs.
Snow removal, Slush, Drains, Flow control, Machinery

49-1503
Annual evaporation from continental type glaciers.
Ohno, H., Ohata, T., *Seppyo,* Dec. 1994, 56(4), p.341-351, In Japanese with English summary. 19 refs.
Glacier surveys, Mountain glaciers, Glacier ablation, Glacier mass balance, Glacier heat balance, Ice air interface, Ice sublimation, China—Kunlun Mountains

49-1504
Prediction methods of winter road conditions in mountainous area.
Nakatsuji, T., Hagiwara, T., Fujiwara, T., Kaku, T., *Seppyo,* Dec. 1994, 56(4), p.353-361, In Japanese with English summary. 10 refs.
Road icing, Road maintenance, Weather forecasting, Safety, Computerized simulation

49-1505
High resolution bio-optical model of microalgal growth: tests using sea-ice algal community time-series data.
Arrigo, K.R., Sullivan, C.W., *Limnology and oceanography,* May 1994, 39(3), p.609-631, 61 refs.
Marine biology, Algae, Growth, Biomass, Photosynthesis, Ice cover effect, Snow cover effect, Ice optics, Light transmission, Mathematical models
A high resolution, two-dimensional time-dependent model of microalgal growth has been developed in which simulated physiological responses are determined by ambient temperature, spectral irradiance, nutrient concentration, and salinity. The model is based on the concept of a maximum temperature-dependent growth rate that is subsequently reduced by limitations imposed from insufficient light or nutrients, as well as sub- or supraoptimal salinity. Particular emphasis was placed on developing the formulation for light limitation, which includes the effects of diel changes in spectral irradiance, seasonal changes in photoperiod, and related adjustments in biochemical C:Chl *a* ratios. This level of detail was needed because the importance of light limitation has been demonstrated on diurnal, seasonal, and annual time scales in polar regions. The model was tested by comparing simulation results to a sea-ice microalgal bloom in McMurdo Sound in 1982. Environmental information from 1982 and biological coefficients derived from sea-ice communities were used as model input. Model results showed excellent agreement with microalgal bloom dynamics observed in 1982 under a variety of environmental conditions. Predicted Chl *a* standing crops were consistently within 15% of observations for the congelation ice and platelet ice, regardless of snow thickness; predicted vertical distributions of Chl *a* exhibited the same depth- dependent pattern as observations. (Auth. mod.)

49-1506
Structure of under-ice melt ponds in the central Arctic and their effect on the sea-ice cover.
Eicken, H., *Limnology and oceanography,* May 1994, 39(3), p.682-694, 23 refs.
Oceanographic surveys, Sea ice distribution, Ice cover thickness, Ice growth, Ice floes, Ice cores, Subglacial observations, Meltwater, Ponds, Salinity, Ice water interface, Arctic Ocean

49-1507
Sediment oxygen profiles in a super-oxygenated antarctic lake.
Wharton, R.A., Jr., Meyer, M.A., McKay, C.P., Mancinelli, R.L., Simmons, G.M., Jr., *Limnology and oceanography,* June 1994, 39(4), p.839-853, 37 refs.
Limnology, Icebound lakes, Ice cover effect, Bottom sediment, Water chemistry, Oxygen, Profiles, Supersaturation, Biomass, Light effects, Seasonal variations, Antarctica—Hoare, Lake
Perennially ice-covered lakes are found in the McMurdo Dry Valleys of southern Victoria Land. In contrast to temperate lakes that have diurnal photic periods, antarctic (and arctic) lakes have a yearly photic period. An unusual feature of the antarctic lakes is the occurrence of O_2 at supersaturated levels in certain portions of the water column. Here the authors report the first sediment O_2 profiles obtained using a microelectrode from a perennially ice-covered antarctic lake. Sediment cores collected in Jan. and Oct. 1987 from Lake Hoare in Taylor Valley show oxygenation down to 15, and in some cases, 25 cm. The oxygenation of sediments several centimeters below the sediment-water interface is atypical for lake sediments and may be characteristic of perennially ice-covered lakes. There is a significant difference between the observed Jan. and Oct. sediment O_2 profiles. Several explanations may account for the difference, including seasonality. A time-dependent model is presented which tests the feasibility of a seasonal cycle resulting from the long photoperiod and benthic primary production in sediments overlain by a highly oxygenated water column. (Auth. mod.)

49-1508
Photosynthesis of *Phaeocystis* in the Greenland Sea.
Cota, G.F., Smith, W.O., Jr., Mitchell, B.G., *Limnology and oceanography,* June 1994, 39(4), p.948-953, 26 refs.
Marine biology, Oceanography, Plankton, Biomass, Photosynthesis, Light effects, Sea water, Optical properties, Seasonal variations, Greenland Sea

49-1509
Miocene and Pliocene lacustrine and fluvial sequences, Upper Ramparts and Canyon Village, Porcupine River, east-central Alaska.
Fouch, T.D., et al, *Quaternary international,* July-Sep. 1994, Vol.22-23, p.11-29, 43 refs.
Pleistocene, Geological surveys, Quaternary deposits, Lacustrine deposits, Subarctic landscapes, Stratigraphy, Sediments, Tectonics, United States—Alaska—Porcupine River

49-1510
$^{40}Ar/^{39}Ar$ age constraints on Neogene sedimentary beds, Upper Ramparts, Half-way Pillar and Canyon Village sites, Porcupine River, east-central Alaska.
Kunk, M.J., Rieck, H., Fouch, T.D., Carter, L.D., *Quaternary international,* July-Sep. 1994, Vol.22-23, p.31-42, 33 refs.
Geological surveys, Subarctic landscapes, Stratigraphy, Tectonics, Sediments, Lacustrine deposits, Radioactive age determination, United States—Alaska—Porcupine River

49-1511
Palynology, paleoclimatology and correlation of Middle Miocene beds from Porcupine River (locality 90-1), Alaska.
White, J.M., Ager, T.A., *Quaternary international,* July-Sep. 1994, Vol.22-23, p.43-77, Refs. p.74-77.
Subarctic landscapes, Geological surveys, Sediments, Lacustrine deposits, Stratigraphy, Palynology, Classifications, Paleoecology, Paleoclimatology, Correlation, United States—Alaska—Porcupine River

49-1512
Paleosols associated with Miocene basalts, Porcupine River, Northeastern Alaska: implications for regional paleoclimates.
Smith, C.A.S., Fox, C.A., Kodama, H., *Quaternary international,* July-Sep. 1994, Vol.22-23, p.79-90, 23 refs.
Paleoclimatology, Geological surveys, Paleoecology, Palynology, Sediments, Peat, Stratigraphy, Soil profiles, United States—Alaska—Porcupine River

49-1513
Identification of Neogene woods from Alaska-Yukon.
Wheeler, E.A., Arnette, C.G., Jr., *Quaternary international,* July-Sep. 1994, Vol.22-23, p.91-102, 34 refs.
Paleobotany, Paleoecology, Sediments, Fossils, Palynology, Trees (plants), Classifications, United States—Alaska—Porcupine River

49-1514
Long pollen sequence of Neogene age, Alaska Range.
Leopold, E.B., Liu, G.W., *Quaternary international,* July-Sep. 1994, Vol.22-23, p.103-140, Refs. p.137-138.
Paleobotany, Palynology, Paleoclimatology, Sediments, Lithology, Stratigraphy, Radioactive age determination, Classifications, United States—Alaska—Alaska Range

49-1515
Ballast Brook and Beaufort Formations (Late Tertiary) on northern Banks Island, arctic Canada.
Fyles, J.G., et al, *Quaternary international,* July-Sep. 1994, Vol.22-23, p.141-171, Refs. p.169-171.
Paleobotany, Paleoecology, Arctic landscapes, Geological surveys, Stratigraphy, Sediments, Fossils, Classifications, Radioactive age determination, Canada—Northwest Territories—Banks Island

49-1516
Preliminary discussion of fossil larches *(Larix,* Pinaceae) from the Arctic.
Schorn, H.E., *Quaternary international,* July-Sep. 1994, Vol.22-23, p.173-183, 60 refs.
Paleobotany, Paleoecology, Arctic landscapes, Sediments, Trees (plants), Fossils, Structural analysis, Classifications, Canada—Yukon Territory—Old Crow

49-1517
Pliocene terrace gravels of the ancestral Yukon River near Circle, Alaska: palynology, paleobotany, paleoenvironmental reconstruction and regional correlation.
Ager, T.A., Matthews, J.V., Jr., Yeend, W., *Quaternary international,* July-Sep. 1994, Vol.22-23, p.185-206, Refs. p.204-106.
Paleobotany, Palynology, Geological surveys, Sediments, Fossils, Classifications, Trees (plants), Gravel, Stratigraphy, United States—Alaska—Circle

49-1518
Structurally preserved larch and spruce cones from the Pliocene of Alaska.
Miller, C.N., Jr., Ping, L., *Quaternary international,* July-Sep. 1994, Vol.22-23, p.207-214, 21 refs.
Paleobotany, Paleoecology, Subarctic landscapes, Sediments, Gravel, Fossils, Trees (plants), Structural analysis, Classifications, United States—Alaska—Circle

49-1519
Paleomagnetic results from Ch'ijee's Bluff, Porcupine River, Yukon Territory.
Evans, M.E., Wang, Y.C., *Quaternary international,* July-Sep. 1994, Vol.22-23, p.215-219, 19 refs.
Pleistocene, Geological surveys, Subarctic landscapes, Sediments, Geomagnetism, Remanent magnetism, Canada—Yukon Territory—Porcupine River

49-1520

Tertiary-Quaternary drainage of the pre-glacial Mackenzie Basin.

Duk-Rodkin, A., Hughes, O.L., *Quaternary international,* July-Sep. 1994, Vol.22-23, p.221-241, 43 refs.

Pleistocene, Subarctic landscapes, Geomorphology, Stratigraphy, Watersheds, Drainage, Canada—Northwest Territories—Mackenzie Mountains

49-1521

Traffic tunnel lining for cold regions.

Witolla, C., *Germany Patent Office. Patent,* Feb. 13, 1992, n.p., No.4025212.

Tunnels, Linings, Thermal insulation, Waterproofing, Sealing, Frost protection

49-1522

Windscreen de-icing system.

Auvity, M., *European Patent Office. Patent,* Feb. 12, 1992, n.p., No.470904.

Motor vehicles, Windows, Defrosting, Ice prevention

49-1523

Mooring and connecting oil production platform.

Castel, Y., *United Kingdom Patent Office. Patent,* May 2, 1990, n.p., No.2224329.

Floating structures, Offshore structures, Moorings, Ice control

49-1524

Ice removal from ship fairway.

Järvi, A., *Sweden Patent Office. Patent,* Oct. 25, 1988, n.p., No.8801428.

Ice navigation, Ice control, Bubbling, Cavitation

49-1525

Ice cover thickness measuring device.

Ilarov, N.A., Shteĭn, IU.V., Vasil'ev, P.N., *Russia Patent Office. Patent,* Jan. 30, 1993, n.p., No.1791696.

Ice cover thickness, Thickness gages

49-1526

Life saving ice spike.

Almgren, U., Nilsson, J., *Sweden Patent Office. Patent,* Jan. 3, 1994, n.p., No.9202053.

Rescue equipment, Cold weather survival, Ice cover effect, Ice crossings

49-1527

Hydrometer type density monitoring device for continuous brine dilution system.

Reich, G., *European Patent Office. Patent,* Feb. 23, 1994, n.p., No.583545.

Chemical ice prevention, Salting, Brines, Road maintenance

49-1528

Multi-purpose aircraft engine.

Spivak, V.A., *Russia Patent Office. Patent,* Oct. 30, 1993, n.p., No.2002087.

Jet engines, Aircraft icing, Ice prevention

49-1529

Northern Hudson Bay and Foxe Basin: water masses, circulation and productivity.

Jones, E.P., Anderson, L.G., *Atmosphere-ocean,* June 1994, 32(2), p.361-374, With French summary. 21 refs.

Oceanography, Water chemistry, Salinity, Ocean currents, Marine biology, Biomass, Geochemistry, Runoff, Sea ice, Meltwater, Canada—Hudson Bay, Canada—Foxe Basin, Arctic Ocean

49-1530

Interannual variability of sea-ice cover in Hudson Bay, Baffin Bay and the Labrador Sea.

Wang, J., Mysak, L.A., Ingram, R.G., *Atmosphere-ocean,* June 1994, 32(2), p.421-447, With French summary. 37 refs.

Oceanography, Climatology, Atmospheric circulation, Sea ice distribution, Ice cover thickness, Ice air interface, Surface temperature, Temperature variations, Seasonal variations, Canada—Hudson Bay, Baffin Bay, Labrador Sea

49-1531

Sea-ice dynamics and CO_2 sensitivity in a global climate model.

Pollard, D., Thompson, S.L., *Atmosphere-ocean,* June 1994, 32(2), p.449-467, With French summary. 49 refs.

Climatology, Climatic changes, Global warming, Atmospheric composition, Carbon dioxide, Sea ice distribution, Ice cover effect, Advection, Air ice water interaction, Simulation

Present-day results and CO_2 sensitivity are described for two versions of a global climate model with and without sea-ice dynamics. Sea-ice dynamics is modelled using the cavitating-fluid method of Flato and Hibler (1990, 1992). The atmospheric general circulation model originated from the National Center for Atmospheric Research (NCAR) Community Climate Model version 1, but is heavily modified to include new treatments of clouds, penetrative convection, planetary boundary-layer mixing, solar radiation, the diurnal cycle and the semi-Lagrangian transport of water vapor. The surface models include an explicit model of vegetation, multilayer models of soil, snow and sea ice, and a slab ocean mixed layer. When sea-ice dynamics is turned off, the CO_2-induced warming increased drastically around 60-80S in winter and spring. This is due to the much greater (and unrealistic) compactness of the antarctic ice cover without dynamics, which is reduced considerably when CO_2 is doubled and exposes more open ocean to the atmosphere. With dynamics, the winter ice is already quite dispersed for 1 x CO_2 so that its compactness does not decrease as much when CO_2 is doubled. (Auth. mod.)

49-1532

On the deterioration of icebergs in the marginal ice zone.

Venkatesh, S., Murphy, D.L., Wright, G.F., *Atmosphere-ocean,* June 1994, 32(2), p.469-484, With French summary. 13 refs.

Oceanographic surveys, Sea ice distribution, Ice edge, Icebergs, Drift, Drift stations, Calving, Ice deterioration, Water temperature, Simulation, Labrador Sea

49-1533

Further aspects of dynamical models for rime-ice and snow accretion on an overhead line conductor.

Poots, G., Skelton, P.L.I., *International journal of numerical methods in engineering,* June 15, 1994, 37(11), p.1863-1880, 13 refs.

Power line icing, Snow loads, Ice accretion, Hoarfrost, Air flow, Turbulent flow, Ice air interface, Mathematical models, Design criteria

49-1534

Debris flows in an alpine environment.

Lewin, J., Warburton, J.A., *Geography,* Apr. 1994, 343(79)pt.2, p.98-107, 9 refs.

Alpine landscapes, Mass flow, Mass movements (geology), Geomorphology, Rock mechanics, Periglacial processes, Safety, Forecasting, Switzerland—Val Ferret

49-1535

Gold in Spitsbergen rocks.

Gavrilenko, B.V., *Geochemistry international,* July 1994, 31(7), p.107-114, Translated from Geokhimiia. 10 refs.

Arctic landscapes, Geological surveys, Geochemistry, Gold, Sampling, Rock properties, Classifications, Norway—Spitsbergen

49-1536

Frustrated West watches as arctic oil spill grows.

Pain, S., Kleiner, K., *New scientist,* Nov. 5, 1994, 144(1950), p.8.

Oil spills, Arctic landscapes, Tundra, Environmental impact, Countermeasures, Russia—Usinsk

49-1537

Infrared spectroscopy of Triton and Pluto ice analogs: the case for saturated hydrocarbons.

Bohn, R.B., Sandford, S.A., Allamandola, L.J., Cruikshank, D.P., *Icarus,* Sep. 1994, 111(1), p.151-173, 61 refs.

Extraterrestrial ice, Satellites (natural), Ground ice, Ice physics, Ice spectroscopy, Infrared spectroscopy, Hydrocarbons, Classifications, Ultraviolet radiation, Photochemical reactions, Simulation

49-1538

Glaciers in Lombardy—a new survey of Lombardy glaciers. [Ghiacciai in Lombardia—nuovo catasto dei ghiaccia Lombardi]

Servizio Glaciologico Lombardo, Galluccio, A., ed, Catasta, G., ed, Milan, Bolis, 1992, 367p., In Italian. 118 refs.

DLC GB2500.L65 G47

Glacier surveys, Mountain glaciers, Alpine glaciation, Topographic features, Glacier mass balance, Classifications, Periodic variations, Italy—Lombardy

49-1539

Diel, tidal and vertical variations of phytoplankton and its environment in Frobisher Bay.

Hsiao, S.I.C., *Arctic,* Dec. 1992, 45(4), p.327-337, With French summary. 70 refs.

Marine biology, Ocean environments, Biomass, Plankton, Distribution, Classifications, Ecosystems, Sampling, Tides, Chlorophylls, Canada—Northwest Territories—Frobisher Bay

49-1540

Energy flow through the marine ecosystem of the Lancaster Sound region, arctic Canada.

Welch, H.E., et al, *Arctic,* Dec. 1992, 45(4), p.343-357, With French summary. Refs. p.354-357.

Ecosystems, Marine biology, Biomass, Distribution, Nutrient cycle, Periodic variations, Canada—Northwest Territories—Lancaster Sound

49-1541

Fossil pollen and insect evidence for postglacial environmental conditions, Nushagak and Holitna lowland regions, southwest Alaska.

Short, S.K., Elias, S.A., Waythomas, C.F., Williams, N.E., *Arctic,* Dec. 1992, 45(4), p.381-392, With French and Russian summaries. 49 refs.

Paleoecology, Paleobotany, Paleoclimatology, Palynology, Classifications, Glacial deposits, Stratigraphy, Tundra, Climatic changes, United States—Alaska—Holitna

49-1542

Recent results of Pleistocene periglacial research in the Netherlands.

Vandenberghe, J., *Geologie en Mijnbouw,* 1993, 72(2), International Symposium on Periglacial Environments in Relation to Climatic Change, Maastricht-Amsterdam, the Netherlands, May 3-6, 1991. Edited by F. Vandenberghe et al, p.103-106, 23 refs.

Pleistocene, Paleoclimatology, Periglacial processes, Geomorphology, Geocryology, Netherlands

49-1543

Periglacial environments and climatic development during the Early Pleistocene Tiglian stage (Beerse Glacial) in northern Belgium.

Kasse, C., *Geologie en Mijnbouw,* 1993, 72(2), International Symposium on Periglacial Environments in Relation to Climatic Change, Maastricht-Amsterdam, the Netherlands, May 3-6, 1991. Edited by F. Vandenberghe et al, p.107-123, 25 refs.

Pleistocene, Paleoclimatology, Paleoecology, Climatic changes, Quaternary deposits, Sedimentation, Periglacial processes, Geocryology, Stratigraphy, Belgium

49-1544

Saalian nivation activity in the Bosbeek valley, NE Belgium.

Gullentops, F., Janssen, J., Paulissen, E., *Geologie en Mijnbouw,* 1993, 72(2), International Symposium on Periglacial Environments in Relation to Climatic Change, Maastricht-Amsterdam, the Netherlands, May 3-6, 1991. Edited by F. Vandenberghe et al, p.125-130, 15 refs.

Pleistocene, Geomorphology, Periglacial processes, Landscape development, Valleys, Soil erosion, Snow cover effect, Snowmelt, Nivation, Belgium

49-1545

Aspects of Weichselian Middle Pleniglacial stratigraphy and vegetation in central Poland.

Krzyszkowski, D., Balwierz, Z., Pyszyński, W., *Geologie en Mijnbouw,* 1993, 72(2), International Symposium on Periglacial Environments in Relation to Climatic Change, Maastricht-Amsterdam, the Netherlands, May 3-6, 1991. Edited by F. Vandenberghe et al, p.131-142, 30 refs.

Pleistocene, Paleoecology, Palynology, Quaternary deposits, Lacustrine deposits, Radioactive age determination, Stratigraphy, Poland

49-1546

Late Plenivistulian deglaciation and the expansion of the periglacial zone in NW Poland.

Kozarski, S., *Geologie en Mijnbouw,* 1993, 72(2), International Symposium on Periglacial Environments in Relation to Climatic Change, Maastricht-Amsterdam, the Netherlands, May 3-6, 1991. Edited by F. Vandenberghe et al, p.143-157, Refs. p.155-157.

Pleistocene, Periglacial processes, Geomorphology, Glacial deposits, Permafrost distribution, Permafrost indicators, Cryoturbation, Ice wedges, Stratigraphy, Poland

49-1547

Periglacial environmental developments between 30 and 20 ka BP in Denmark.

Kolstrup, E., *Geologie en Mijnbouw,* 1993, 72(2), International Symposium on Periglacial Environments in Relation to Climatic Change, Maastricht-Amsterdam, the Netherlands, May 3-6, 1991. Edited by F. Vandenberghe et al, p.159-166, 26 refs.

Pleistocene, Paleoecology, Geomorphology, Periglacial processes, Sediments, Eolian soils, Stratigraphy, Permafrost indicators, Denmark

49-1548

Mineralogy and abrasion of sand grains due to Vistulian (Late Pleistocene) aeolian processes in central Poland.

Mankowska, B., *Geologie en Mijnbouw,* 1993, 72(2), International Symposium on Periglacial Environments in Relation to Climatic Change, Maastricht-Amsterdam, the Netherlands, May 3-6, 1991. Edited by F. Vandenberghe et al, p.167-177, 31 refs.

Pleistocene, Geomorphology, Periglacial processes, Eolian soils, Sediments, Abrasion, Wind erosion, Mineralogy, Stratigraphy, Poland

49-1549

Late Quaternary chronology of the Allier terrace sediments (Massif Central, France).

Veldkamp, A., Kroonenberg, S.B., *Geologie en Mijnbouw,* 1993, 72(2), International Symposium on Periglacial Environments in Relation to Climatic Change, Maastricht-Amsterdam, the Netherlands, May 3-6, 1991. Edited by F. Vandenberghe et al, p.179-192, 35 refs.

Pleistocene, Paleoclimatology, Geomorphology, Geochronology, Geologic structures, Quaternary deposits, Stratigraphy, Radioactive age determination, France

49-1550

Periglacial environments during the Weichselian Late Glacial in the Maas valley, the Netherlands.

Bohncke, S.J.P., Vandenberghe, J., Huijzer, A.S., *Geologie en Mijnbouw,* 1993, 72(2), International Symposium on Periglacial Environments in Relation to Climatic Change, Maastricht-Amsterdam, the Netherlands, May 3-6, 1991. Edited by F. Vandenberghe et al, p.193-210, Refs. p.208-210.

Pleistocene, Geomorphology, Paleobotany, Periglacial processes, Sediments, Radioactive age determination, Stratigraphy, Palynology, Cryoturbation, Permafrost indicators, Netherlands

49-1551

Dune dynamics and cryoturbation features controlled by Holocene water level change, Hietatievat, Finnish Lapland.

Van Vliet-Lanoë, B., Seppälä, M., Käyhkö, J., *Geologie en Mijnbouw,* 1993, 72(2), International Symposium on Periglacial Environments in Relation to Climatic Change, Maastricht-Amsterdam, the Netherlands, May 3-6, 1991. Edited by F. Vandenberghe et al, p.211-224, 47 refs.

Geocryology, Geomorphology, Climatic changes, Sands, Water level, Cryoturbation, Periglacial processes, Stratigraphy, Seasonal freeze thaw, Finland

49-1552

Influence of periglacial activity on the remanent magnetization of sediments.

Hus, J.J., Paepe, R., Geeraerts, R., *Geologie en Mijnbouw,* 1993, 72(2), International Symposium on Periglacial Environments in Relation to Climatic Change, Maastricht-Amsterdam, the Netherlands, May 3-6, 1991. Edited by F. Vandenberghe et al, p.225-235, 38 refs.

Pleistocene, Geocryology, Quaternary deposits, Stratigraphy, Ice wedges, Periglacial processes, Geomagnetism, Remanent magnetism, Magnetic anomalies, Belgium

49-1553

Boulder depressions in central Sweden—remnants of a pre-Late Weichselian landscape?

Hättestrand, C., *Geografiska annaler,* 1994, 76A(3), p.153-160, 27 refs.

Pleistocene, Glacial geology, Glacial erosion, Geomorphology, Periglacial processes, Moraines, Topographic features, Frost heave, Rock mechanics, Sweden

49-1554

Effects of changes in groundwater level on palsas in central Iceland.

Thórhallsdóttir, T.E., *Geografiska annaler,* 1994, 76A(3), p.161-167, 25 refs.

Subarctic landscapes, Geocryology, Frost mounds, Topographic features, Periglacial processes, Permafrost hydrology, Permafrost transformation, Lake water, Suprapermafrost ground water, Water level, Iceland

49-1555

Paleo-periglacial ventifact formation by suspended silt or snow—site studies in south Sweden.

Schlyter, P., *Geografiska annaler,* 1994, 76A(3), p.187-201, 68 refs.

Pleistocene, Rock properties, Microrelief, Abrasion, Blowing snow, Eolian soils, Wind erosion, Periglacial processes, Snow cover effect, Sweden

49-1556

Interaction of CCl_4 with the surface of amorphous ice.

Blanchard, J.L., Roberts, J.T., *Langmuir,* Sep. 1994, 10(9), p.3303-3310, 34 refs.

Ice physics, Amorphous ice, Water films, Monomolecular films, Ice spectroscopy, Surface properties, Ice solid interface, Ice vapor interface, Adsorption, Molecular energy levels, Low temperature tests

49-1557

Climate, mass balance and glacial changes on small dome of Collins Ice Cap, King George Island, Antarctica.

Wen, J.H., et al, *Antarctic research,* June 1994, 5(1), p.52-61, 15 refs.

Glacier mass balance, Glacier heat balance, Glacier oscillation, Antarctica—King George Island

During the 1991-92 Chinese Antarctic Expedition, full-year glacial investigations of the small dome of Collins Ice Cap were carried out. The data showed that vertical temperature gradients on the dome were about 0.79 C/100 m in the summer and 0.66 C/100 m in the winter. Lower summer temperature in this area is one of the most important conditions for glacial development. 1991-92 was a weak positive balance year, with a mass balance difference of 163 mm, annual ELA of 140 m, mass balance gradient of 8.4 mm/m; mass balance level was 928 mm. Mass balance fluctuations on the small dome for 1971-1992 were calculated by a new method. Results show that the small dome of Collins Ice Cap was relatively stable over 21 years. (Auth. mod.)

49-1558

Spatial and temporal patterns of the Fennoscandian seismicity—an exercise in explosion monitoring.

Tarvainen, M., Husebye, E.S., *Geophysica,* 1993, 29(1-2), p.1-19, 18 refs.

Mining, Seismology, Seismic surveys, Geophysical surveys, Subpolar regions, Explosives, Explosion effects, Detection, Periodic variations, Monitors, Statistical analysis, Finland, Russia

49-1559

Ground acceleration measurements in Finland.

Teikari, P., *Geophysica,* 1993, 29(1-2), p.21-31, 10 refs.

Geophysical surveys, Seismology, Bedrock, Earthquakes, Detection, Seismic velocity, Subpolar regions, Finland

49-1560

Methodological aspects on river cryophenology exemplified by a tricentennial break-up time series from Tornio.

Kajander, J., *Geophysica,* 1993, 29(1-2), p.73-95, 36 refs.

Icebound rivers, Hydrology, Ice breakup, Ice conditions, Terminology, Statistical analysis, Periodic variations, Correlation, Finland—Tornio River

49-1561

Initial observations of salt sieving in frozen soil.

Black, P.B., CR 94-09, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Aug. 1994, 9p., ADA-286 373, 13 refs.

Moisture transfer, Soil water migration, Unfrozen water content, Soil freezing, Mathematical models

The role of solutes in the transport of water through frozen porous media is more complicated and subtle than simply lowering the freezing point of the water. This report presents evidence that unfrozen water films in soil act as a semipermeable membrane selectively filtering solutes. The calculated film thickness at the test temperature (-0.05 C) indicates that all solute should pass. The additional influence of anion exclusion arising from a diffuse electrical double layer suggests that solute movement is restricted and a "salt-sieving" process results. Experimental observations are reported for a specially designed constant-volume ice-sandwich permeameter. Proposed research for a constant-stress ice-sandwich permeameter is presented as a means of overcoming experimental uncertainties of the present system.

49-1562

Softening of rigid PVC by aqueous solutions of organic solvents.

Parker, L.V., Ranney, T.A., SR 94-27, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1994, 17p., ADA-286 374, 12 refs.

Polymers, Monitors, Ground water

This research examined softening of rigid PVC by aqueous solutions of organic solvents known to be good PVC swelling agents. Significant changes in the hardness readings of rigid PVC exposed to aqueous solutions of methylene chloride (a good PVC swelling agent) occurred at thermodynamic activities as low as 0.1, which is much lower than has been reported or predicted. Rigid PVC became rubbery after exposure to 0.6-activity solutions of methylene chloride. Whether a similar phenomenon occurs with TCE, which is not as good a PVC swelling agent, is not clear from these preliminary studies. This study also looked at the effect of a mixture of several organic solvents dissolved in an aqueous solution. A solution that contained three good PVC swelling agents, each at an activity of 0.3, rapidly softened PVC (within 2 days). This indicates that there is some type of interactive or cumulative effect associated with mixtures of organic solutes, with each solute at an activity of 0.3 or higher. A study was also conducted to determine if aqueous solutions of a good PVC swelling agent that is also totally miscible in water (acetone) can soften PVC. After 1 week a concentration of 50% acetone softened PVC, while at 25% solution did not.

49-1563

Screening for metals by x-ray fluorescence spectrometry using a single calibration standard.

Hewitt, A.D., SR 94-20, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* July 1994, 11p., ADA-286 425, 19 refs.

Soil pollution, Environmental tests, Metals, X ray analysis

Analysis for copper, zinc, arsenic and lead was performed on a variety of solid particle matrices using a portable, high-resolution X-ray fluorescence (XRF) spectrometer. All quantitative determinations were based on an instrumental calibration method that uses a single certified reference material to establish elemental response factors and the Compton KA peak to normalize for matrix discrepancies. This simple approach to XRF analysis circumvents the need to acquire matrix-matched standards for either empirical coefficients or fundamental parameter methods of calibration. Preliminary results show that response factor/Compton KA peak normalization is a promising approach when screening for these metals in soils, dust, paint chips and incinerated sludge.

49-1564
Surface of ice.
Petrenko, V.F., SR 94-22, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1994, 37p., ADA-286 424, Refs. p.33-37.
Ice surface, Ice cover thickness, Molecular structure, Ice sintering, Ice physics, Ice models, Ice electrical properties, Protons, Backscattering, Nuclear magnetic resonance, Regelation, Ice adhesion, Adsorption
This report examines the structure and physical properties of the surface of ice: a liquid-like layer on the ice surface, its thickness and molecular structure, surface conductivity, surface electric charge, surface potential, surface diffusion and so forth. The author reviews experimental results and theoretical models on ice adhesion, gas adsorption and ice sintering. Special attention is given to the results of studies from the last two decades. Among the experimental techniques under consideration are nuclear magnetic resonance, X-ray diffraction, optical ellipsometry, measurements of ice surface conductivity and dielectric permittivity, frictional electrification of snow and ice, proton channeling and others. In conclusion, theoretical models of the ice surface structure and the results of molecular dynamics are considered.

49-1565
Current issues in Alaska wetland management.
Racine, C.H., SR 94-26, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1994, 18p., ADA-286 427, Refs. p.14-18.
Wetlands, Environmental protection, United States—Alaska
Although wetlands cover over half of Alaska, the status, management and regulation of these areas is problematic. The technical literature on Alaskan wetland vegetation, soils and hydrology is abundant, but the application of the literature to wetland management is poorly developed. This report identifies problems, issues and information gaps in the management of Alaskan wetlands. There are numerous arguments and debates on the designation, function and values, and disturbance of certain wetlands in Alaska. Permafrost, fire cycles and unique hydrologic regimes complicate the designation and delineation of Alaskan wetlands. The functions and values of most Alaskan wetlands clearly lie in their importance as habitat, particularly for migrating waterbirds, but an understanding of their role in flood water storage, water quality improvement, subsistence and other functions remains controversial and in need of study. Disturbance and other impacts on Alaskan wetlands is small relative to the large area that wetlands cover and in comparison with the loss of wetlands in the lower 48 states. However, several development projects in Alaska have affected large wetland areas and methods to restore these wetlands are being developed. Cumulative impacts are unknown, as are techniques for restoring permafrost wetlands containing gravel fill.

49-1566
Calculation of multi-year mass balance variations on small dome of Collins Ice Cap, King George Island.
Xie, Z.C., Wen, J.H., Han, J.K., *Antarctic research (Chinese edition),* June 1994, 6(2), p.32-39, In Chinese with English summary. 13 refs.
Glacier oscillation, Glacier mass balance, Ice air interface, Air temperature, Antarctica—King George Island
Based on field measured data of mass balance of a small dome of the Collins Ice Cap in 1991-92, meteorological data of summer mean temperatures and annual precipitation, mass balance variations of the small dome from 1971-1992 were calculated. Results show that the contribution of precipitation and temperature to mass balance was 68 and 32%, respectively. From the 70s to the mid 80s, lower annual temperature was beneficial to glacial accumulation; precipitation was less, and its contributions to the mass balance was greater than that of temperature, so a negative mass balance of the small dome occurred. From the mid 80s to the beginning of the 90s, a larger positive mass balance occurred from increased precipitation. The trend of mass balance of the small dome has been close to zero over the last 20 years. (Auth. mod.)

49-1567
Radar sounding and study of the bedrock topography on Collins Ice Cap.
Zhu, G.C., et al, *Antarctic research (Chinese edition),* June 1994, 6(2), p.40-45, In Chinese with English summary. 2 refs.
Glacier thickness, Radar echoes, Bedrock, Bottom topography, Antarctica—King George Island
Using a high frequency pulse radar at 300 MHz, radar sounding was carried out at 150 points on Collins Ice Cap, and a bedrock echo profile was obtained over 15 km. The maximum ice thickness, 125-131 m, of the Small Dome of the ice cap was located on the summit. The average thickness on the ridge, from the summit of Small Dome to the summit of the Main Dome, was about 109 m. A radar echo was observed at depths of 50-85 m around the summit of the Main Dome, which proved to be a water table by ice coring. The bedrock topography of the Small Dome, in the direction south to north, was similar to that of the northern terrace. (Auth. mod.)

49-1568
Antarctica I: Deep structure investigations inferred from seismology; a review.
Roult, G., Rouland, D., *Physics of the earth and planetary interiors,* 1994, 84(1-4), p.15-32, Refs. p.30-32.
Ice surface, Polar regions, Seismology, Tectonics
The strategic position of Antarctica and its role have always been seen as clues to the tectonic and geodynamic history of the Southern Hemisphere. Direct investigations are difficult, and seismology was, and still is, a very efficient tool for answering some important questions. Major seismological results from the beginning of the century to the present are reviewed, taking into consideration their limitations owing to the lack of stations and data. The existing regional Earth models reviewed are very simple because of poor processing facilities. The availability of high-quality data obtained with the GEOSCOPE network in this part of the Southern Hemisphere has recently led to the construction of maps of lateral heterogeneities of Antarctica with an improved resolution. A brief report of the authors' contribution is presented. (Auth.)

49-1569
No ice-sheet collapse.
Bentley, C.R., et al, *Nature,* Aug. 26, 1993, 364(6440), p.766, For the article being commented on see 47-1941 or 21F-47715. 7 refs.
Ice sheets, Glacier flow, Volcanoes, Grounding line, Antarctica—West Antarctica
In the paper under discussion, the authors, (Blankenship, D.D. *et al, Nature* 361:526-529 (1993)), present evidence for a subglacial volcano which supports the characterization of central West Antarctica as a rift zone. The present author takes issue with such a characterization, believing that a retreat of the grounding line of so great a magnitude as the authors of the cited paper propose would have already produced an instability that renders the proposed collapse mechanism largely irrelevant. The present author also questions the conclusion that "elevated thermal flux provides an important control on the dynamics of the [west antarctic ice sheet]," citing several instances which show that fast moving glaciers are a common occurrence among past ice sheets, very few of which have been associated with volcanoes.

49-1570
Crystal fabrics of firn/ice cores from shallow boreholes on Nelson Ice Cap, Antarctica.
Ren, J.W., Qin, D.H., Liu, C., *Antarctic research (Chinese edition),* Sep. 1994, 6(3), p.20-24, In Chinese with English summary. 13 refs.
Ice crystal structure, Ice sheets, Ice cores, Ice formation, Firn, Antarctica—Nelson Island
The crystal fabric measurement of three shallow firn/ice cores from Nelson ice cap shows that c-axes orientation is preferred at the surface. Within 20 m depth, a double-fan pattern fabric is dominant. Between 20 and 30 m the fabric pattern has a tendency to change to a single-maximum pattern. These results are very different from those reported from mountain temperate glaciers in lower latitudes. The intense meltwater percolation and refreezing may have an important effect, but the mechanism needs to be studied further in detail. (Auth.)

49-1571
Preliminary age determination with numerical modelling for an ice core extracted from Low Dome of Collins Ice Cap, King George Island, Antarctica.
Zhang, W.C., Han, J.K., *Antarctic research (Chinese edition),* Sep. 1994, 6(3), p.25-32, In Chinese with English summary. 20 refs.
Ice cores, Ice dating, Ice models, Mathematical models, Antarctica—King George Island
According to ice flow state, temperature distribution, mass balance and dynamic characteristics of Low Dome on Collins Ice Cap, revealed by observational data collected in situ for more than one year, the Dansgaard-Johnsen model and isothermal ice flow models for n=3 are adopted to calculate the time-scales of an 80.2 m ice core. Calculations show a very approximate time scale of the core; at a depth of 10 m above the bedrock, ages of 1879 y and 1854 y B.P. are obtained by the two models, respectively. The maximum calculation error between the two models is no more than 2%. Comparison with records of volcanic ash layers contained in the middle-upper part of the core suggests an age error of less than 3%. (Auth. mod.)

49-1572
Study on the oscillation relationship between sea ice of the Arctic and Antarctic.
Xie, S.M., Bao, C.L., Hao, C.J., *Antarctic research (Chinese edition),* Sep. 1994, 6(3), p.38-52, In Chinese with English summary. 16 refs.
Sea ice distribution, Ice models, Variations, Polar regions
In this paper, the antarctic sea ice is divided into 4 regions: SPI1, the eastern antarctic region; SPI2, centered at the Ross Sea; SPI3, centered at the Weddell Sea; and SPI4, the whole antarctic sea region. The arctic sea ice is divided into 3 regions: NPI1 on the Pacific side; NPI2 on the Atlantic side; and NPI3, the whole arctic sea region. Analysis of the SIGRID polar sea ice data provided by WDC-A shows that very complicated interactions exist between the sea ice of the arctic and antarctic regions, with the most outstanding characteristics as follows: the vibration source of interactions between the two poles' sea ice is NPI2. SPI3 is the positive feedback center affecting the antarctic sea ice. SPI2 is the negative feedback center affecting both poles' sea ice. The strongest interactions among NPI2, SPI3 and SPI2 make a quasi-periodic intensity variation between the sea ice of the Antarctic and the Arctic, with a cycle period of 5 to 6 years. This cycle period coincides with the principal period of NPI2 and SPI3 variations. An oscillation between SPI3 and SPI2 is of a zonal nature, while the oscillation between NPI2 and SPI3, or SPI2, is of meridional nature. (Auth. mod.)

49-1573
Energy balance model for prediction of surface temperatures.
Alexandersson, H., Gollvik, S., Mueller, L., *Swedish Meteorological and Hydrological Institute. Reports. Meteorology and climatology,* 1991, SMHI RMK, No.63, 20p., 11 refs.
Road icing, Frost forecasting, Weather forecasting, Surface temperature, Heat balance, Mathematical models, Sweden

49-1574
Abbreviated test plan for the cold temperature firing test of the M934 cartridge to the M121 120mm mortar, and technical feasibility test of the M113 engine glow plug modification, and preproduction qualification test of the heater modernization program.
Litavec, D.J., U.S. Army Test and Evaluation Command TECOM Project No.2-MU-001-934-008/1-VC-080-1A2-014, Fort Greely, AK, U.S. Army Cold Regions Test Activity, Nov. 1994, 12p. + appends.
Military equipment, Engine starters, Motor vehicles, Electric heating, Cold weather tests

49-1575
Navy-NASA SSM/I validation experiment—KRMS data products.
Eppler, D.T., Farmer, L.D., *U.S. Naval Oceanographic and Atmospheric Research Laboratory. NOARL technical note,* Feb. 1991, No.48, 49p., ADA-240 434, 7 refs.
Ice surveys, Sea ice distribution, Ice reporting, Ice detection, Ice conditions, Radiometry

49-1576
Proceedings of lectures.
International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988, Florence, Accademia dei Georgrofili, [1988], 832p., For selected papers see 49-1577 through 49-1600.
Road icing, Road maintenance, Weather forecasting, Safety

49-1577
Research on snow and ice control by the Strategic Highway Research Program.
Minsk, L.D., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.37-42.
Road icing, Road maintenance, Snow removal, Research projects, Cost analysis, United States

49-1578
Open road weather service for highway authorities in U.K.
Flood, C., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.43-56.
Road icing, Road maintenance, Weather forecasting, United Kingdom

49-1579

French road weather system implementation.

Le Quentrec, M.M., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.57-59.

Road icing, Road maintenance, Weather forecasting, France

49-1580

Wisconsin's winter weather system.

Stephenson, T.E., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.61-101.

Road icing, Road maintenance, Snow removal, Ice detection, Ice forecasting, Frost forecasting, Weather forecasting, Data transmission, Cost analysis, United States—Wisconsin

49-1581

Road weather in Devon.

Willmington, L.D.V., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.103-120.

Road icing, Road maintenance, Snow removal, Ice detection, Weather forecasting, Cost analysis, United Kingdom—England

49-1582

Use of weather data on the "Autostrade S.p.A." network in Italy. [L'informazione meteorologica sulla rete Autostrade]

Selvi, R., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.121-136, In Italian with English, French, and German summaries.

Road icing, Road maintenance, Weather forecasting, Italy

49-1583

Winter-index based on measured and observed road-weather parameters.

Voldborg, H., Knudsen, F., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.169-173.

Road icing, Road maintenance, Weather forecasting, Denmark

49-1584

Introduction to road microclimate—thermal mapping.

Lindqvist, S., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.174-182.

Road icing, Road maintenance, Weather forecasting, Sweden

49-1585

Method for the detection of road surface conditions without contact.

Scharsching, H., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.183-190.

Road icing, Road maintenance, Moisture detection, Weather forecasting

49-1586

Use of satellite and weather radar in winter operations on highways.

Perry, A., Runacres, A., Symons, L., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.246-252, 6 refs.

Road icing, Road maintenance, Weather forecasting, Radar tracking, United Kingdom

49-1587

Local weather effects and road safety: theoretic considerations, acquisition of specific information and development lines of the informative system.

Volta, E., Ardemagni, C., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.253-264, 9 refs.

Road icing, Road maintenance, Weather forecasting, Safety

49-1588

Weather road maintenance technology and requirements to icy road warning systems and spraying machines.

Muehlberger, J., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.283-286.

Road icing, Road maintenance, Salting, Weather forecasting, Warning systems

49-1589

Ice and slippery road warning system: traffic influence and road maintenance.

Dalsgaard, E., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.287-297.

Road icing, Road maintenance, Weather forecasting, Warning systems, Safety, Denmark

49-1590

EPOKE lives by winter weather.

Hansen, L., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.299-305.

Road icing, Road maintenance, Salting, Denmark

49-1591

Use of brine by the winter road services.

Veschambre, Y., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.371-404.

Road icing, Road maintenance, Salting, Brines

49-1592

Spraying of thawing agents for hazardous areas.

Schuh, G.A., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.442-460.

Road icing, Road maintenance, Chemical ice prevention, Urea

49-1593

Restructuring of systems and centers for winter maintenance on the IRI-ITALSTAT Autostrade network. [Le trasformazioni in atto dei sistemi e dei centri per la viabilità invernale della rete "autostrade" IRI-ITALSTAT]

Camomilla, G., Malleone, A., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.461-480, In Italian with English summary.

Road icing, Road maintenance, Salting, Italy

49-1594

Weather information system for the Swedish road network.

Millgard, L., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.483-488.

Road icing, Road maintenance, Weather forecasting, Sweden

49-1595

Road surface condition prediction.

Voldborg, H., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.489-497.

Road icing, Road maintenance, Weather forecasting, Denmark

49-1596

Hydrological-hydraulic forecasting system protecting the Milan-Rome highway between Chiusi and Fabro.

Cargnelutti, M., Ferrari, S., Galfrè, P., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.498-539, 6 refs.

Road maintenance, Runoff forecasting, Flood forecasting, Warning systems, Safety, Italy

49-1597

Towards a cost/benefit analysis of the UK national ice prediction system.

Thornes, J.E., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.559-579, 6 refs.

Road icing, Road maintenance, Ice forecasting, Weather forecasting, Cost analysis, United Kingdom

49-1598

Meteorological Office road surface temperature prediction model.

Thompson, N., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.606-616, 18 refs.

Road icing, Frost forecasting, Weather forecasting, Surface temperature, Computerized simulation

49-1599

Use of numerical prognosis in road weather prediction.

Lystad, M., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.655-666, 3 refs.

Road icing, Road maintenance, Weather forecasting, Norway

49-1600

Conditional probability forecast of frozen precipitation for road users.

Dimitrijevic, V.M., Nikolic, Z., International Conference on Weather and Road Safety, 4th, Florence, Italy, Nov. 8-10, 1988. Proceedings, Florence, Accademia dei Georgrofili, [1988], p.667-679, 16 refs.

Road icing, Road maintenance, Weather forecasting, Frost forecasting, Statistical analysis, Serbia

49-1601

Commitment to Alaskans—executive summary.

Alaska Sanitation Task Force, Juneau, AK, Oct. 1992, 38p., Draft of recommendations of the Task Force.

Regional planning, Sanitary engineering, Health, Sewage disposal, Cost analysis, United States—Alaska

49-1602

Soil-water interactions: mechanisms and applications.

Iwata, S., Tabuchi, T., Warkentin, B.P., New York, Marcel Dekker, Inc., 1995, p.71-72,107-125, Second edition, revised and expanded.

DLC S594.I86 1994

Soil freezing, Freezing front, Unfrozen water content, Soil water migration

49-1603

Mass balance, meteorological, and runoff measurements at South Cascade Glacier, Washington, 1992 balance year.

Krimmel, R.M., *U.S. Geological Survey. Open-file report,* 1993, No.93-640, 38p., 6 refs.

Glacier surveys, Glacier mass balance, Glacier oscillation, Runoff, United States—Washington

49-1604

Runoff, precipitation, mass balance, and ice velocity measurements at South Cascade Glacier, Washington, 1993 balance year.

Krimmel, R.M., *U.S. Geological Survey. Water-resources investigations report,* 1994, No.94-4139, 35p., 9 refs.

Glacier surveys, Glacier mass balance, Glacier oscillation, Glacier flow, Runoff, United States—Washington

49-1605
New foe in the avalanche war.
Conger, S., *Avalanche review,* Nov. 1994, 13(1), p.1-2.
Avalanches, Rescue equipment, Radio beacons

49-1606
Summary of U.S. avalanche incidents, winter 1993-94.
Williams, K., *Avalanche review,* Nov. 1994, 13(1), p.3.
Avalanches, Accidents, United States

49-1607
Avalanche rescue beacons: the "new" method of secondary search—does it work.
Faisant, R., *Avalanche review,* Nov. 1994, 13(1), p.4-5.
Avalanches, Rescue equipment, Rescue operations, Radio beacons

49-1608
Using stable isotopes as natural tracers to delineate hydrological drainage basins on the Greenland ice-sheet margin.
Reeh, N., Thomsen, H.H., *Chemical geology,* 1993, Vol.109, p.281-291, 11 refs.
Ice sheets, Glacier surveys, Glacial hydrology, Subglacial drainage, Glacial lakes, Meltwater, Water chemistry, Runoff forecasting, Isotope analysis, Greenland

49-1609
Ventilating attics to minimize icings at eaves.
Tobiasson, W., Buska, J., Greatorex, A., MP 3527, *Energy and buildings,* 1994, Vol.21, p.229-234, 6 refs. For another version see 48-3860.
Cold weather construction, Buildings, Roofs, Icicles, Ice prevention, Ventilation

In cold regions, icicles and ice dams may develop on roofs that slope to cold eaves. Ventilating the space below the snow-covered roof with outdoor air to create a 'cold' ventilated roof is often an effective way to avoid such problems. Several buildings in northern New York were instrumented to determine how their attic temperature influenced icing. It was observed that problematic icings developed very slowly, if at all, when the outside temperature was above -5.5 C. It appears that icings can be avoided by sizing natural, and if necessary, mechanical attic ventilation systems to maintain an attic temperature of -1 C when the outside temperature is -5.5 C.

49-1610
Experimental study of natural heat transfer from a horizontal ice cylinder immersed in cold pure water.
Riu, K.J., Choo, H.L., Moon, J.H., *Korean scientific abstracts,* Aug. 1994, 26(4), p.88-89, Abstract only from Transactions of the Korean Society of Mechanical Engineers, 1994, Vol.18, No.4, p.1019-1030.
Ice water interface, Ice heat flux, Ice melting, Heat transfer

49-1611
Panel heaters used to control ice growth caused by fluctuating water levels.
Haynes, F.D., Haehnel, R., Zabilansky, L., MP 3528, *U.S. Army Corps of Engineers. Waterways Experiment Station. Repair, Evaluation, Maintenance, and Rehabilitation Research Program. REMR bulletin,* Apr. 1994, 11(1), p.7-10.
Locks (waterways), Dams, Ice growth, Ice control, Ice prevention, Radiant heating

49-1612
Heated water jet for melting ice.
Haynes, F.D., MP 3529, *U.S. Army Corps of Engineers. Waterways Experiment Station. Repair, Evaluation, Maintenance, and Rehabilitation Research Program. REMR bulletin,* Dec. 1993, 10(4), p.12-15, 2 refs.
Locks (waterways), Dams, Ice control, Ice prevention, Ice removal, Artificial melting, Hydraulic jets

49-1613
Panel wall heaters successful at Starved Rock Lock and Dam, Illinois River.
Haynes, F.D., MP 3530, *U.S. Army Corps of Engineers. Waterways Experiment Station. Repair, Evaluation, Maintenance, and Rehabilitation Research Program. REMR bulletin,* Apr. 1994, 11(1), p.11.
Locks (waterways), Dams, Ice control, Ice prevention, Radiant heating, United States—Illinois River

49-1614
Acronyms and abbreviations for the polar science community.
International Arctic Science Committee, Oslo, 1994, 57p.
Dictionaries, Terminology, Organizations, Research projects

49-1615
Long term modelling of permafrost dynamics.
Fawcett, K., Anderson, M.G., *U.S. Army European Research Office. Technical report,* July 1994, 30p. + appends., 9 refs.
Frozen ground thermodynamics, Permafrost heat transfer, Permafrost mass transfer, Soil freezing, Ground thawing, Frost weathering, Solifluction, Computer programs

49-1616
Frazil ice evolution in open channels.
Hammar, L., Luleå, Sweden, University of Technology, 1994, 21p., Licentiate thesis. With Swedish summary. 18 refs.
River ice, Frazil ice, Ice formation, Ice growth, Ice crystal collision, Ice crystal growth, Channels (waterways), Mathematical models

49-1617
Annual report 1994.
National Snow and Ice Data Center. World Data Center-A for Glaciology, Boulder, University of Colorado, 1994, 53p., 44 refs.
Snow surveys, Ice surveys, Glacier surveys, Research projects, Organizations, Data processing

49-1618
Northern granular resources bibliography.
Howard, L., ed, Goodwin, R., ed, ASTIS occasional publication, No.13, Calgary, University, Arctic Institute of North America, Arctic Science and Technology Information System, 1994, 134p., Contains 495 citations.
Bibliographies, Construction materials, Gravel, Sands, Earth fills, Quarries, Natural resources, Canada—Yukon, Canada—Northwest Territories

49-1619
Bearing capacity of soils. New York, American Society of Civil Engineers, 1993, 142p., 109 refs. Technical engineering and design guides as adapted from the U.S. Army Corps of Engineers, No.7.
DLC TA775.B395 1993
Soil strength, Bearing strength, Foundations, Design criteria

49-1620
Introduction to frozen ground engineering.
Andersland, O.B., Ladanyi, B., New York, Chapman & Hall, Inc., 1994, 352p., Refs. p.325-342.
DLC TA713.I6 1994
Frozen ground mechanics, Frozen ground strength, Frozen ground thermodynamics, Permafrost beneath structures, Soil freezing, Artificial freezing, Foundations, Earthwork, Soil stabilization, Engineering geology

49-1621
Ice caps and frozen rocks in Earth history. [Pokrovnye oledeneniia i merzlye porody v istorii zemli]
Ershov, E.D., Lisitsyna, O.M., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* July-Aug. 1993, No.4, p.3-26, In Russian. 39 refs.
Paleoclimatology, Glacial deposits, Frozen rocks, Geocryology, Glaciation

49-1622
Characteristics of the deformation of thawing ground based on research data. [Zakonomernosti deformirovaniia ottaivaiushchikh gruntov po eksperimental'nym dannym]
Ziangirov, R.S., Kal'bergenov, R.G., Topekha, S.V., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* July-Aug. 1993, No.4, p.50-59, In Russian. 6 refs.
Ground thawing, Cryogenic structures, Soil texture, Soil composition, Deformation, Soil structure, Russia—Yamal Peninsula, Mongolia

49-1623
Analytical method of estimating erosional and thermoerosional activity. [Analiticheskiĭ metod otsenki erozionnoĭ i termoerozionnoĭ aktivnosti]
Chekhovskiĭ, A.L., Skubitskaia, M.G., Dan'ko, V.K., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* July-Aug. 1993, No.4, p.98-103, In Russian. 11 refs.
Analysis (mathematics), Mathematical models, Erosion, Forecasting, Permafrost distribution, Ice erosion

49-1624
Mathematical modelling of the process of cryogenic moisture migration in natural systems. [Matematicheskoe modelirovanie protsessa kriogennoĭ migratsiĭ vlagi v prirodnykh sistemakh]
Gamaiunov, N.I., Stotland, D.M., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* July-Aug. 1993, No.4, p.104-116, In Russian. 24 refs.
Mathematical models, Moisture transfer, Soil water migration, Peat

49-1625
Engineering geological aspect of problems in the preservation of ancient defensive structures. [Inzhenerno-geologicheskiĭ aspekt problemy sokhraneniia drevnikh oboronitel'nykh sooruzheniĭ]
Pashkin, E.M., Domarev, O.V., Nikiforov, A.A., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* July-Aug. 1993, No.4, p.117-125, In Russian. 5 refs.
Engineering geology, Deformation, Frost heave, Seasonal freeze thaw

49-1626
Genesis of loess subsidence. [Genezis prosadochnosti lessovykh porod]
Minervin, A.V., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* May-June 1993, No.3, p.18-36, In Russian. 50 refs.
Loess, Subsidence, Pleistocene, Permafrost

49-1627
Predicting changes in the geological environment under conditions of urban technogenic impact, based on a cartographic method. [Prognozirovanie izmeneniia geologicheskoĭ sredy v usloviiakh tekhnogennogo vozdeĭstviia goroda na osnove kartograficheskogo metoda]
Krepsha, N.V., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* May-June 1993, No.3, p.44-57, In Russian. 3 refs.
Environmental impact, Geological maps, Frost heave, Engineering geology, Russia—Tomsk

49-1628
Effect of surface roughness of foundation materials on the strength of their adfreezing to soil under various conditions. [Vliianie sherokhovatosti poverkhnosti materialov fundamentov na prochnost' smerzaniia s gruntom v razlichnykh usloviiakh]
Volokhov, S.S., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* May-June 1993, No.3, p.76-81, In Russian. 13 refs.
Foundations, Surface roughness, Frozen ground mechanics, Ice adhesion, Ice solid interface

49-1629
Convective nature of dislocations in deposits with stratified ice in northern West Siberia. [Konvektivnaia priroda dislokatsiĭ v otlozheniiakh s plastovymi l'dami na severe Zapadnoĭ Sibiri]
Shpolianskaia, N.A., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* May-June 1993, No.3, p.94-103, In Russian. 23 refs.
Ground ice, Stratification, Convection, Rheology, Russia—Siberia

49-1630

Seismic sequences of the Ross Sea continental margin (Antarctica).

Busetti, M., De Santis, L., Kavun, M., Zayatz, I., *Bollettino di geofisica teorica ed applicata,* Mar.-June 1993, 35(137-138), Monograph on the Ross Sea Italian geophysical expeditions to Antarctica. Edited by I. Finetti and C. Roda, p.133-152, 23 refs.

Seismic surveys, Glacial geology, Marine deposits, Glacier flow, Geochronology, Antarctica—Ross Sea

Thick sedimentary sequences occur under the continental margin of the Ross Sea. MCS lines collected in the Ross Sea since 1987 by OGS-Trieste, Italy and MAGE-Murmansk, Russia have been used to correlate the main unconformities and the major depositional patterns ranging in age from at least Late Oligocene to the present. The unconformity U5 has been identified as a continuous reflector from the eastern to northwestern Ross Sea margin. Reflectors correlated with the U6, U5A, U4A, U4, U3, U2, and U1 unconformities show lateral continuity but are not present everywhere in the Ross Sea. Aggradation sequences occur below U5 on the northwestern and eastern Ross Sea margin, while a prevailing progradational pattern with substantial advance of the shelf break occurs in the more recent sedimentary sequences. All the unconformities seem to be controlled by glacial erosion and tectonics. The beginning of progradation is related to the onset of major glacial expansion which prevented the preservation of most of the thin interglacial sedimentary sequences. The greater sediment thickness and greater advance of the shelf break in the eastern Ross Sea suggest a different ice flow pattern on the two sides of the Ross margin. (Auth.)

49-1631

Radio echo sounding on Strandline Glacier, Terra Nova Bay (Antarctica).

Lozej, A., Tabacco, I., *Bollettino di geofisica teorica ed applicata,* Mar.-June 1993, 35(137-138), Monograph on the Ross Sea Italian geophysical expeditions to Antarctica. Edited by I. Finetti and C. Roda, p.231-244, 20 refs.

Radio echo soundings, Glacier oscillation, Glacier thickness, Bottom topography, Bedrock, Antarctica—Terra Nova Bay

This paper is a report of a radio echo sounding (R.E.S.) survey (recently renamed as Ground Penetrating Radar, G.P.R.), carried out on the Strandline Glacier, Terra Nova Bay, during the Italian Antarctic Expedition 1988-89. The Strandline Glacier is a local dry-based glacier of particular interest because its fluctuations can be related to climatic variations. The R.E.S. profile allowed the authors to determine the thickness of the ice cover, the morphology of the bedrock, and to distinguish geometrical trends and discontinuities in the ice cover. R.E.S. profiles will be repeated in future to study variations of ice thickness and to evaluate mass balance. (Auth.)

49-1632

Changes in cryogenic conditions during global warming of the climate and the stability of buildings in the cryolithozone. [Izmenenia merzlotnykh usloviĭ pri global'nom poteplenii klimata i ustoĭchivost' zdaniĭ v kriolitozone]

Khrustalev, L.N., Pustovoĭt, G.P., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* Sep.-Oct. 1993, No.5, p.30-36, In Russian. 7 refs.

Global warming, Climatic changes, Climatic factors, Foundations, Permafrost beneath structures

49-1633

Engineering-geological analysis of postcryogenic degradation of loess in the contours of residual-polygonal sink-hole morphosculptures in the southern East European platform. [Inzhenerno-geologicheskaia otsenka postkriogennoĭ degradatsii lessovykh porod v konturakh ostatochno-poligonal'nykh zapadinnykh morfoskul'ptur iuga vostochno-evropeĭskoĭ platformy]

Molodykh, I.I., Korneenko, S.V., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* Sep.-Oct. 1993, No.5, p.75-94, In Russian. 8 refs.

Loess, Engineering geology, Rock properties, Rock mechanics, Porosity, Seepage, Loams

49-1634

Geoecological conditions of a cryolithozone. [Geoekologicheskie usloviia kriolitozony]

Ershov, E.D., Chizhov, A.B., Gavrilov, A.V., Maksimova, L.N., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* Mar.-Apr. 1993, No.2, p.3-17, In Russian. 6 refs.

Geocryology, Ecology, Environmental protection

49-1635

Engineering geological importance of the structural characteristics of morainal massives. [Inzhenerno-geologicheskoe znachenie strukturnykh osobennosteĭ morennykh massivov]

Kondrus', O.I., IUdkevich, A.I., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* Mar.-Apr. 1993, No.2, p.94-101, In Russian. 9 refs.

Engineering geology, Moraines, Models, Pleistocene

49-1636

Using statistical criterion and spatial structures in engineering geological surveys. [Ob ispol'zovanii statisticheskoĭ priznakovoĭ i prostranstvennoĭ struktur prirodnykh sistem pri inzhenerno-geologicheskikh s"emkakh]

Bondarik, G.K., Kiuntsel', V.V., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* Mar.-Apr. 1993, No.2, p.102-109, In Russian. 9 refs.

Engineering geology, Geological surveys, Cold weather construction, Statistical analysis, Landscape types

49-1637

Estimate of the deterministic occurrence of the residual-polygonal sink morphosculptures in the southern East European platform. [Otsenka determinirovannosti rasprostraneniia ostatochno-poligonal'nykh zapadinnykh morfoskul'ptur iuga vostochno-evropeĭskoĭ platformy]

Molodykh, I.I., Postnova, T.V., Korneenko, S.V., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* Jan.-Feb. 1993, No.1, p.109-119, In Russian. 9 refs.

Periglacial processes, Mathematical models, Glaciation, Landscape types, Thermokarst development

49-1638

Response of permafrost to global changes in climate. [Reaktsiia merzloty na global'nye izmeneniia klimata]

Ershov, E.D., et al, *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* Sep.-Oct. 1994, No.5, p.11-24, In Russian. 18 refs.

Global change, Climatic changes, Air temperature, Temperature variations, Geocryology, Snow depth, Permafrost thermal properties, Frozen rock temperature, Seasonal freeze thaw, Russia—Siberia

49-1639

Formation of structures of large avalanche-landslide bodies. [Formirovanie struktury krupnykh obval'no-opolznevykh tel]

Strom, A.L., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* Sep.-Oct. 1994, No.5, p.64-77, In Russian. 37 refs.

Landslides, Glacial deposits, Avalanches, Avalanche formation, Avalanche mechanics, Avalanche modeling

49-1640

Impact of engineering activities on the temperature regime of soils in southeastern Siberia. [Vliianie inzhenernykh meropriiatiĭ na temperaturnyĭ rezhim gruntov v iuzhnykh raĭonakh Vostochnoĭ Sibiri]

Bryksin, V.N., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* Sep.-Oct. 1994, No.5, p.78-85, In Russian. 12 refs.

Thermal regime, Soil temperature, Frozen ground temperature, Engineering, Environmental impact, Radiation balance, Turbulent exchange, Active layer, Russia—Siberia

49-1641

Performance evaluation of constructed wetland treatment system.

Sumrall, L.B., Surampalli, R.Y., Banerji, S.K., Sievers, D.M., *Journal of cold regions engineering,* June 1994, 8(2), p.35-46, 20 refs.

Wetlands, Ponds, Water treatment, Water chemistry, Sampling, Vegetation factors, Ice cover effect, Performance, Environmental tests

49-1642

Effects of commercial vessel passage in narrow channels with and without ice cover.

Lyon, J.G., Williams, D.C., Flannigan, K.G., *Journal of cold regions engineering,* June 1994, 8(2), p.47-64, 17 refs.

Channels (waterways), Water level, Sedimentation, Suspended sediments, Ships, Ice navigation, Ice cover effect, Water waves, Hydraulics, Mathematical models

49-1643

Bridge-pier location and ice conveyance in curved channels.

Urroz, G.E., Schaefer, J., Ettema, R., *Journal of cold regions engineering,* June 1994, 8(2), p.66-72, 9 refs.

Channels (waterways), Ice jams, Floating ice, Bridges, Ice control, Ice solid interface, Hydraulics, Simulation, Artificial ice, Design criteria

49-1644

Retrieval of ice particle size information from VHF wind profiler Doppler spectra.

Rajopadhyaya, D.K., May, P.T., Vincent, R.A., *Journal of atmospheric and oceanic technology,* Dec. 1994, 11(6), p.1559-1568, 30 refs.

Precipitation (meteorology), Cloud physics, Radar echoes, Ice crystals, Reflectivity, Ice detection, Dendritic ice, Particle size distribution, Spectra, Statistical analysis

49-1645

Nonlinear lateral and yaw dynamics and stability of snowmobiles.

Liu, Z.H., Mansour, W.M., Bourassa, P., *Vehicle system dynamics,* Oct. 1994, 23(7), p.525-544, 15 refs.

Snow vehicles, Tracked vehicles, Performance, Stability, Ice solid interface, Skis, Loads (forces), Design criteria, Mathematical models

49-1646

Frost protection of buried PVC water mains in western Canada.

Sepehr, K., Goodrich, L.E., *Canadian geotechnical journal,* Aug. 1994, 31(4), p.491-501, With French summary. 13 refs.

Underground pipelines, Water pipelines, Frost protection, Frost penetration, Pipeline insulation, Thermal insulation, Cellular plastics, Earth fills, Heat transfer, Design criteria, Mathematical models

49-1647

Cooperative effects in hydrogen bonding: fourth-order many-body perturbation theory studies of water oligomers and of an infinite water chain as a model for ice.

Suhai, S., *Journal of chemical physics,* Dec. 1, 1994, 101(11), p.9766-9782, 102 refs.

Ice physics, Ice structure, Water structure, Molecular structure, Polymers, Cohesion, Ice models, Ice electrical properties, Molecular energy levels, Hydrogen bonds, Computerized simulation

49-1648

Existence of a density maximum in extended simple point charge water.

Báez, L.A., Clancy, P., *Journal of chemical physics,* Dec. 1, 1994, 101(11), p.9837-9840, 16 refs.

Ice physics, Low temperature research, Computerized simulation, Water structure, Molecular energy levels, Thermodynamics, Self diffusion, Density (mass/volume), Phase transformations, Temperature effects

49-1649

Experimental studies of structural-textural transformations in frozen rocks under shear. [Eksperimental'nye issledovaniia strukturno-teksturnykh preobrazovaniĭ v merzlykh porodakh pri sdvige]

Chuvilin, E.M., Roman, L.T., Tsyrendorzhieva, M.D., Degasiuk, V.N., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* May-June 1994, No.3, p.69-75, In Russian. 6 refs.

Frozen ground mechanics, Shear stress, Frozen rocks, Microstructure, Soil texture, Transformations

49-1650

Talik development beneath a reservoir under conditions of conductive heat transfer. [Razvitie talika pod vodokhranilishchem v usloviiakh konduktivnogo teploobmena]

Krivonogova, N.F., Sobol', S.V., Fevralev, A.V., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* May-June 1994, No.3, p.95-98, In Russian. 3 refs.

Taliks, Reservoirs, Heat transfer, Analysis (mathematics), Thermal regime, Soil temperature, Frozen ground temperature, Forecasting

49-1651

Monitoring of permafrost. [Monitoring mnogoletnemerzlykh porod]

Khrustalev, L.N., Pustovoĭt, G.P., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia,* July-Aug. 1994, No.4, p.43-49, In Russian. 4 refs.

Permafrost thermal properties, Permafrost forecasting, Mathematical models, Temperature variations

49-1652

Experimental investigations of mass transfer processes in freezing saline rocks. [Eksperimental'nye issledovaniia protsessov massoperenosa v pomerzaiushchikh zasolennykh porodakh]

Ershov, E.D., Lebedenko, IU.P., Chuvilin, E.M., Naumova, N.S., *Inzhenernaia geologiia,* July-Aug. 1992, No.4, p.27-35, In Russian. 17 refs.

Frozen rocks, Mass transfer, Salinity, Freezing front

49-1653

Technogenic changes in the engineering geological conditions of the Verkhnelensky region. [Tekhnogennye izmeneniia inzhenerno-geologicheskikh usloviĭ Verkhnelenskogo raĭona]

Trzhtsinskiĭ, IU.B., Litvin, V.M., Toporkov, V.A., Filippov, V.M., *Inzhenernaia geologiia,* July-Aug. 1992, No.4, p.70-76, In Russian. 8 refs.

Engineering geology, Geocryology, Geologic processes, Russia—Irkutsk

49-1654

Physical parameters influencing diatom community structure in eastern antarctic sea ice.

Scott, P., McMinn, A., Hosie, G., *Polar biology,* Nov. 1994, 14(8), p.507-517, Refs. p.516-517.

Sea ice, Ice cores, Ice crystal structure, Algae, Antarctica—Prydz Bay

Diatom assemblages obtained from fast ice around Prydz Bay are distinctly different from those obtained from pack ice in the same area. The dominant species in all ice cores were *Fragilariopsis curta, F. cylindrus, Nitzschia stellata* and *Pseudonitzschia turgiduloides. Entomoneis kjellmanii* and *Cocconeis* spp. were more characteristic of fast ice samples and *F. curta* of pack ice samples. Ice crystal type (i.e. whether frazil or congelation crystal) is an important factor in determining the algal composition of the ice. Other significant influences include the time of year, the ice form and the salinity of the ice. (Auth.)

49-1655

Minnesota Metrodome—a study on the behaviour of air supported roofs under environmental loads.

Liddell, I., *Structural engineering review,* Aug.-Nov. 1994, 6(3-4), p.215-235, 23 refs.

Roofs, Inflatable structures, Design criteria, Stability, Damage, Snow removal, Snow loads, Meltwater, Snow melting, Countermeasures

49-1656

Thermal and albedo mapping of the polar regions of Mars using Viking thermal mapper observations. 1. North polar region.

Paige, D.A., Bachman, J.E., Keegan, K.D., *Journal of geophysical research,* Dec. 25, 1994, 99(E12), p.25,959-25,991, 97 refs.

Mars (planet), Polar regions, Extraterrestrial ice, Remote sensing, Infrared reconnaissance, Sensor mapping, Stereomapping, Albedo, Surface temperature, Atmospheric composition, Ice detection

49-1657

Thermal and albedo mapping of the polar regions of Mars using Viking thermal mapper observations. 2. South polar region.

Paige, D.A., Keegan, K.D., *Journal of geophysical research,* Dec. 25, 1994, 99(E12), p.25,993-26-013, 48 refs.

Mars (planet), Extraterrestrial ice, Polar regions, Remote sensing, Infrared reconnaissance, Sensor mapping, Ice detection, Frost, Carbon dioxide, Albedo, Surface temperature

49-1658

Estimating ground snow loads using local climatological data.

Fridley, K.J., Roberts, K.A., Mitchell, J.B., *Journal of structural engineering,* Dec. 1994, 120(12), p.3567-3576, 11 refs.

Snow physics, Snow loads, Snow depth, Snow density, Snow water equivalent, Meteorological data, Correlation, Long range forecasting, Mathematical models

49-1659

Setup and relaxation in glacial sand.

York, D.L., Brusey, W.G., Clemente, F.M., Law, S.K., *Journal of geotechnical engineering,* Sep. 1994, 120(9), p.1498-1513, 21 refs.

Glacial deposits, Sands, Soil mechanics, Soil strength, Relaxation (mechanics), Soil compaction, Pile driving, Pile structures, Bearing strength

49-1660

Effect of cold regions climate on composite jacketed concrete columns.

Karbhari, V.M., Eckel, D.A., II, *Journal of cold regions engineering,* Sep. 1994, 8(3), p.73-86, 18 refs.

Cold weather construction, Construction materials, Cold weather performance, Composite materials, Covering, Concrete piles, Reinforced concretes, Concrete strength, Low temperature tests, Temperature effects

49-1661

Pipe uplift resistance in frozen soil and comparison with measurements.

Foriero, A., Ladanyi, B., *Journal of cold regions engineering,* Sep. 1994, 8(3), p.93-111, 25 refs.

Underground pipelines, Deformation, Frozen ground mechanics, Frost heave, Stress concentration, Soil pressure, Structural analysis, Dislocations (materials), Mathematical models

49-1662

Newtonian fluid mechanics treatment of debris flows and avalanches.

Hunt, B., *Journal of hydraulic engineering,* Dec. 1994, 120(12), p.1350-1363, 11 refs.

Slope processes, Mass flow, Turbulent flow, Laminar flow, Unsteady flow, Avalanche mechanics, Fluid mechanics, Viscosity, Shock waves, Mathematical models

49-1663

Estimation of mean flow velocity in ice-covered channels.

Teal, M.J., Ettema, R., Walker, J.F., *Journal of hydraulic engineering,* Dec. 1994, 120(12), p.1385-1400, 16 refs.

Stream flow, River flow, Flow measurement, Velocity measurement, River ice, Ice cover effect, Ice water interface, Hydraulics, Accuracy, Analysis (mathematics)

49-1664

Spatial disaggregation from studies of climatic hydrologic sensitivity.

Epstein, D., Ramirez, J.A., *Journal of hydraulic engineering,* Dec. 1994, 120(12), p.1449-1467, 27 refs.

Watersheds, Snow hydrology, Precipitation (meteorology), Greenhouse effect, Climatic changes, Snow accumulation, Snowmelt, Runoff, Mathematical models, United States—Colorado—Rio Grande

49-1665

Wave propagation in ice-covered channels—discussion.

Steffler, P.M., Hicks, F.E., Daly, S.F., MP 3531, *Journal of hydraulic engineering,* Dec. 1994, 120(12), p.1478-1480, 2 refs. For paper under discussion see 48-1242.

Channels (waterways), Water flow, Ice cover effect, Ice water interface, Wave propagation, Hydraulics, Analysis (mathematics)

49-1666

Oil and gas exploitation in the polar regions: environmental perspectives.

Drewry, D.J., Shears, J.R., *Journal of the World Energy Council,* July 1993, p.50-58, 47 refs.

DLC TJ163.15.W659a July 1993

Oil spills, Water pollution, Environmental impact, Sea water, Tundra, Ecosystems

In the past, the development of oil and gas fields in the polar regions has been limited mainly by severe climatic conditions and the lack of technology. These have mainly been overcome, and in the Arctic continued exploration remains a high priority. In retrospect, 1989 may be considered a turning point. The major oil spills that occurred in the polar regions that year, the *Exxon Valdez* in Alaska and the *Bahia Paraiso* in Antarctica, damaged the credibility of the oil industry in its claim that development was possible without significantly affecting the environment. The concern over the possible environmental effects of mining in Antarctica led to a ban on all mining activity for at least 50 years. Now and in the future it seems the oil and gas industry will be controlled primarily on the basis of its likely environmental impact. (Auth.)

49-1667

Primary succession on land.

Miles, J., ed, Walton, D.W.H., ed, Oxford, Blackwell Scientific Publications, 1993, 309p., For selected papers see 49-1668 through 49-1672 or B-51778 through B-51780.

Meetings, Plant ecology, Cold weather survival

A 1989 symposium explored many of the factors involved in the primary succession, defined as the replacement of one community by another, of microbial life forms in hot and cold desert regions, but primarily in Antarctica. Participants delved into such fundamentals of succession as how a succeeding community gets there, establishes itself, and grows; the characteristics of the habitat; the influence of allo- and autogenic factors; the progression as conditions of the habitat change; and interactions with other species.

49-1668

Cryptoendolithic communities from hot and cold deserts: speculation on microbial colonization and succession.

Vestal, J.R., Primary succession on land. Edited by J. Miles and D.W.H. Walton, Oxford, Blackwell Scientific Publications, 1993, p.5-16, 41 refs.

DLC QH540.P74 1993

Frozen ground chemistry, Rock properties, Lichens, Microbiology, Antarctica—McMurdo Dry Valleys

The cryptoendolithic microbial community is a complete ecosystem containing primary producers and consumer/decomposers located within the pores of certain types of rocks. It has no predators. This unique habitat provides enough protection for microbes to survive a physical environment characterized by extreme temperatures, aridity, low light and limited space. As conditions for metabolic activity are so limited in both frequency and duration, determining colonization and succession events in this environment is very difficult. Two types of antarctic community are recognized: one dominated by lichens and the other by cyanobacteria. The distribution of the communities appears to be related to water availability, the presence of iron oxide and rock strength. It is postulated that within these endolithic communities succession may only occur in the decomposer microbiota, and that the plant community constitutes a climax at establishment. (Auth.)

49-1669

Microbial processes and initial stabilization of fellfield soil.

Wynn-Williams, D.D., Primary succession on land. Edited by J. Miles and D.W.H. Walton, Oxford, Blackwell Scientific Publications, 1993, p.17-32, 69 refs.

DLC QH540.P74 1993

Patterned ground, Geochemistry, Microbiology

Fellfield substrata are usually flexible or mobile and normally contain free water except in very cold deserts. Disruption by freezing and thawing with its resultant hydrostatic pressures causes particulate sorting and patterning of the ground. Abiotic weathering and exfoliation of rock initiate fellfield soil formation, while endo- and chasmolithic microbial communities accelerate these processes and provide an inoculum as a precursor to stabilization. Although not visually apparent, microbes may be the first colonists of all virgin substrata and may initiate or escalate plant succession. Phototrophic microbial crusts stabilize the fellfield soil surface by binding mineral particles in a cyanobacterial and algal filament-mucigel matrix. Epifluorescence microscopy and TV image analysis of undisturbed, moist frost- polygon fines at Signy I. suggested that scarce microbial resources may be conserved by the soil crust which is composed of a separable mosaic of heterogeneous microbial 'rafts'. A cloche enhanced the ambient conditions for microbial growth, resulting in an increase in surface area of microbial colonization of soil from 5 to 74% in three successive growing seasons. The relatively rapid growth rate of fellfield cyanobacteria and their sensitivity to environmental factors makes them valuable indicators of the short- and long-term effects of climatic change. (Auth.)

49-1670

Effects of cryptogams on mineral substrates.

Walton, D.W.H., Primary succession on land. Edited by J. Miles and D.W.H. Walton, Oxford, Blackwell Scientific Publications, 1993, p.33-53, 99 refs.

DLC QH540.P74 1993

Ecosystems, Algae, Mosses, Lichens, Alpine landscapes, Reviews

49-1671

Role of bryophyte propagule banks in primary succession: case-study of an antarctic fellfield.

Smith, R.I.L., Primary succession on land. Edited by J. Miles and D.W.H. Walton, Oxford, Blackwell Scientific Publications, 1993, p.55-78, 77 refs.

DLC QH540.P74 1993

Plants (botany), Ground ice, Plant ecology, Mosses, —Signy Island, —Jane Col

The role of bryophytes in primary succession is highlighted and their general omission from most studies of the early stage of colonization is emphasized. Bryophyte colonists develop from sexual and asexual propagules deposited over a long period from both local and distant provenances. Some may rapidly establish new plants, while others remain dormant indefinitely on or beneath the surface of the substratum. The viable component of these diaspores, the soil propagule bank, constitutes a reservoir of potential colonists equivalent to the seed bank of higher plants. An environmental stimulus or suite of stimuli may activate the dormant viable propagules into developing as new plants. Before this, microbial modification of the soil surface is usually required to bind and stabilize soil particles and provide a nutrient base. Laboratory and field experiments on maritime antarctic soils are used to illustrate aspects of the bryophyte propagule bank. The importance of ice fields as a sink for spores and vegetative propagules is stressed. Their release in meltwater onto terrestrial habitats near the ice margins is of particular importance in the colonization of newly exposed substrata. The possible effects of global warming, especially in polar regions, on these propagule banks, on the rate of colonization and on the species composition of the developing communities are considered. (Auth.)

49-1672

Plant distribution patterns and primary succession on a glacier foreland: a comparative study of cryptogams and higher plants.

Crouch, H.J., Primary succession on land. Edited by J. Miles and D.W.H. Walton, Oxford, Blackwell Scientific Publications, 1993, p.133-145, 35 refs.

DLC QH540.P74 1993

Glaciers, Geocryology, Plant ecology, Plant succession, Norway—Storbreen

49-1673

Encapsulation of human erythrocytes by growing ice crystals.

Lipp, G., Galow, S., Körber, C., Rau, G., *Cryobiology,* June 1994, 31(3), p.305-312, 29 refs.

Cryobiology, Preserving, Solutions, Particles, Ice physics, Ice crystal growth, Ice water interface, Freezing front, Temperature effects, Fluid dynamics

49-1674

Evidence for a relict glacial landscape in Quebec-Labrador.

Kleman, J., Borgström, I., Hättestrand, C., *Palaeogeography, palaeoclimatology, palaeoecology,* Oct. 1994, 111(3-4), p.217-228, 33 refs.

Pleistocene, Ice sheets, Glacier oscillation, Glacier flow, Glacial geology, Meltwater, Landforms, Landscape development, Geomorphology, Canada—Quebec

49-1675

Rayleigh lidar observations of thermal structure and gravity wave activity in the high Arctic during a stratospheric warming.

Whiteway, J.A., Carswell, A.I., *Journal of the atmospheric sciences,* Nov. 1, 1994, 51(21), p.3122-3136, 77 refs.

Polar atmospheres, Stratosphere, Air temperature, Temperature measurement, Profiles, Atmospheric physics, Convection, Gravity waves, Wave propagation, Lidar, Canada—Northwest Territories—Eureka

49-1676

Interstadial climatic cycles: a link between western North America and Greenland?

Phillips, F.M., Campbell, A.R., Smith, G.I., Bischoff, J.L., *Geology,* Dec. 1994, 22(12), p.1115-1118, 22 refs.

Paleoclimatology, Climatic changes, Global change, Pleistocene, Ice age theory, Lacustrine deposits, Ice sheets, Ice cores, Radioactive age determination, Correlation, Greenland—Summit

49-1677

Measurements of thermal infrared spectral reflectance of frost, snow, and ice.

Salisbury, J.W., D'Aria, D.M., Wald, A.E., *Journal of geophysical research,* Dec. 10, 1994, 99(B12), p.24,235-24,240, 18 refs.

Snow optics, Frost, Radiance, Reflectivity, Infrared spectroscopy, Spectra, Radiation balance, Grain size, Snow melting

49-1678

Modeling thermal infrared (2-14 microns) reflectance spectra of frost and snow.

Wald, A.E., *Journal of geophysical research,* Dec. 10, 1994, 99(B12), p.24,241-24,250, 20 refs.

Snow optics, Frost, Infrared radiation, Brightness, Reflectivity, Spectra, Scattering, Snow cover structure, Theories, Mathematical models

49-1679

Thermoluminescence profiles in meteorite finds, climatic change, and ice thicknesses in the Allan Hills, Antarctica, during the Quaternary.

Benoit, P.H., Sears, D.W.G., *Antarctic journal of the United States,* 1993, 28(5), p.52-54, 12 refs.

Luminescence, Thermal properties, Climatic changes, Ice cover thickness, Antarctica—Allan Hills

The natural thermoluminescence (TL) level of a meteorite reflects both its terrestrial age and its thermal history. In this paper, the authors examine terrestrial thermal profiles for a single meteorite and discuss the implications of these data for the icefield on which it was found. Meteorite ALHA78084 was used in this study. It was found on the Allan Hills Mid Western Icefield by an American antarctic search for meteorites (ANSMET) expedition in 1978. Two interpretations of the present data, in terms of glaciological history of the region, are possible: the ice thickness in this portion of Antarctica has not been great enough over at least the last 100,000 years to eliminate the Allan Hills Mid Western Icefield, or the ice velocity within the field was not great enough to carry the meteorite away during this time interval. It is concluded that the ice thickness in this region has been within a few hundred meters of the present value over the last 100,000 years, despite documented glacial-interglacial cycles during this period in Antarctica.

49-1680

West antarctic ice sheet collapse: chimera or clear danger?

Alley, R.B., MacAyeal, D.R., *Antarctic journal of the United States,* 1993, 28(5), p.59-60, 23 refs.

Land ice, Ice sheets, Ice melting, Climatic changes, Ice deformation, Sea level, Antarctica—West Antarctica

The specter of west antarctic collapse has been with us for a quarter of a century. During that time, opinions on the likelihood of that collapse have varied widely. Recently, certain official assessments (for example, IPCC 1990) concerned primarily with the future response to projected global warming have concluded that Antarctica will not cause much sea-level rise within the planning horizon of a century or so. Nevertheless, the west antarctic stability merits further attention. A west antarctic equivalent of an H-event could raise sea level meters in centuries, with considerable impact on humans. This could occur in response to the warming that ended the last ice age, with no contribution from any future global warming. In colloquial terms, the fuse may have been lit 10,000 years ago for a future ice-sheet H-bomb.

49-1681

Ice-stream mechanics.

Whillans, I.M., *Antarctic journal of the United States,* 1993, 28(5), p.61-63, 5 refs.

Strain tests, Land ice, Stream flow, Sleds, Safety, Equipment

This field program was designed to test some theories for ice-stream mechanics, to describe crevasse opening and the behavior of crevasse bridges, and to study a feature on an interstream ridge that may be a relic from a formerly different ice-stream flow. The method used permitted large strain grids to be surveyed accurately in a short time, horizontal strain rates to be calculated easily in the field, and for the first time, relative vertical velocities to be readily obtained. The acquisition of precise relative vertical velocities over a large area constitutes a new type of measurement that is expected to be useful in testing models for ice flow.

49-1682

Vertical temperature profile of ice stream B.

Engelhardt, H., Kamb, B., *Antarctic journal of the United States,* 1993, 28(5), p.63-66, 12 refs.

Land ice, Ice temperature, Boreholes, Temperature measurement, Antarctica—Marie Byrd Land

The vertical temperature profile through Ice Stream B has been measured near Upstream B Camp in several hot-water-drilled boreholes, using temperature transducers and thermistors. The ice thicknesses were 1,035 m and 1,057 m in boreholes 500 m apart, transverse to flow of the ice stream. In the first temperature-transducer string, emplaced in 1988-1989, the sensors in the lowest 110 m did not survive the ice pressure. In the 1991-1992 field season, a new thermistor string was emplaced to measure the lowest 167 m in a 1,057 m borehole. In 1992-1993, a thermistor string was placed in the upper 120 m of the ice stream near the 1,057 m borehole. A figure shows all of the equilibrated and extrapolated temperature determinations.

49-1683

Temperature measurements in the margin of ice stream B, 1992-1993.

Echelmeyer, K.A., Harrison, W., *Antarctic journal of the United States,* 1993, 28(5), p.66-67, 3 refs.

Ice temperature, Ice surface, Stream flow, Shear stress, Antarctica—Marie Byrd Land

The low shear stress at the bottom of Ice Stream B, suggested both by soft subglacier sediment samples and by recent theoretical analyses of transverse profiles of velocity across the ice stream, indicates that the margins of the ice stream probably play a significant role in the dynamics of flow, perhaps exerting more drag on the ice stream than does the bed itself. The most important unknowns are the rate of convergence of ice into the ice stream, the stability of the positions of the margins, and the shear stress itself. The authors examine these unknowns using a program of temperature measurements in the margins and a surveying program to improve knowledge of the rate of convergence of the ice into the ice stream. The work began near Upstream B Camp in the 1992-93 austral summer.

49-1684

Glacier geophysical studies at Taylor Dome: year three.

Morse, D.L., Waddington, E.D., *Antarctic journal of the United States,* 1993, 28(5), p.67-69, 5 refs.

Paleoclimatology, Ice cores, Glacier surveys, Radio echo soundings, Antarctica—Taylor Glacier

Taylor Dome is the site of an ongoing ice core/paleoclimate project. The main activities of the 1992-93 season included surveys by ground-based optical methods, surveys using satellite receivers, radio-echo sounding of bedrock topography, and depositional environment characterization.

49-1685

Profile of oxygen isotope compositions of ice in the Lewis Cliff ice tongue, Transantarctic Mountains.

Faure, G., Hagen, E.H., Johnson, K.S., Buchanan, D., *Antarctic journal of the United States,* 1993, 28(5), p.69-70, 7 refs.

Ice composition, Oxygen isotopes, Antarctica—Lewis Cliff

The isotope compositions of oxygen in ice collected along a line across the northern (lower) part of Lewis Cliff are displayed in a figure. The isotope compositions of oxygen are expressed as the $\delta^{18}O$ parameter relative to standard mean ocean water (abbreviated SMOW). The values of this parameter vary widely from -43.1 to -58.7 per mill and indicate severe depletion of the ice in ^{18}O. The extreme ^{18}O depletion of some of the ice in the Lewis Cliff ice tongue is exceeded only by ice in the core drilled at Vostok Station, where $\delta^{18}O$ values as low as -62 per mill have been reported. A second interesting feature of the data is the change in the $\delta^{18}O$ parameter from -43.1 per mill at station 500W to -53.1 per mill at station 600W. The decrease of this value by 10 per mill implies a major change in the average annual temperature at the time and place where this ice originally formed.

49-1686
Studies of cosmogenic *in situ* produced carbon-14 in polar accumulation and ablation ice.
Lal, D., Jull, A.J.T., Donahue, D.J., *Antarctic journal of the United States,* 1993, 28(5), p.70-73, 13 refs.
Ice composition, Isotopes, Paleoecology
Pure polar ice contains a suite of extraneous substances that serve as direct and proxy links to the paleoenvironment. These substances—stable and radioactive isotopes, chemical compounds, and particles—are being studied to delineate different aspects of geophysical and environmental changes in the past. A relatively new addition to the useful tracers is the radionuclide ^{14}C, which is directly produced *in situ* in the ice lattice primarily by nuclear interactions of cosmic-ray energetic neutrons with oxygen nuclei. In this article, the authors summarize the highlights of the work done thus far on studies of the *in situ*-produced ^{14}C in accumulation and ablation ice, and indicate the potential of the *in situ* ^{14}C as a tracer for ice dynamics.

49-1687
Helium isotope results from Ice Station Weddell 1.
Weppernig, R., Schlosser, P., *Antarctic journal of the United States,* 1993, 28(5), p.76-77, 6 refs.
Oceanographic surveys, Ice cover effect, Sea ice, Isotope analysis, Air ice water interaction, Antarctica—Weddell Sea
As part of the Ice Station Weddell 1 hydrography/tracer program, the authors collected about 400 helium isotope samples. Most of the samples were taken along the drift track of the ice floe. The first helium isotope data show very low isotopic helium-3 values in a thin bottom layer (about 100 m thick) along the drift track of the ice station. The ^{4}He concentrations of the surface waters reflect the ice cover during the time of sampling. Gas exchange is reduced because of the ice cover, and ^{4}He accumulates as Circumpolar Deep Water (CDW) entrains into the surface layer. At station 9, the gradient between surface water and CDW is well pronounced, which is an indication of a well-mixed surface layer and rapid gas exchange with the atmosphere. The ^{4}He concentrations increase slightly with depth, and one generally observes a maximum at about 100 m above the bottom. The authors interpret this pattern as an indication that there are different types of shelf water contributing to the deep and bottom waters formed in the western Weddell Sea.

49-1688
Salinity variations in Weddell Sea pack ice.
Ackley, S.F., Gow, A.J., Lytle, V.I., MP 3532, *Antarctic journal of the United States,* 1993, 28(5), p.79-81, 6 refs.
Ice composition, Pack ice, Ice salinity, Antarctica—Weddell Sea
The 5-month lifetime of Ice Station Weddell 1 (ISW-1) enabled revisits to several sites, and studies were made of the evolution of the salinity distribution in the ice cover. Two figures show core profiles taken from a new ice growth area adjacent to the ISW-1 floe. The two cores were taken within 2 m of each other, 30 days apart on Mar. 13 and Apr. 12, 1992. The cores of first-year ice show behavior at variance with arctic ice of similar age, primarily because of their anomalously high near-surface salinities. This results from an initial thick layer of frazil ice and fast freezing of the resulting ice slurry that apparently both contribute to the high surface salinity. For the second-year ice at ISW-1, the mean salinity falls below that of arctic winter ice, reflecting some transformation during the summer warming.

49-1689
Ultraviolet radiation and its extinction in antarctic sea ice.
Wendler, G., Quakenbush, T., *Antarctic journal of the United States,* 1993, 28(5), p.84-85, 7 refs.
Ultraviolet radiation, Sea ice, Attenuation, Antarctica—McMurdo Station
In Dec. 1992, a cruise on the U.S. Coast Guard ice breaker *Polar Star* was made from Hobart, Tasmania, to McMurdo Sound. This report deals with measured attenuation of radiation in sea ice recorded during the cruise, with special attention to ultraviolet (UV) radiation. Only one example of the extinction of radiation in sea ice has been presented. The authors simultaneously measured the sea-ice characteristics (for example, crystal size) and the inclusion of pollutants (algae). More detailed analysis of all the measurements, including modeling results, will be presented later.

49-1690
Late Holocene fluctuations in the front of the Muller Ice Shelf, Antarctic Peninsula.
Domack, E.W., Stein, A.B., *Antarctic journal of the United States,* 1993, 28(5), p.96-97, 3 refs.
Ice shelves, Ice deformation, Ice dating, Marine geology, Glacial deposits, Coring, Sedimentation, Antarctica—Antarctic Peninsula
To investigate the fluctuation of the Muller Ice Shelf, the authors collected surface sediment samples, piston cores and kasten cores close to the present calving line. The sand content of surface and downcore samples was most revealing. A modern sand-rich facies is associated with the calving terminus of the Muller Ice Shelf. The sand is being brought into the marine environment by processes acting at the calving terminus of the ice shelf. To determine when the sand was first brought into the system, core sedimentation rates were calculated. Results show that the sand input into Lallemand Fjord began approximately 243 years ago. If sand input is directly related to the ice-front environment of the Muller Ice Shelf, then it can be inferred that this shelf is a relatively recent feature of Lallemand Fjord. If ice shelves accurately reflect the climate of the region, then it must be assumed that there has been a cooling trend over the past 240 years. The most recent historical record, however, shows that the Muller Ice Shelf is disintegrating.

49-1691
Massive iceberg discharges as triggers for global climate change.
Broecker, W.S., *Nature,* Dec. 1, 1994, 372(6505), p.421-424, 45 refs.
Ice cores, Icebergs, Climatic changes, Sediments, Greenland

49-1692
Eemian cooling in the Norwegian Sea and North Atlantic ocean preceding continental ice-sheet growth.
Cortijo, E., et al, *Nature,* Dec. 1, 1994, 372(6505), p.446-449, 31 refs.
Ice cores, Ice sheets, Ice growth, Cooling, Water temperature, Greenland, Norwegian Sea

49-1693
Climate correlations between Greenland and Antarctica during the past 100,000 years.
Bender, M., et al, MP 3533, *Nature,* Dec. 15, 1994, 372(6507), p.663-666, 50 refs.
Ice cores, Climatic changes, Geochemistry, Geochronology, Antarctica—Vostok Station
Ice cores recovered from central Greenland by the GRIP and GISP2 projects have recorded 22 interstadial (warm) events during the part of the last glaciation spanning 20-105 kyr. The ice core from Vostok, East Antarctica records nine interstadials during this period. Explored here are links between Greenland and antarctic climate during the last glaciation, using a high-resolution chronology derived by correlating oxygen isotope data for trapped O_2 in the GISP2 and Vostok cores. This procedure shows that interstadials occurred in East Antarctica whenever those in Greenland lasted longer than 2,000 years. The results suggest that partial deglaciation and changes in ocean circulation are partly responsible for the climate teleconnection between Greenland and Antarctica. Ice older than 115 kyr in the GISP2 core shows rapid variations in the $\delta^{18}O$ of O_2 that have no counterpart in the Vostok record. The age-depth relationship, and thus the climate record, in this part of the GISP2 core appears to be significantly disturbed. (Auth. mod.)

49-1694
Numerical simulations of convective snow clouds over the Sea of Japan: two-dimensional simulations of mixed layer development and convective snow cloud formation.
Murakami, M., Clark, T.L., Hall, W.D., *Meteorological Society of Japan. Journal,* Feb. 1994, 72(1), p.43-62, With Japanese summary. 29 refs.
Precipitation (meteorology), Clouds (meteorology), Cloud physics, Air masses, Snowstorms, Snow crystal growth, Convection, Homogeneous nucleation, Mathematical models, Japan, Sea

49-1695
Spatial resolution improvement of SSM/I data with image restoration techniques.
Sethmann, R., Burns, B.A., Heygster, G.C., *IEEE transactions on geoscience and remote sensing,* Nov. 1994, 32(6), p.1144-1151, 12 refs.
Spaceborne photography, Radiometry, Sea ice distribution, Ice edge, Detection, Resolution, Image processing, Antarctica—Weddell Sea
A space variant image restoration algorithm has been developed with the aim of improving the spatial resolution of SSM/I (Special Sensor Microwave/Imager) passive microwave imagery. Due to the conical scanning of the instrument the relative geometry of the data samples changes over the scan. This change is accounted for by using a space variant point-spread-function in the restoration algorithm. Application of this algorithm to a scene from the Weddell Sea results in an image with enhanced ice edge and coast definition. As a result, ice concentration estimates near the edge agree more closely with higher resolution (optical) data from AVHRR (Advanced Very High Resolution Radiometer). (Auth. mod.)

49-1696
Snow probe for *in situ* determination of wetness and density.
Kendra, J.R., Ulaby, F.T., Sarabandi, K., *IEEE transactions on geoscience and remote sensing,* Nov. 1994, 32(6), p.1152-1159, 12 refs.
Snow physics, Snow density, Snow water content, Dielectric properties, Probes, Electrical measurement, Specifications, Design, Analysis (mathematics)

49-1697
Taking GPS to the top of the world.
Schmidt, M., *GPS world,* Feb. 1993, 4(2), p.25-34,66.
Expeditions, Geophysical surveys, Geodetic surveys, Mountains, Height finding, Canada—Yukon Territory—Logan, Mt.

49-1698
Renland ice core. A northern hemisphere record of aerosol composition over 120,000 years.
Hansson, M.E., *Tellus,* Nov. 1994, 46B(5), p.390-418, 62 refs.
Pleistocene, Paleoclimatology, Climatic changes, Atmospheric composition, Aerosols, Ice sheets, Ice cores, Impurities, Chemical analysis, Profiles, Greenland—Renland

49-1699
Inclusion of scattering losses in the models of the effective permittivity of dielectric mixture and applications to wet snow.
Boiarskiĭ, D.A., Tikhonov, V.V., Kleeorin, N.I., Mirovskiĭ, V.G., *Journal of electromagnetic waves and applications,* Nov. 1994, 8(11), p.1395-1410, 25 refs.
Snow optics, Wet snow, Remote sensing, Electromagnetic properties, Dielectric properties, Light scattering, Polarization (charge separation), Ice water interface, Porosity, Mathematical models

49-1700
Thermal performance of heat pipe arrays in soils.
Hegab, H.E., Colwell, G.T., *Numerical heat transfer A,* Dec. 1994, 26(6), p.619-630, 16 refs.
Heat pipes, Heat transfer, Performance, Soil temperature, Thermal conductivity, Temperature control, Thermal analysis, Mathematical models

49-1701
Prediction of snowmelt infiltration into frozen soils.
Tao, Y.X., Gray, D.M., *Numerical heat transfer A,* Dec. 1994, 26(6), p.643-665, 21 refs.
Snow hydrology, Snowmelt, Seepage, Moisture transfer, Saturation, Ice solid interface, Frozen ground physics, Phase transformations, Heat transfer, Mathematical models

49-1702
Accumulation record from the GISP2 core as an indicator of climate change throughout the Holocene.
Meese, D.A., et al, MP 3535, *Science,* Dec. 9, 1994, 266(5191), p.1680-1682, 24 refs.
Ice cores, Climatic changes, Geochronology, Geochemistry, Greenland
A depth-age scale and an accumulation history for the Holocene have been established on the Greenland Ice Sheet Project 2 (GISP2) deep core, providing the most continuously dated record of annual layer accumulation currently available. The depth-age scale was obtained with the use of various independent techniques to count annual layers in the core. An annual record of surface accumulation during the Holocene was obtained by correcting the observed layer thicknesses for flow-thinning. Fluctuations in accumulation provide a continuous and detailed record of climate variability over central Greenland during the Holocene. Climate events, including "Little Ice Age" type events, are examined.

49-1703
Ice cores north and south.
Jouzel, J., *Nature,* Dec. 15, 1994, 372(6507), p.612-613.
Ice cores, Gas inclusions, Climatic changes
The author presents a brief review of recent research on ice cores from Greenland and Antarctica, focusing on the relationship between gases which are trapped in ice sheets and are also present in sea water and the atmosphere. Because of the air bubbles trapped in ice cores, it is now perhaps possible to know more accurately the leads and lags between Northern and Southern Hemisphere climates and more generally between climate forcings over the past 100 kyr. This is important not only for understanding past climate changes but also because this period contains information on climate sensitivity and variability which could be the key to our future climate.

49-1704
Changes in polar ozone.
Bojkov, R.D., *World Meteorological Organization. WMO bulletin,* Apr. 1992, 41(2), p.171-180.
Ozone, Stratosphere, Chemical composition

After an introductory review of the discovery of ozone depletion, the ozone scientific background, its mechanics and regime in polar regions, relation to lower stratosphere temperature and its long-term trends, are discussed. After describing the polar stratospheric chemistry, the author predicts that the appearance and duration of the ozone decline in high latitudes, and its intensity over the middle latitudes, will be prolonged and more significant than heretofore.

49-1705

Drift of a giant tabular berg in the antarctic seas.

Garcia, M.J., *World Meteorological Organization. WMO bulletin,* Apr. 1992, 41(2), p.181-183, 7 refs.

Icebergs, Drift, Ice shelves, Calving, Image processing, Antarctica—Weddell Sea

On Aug. 28, 1991, weather analysts at the Satellite Center of the National Meteorological Service (NMS) of Argentina detected a large block of ice in the vicinity of the South Shetland Is. From then on, the displacement of the giant tabular berg has been monitored using pictures from the HRPT (high-resolution picture transmission) receiving station in Villa Ortúzar, Buenos Aires, while studies are being made of its origin. Background data, and analysis of the satellite images shown, are given.

49-1706

Loss of freeze-thaw durability of concrete containing accelerating admixtures.

Stott, D., Rezansoff, T., Sparling, B.F., *Canadian journal of civil engineering,* Aug. 1994, 21(4), p.605-613, With French summary. 18 refs.

Concrete durability, Concrete admixtures, Physical properties, Concrete curing, Frost resistance, Freeze thaw tests, Air entrainment, Compressive properties

49-1707

Combined effect of repeated loads and low temperatures on asphalt pavements.

Fang, Y.W., Sargious, M., *Canadian journal of civil engineering,* Aug. 1994, 21(4), p.674-681, With French summary. 12 refs.

Pavements, Bituminous concretes, Specifications, Fatigue (materials), Thickness, Thermal stresses, Low temperature tests, Temperature effects, Loading, Correlation, Design criteria

49-1708

Laboratory study of frazil distribution in a flow.

Tsang, G., Cui, W., *Canadian journal of civil engineering,* Aug. 1994, 21(4), p.696-709, With French summary. 15 refs.

River ice, Frazil ice, Hydraulics, Ice formation, Distribution, Stratification, Underwater ice, Turbulent flow, Ice water interface, Simulation, Ice forecasting

49-1709

Simulated climate change: a field manipulation study of polar microarthropod community response to global warming.

Kennedy, A.D., *Ecography,* June 1994, 17(2), p.131-140, 49 refs.

Climatic changes, Global warming, Arctic landscapes, Ecosystems, Soil microbiology, Sampling, Microclimatology, Environmental tests, Greenhouse effect, Simulation, Antarctica—Signy Island

Passive cloches were deployed at three altitudinally distinct sites on Signy I. to investigate the effect of ameliorated thermal environment upon fellfield microarthropod communities. Temperature was monitored at 1.5 m height, at ground surface level, and at 5 cm depth in cloche and control plots. During summer (Dec.-Mar.), cloches elevated monthly mean temperatures by up to 2.46 C at the soil surface and 2.20 C at 5 cm depth. Integrated air temperatures over consecutive 10 d periods were up to 4.65 C warmer in cloches than controls. After eight years of these manipulations, sampling of the upper 50 mm of soil revealed consistently greater microarthropod populations within cloches than in controls. Maximum difference occurred at high altitude where thermal amelioration was greatest. Cloche populations of the numerically dominant collembolan *Cryptopygus antarcticus* Willem contained an increased proportion of small individuals. No species new to Signy I. were recorded. (Auth. mod.)

49-1710

Intraseasonal variation in pollination intensity and seed set in an alpine population of *Ranunculus acris* in southwestern Norway.

Totland, O., *Ecography,* June 1994, 17(2), p.159-165, 40 refs.

Ecosystems, Plants (botany), Plant ecology, Phenology, Pollen, Temperature effects, Seasonal variations, Alpine landscapes, Subarctic landscapes, Norway

49-1711

Ice core record of polycyclic aromatic hydrocarbons over the past 400 years.

Kawamura, K., Suzuki, I., Fujii, Y., Watanabe, O., *Naturwissenschaften,* Nov. 1994, 81(11), p.502-505, 21 refs.

Ice sheets, Ice cores, Impurities, Environmental tests, Chemical analysis, Hydrocarbons, Air pollution, Periodic variations, Greenland

49-1712

Macrobenthos composition, abundance and biomass in the Arctic Ocean along a transect between Svalbard and the Makarov Basin.

Kröncke, I., *Polar biology,* Nov. 1994, 14(8), p.519-529, 28 refs.

Marine biology, Oceanographic surveys, Subglacial observations, Ocean bottom, Biomass, Ecology, Sampling, Ice cover effect, Arctic Ocean

49-1713

Development of ice biota in a temperate sea area (Gulf of Bothnia).

Norrman, B., Andersson, A., *Polar biology,* Nov. 1994, 14(8), p.531-537, 31 refs.

Marine biology, Oceanographic surveys, Sea ice, Sampling, Biomass, Ecology, Ice cores, Algae, Chlorophylls, Ice edge, Ice cover effect, Seasonal variations, Baltic Sea

49-1714

Changes in the chemistry of soil solution and acetic-acid extractable P following different types of freeze/thaw episodes.

Ron Vaz, M.D., Edwards, A.C., Shand, C.A., Cresser, M.S., *European journal of soil science,* Sep. 1994, 45(3), p.353-359, 38 refs.

Soil chemistry, Soil freezing, Organic soils, Freeze thaw cycles, Freeze thaw tests, Frozen ground chemistry, Nutrient cycle, Leaching, Solubility

49-1715

Snowline instability in a general circulation model: application to Carboniferous glaciation.

Crowley, T.J., Yip, K.J., Baum, S.K., *Climate dynamics,* Nov. 1994, 10(8), p.363-376, 63 refs.

Paleoclimatology, Pleistocene, Ice age theory, Climatic changes, Glaciation, Snow cover effect, Radiation balance, Albedo, Models

49-1716

Ice accretion on aircraft wings.

Tran, P., Brahimi, M.T., Paraschivoiu, I., *Canadian aeronautics and space journal,* Sep. 1994, 40(3), p.91-98, With French summary. 44 refs.

Aircraft icing, Ice accretion, Ice forecasting, Glaze, Cloud droplets, Fluid dynamics, Ice solid interface, Mathematical models, Computerized simulation

49-1717

Phase equilibria in the water-sucrose-sodium chloride system.

Gribaudo, L.M., Rubiolo, A.C., *International journal of food science and technology,* Apr. 1992, 27(2), p.159-169, 14 refs.

Solutions, Thermodynamics, Ice water interface, Phase transformations, Temperature measurement, Solubility, Liquid phases, Chemical composition

49-1718

Ground freezing 94.

International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994, Frémond, M., ed, Rotterdam, A.A. Balkema, 1994, 420p., In English and French. Refs. passim. For individual papers see 49-1719 through 49-1785.

Soil freezing, Soil stabilization, Frozen ground strength, Frozen ground thermodynamics, Frost heave, Permafrost, Artificial freezing

49-1719

Inhibition effect of porous, thermal insulating materials against frost heave and frost penetration.

Sawada, S., Suzuki, T., Liu, C.G., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.3-7, 2 refs.

Soil freezing, Frost heave, Frost penetration, Frost protection, Thermal insulation, Porous materials

49-1720

Analysis on the frozen fringe and the ice segregation temperature.

Chen, R.J., Cheng, G.D., Wu, Z.W., Horiguchi, K., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.9-12, 10 refs.

Soil freezing, Freezing front, Frost heave, Ice lenses, Frozen ground thermodynamics, Frozen ground temperature, Frozen ground compression

49-1721

Computer code GEOCAL.

Gonze, P., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.13-16, With French summary.

Soil freezing, Frozen ground thermodynamics, Frozen ground mechanics, Artificial freezing, Computer programs

49-1722

Cryogenic alteration of frost susceptible soils.

White, T.L., Williams, P.J., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.17-24, 16 refs.

Soil freezing, Frozen ground thermodynamics, Frost action, Cryogenic soils, Soil structure, Soil texture

49-1723

Dependence of segregation potential on thermal and hydraulic conditions predicted by model M_1.

Nakano, Y., MP 3537, International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.25-33, 25 refs.

Soil freezing, Ice lenses, Freezing front, Frost heave, Frost forecasting, Frozen ground thermodynamics, Soil water migration, Mathematical models

The widely used segregation potential (SP) model is semiempirical in nature. An accurate mathematical model is needed that provides the functional dependence of SP on pertinent variables specifying given thermal and hydraulic conditions in terms of well-defined functions (or parameters) describing the properties of a given soil. In response to such need a mathematical model called M_1 was introduced and efforts have been made to validate M_1 by empirical findings and experimental data. In this paper it is shown that the functional dependence of SP on pertinent variables predicted by M_1 is consistent with empirical findings that were used to build the SP model.

49-1724

Experimental research for heat preservation of freeze pipe in the swift water flow.

Zhou, X.M., Wang, Z.T., Su, L.F., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.35-37, 1 ref.

Soil freezing, Artificial freezing, Soil stabilization, Tunneling (excavation), Pipes (tubes), Pipeline insulation, Thermal insulation

49-1725

Finite element modelling of transient non-linear heat flow using the node state method.

Coutts, R.J., Konrad, J.M., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.39-47, 5 refs.

Heat transfer, Phase transformations, Enthalpy, Soil freezing, Underground pipelines, Computerized simulation, Mathematical models

49-1726

Freezing-thawing kinetics in water and water-saturated soils.

Grechishchev, S.E., Pavlov, A.V., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.49-55, 2 refs.

Soil freezing, Frozen ground thermodynamics, Freezing front, Ground thawing, Soil water migration

49-1727

Ground water remediation by controlled soil freezing.

Andersland, O.B., Wiggert, D.C., Lehner, C.A., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.57-63, 3 refs.

Oil spills, Oil recovery, Soil pollution, Soil freezing, Artificial freezing, Land reclamation

49-1728

Influence of cooling rate on frost heave of freezing soils in open systems.

Xu, X.Z., Zhang, L.X., Deng, Y.S., Wang, J.C., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.65-68, 3 refs.

Soil freezing, Frost heave, Frost forecasting, Soil water migration, Cooling rate

49-1729

Permeability of frozen soils: theoretical approach and first comparison with experimental measurements. [Perméabilité des sols gelés, approche théorique, première confrontation avec des mesures expérimentales]

Djaballah, N., Aguirre-Puente, J., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.69-74, In French with English summary. 19 refs.

Soil freezing, Frozen ground thermodynamics, Frozen ground strength, Soil water migration, Permeability, Mathematical models

49-1730

Regulation of temperature as a method to control deformation of spoil heaps in polar regions.

Bondarenko, G.I., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.75-78, 3 refs.

Frozen ground strength, Frozen ground thermodynamics, Soil creep, Slope stability, Tailings, Land reclamation, Mathematical models

49-1731

Supercooling: a macroscopic predictive theory.

Frémond, M., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.79-84, 2 refs.

Ice formation, Ice water interface, Freezing nuclei, Homogeneous nucleation, Supercooling, Phase transformations, Mathematical models

49-1732

Temperature dependence of unfrozen water film thickness of frozen soils.

Ishizaki, T., Fukuda, M., Xu, X.Z., Chuvilin, E.M., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.85-88, 9 refs.

Soil freezing, Frozen ground thermodynamics, Unfrozen water content, Water films, Moisture detection, Nuclear magnetic resonance

49-1733

Centrifuge modelling of frost heave of pipelines.

Chen, X.S., Schofield, A.N., Smith, C.C., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.91-96, 10 refs.

Soil freezing, Frost heave, Frozen ground strength, Underground pipelines, Pipeline freezing, Freeze thaw tests

49-1734

Creep behaviour and prediction of long-term strength of frozen soil under dynamic loading.

Zhu, Y.L., He, P., Zhang, C.Q., Shen, Z.Y., Zhang, J.Y., Roman, L.T., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.97-102, 5 refs.

Frozen ground strength, Frozen ground compression, Soil creep, Statistical analysis

49-1735

Creep strength of Ottawa frozen sand under varying mean stress.

Fish, A.M., MP 3538, International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.103-108, 14 refs.

Frozen ground strength, Frozen ground compression, Soil creep, Sands, Soil tests, Strain tests, Mathematical models

Studies were carried out on the creep strength of Ottawa fine sand at -3.89 C under triaxial compression. The time-dependent strength of the frozen soil under multiaxial stress state is described by a parabolic creep strength criterion. In the particular case of the small stress domain, the parabolic yield criterion transforms into a generalized (for creep conditions) Drucker-Prager strength criterion. The latter, which was originally developed by the author to describe the strength of frozen soil when mean normal stress was constant, is expanded in the paper over a stress state at which the mean normal stress changes with time in accordance with the curve of the long-term strength (time-dependent failure). It is shown that if the rheological parameters of frozen soil are known, the above criterion describes the long-term strength of soil under a multiaxial stress state at constant and varying mean stress.

49-1736

Deformation and compaction of frozen soils.

Viklander, P., Knutsson, S., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.109-116, 17 refs.

Frozen ground strength, Frozen ground compression, Frozen ground settling, Thaw weakening, Soil compaction

49-1737

Determination of permafrost creep parameters from *in- situ* measurements.

Wang, B.L., French, H.M., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.117-120, 25 refs.

Frozen ground strength, Soil creep, Slope stability, Permafrost surveys, Permafrost beneath structures, Mathematical models

49-1738

Effective stresses in unsaturated soils after freezing and thawing.

Nishimura, T., Ogawa, S., Fukuda, M., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.121-128, 18 refs.

Soil freezing, Frost heave, Frozen ground strength, Frozen ground compression, Thaw consolidation

49-1739

Estimation of frost heave for stratified soil profile.

Sheng, D.C., Axelsson, K., Knutsson, S., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.129-141, 36 refs.

Soil freezing, Frost heave, Frost forecasting, Frozen ground thermodynamics, Ice lenses, Freezing front, Mathematical models

49-1740

Links between in situ determined mechanical and electrical properties of a silty frozen ground.

Fortier, R., Ladanyi, B., Allard, M., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.143-152, 13 refs.

Permafrost surveys, Frost mounds, Frozen ground strength, Saline soils, Unfrozen water content, Electrical logging, Canada—Quebec—Ungava Bay

49-1741

Measurement of electrical resistivity of frozen soils.

Harada, K., Fukuda, M., Ishizaki, T., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.153-156, 7 refs.

Permafrost surveys, Permafrost thickness, Frozen ground temperature, Frost penetration, Unfrozen water content, Electrical resistivity, Japan

49-1742

Measuring unfrozen pore water pressure at the ice-lens forming front.

Miyata, Y., Minami, Y., Akagawa, S., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.157-162, 9 refs.

Soil freezing, Ice lenses, Freezing front, Frost heave, Frozen ground thermodynamics, Soil water migration

49-1743

Microstructure damage behavior and change characteristic in the creep process of frozen soil.

Zhang, C.Q., Wei, X.X., Miao, T.D., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.163-167, 5 refs.

Frozen ground strength, Soil creep, Soil structure, Loess, Microstructure

49-1744

Modelling heave-time curves from laboratory freezing tests.

Jones, R.H., Baba, H.U., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.169-174, 14 refs.

Soil freezing, Frost heave, Frost forecasting, Frozen ground strength, Soil tests

49-1745

Elastic waves in frost-susceptible porous media—application to the study of soils and rocks under cold conditions. [Ondes élastiques dans les milieux poreux soumis au gel—application à l'étude des sols et des roches en conditions froides]

Leclaire, P., Aguirre-Puente, J., Cohen-Ténoudji, F., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.175-179, In French. 13 refs.

Frozen ground thermodynamics, Frozen ground strength, Soil structure, Unfrozen water content, Porous materials, Elastic waves, Wave propagation

49-1746

Plastic and viscous potential of frozen sand.

Meissner, H., Kroh, H., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.181-187, With French summary. 6 refs.

Frozen ground strength, Frozen ground compression, Soil creep, Sands, Soil tests, Strain tests, Mathematical models

49-1747

Relation between frost damage to limestones and their reticular porous geometry. [Relations entre l'endommagement par le gel des roches calcaires et la géométrie de leurs réseaux poreux]

Remy, J.M., Homand, F., Bellanger, M., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.189-197, In French with English summary. 25 refs.

Frozen ground strength, Frost action, Soil structure, Porous materials

49-1748

Thermal and mechanical characteristics of clay soil artificially frozen by liquid nitrogen.

Weng, J.J., Zhang, M., Esaki, T., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.199-203, 4 refs.

Soil freezing, Artificial freezing, Soil stabilization, Tunneling (excavation), Clay soils, Frozen ground strength, Frozen ground thermodynamics

49-1749

Adfreezing shear strength peculiarities of different soils.

Brushkov, A.V., Chekhovskiĭ, A.L., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.207-213, 4 refs.

Soil freezing, Frozen ground strength, Ice adhesion, Pile load tests

49-1750

Numerical simulation on the forecast of freezing-thawing processes surrounding a mountain tunnel.

Mi, H.Z., Chen, X.B., Wang, Y.Q., Wang, S.L., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.215-218, 4 refs.

Soil freezing, Frost forecasting, Frost penetration, Frost action, Frost protection, Thermal insulation, Permafrost beneath structures, Railroad tunnels, China—Qilian Mountains

49-1751

Frost susceptibility of highway engineering soils. [Caractérisation de la sensibilité au gel des sols utilisés en technique de chaussées]

Livet, J., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.219-223, In French. 13 refs.

Subgrade soils, Soil freezing, Frost action, Frost resistance, Frozen ground strength, Road maintenance

49-1752

Deformation of artificially frozen shafts during excavation.

Zhang, Y., Sego, D.C., Morgenstern, N.R., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.225-232, 16 refs.

Soil freezing, Artificial freezing, Soil stabilization, Frozen ground strength, Shaft sinking

49-1753

Effects of permafrost degeneration on the roadbed stability of Qinghai-Sichuan highway.

Wu, Z.W., Zhu, L.N., Liu, Y.Z., Zang, E.M., Wang, X.Y., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.233-236, 4 refs.

Permafrost beneath roads, Permafrost preservation, Road maintenance, China—Qinghai-Xizang Plateau

49-1754

Frost protection of ice arenas.

Saarelainen, S., Kivikoski, H., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.237-243, 8 refs.

Artificial ice, Artificial freezing, Subgrade soils, Soil stabilization, Frost protection, Finland

49-1755

Ground freezing for using foundation structures.

Kutvitskaia, N.B., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.245-248, 1 ref.

Permafrost beneath structures, Permafrost preservation, Artificial freezing, Soil freezing, Soil stabilization, Frozen ground strength, Foundations

49-1756

Improving the frost resistance of fine and granular soils. [L'amélioration de la tenue au gel des sols fins ou grenus]

Livet, J., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.249-254, In French.

Soil freezing, Frost resistance, Frost protection, Soil stabilization, Road maintenance

49-1757

Designing French roads for frost and safeguarding the national highway network in winter. [Le dimensionnement au gel des chaussées françaises et la sauvegarde du patrimoine routier pendant l'hiver]

Boutonnet, M., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.255-263, In French. 9 refs.

Road icing, Road maintenance, Frost protection, France

49-1758

Simulation of retaining wall displacement by frost action using the segregation potential approach.

Konrad, J.M., Shen, M., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.265-270, 19 refs.

Soil freezing, Frost heave, Frost forecasting, Frost action, Freezing front, Ice lenses, Soil water migration, Walls, Mathematical models

49-1759

Study on joint action of freeze wall and shaft lining.

Yu, X., Wang, Z.T., Genda, L., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.271-277, 5 refs.

Soil freezing, Artificial freezing, Soil stabilization, Frozen ground strength, Shaft sinking, Linings, Mathematical models

49-1760

Application of freezing method to launch a large diameter shield tunnel.

Saka, F., Tanaka, M., Hara, H., Takimoto, K., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.281-288, 2 refs.

Soil freezing, Artificial freezing, Frost heave, Frozen ground compression, Frost protection, Soil stabilization, Tunneling (excavation), Japan

49-1761

Construction of extension shield tunnel using ground freezing method.

Suzuki, S., Mizuno, R., Kimura, K., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.289-293, 3 refs.

Soil freezing, Artificial freezing, Frost heave, Soil stabilization, Tunneling (excavation), Japan

49-1762

Effects of frost depths of the ground to the degrees of liquefaction in Kushiro region under the seismic activities of 1993 Kushiro-Oki earthquake.

Fukuda, M., Tomatsu, Y., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.295-302, 10 refs.

Earthquakes, Frost penetration, Frozen ground strength, Japan

49-1763

Freezing techniques in the deep shaft construction of Chensilou Coal Mine.

Zhang, W., Pang, R.Q., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.303-309, 6 refs.

Soil freezing, Artificial freezing, Soil stabilization, Frozen ground strength, Frost protection, Mine shafts, Shaft sinking, Coal, China—Henan Province

49-1764

Full-scale model test on frost-heaving pressure in a reinforced retaining wall.

Suzuki, T., Sawada, S., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.311-316, 3 refs.

Soil freezing, Frost heave, Frost protection, Frozen ground strength, Soil stabilization, Earth fills, Walls

49-1765
Ground freezing to aid construction of an effluent treatment shaft within a chemical plant.
Harvey, S.J., Belton, J.A., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.317-325.
Soil freezing, Artificial freezing, Soil stabilization, Shaft sinking, Shafts (excavations), Waste treatment

49-1766
Use of artificial ground freezing in three sections of the Düseldorf subway.
Jordan, P., Hass, H., Jessberger, H.L., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.327-339, 2 refs.
Soil freezing, Artificial freezing, Soil stabilization, Frozen ground strength, Tunneling (excavation), Railroad tunnels, Germany

49-1767
Geochemical study of carbonate precipitation by soil freezing process in natural environment (Brögger peninsula, Spitsbergen).
Marlin, C., Dever, L., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.343-349, 15 refs.
Soil freezing, Cryogenic soils, Frozen ground chemistry, Geochemical cycles, Hydrogeochemistry, Active layer, Soil chemistry, Norway—Spitsbergen

49-1768
Ground freezing for management of hazardous wastes.
Dash, J.G., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.351-354, 16 refs.
Soil freezing, Artificial freezing, Soil stabilization, Waste disposal

49-1769
Heavy metal ions transfer in frozen soils.
Ershov, E.D., Chuvilin, E.M., Zherebiat'eva, O.G., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.355-360, 8 refs.
Cryogenic soils, Frozen ground chemistry, Soil pollution, Hydrogeochemistry

49-1770
Heterogenetic and syngenetic growth of permafrost.
Lunardini, V.J., MP 3539, International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.361-373, 32 refs.
Permafrost origin, Permafrost dating, Permafrost forecasting, Permafrost heat balance, Permafrost thermal properties, Paleoclimatology, Mathematical models

The growth of permafrost is an example of the freeze to a great depth of a semi-infinite medium with an initial temperature gradient, a lower boundary heat flow, and a prescribed surface temperature. This thermal problem for a conduction system with surface deposition is solved approximately with the heat balance integral technique. The appropriate surface temperature is chosen by examining known or ice-core-deduced paleotemperatures for specific locations. Graphs are presented allowing predictions to be made for a variety of typical permafrost or frozen ground examples.

49-1771
Influence of freezing-thawing process on the unfrozen water content of frozen saline soil.
Zhang, L.X., Xu, X.Z., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.375-377, 4 refs.
Soil freezing, Ground thawing, Saline soils, Unfrozen water content, Frozen ground chemistry, Frozen ground thermodynamics

49-1772
Soil freezing in presence of solute.
Frémond, M., San Martin H., J., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.379-383, 3 refs.
Soil freezing, Frozen ground thermodynamics, Frozen ground chemistry, Soil structure, Soil water migration, Phase transformations, Mathematical models

49-1773
Some behaviours of saline soils mixed with Na_2SO_4 and NaCl during cooling.
Chen, X.B., Wang, Y.Q., Ding, Y.Q., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.385-389, 7 refs.
Saline soils, Soil freezing, Frozen ground thermodynamics, Frozen ground chemistry

49-1774
Example of rapid freezing by liquid nitrogen. [Un exemple de congélation très rapide à l'azote liquide]
Despaigne, G., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.393-394, In French.
Oil spills, Oil recovery, Soil pollution, Soil freezing, Artificial freezing, Land reclamation

49-1775
Correlation between heat flux on the ground and permafrost thermal regime near the Spanish Antarctic Station.
Ramos, M., Aguirre-Puente, J., Costard, E., Ozouf, J.C., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.395-396, 4 refs.
Permafrost heat transfer, Permafrost thermal properties, Soil air interface, Antarctica—Juan Carlos I Station

During the 1991-92 and 1993-94 antarctic summer a turbulent atmospheric parameters measuring device was installed near the Spanish antarctic station (Juan Carlos I Station) at Livingston I. in order to register the exchanged energy flux between the soil and the lower atmosphere. Temporal evolution of freezing/thawing in the active layer of permafrost was also registered using several temperature probes. Based on the energy exchange flux data and the movement of the free boundary in permafrost, the authors examine the active layer's permafrost evolution as a function of the energy change in the soil/atmosphere surface. (Auth. mod.)

49-1776
Field observation of solute migration in freezing and thawing soils with different ground water tables.
Kang, S.Y., Gao, W.Y., Xu, X.Z., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.397-398, 3 refs.
Soil freezing, Ground thawing, Frozen ground chemistry, Water table

49-1777
Frost heave experiments with layered porous material.
Ishizaki, T., Fukuda, M., Xu, X.Z., Chuvilin, E.M., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.399-400, 4 refs.
Soil freezing, Frost heave, Soil water migration, Porous materials

49-1778
Facility for the world wine and spirits city, Bordeaux: completion of the access ramp for a parking garage. [Chantier de la cité mondiale du vin et des spiritueux à Bordeaux; réalisation de la rampe d'accès au parc de stationnement]
Despaigne, G., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.401-403, In French.
Soil freezing, Artificial freezing, Soil stabilization, Tunneling (excavation)

49-1779
Ground freezing application in tunnel constructions.
Tanaka, M., Iji, M., Nakai, I., Kashiwagi, T., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.405-406.
Soil freezing, Artificial freezing, Soil stabilization, Tunneling (excavation)

49-1780
Frozen soils/structures interactions: pipelines buried in permafrost—a France-Canada collaboration (1981-1993). [Interactions 'Structures/sols gelés': gazoducs enterrés dans le pergélisol—une collaboration franco-canadienne]
Aguirre-Puente, J., et al, International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.407-408, In French with English summary. 3 refs.
Underground pipelines, Gas pipelines, Permafrost beneath structures

49-1781
Investigation of frost/pipe heave associated with large-diameter chilled gas pipeline operation using a small-scale laboratory model.
Greene, D.P., Kettle, R.J., Middleton, E., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.409-410, 3 refs.
Gas pipelines, Pipeline freezing, Frost heave, Freeze thaw tests, Environmental tests

49-1782
Jacking of a railroad overpass with soil stabilization and waterproofing by ground freezing.
Orth, W., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.411-412, 2 refs.
Soil freezing, Artificial freezing, Soil stabilization, Railroads

49-1783
Periglacial phenomena in France: survey and geoprospective interest. [Les phénomènes périglaciaires en France: inventaire et intérêt en géoprospective]
Courbouleix, S., Mouroux, B., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.413-414, In French.
Periglacial processes, Engineering geology, France

49-1784
Modeling of the permafrost depth during the last glacial cycle in France. [Modélisation de la profondeur du pergélisol au cours du dernier cycle glaciaire en France]
Lebret, P., et al, International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.415-416, In French. 8 refs.
Permafrost thickness, Paleoclimatology, France

49-1785
Using method of temperature-time analogy to determine long-term strength of frozen soil in triaxial compression.
Roman, L.T., Zhu, Y.L., Zhang, C.Q., Ma, W., Zhang, J.M., International Symposium on Ground Freezing, 7th, Nancy, France, Oct. 24-28, 1994. Proceedings. Ground Freezing 94. Edited by M. Frémond, Rotterdam, A.A. Balkema, 1994, p.417-418, 3 refs.
Frozen ground strength, Frozen ground compression, Soil creep

49-1786
Order-of-magnitude estimate of the current uplift-rates in Switzerland caused by the Würm alpine deglaciation.
Gudmundsson, G.H., *Eclogae geologicae Helvetiae,* 1994, 87(2), p.545-557, With German summary. 34 refs.
Alpine glaciation, Pleistocene, Tectonics, Geologic processes, Isostasy, Glacial geology, Ice loads, Viscoelasticity, Rheology, Switzerland

49-1787
Simple models for wet-snow accretion on transmission lines: snow load and liquid water content.
Poots, G., Skelton, P.L.I., *International journal of heat and fluid flow,* Oct. 1994, 15(5), p.411-417, 13 refs.
Power line icing, Snow physics, Snow accumulation, Wet snow, Snow loads, Snow water content, Ice solid interface, Snow heat flux, Forecasting, Mathematical models

49-1788
Arctic Climate System Study—ACSyS.
Augstein, E., *World Meteorological Organization. WMO bulletin,* Jan. 1993, 42(1), p.33-39, 24 refs.
Climatology, Oceanography, Research projects, Climatic changes, Ocean currents, Sea ice distribution, Air ice water interaction, Ice cover effect, Arctic Ocean

49-1789
Avalanche disaster in south-eastern Turkey in the winter of 1992.
Gürer, I., Sayin, A., *World Meteorological Organization. WMO bulletin,* Jan. 1993, 42(1), p.44-48, 4 refs.
Avalanche protection, Avalanche forecasting, Safety, Meteorological factors, Turkey

49-1790
Sensitivity of the south Chilean snowline to climatic change.
Kerr, A., Sugden, D.E., *Climatic change,* Nov. 1994, 28(3), p.255-272, 39 refs.
Paleoclimatology, Paleoecology, Climatic changes, Glacier mass balance, Glacier oscillation, Surface energy, Snow line, Periodic variations, Wind factors, Mathematical models, Chile

49-1791
Pair distribution functions and attenuation rates for sticky particles in dense media.
Ding, K.H., Zurk, L.M., Tsang, L., *Journal of electromagnetic waves and applications,* Dec. 1994, 8(12), p.1585-1604, 22 refs.
Remote sensing, Snow physics, Metamorphism (snow), Particles, Coalescence, Adhesion, Scattering, Electromagnetic properties, Simulation, Mathematical models

49-1792
Physical controls on the development and characteristics of antarctic sea ice biological communities—a review and synthesis.
Ackley, S.F., Sullivan, C.W., MP 3540, *Deep-sea research pt.I,* 1994, 41(10), p.1583-1604, Refs. p.1600-1604.
Marine biology, Biomass, Algae, Ecosystems, Sea ice, Pack ice, Ice microstructure, Ice growth, Classifications, Ice cover effect, Ice water interface, Antarctica—Weddell Sea, Antarctica—Ross Sea
Ice structures found in antarctic sea ice and related morphological processes are summarized, including frazil ice growth; the flooded snow layer; pressure ridge induced flooding; thermally driven brine drainage; and platelet-ice formation. The associated colonization, physiological adaptation, and growth of sea ice biota within these structures, to the levels presently identifiable, are also reviewed. Variability of ice structure and associated biological communities over small spatial scales necessitated analysis of the biological component in combination with physical and chemical properties of the sea ice. The ice microstructure provides indications of the growth and evolution of ice properties and initially defines how ice biota colonize the ice. While the ice microstructure shapes the localized biological response, relatively large regions of pack ice have characteristic microstructures. Regional patterns of biomass and biological productivity within the antarctic sea ice zone may therefore be predictable as a result of these physical-biological associations. Examples from the drifting pack ice and fast ice zones of the Weddell and Ross Seas are given. (Auth. mod.)

49-1793
Anthropogenic lead isotopes in Antarctica.
Rosman, K.J.R., Chisholm, W., Boutron, C.F., Candelone, J.P., Patterson, C.C., *Geophysical research letters,* Dec. 1, 1994, 21(24), p.2669-2672, 18 refs.
Ice sheets, Ice surface, Snow composition, Snow impurities, Sampling, Air pollution, Dust, Isotope analysis, Correlation, Dusting, Antarctica—Adélie Coast
This paper reports the first measurements of Pb isotopes in antarctic snow, which show that even recent snow containing 2.3 pg/g is highly polluted with anthropogenic Pb. This follows from a comparison of isotope abundances of Pb in surface snow and terrestrial dust extracted from ancient antarctic ice (Dome C, depth 308 m, approximate age 7,500 a BP), the latter being distinctly more radiogenic. This result is independent of geochemical arguments based on measurements of Al, Na and SO_4. South America is suggested as a likely source of this anthropogenic Pb. The presence of significantly less radiogenic Pb in the snow adjacent to two antarctic base stations indicates that there is contamination from station emissions, although emission from Australia is an alternative explanation for a site 33 km from Dumont d'Urville. (Auth. mod.)

49-1794
Freezing temperatures of $H_2SO_4/HNO_3/H_2O$ mixtures: implications for polar stratospheric clouds.
Song, N.H., *Geophysical research letters,* Dec. 1, 1994, 21(24), p.2709-2712, 14 refs.
Polar atmospheres, Cloud physics, Solutions, Freezing points, Freezing indexes, Polar stratospheric clouds, Chemical properties, Simulation
The freezing temperatures of $H_2SO_4/HNO_3/H_2O$ mixtures were systematically documented. Nitric acid was found to affect freezing significantly. Measurements show that nitric acid can cause substantial supercooling over a broad composition range. However, some ternary compositions, like those in polar stratospheric clouds (PSCs), have high freezing temperatures. The freezing of PSC particles could be controlled by the temperature and vapor pressure of both nitric acid and water in a nonlinear way. Formation of polar stratospheric clouds may be forecast on the basis of conditions of temperature and vapor contents of water and nitric acid. (Auth.)

49-1795
Effect of ice particles on Thomson scattering from the polar summer mesopause region.
Klostermeyer, J., *Geophysical research letters,* Dec. 1, 1994, 21(24), p.2721-2724, 15 refs.
Polar atmospheres, Atmospheric physics, Cloud physics, Radar echoes, Scattering, Spectra, Particles, Polarization (charge separation), Ice crystal collision, Ice electrical properties

49-1796
Lattice misfit as revealed by dislocation etch pits in a deformed ice crystal.
Barrette, P.D., Sinha, N.K., *Journal of materials science letters,* Oct. 15, 1994, 13(20), p.1478-1481, 24 refs.
Ice physics, Ice crystal structure, Ice plasticity, Latticed structures, Defects, Orientation, Ice deformation, Mechanical tests, Dislocations (materials)

49-1797
Three-dimensional model interpretation of NOx measurements from the lower stratosphere.
Folkins, I., et al, *Journal of geophysical research,* Nov. 20, 1994, 99(D11), p.23,117-23,129, 22 refs.
Polar atmospheres, Stratosphere, Aerial surveys, Air masses, Atmospheric composition, Aerosols, Ozone, Photochemical reactions, Chemical properties, Models

49-1798
NCAR CCM2 simulation of the modern antarctic climate.
Tzeng, R.Y., Bromwich, D.H., Parish, T.R., Chen, B., *Journal of geophysical research,* Nov. 20, 1994, 99(D11), p.23,131-23,148, 53 refs.
Climatology, Polar atmospheres, Climatic changes, Seasonal variations, Climatic factors, Atmospheric circulation, Air pressure, Ice cover thickness, Radiation balance, Simulation, Accuracy
The National Center for Atmospheric Research community climate model version 2 (CCM2) simulation of the circumpolar trough, surface air temperature, the polar vortex, cloudiness, winds, and atmospheric moisture and energy budgets are examined to validate the model's representation of the present-day antarctic climate. The results show that while the CCM2 can well simulate many important climate features over Antarctica, there are also some serious errors in the model. The model errors over high southern latitudes can be summarized as follows: the circumpolar trough, the polar vortex, and the westerlies in mid-latitudes are too strong; the semiannual cycle of the circumpolar trough is distorted compared to observations; the low centers of the circumpolar trough and the troughs in the middle and upper troposphere are shifted eastward by 15-40 deg longitude; the surface temperatures are too cold over the plateau in summer and over the coastline in winter; the polar tropopause continues to have a cold bias; and the cloudiness is too high over the continent. These biases are induced by two major factors: (1) the cloud optical properties in tropical and middle latitudes, and (2) the cold bias of the surface air temperature. Although the simulated antarctic climate still suffers these biases, the overall performance of the CCM2 is much better than that of the CCM1-T42. (Auth. mod.)

49-1799
Effect of atmospheric precipitation on the characteristics of a phased antenna array.
Kniazev, S.T., Nechaev, IU.B., Fadeev, A.S., *Telecommunications and radio engineering,* May 1993, 48(5), p.99-102, Translated from Radiotekhnika. 3 refs.
Antennas, Radio waves, Wave propagation, Dielectric properties, Electromagnetic properties, Precipitation (meteorology), Ice cover effect, Analysis (mathematics)

49-1800
Thawing in saturated porous media.
Fasano, A., Guan, Z., Primicerio, M., Rubinstein, I., *Meccanica,* 1993, 28(2), p.103-109, With Italian summary. 9 refs.
Porous materials, Saturation, Ice melting, Phase transformations, Ice water interface, Solid phases, Heat transfer, Water transport, Boundary value problems, Mathematical models

49-1801
Nuclear magnetic resonance imaging as a probe of the freezing-thawing phenomena of liquids in heterogeneous systems.
Fyfe, C.A., Isbell, S.A., Burlinson, N.E., *Magnetic resonance in chemistry,* May 1994, 32(5), p.276-283, 8 refs.
Frozen liquids, Solutions, Freezing, Ice formation, Nuclear magnetic resonance, Imaging, Liquid solid interfaces, Temperature effects

49-1802
Recent fluctuations of the lichen-spruce forest limit in subarctic Quebec.
Lavoie, C., Payette, S., *Journal of ecology,* Dec. 1994, 82(4), p.725-734, 31 refs.
Plant ecology, Subarctic landscapes, Vegetation patterns, Forest lines, Lichens, Growth, Revegetation, Climatic changes, Canada—Quebec

49-1803
Does polluted air keep the Arctic cool.
Pearce, F., *New scientist,* Oct. 29, 1994, 144(1949), p.19.
Polar atmospheres, Air temperature, Air pollution, Haze, Greenhouse effect, Climatic factors, Global warming

49-1804
Ocean-ice interaction in the marginal ice zone using synthetic aperture radar imagery.
Liu, A.K., Peng, C.Y., Weingartner, T.J., *Journal of geophysical research,* Nov. 15, 1994, 99(C11), p.22,391-22,400, 24 refs.
Oceanography, Spaceborne photography, Synthetic aperture radar, Sea ice distribution, Ice edge, Radar tracking, Ice water interface, Ice cover effect, Ocean waves, Wave propagation, Chukchi Sea

49-1805

On the relationship between energy fluxes, dielectric properties, and microwave scattering over snow covered first-year sea ice during the spring transition period.

Barber, D.G., Papakyriakou, T.N., LeDrew, E.F., *Journal of geophysical research,* Nov. 15, 1994, 99(C11), p.22,401-22,411, 22 refs.

Sea ice, Surface temperature, Scattering, Seasonal variations, Radiation balance, Heat balance, Remote sensing, Radiometry, Dielectric properties, Ice heat flux, Snow cover effect, Snow ice interface

49-1806

Feasibility of sea ice typing with synthetic aperture radar (SAR): merging of Landsat thematic mapper and ERS 1 SAR satellite imagery.

Steffen, K., Heinrichs, J., *Journal of geophysical research,* Nov. 15, 1994, 99(C11), p.22,413-22,424, 12 refs.

Sea ice distribution, Spaceborne photography, Classifications, Synthetic aperture radar, LANDSAT, Radiometry, Image processing, Correlation, Ice edge, Ice detection, Backscattering

49-1807

Observation of melt onset on multiyear arctic sea ice using the ERS 1 synthetic aperture radar.

Winebrenner, D.P., Nelson, E.D., Colony, R., West, R.D., *Journal of geophysical research,* Nov. 15, 1994, 99(C11), p.22,425-22,441, 30 refs.

Sea ice, Remote sensing, Synthetic aperture radar, Ice melting, Snowmelt, Detection, Surface temperature, Backscattering, Attenuation, Saturation, Snow cover effect, Arctic Ocean

49-1808

Sea ice type maps from Alaska Synthetic Aperture Radar Facility imagery: an assessment.

Fetterer, F.M., Gineris, D.J., Kwok, R., *Journal of geophysical research,* Nov. 15, 1994, 99(C11), p.22,443-22,458, 21 refs.

Sea ice distribution, Ice conditions, Classifications, Spaceborne photography, Synthetic aperture radar, Image processing, Accuracy, Arctic Ocean

49-1809

Structural and stratigraphic features and ERS 1 synthetic aperture radar backscatter characteristics of ice growing on shallow lakes in NW Alaska, winter 1991-1992.

Jeffries, M.O., Morris, K., Weeks, W.F., Wakabayashi, H., *Journal of geophysical research,* Nov. 15, 1994, 99(C11), p.22,459-22,471, 20 refs.

Frozen lakes, Lake ice, Ice growth, Surface structure, Bubbles, Ice cover thickness, Stratigraphy, Remote sensing, Synthetic aperture radar, Backscattering, United States—Alaska—Barrow Lake

49-1810

Analysis of ERS 1 synthetic aperture radar data of frozen lakes in northern Montana and implications for climate studies.

Hall, D.K., et al, *Journal of geophysical research,* Nov. 15, 1994, 99(C11), p.22,473-22,482, 27 refs.

Frozen lakes, Freezeup, Climatology, Remote sensing, Synthetic aperture radar, Spaceborne photography, Backscattering, Surface structure, Bubbles, United States—Montana

49-1811

ERS 1 synthetic aperture radar image of atmospheric lee waves.

Vachon, P.W., Johannessen, O.M., Johannessen, J.A., *Journal of geophysical research,* Nov. 15, 1994, 99(C11), p.22,483-22,490, 14 refs.

Atmospheric boundary layer, Atmospheric physics, Gravity waves, Wave propagation, Wind velocity, Detection, Spaceborne photography, Synthetic aperture radar, Sea ice distribution, Ice openings, Barents Sea

49-1812

Cooling of the West Spitsbergen Current: wintertime observations west of Svalbard.

Boyd, T.J., D'Asaro, E.A., *Journal of geophysical research,* Nov. 15, 1994, 99(C11), p.22,597-22,618, 54 refs.

Oceanography, Ocean currents, Water temperature, Cooling rate, Sea ice distribution, Advection, Air ice water interaction, Ice cover effect, Greenland Sea

49-1813

Climatological data for Arctic Ice Island T-3. Number 3. January 1968-April 1971. Ashville, NC, U.S. National Oceanic and Atmospheric Administration, Environmental Data Service, 1974, 152p., 22 refs.

DLC QC994.8.U523a

Ice islands, Drift, Drift stations, Ocean currents, Meteorological data, Weather observations

49-1814

On the oblique reflexion and transmission of ocean waves at shore fast sea ice.

Fox, C., Squire, V.A., *Royal Society of London. Philosophical transactions. Series A. Physical sciences and engineering,* Apr. 15, 1994, 347(1682), p.185-218, 53 refs.

Ocean waves, Fast ice, Ice water interface, Ice cover effect, Ice edge, Ice elasticity, Wave propagation, Mathematical models

49-1815

Two-dimensional model for the dynamics of sea ice.

Gray, J.M.N.T., Morland, L.W., *Royal Society of London. Philosophical transactions. Series A. Physical sciences and engineering,* Apr. 15, 1994, 347(1682), p.219-290, Refs. p.286-290.

Ice floes, Pack ice, Ice models, Ice mechanics, Ice strength, Ice pressure, Ice deformation, Drift, Pressure ridges, Mathematical models

49-1816

Guidelines for realizing the International Temperature Scale of 1990 (ITS-90).

Mangum, B.W., Furukawa, G.T., *U.S. National Institute of Standards and Technology. NIST technical note,* Aug. 1990, No.1265, 176p., PB91-112854, 105 refs.

Cryogenics, Low temperature research, Temperature measurement, Standards

49-1817

Interannual and intraseasonal variability of the ice cover in the Gulf of Saint Lawrence, 1963-1990.

Déry, F., Montreal, McGill University, 1992, 220p., MS thesis. With French summary. Refs. p.160-164.

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Air ice water interaction, Seasonal variations, Statistical analysis, Canada—St. Lawrence, Gulf

49-1818

Atmospheric halos.

Tape, W., *American Geophysical Union. Antarctic research series,* 1994, Vol.64, 143p., 44 refs.

Atmospheric physics, Optical phenomena, Ice crystal optics, Ice crystal structure

Halos are caused by the refraction and reflection of sunlight in prismatic ice crystals in the atmosphere. The most common halos are parhelia (two bright spots about 22 degrees on either side of the sun) and circumzenith arcs (a rainbow colored arc with its center at the zenith about 46 degrees above the sun), usually produced by plate crystals, and tangent arcs (halos tangent to other halos), usually produced by column crystals. It is suggested that randomly oriented crystals may produce complete circular halos around the sun at 22 and 46 degrees. Ray paths for various crystal shapes and orientations are described and numerous photographs of halos and representative ice crystals are provided, mostly from Alaska, Wisconsin, and Antarctica, with some of the best examples from Antarctica.

49-1819

On the coupling between snow distribution and snow melt.

Gjessing, Y., Nordiska meteorologmötet (Nordic meteorology meeting), 17th, Saariselkä, Finland, Aug. 12-17, 1990 (NMM-90), Helsinki, Meteorologiska institutet, 1991, p.271-279, In Norwegian with English summary. 3 refs.

Snow cover distribution, Snowmelt, Runoff forecasting, Norway

49-1820

Mountain weather and climate. 2nd edition.

Barry, R.G., London, Routledge, 1992, 402p., Refs. passim. For 1st edition see 37-1763.

DLC QC993.6.B37 1992

Mountains, Topographic effects, Climatology, Meteorology, Precipitation (meteorology), Snowfall, Snow cover distribution

49-1821

Annual report 1994.

Arctic Institute of North America, Calgary, Alberta, University, 1994, 16p., Refs. passim.

Research projects, Organizations, Cost analysis

49-1822

Glacial lake outburst floods and risk engineering in the Himalaya—a review of the Langmoche disaster, Khumbu Himal, 4 August 1985.

Ives, J.D., International Centre for Integrated Mountain Development. Occasional paper no.5, Kathmandu, 1986, 42p., 49 refs.

Mountains, Glacial hydrology, Glacial lakes, Lake bursts, Hydrography, Safety, Glacier surveys, Monitors, Flood forecasting, Nepal

49-1823

Glaciotectonic landforms and structures.

Aber, J.S., International Quaternary Research Commission on Formation and Properties of Glacial Deposits Field Conference, Regina, Saskatchewan, 1993. Proceedings. Field trip guidebook—Quaternary and later Tertiary landscapes of southwestern Saskatchewan and adjacent areas. Edited by D.J. Sauchyn, University of Regina, 1993, p.20-26, Refs. p.104-113.

DLC QE693.5.I58

Glacial geology, Quaternary deposits, Moraines, Glacial erosion, Geomorphology, Tectonics, Landforms, Canada—Saskatchewan

49-1824

Melting driven by vigorous compositional convection.

Kerr, R.C., *Journal of fluid mechanics,* Dec. 10, 1994, Vol.280, p.255-285, 55 refs.

Fluid mechanics, Ice physics, Ice melting, Solutions, Ice water interface, Surface roughness, Convection, Buoyancy, Magma, Simulation, Analysis (mathematics)

49-1825

Dissolving driven by vigorous compositional convection.

Kerr, R.C., *Journal of fluid mechanics,* Dec. 10, 1994, Vol.280, p.287-302, 43 refs.

Fluid mechanics, Magma, Geologic processes, Simulation, Ice physics, Ice water interface, Ice melting, Convection, Solubility, Analysis (mathematics)

49-1826

Design and construction of remote facilities under arctic conditions. Juneau, Office of the Governor, Alaska Science and Engineering Advisory Commission, 1989, 88p., Proceedings of a conference in Anchorage, Mar. 9-10, 1989.

Cold weather construction, Buildings, Utilities, Regional planning, Cost analysis, Meetings, United States—Alaska

49-1827

Design data of composite materials for cold regions environments.

Dutta, P.K., MP 3541, International Symposium on Composite Materials and Structures, 2nd, Beijing, Aug. 3-7, 1992 (ISCMS/II). Abstracts of paper for work-in-progress, Beijing, [1992], p.5-6.

Composite materials, Cold weather performance, Frost resistance, Thermal stresses

49-1828

Dynamic stresses in composites at low temperatures.

Dutta, P.K., MP 3542, Dynamic Response of Composite Structures Workshop, New Orleans, Aug. 30-Sep. 1, 1993, Research Triangle Park, NC, U.S. Army Research Office, [1993], 2p.

Composite materials, Polymers, Cold weather performance, Cold stress, Strain tests

49-1829

Characterization of composite materials by Vertical Dynamic Hopkinson Bar.

Nwosu, S.N., Dutta, P.K., Hui, D., MP 3543, Integrated design and manufacturing of composites, New York, American Society of Mechanical Engineers, 1994, p.141-151, 12 refs.

Composite materials, Impact strength, Impact tests, Mechanical tests, Test equipment

A single Vertical Dynamic Hopkinson Bar (VDHB) is introduced for the characterization of composite materials by stress reflectance of the waveforms. The incident stress wave is generated in a vertical bar from longitudinal vertical impact of a steel impactor. The results show a correlation between the mechanical wave stress reflectance and the material impedances. Of the graphite epoxy, fiber reinforced plastics, rubber and foam materials tested, the graphite epoxy had the highest stress reflectance.

49-1830

Detailed Test Plan for the Preproduction Qualification Test (PPQT) of the Mounted Crewman Cold/Wet Glove (MCG) Soldier Enhancement Program (SEP).

Litavec, D.J., U.S. Army Test and Evaluation Command TECOM Project No.8-EI-495-MCG-002, Fort Greely, AK, U.S. Army Cold Regions Test Activity, Dec. 1994, 16p. + appends., 12 refs.

Clothing, Military equipment, Cold weather tests

49-1831

Collection and curation of IDPs from the Greenland and antarctic ice sheets.

Maurette, M., Immel, G., Hammer, C., Harvey, R., Kurat, G., Taylor, S., MP 3544, Analysis of Interplanetary Dust Workshop, Houston, May 1993. AIP conference proceedings, No.310, New York, American Institute of Physics, 1994, p.277-289, 28 refs.

Ice sheets, Ice composition, Impurities, Cosmic dust

Upon melting or sublimating, Greenland and antarctic ice yields a sandy material which is very rich (up to about 10% by weight in the 50-100 micron size fraction) in unmelted and partially melted micrometeorites (called MMs for micrometeorite or IDPs for interplanetary dust particles). These polar micrometeorites are remarkably unweathered despite having lost unknown amounts of soluble sulfates and carbonates and having "accreted" some trace elements during their settling time in the Earth's atmosphere. Although they mainly bear similarities with the rare class of CM and CR chondrites, some of the characteristics of their primary minerals strongly suggest that they are composed of a material not yet represented in meteorite collections. This paper describes improved methods for collecting micrometeorites in Greenland and Antarctica, and ways to study the past variations of the micrometeorite flux over a time scale >200,000 years.

49-1832

Dispersion by chemical reaction treatment of asphalt tar.

Marion, G.M., Brar, G.S., Payne, J.R., Stanka, M.A., MP 3545, HTRW Innovative Technology Transfer Workshop, 4th, Omaha, July 19-22, 1994, U.S. Army Corps of Engineers, [1994], 2p.

Oil spills, Oil recovery, Soil pollution, Soil chemistry, Land reclamation

49-1833

***In situ* degradation of oil in a soil of the boreal region of the Northwest Territories.**

Westlake, D.W.S., Jobson, A.M., Cook, F.D., *Canadian journal of microbiology,* 1978, Vol.28, p.254-260, With French summary. 29 refs.

Oil spills, Oil recovery, Forest soils, Soil pollution, Soil chemistry, Soil microbiology, Land reclamation, Canada—Northwest Territories

49-1834

Permafrost in the Alps. [Permafrost in den Alpen]

Vonder Mühll, D.S., Hoelzle, M., Wagner, S., *Geowissenschaften,* 1994, 12(5/6), p.149-153, In German with English summary. 16 refs.

Permafrost surveys, Permafrost distribution, Permafrost thickness, Rock glaciers, Soil creep, Switzerland

49-1835

Alpine hydropower changing with the times. [Alpine Wasserkraft im Wandel der Zeit]

Vischer, D.L., *Geowissenschaften,* 1994, 12(5/6), p.154-158, In German with English summary. 2 refs.

Electric power, Economic development, History, Switzerland

49-1836

Flood propagation on mobile beds under mountainous flow conditions.

Beffa, C., Faeh, R., Specialty Conference on Modeling of Flood Propagation Over Initially Dry Areas, Milan, June 6-July 1, 1994. Proceedings, New York, American Society of Civil Engineers, 1994, p.327-341, 17 refs.

Flood forecasting, Mountains, Suspended sediments, Sediment transport, Mathematical models, Switzerland

49-1837

Palaeogeographical relationships between Alpine and Jura glaciers during the two last Pleistocene glaciations.

Campy, M., *Palaeogeography, palaeoclimatology, palaeoecology,* May 1992, 93(1/2), p.1-12, 40 refs.

Alpine glaciation, Mountain glaciers, Pleistocene, Paleoclimatology, Moraines, Geochronology, Switzerland, France

49-1838

Chronologic evidence for multiple periods of loess deposition during the Late Pleistocene in the Missouri and Mississippi River Valley, United States: implications for the activity of the Laurentide Ice Sheet.

Forman, S.L., Bettis, E.A., III, Kemmis, T.J., Miller, B.B., *Palaeogeography, palaeoclimatology, palaeoecology,* May 1992, 93(1/2), p.71-83, 46 refs.

Glaciation, Pleistocene, Paleoclimatology, Loess, Stratigraphy, Soil dating, Geochronology, United States

49-1839

Pleistocene climates in China and Europe compared to oxygen isotope record.

Kukla, G.J., Palaeoecology of Africa and the surrounding islands, Vol.18. Edited by J.A. Coetzee, Rotterdam, A.A. Balkema, 1987, p.37-45, 28 refs. DLC QE993.P28 1987

Pleistocene, Paleoclimatology, Glaciation, Stratigraphy, Marine deposits, Bottom sediment, Loess, Isotope analysis

49-1840

Evaluation of algorithms for mapping snow cover parameters in the Federal Republic of Germany using passive microwave data.

Schweiger, A.J., Barry, R.G., *Erdkunde,* June 1989, 43(2), p.85-94, With German summary. 16 refs.

Snow surveys, Snow cover distribution, Snow water equivalent, Snow line, Terrain identification, Radiometry, Spaceborne photography, Image processing, Germany

49-1841

Avalanches in our western mountains: what are we doing about them.

Williams, K., *Weatherwise,* Oct. 1972, 25(5), p.220-227.

Avalanches, Snowstorms, Accidents, United States—Washington

49-1842

Geocryological glossary. [Dongtuxue cidian]

Qiu, G.P., ed, Liu, J.R., ed, Liu, H.X., ed, Lanzhou, Gansu kexue jishu chubanshe (Gansu Science and Technology Publishing House), 1994, 275p., In Chinese with English and Russian equivalents and indexes.

Geocryology, Frozen ground, Permafrost, Dictionaries, Terminology

49-1843

Glacier sliding over sinusoidal bed and the characteristics of creeping flow over bedrock undulations.

Gudmundsson, G.H., *Zurich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1994, No.130, 102p., With German summary. Refs. p.97-101.

Basal sliding, Glacier flow, Glacier beds, Glacier friction, Bedrock, Fossil ice, Mathematical models

49-1844

Soil freezing characteristic: its measurement and similarity to the soil moisture characteristic.

Spaans, E.J.A., Minneapolis, University of Minnesota, 1994, 121p., Ph.D. thesis. Refs. p.109-115.

Soil freezing, Frozen ground thermodynamics, Freezing potential (electrical), Soil water migration, Water retention, Unfrozen water content, Mathematical models

49-1845

Ice jam formation processes.

Mattke, T.W., Minneapolis, University of Minnesota, 1994, 103p., University Microfilms order No.DA9424323, Ph.D. thesis. 47 refs.

River ice, Ice jams, Ice breakup, Ice water interface, Ice forecasting, River flow, Flood forecasting, Mathematical models

49-1846

Structure and morphology of gas phase deposited ice.

Langel, W., Fleger, H.W., Knözinger, E., *Berichte der Bunsen-Gesellschaft für Physikalische Chemie,* Jan. 1994, 98(1), p.81-91, 37 refs.

Ice physics, Amorphous ice, Surface structure, Grain size, Gases, Heterogeneous nucleation, Ice vapor interface, Condensation, Substrates, Low temperature tests, X ray diffraction

49-1847

Dissolved oxygen variations in alpine glacial meltwaters.

Brown, G.H., et al, *Earth surface processes and landforms,* May 1994, 19(3), p.247-253, 17 refs.

Hydrogeochemistry, Bedrock, Weathering, Alpine glaciation, Glacial hydrology, Glacier melting, Meltwater, Oxygen, Solubility, Switzerland—Haut Glacier d'Arolla

49-1848

Estimation of cirrus optical thickness from sun photometer measurements.

Shiobara, M., Asano, S., *Journal of applied meteorology,* June 1994, 33(6), p.672-681, 13 refs.

Cloud physics, Optical properties, Solar radiation, Atmospheric density, Scattering, Radiance, Ice crystal optics, Photometry, Simulation, Analysis (mathematics)

49-1849

Kinetic studies of metal speciation using chelex cation exchange resin: application to cadmium, copper, and lead speciation in river water and snow.

Chakrabarti, C.L., et al, *Environmental science & technology,* Oct. 1994, 28(11), p.1957-1967, 55 refs.

Geochemistry, Metals, Solubility, Environmental tests, Surface waters, Snow composition, Snow impurities, Sampling, Chemical analysis

49-1850

Small-scale experiments on ice-jam initiation in a curved channel.

Urroz, G.E., Ettema, R., *Canadian journal of civil engineering,* Oct. 1994, 21(5), p.719-727, With French summary. 11 refs.

Ice mechanics, River ice, River flow, Ice jams, Channels (waterways), Ice water interface, Simulation, Models, Hydraulics, Topographic effects, Artificial ice

49-1851

IGARSS '94—surface and atmospheric remote sensing: technologies, data analysis and interpretation. Proceedings.

International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, 2543p. (4 vols.), Refs. passim. For selected papers see 49-1852 through 49-1966.

Remote sensing, Spaceborne photography, Radar echoes, Synthetic aperture radar, Geophysical surveys, Snow surveys, Ice surveys, Snow cover distribution, Sea ice distribution, Ice sheets, Scattering, Data processing, Resolution, Meetings

49-1852
Height distribution of ice particles in wintertime thunderclouds observed by a dual polarization radar.
Maekawa, Y., Fukao, S., Sonoi, Y., Masukura, K., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.29-31, 4 refs.
Precipitation (meteorology), Cloud physics, Weather observations, Snow pellets, Distribution, Cloud electrification, Radar echoes, Ice crystal optics, Lightning

49-1853
Estimation of ice water content using multi-parameter radar measurements.
Thurai, M., Vivekanandan, J., Morgan, K.L., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.32-34, 5 refs.
Precipitation (meteorology), Remote sensing, Radar echoes, Cloud physics, Profiles, Ice crystal optics, Ice melting, Water content, Scattering

49-1854
Angular characteristics of the Pathfinder AVHRR land thermal data and radiative transfer modeling.
Liang, S.L., Ranson, K.J., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.61-63, 8 refs.
Geophysical surveys, Remote sensing, Orientation, Surface temperature, Radiometry, Radiance, Upwelling, Snow cover effect, Mathematical models

49-1855
Two-phase algorithm to correct for atmospheric effects on the 85 GHz channels of the SSM/I in the arctic region.
St. Germain, K.M., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.67-69, 5 refs.
Sea ice distribution, Spaceborne photography, Radiometry, Microwaves, Attenuation, Atmospheric density, Brightness, Accuracy, Image processing

49-1856
Scattering of millimeter radiowaves by dry snowflakes.
Osharin, A.M., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.82-83, 7 refs.
Falling snow, Snowflakes, Snow optics, Radio waves, Scattering, Radiation absorption, Fractals

49-1857
Effect of latent heat transfer on diurnal and annual prediction of temperature and radiobrightness of northern prairie.
Liou, Y.A., England, A.W., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.131-133, 18 refs.
Soil air interface, Soil temperature, Surface temperature, Latent heat, Heat transfer, Brightness, Temperature gradients, Frozen ground thermodynamics, Mathematical models

49-1858
Far-infrared absorption of CO_2 clathrate hydrate.
Landry, J.C., England, A.W., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.138-140, 10 refs.
Remote sensing, Radiometry, Clathrates, Hydrates, Refractivity, Radiation absorption, Infrared radiation, Spectra, Detection, Simulation

49-1859

Antarctic sea ice passive microwave signatures during summer and autumn.

Comiso, J.C., Ackley, S.F., MP 3555, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.143-146, 10 refs.

Sea ice distribution, Ice conditions, Classifications, Seasonal variations, Remote sensing, Radiometry, Synthetic aperture radar, Brightness, Antarctica—Weddell Sea

The microwave signatures of antarctic sea ice during the summer and autumn of 1992 are examined using SSM/I data in conjunction with ERS-1 SAR data and observations from an ice station in the western Weddell Sea region. The period from Feb. through Apr. is observed to be critical in terms of monitoring sea ice cover with passive microwave sensors because of surface effects (e.g. melt, slush and flooding) that may cause large fluctuations in the signature of sea ice during the period. Ice concentrations calculated using reference brightness temperatures normally used for winter data are considerably lower than those observed in the field and those derived from SAR data. Reference temperatures more appropriate for the summer ice data were inferred and provided more compatible ice concentrations. In late summer and autumn, freezing conditions begin to dominate and the brightness temperatures of sea ice, still different from those of winter, reflect those primarily of refrozen slush over thick ice, young ice, and new ice.

49-1860

Contribution of antarctic coastal polynyi to total ice production: comparison of satellite- and model-derived estimates.

Markus, T., Fischer, H., Burns, B.A., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.147-149, 15 refs.

Sea ice distribution, Polynyas, Ice formation, Remote sensing, Radiometry, Models, Correlation, Air ice water interaction, Freezing rate, Antarctica—Weddell Sea

Daily measurements of coastal polynyas in the Weddell Sea were carried out from July through Nov. 1987 with a special method applied to passive microwave data of the SSM/I. Using the derived areas along with surface air temperature and wind field data, freezing rates and the amount of ice produced in the polynyas have been estimated. The results are compared with ice concentration analyses and a large-scale dynamic-thermodynamic sea ice model. The comparison shows that daily changes in near-coast freezing rates, predominantly caused by changes in polynya area, are reflected in changes in the freezing rate for the entire Weddell Sea. Additionally, a polynya area of only 0.3% of the Weddell Sea ice extent can be responsible for a change in ice extent of 5.5%. Although in general the model results for areas adjacent to the coast agree with the passive microwave results, some areas show significant differences in freezing rates.

49-1861

Characteristics of winter sea ice conditions in the southwestern Weddell Sea in 1992 as derived from multi-sensor observations.

Viehoff, T., Li, A., Oelke, C., Rebhan, H., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.150-152, 9 refs.

Sea ice distribution, Ice conditions, Ice surveys, Drift, Classifications, Radiometry, Synthetic aperture radar, Spaceborne photography, Antarctica—Weddell Sea

Sea ice conditions in the southwestern Weddell Sea during austral summer 1992 were analyzed using different remote sensing techniques as well as satellite-tracked buoy data. The temporal and spatial variability of the large scale ice concentration of first-year and multi-year ice fraction were extracted from SSM/I passive microwave data for the period 1987-1992. The results were compared with backscatter signatures from the ERS-1 SAR as well as with ice motion data from the AVHRR and from buoys. The combination of these data indicates that in the southwestern Weddell Sea a sea ice regime of mostly first-year ice exists which is different from the basinwide ice conditions. The spatial separation of both regimes is correlated with the continental slope, indicating that the barotropic part of the ocean circulation is a dominant factor for the forcing of the ice cover.

49-1862
Satellite microwave radar- and buoy-tracked ice motion in the Weddell Sea during WWGS '92.
Drinkwater, M.R., Kottmeier, C., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.153-155, 3 refs.
Sea ice distribution, Drift, Ice surveys, Remote sensing, Synthetic aperture radar, Radar tracking, Accuracy, Antarctica—Weddell Sea
The first results of ERS-1 SAR sea-ice drift tracking are presented for Antarctica. Summer and winter examples illustrate temporal variations in ice drift in the western and eastern Weddell Sea during two field experiments. Time-series of mean drift velocity, divergence and rotation are compared with meteorological data from an ice camp and by instrumented buoys. Results indicate that SAR successfully characterizes the 'spatially mesoscale' kinematics of Weddell Sea ice during summer and winter, if the coverage as well as temporal and spatial sampling are judiciously planned. Measurements show that winter ice production mostly occurs during synoptic events where pulses of wind force ice divergence, lead formation and ice growth.

49-1863
Enhanced resolution ERS-1 scatterometer imaging of southern hemisphere polar ice.
Long, D.G., Early, D.S., Drinkwater, M.R., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.156-158, 5 refs. For another version, see 49-1187 or 22F-51496.
Ice surveys, Sea ice, Glacier ice, Spaceborne photography, Radar echoes, Backscattering, Image processing, Resolution, Synthetic aperture radar
The ERS-1 mission has generated a wealth of radar data over the Southern Hemisphere polar region. While the SAR mode of the ERS-1 Active Microwave Instrument can provide only limited temporal and spatial coverage, the scatterometer mode provides frequent global coverage, albeit at a much lower (50 km) resolution. By applying a recently developed algorithm for generating enhanced resolution scatterometer images, the ERS-1 scatterometer data can be used to study both sea ice and glacial ice to support SAR-based studies. This paper describes the algorithm and its application to ERS-1 scatterometer data with particular emphasis on sea ice. Selected images from a time series covering a complete annual cycle are presented.

49-1864
Testing of a coupled ice-ocean model in a sea ice forecasting system.
Preller, R.H., Posey, P.G., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.159-161, 8 refs.
Ice surveys, Oceanography, Sea ice distribution, Ice cover thickness, Seasonal variations, Models, Ice forecasting, Accuracy

49-1865
ERS-1 SAR backscatter modeling and interpretation of sea ice signatures.
Askne, J., Carlström, A., Dierking, W., Ulander, L.M.H., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.162-164, 9 refs.
Sea ice, Ice conditions, Surface properties, Remote sensing, Image processing, Synthetic aperture radar, Backscattering, Models, Snow cover effect

49-1866
ERS-1 investigations of southern ocean sea ice geophysics using combined scatterometer and SAR images.
Drinkwater, M.R., Early, D.S., Long, D.G., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.165-167, 3 refs.
Sea ice, Ice surveys, Ice conditions, Remote sensing, Synthetic aperture radar, Radar echoes, Image processing, Antarctica—Weddell Sea
Coregistered ERS-1 SAR and scatterometer data are presented for the Weddell Sea. Calibrated image backscatter statistics are extracted from data acquired in regions where surface measurements were made during two extensive international Weddell Sea experiments in 1992. Changes in summer ice-surface conditions due to

temperature and wind are shown to have a large impact on observed microwave backscatter values. Winter calibrated backscatter distributions are also investigated as a way of describing ice thickness conditions in different locations during winter. Coregistered SAR and EScat data over a manned drifting ice station are used to illustrate the seasonal signature changes occurring during the fall freeze-up transition. Combinations of Weddell Sea SAR and scatterometer data are shown to be extremely powerful tools for monitoring both sea-ice dynamics and the thermodynamic changes which accompany seasonal transitions in the southern ocean. (Auth.)

49-1867

Model for estimating surface roughness of level and ridged sea ice using ERS-1 SAR.

Carlström, A., Ulander, L.M.H., Håkansson, B., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.168-170, 7 refs.

Sea ice, Ice surveys, Surface roughness, Pressure ridges, Spaceborne photography, Synthetic aperture radar, Backscattering, Data processing, Mathematical models

49-1868

Remote sensing through cirrus clouds: visual and sub-visual.

Shanks, J.G., Lynch, D.K., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.208-210, 33 refs.

Cloud cover, Cloud physics, Remote sensing, Surface temperature, Light scattering, Ice crystal optics, Specular reflection, Countermeasures

49-1869

Rainrate estimation in the presence of hail using S-band specific differential phase.

Aydin, K., Bringi, V.N., Liu, L., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.361-362, 6 refs.

Precipitation (meteorology), Rain, Detection, Remote sensing, Radar echoes, Hail prevention

49-1870

K-band model computations of propagation effects in precipitation.

Vivekanandan, J., Turk, J., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.363-365, 4 refs.

Precipitation (meteorology), Remote sensing, Radar echoes, Classifications, Backscattering, Polarization (waves), Falling snow, Snow optics

49-1871

Melting layer observations with radar and aircraft.

Hagen, M., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.372-374, 7 refs.

Precipitation (meteorology), Remote sensing, Falling snow, Snow melting, Ice detection, Radar echoes, Backscattering

49-1872

Observations of a MCS with a dual-polarization radar.

Ryzhkov, A.V., Zrnic, D.S., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.375-377, 5 refs.

Precipitation (meteorology), Remote sensing, Radar echoes, Polarization (waves), Hail, Ice detection, Ice melting

49-1873

95 GHz airborne radar for high resolution polarimetric cloud measurements.

Pazmany, A.L., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.424-426, 3 refs.

Cloud cover, Cloud physics, Airborne radar, Radar echoes, Imaging, Ice detection, Ice crystal optics, Ice crystal size

49-1874

Laser propagation in saltwater ice.

Longacre, J.R., Landry, M.A., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.485-487, 4 refs.

Sea ice, Remote sensing, Optical properties, Ice optics, Lasers, Light transmission, Wave propagation, Backscattering, Temperature effects

49-1875

Optical and microwave response to thermally dynamic saline ice sheets.

Tanis, F.J., Onstott, R.G., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.488-490, 1 ref.

Sea ice, Ice optics, Ice growth, Backscattering, Microwaves, Transmissivity, Surface roughness, Temperature effects

49-1876

Sea ice characterization with a millimeter wave scatterometer.

Isham, J.D., Swift, C.T., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.491-492.

Sea ice, Ice optics, Surface properties, Radar echoes, Polarization (waves), Scattering, Surface roughness, Ice growth, Correlation

49-1877

Microwave scattering from saline ice using plane wave illumination.

Jezek, K.C., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.493-495, 2 refs.

Sea ice, Electromagnetic properties, Radar echoes, Microwaves, Antennas, Scattering, Snow cover effect, Performance

49-1878

Feature matching from SAR arctic data using neural networks.

Silveira, P.E., Van Dyne, M., Tsatsoulis, C., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.496-498, 7 refs.

Sea ice, Ice floes, Classifications, Radar tracking, Spaceborne photography, Synthetic aperture radar, Correlation, Image processing, Neural networks, Arctic Ocean

49-1879

Examination of the radar backscatter of sea ice in the East Siberian and Chukchi Seas.

Gineris, D.J., Fetterer, F.M., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.499-502, 4 refs.

Sea ice distribution, Spaceborne photography, Synthetic aperture radar, Backscattering, Ice conditions, Classifications, Image processing, Statistical analysis, Chukchi Sea, East Siberian Sea

49-1880

Automatic synthetic aperture radar information extraction algorithms for sea ice applications.

Ramsay, B.R., Hirose, T., Heacock, T., Walton, A., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.505-507, 7 refs.

Sea ice, Drift, Radar tracking, Spaceborne photography, Synthetic aperture radar, Classifications, Image processing, Data processing

49-1881

Detection of volume scattering effects in beamwidth limited altimetry data.

Newkirk, M.H., Brown, G.S., Vandemark, D.C., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.532-534, 9 refs.

Remote sensing, Geophysical surveys, Radar echoes, Ice sheets, Height finding, Scattering, Snow cover effect, Mathematical models

49-1882

Monte Carlo simulations of the extinction rate of densely packed spheres with clustered and non-clustered geometries.

Zurk, L.M., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.535-537, 8 refs.

Snow physics, Wave propagation, Scattering, Attenuation, Electromagnetic properties, Spheres, Simulation, Fractals, Mathematical models

49-1883

Polarimetric backscattering from thin saline ice related to ice physical and morphological characteristics.

Nghiem, S.V., et al, MP 3546, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.541-543, 8 refs.

Sea ice, Ice physics, Physical properties, Electromagnetic properties, Wave propagation, Attenuation, Backscattering, Surface roughness, Mathematical models

A model for polarimetric backscattering from thin saline ice, including volume and surface scattering mechanisms, is used to relate ice physical and morphological characteristics to the backscattering signatures obtained under controlled laboratory conditions. The model is based on the analytic wave theory and accounts for ellipsoidal brine inclusions, *c*-axis orientations, rough interfaces, vertical anisotropy, and permittivity tensor determined with brine volume governed by thermodynamic phase equations during the process of ice growth. A brine or slush cover layer is modelled in a layered configuration as a lossy layer with large permittivity magnitude due to the high salinity. The contribution to backscattering from rough interfaces is included with consideration of wave attenuation and phase difference effect in the anisotropic ice media.

49-1884

Fully polarimetric measurements of robotically fabricated dense media targets.

Porco, R.L., Bredow, J.W., Fung, A.K., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.544-546, 10 refs.

Ice physics, Synthetic materials, Composite materials, Artificial ice, Electromagnetic properties, Scattering, Polarization (waves), Simulation

49-1885

Radiobrightness signatures of energy balance processes: melt/freeze cycles in snow and prairie grass covered ground.

Galantowicz, J.F., England, A.W., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.596-598, 12 refs.

Soil physics, Radiometry, Surface temperature, Heat balance, Brightness, Insolation, Freeze thaw cycles, Snow cover effect, Mathematical models

49-1886

Measurements of microwave emission from new and young saline ice during the 1993 CRREL pond experiment.

Grenfell, T.C., Wensnahan, M.R., Winebrenner, D.P., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.605-607, 2 refs.

Sea ice, Young ice, Ice growth, Surface roughness, Radiometry, Electromagnetic properties, Brightness, Ice cover effect, Simulation

49-1887

Experimental study of relative contributions from surface and volume scattering mechanisms in saline ice.

Bredow, J.W., et al, MP 3547, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.608-610, 2 refs.

Sea ice, Ice optics, Electromagnetic properties, Radar echoes, Scattering, Surface roughness, Albedo, Simulation, Mathematical models

A randomly rough surface with Gaussian height distribution and a Gaussian correlation function was manufactured as a good conducting mold to generate a thin ice layer with the same surface geometry. This ice layer was superimposed on a thick smooth saline ice with known salinity property to form a saline ice medium with a known air-ice roughness characteristic. Multifrequency radar backscattering measurements were taken at C through X bands on the mold itself, and at X through Ku bands on the smooth saline ice medium before and after adding the rough ice boundary. Measurements of the mold were made to establish a reference for scattering. The objective of the ice measurements is to establish the contribution from surface roughness alone from the smooth saline ice, before and after adding roughness, so that a clear understanding is achieved regarding the roles of surface and volume scattering and how these two mechanisms combine to total scattering from an inhomogeneous medium with irregular boundary. Results indicate that surface scattering dominates at small angles of incidence and its range of dominance decreases with increase in frequency. This happens because the increase in volume scattering due to larger albedos exceeds the increase in surface scattering as frequency increases.

49-1888

Polarimetric backscattering signatures from thin saline ice under controlled laboratory conditions.

Nghiem, S.V., et al, MP 3548, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.611-613, 3 refs.

Sea ice, Young ice, Electromagnetic properties, Ice cover thickness, Remote sensing, Microwaves, Backscattering, Polarization (waves), Simulation

An experiment was conducted to measure polarimetric backscattering signatures from thin ice at the U.S. Army Cold Regions Research and Engineering Laboratory. The purpose of the experiment is to provide data for understanding scattering mechanisms in sea ice in order to develop models relating polarimetric signatures to physical, morphological, and electromagnetic properties of sea ice. Saline ice was grown in an indoor pit with the air temperature kept about -20 C to simulate the cold arctic condition. During ice growth, a C-band polarimetric scatterometer was used to acquire backscattering matrices as functions of incident angles for ice thicknesses up to 12 cm. Also investigated were polarimetric signatures of thin ice under various modified conditions including frost flower, ice warming, surface flooding, and slush layer. Ice characterization parameters and samples were collected to relate ice properties to the microwave polarimetric signatures. (Auth. mod.)

49-1889

Microwave study of the formation of brine layers on homogeneous saline ice sheets.

Onstott, R.G., Madden, M.P., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.614-616, 3 refs.

Sea ice, Brines, Ice water interface, Electromagnetic properties, Remote sensing, Microwaves, Backscattering, Surface roughness, Models

49-1890

Modeling interpretation of scattering from snow-covered sea ice.

Fung, A.K., et al, MP 3549, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.617-619, 3 refs.

Sea ice, Remote sensing, Radar echoes, Scattering, Polarization (waves), Surface roughness, Albedo, Snow cover effect, Mathematical models

Radar scattering measurements of saline ice at 5.3 and 13.4 GHz were collected during the '90 and '92 winter seasons at the U.S. Army Cold Regions Research and Engineering Laboratory. Both like- and cross-polarizations were obtained from saline ice with and without snow cover. Measurements were examined with a radiative transfer model applied to inhomogeneous layers with densely populated discrete scatterers. It is found that bare saline ice has a low albedo and hence its like-polarized backscattering is dominated by the irregular air-ice interface over 10 to 50 degs. For cross-polarized scattering, volume scattering effect is also small compared with surface scattering. When there is snow cover, there is a general increase in scattering along nonspecular directions. This is attributed to the brine wicking effect which causes a higher concentration of brine along the interface region and a possible roughening of the snow-ice interface.

49-1891

Forward and inverse signature modeling for congelation ice.

Winebrenner, D.P., Sylvester, J., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.620-622, 5 refs.

Sea ice, Young ice, Ice cover thickness, Radar echoes, Backscattering, Reflectivity, Polarization (waves), Mathematical models

49-1892

Radiative transfer theory for remote sensing of sea ice.

Ewe, H.T., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.623-625, 6 refs.

Sea ice, Remote sensing, Scattering, Radiation balance, Brightness, Layers, Surface roughness, Mathematical models, Theories

49-1893

Inversion algorithms for remote sensing of sea ice.

Veysoglu, M.E., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.1, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.626-628, 3 refs.

Sea ice, Remote sensing, Ice growth, Ice cover thickness, Radiation balance, Electromagnetic properties, Thermodynamic properties, Mathematical models, Ice models

49-1894

Studies of radiatively important clouds with 8-millimeter-wavelength Doppler radar.

Kropfli, R.A., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.657-659, 11 refs.

Clouds (meteorology), Cloud physics, Physical properties, Remote sensing, Radar echoes, Ice crystal size, Ice crystal optics

49-1895

Studies on passive remote sensing of vapor, liquid, and ice water paths.

Li, L., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.666-668, 8 refs.

Clouds (meteorology), Cloud physics, Remote sensing, Radiometry, Ice detection, Scattering, Particle size distribution, Water vapor, Supercooling, Models

49-1896

Millimeter wave scattering from ice crystal distributions.

Aydin, K., Tang, C., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.669-671, 8 refs.

Clouds (meteorology), Remote sensing, Radar echoes, Cloud physics, Scattering, Ice detection, Particle size distribution, Ice crystal structure, Orientation, Ice crystal optics

49-1897

CO_2 lidar: a somewhat different view of clouds.

Eberhard, W.L., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.929-931, 8 refs.

Clouds (meteorology), Remote sensing, Lidar, Infrared radiation, Cloud physics, Backscattering, Ice crystal optics, Ice detection

49-1898

Analysis of surface-based passive microwave observations during LEADEX 1992.

Grenfell, T.C., Perovich, D.K., MP 3550, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1005-1007, 5 refs.

Sea ice distribution, Ice openings, Remote sensing, Radiometry, Microwaves, Brightness, Young ice, Ice growth, Frazil ice, Polarization (waves)

The concentration and thickness of new and young sea ice are of interest in understanding the heat and mass balance of the polar oceans. Heat and salt exchange processes in thin ice areas are one to two orders of magnitude more vigorous than in areas of thick first-year (FY) and multiyear ice. A small amount of new ice production (1-5%) can therefore have a substantial effect on the regional energy balance. Due to the logistical difficulties in observing thin ice in the polar regions, most of the information on the development of passive microwave signatures of thin sea ice has been obtained from experiments on ice grown in a pond at the Cold Regions Research and Engineering Laboratory in Hanover, NH. An experiment dedicated to studying the properties of sea ice growing in Arctic leads (LEADEX '92) was carried out during Mar. and Apr. 1992 in the southern Beaufort Sea about 160 km north of Prudhoe Bay, AK. The authors participated in this effort in order to obtain passive microwave observations of thin sea ice growing under natural conditions.

49-1899

Optical properties of multiyear and first year sea ice.

Tanis, F.J., Onstott, R.G., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1009-1011, 4 refs.

Sea ice, Remote sensing, Optical properties, Lasers, Wave propagation, Scattering, Attenuation, Snow cover effect, Albedo

49-1900

Lead retrieval using visible and thermal AVHRR imagery: testing theoretical atmospheric and geometric effects with LEADEX data.

Key, J., Stone, R., Maslanik, J.A., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1012-1014, 4 refs.

Sea ice distribution, Ice openings, Spaceborne photography, Sensor mapping, Radiometry, Detection, Brightness, Upwelling, Albedo

49-1901

Satellite remote sensing of the Beaufort Sea during LEADEX '92.

Shuchman, R.A., Onstott, R.G., Fett, R.W., Wackerman, C.C., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1015-1017.

Sea ice distribution, Ice surveys, Synthetic aperture radar, Spaceborne photography, Ice openings, Ice growth, Detection, Beaufort Sea

49-1902

Estimating high latitude radiative fluxes from satellite data: problems and successes.

Key, J., Stone, R., Rehder, M., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1018-1020, 11 refs.

Polar atmospheres, Optical properties, Radiation balance, Remote sensing, Cloud cover, Radiometry, Ice cover effect, Beaufort Sea

49-1903

Use of time series SAR data to resolve ice type ambiguities in newly-opened leads.

Kwok, R., Cunningham, G.F., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1024-1026, 8 refs.

Sea ice distribution, Ice openings, Ice growth, Ice detection, Spaceborne photography, Synthetic aperture radar, Classifications, Backscattering

49-1904

Extracting seasonal parameters of sea ice morphology from SAR imagery: size distributions of first-year ice.

Daida, J.M., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1027-1029, 9 refs.

Sea ice distribution, Ice openings, Ice surveys, Spaceborne photography, Synthetic aperture radar, Image processing, Statistical analysis, Seasonal variations, Fractals

49-1905

UARS Microwave Limb Sounder observations of upper atmosphere ozone and chlorine monoxide.

Flower, D.A., Froidevaux, L., Jarnot, R.F., Read, W.G., Waters, J.W., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1115-1117, 8 refs.

Polar atmospheres, Stratosphere, Atmospheric attenuation, Air pollution, Remote sensing, Sounding, Microwaves, Ozone, Chemical properties

Upper Atmospheric Research Satellite Microwave Limb Sounder (UARS MLS) observations of stratospheric ozone and chlorine monoxide are described. Enhanced concentrations of ClO, the predominant form of reactive chlorine responsible for ozone depletion, are seen within both the northern and southern winter polar vortices. In the Southern Hemisphere, this leads directly to the development of the annual antarctic ozone hole. While ozone depletion is also observed in the north, it is less severe and there is considerable interannual variability. (Auth. mod.)

49-1906

Operational use of satellite data for sea ice analysis at the U.S. and Canadian National Ice Centers.

Bertoia, C., Carrieres, T., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1228-1230, 3 refs.

Sea ice distribution, Ice detection, Ice navigation, Remote sensing, Ice surveys, Telecommunication, Spaceborne photography, Spacecraft, International cooperation

49-1907

Operational use of SSM/I ice concentration in the initialization of a coupled ice-ocean model.

Posey, P.G., Preller, R.H., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1231-1233, 11 refs.

Sea ice distribution, Ice forecasting, Spaceborne photography, Radiometry, Ice models, Data processing

49-1908

Ice edge detection and ice/water classification utilizing the ERS-1 and TOPEX altimeters.

Coulter, R.E., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.2, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1234-1236, 4 refs.

Sea ice distribution, Ice edge, Detection, Sensor mapping, Radar echoes, Classifications, Spaceborne photography, Data processing, Resolution

49-1909

Capability of radar and microwave radiometer to classify snow types in forested areas.

Koskinen, J., Kurvonen, L., Jääskeläinen, V., Hallikainen, M., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1283-1286, 5 refs.

Snow cover distribution, Snow surveys, Sensor mapping, Radiometry, Spaceborne photography, Synthetic aperture radar, Classifications, Correlation, Vegetation factors

49-1910

Classification of Baltic Sea ice with airborne microwave radiometer.

Kurvonen, L., Toikka, M., Hallikainen, M., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1287-1290, 5 refs.

Sea ice distribution, Ice conditions, Sensor mapping, Remote sensing, Helicopters, Radiometry, Brightness, Classifications, Snow cover effect, Baltic Sea

49-1911

Retrieval of snow and sea ice parameters from SSM/I data.

Grandell, J., Hallikainen, M., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1291-1293, 6 refs.

Spaceborne photography, Sensor mapping, Snow surveys, Sea ice distribution, Radiometry, Snow water equivalent, Image processing

49-1912

Backscattering from sea ice with vertical structural variation: a model analysis.

Tjuatja, S., Fung, A.K., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1294-1296, 8 refs.

Sea ice, Ice models, Ice physics, Subsurface structures, Salinity, Remote sensing, Backscattering, Microwaves, Electromagnetic properties

49-1913

Influence of layering and grain size on microwave emission from polar firn.

West, R.D., Winebrenner, D.P., Tsang, L., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1297-1299, 5 refs.

Ice sheets, Remote sensing, Microwaves, Snow optics, Firn stratification, Snow density, Grain size, Particle size distribution, Scattering, Models

49-1914

Sea-ice velocity fields estimation on Ross Sea AVHRR images.

Moctezuma-Flores, M., Maitre, H., Parmiggiani, F., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1300-1302, 12 refs.

Sea ice distribution, Drift, Ice detection, Spaceborne photography, Radiometry, Sensor mapping, Image processing, Classifications, Resolution, Antarctica—Ross Sea

AVHRR (Advanced Very High Resolution Radiometry) imagery of the Ross Sea in Dec. 1990 has been analyzed to obtain information about the geophysical processes acting during the melting season. A complete methodology is proposed for automatic tracking of sea-ice in daylight AVHRR data. Previous tracking algorithms have been able to retrieve sea-ice motion under limited atmospheric conditions; cloud-free data are normally required. In this study weaker hypotheses are introduced in order to remain under normal circumstances. Two aspects are outlined: the use of partially cloudy monocular images and the estimation of ice pack trajectories along an image sequence. First, a classification technique is applied for the discrimination of clouds over the sea and for the detection of snow-ice regions. Then an optimal matching filter is used for the sea-ice motion estimation. The final derived vector field is homogeneous and shows the ice pack motion over three days of image data. (Auth. mod.)

49-1915

Intercomparison of observed and simulated ice motion for a one year time series.

Fowler, C., Maslanik, J.A., Emery, W., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1303-1305, 4 refs.

Sea ice distribution, Drift, Ice models, Sensors, Spaceborne photography, Radiometry, Simulation, Correlation, Image processing, Seasonal variations, Beaufort Sea

49-1916

Assimilating remotely-sensed data into a dynamic-thermodynamic sea ice model.

Maslanik, J.A., Maybee, H., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1306-1308, 8 refs.

Sea ice distribution, Ice growth, Remote sensing, Sensor mapping, Ice models, Drift, Velocity, Thermodynamics, Arctic Ocean

49-1917

Application of neural networks for identification of sea ice coverage and movements from satellite imagery.

Rau, Y.C., Comiso, J.C., Lure, F.Y.M., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1407-1409, 9 refs.

Sea ice distribution, Ice conditions, Drift, Classifications, Spaceborne photography, Radiometry, Image processing, Data processing, Neural networks

49-1918

Alaska SAR facility: an introduction.

Wales, C.A., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1491-1493.

Remote sensing, Research projects, Geophysical surveys, Sea ice distribution, Ice surveys, Telecommunication, Data processing, Spaceborne photography, Synthetic aperture radar, United States—Alaska—Fairbanks

49-1919

SAR instrument for global monitoring of land surfaces and polar ice.

Lin, C.C., Mancini, P.L., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1525-1528, 8 refs.

Geophysical surveys, Remote sensing, Sensor mapping, Synthetic aperture radar, Design criteria, Ice surveys, Classifications, Sea ice distribution, Glacier thickness

49-1920

Model of complex dielectric constant of wet and frozen soil in the 1-40 GHz frequency range.

Tikhonov, V.V., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1576-1578, 9 refs.

Frozen ground physics, Remote sensing, Radiometry, Microwaves, Dielectric properties, Mathematical models

49-1921

mm-wave spectroscopy of stratospheric trace gases at the South Pole over an 11-month cycle: O_3, N_2O, HNO_3, NO_2, and ClO.

De Zafra, R.L., Trimble, C., Reeves, J.M., Cheng, D., Shindell, D.T., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1678-1680, 9 refs.

Polar atmospheres, Stratosphere, Remote sensing, Atmospheric composition, Atmospheric density, Gases, Ozone, Chemical properties, Spectroscopy, Polar stratospheric clouds, Antarctica—Amundsen-Scott Station

A ground-based, cryogenically cooled tunable heterodyne spectrometer operating near 275 GHz (1.1 mm) was employed to make frequent quantitative measurements of various trace gases at Amundsen-Scott Station over an 11 month period starting in Feb. 1993. The detector is a high frequency Schottky diode cooled to 20 K. Here is presented an overview of the data collected by this system for O_3, N_2O, NO_2, HNO_3, and ClO in the polar vortex. Vertical profiles of the chosen trace gases are affected variously by gas-phase chemistry, heterogeneous chemistry on particle surfaces, condensation, photochemistry, and transport. A unique record has been obtained from which the dynamical development of the antarctic winter vortex, the extent and influence of downward transport in the mesosphere and stratosphere, the timing of polar stratospheric cloud formation, and the onset and duration of ozone destruction by chlorine photochemistry can all be obtained. (Auth. mod.)

49-1922

Accuracy of profile retrievals from mm-wave spectra of ClO and N_2O.

Emmons, L.K., De Zafra, R.L., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1684-1686, 5 refs.

Polar atmospheres, Profiles, Remote sensing, Spectroscopy, Spectra, Stratosphere, Chemical properties, Gases, Data processing, Accuracy

The accuracy of a Chahine-Twomey retrieval algorithm, acting on pressure-broadened mm-wave rotational spectra measured with ground-based equipment, is explored for two radically different profiles. The first represents a two-layered antarctic ClO distribution having a maximum mixing ratio of ca. 1.5 ppbv and no tropospheric component, and the second represents a typical polar N_2O profile, with a tropospheric mixing ratio of 300 ppbv dropping rapidly in the low- to mid-stratosphere. The uncertainties or errors due to intrinsic retrieval limits, practical levels of random noise, uncertainties in input parameters (atmospheric temperature and pressure profiles, pressure broadening), and in calibration of instrument sensitivity are all explored; an overall error budget is established as a function of altitude. (Auth. mod.)

49-1923

Millimeter-wave measurements at the arctic NDSC-Station Ny-Ålesund in the winters 1992/1993 and 1993/1994.

Schwaab, G.W., Klein, U., Künzi, K., Raffalski, U., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1690-1692, 7 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Remote sensing, Radiometry, Ozone, Spectra, Norway—Spitsbergen

49-1924

Ice lead orientation characteristics in the winter Beaufort Sea.

Cunningham, G.F., Kwok, R., Banfield, J., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1747-1749, 7 refs.

Sea ice distribution, Ice openings, Ice deformation, Detection, Orientation, Remote sensing, Spaceborne photography, Synthetic aperture radar, Image processing, Beaufort Sea

49-1925

Determination of ice age: a proposed scheme for a RADARSAT sea ice geophysical processor system.

Kwok, R., Rothrock, D.A., Cunningham, G.F., Stern, H., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1750-1752, 7 refs.

Sea ice distribution, Ice cover thickness, Spaceborne photography, Drift, Radar tracking, Classifications, Synthetic aperture radar, Image processing

49-1926

Utilizing the dynamic behavior of sea ice for determining ice thickness distributions in SAR imagery.

Haverkamp, D., Tsatsoulis, C., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1753-1755, 6 refs.

Sea ice distribution, Ice cover thickness, Ice conditions, Classifications, Spaceborne photography, Synthetic aperture radar, Image processing, Resolution, Correlation

49-1927

SAR derived sea ice thickness during ICEX'92.

Malinas, N.P., Shuchman, R.A., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1756-1758, 4 refs.

Sea ice, Ice cover thickness, Airborne radar, Synthetic aperture radar, Backscattering, Acoustic measurement, Image processing, Correlation, Arctic Ocean

49-1928

Using ERS-1 SAR data to monitor the state of the Arctic Ocean sea ice surface between spring and autumn, 1992.

Schwartz, K., Jeffries, M.O., Li, S., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1759-1762, 10 refs.

Sea ice, Ice conditions, Ice surface, Spaceborne photography, Synthetic aperture radar, Backscattering, Image processing, Seasonal freeze thaw, Arctic Ocean

49-1929

Height and large-scale height roughness information from CCRS interferometric SAR data of arctic sea ice.

van der Kooij, M.W.A., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1764-1766, 9 refs.

Sea ice, Surface roughness, Ice conditions, Ice detection, Airborne radar, Synthetic aperture radar, Image processing, Performance, Arctic Ocean

49-1930

Wave evolution in the marginal ice zone using ERS-1 SAR.

Liu, A.K., Peng, C.Y., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1767-1769, 4 refs.

Sea ice, Pack ice, Ocean waves, Ice water interface, Wave propagation, Attenuation, Spaceborne photography, Synthetic aperture radar, Backscattering

49-1931

Nonlinear statistical precipitation retrievals using simulated passive microwave imagery.

Skofronick-Jackson, G.M., Gasiewski, A.J., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1786-1788, 8 refs.

Precipitation (meteorology), Remote sensing, Cloud physics, Ice optics, Ice detection, Radiometry, Image processing, Statistical analysis, Scattering

49-1932

P-band radar mapping of forest biomass in boreal forests of interior Alaska.

Rignot, E.J.M., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1853-1855, 15 refs.

Forest canopy, Biomass, Classifications, Sensor mapping, Subarctic landscapes, Vegetation patterns, Airborne radar, Backscattering, Topographic effects, United States—Alaska

49-1933

Ecological approach to radar mapping of biomass in interior Alaska boreal forests.

Williams, C.L., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.3, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1856-1859, 19 refs.

Forest ecosystems, Plant ecology, Subarctic landscapes, Biomass, Classifications, Radar photography, Sensor mapping, Vegetation patterns, Models, United States—Alaska

49-1934

Inverse technique for obtaining cirrus cloud microphysical parameters using combined radar and lidar backscatter measurements.

Intrieri, J.M., Eberhard, W.L., Feingold, G., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1904-1906, 7 refs.

Cloud physics, Remote sensing, Lidar, Radar echoes, Backscattering, Ice crystal optics, Mathematical models

49-1935

Measurement and modeling of the bidirectional reflectance of snow.

Nolin, A.W., Steffen, K., Dozier, J., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1919-1921, 6 refs.

Snow cover structure, Microstructure, Remote sensing, Snow optics, Radiometry, Albedo, Backscattering, Anisotropy, Mathematical models

49-1936

Active microwave measurements of snow cover—progress in polarimetric SAR.

Shi, J.C., Dozier, J., Rott, H., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1922-1924, 17 refs.

Snow cover distribution, Snow hydrology, Wet snow, Spaceborne photography, Synthetic aperture radar, Microwaves, Sensor mapping

49-1937

Review of modeling for millimeter wave remote sensing of snow.
O'Neill, K., MP 3551, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1925-1928, 37 refs.
Snow physics, Snow cover structure, Microstructure, Remote sensing, Radar echoes, Surface roughness, Scattering, Models
Millimeter wave sensing presents new problems and prospects in relation to snow. Recognition of the importance and measurement of the particulars of snowpack microstructure challenges traditional modeling approaches. Simulation methods are examined in relation to the demands of millimeter wave sensing. Distinctive features and critical issues include treatment of near-surface microstructure, medium anisotropy and density, polarization effects, moisture content, and multi-scale surface roughness.

49-1938

Effect of snow stereology on millimeter wave extinction.
Koh, G., Davis, R.E., MP 3552, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1929-1931, 7 refs.
Snow physics, Snow density, Microstructure, Remote sensing, Radar echoes, Scattering, Attenuation, Radiation absorption, Simulation
A network analyzer based system was used to measure the extinction coefficient of various snow types at 26.5 to 40 GHz under controlled laboratory conditions. The snow samples were prepared using sieved snow so that the physical properties of the snow could be extensively characterized. By using sieved snow, it was possible to vary and to measure the size distribution of the disaggregated ice particles making up the snow sample. In addition, snow stereology measurements were made to obtain the microstructural properties of the snow samples. These results were then used to identify the key snow pack parameters that are required to determine the extinction behavior of a snow pack at the radar frequencies.

49-1939

Detailed study of the backscatter characteristics of snowcover measured at 35, 95 and 225 GHz.
Chang, P., Mead, J.B., McIntosh, R.E., Davis, R., Boyne, H., MP 3553, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1932-1934, 9 refs.
Snow cover structure, Classifications, Remote sensing, Radar echoes, Backscattering, Microstructure, Anisotropy, Metamorphism (snow)
This paper presents 35, 95 and 225 GHz polarimetric backscatter data from snowcover. It compares measured backscatter data with detailed *in situ* data measurements of the snowcover including microstructural anisotropies within the snowpack. Observations of radar backscatter at 35, 95 and 225 GHz were made during melt-freeze cycles, and measurable differences in the normalized radar cross-section between older metamorphic snow and fresh low density snow were observed. Further polarimetric measurements show that the average phase difference between the co-polarized terms of the scattering matrix is nonzero for certain snow types. These measurements are explained by the effects that the microstructure of the snow has on propagation within the snowpack. A simple vector radiative transfer model that includes the propagation effects is seen to predict the Mueller matrix for dry snowcover reasonably well.

49-1940

Mapping the diagenetic zone transitions of Greenland using the AAFE airborne radar altimeter.
Ferraro, E.J., Swift, C.T., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1935-1937, 6 refs.
Ice sheets, Airborne radar, Sensor mapping, Radar echoes, Height finding, Surface structure, Scattering, Diagenesis, Greenland

49-1941

Snow cover classification using millimeter-wave radar imagery.
Narayanan, R.M., Jackson, S.R., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1938-1941, 8 refs.
Snow cover structure, Classifications, Snow surveys, Airborne radar, Radar photography, Backscattering, Image processing, Mathematical models

49-1942

Snow index for the Landsat Thematic Mapper and Moderate Resolution Imaging Spectroradiometer.
Riggs, G.A., Hall, D.K., Salomonson, V.V., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1942-1944, 12 refs.
Snow cover distribution, Sensor mapping, Radiometry, Reflectivity, LANDSAT, Spaceborne photography, Data processing, Resolution

49-1943

Monitoring land surfaces with combined DMSP-SSM/I and ERS-1 scatterometer data.
Hiltbrunner, D., Mätzler, C., Wiesmann, A., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1945-1947, 5 refs.
Geophysical surveys, Remote sensing, Surface temperature, Radiometry, Scattering, Brightness, Sensor mapping, Snow cover distribution, Classifications

49-1944

Progress in polar oceans research using ERS-1 data.
Carsey, F.D., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.1957-1958, 2 refs.
Oceanographic surveys, Sea ice distribution, Drift, Classifications, Spaceborne photography, Synthetic aperture radar, Antarctica—Weddell Sea
Data from ERS-1, especially from the Active Microwave Instrument Image Mode, or SAR, have been particularly useful in providing data on ice type and motion and oceanic mesoscale features. These data have been used in studies of ocean and ice circulation, climate processes, mesoscale processes near the ice edge, freshwater fluxes, and convection, and have also proved useful in support of operations in ice covered seas. (Auth. mod.)

49-1945

Microwave effective permittivity model of media of dielectric particles and applications to dry and wet snow.
Boiarskiĭ, D.A., Tikhonov, V.V., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2065-2067, 11 refs.
Remote sensing, Snow physics, Snow cover structure, Scattering, Attenuation, Dielectric properties, Microwaves, Mathematical models

49-1946

Two flow model of wet snow microwave emissivity.
Boiarskiĭ, D.A., Etkin, V.S., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2068-2070, 6 refs.
Snow hydrology, Remote sensing, Microwaves, Snow cover structure, Snow stratigraphy, Brightness, Radiometry, Wet snow, Mathematical models

49-1947

Close range 37 GHz passive microwave observations of snow on north and south facing slopes.
Pilant, D., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2071-2073, 6 refs.
Snow cover structure, Remote sensing, Radiometry, Microwaves, Brightness, Grain size, Solar radiation, Topographic effects

49-1948

Radar satellite snowmelt detection in the Canadian Rocky Mountains.
Maxfield, A.W., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2074-2077.
Snow surveys, Snow cover structure, Snowmelt, Detection, Spaceborne photography, Radar photography, Backscattering, Canada—Rocky Mountains

49-1949

Estimating snow particle size using TM band-4.
Shi, J.C., Dozier, J., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2078-2080, 12 refs.
Snow cover structure, Remote sensing, Sensor mapping, LANDSAT, Radiometry, Radiance, Grain size, Alpine landscapes

49-1950

Snowcover mapping with the Airborne Visible/Infrared Imaging Spectrometer.
Nolin, A.W., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2081-2083, 6 refs.
Snow cover distribution, Remote sensing, Sensor mapping, Grain size, Infrared spectroscopy, Aerial surveys, Image processing, Alpine landscapes, Radiometry

49-1951

Automatic system for operational snow-cover monitoring in the Norwegian mountain regions.
Solberg, R., Andersen, T., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2084-2086, 10 refs.
Snow cover distribution, Remote sensing, Sensor mapping, Mountains, Snow surveys, Image processing, Spaceborne photography, Norway

49-1952

Monitoring alpine snow cover variations using NOAA-AVHRR data.
Baumgartner, M.F., Apfl, G., Holzer, T., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2087-2089, 5 refs.
Snow hydrology, Snow surveys, Snowmelt, Runoff forecasting, Remote sensing, Spaceborne photography, Image processing, Alpine landscapes, Radiometry

49-1953

Experiences from real time runoff forecasts by snow cover remote sensing.
Seidel, K., Brüsch, W., Steinmeier, C., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2090-2093, 9 refs.
Electric power, Water supply, Snow surveys, Snow hydrology, Runoff forecasting, Remote sensing, Sensor mapping, Spaceborne photography, Accuracy

49-1954

Analysis of real infrared scenes acquired for SWOE JT&E.
Bleiweiss, M.P., Rollins, M., Chaapel, C., Berger, R., MP 3554, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2101-2105, 14 refs.
Remote sensing, Geophysical surveys, Terrain identification, Imaging, Image processing, Infrared photography, Radiometry
An ensemble of terrain images from forested and semiarid environments are analyzed in terms of first- and second-order textural statistics and Fourier and wavelet transform metrics. Such parameters are

sought in an effort to reduce the dimensionality of terrain image information to suitable levels of both generality and specificity. By developing a practical set of feature metrics, a real and generated scene can be compared critically in terms of scene elements rather than pixel-to-pixel error. This paper presents some of the results of such a validation process for the Smart Weapons Operability Enhancement Joint Test and Evaluation program. Statistical and transform-based techniques were applied to terrain images obtained at various times of day under a variety of weather conditions. Statistical analyses of scene radiance distributions and "clutter" content were performed both spatially and temporally. An emphasis on the spatial and temporal distinction between widely distributed terrain features (grass, dirt) and discrete features (trees, bushes) is made.

49-1955

Discrimination between young sea ice types from single look SAR image texture.

Collins, M.J., Livingstone, C.E., Raney, R.K., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2158-2161, 15 refs.

Sea ice distribution, Ice floes, Young ice, Classifications, Remote sensing, Aerial surveys, Synthetic aperture radar, Radar photography, Image processing, Mathematical models

49-1956

Reconstructing enhanced resolution images from spaceborne microwave sensors.

Daum, D.R., Long, D.G., Davis, W.B., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2231-2233, 6 refs.

Remote sensing, Geophysical surveys, Spaceborne photography, Radiometry, Microwaves, Image processing, Resolution, Ice sheets, Brightness, Greenland

49-1957

Comparison of enhanced resolution images of Greenland from the ERS-1 and Seasat scatterometers.

Early, D.S., Long, D.G., Drinkwater, M.R., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2382-2384, 4 refs.

Ice sheets, Remote sensing, Spaceborne photography, Resolution, Microwaves, Scattering, Image processing, Correlation, Radar echoes, Greenland

49-1958

Spatial texture in airSAR images of the Greenland ice sheet.

Lin, I.I., Rees, W.G., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2385-2387, 11 refs.

Ice sheets, Surface structure, Classifications, Aerial surveys, Radar photography, Synthetic aperture radar, Image processing, Greenland

49-1959

Study on glacier movement using satellite SAR and visible/near-IR imagery.

Takahashi, A., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2391-2393, 5 refs.

Ice sheets, Ice shelves, Glacier flow, Glacier tongues, Spaceborne photography, Synthetic aperture radar, LANDSAT, Radiometry, Antarctica—Shirase Glacier

The movement of Shirase glacier and Kaya glacier in Lützow-Holm Bay was analyzed using LANDSAT/TM, MSS, MOS-1/MESSR and ERS-1/SAR data. Through multi-temporal analysis, velocity of the Shirase glacier floating ice tongue is estimated to be 2.9 km/year for 1988-1989 and 2.6 km/year for 1989-1991. The ERS-1/SAR image was compared with MOS-1/MESSR near-IR images for Kaya glacier and sea ice. Floating ice tongue edges and fast ice in both images show clear differences, which suggests the importance of multi-sensor analysis for glacier study. (Auth. mod.)

49-1960

Surface elevation change of the Greenland ice sheet from an analysis of Seasat & Geosat altimeter data.

Davis, C.H., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2394-2397, 11 refs.

Ice sheets, Glacier thickness, Remote sensing, Radar echoes, Scattering, Height finding, Data processing, Correlation, Periodic variations, Greenland

49-1961

Determination of surface features on glaciers in Alaska from ERS-1 SAR observations.

Josberger, E.G., True, M.A., Shuchman, R.A., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2398-2400, 2 refs.

Glacier surveys, Glacier surfaces, Spaceborne photography, Synthetic aperture radar, Brightness, Topographic features, Surface roughness, Correlation, United States—Alaska—Columbia Glacier, United States—Alaska—Bering Glacier

49-1962

Development of a high resolution ice echo sounder for arctic ice sheet.

Suitz, T., Okamoto, K., Maeno, H., Uratsuka, S., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2401-2402.

Ice sheets, Ice structure, Subsurface structures, Remote sensing, Radio echo soundings, Electric equipment, Design, Specifications, Radar echoes

49-1963

Simulation study of a microwave radiometric temperature profiler for the antarctic atmosphere.

Basili, P., et al, International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2436-2438, 7 refs.

Polar atmospheres, Air temperature, Temperature measurement, Remote sensing, Profiles, Radiometry, Simulation, Antarctica—Dumont d'Urville Station

This paper describes a simulation study carried out by applying the radiative transfer equation to a database of radiosoundings released from the Dumont d'Urville Station, located in the proximity of the eastern coasts of Antarctica. This study was conducted for defining the specifications of the radiometric channels and for assessing an inversion algorithm for temperature profile retrieval, suitable for the foreseen operational mode of continuously working ground-based microwave radiometer observation of the antarctic atmosphere. (Auth. mod.)

49-1964

Theoretical sensitivity of ERS-1 SAR backscatter over forest.

Wegmüller, U., Holecz, F., Wang, Y., Kattenborn, G., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2477-2479, 23 refs.

Forest canopy, Biomass, Vegetation patterns, Remote sensing, Synthetic aperture radar, Backscattering, Soil freezing, Soil temperature, Freeze thaw cycles, Models

49-1965

Temporal variations in radar backscatter coefficients of vegetation and snow cover.

Nyström, A., Stjernman, A., Vivekanandan, J., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2483-2485, 11 refs.

Arctic landscapes, Vegetation patterns, Remote sensing, Synthetic aperture radar, Backscattering, Diurnal variations, Snow cover effect, Snow cover structure, Snow water equivalent

49-1966

Estimation of penetration depth in a random medium using frequency decorrelation of the backscattered field.

Nashashibi, A., Sarabandi, K., Ulaby, F.T., International Geoscience and Remote Sensing Symposium, Pasadena, CA, Aug. 8-12, 1994. Proceedings, Vol.4, Piscataway, NJ, Institute of Electrical and Electronics Engineers, Inc., 1994, p.2492-2493, 2 refs.

Remote sensing, Radar echoes, Penetration, Snow cover structure, Wet snow, Snow water equivalent, Backscattering, Data processing, Statistical analysis

49-1967

1994-1995 Northern Sea Route directory of icebreaking ships; reference for the Arctic and Antarctic transport and offshore industries.

Tunik, L., ed, New York, Backbone Publishing Company, 1994, 217p., Refs. p.212-217.

Icebreakers, Ships, Marine transportation, Oceanographic ships, Ice navigation, Northern Sea Route

This directory contains detailed information about Russian-built ships capable of navigation on the NSR (Northern Sea Route). A total of 699 ships (537 under the Russian flag) are listed. In addition to ice-related technical and ownership information, there are statistics, indexes, and some help on administrative and technical requirements to be met for navigation on the NSR. The ships listed here can also navigate other ice-infested arctic and antarctic waters. (Auth. mod.)

49-1968

Man's expansion into the littoral-offshore zone. [Ekspansiia cheloveka v pribrezhno-shel'fovuiu zonu]

Aĭbulatov, N.A., *Rossiĭskaia akademiia nauk. Vestnik,* Apr. 1994, 64(4), p.340-348, In Russian. 8 refs.

Environmental impact, Environmental protection, Ecology, Radioactive isotopes, Fallout, Littoral zone, Barents Sea, Russia—Kara Sea

49-1969

Summary report.

Antarctic Traverse Workshop, Washington, D.C, May 2-4, 1994, Melendy, R., ed, Blaisdell, G.L., ed, MP 3556, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1994, Var. p.

Traverses, Logistics, Route surveys, Snow vehicles, Tracked vehicles, Tractors, Crevasse detection, Antarctica

The main focus of this workshop was on heavy hauling oversnow for supply of inland stations rather than on short, light traverses for purely scientific purposes. The attendees were from Argentina, Australia, Canada, France, Germany, Italy, Norway, Russia, South Africa, Sweden, the United Kingdom, and the United States. There were no written proceedings. Most of the text consists of handouts and overhead slides. Topics of discussion include traverse experiences; route selection; crevasse detection; and equipment, in particular, caterpillar tractors, caterpillar trailers, and sleds.

49-1970

Magnitude and frequency of floods in Alaska and conterminous basins of Canada.

Jones, S.H., Fahl, C.B., *U.S. Geological Survey. Water-resources investigations report,* 1994, No.93-4179, 122p. + 2 maps in separate pocket, Refs. p.34-37.

Flood forecasting, River basins, Snowmelt, Stream flow, Runoff forecasting, Statistical analysis, Mathematical models, United States—Alaska, Canada—Yukon Territory

49-1971

Construction and characterization of a spray-ice pad, Tuktoyaktuk, Northwest Territories.

Instanes, A., Sego, D.C., Addo, K., *Canadian geotechnical journal,* Oct. 1994, 31(5), p.703-713, With French summary. 22 refs.

Ice (construction material), Ice islands, Spray freezing, Sampling, Mechanical properties, Ice strength, Ice density, Mechanical tests, Elastic waves, Cold weather construction, Canada—Northwest Territories

49-1972
Avalanche Lake rock avalanche, Mackenzie Mountains, Northwest Territories, Canada: description, dating, and dynamics.
Evans, S.G., Hungr, O., Enegren, E.G., *Canadian geotechnical journal,* Oct. 1994, 31(5), p.749-768, With French summary. 35 refs.
Subarctic landscapes, Mass movements (geology), Landslides, Avalanche mechanics, Avalanche tracks, Rock streams, Rock properties, Geomorphology, Radioactive age determination, Canada—Northwest Territories—Mackenzie Mountains

49-1973
Ion dynamics of a freezing soil monitored *in situ* by time domain reflectometry.
Lundin, L.C., Johnsson, H., *Water resources research,* Dec. 1994, 30(12), p.3471-3478, 29 refs.
Soil freezing, Soil tests, Ion density (concentration), Frozen ground physics, Freeze thaw cycles, Soil water migration, Unfrozen water content, Phase transformations, Electrical resistivity, Electrical measurement, Thermodynamics

49-1974
Extension of Biot's theory of wave propagation to frozen porous media.
Leclaire, P., Cohen-Ténoudji, F., Aguirre-Puente, J., *Acoustical Society of America. Journal,* Dec. 1994, 96(6), p.3753-3768, 33 refs.
Porous materials, Acoustic measurement, Frozen liquids, Ice water interface, Unfrozen water content, Wave propagation, Elastic waves, Attenuation, Temperature effects, Thermodynamics, Mathematical models

49-1975
Impact of the ice phase and radiation on a midlatitude squall line system.
Chin, H.N.S., *Journal of the atmospheric sciences,* Nov. 15, 1994, 51(22), p.3320-3343, 69 refs.
Precipitation (meteorology), Cloud physics, Optical properties, Thermodynamic properties, Insolation, Radiation balance, Snowfall, Ice melting, Ice crystal optics, Mathematical models

49-1976
Geochemical changes in crude oil spilled from the *Exxon Valdez* supertanker into Prince William Sound, Alaska.
Hostettler, F.D., Kvenvolden, K.A., *Organic geochemistry,* 1994, 21(8-9), p.927-936, 39 refs.
Oil spills, Hydrocarbons, Crude oil, Degradation, Sampling, Geochemistry, Water pollution, Beaches, Environmental impact, United States—Alaska—Prince William Sound

49-1977
Effect of sea ice on the solar energy budget in the atmosphere-sea ice-ocean system: a model study.
Jin, Z.H., Stamnes, K.H., Weeks, W.F., Tsay, S.C., *Journal of geophysical research,* Dec. 15, 1994, 99(C12), p.25,281-25,294, 43 refs.
Climatology, Sea ice, Air ice water interaction, Cloud cover, Optical properties, Radiation balance, Solar radiation, Radiation absorption, Ice cover effect, Light scattering, Mathematical models

49-1978
Probable role of stratospheric 'ice' clouds: heterogeneous chemistry of the 'ozone hole'.
Molina, M.J., Chemistry for the 21st Century Monograph. Chemistry of the atmosphere: its impact on global change, London, International Union of Pure and Applied Chemistry, 1994, p.27-38, 43 refs.
Cloud physics, Aerosols, Polar stratospheric clouds, Chemical properties, Ice vapor interface, Vapor pressure, Phase transformations, Adsorption, Ozone
Chemical reactions occurring on the surfaces of polar stratospheric cloud (PSC) particles are now recognized to be an essential component of the chlorofluorocarbon (CFC)-induced polar ozone-depletion mechanism. The most important of these 'heterogeneous' reactions transforms the two most abundant inert reservoirs of chlorine (HCl and $ClONO_2$) into Cl_2, which photolyses readily to yield active chlorine. There are two important types of PSC: type I consists of nitric acid trihydrate (NAT) crystals, which form at temperatures several degrees above the frost point of water; type II consists of water-ice crystals. This paper considers some physical chemistry aspects of these heterogeneous reactions, focusing on two points: the nature of the interaction of HCl vapor with ice and NAT, and the nature of 'water-rich' and 'nitric acid-rich' NAT. (Auth. mod.)

49-1979
Lithological and structural effects on forms of glacial erosion: cirques and lake basins.
Evans, I.S., British Geomorphological Research Group Symposia Series. Rock weathering and landform evolution. Edited by D.A. Robinson et al, Chichester, John Wiley & Sons, 1994, p.455-472, 41 refs.
DLC QE570.R63
Glacial geology, Glacial erosion, Landforms, Bedrock, Geomorphology, Lithology, Geologic structures, Cirques

49-1980
Joint control in the formation of rock steps in the subglacial environment.
Rea, B.R., British Geomorphological Research Group Symposia Series. Rock weathering and landform evolution. Edited by D.A. Robinson et al, Chichester, John Wiley & Sons, 1994, p.473-486, 20 refs.
DLC QE570.R63
Glacial geology, Glacial erosion, Subglacial observations, Glacier beds, Bedrock, Rock properties, Landforms, Ice solid interface, Shear stress, Norway—Øksfjordjøkelen

49-1981
Observations of molecular ices.
Whittet, D.C.B., Graduate Series in Astronomy. Dust and chemistry in astronomy. Edited by T.J. Millar et al, London, Institute of Physics Publishing, 1993, p.9-35, Refs. p.32-35.
DLC QB791.D84
Extraterrestrial ice, Cosmic dust, Chemical composition, Ice detection, Remote sensing, Ice spectroscopy, Infrared spectroscopy, Radiation absorption, Spectra, Carbon dioxide

49-1982
Irradiation of molecular ices.
Pirronello, V., Graduate Series in Astronomy. Dust and chemistry in astronomy. Edited by T.J. Millar et al, London, Institute of Physics Publishing, 1993, p.297-329, Refs. p.325-329.
DLC QB791.D84
Extraterrestrial ice, Cosmic dust, Ice physics, Radiation absorption, Ionization, Phase transformations, Chemical composition, Molecular energy levels

49-1983
Modification of halocline source waters during freezing on the Beaufort Sea shelf: evidence from oxygen isotopes and dissolved nutrients.
Melling, H., Moore, R.M., *Continental shelf research,* Jan. 1995, 15(1), p.89-113, 37 refs.
Oceanography, Hydrography, Sampling, Ice growth, Ice cover effect, Ice water interface, Ventilation, Water temperature, Salinity, Isotope analysis, Beaufort Sea

49-1984
Problems in roadbeds on Far East railroads; Inter-university collected scientific papers. [Voprosy zemlianogo polotna na dorogakh Dal'nego Vostoka; Mezhvuzovskiĭ sbornik nauchnykh trudov]
Polevichenko, A.G., ed, Khabarovsk, Khabarovskiĭ institut inzhenerov zheleznodorozhnogo transporta, 1991, 110p., In Russian. For selected papers see 49-1985 through 49-1989.
Roadbeds, Embankments, Permafrost bases

49-1985
Variations in dynamic pressures in soils in the main area of the embankment in spring-summer periods. [Izmenenie dinamicheskikh napriazheniĭ v gruntakh osnovnoĭ ploshchadki nasypi v vesenneletniĭ periody]
Stoianovich, G.M., Pupatenko, V.V., Seredin, A.I., Voprosy zemlianogo polotna na dorogakh Dal'nego Vostoka; Mezhvuzovskiĭ sbornik nauchnykh trudov (Problems in roadbeds of Far East railroads; Inter-university collected scientific papers). Edited by A.G. Polevichenko, Khabarovsk, Khabarovskiĭ institut inzhenerov zheleznodorozhnogo transporta, 1991, p.8-14, In Russian.
Ground thawing, Active layer, Soil pressure, Embankments

49-1986
Results of *in situ* studies of the stability of an embankment with a heat-insulating layer on a thawing permafrost foundation. [Rezul'taty naturnykh nabliudeniĭ za ustoĭchivost'iu nasypi s teploizoliruiushchim pokrytiem na protaivaiushchem vechnomerzlom osnovanii]
Zhdanova, S.M., Burakova, L.S., Vasil'kova, L.V., Voprosy zemlianogo polotna na dorogakh Dal'nego Vostoka; Mezhvuzovskiĭ sbornik nauchnykh trudov (Problems in roadbeds of Far East railroads; Inter-university collected scientific papers). Edited by A.G. Polevichenko, Khabarovsk, Khabarovskiĭ institut inzhenerov zheleznodorozhnogo transporta, 1991, p.37-45, In Russian. 1 ref.
Embankments, Thermal insulation, Permafrost beneath roads, Permafrost bases, Roadbeds, Stability

49-1987
Effect of the embankment of a secondary track on the stability of the existing embankment with a talik zone in a permafrost base. [O vliianii prisypki vtorogo puti na ustoĭchivost' sushchestvuiushcheĭ nasypi so sformirovavsheĭsia talikovoĭ zonoĭ v osnovanii iz vechnomerzlykh gruntov]
Zhdanova, S.M., Vasil'kova, L.V., Burakova, L.S., Voprosy zemlianogo polotna na dorogakh Dal'nego Vostoka; Mezhvuzovskiĭ sbornik nauchnykh trudov (Problems in roadbeds of Far East railroads; Inter-university collected scientific papers). Edited by A.G. Polevichenko, Khabarovsk, Khabarovskiĭ institut inzhenerov zheleznodorozhnogo transporta, 1991, p.45-50, In Russian. 1 ref.
Embankments, Stability, Seasonal freeze thaw, Permafrost bases, Foundations, Taliks, Deformation, Ground thawing, Sediments

49-1988
On determining additional expenditures in the maintenance of embankments of secondary tracks on high-temperature permafrost. [K voprosu opredeleniia dopolnitel'nykh zatrat po ekspluatatsii nasypeĭ vtorykh puteĭ na vysokotemperaturnykh vechnomerzlykh gruntakh]
Derbas, V.A., Timofeev, G.I., *Acoustical Society of America. Journal,* Dec. 1994, 96(6), p.54-60, In Russian. 5 refs.
Embankments, Cost analysis, Permafrost bases

49-1989
Increasing efficiency in the construction of a roadbed on secondary tracks on permafrost. [Povyshenie effektivnosti sooruzheniia zemlianogo polotna vtorykh puteĭ na vechnomerzlykh gruntakh]
Timofeev, G.I., Voprosy zemlianogo polotna na dorogakh Dal'nego Vostoka; Mezhvuzovskiĭ sbornik nauchnykh trudov (Problems in roadbeds of Far East railroads; Inter-university collected scientific papers). Edited by A.G. Polevichenko, Khabarovsk, Khabarovskiĭ institut inzhenerov zheleznodorozhnogo transporta, 1991, p.94-102, In Russian. 1 ref.
Roadbeds, Permafrost beneath roads, Environmental impact, Construction

49-1990
GISP ice core record of volcanism since 7,000 B.C.
Fiedel, S.J., Southon, J.R., Brown, T.A., Zielinski, G.A., MP 3557, *Science,* Jan. 13, 1995, 267(5195), p.256-258, 23 refs.
Ice cores, Volcanoes, Geochronology, Greenland
Fiedel, Southon and Brown comment on Zielinski's paper which appeared in Science on May 13, 1994 and is identified in the CRREL Bibliography as 48-3941. Zielinski et al respond.

49-1991
Fast glacier flow over soft beds.
Clark, P.U., *Science,* Jan. 6, 1995, 267(5194), p.43-44, 15 refs.
Glacier beds, Glacier flow, Sediments, Antarctica—West Antarctica
The author provides a brief synthesis of recent and current research into the mechanisms which determine the flow characteristics of glaciers. The case for bed sediment deformation is considered, as is that of no sediment action but instead an increase in subglacial water pressure causing the glacier to rise above the bed. A third possibility for controlling flow mechanisms lies in localized bedrock knobs,

"sticky spots" that support high basal shear stress. Modelling a mixed bed of sticky spots, subglacial water pressure, and deforming sediments remains a problem.

49-1992

Flow mechanisms of glaciers on soft beds.

Iverson, N.R., Hanson, B., Hooke, R.L., Jansson, P., *Science*, Jan. 6, 1995, 267(5194), p.80-81, 20 refs.

Glacier flow, Glacier beds, Mechanical properties, Water pressure, Flow rate, Sweden—Storglaciären

49-1993

Expedition ANTARKTIS-X of RV *Polarstern* 1992—Report of Legs ANT-X/1a and 2. [Die Expedition ANTARKTIS-X mit FS *Polarstern* 1992—Bericht von den Fahrtabschnitten ANT-X/1a und 2]

Miller, H., ed, *Berichte zur Polarforschung*, 1994, No.152, 292p. (Pertinent p. 71-292), In German with English summary.

Expeditions, Sea ice, Geophysical surveys, Sediments, Marine biology, Glaciology, Ice shelves, Ice physics, Ice mechanics, Synthetic aperture radar

Leg ANT-X/2 was planned mainly to answer geoscientific and glaciological questions, and included comprehensive work on land and ice. At Drescher Island, biologists observed the feeding and diving behavior of seals and penguins. They obtained new results on the ecophysiology of these animals using newly developed techniques to determine diving depths and feeding behavior. Glaciological work continued on the Ronne Ice Shelf. This long-term program is part of the International Filchner/Ronne Ice Shelf Programme, and includes studies of mass balance and dynamics of the ice shelf. Particular attention was given to processes on the underside of the ice shelf. Comprehensive ground truth observations for the SAR and altimeter of ERS-1 were carried out, and measurements of the movement and deformation of the ice shelf continued. Studies of the dynamics and mass balance of the sea ice were made using various satellite data and through direct observations of buoys and a helicopter mounted camera. The main tasks of the marine program were geophysical measurements of Earth's crust and its sediment cover and parallel marine geological investigations. Work continued on the Antarctic Peninsula and at Astrid Ridge, and mapping of sediment cover and deep crustal structures was completed.

49-1994

Russian-German cooperation: the Transdrift I Expedition to the Laptev Sea.

Kassens, H., ed, Karpiĭ, V., ed, *Berichte zur Polarforschung*, 1994, No.151, 168p., 13 refs.

Expeditions, Sea ice, Rivers, Water temperature, Hydrogeochemistry, Russia—Laptev Sea

49-1995

Molecular ices as temperature indicators in the ISM.

Smith, R.G., Robinson, G., Hyland, A.R., *Astronomical Society of Australia. Proceedings*, 1993, 10(3), p.241-246, 30 refs.

Air temperature, Ice structure, Atmospheric composition, Molecular structure

49-1996

Evidence for massive discharges into the North Atlantic Ocean during the last glacial period.

Bond, G.C., et al, *Nature*, Nov. 19, 1992, 360(6401), p.245-249, 29 refs.

Icebergs, Sediments, Water temperature, Drift, Calving, North Atlantic Ocean

49-1997

Primary production in the glacial North Atlantic and North Pacific Oceans.

Sancetta, C., *Nature*, Nov. 19, 1992, 360(6401), p.249-251, 34 refs.

Biomass, Sea ice, Marine biology, Okhotsk Sea, Baffin Bay

49-1998

Rheological nonlinearity and flow instability in the deforming bed mechanism of ice stream motion.

Kamb, B., *Journal of geophysical research*, Sep. 10, 1991, 96(B10), p.16,585-16,595, 63 refs.

Ice creep, Rheology, Ice sheets, Glacier beds, Antarctica—West Antarctica

Contrary to what has recently been assumed in modeling the proposed deforming bed mechanism for the rapid motion of antarctic ice streams, the rheology of water-saturated till is probably highly nonlinear, according to information from soil mechanics and preliminary experiments on till from the base of Ice Stream B. The equivalent flow law exponent n is probably as high as 100, and the nonlinearities of the shear stress and effective pressure dependences are closely linked. The high nonlinearity has important consequences for the deforming bed mechanism. A flow system operating by this mechanism can be unstable as a result of feedback from the generation of basal water by shear heating of basal till. The short-term feedback effect is analyzed for a perturbation in a model ice stream in which the basal meltwater is transported through a distributed system of narrow-gap conduits at the ice-till interface. Although the analysis is approximate and some of the system parameters are poorly known, the results suggest that the deforming bed mechanism is unstable for $n>20$. The apparent absence of such instability in currently active ice streams implies that their motion is controlled not by the deforming bed but by some other as yet unidentified mechanism. (Auth.)

49-1999

Snow on sea ice: competing effects in shaping climate.

Ledley, T.S., *Journal of geophysical research*, Sep. 20, 1991, 96(D9), p.17,195-17,208, 26 refs.

Sea ice, Snow cover, Climatic changes, Snow physics, Snow heat flux

The impact of the addition of snow and its thermal properties on sea ice and leads and the subsequent effect on climate are examined in this study. The results show that the thermal properties of snow introduce competing effects on climate. The first effect is that the snow acts as an insulator, keeping the ice warm and thus thin. The second effect is that snow has a lower volumetric specific heat and volumetric heat of fusion than ice, causing it to cool, warm, and melt more easily than ice. This produces longer periods of ice-free conditions during the summer and thus a warmer climate. The third effect is that snow has a higher albedo than ice. This causes a reduction in the absorbed solar energy by the entire Earth-atmosphere system and results in a cooling of the climate. The results described here indicate that the albedo effect is dominant, so that the addition of snow cools the climate. These results show that snow on sea ice is a very important factor in shaping polar climate and that significant changes in the thickness and/or extent of the snow cover could have important implications for understanding changes in our climate. (Auth.)

49-2000

Ice core evidence for an explosive tropical volcanic eruption 6 years preceding Tambora.

Dai, J.C., Mosley-Thompson, E., Thompson, L.G., *Journal of geophysical research*, Sep. 30, 1991, 96(D9), p.17,361-17,366, 34 refs.

Ice cores, Volcanoes, Antarctica—Siple Station, Greenland

High-resolution analyses of ice cores from Antarctica and Greenland reveal an explosive volcanic eruption in the tropics in 1809 which is not reflected in the historical record. A comparison in the same ice cores of the sulfate flux from the 1809 eruption to that from the Tambora eruption (1815) indicates a near-equatorial location and a magnitude roughly half that of Tambora. Thus this event should be considered comparable to other eruptions producing large volumes of sulfur-rich gases such as Coseguina, Krakatau, Agung, and El Chichón. The increase in the atmospheric concentration of sulfuric acid may have contributed to the Northern Hemisphere cooling observed in the early 19th century and may account partially for the decline in surface temperatures which preceded the eruption of Tambora in 1815. (Auth. mod.)

49-2001

Himalaya to the sea: geology, geomorphology and the Quaternary.

Shroder, J.F., Jr., ed, London, Routledge, 1993, 429p., Refs. p.379-410. For selected papers see 49-2002 through 49-2009.

Alpine glaciation, Mountain glaciers, Glacier surveys, Glacial deposits, Glacial erosion, Quaternary deposits, Geochronology, Paleoclimatology

49-2002

Himalaya to the sea: geomorphology and the Quaternary of Pakistan in the regional context.

Shroder, J.F., Jr., Himalaya to the sea: geology, geomorphology and the Quaternary. Edited by J.F. Shroder, Jr., London, Routledge, 1993, p.1-42 (Pertinent p.18-20).

Alpine glaciation, Mountain glaciers, Glacier surveys, Glacier surges, Paleoclimatology, Pakistan

49-2003

Present and past patterns of glaciation in the northwest Himalaya: climatic, tectonic and topographic controls.

Holmes, J.A., Himalaya to the sea: geology, geomorphology and the Quaternary. Edited by J.F. Shroder, Jr., London, Routledge, 1993, p.72-90.

Glacier surveys, Alpine glaciation, Mountain glaciers, Glacier oscillation, Glacier mass balance, Snow line, Tectonics, Paleoclimatology, Kashmir

49-2004

Revised chronostratigraphy of the late Cenozoic Bunthang sequence of Skardu intermontane basin, Karakoram Himalaya, Pakistan.

Cronin, V.S., Johnson, G.D., Himalaya to the sea: geology, geomorphology and the Quaternary. Edited by J.F. Shroder, Jr., London, Routledge, 1993, p.91-107.

Alpine glaciation, Glacial deposits, Quaternary deposits, Stratigraphy, Geochronology, Remanent magnetism, Pakistan—Karakoram Mountains

49-2005

Quaternary and Holocene intermontane basin sedimentation in the Karakoram Mountains.

Owen, L.A., Derbyshire, E., Himalaya to the sea: geology, geomorphology and the Quaternary. Edited by J.F. Shroder, Jr., London, Routledge, 1993, p.108-131.

Alpine glaciation, Mountain glaciers, Glacial deposits, Glacial erosion, Sediment transport, Mass movements (geology), Quaternary deposits, Tectonics, Karakoram Mountains

49-2006

Quaternary glaciation of the Karakoram and Nanga Parbat Himalaya.

Shroder, J.F., Jr., Owen, L.A., Derbyshire, E., Himalaya to the sea: geology, geomorphology and the Quaternary. Edited by J.F. Shroder, Jr., London, Routledge, 1993, p.132-158.

Alpine glaciation, Glacial deposits, Quaternary deposits, Moraines, Pleistocene, Geochronology, Kashmir

49-2007

Altitudinal organization of Karakoram geomorphic processes and depositional environments.

Hewitt, K., Himalaya to the sea: geology, geomorphology and the Quaternary. Edited by J.F. Shroder, Jr., London, Routledge, 1993, p.159-183.

Alpine glaciation, Mountain glaciers, Glacial deposits, Moraines, Glacier surveys, Periglacial processes, Nivation, Alpine tundra, Geomorphology, Karakoram Mountains

49-2008

Sediment transport and yield at the Raikot Glacier, Nanga Parbat, Punjab Himalaya.

Gardner, J.S., Jones, N.K., Himalaya to the sea: geology, geomorphology and the Quaternary. Edited by J.F. Shroder, Jr., London, Routledge, 1993, p.184-197.

Glacier surveys, Mountain glaciers, Glacial deposits, Glacial erosion, Glacier mass balance, Sediment transport, Kashmir

49-2009

Palaeoclimatic significance of the loess deposits of northern Pakistan.

Rendell, H.M., Himalaya to the sea: geology, geomorphology and the Quaternary. Edited by J.F. Shroder, Jr., London, Routledge, 1993, p.227-235.

Alpine glaciation, Quaternary deposits, Loess, Paleoclimatology, Pleistocene, Geochronology, Soil dating, Pakistan

49-2010

Diamicton at Deadman Pass, central Sierra Nevada, California: a residual lag and colluvial deposit, not a 3 Ma glacial till.

Bailey, R.A., Huber, N.K., Curry, R.R., *Geological Society of America. Bulletin*, Sep. 1990, 102(9), p.1165-1173, 11 refs.

Glacial deposits, Lithology, Glacial till, Glacial till, United States—California—Deadman Pass

49-2011

Pleistocene glacial tectonism and sedimentation on a macrotidal piedmont coast, Ekuk Bluffs, southwestern Alaska.

Lea, P.D., *Geological Society of America. Bulletin*, Sep. 1990, 102(9), p.1230-1245, 82 refs.

Pleistocene, Sedimentation, Moraines, Glacier flow, United States—Alaska—Ekuk Bluffs

49-2012
Depositional record of a glacial-lake outburst: Glacial Lake Souris, North Dakota.
Lord, M.L., *Geological Society of America. Bulletin,* Feb. 1991, 103(2), p.290-299, 41 refs.
Glacial lakes, Lacustrine deposits, Models, United States—North Dakota—Souris, Lake

49-2013
Clastic sequences developed during late Quaternary glacio-eustatic sea-level fluctuations on a passive margin: example from the inner continental shelf near Barnegat Inlet, New Jersey.
Ashley, G.M., Wellner, R.W., Esker, D., Sheridan, R.E., *Geological Society of America. Bulletin,* Dec. 1991, 103(12), p.1607-1621, 48 refs.
Seismic reflection, Stratigraphy, Sea level, Quaternary deposits, LANDSAT, Shore erosion, Sediments, United States—New Jersey—Barnegat Inlet

49-2014
Post-glacial relative sea-level history of northwestern Spitsbergen, Svalbard: alternative interpretation and reply.
Héquette, A., *Geological Society of America. Bulletin,* Aug. 1992, 104(8), p.1059-1066, 18 refs. For original paper see 48-2684.
Pleistocene, Marine geology, Glaciation, Shores, Marine deposits, Radioactive age determination, Ice sheets, Glacier oscillation, Ice loads, Sea level, Norway—Spitsbergen

49-2015
Glacial geology of western Hudson Strait, Canada, with reference to Laurentide Ice Sheet dynamics.
Laymon, C.A., *Geological Society of America. Bulletin,* Sep. 1992, 104(9), p.1169-1177, 63 refs.
Glacial geology, Ice cover, Ice mechanics, Canada—Northwest Territories—Hudson Strait

49-2016
Gravel/diamicton lag on the south Albertan prairies, Canada: evidence of bed armoring in early deglacial sheet-flood/spillway courses.
Evans, D.J.A., *Geological Society of America. Bulletin,* Aug. 1991, 103(8), p.975-982, 19 refs.
Stratigraphy, Sediments, Spillways, Lacustrine deposits, Meltwater, Canada—Alberta

49-2017
Late Wisconsinan, pre-Valley Heads glaciation in the western Mohawk Valley, central New York, and its regional implications.
Ridge, J.C., Franzi, D.A., Muller, E.H., *Geological Society of America. Bulletin,* Aug. 1991, 103(8), p.1032-1048, 75 refs.
Stratigraphy, Lithology, Glacial geology, United States—New York—Mohawk Valley

49-2018
Aminostratigraphy of Pliocene-Pleistocene high-sea-level deposits, Nome coastal plain and adjacent nearshore area, Alaska.
Kaufman, D.S., *Geological Society of America. Bulletin,* Jan. 1992, 104(1), p.40-52, 62 refs.
Stratigraphy, Pleistocene, Sea level, Marine deposits, Correlation, United States—Alaska—Nome

49-2019
Magnitudes and implications of peak discharges from glacial Lake Missoula.
O'Connor, J.E., Baker, V.R., *Geological Society of America. Bulletin,* Mar. 1992, 104(3), p.267-279, 50 refs.
Glacial lakes, Ice dams, Hydrography, Flooding, Models, Pleistocene, United States—Washington—Missoula, Lake

49-2020
Large-scale aspects of the United States hydrologic cycle.
Roads, J.O., Chen, S.C., Guetter, A.K., Georgakakos, K.P., *American Meteorological Society. Bulletin,* Sep. 1994, 75(9), p.1589-1610, 49 refs.
Climatology, Surface waters, Precipitation (meteorology), Hydrologic cycle, Water balance, Meteorological data, Moisture transfer, Simulation, Snow water content

49-2021
Theory for the primary and secondary drying stages of the freeze-drying of pharmaceutical crystalline and amorphous solutes: comparison between experimental data and theory.
Liapis, A.I., Bruttini, R., *Separations technology,* July 1994, 4(3), p.144-155, 32 refs.
Freeze drying, Phase transformations, Theories, Solutions, Frozen liquids, Porosity, Ice sublimation, Ice vapor interface, Mass transfer, Water transport, Mathematical models

49-2022
FTIR measurements of HF, N_2O and CFCs during the arctic polar night with the moon as a light source, subsidence during winter 1992/93.
Notholt, J., *Geophysical research letters,* Nov. 1, 1994, 21(22), p.2385-2388, 13 refs.
Polar atmospheres, Atmospheric composition, Aerosols, Stratosphere, Air pollution, Infrared spectroscopy, Atmospheric density, Spectra, Subsidence, Norway—Spitsbergen

49-2023
Anomalous arctic lower stratospheric polar vortex of 1992-1993.
Manney, G.L., Zurek, R.W., Gelman, M.E., Miller, A.J., Nagatani, R., *Geophysical research letters,* Nov. 1, 1994, 21(22), p.2405-2408, 13 refs.
Polar atmospheres, Stratosphere, Climatology, Atmospheric composition, Atmospheric circulation, Ozone, Periodic variations

49-2024
New Ice Age?
Hadeed, F., *Yale scientific,* Fall 1994, 68(3), p.6-7.
Ice age theory, Global change, Climatic changes

49-2025
High-resolution record of Lateglacial and early Holocene marine sediments from southwestern Sweden; with special emphasis on environmental changes close to the Pleistocene-Holocene transition and the influence of fresh water from the Baltic basin.
Bergsten, H., *Journal of quaternary science,* Mar. 1994, 9(1), p.1-12, 59 refs.
Pleistocene, Marine deposits, Quaternary deposits, Stratigraphy, Oceanography, Paleoclimatology, Climatic changes, Radioactive age determination, Glacier melting, Glacial lakes, Meltwater, Sediment transport, Sweden

49-2026
Late Weichselian stable isotope stratigraphy compared with biostratigraphical data: a case study from southern Sweden.
Hammarlund, D., Lemdahl, G., *Journal of quaternary science,* Mar. 1994, 9(1), p.13-31, Refs. p.29-31.
Pleistocene, Quaternary deposits, Paleoclimatology, Paleoecology, Climatic changes, Lacustrine deposits, Stratigraphy, Isotope analysis, Correlation, Sweden

49-2027
Fissure-fill and tunnel-fill sediments: expressions of permafrost and increased hydrostatic pressure.
Kumpulainen, R.A., *Journal of quaternary science,* Mar. 1994, 9(1), p.59-72, 47 refs.
Pleistocene, Quaternary deposits, Deltas, Discontinuous permafrost, Sedimentation, Permafrost structure, Permafrost hydrology, Water pressure, Patterned ground, Permafrost indicators, Glacial geology, Iceland

49-2028
Gibbsitic soils on former nunataks: implications for ice sheet reconstruction.
Ballantyne, C.K., *Journal of quaternary science,* Mar. 1994, 9(1), p.73-80, 43 refs.
Pleistocene, Ice sheets, Altitude, Nunataks, Periglacial processes, Frost weathering, Bedrock, Mountain soils, Clay minerals, Soil analysis, Mineralogy, X ray diffraction, United Kingdom—Scotland

49-2029
Last glaciation of Germania Land and adjacent areas, northeast Greenland.
Landvik, J.Y., *Journal of quaternary science,* Mar. 1994, 9(1), p.81-92, 34 refs.
Pleistocene, Arctic landscapes, Ice sheets, Glaciation, Glacier oscillation, Glacial geology, Radioactive age determination, Geochronology, Quaternary deposits, Moraines, Stratigraphy, Greenland

49-2030
Polar Sunrise Experiment 1992 (PSE 1992): preface.
Barrie, L.A., Bottenheim, J.W., Hart, W.R., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,313-25,314, 19 refs.
Research projects, Polar atmospheres, Atmospheric boundary layer, Atmospheric composition, Profiles, Photochemical reactions, Chemical analysis, Sunlight, Diurnal variations, Seasonal variations, Canada—Northwest Territories—Alert

49-2031
Meteorological aspects of the 1992 Polar Sunrise Experiment.
Hopper, J.F., Hart, W.R., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,315-25,328, 20 refs.
Polar atmospheres, Synoptic meteorology, Air pollution, Atmospheric composition, Seasonal variations, Chemical composition, Atmospheric circulation, Wind factors, Ozone, Topographic effects, Weather observations, Canada—Northwest Territories—Ellesmere Island

49-2032
Analysis of long-range transport events at Alert, Northwest Territories, during the Polar Sunrise Experiment.
Worthy, D.E.J., Trivett, N.B.A., Hopper, J.F., Bottenheim, J.W., Levin, I., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,329-25,344, 32 refs.
Polar atmospheres, Haze, Air pollution, Aerosols, Atmospheric composition, Atmospheric circulation, Sampling, Chemical properties, Diurnal variations, Correlation, Photochemical reactions, Canada—Northwest Territories—Ellesmere Island

49-2033
Measurement of ozone during Polar Sunrise Experiment 1992.
Anlauf, K.G., Mickle, R.E., Trivett, N.B.A., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,345-25,353, 11 refs.
Polar atmospheres, Atmospheric composition, Ozone, Atmospheric boundary layer, Air masses, Sampling, Chemical properties, Seasonal variations, Photochemical reactions, Sunlight, Diurnal variations, Temperature inversions, Canada—Northwest Territories—Alert

49-2034
Measurements of C_2-C_6 hydrocarbons during the Polar Sunrise 1992 Experiment: evidence for Cl atom and Br atom chemistry.
Jobson, B.T., Niki, H., Yokouchi, Y., Bottenheim, J.W., Hopper, F., Leaitch, W.R., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,355-25,368, 36 refs.
Polar atmospheres, Marine atmospheres, Atmospheric boundary layer, Atmospheric composition, Air pollution, Chemical properties, Sampling, Aerosols, Hydrocarbons, Ozone, Seasonal variations, Canada—Northwest Territories—Alert

49-2035
Relationships between organic nitrates and surface ozone destruction during Polar Sunrise Experiment 1992.
Muthuramu, K., Shepson, P.B., Bottenheim, J.W., Jobson, B.T., Niki, H., Anlauf, K.G., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,369-25,378, 33 refs.
Polar atmospheres, Atmospheric composition, Atmospheric boundary layer, Ozone, Chemical properties, Sampling, Air pollution, Photochemical reactions, Atmospheric attenuation, Diurnal variations, Correlation, Canada—Northwest Territories—Alert

49-2036

Serial gas chromatographic/mass spectrometric measurements of some volatile organic compounds in the arctic atmosphere during the 1992 Polar Sunrise Experiment.

Yokouchi, Y., Akimoto, H., Barrie, L.A., Bottenheim, J.W., Anlauf, K., Jobson, B.T., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,379-25,389, 20 refs.

Polar atmospheres, Atmospheric composition, Atmospheric boundary layer, Air pollution, Chemical properties, Aerosols, Hydrocarbons, Sampling, Photochemical reactions, Diurnal variations, Atmospheric attenuation, Correlation, Canada—Northwest Territories—Alert

49-2037

Gas phase formaldehyde and peroxide measurements in the arctic atmosphere.

de Serves, C., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,391-25,398, 33 refs.

Polar atmospheres, Atmospheric composition, Atmospheric boundary layer, Atmospheric attenuation, Sampling, Photochemical reactions, Hydrocarbons, Chemical properties, Diurnal variations, Seasonal variations, Ozone, Sunlight, Canada—Northwest Territories—Alert

49-2038

Spectroscopic measurements of bromine oxide and ozone in the high Arctic during Polar Sunrise Experiment 1992.

Hausmann, M., Platt, U., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,399-25,413, 27 refs.

Polar atmospheres, Atmospheric composition, Atmospheric boundary layer, Atmospheric attenuation, Photochemical reactions, Ozone, Spectroscopy, Chemical properties, Turbulent diffusion, Radiation absorption, Spectra, Canada—Northwest Territories—Alert

49-2039

Organic and inorganic bromine compounds and their composition in the arctic troposphere during polar sunrise.

Li, S.M., et al, *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,415-25,428, 37 refs.

Polar atmospheres, Atmospheric boundary layer, Atmospheric composition, Hydrocarbons, Sampling, Chemical properties, Photochemical reactions, Seasonal variations, Diurnal variations, Correlation, Canada—Northwest Territories—Alert

49-2040

Aerosol size distributions in arctic haze during the Polar Sunrise Experiment 1992.

Staebler, R.M., den Hartog, G., Georgi, B., Düsterdiek, T., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,429-25,437, 36 refs.

Polar atmospheres, Atmospheric boundary layer, Atmospheric composition, Atmospheric attenuation, Haze, Aerosols, Sampling, Particle size distribution, Ozone, Photochemical reactions, Diurnal variations, Canada—Northwest Territories—Alert

49-2041

Arctic aerosol size-segregated chemical observations in relation to ozone depletion during Polar Sunrise Experiment 1992.

Barrie, L.A., et al, *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,439-25,451, 38 refs.

Polar atmospheres, Atmospheric composition, Atmospheric boundary layer, Atmospheric attenuation, Aerosols, Particle size distribution, Seasonal variations, Sampling, Chemical properties, Ozone, Canada—Northwest Territories—Alert

49-2042

Lower tropospheric measurements of halogens, nitrates, and sulphur oxides during Polar Sunrise Experiment 1992.

Barrie, L.A., Li, S.M., Toom, D.L., Landsberger, S., Sturges, W., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,453-25,467, 23 refs.

Polar atmospheres, Atmospheric boundary layer, Atmospheric composition, Atmospheric attenuation, Ozone, Sampling, Aerosols, Accuracy, Photochemical reactions, Diurnal variations, Seasonal variations, Correlation, Canada—Northwest Territories—Alert

49-2043

Equilibrium of particle nitrite with gas phase HONO: tropospheric measurements in the high Arctic during polar sunrise.

Li, S.M., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,469-25,478, 45 refs.

Polar atmospheres, Atmospheric boundary layer, Atmospheric composition, Atmospheric attenuation, Aerosols, Sampling, Chemical properties, Photochemical reactions, Diurnal variations, Turbulent diffusion, Canada—Northwest Territories—Alert

49-2044

Fourier transform infrared measurement of the formation of nitrogen compounds on sodium chloride particles exposed to the ambient air in the Arctic.

Kutsuna, S., Ibusuki, T., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,479-25,488, 27 refs.

Polar atmospheres, Atmospheric composition, Chemical properties, Atmospheric boundary layer, Sampling, Infrared spectroscopy, Photochemical reactions, Aerosols, Radiation absorption, Salinity, Ozone, Canada—Northwest Territories—Alert

49-2045

Chemical and meteorological observations at ice camp SWAN during Polar Sunrise Experiment 1992.

Hopper, J.F., et al, *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,489-25,498, 17 refs.

Polar atmospheres, Marine atmospheres, Atmospheric boundary layer, Atmospheric composition, Atmospheric attenuation, Aerosols, Ozone, Sampling, Turbulent diffusion, Chemical properties, Ice air interface, Arctic Ocean

49-2046

Airborne observations related to ozone depletion at polar sunrise.

Leaitch, W.R., et al, *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,499-25,517, 23 refs.

Polar atmospheres, Atmospheric boundary layer, Atmospheric composition, Atmospheric attenuation, Aerial surveys, Ozone, Sampling, Photochemical reactions, Aerosols, Heterogeneous nucleation, Profiles, Canada—Northwest Territories

49-2047

Infrared optical constants of H_2O ice, amorphous nitric acid solutions, and nitric acid hydrates.

Toon, O.B., Tolbert, M.A., Koehler, B.G., Middlebrook, A.M., Jordan, J., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,631-25,654, 24 refs.

Polar atmospheres, Polar stratospheric clouds, Simulation, Ice optics, Cloud physics, Infrared radiation, Hydrates, Aerosols, Optical properties, Refractivity, Indexes (ratios)

This paper presents a determination of the infrared optical constants of nitric acid trihydrate, nitric acid dihydrate, nitric acid monohydrate, and solid amorphous nitric acid solutions which crystallize to form these hydrates. Included are the infrared optical constants of H_2O ice. The transmission of infrared light was measured through thin films of varying thickness over the frequency range from about 7000 to 500/cm at temperatures below 200 K. A theory was developed for the transmission of light through a substrate that has thin films on both sides. An iterative Kramers-Kronig technique was used to determine the optical constants which give the best match between measured transmission spectra and those calculated for a variety of films of different thickness. These optical constants should be useful for calculations of the infrared spectrum of polar stratospheric clouds. (Auth. mod.)

49-2048

Real refractive indices of infrared-characterized nitric-acid/ice films: implications for optical measurements of polar stratospheric clouds.

Middlebrook, A.M., Berland, B.S., George, S.M., Tolbert, M.A., Toon, O.B., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,655-25,666, 48 refs.

Polar atmospheres, Polar stratospheric clouds, Optical properties, Infrared spectroscopy, Ice optics, Hydrates, Films, Aerosols, Refractivity, Simulation, Indexes (ratios)

The infrared spectra of nitric-acid/ice films representative of polar stratospheric clouds (PSCs) were collected with simultaneous optical interference measurements to determine the real refractive indices at ϵ=632 nm. Ice and amorphous nitric-acid/ice films were prepared by condensation of water and nitric acid vapors onto a wedged Al_2O_3 substrate. The real refractive indices of these films were determined from the optical interference of a reflected helium-neon laser during film growth. The indices of the amorphous films varied smoothly from n=1.30 for ice to n=1.49 for nitric acid, similar to observations in previous work. During desorption, the refractive indices for ice, NAM (nitric acid monohydrate), α- and β-NAT (nitric acid trihydrate) films were measured using the optical interference technique. In agreement with earlier data, the real refractive indices for ice and NAM determined in desorption were n=1.30±0.01 and n=1.53±0.03, respectively. (Auth. mod.)

49-2049

Heterogeneous reactions in a stratospheric box model: a sensitivity study.

Danilin, M.Y., McConnell, J.C., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,681-25,696, 63 refs.

Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Atmospheric attenuation, Aerosols, Ozone, Heterogeneous nucleation, Models, Chemical properties

A chemical module prepared for a three-dimensional global chemistry transport model and a general circulation model has been used to carry out a sensitivity study of the effects of heterogeneous reactions on/in the sulfate aerosol and on polar stratospheric cloud (PSC) particles. Presented here are results for the latitudes 60S, 70S and 75S at the 50-mbar level. Findings indicate that (1) the new values of the HNO_3 cross sections result in lower mixing ratios for NO_x and make ozone more vulnerable to catalytic destruction by ClO_x; (2) the effect of the heterogeneous reactions $OH+HNO_3(a)$ to H_2+NO_3 and $HO_2+HO_2(a)$ to $H_2O_2+O_2$ are small in comparison with the same gas phase reactions and play a negligible role in the ozone balance; (3) the HCl reactions in the sulfuric acid aerosol at 60S and 70S increase the chlorine activation up to 0.53 parts per billion by volume (ppbv) and 0.72 ppbv, respectively, for liquid aerosol and up to 0.87 ppbv for frozen aerosol at 70S for volcanic conditions, which results in considerable ozone depletion at these latitudes; (4) concerning the ozone "hole" phenomenon, the authors consider the different initial ratios of $ClONO_2$/HCl, of N_2O_5, galactic cosmic rays, and longer lifetimes for the PSC. (Auth. mod.)

49-2050

Arctic chlorine monoxide observations during spring 1993 over Thule, Greenland, and implications for ozone depletion.

Shindell, D.T., Reeves, J.M., Emmons, L.K., De Zafra, R.L., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,697-25,704, 19 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Chemical properties, Sampling, Aerosols, Profiles, Photochemical reactions, Correlation, Seasonal variations, Ozone, Greenland

This paper presents data concerning the vertical distribution of chlorine monoxide (ClO), from measurements of pressure-broadened molecular-emission spectra made over Thule, Greenland during the 1993 arctic spring. The measurements show a weak lower stratospheric layer of chlorine monoxide inside the vortex in late Feb., which was, however, significantly greater in mixing ratio than that observed in spring 1992. ClO was also observed in much smaller quantities in early to mid-Mar. 1993 when Thule was outside the vortex. The amount of ClO within the vortex was severely reduced by the time it returned over Thule in late Mar. This reduction occurred several weeks earlier relative to the winter solstice than the decline of ClO inside the antarctic vortex in 1993. The enhanced arctic lower stratospheric layer seen in late Feb. 1993 had a peak mixing ratio of about 0.5 parts per billion by volume (ppbv), nearly a factor of 3 smaller than that observed in the Antarctic in 1993 at a nearly equivalent photochemical period. (Auth. mod.)

49-2051

Comparison of two land surface process models using prescribed forcings.

Bonan, G.B., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,803-25,818, 43 refs.

Climatology, Soil air interface, Climatic factors, Surface energy, Vegetation factors, Tundra, Snow hydrology, Snow cover effect, Albedo, Turbulent exchange, Heat flux, Mathematical models

49-2052

Summer temperatures across northern North America: regional reconstructions from 1760 using tree-ring densities.

Briffa, K.R., Jones, P.D., Schweingruber, F.H., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,835-25,844, 40 refs.

Climatology, Air temperature, Temperature variations, Periodic variations, Surface temperature, Trees (plants), Age determination, Volcanic ash, Correlation, Records (extremes)

49-2053

Analysis of 10-day isentropic flow patterns for Barrow, Alaska: 1985-1992.

Harris, J.M., Kahl, J.D.W., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,845-25,855, 41 refs.

Climatology, Atmospheric circulation, Atmospheric composition, Sampling, Polar atmospheres, Atmospheric boundary layer, Wind direction, Periodic variations, Haze, Air pollution, United States—Alaska—Barrow

49-2054

Radiative sensitivities of tropical anvils to small ice crystals.

Zender, C.S., Kiehl, J.T., *Journal of geophysical research,* Dec. 20, 1994, 99(D12), p.25,869-25,880, 42 refs.

Cloud cover, Radiation balance, Cloud physics, Albedo, Climatic factors, Optical properties, Ice crystal optics, Ice crystal size, Radiation absorption, Ice air interface, Backscattering, Mathematical models

49-2055

Long-term recovery of vegetation on two experimental crude oil spills in interior Alaska black spruce taiga.

Racine, C.H., MP 3558, *Canadian journal of botany,* 1994, Vol.72, p.1171-1177, 22 refs.

Subarctic landscapes, Taiga, Ecosystems, Revegetation, Crude oil, Oil spills, Environmental impact, Environmental tests, Vegetation patterns, Trees (plants), United States—Alaska

Vegetation was sampled on two black spruce taiga sites in interior Alaska, 15 and 20 years after crude oil was experimentally applied as low-volume sprays or high-volume point spills. Low volume spray spills that uniformly covered the ground caused initial damage to vegetation, but after 20 years recovery of the understory, vegetation was almost complete, with dramatic recovery and expansion of fruticose lichens. High-volume point spills created small areas of surface oil saturation with dead vegetation and little sign of recovery but spread out mostly below ground with little or no apparent effect on the shallowly rooted vegetation above even after 15-20 years. At both sites with surface oil, black spruce mortality was high, with no evidence of long-term recovery and with continuing chronic effects after 15 years. However, from a long-term perspective the black spruce taiga ecosystem appears to be able to recover from low volume spray spills and to retain large amounts of crude oil from high-volume point spills below ground with minimal damage to the vegetation. Because of the permafrost, removal of crude oil from this ecosystem by soil excavation is undesirable. *In situ* acceleration of oil breakdown using fertilizers and bacteria is a possible option; seeding or planting of *E. vaginatum* on surface-oiled areas may also provide some cover and below ground biomass.

49-2056

Reproductive patterns of *Betula pendula* and *B. pubescens* coll. along a regional altitudinal gradient in northern Sweden.

Holm, S.O., *Ecography,* Jan.-Mar. 1994, 17(1), p.60-72, 67 refs.

Ecosystems, Plant ecology, Subarctic landscapes, Trees (plants), Growth, Vegetation patterns, Altitude, Forest lines, Sweden

49-2057

Reproductive variability and pollen limitation in three *Betula* taxa in northern Sweden.

Holm, S.O., *Ecography,* Jan.-Mar. 1994, 17(1), p.73-81, 52 refs.

Subarctic landscapes, Trees (plants), Vegetation patterns, Plant ecology, Growth, Pollen, Altitude, Statistical analysis, Sweden

49-2058

Puddle wonders.

Brausch, J., Knight, C.A., *Weatherwise,* Dec. 1994-Jan. 1995, 47(6), p.18-24.

Ice crystal structure, Ice crystal growth, Photography, Phase transformations, Ice water interface

49-2059

Warm snow.

Schlatter, T., Karvelot, J., *Weatherwise,* Dec. 1994-Jan. 1995, 47(6), p.42.

Weather observations, Snowfall, Meteorological factors, Air temperature, Surface temperature, Temperature effects

49-2060

Snow measurements.

Schlatter, T., Yancey, M., *Weatherwise,* Dec. 1994-Jan. 1995, 47(6), p.42-44.

Weather observations, Snowfall, Snow depth, Meteorological data, Measurement, Accuracy, Standards

49-2061

Streamflow processes in an alpine permafrost catchment, Tianshan, China.

Woo, M.K., Yang, Z.N., Xia, Z.J., Yang, D.Q., *Permafrost and periglacial processes,* July 1994, 5(2), p.71-85, With French summary. 23 refs.

Alpine landscapes, Water balance, Stream flow, Runoff, Permafrost hydrology, Seepage, Active layer, Ground thawing, Seasonal freeze thaw, Snowmelt, Subsurface drainage, China—Tian Shan

49-2062

Climate controls and high-altitude permafrost, Qinghai-Xizang (Tibet) Plateau, China.

Wang, B.L., French, H.M., *Permafrost and periglacial processes,* July 1994, 5(2), p.87-100, With French summary. 44 refs.

Geocryology, Periglacial processes, Mountain soils, Soil temperature, Thermal regime, Seasonal freeze thaw, Permafrost thermal properties, Permafrost physics, Permafrost transformation, Climatic factors, China—Qinghai-Xizang Plateau

49-2063

Current changes of climate and permafrost in the Arctic and Sub-Arctic of Russia.

Pavlov, A.V., *Permafrost and periglacial processes,* July 1994, 5(2), p.101-110, With French summary. 12 refs.

Climatic changes, Global warming, Soil temperature, Air temperature, Correlation, Periodic variations, Geocryology, Continuous permafrost, Permafrost transformation, Snow cover effect, Thaw depth, Russia—Yakutia, Russia—Siberia

49-2064

Thufur in the Mohlesi Valley, Lesotho, southern Africa.

Grab, S.W., *Permafrost and periglacial processes,* July 1994, 5(2), p.111-118, With French summary. 35 refs.

Periglacial processes, Cryogenic soils, Alpine landscapes, Frost mounds, Frozen ground mechanics, Hummocks, Geomorphology, Soil surveys, South Africa—Lesotho

49-2065

Some observations regarding sorted stripes, Livingston Island, South Shetlands.

Hall, K., *Permafrost and periglacial processes,* July 1994, 5(2), p.119-126, With French summary. 41 refs.

Periglacial processes, Patterned ground, Geomorphology, Soil surveys, Frozen ground mechanics, Sorting, Ice solid interface, Snow cover effect, Insulation, Temperature effects, Antarctica—Livingston Island

Sorted stripes have long been recognized in the subantarctic and the maritime Antarctic. The cold and wet conditions of these regions, when compared with the drier continent, are ideal for their development. In particular, the frequent low-amplitude, short-duration freeze-thaw cycles of the subantarctic favor the development of miniature sorted forms. The maritime Antarctic, however, with its larger amplitude and longer duration of freeze-thaw cycles, plus the presence of permafrost, exhibits a more frequent occurrence of the larger forms. The Byers Peninsula has an extensive range of sorted features but, despite being situated in the maritime Antarctic and within a permafrost zone, the majority of these features are of the miniature variety. In addition, the sorted stripes exhibit a distinct spatial preference. Their alignment and spatial distribution are not associated with either the sun or the wind, but are a function of the snow cover. (Auth. mod.)

49-2066

Sequence stratigraphy enhancement of biostratigraphic correlation with application to the Upper Cretaceous of northern Siberia: a potential tool for petroleum exploration.

Sahagian, D.L., Beisel, A.L., Zakharov, V.A., *International geology review,* Apr. 1994, 36(4), p.359-372, 38 refs.

Geologic structures, Geologic processes, Marine deposits, Sea level, Stratigraphy, Sedimentation, Correlation, Hydrocarbons, Exploration, Russia—Siberia

49-2067

Petroleum habitat of East Siberia, Russia.

Clarke, J.W., *International geology review,* Mar. 1994, 36(3), p.238-249, 17 refs.

Hydrocarbons, Exploration, Geologic structures, Geologic processes, Tectonics, Stratigraphy, Sediments, Russia—Siberia

49-2068

Oil and gas development in East Siberia.

Sagers, M.J., *International geology review,* Mar. 1994, 36(3), p.250-258, 14 refs.

Hydrocarbons, Natural gas, Gas production, Natural resources, Economic development, Petroleum industry, International cooperation, Geological surveys, Exploration, Russia—Siberia

49-2069

Nitrogen cycling in the Barents Sea—seasonal dynamics of new and regenerated production in the marginal ice zone.

Kristiansen, S., Farbrot, T., Wheeler, P.A., *Limnology and oceanography,* Nov. 1994, 39(7), p.1630-1642, 38 refs.

Marine biology, Biomass, Ecosystems, Nutrient cycle, Water chemistry, Sampling, Plankton, Ice edge, Ice cover effect, Seasonal variations, Barents Sea

49-2070

Classification of sea ice according to the type of its underside profiles and the reflection of sound from rough ice of various types.

Aleksandrov, I.A., *Acoustical physics,* Sep.-Oct. 1994, 40(5), p.654-657, Translated from Akusticheskiĭ zhurnal. 2 refs.

Sea ice, Classifications, Ice acoustics, Ice surface, Underwater acoustics, Acoustic measurement, Ice bottom surface, Surface roughness, Sound waves, Reflectivity, Analysis (mathematics), Topographic effects

49-2071

Life cycle and precipitation formation in a hybrid-type hailstorm revealed by polarimetric and Doppler radar measurements.

Höller, H., Bringi, V.N., Hubbert, J., Hagen, M., Meischner, P.F., *Journal of the atmospheric sciences,* Sep. 1,1994, 51(17), p.2500-2522, 43 refs.

Precipitation (meteorology), Classifications, Remote sensing, Radar echoes, Ice detection, Atmospheric physics, Hail clouds, Hailstone growth, Snow pellets, Thunderstorms

49-2072

Effect of freezing rate on the thermal, mechanical and physical aging properties of the glassy state in frozen sucrose solutions.

Sahagian, M.E., Goff, H.D., *Thermochimica acta,* Nov. 15, 1994, 246(2), p.271-283, 30 refs.

Solutions, Frozen liquids, Phase transformations, Freezing rate, Liquid phases, Thermal analysis, Temperature measurement, Chemical properties, Temperature effects, Enthalpy, Ice water interface

49-2073

Formaldehyde formation in $H_2O/^{13}CD_4$ frozen mixtures by swift ions.

Pirronello, V., Brown, W.L., Lanzerotti, L.J., Lanzafame, G., Averna, D., Conference on Dust in the Universe, Manchester, England, Dec. 14-18, 1987. Proceedings. Dust in the universe. Edited by M.E. Bailey et al, Cambridge, Cambridge University Press, 1988, p.281-285, 11 refs.

Extraterrestrial ice, Ice physics, Cosmic dust, Simulation, Solutions, Frozen liquids, Ionization, Radiation absorption, Low temperature tests

49-2074

Polar oceans and their role in shaping the global environment.

Johannessen, O.M., ed, Muench, R.D., ed, Overland, J.E., ed, *American Geophysical Union. Geophysical monograph series,* 1994, No.85, 525p., Refs. passim. Contributions to the Nansen Centennial Symposium, Bergen, Norway, June 21-25, 1993. For selected papers see 49-2075 through 49-2109, or F-51877, F-51879, F-51880, J-51876, J-51878, J-51881, and J-51882.

Ice surveys, Sea ice distribution, Ice cover effect, Air ice water interaction, Oceanographic surveys, Ocean currents, Water transport, Water temperature, Water chemistry, Salinity

Topics include polar ocean circulation, water masses, convective processes, carbon cycles, global climate, and ice-ocean-atmosphere interaction. Eight papers out of 35 are pertinent to the Antarctic, which deal with the distribution of water masses on the continental shelf in the Weddell Sea; radioactive isotopes in the Weddell Sea; sea ice ridging in the Weddell Sea; CO_2 fluxes in the southern ocean; sea ice thickness and climate; atmospheric forcing in thermodynamic sea ice models; surface heat fluxes in the Weddell Sea; and satellite altimetry of sea states in the southern ocean.

49-2075

Arctic Ocean and climate: a perspective.

Aagard, K., Carmack, E.C., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.5-20, 56 refs.

Air water interactions, Oceanographic surveys, Ocean currents, Water transport, Water temperature, Salinity, Ice cover effect, Global change

49-2076

Review of coupled ice-ocean models.

Mellor, G.L., Häkkinen, S., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.21-31, 53 refs.

Air ice water interaction, Ice water interface, Ice cover effect, Ice heat flux, Ice models, Ocean currents, Water transport, Global change

49-2077

On the intermediate depth waters of the Arctic Ocean.

Rudels, B., Jones, E.P., Anderson, L.G., Kattner, G., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.33-46, 31 refs.

Oceanographic surveys, Ocean currents, Water transport, Water temperature, Salinity, Water chemistry, Air water interactions

49-2078

Nutrient-based tracers in the western Arctic: a new lower holocline water defined.

Salmon, D.K., McRoy, C.P., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.47-61, 25 refs.

Oceanographic surveys, Ocean currents, Water transport, Water chemistry, Salinity, Nutrient cycle

49-2079

Potential of barium as a tracer of arctic water masses.

Falkner, K.K., Macdonald, R.W., Carmack, E.C., Weingartner, T.J., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.63-76, 64 refs.

Oceanographic surveys, Ocean currents, Water transport, Water chemistry, Nutrient cycle, Geochemical cycles, Salinity

49-2080

Northern Barents Sea: water mass distribution and modification.

Pfirman, S.L., Bauch, D., Gammelsrød, T., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.77-94, 38 refs.

Oceanographic surveys, Ocean currents, Water transport, Water temperature, Salinity, Ice cover effect, Barents Sea

49-2081

Study on the inflow of Atlantic water to the Gin Sea using GEOSAT altimeter data.

Samuel, P., Johannessen, J.A., Johannessen, O.M., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.95-108, 33 refs.

Oceanographic surveys, Ocean currents, Water transport, Sea level, Height finding, Spaceborne photography, Greenland Sea, Norwegian Sea

49-2082

Observation and simulation of ice tongues and vortex pairs in the marginal ice zone.

Johannessen, O.M., Sandven, S., Budgell, W.P., Johannessen, J.A., Shuchman, R.A., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.109-136, 21 refs.

Ice surveys, Sea ice distribution, Ice edge, Ice water interface, Drift, Ocean currents, Greenland Sea, Fram Strait

49-2083

Arctic Ocean tides.

Kowalik, Z., Proshutinskiĭ, A.IU., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.137-158, 70 refs.

Tidal currents, Tides, Ice water interface, Sea ice distribution, Pack ice, Ice openings, Ice deformation, Drift, Mathematical models

49-2084

Distribution of water masses on the continental shelf in the southern Weddell Sea.

Gammelsrød, T., et al, *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.159-176, 35 refs.

Ice shelves, Ice water interface, Subglacial observations, Meltwater, Oceanographic surveys, Ocean currents, Water transport, Water temperature, Water chemistry, Salinity, Antarctica—Weddell Sea

Water properties on the continental shelf in the southern Weddell Sea observed during NARP 92-93 are presented. The station distribution includes a section close to the floating ice shelf from the Filchner Depression to the Antarctic Peninsula. Temperature, salinity, oxygen, silicate, CFC-11 and CFC-12 distributions are shown. Melting under the ice shelves, circulation systems, residence times, sediment/water interactions and bottom water formation are discussed. Ice Shelf Water (ISW), which is formed by cooling and melting below the floating ice shelf, seems to be about 10 years older than its parent water mass, which indicates the residence time below the ice shelf. The average melting rate below the Filchner Ronne ice shelf, based on the volume flux of ISW in the Filchner Depression, is estimated to be 0.1 m/year. Compared with earlier observations, considerable changes were found in the water characteristics and distribution; the temperature of the Weddell Deep Water has increased 0.7 C since 1977. Western Shelf Water, usually dominating the bottom layers in the Filchner Depression and on the Berkner Shelf, was found only in the Ronne Depression. (Auth.)

49-2085

^{228}Ra and ^{228}Th in the Weddell Sea.

Rutgers van der Loeff, M.M., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.177-186, 35 refs.

Oceanographic surveys, Ocean currents, Water transport, Water chemistry, Radioactive isotopes, Antarctica—Weddell Sea

^{228}Ra and its granddaughter ^{228}Th were measured on a N-S transect from 45S to the Antarctic continent across the Antarctic Circumpolar Current (ACC) and the Weddell Sea. The distributions of ^{230}Th, ^{228}Th and ^{228}Ra show that southward transport across the ACC of Circumpolar Deep Water (CDW), the source of Warm Deep Water (WDW) in the Weddell Sea, occurs on a time scale between 8 and 30 years, in qualitative agreement with estimates of the upwelling rate of WDW. The distribution of ^{228}Ra in deep waters is controlled by advection and isopycnal mixing rather than diapycnal mixing. In the Weddell Sea, deep-water ^{228}Ra activities reach 15-20 dpm/m^3. Enrichment in deep water is controlled by the production in the deep-sea floor, favored by low biogenic sediment accumulation rates and consequently high ^{232}Th contents in the surface sediment (3 to 5 dpm/g). The highest ^{228}Ra value (73 dpm/m^3) was observed near the sea floor in a channel where an eastern outflow of Weddell Sea Bottom Water (WSBW) is suspected. It is not yet known whether this value is produced *in-situ* by accumulation in the stratified bottom water, or contains a signal of enrichment in shelf- and Ice Shelf Water.

49-2086

Modelling the extent of sea ice ridging in the Weddell Sea.

Harder, M., Lemke, P., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.187-197, 14 refs.

Pressure ridges, Ice pressure, Ice deformation, Ice cover thickness, Drift, Ice models, Mathematical models, Antarctica—Weddell Sea

A dynamic-thermodynamic sea ice model is modified to distinguish level and ridged ice and is applied to the Weddell Sea. The model explicitly states different prognostic thicknesses for ridged and unridged ice, using four extended continuity equations which include terms to transform level ice into ridged ice due to deformation. Significantly different temporal evolution and spatial distribution for the two ice classes are predicted. Another important extension of the sea ice model, the age of both level and ridged ice, is introduced additionally through two prognostically determined variables, described by two extended continuity equations.

49-2087

Thermobaric convection.

Garwood, R.W., Jr., Isakari, S.M., Gallacher, P.C., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.199-209, 28 refs.

Ocean currents, Water transport, Water temperature, Water pressure, Turbulent exchange, Convection, Mathematical models

49-2088

Oceanic convection in the Greenland Sea Odden region as interpreted in satellite data.

Carsey, F.D., Roach, A.T., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.211-222, 38 refs.

Ice surveys, Sea ice distribution, Ice edge, Ice water interface, Polynyas, Oceanographic surveys, Ocean currents, Water transport, Convection, Spaceborne photography, Greenland Sea

49-2089

Transport of biogenic particulate matter to depth within the Greenland Sea.

Manley, T.O., Smith, W.O., Jr., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.223-236, 59 refs.

Ice edge, Ice cover effect, Oceanographic surveys, Ocean currents, Water transport, Biomass, Nutrient cycle, Suspended sediments, Greenland Sea

49-2090

Distribution of dissolved inorganic and organic carbon in the Eurasian basin of the Arctic Ocean.

Anderson, L.G., Olsson, K., Skoog, A., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.255-262, 21 refs.

Oceanographic surveys, Ocean currents, Water transport, Water chemistry, Salinity, Nutrient cycle, Geochemical cycles, Ice cover effect, Meltwater

49-2091

Primary productivity of a *Phaeocystis* bloom in the Greenland Sea during spring, 1989.

Smith, W.O., Jr., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.263-272, 25 refs.

Ice cover effect, Meltwater, Oceanographic surveys, Plankton, Algae, Biomass, Nutrient cycle, Geochemical cycles, Water chemistry, Greenland Sea

49-2092

Air-sea CO_2 fluxes in the Southern Ocean between 25E and 85E.

Poisson, A., et al, *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.273-284, 22 refs.

Oceanographic surveys, Air water interactions, Carbon dioxide, Nutrient cycle, Geochemical cycles, Water chemistry, Chlorophylls, Ice edge, Ice cover effect, Indian Ocean

The variations of ΔfCO_2 (difference of sea surface and atmospheric carbon dioxide fugacities) and air-sea CO_2 fluxes are described in the western Indian sector of the southern ocean. Measurements were made during two cruises in Jan.-Apr. 1991 and one cruise in Feb. 1993. ΔfCO_2 distributions observed in Feb. 1987 and Feb. 1993 at 30E are also compared. Large ΔfCO_2 variations have been observed, most of which can be related to dynamical variability and/or local biological activity, near the ice edge, the Antarctic Divergence, the Polar Front Zone or local change in topography (e.g. Kerguelen Plateau). Near the pack ice, clear relationships are found between low ΔfCO_2 (CO_2 sink area) and high chlorophyll-a concentrations. A significant CO_2 source region was found in Feb. 1993 centered on the antarctic divergence. South of the Polar Front Zone, fCO_2 decreases strongly; this signal was also found in 1987 and 1991 and can be related to high chlorophyll signal. In the region of the Kerguelen Plateau, ΔfCO_2 spatial variability is very high. Comparing years 1987 and 1993 reveals that when considering interannual variability (mainly related to SST differences between the two periods) the change in ΔfCO_2 has been low over 6 years. (Auth. mod.)

49-2093

Arctic structural evolution: relationship to paleoceanography.

Johnson, G.L., Pogrebitskiĭ, IU.E., Macnab, R., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.285-294, 45 refs.

Marine geology, Bottom topography, Tectonics, Continental drift, Geochronology, Geomorphology, Paleoclimatology, Global change

49-2094

Mid-Pleistocene climate shift—the Nansen connection.

Berger, W.H., Jansen, E., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.295-311, Refs. p.308-311.

Ice age theory, Pleistocene, Glaciation, Ocean currents, Geochronology, Paleoclimatology, Global change

49-2095

Variability of the atmospheric energy flux across 70N computed from the GFDL data set.

Overland,J.E., Turet, P., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.313-325, 10 refs.

Polar atmospheres, Air ice water interaction, Ice cover effect, Ocean currents, Atmospheric circulation, Heat balance, Computerized simulation

49-2096

Influence of polar oceans on interannual climate variations.

Alekseev, G.V., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.327-336, 28 refs.

Air water interactions, Atmospheric circulation, Ocean currents, Ice cover effect, Heat balance, Mathematical models

49-2097

Sea ice thickness changes and their relation to climate.

Wadhams, P., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.337-361, Refs. p.358-361.

Ice surveys, Ice cover thickness, Sea ice distribution, Ice deformation, Pressure ridges, Ice cover effect, Air ice water interaction, Global change, Statistical analysis

The current state of knowledge of sea ice thickness variability in the Arctic and Antarctic is reviewed and evidence for the impact of climate change is provided. The statistical properties of the ice thickness distribution and the mechanisms underlying its development are examined and the shape of the distribution and the statistics of pressure ridge keel depths, slopes, widths and spacings are discussed. In the Antarctic useful results to date on ice thickness distribution have come mainly from drilling, which greatly limits the generality of the conclusions that can be drawn. Data are far too sparse to provide evidence for climate-related changes. Some interesting aspects of antarctic sea ice are the fact that first-year ice is very thin (about 60 cm); that the deep snow cover causes a significant fraction of the ice to undergo flooding leading to snow-ice formation; and that pressure ridges tend to be shallow with drafts of less than 6 m. (Auth. mod.)

49-2098

Variability in sea-ice thickness over the North Pole from 1958 to 1992.

McLaren, A.S., Bourke, R.H., Walsh, J.E., Weaver, R.L., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.363-371, 27 refs.

Ice surveys, Ice cover thickness, Sea ice distribution, Subglacial navigation, Echo sounding, Submarines, Statistical analysis

49-2099

On the required accuracy of atmospheric forcing fields for driving dynamic-thermodynamic sea ice models.

Fischer, H., Lemke, P., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.373-381, 27 refs.

Air ice water interaction, Ice cover thickness, Sea ice distribution, Drift, Ice models, Computerized simulation, Antarctica—Weddell Sea

Presently several improved sea ice-ocean models are being developed in order to investigate the role of sea ice in determining the boundary conditions at the sea surface and to assess its influence on the global ocean circulation. For driving sea ice-ocean models atmospheric data sets are being compiled using analyses of numerical weather prediction models, *in situ* observations and remote sensing products. Since these forcing data (wind, temperature, humidity, precipitation and cloud cover) originate from a variety of sources with different accuracy, the question arises how accurate the atmospheric data have to be in order to be useful for a realistic simulation of sea ice variability on a seasonal and interannual time scale. This paper presents an error analysis on the basis of numerical experiments with a dynamic-thermodynamic sea ice-mixed layer model for the Weddell Sea. (Auth. mod.)

49-2100

On the effect of ocean circulation on arctic ice-margin variations.

Hibler, W.D., III, Zhang, J.L., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.383-397, 13 refs.

Air ice water interaction, Ice surveys, Sea ice distribution, Ice edge, Drift, Ice heat flux, Ice models, Ocean currents, Computerized simulation

49-2101

On the surface heat fluxes in the Weddell Sea.

Launiainen, J., Vihma, T., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.399-419, 60 refs.

Air ice water interaction, Ice cover effect, Ice heat flux, Polynyas, Oceanographic surveys, Ocean currents, Heat loss, Turbulent exchange, Mathematical models, Antarctica—Weddell Sea

Turbulent surface fluxes of sensible and latent heat in the Weddell Sea were studied using drifting marine meteorological buoys with satellite telemetry. In 1990-1992 a total of 5 buoys were deployed on the sea ice, in the open ocean, and on the edge of a floating continental ice shelf. Buoy measurements included wind speed, air temperature and humidity with duplicate sensors, and yielded year-round time series. Modification of the continental air-mass flowing out from the shelf ice to the open sea was studied with aerological soundings made from a research vessel. Associated turbulent heat exchange was estimated on the basis of three methods: modification in the temperature profiles, surface observations, and diabatic resistance laws for the atmospheric boundary layer. If one estimates an area-averaged turbulent heat exchange between the surface and the atmosphere for the whole Weddell Sea on the basis of these data, the large upward fluxes from leads and coastal polynyas (with an areal coverage of 5 to 7% in wintertime) approximately balance the downward fluxes over the sea ice. A first-order estimate for the annual area-averaged total vertical heat loss from the water mass is 20 to 30 W/m^2. (Auth. mod.)

49-2102

Southern Ocean wave fields during the austral winters 1985-1988, by Geosat radar altimeter.

Campbell, W.J., Josberger, E.G., Mognard, N.M., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.421-434, 16 refs.

Oceanographic surveys, Ocean waves, Sea states, Marine meteorology, Height finding, Spaceborne photography

The Geosat radar altimeter is the first satellite sensor to have acquired a global sea state data set over a period of several years. The Geosat altimeter observations over the southern ocean have been processed to derive the austral winter seasonally averaged wave fields from 1985 through 1988. With the satellite observations, the highest sea states for each of the four austral winters are found south of latitude 40S and can reach the antarctic ice edge. In general, the highest Geosat mean significant wave heights are of the order of 4 to 5 m, and within each ocean there is a significant annual variation in the extent of these regions with large wave heights. In the region south of 50S, 30 to 50% of the measured wave heights are greater than 5 m. The Indian Ocean south of 40S is almost entirely covered with these large waves while the Atlantic Ocean is significantly calmer, with only the eastern portion containing such large waves, which do not occur every year. (Auth. mod.)

49-2103

Factors affecting variations of snow surface temperature and air temperature over sea ice in winter.

Guest, P.S., Davidson, K.L., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.435-442, 27 refs.

Ice cover effect, Ice air interface, Snow ice interface, Snow air interface, Snow surface temperature, Ice heat flux, Snow heat flux, Air temperature

49-2104

Aircraft measured atmospheric momentum, heat and radiation fluxes over arctic sea ice.

Hartmann, J., Kottmeier, C., Wamser, C., Augstein, E., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.443-454, 28 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice cover effect, Ice air interface, Ice heat flux, Radiation balance, Aerial surveys, Mathematical models

49-2105

Opening and closing of the "Husky 1" lead complex.

Fett, R.W., Davidson, K.L., Overland, J.E., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.455-473, 6 refs.

Air ice water interaction, Ice surveys, Ice openings, Ice water interface, Ice air interface, Ice reporting, Beaufort Sea

49-2106

Polynyas as a possible source for enigmatic Bennett Island atmospheric plumes.

Dethleff, D., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.475-483, 25 refs.

Polar atmospheres, Air water interactions, Polynyas, Clouds (meteorology), Russia—East Siberian Sea

49-2107

Interannual variability of the thermohaline structure in the convective gyre of the Greenland Sea.

Alekseev, G.V., Ivanov, V.V., Korablev, A.A., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.485-496, 15 refs.

Oceanographic surveys, Ocean currents, Water transport, Water temperature, Salinity, Convection, Greenland Sea

49-2108

Microwave remote sensing of the snow and ice cover: the Russian experience.

Kondrat'ev, K.IA., Melent'ev, V.V., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.497-504, 18 refs.

Research projects, Ice surveys, Ice reporting, Sea ice distribution, Ice conditions, Ice detection, Radiometry, Russia

49-2109

Short- and long-term temporal behavior of polar sea ice covers from satellite passive-microwave observations.

Campbell, W.J., Gloersen, P., Zwally, H.J., *American Geophysical Union. Geophysical monograph series,* 1994, No.85, Polar oceans and their role in shaping the global environment. Edited by O.M. Johannessen, R.D. Muench, and J.E. Overland, p.505-520, 25 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Radiometry, Spaceborne photography

49-2110

Some concepts for precise estimation of deformations/rigid areas in polar pack ice based on time series of ERS-1 SAR images.

Korsnes, R., *International journal of remote sensing,* Dec. 1994, 15(18), p.3663-3674, 10 refs.

Sea ice distribution, Pack ice, Ice surveys, Ice deformation, Ice edge, Classifications, Spaceborne photography, Synthetic aperture radar, Image processing

49-2111

Classification of MOS-1 VTIR images in the Antarctic, a case study.

Schneider, W., Yamanouchi, T., Watanabe, O., Nishio, F., Masuko, H., *International journal of remote sensing,* Dec. 1994, 15(18), p.3675-3691, 21 refs.

Spaceborne photography, Infrared photography, Polar atmospheres, Cloud cover, Classifications, Radiometry, Image processing, Ice sheets, Albedo

Several procedures are described for the automatic processing of data from the visible and thermal infrared radiometers of the MOS-1 satellite during passes over the Antarctic. Under sunlight conditions it is possible to distinguish automatically between cloud free and cloudy surfaces by applying thresholds to the albedo, the brightness temperature and to the degree of homogeneity. Among the cloudy surfaces, stratus clouds above the antarctic continent are identified. The remaining clouds are classified according to their brightness temperatures and albedos. (Auth. mod.)

49-2112

Climatological aspects of mesoscale cyclogenesis over the Ross Sea and Ross Ice Shelf regions of Antarctica.

Carrasco, J.F., Bromwich, D.H., *Monthly weather review,* Nov. 1994, 122(11), p.2405-2425, 63 refs.

Polar atmospheres, Synoptic meteorology, Marine atmospheres, Climatology, Atmospheric circulation, Turbulent boundary layer, Ice sheets, Ice air interface, Ice cover effect, Spaceborne photography, Cloud cover, Seasonal variations, Antarctica—Ross Ice Shelf

49-2113

Research aircraft observations of a polar low at the East Greenland ice edge.

Douglas, M.W., Shapiro, M.A., Fedor, L.S., Saukkonen, L., *Monthly weather review,* Jan. 1995, 123(1), p.5-15, 14 refs.

Synoptic meteorology, Air masses, Marine atmospheres, Convection, Subpolar regions, Cloud cover, Atmospheric disturbances, Atmospheric circulation, Aerial surveys, Spaceborne photography, Weather observations, Greenland

49-2114

Infrared spectra of CF_4 adsorbed on ice: probing adsorbate dilution and phase separation with the v_3 transverse-longitudinal splitting.

Rowland, B., Kadagathur, N.S., Devlin, J.P., *Journal of chemical physics,* Jan. 1,1995, 102(1), p.13-19, 18 refs.

Ice physics, Ice spectroscopy, Ice vapor interface, Gases, Ice microstructure, Adsorption, Layers, Infrared spectroscopy, Spectra, Low temperature tests, Molecular energy levels, Oscillations

49-2115

Paleoecology and stratigraphy of Nichols Meadow, Sierra National Forest, California, USA.

Koehler, P.A., Anderson, R.S., *Palaeogeography, palaeoclimatology, palaeoecology,* Nov. 1994, 112(1-2), p.1-17, 31 refs.

Meadow soils, Pleistocene, Mountain soils, Soil formation, Stratigraphy, Paleoecology, Paleobotany, Sediments, Radioactive age determination, Vegetation patterns, United States—California

49-2116

Late-glacial moraine sequences in Mexico: is there evidence for the Younger Dryas event.

Heine, K., *Paleogeography, palaeoclimatology, palaeoecology,* Nov. 1994, 112(1-2), p.113-123, 32 refs.

Pleistocene, Paleoclimatology, Glacier oscillation, Glacial deposits, Quaternary deposits, Moraines, Radioactive age determination, Geomorphology, Mexico

49-2117

Cyclic changes in the sedimentary environment during the last interglacial/glacial cycle; coastal Jameson Land, East Greenland.

Lyså, A,, Landvik, J.Y., *Palaeogeography, palaeoclimatology, palaeoecology,* Nov. 1994, 112(1-2), p.143-156, 75 refs.

Pleistocene, Marine geology, Marine deposits, Glacial deposits, Sedimentation, Stratigraphy, Periodic variations, Ice sheets, Glacier oscillation, Sea level, Isostasy, Greenland

49-2118

Analysis of the physical state of one arctic polar stratospheric cloud based on observations.

Drdla, K., et al, *Geophysical research letters,* Nov. 15, 1994, 21(23), p.2475-2478, 26 refs.

Cloud physics, Aerial surveys, Polar stratospheric clouds, Chemical properties, Stratosphere, Aerosols, Particle size distribution, Ozone

49-2119

Stratospheric aerosol growth and HNO_3 gas phase depletion from coupled HNO_3 and water uptake by liquid particles.

Carslaw, K.S., Luo, B.P., Clegg, S.L., Peter, T., Brimblecombe, P., Crutzen, P.J., *Geophysical research letters,* Nov. 15, 1994, 21(23), p.2479-2482, 22 refs.

Cloud physics, Polar stratospheric clouds, Chemical properties, Supercooling, Aerosols, Solubility, Phase transformations, Temperature effects, Atmospheric attenuation

49-2120

Greenland precipitation estimates from the atmospheric moisture budget.

Robasky, F.M., Bromwich, D.H., *Geophysical research letters,* Nov. 15, 1994, 21(23), p.2495-2498, 20 refs.

Polar atmospheres, Precipitation (meteorology), Atmospheric composition, Moisture transfer, Humidity, Snow accumulation, Ice sheets, Sounding, Periodic variations, Statistical analysis, Greenland

49-2121

Meridional distributions of NO_x, NO_y, and other species in the lower stratosphere and upper troposphere during AASE II.

Weinheimer, A.J., et al, *Geophysical research letters,* Nov. 15, 1994, 21(23), p.2583-2586, 10 refs.

Polar atmospheres, Atmospheric composition, Stratosphere, Aerial surveys, Sampling, Aerosols, Distribution, Chemical properties

49-2122

Comparison of column abundances from three infrared spectrometers during AASE II.

Traub, W.A., et al, *Geophysical research letters,* Nov. 15, 1994, 21(23), p.2591-2594, 16 refs.

Polar atmospheres, Atmospheric composition, Chemical properties, Aerial surveys, Sampling, Ozone, Profiles, Correlation, Infrared spectroscopy

49-2123

Chemical change in the arctic vortex during AASE II.

Traub, W.A., Jucks, K.W., Johnson, D.G., Chance, K.V., *Geophysical research letters,* Nov. 15, 1994, 21(23), p.2595-2598, 14 refs.

Polar atmospheres, Stratosphere, Atmospheric attenuation, Aerial surveys, Chemical properties, Ozone, Infrared spectroscopy, Spectra, Seasonal variations

49-2124

Two Late Quaternary pollen records from south-central Alaska.

Anderson, P.M., et al, *Géographie physique et Quaternaire,* 1994, 48(2), p.131-143, With French and Russian summaries. 42 refs.

Paleobotany, Paleoclimatology, Forest lines, Subarctic landscapes, Palynology, Vegetation patterns, Classifications, Quaternary deposits, Age determination, United States—Alaska

49-2125

Effect of climatic fluctuations on post-fire regeneration of two jack pine and red pine populations during the twentieth century.

Bergeron, Y., Brisson, J., *Géographie physique et Quaternaire,* 1994, 48(2), p.145-149, With French and German summaries. 21 refs.

Trees (plants), Revegetation, Plant ecology, Growth, Fires, Forest lines, Snow cover effect, Climatic factors, Periodic variations, Canada—Quebec

49-2126

Marine high resolution records of the last interglacial in northwest Europe: a review.

Seidenkrantz, M.S., Knudsen, K.L., *Géographie physique et Quaternaire,* 1994, 48(2), p.157-168, With French and German summaries. 60 refs.

Pleistocene, Paleoclimatology, Glacial deposits, Climatic changes, Sea level, Marine deposits, Marine geology, Boreholes, Isotope analysis, Glacier oscillation, Denmark

49-2127

Permafrost structures of Würmian age on the northern piedmont of the Pyrénées. [Présence d'un pergélisol würmien sur le piémont des Pyrénées atlantiques]

Gangloff, P., Hétu, B., Courchesne, F., Richard, P.J.H., *Géographie physique et Quaternaire,* 1994, 48(2), p.169-178, In French with English and German summaries. 36 refs.

Mountain soils, Terraces, Pleistocene, Geocryology, Permafrost distribution, Permafrost structure, Permafrost indicators, Cryoturbation, Ice wedges, Pyrenees

49-2128

Progress towards a Cenozoic antarctic glacial history.

Barrett, P.J., *Terra Antartica. Special issue,* 1994, 1(2), Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) Symposium, Siena, 1994. Antarctic continental margin: geophysical and geological stratigraphic records of Cenozoic glaciation, paleoenvironments, and sea-level change. Extended abstracts, p.247-248, 20 refs.

Glaciation, Glacial geology, Ice sheets, Ice volume, Sea level

The broad outline of antarctic glacial history was established almost 20 years ago with an oxygen isotope curve for the Cenozoic era based on measurements of carbonate shells from deep-sea cores from the southern ocean. The curve, which was subsequently supported by further oxygen isotope studies, represents changes in both water temperature and ice volume. Here it is compared in a figure with the eustatic sea level curve of Haq et al. (1987). Some consider the magnitude of their indicated sea level changes to be excessive, but few question the timing of the short term (1 my) sea level events, which are thought to result from variations in global ice volume (=antarctic ice volume prior to 2.4 Ma). The present antarctic ice sheet owes its existence not to the continent's polar position, which it has occupied for the last 130 Ma, but to its thermal isolation. The first stage in cryospheric development began soon after 40 Ma as Australia and Tasmania cleared North Victoria Land, with final isolation taking place only 23 Ma with the separation of South America and the Antarctic Peninsula. (Auth. mod.)

49-2129

Sedimentation by the antarctic ice sheet from a glaciological perspective.

Bentley, C.R., *Terra Antartica. Special issue,* 1994, 1(2), Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) Symposium, Siena, 1994. Antarctic continental margin: geophysical and geological stratigraphic records of Cenozoic glaciation, paleoenvironments, and sea-level change. Extended abstracts, p.249-250, 15 refs.

Ice sheets, Ice volume, Rheology, Sedimentation, Glacial geology, Sea level, Antarctica—Ross Sea

The author addresses the questions of what the glaciological evidence and expectations are for changes in the dimensions of the ice sheet and how the sedimentation process is tied to those changes. He suggests that the discharge of till beneath the ice shelf at the grounding line will facilitate grounding-line advance in times of falling sea level. The till delta will be changed from a zone of progressive decoupling between the ice and its bed into a zone of active erosion. Re-activated till will be deposited at the grounding line, thus helping it to advance. This process may have made it possible for the grounding line in the Ross Embayment to advance well out into the Ross Sea during the last glacial maximum.

49-2130

Glacial sedimentation processes.

Syvitski, J., *Terra Antartica. Special issue,* 1994, 1(2), Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) Symposium, Siena, 1994. Antarctic continental margin: geophysical and geological stratigraphic records of Cenozoic glaciation, paleoenvironments, and sea-level change. Extended abstracts, p.251-253, 20 refs.

Ice sheets, Marine deposits, Glacial geology, Marine geology, Ice shelves, Sedimentation

The type of sediment deposits fronting the marine margin of an ice sheet depends on glaciologic, oceanographic and geologic parameters. The study of glacimarine deposition has often employed two end-member analog environments: temperate tidewater-glaciers of SE Alaska, and floating and polar ice-margins of Antarctica, where little meltwater emanates from the ice sheet and sediment deposition is controlled by formation of diamicton (till) near the grounding line.

49-2131

Late Cenozoic tectonic and volcanic controls on the dynamics of the West Antarctic ice sheet in the West Antarctic rift system.

Behrendt, J.C., et al, *Terra Antartica. Special issue,* 1994, 1(2), Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) Symposium, Siena, 1994. Antarctic continental margin: geophysical and geological stratigraphic records of Cenozoic glaciation, paleoenvironments, and sea-level change. Extended abstracts, p.333-334, 12 refs.

Ice sheets, Ice shelves, Glaciation, Tectonics, Volcanoes, Subglacial observations, Glacial geology, Glacial erosion, Seismology, Antarctica—Ross Sea, Antarctica—Ross Ice Shelf

The CASERTZ and GANOVEX-USGS aeromagnetic results, combined with >100,000 km of widely spaced aeromagnetic profiles, indicate at least $10^6 km^3$ of probable late Cenozoic(?) volcanic rock in the West Antarctic rift beneath the ice sheet and Ross Ice Shelf, which is comparable to volumes calculated for other mantle plumes. Seismic reflection and radar ice sounding data are interpreted as indicating glacial erosion of volcanic peaks erupted beneath the ice sheet in several places, suggesting this is a general case. Behrendt and Cooper (1991) suggest a possible synergistic relationship between the high uplift rate of the rift shoulder and antarctic glaciation which is generally coincident in late Cenozoic time.

49-2132

Cenozoic glacial record of the Ross Sea region, revealed by deep drilling on the continental shelf.

Hambrey, M.J., Barrett, P.J., *Terra Antartica. Special issue,* 1994, 1(2), Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) Symposium, Siena, 1994. Antarctic continental margin: geophysical and geological stratigraphic records of Cenozoic glaciation, paleoenvironments, and sea-level change. Extended abstracts, p.367-369, 19 refs.

Glacial geology, Glacial deposits, Marine geology, Geochronology, Ice sheets, Antarctica—Ross Sea

Historically, the Ross Sea region occupies the most important place in deciphering the glacial history of Antarctica. It has been influenced by ice from several major sources, notably the largely marine-based West Antarctic ice sheet, the mainly terrestrial East Antarctic ice sheet, and local ice from the Transantarctic Mountains, a glaciological situation that still prevails today. Reviews and syntheses of the Cenozoic stratigraphic record from the Ross Sea have recently been published elsewhere so only the main elements are presented here, together with a brief mention of some of the problems requiring resolution.

49-2133

Prograded sequences, erosional unconformities, and ice advances on the Wilkes Land margin.

Eittreim, S.L., Tanahashi, M., Cooper, A.K., Wannesson, J., *Terra Antartica. Special issue,* 1994, 1(2), Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) Symposium, Siena, 1994. Antarctic continental margin: geophysical and geological stratigraphic records of Cenozoic glaciation, paleoenvironments, and sea-level change. Extended abstracts, p.389-390, 12 refs.

Ice sheets, Glacier flow, Glacial erosion, Glacial geology, Marine deposits, Seismic surveys, Bottom topography, Antarctica—Wilkes Land

The Chase et al. (1987) bathymetric map shows the Wilkes Land shelf to be composed of outer-shelf banks (less than 400 m), separated by broad, dish-shaped outer-shelf troughs. These outer-shelf troughs are connected to the high-relief, shore-parallel inner-shelf troughs whose floors apparently go to the bases of the present Mertz, Ninnis, and other glacial tongues. The combined inner- and outer-shelf troughs are likely conduits for the extension of the glacial tongues to the outer shelf, presumably as ice streams. Seismic data show that progradational sequences occur immediately below the sea floor of the outer-shelf troughs. Present-day banks however are demonstrably aggradational, not progradational. Modern ice streams emanate from the continental ice sheet at restricted locations and occupy a very small percentage of the total ice margin fronting the sea. To accomplish the great erosion that has occurred to over-deepen the antarctic shelf, such localized ice streams must have crossed the shelf on varied paths over the Tertiary history of ice expansions onto the antarctic shelf.

49-2134

Cenozoic sedimentary record of the Prydz Bay continental shelf, East Antarctica.

Hambrey, M.J., Ehrmann, W.U., Larsen, B., *Terra Antartica. Special issue,* 1994, 1(2), Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) Symposium, Siena, 1994. Antarctic continental margin: geophysical and geological stratigraphic records of Cenozoic glaciation, paleoenvironments, and sea-level change. Extended abstracts, p.399-402, 12 refs.

Glacial geology, Glaciation, Land ice, Ice sheets, Glacial erosion, Sedimentation, Seismic surveys, Antarctica—Prydz Bay

During Leg 119 of the Ocean Drilling Program, 5 holes were drilled on a transect across the continental shelf in Prydz Bay in the 1987-88 season in order to establish the long-term history of the East Antarctic ice sheet, and in particular to examine the timing and initiation of glaciation at sea level and the subsequent development of the ice sheet, and to improve the understanding of the processes of erosion and sedimentation on a glacier-influenced continental shelf. These aims, combining biostratigraphic, sedimentological and geophysical techniques, were achieved, and a general model for deposition in such a setting was developed. The documented record extends back at least to earliest Oligocene time and possibly middle Eocene.

49-2135

Morphology and late glacial history of Prydz Bay, Antarctica, based on echo sounder data.

O'Brien, P.E., *Terra Antartica. Special issue,* 1994, 1(2), Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) Symposium, Siena, 1994. Antarctic continental margin: geophysical and geological stratigraphic records of Cenozoic glaciation, paleoenvironments, and sea-level change. Extended abstracts, p.403-405, 15 refs.

Glacial geology, Ice shelves, Echo sounding, Marine deposits, Bottom topography, Sedimentation, Antarctica—Amery Ice Shelf, Antarctica—Prydz Bay

The Lambert Glacier-Amery Ice Shelf system is the largest outlet glacier flowing from the East Antarctic ice sheet. It ends in Prydz Bay, the site of a major sedimentary basin. This study uses echo-sounder data to investigate sea floor morphology as a framework for understanding sedimentation processes and to develop a model for the retreat of the Amery Ice Shelf from the continental shelf during the last deglaciation. These data are supplemented by preliminary results from the analysis of grabs and gravity cores.

49-2136

Seismic activity in and around the antarctic continent.

Kaminuma, K., *Terra Antartica. Special issue,* 1994, 1(2), Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) Symposium, Siena, 1994. Antarctic continental margin: geophysical and geological stratigraphic records of Cenozoic glaciation, paleoenvironments, and sea-level change. Extended abstracts, p.423-426, 14 refs.

Earthquakes, Icequakes, Seismology, Seismic surveys, Tectonics, Sea ice, Antarctica—Showa Station

The antarctic continent and its surrounding southern ocean are divided into the following 5 regions in terms of seismicity: an intraplate low seismic region, high seismic region around the Antarctic Peninsula, antarctic continent aseismic region, low seismic region at the edge of the continent, and a volcanic region. A tripartite seismic array with three-component seismographs was operated around Showa Station in 1987-89 for studying the local seismicity around the station and the propagation characteristics of seismic waves under the east antarctic shield area. More than 17,000 events were recorded during 29 months from June 1987 to Oct. 1989; of these, about 25% were sea-ice shocks, 66% were icequakes, 8% were teleseisms and 1% were events caused by glacier movements. Only 10 local events were located by the network during the 20 months from June 1987 to Jan. 1989.

49-2137

Processes and facies of glacier grounding-line systems with inferences on lithofacies architecture and seismic stratigraphy.

Powell, R.D., *Terra Antartica. Special issue,* 1994, 1(2), Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) Symposium, Siena, 1994. Antarctic continental margin: geophysical and geological stratigraphic records of Cenozoic glaciation, paleoenvironments, and sea-level change. Extended abstracts, p.433-434, 4 refs.

Glacial deposits, Glacier tongues, Marine deposits, Glacier oscillation, Sedimentation, Antarctica—Mackay Glacier Tongue

Fluted till is exposed on the sea floor below the floating glacier-tongue of Mackay Glacier, an outlet glacier of the East Antarctic Ice Sheet entering McMurdo Sound. Areas of undisturbed till surface indicate the glacier lifted from its bed during an apparently fast retreat of the grounding line. The timing of the grounding line retreat is currently uncertain; however, diverse epibenthic communities on the surface include varieties of sponge species similar to those found by marine biologists at shallower depths in McMurdo Sound. The sponges are quite large, which probably indicates grounding line retreat at least tens of years ago. Aerial photographs and direct observations since the time of Scott's expeditions document the fluctuation in position of the tongue terminus due to iceberg calving. However, such fluctuations need not reflect movement of the grounding line.

49-2138

Subice topography and its implications on the glacial erosion history and tectonic evolution of Victoria Land during the Cenozoic.

Delisle, G., *Terra Antartica. Special issue,* 1994, 1(2), Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) Symposium, Siena, 1994. Antarctic continental margin: geophysical and geological stratigraphic records of Cenozoic glaciation, paleoenvironments, and sea-level change. Extended abstracts, p.441-443, 8 refs.

Glacial geology, Glacial erosion, Land ice, Subglacial observations, Mapping, Bottom topography, Antarctica—Victoria Land

The subice topography of selected areas of Victoria Land, typically covered by 300-1100 m thick ice, was surveyed with a ground based radio echo sounder during the GANOVEX VI (1990-91) and GANOVEX VII (1992-93) expeditions and the ACRUP-I project of the Italian Antarctic Expedition of 1993-94. The amount of glacial erosion in the area during Cenozoic times can be roughly estimated on the basis of the following two observations: the subice topography maps offer evidence for block tectonic movement, which has left blocks exposed in different degrees to erosional processes. Secondly, the subice topography maps clearly indicate the erosional base to coincide frequently with the top section of the basement, indicating that the main mass eroded away by glacial action consisting of Post-Ordovician deposits.

49-2139

Late Neogene record of paleoenvironmental change from the southern ocean: regional and global implications.

Ishman, S.E., *Terra Antartica. Special issue,* 1994, 1(2), Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) Symposium, Siena, 1994. Antarctic continental margin: geophysical and geological stratigraphic records of Cenozoic glaciation, paleoenvironments, and sea-level change. Extended abstracts, p.477-478, 9 refs.

Marine geology, Glacial geology, Ice sheets, Paleoecology, Sea level, Variations, Antarctica—Victoria Land, Antarctica—Weddell Sea

The antarctic margin provides the best opportunity to construct an ice proximal paleoenvironmental record for Antarctica. Data from the South Atlantic (ODP 704A) show light $\delta^{18}O$ values relative to today, associated with the predominance of northern component deep water, indicating southern ocean conditions warmer than present in the middle to late Pliocene. These data and others like them are needed for a better understanding of depositional models, ice sheet dynamics and the importance of antarctic ice volume to global conditions.

49-2140

Changes to ocean wave spectra in a marginal ice zone. 1.

Meylan, M., Squire, V.A., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.3., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.136-141, 10 refs.

Ice water interface, Ice cover effect, Ice edge, Ocean waves, Wave propagation, Mathematical models

49-2141

Changes to ocean wave spectra in a marginal ice zone. 2.

Squire, V.A., Meylan, M., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.3., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.142-146, 12 refs.

Ice water interface, Ice cover effect, Ice edge, Ice floes, Ocean waves

49-2142

Spreading of crude petroleum in brash ice; effects of oil's physical properties and water current.

Sayed, M., Kotlyar, L.S., Sparks, B.D., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.1., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.225-232, 8 refs.

Oil spills, Ice cover effect, Ice water interface, Floating ice, Water pollution, Environmental tests

49-2143

Current distribution and thermal stability of natural gas hydrates in the Canadian polar regions.

Judge, A., Smith, S.L., Majorowicz, J., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.1., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.307-314, 40 refs.

Hydrates, Natural gas, Exploration, Permafrost surveys, Subsea permafrost, Bottom sediment, Soil air interface, Climatic changes, Well logging, Canada—Northwest Territories—Arctic Islands, Canada—Northwest Territories—Mackenzie River Delta, Beaufort Sea

49-2144

Study on the characteristics of high-strength lightweight concrete for icy waters.

Asai, Y., Itoh, Y., Kanie, S., Sakai, M., Saeki, H., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.4., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.363-368, 3 refs.

Lightweight concretes, Concrete freezing, Concrete durability, Concrete strength, Concrete aggregates, Frost resistance, Frost protection, Freeze thaw tests

49-2145

World's first SPB LNG carrier *Polar Eagle*.

Aoki, E., Nakajima, Y., Yamada, K., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.4., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.586-590, 3 refs.

Tanker ships, Liquefied gases

49-2146

Ice sheets and sea level.

Bromwich, D.H., *Nature,* Jan. 5, 1995, 373(6509), p.18-19, 11 refs.

Snow accumulation, Ice sheets, Atmospheric circulation, Air temperature, Sea level

An appraisal is made assessing the influence of changes in atmospheric temperatures and storm tracks in both hemispheres on global warming and sea level. The evidence seems to point to storm tracks as the dominant mechanism.

49-2147

Dominant influence of atmospheric circulation on snow accumulation in Greenland over the past 18,000 years.

Kapsner, W.R., Alley, R.B., Shuman, C.A., Anandakrishnan, S., Grootes, P.M., *Nature,* Jan. 5, 1995, 373(6509), p.52-54, 35 refs.

Snow accumulation, Atmospheric circulation, Air temperature, Climatic changes, Ice cores, Greenland

49-2148

Proceedings. Vol.2.

International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994, Chung, J.S., ed, Karal, K., ed, Koterayama, W., ed, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1995, 615p., Refs. passim. For selected papers see 49-2149 through 49-2179.

DLC TC1665.I5793a Vol.2, 1994

Ice loads, Ice solid interface, Ice pressure, Ice friction, Ice cover strength, Ice deformation, Ice navigation, Offshore structures

49-2149

Review of cold regions developments in Canada.

Frederking, R.M.W., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.414-421, 10 refs.

Minerals, Mining, Petroleum industry, Economic development, Exploration, Ice conditions, Ice navigation, Permafrost distribution, Canada

49-2150

Flexible vertical sheet in waves.

Meylan, M., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.422-427, 9 refs.

Ice water interface, Ice cover effect, Ice elasticity, Ocean waves, Wave propagation, Mathematical models

49-2151

Moving loads on sea ice: a juxtaposition of theory and experiment.

Rayner, G.D., Enlow, R.L., Squire, V.A., Robinson, W.H., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.428-437, 12 refs.

Ice runways, Ice roads, Ice cover strength, Ice loads, Ice deformation, Dynamic loads, Mathematical models

49-2152

Modelling of creep deformations in ice.

Nilsen, A.U., Horrigmoe, G., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.438-441, 15 refs.

Ice creep, Ice deformation, Ice cover strength, Ice solid interface, Mathematical models

49-2153

Numerical simulations of ice failure problems.

Shibue, T., Kato, K., Kumakura, Y., Toi, Y., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.442-448, 10 refs.

Ice cover strength, Ice deformation, Ice loads, Ice cracks, Ice solid interface, Mathematical models, Computerized simulation

49-2154

Constitutive modelling of the visco-plastic behaviour of ice.

Azizi, F., Whalley, W.B., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.449-454, 16 refs.

Ice cover strength, Ice deformation, Ice creep, Ice pressure, Ice plasticity, Ice models, Mathematical models

49-2155

Strength anisotropia of sea ice.

Evdokimov, G.N., Rogachko, S.I., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.455-457, 12 refs.

Ice cover strength, Ice structure, Ice deformation, Ice pressure

49-2156

Distributed mass/discrete floe model for rheology computation of pack ice consisting of disk floes.

Rheem, C.K., Yamaguchi, H., Kato, H., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.458-465, 14 refs.

Ice floes, Ice cover strength, Ice deformation, Ice loads, Ice pressure, Ice friction, Ice solid interface, Drift, Ice models, Mathematical models

49-2157

Complete ice cover formation in closed water.

Hirayama, K., Sakai, S., Sasamoto, M., Kobayashi, M., Miya, A., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.466-472, 10 refs.

Lake ice, Ice formation, Freezeup, Ice cover thickness, Ice cover strength, Ice forecasting

49-2158

Operational ice model at the Atmospheric Environment Service, Canada.

Neralla, V.R., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.473-478, 17 refs.

Sea ice distribution, Ice conditions, Ice cover thickness, Drift, Ice forecasting, Ice models, Mathematical models, Canada

49-2159

Laboratory evaluation of aircraft ground de/anti-icing products.

Louchez, P.R., Laforte, J.L., Bouchard, G., Farzaneh, M., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.479-483, 13 refs.

Aircraft icing, Chemical ice prevention, Wind tunnels

49-2160

New ideas concerning aircraft icing forecast.

Fuchs, W., Schickel, K.P., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.484-487, 11 refs.

Aircraft icing, Ice accretion, Icing rate, Ice forecasting

49-2161

New method of modelling ice accretion on objects of complex geometry.

Szilder, K., Lozowski, E.P., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.488-494, 11 refs.

Ice accretion, Icicles, Ice solid interface, Ice models, Ice forecasting

49-2162

Icing rate meter estimation of in-cloud cable icing.

McComber, P., Druez, J., Laflamme, J., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.495-502, 14 refs.

Power line icing, Ice accretion, Icing rate, Ice loads, Ice detection

49-2163

Industrial research and development of ice technology.

Kawasaki, T., Tozawa, S., Kayo, Y., Yano, S., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.503-508, 15 refs.

Ice loads, Ice pressure, Ice forecasting, Ice solid interface, Metal ice friction, Offshore structures, Ships

49-2164

Effect of imperfect contact on total ice force.

Takeuchi, T., Saeki, H., Okamoto, S., Yamashita, T., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.509-513, 15 refs.

Ice solid interface, Ice loads, Ice cover strength, Ice deformation, Ice pressure, Offshore structures, Environmental tests

49-2165

About initial conditions of ice-structure interaction problem.

Bekker, A.T., Rudetskiĭ, V.A., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.514-516, 2 refs.

Ice solid interface, Ice loads, Ice pressure, Ice cover strength, Ice deformation, Offshore structures, Mathematical models

49-2166

Load combination for offshore structures.

Bekker, A.T., Uvarova, T.E., Shtan'ko, L.F., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.517-520, 6 refs.

Ice solid interface, Ice loads, Ice pressure, Offshore structures, Design criteria, Mathematical models

49-2167

Nonlinear finite element analysis of ice-structure interaction at varying strain rates.

Horrigmoe, G., Andersen, R., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.521-525, 9 refs.

Ice solid interface, Ice loads, Ice pressure, Ice cover strength, Ice deformation, Offshore structures, Mathematical models

49-2168

Model experiments for ice forces on multi conical legged structures.

Kato, K., Adachi, M., Kishimoto, H., Hayashiguchi, S., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.526-533, 6 refs.

Ice solid interface, Ice loads, Ice pressure, Offshore structures, Environmental tests, Mathematical models

49-2169

Mitigation of steady-state vibrations induced by ice.

Kärnä, T., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.534-539, 33 refs.

Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice control, Damping, Offshore structures

49-2170

Ice-material surface interaction in ice friction and ice adfreeze bonding.

Nakazawa, N., Terashima, T., Saeki, H., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.540-544, 11 refs.

Ice solid interface, Ice loads, Ice friction, Ice adhesion, Ice deformation, Offshore structures, Concrete structures, Steel structures

49-2171

Estimation method for abrasion of concrete structures due to sea ice movement.

Itoh, Y., Tanaka, Y., Saeki, H., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.545-552, 9 refs.

Ice solid interface, Ice loads, Ice pressure, Ice friction, Abrasion, Concrete structures, Environmental tests

49-2172

Influence of a rubble field in front of a conical structure.

Izumiyama, K., Irani, M.B., Timco, G.W., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.553-558, 9 refs.

Ice solid interface, Ice loads, Ice pressure, Ice pileup, Offshore structures, Environmental tests

49-2173

Friction coefficient between model ice and roughened model surface.

Kishi, S., Yamauchi, Y., Inoue, M., Narita, S., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.559-564, 6 refs.

Ice solid interface, Metal ice friction, Ice loads, Ice navigation, Icebreakers, Environmental tests

49-2174

Model tests of multi-legged structures in continuous and broken ice fields.

Toyama, Y., Yashima, N., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.565-571, 13 refs.

Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice pileup, Offshore structures, Environmental tests, Mathematical models

49-2175

Development of the sink-and-float-type ice boom (SFIB) in ice floe control.

Imaizumi, A., Hara, F., Saeki, H., Enoki, K., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.572-577, 4 refs.

Ice booms, Ice control, Ice floes, Ports

49-2176
On the speed dependence of the ice submerging resistance in level ice.
Kamarainen, J., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.578-583, 8 refs.
Ice solid interface, Ice loads, Ice pressure, Metal ice friction, Ice navigation, Ships, Mathematical models

49-2177
Study on icebreaking performance of polar ships—ridge transit performance.
Nozawa, K., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.584-591, 7 refs.
Icebreakers, Ice breaking, Ice navigation, Metal ice friction, Pressure ridges

49-2178
Hydrodynamic effect of ship advance on ice flexural failure.
Yamaguchi, H., Kato, H., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.592-595, 14 refs.
Icebreakers, Ice breaking, Ice navigation, Metal ice friction, Ice cover strength, Ice deformation, Ice water interface

49-2179
Experimental determination of hydrodynamic non-contact loads during propeller/ice interaction.
Newbury, S., Browne, R.P., Jones, S.J., International Offshore and Polar Engineering Conference, 4th, Osaka, Japan, Apr. 10-15, 1994. Proceedings. Vol.2. Edited by J.S. Chung, K. Karal, and W. Koterayama, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1994, p.596-601, 5 refs.
Propellers, Ice breaking, Ice navigation, Ice solid interface, Ice loads, Metal ice friction, Cavitation

49-2180
Differential thermal expansion and contraction: a mechanistic approach to adhesion in asphalt concrete.
El Hussein, H.M., Abd Halim, A.O., *Canadian journal of civil engineering,* June 1993, 20(3), p.366-373, With French summary. 16 refs.
Bituminous concretes, Concrete pavements, Concrete aggregates, Adhesion, Thermal stresses, Thermal expansion, Low temperature tests, Temperature effects, Cold weather performance, Mechanical tests, Freeze thaw cycles, Analysis (mathematics)

49-2181
Early Holocene deglaciation of Expedition and Strand fiords, Canadian High Arctic.
Lemmen, D.S., Aitken, A.E., Gilbert, R., *Canadian journal of earth sciences,* June 1994, 31(6), p.943-958, With French summary. 66 refs.
Arctic landscapes, Geomorphology, Paleoecology, Glaciation, Glacial geology, Quaternary deposits, Marine deposits, Geochronology, Radioactive age determination, Canada—Northwest Territories—Axel Heiberg Island

49-2182
Modelling of permafrost thickness during the late glacial stage in France: preliminary results.
Lebret, P., et al, *Canadian journal of earth sciences,* June 1994, 31(6), p.959-968, With French summary. 58 refs.
Pleistocene, Soil freezing, Permafrost physics, Permafrost thickness, Permafrost depth, Permafrost distribution, Permafrost indicators, Soil temperature, Surface temperature, Lithology, Computerized simulation, France

49-2183
Iron phosphate precipitation by epilithic microbial biofilms in arctic Canada.
Konhauser, K.O., Fyfe, W.S., Schultze-Lam, S., Ferris, F.G., Beveridge, T.J., *Canadian journal of earth sciences,* Aug. 1994, 31(8), p.1320-1324, With French summary. 29 refs.
Arctic landscapes, Microbiology, Bacteria, Fungi, Rocks, Weathering, Mineralogy, Films, Ecosystems, Geochemical cycles, Canada—Northwest Territories—Ellesmere Island

49-2184
Nitrogen fixation and photosynthesis in high arctic forms of *Nostoc commune*.
Lennihan, R., Chapin, D.M., Dickson, L.G., *Canadian journal of botany,* July 1994, 72(7), p.940-945, With French summary. 34 refs.
Arctic landscapes, Ecosystems, Plant physiology, Bacteria, Microbiology, Phenology, Photosynthesis, Nutrient cycle, Temperature effects, Seasonal variations, Canada—Northwest Territories—Devon Island

49-2185
Chemical composition of fresh snow from Gulmarg, north India.
Naik, M.S., Khemani, L.T., Momin, G.A., Rao, P.S.P., Safai, P.D., Pillai, A.G., *Environmental pollution,* 1995, 87(2), p.167-171, 28 refs.
Snow composition, Sampling, Chemical analysis, Snow impurities, Ion density (concentration), Environmental tests, Air pollution, Aerosols, India

49-2186
Device for sampling frozen soil.
Rusetskas, IU.IU., *Eurasian soil science,* Apr. 1994, 26(4), p.123-125, Translated from Pochvovedenie, 25(10), 1993. 5 refs.
Soil tests, Soil science, Permafrost samplers, Core samplers, Augers, Design

49-2187
Snow ecology: a report on a new initiative.
Jones, H.G., Pomeroy, J.W., Walker, D.A., Wharton, R.A., *Canadian field-naturalist,* Jan.-Mar. 1994, 108(1), p.96-98.
Ecology, Ecosystems, Snow cover effect, Environmental impact, Research projects, Meetings

49-2188
Rapid geomorphic change caused by glacial outburst floods and debris flows along Tahoma Creek, Mount Rainier, Washington, U.S.A.
Walder, J.S., Driedger, C.L., *Arctic and alpine research,* Nov. 1994, 26(4), p.319-327, 21 refs.
Glacial hydrology, Alpine landscapes, Lake bursts, Glacier ice, Flooding, Stream flow, Sediment transport, Mass flow, Geomorphology, United States—Washington—Rainier, Mt.

49-2189
Nutrient cycling in the three central Himalayan forests ranging from close canopied to open canopied treeline forests, India.
Garkoti, S.C., Singh, S.P., *Arctic and alpine research,* Nov. 1994, 26(4), p.339-348, 51 refs.
Alpine landscapes, Trees (plants), Forest lines, Forest canopy, Forest ecosystems, Nutrient cycle, Plant tissues, Vegetation patterns, Plant ecology, India—Himalaya Mountains

49-2190
Vegetation succession on river gravel bars across the northwestern Himalayas, India.
Prach, K., *Arctic and alpine research,* Nov. 1994, 26(4), p.349-353, 23 refs.
Plant ecology, Mountains, River basins, Vegetation patterns, Altitude, Revegetation, Biogeography, India—Himalaya Mountains

49-2191
Succession on regraded placer mine spoil in Alaska, U.S.A., in relation to initial site characteristics.
Densmore, R.V., *Arctic and alpine research,* Nov. 1994, 26(4), p.354-363, 32 refs.
Subarctic landscapes, Placer mining, Land reclamation, Excavation, Environmental impact, Plant ecology, Vegetation patterns, Revegetation, Nutrient cycle, Subgrade soils, Substrates, United States—Alaska

49-2192
Changes in vegetation and soil fertility along a predictable snowmelt gradient in the Mosquito Range, Colorado, U.S.A.
Stanton, M.L., Rejmánek, M., Galen, C., *Arctic and alpine research,* Nov. 1994, 26(4), p.364-374, 69 refs.
Alpine landscapes, Plant ecology, Ecosystems, Phenology, Vegetation patterns, Correlation, Snowmelt, Seasonal variations, Snow cover effect, United States—Colorado—Pennsylvania Mountain

49-2193
Pikas and permafrost: Post-Wisconsin historical zoogeography of *Ochotona* in the southern Rocky Mountains, U.S.A.
Hafner, D.J., *Arctic and alpine research,* Nov. 1994, 26(4), p.375-382, 55 refs.
Permafrost distribution, Biogeography, Alpine landscapes, Talus, Periglacial processes, Ecosystems, Animals, Distribution, Vegetation patterns, Climatic factors, United States—Colorado—Rocky Mountains

49-2194
Modern pollen spectra and vegetation in the Wind River Range, Wyoming, U.S.A.
Fall, P.L., *Arctic and alpine research,* Nov. 1994, 26(4), p.383-392, 30 refs.
Alpine landscapes, Alpine tundra, Pollen, Sampling, Distribution, Paleobotany, Paleoecology, Vegetation patterns, Plant ecology, United States—Wyoming—Wind River Range

49-2195
Remote sensing of the radiation balance during the growing season at the Niwot Ridge long-term ecological research site, Front Range, Colorado, U.S.A.
Duguay, C.R., *Arctic and alpine research,* Nov. 1994, 26(4), p.393-402, 31 refs.
Alpine landscapes, Alpine tundra, Ecosystems, Radiation balance, Remote sensing, LANDSAT, Snow cover effect, Albedo, Seasonal variations, Sensor mapping, United States—Colorado—Front Range

49-2196
Role of willow-birch forest in the surface energy balance at arctic treeline.
Blanken, P.D., Rouse, W.R., *Arctic and alpine research,* Nov. 1994, 26(4), p.403-411, 26 refs.
Arctic landscapes, Surface energy, Forest ecosystems, Forest canopy, Growth, Evapotranspiration, Heat balance, Vegetation factors, Climatic factors, Taiga, Canada—Manitoba—Churchill

49-2197
Variation in wood anatomy of white spruce in response to dune activity.
Cournoyer, L., Filion, L., *Arctic and alpine research,* Nov. 1994, 26(4), p.412-417, 38 refs.
Subarctic landscapes, Trees (plants), Eolian soils, Shoreline modification, Plant tissues, Structural analysis, Growth, Age determination, Wind factors, Periodic variations, Climatology, Canada—Hudson Bay

49-2198
Groundwater-discharge fens in the Tanana lowlands, interior Alaska, U.S.A.
Racine, C.H., Walters, J.C., MP 3559, *Arctic and alpine research,* Nov. 1994, 26(4), p.418-426, 27 refs.
Subarctic landscapes, Wetlands, Channels (waterways), Ground water, Upwelling, Hydrology, Plant ecology, Ecosystems, Classifications, Vegetation patterns, United States—Alaska—Tanana Flats

Large expanses of herbaceous floating mat wetlands (FMW) bordered by slightly higher uplands with forest or scrub occur in the northwest corner of the Tanana Flats between the Alaska Range and the Tanana River. The floating mat vegetation consists of tall emergent macrophytes; mosses are conspicuously absent and shrubs are infrequent. Although species dominance shifts over short distances on the mat, four community types can be recognized: (1) *Menyanthes trifoliata*, (2) *Carex aquatilis*, (3) *Typha latifolia*, and (4) *Calla palustris*. Below the water surface, the mat extends to a depth of 0.5 to 1.0 m and consists of rhizomes and roots in a matrix of well-decomposed peat and water. The mat then either directly overlies unfrozen gray silts at a depth of 1 m, or more commonly, floats on a clear-water or loose peat zone above more consolidated peat lying on unfrozen silt at a depth of 1.5 to 2.5 m. No permafrost or frozen ground was detected in late Aug. or late winter below these floating mats, but it is ubiquitous on the bordering uplands, 0.5 to 2 m above the FMW. The topographic location, apparent absence of permafrost, water chemistry, and vegetation composition all suggest that these areas are fens fed by groundwater sources flowing out of the Alaska Range. Although floating mats are frequently described in the literature as occupying the edge of northern ponds and lakes, the FMW described here do not; they appear to be unique because of their large extent, absence of mosses, physiographic position, and presumed origin.

49-2199

Heat flux transducers measure *in-situ* building thermal performance.

Flanders, S.N., MP 3560, *Journal of thermal insulation and building envelopes,* July 1994, Vol.18, p.28-52, 30 refs.

Buildings, Thermal insulation, Heat flux, Temperature measurement, Standards

This paper presents an overview of heat flux transducers (HFTs) used for *in-situ* measurements of building performance. HFTs that are mounted in laboratory testing apparatuses are beyond the scope of the paper. The overview is based on HFT literature from the past five years. The overview covers how HFTs are constructed to measure heat flow and touches on the near relatives of HFTs, portable calorimeters and thermal probes. The question of calibration is key to the appropriate use of HFTs. The paper discusses the range of building thermal performance applications for HFTs, from roofs to foundations to mechanical systems. A variety of ASTM (American Society for Testing and Materials) standards exist that relate to characterizing the building thermal context the HFT is used in. They pertain to: using thermography; HFT measurements; calculating thermal resistance from *in-situ* data; and calibrating the HFT. The author discusses key elements to consider in the use of HFTs for *in-situ* measurements and addresses current developments in the construction and use of HFTs.

49-2200

Potential role of natural attenuation in remediating contaminated soils at cold region military installations.

Currier, P.M., Reynolds, C.M., Grant, S.A., MP 3561, Annual Army Environmental R&D Symposium, 17th, and USACE Innovative Technology Transfer Workshop, 3rd, Williamsburg, VA, June 22-24, 1993, Fort Belvoir, VA, U.S. Army Corps of Engineers, [1993], 6p., 2 refs.

Soil pollution, Soil chemistry, Soil microbiology, Land reclamation, Oil spills, Waste treatment, Military facilities

Technology continually reduces the cost of treating contaminated soils, yet estimates of the amount of soil requiring treatment are continuously increasing. It now appears inevitable that the resources available will be insufficient to treat all contaminated soils. Generally, contaminants in soil are attenuated to some extent by natural processes. Preliminary information from bioremediation studies and site investigations in Alaska indicate significant variability in reduction of oil contamination when no active or engineered measures are applied. Processes for remediating organic contamination in soil are the same whether the remediation is engineered or natural. In engineered remediation, one to several processes are enhanced by controlling the limiting factors. Engineered solutions are often favored due to the control of transport and transformation processes that can be attained.

49-2201

"Inside-out weathering" of boulders in glacial outwash gravel.

Suggate, R.P., Watters, W.A., *New Zealand journal of geology and geophysics,* 1991, 34(1), p.93-97, 5 refs.

Glacial deposits, Outwash, Gravel, Weathering, Lithology, New Zealand

49-2202

Glacial history of the upper Derwent Valley, Tasmania.

Kiernan, K., *New Zealand journal of geology and geophysics,* 1991, 34(2), p.157-166, 50 refs.

Glaciation, Glacial geology, Glacial deposits, Moraines, Geochronology, Pleistocene, Paleoclimatology, Australia—Tasmania

49-2203

Glacial retreat and evolution of pro-glacial lakes Post-Algonquin and Barlow, Témiscamingue, Québec and Ontario. [Déglaciation et évolution des lacs proglaciaires Post-Algonquin et Barlow au Témiscamingue, Québec et Ontario]

Veillette, J.J., *Géographie physique et Quaternaire,* 1988, 42(1), p.7-31, In French with English and German summaries. 65 refs.

Glaciation, Glacial lakes, Lacustrine deposits, Moraines, Quaternary deposits, Geochronology, Geological surveys, Paleoclimatology, Canada—Ontario, Canada—Quebec

49-2204

Thermoluminescence dating of Late Pleistocene sediments, St. Lawrence lowland, Quebec.

Lamothe, M., Huntley, D.J., *Géographie physique et Quaternaire,* 1988, 42(1), p.33-44, With French and German summaries. 37 refs.

Glaciation, Glacial deposits, Quaternary deposits, Pleistocene, Geochronology, Stratigraphy, Soil dating, Paleoclimatology, Canada—Quebec

49-2205

Geomorphology of glaciomarine sediments in a high arctic fiord.

Bednarski, J.M., *Géographie physique et Quaternaire,* 1988, 42(1), p.65-74, With French and Russian summaries. 26 refs.

Glaciation, Glacial deposits, Marine deposits, Sea level, Isostasy, Geomorphology, Geochronology, Paleoclimatology, Canada—Northwest Territories—Ellesmere Island

49-2206

Sixteen thousand year old organic deposit, northern Baffin Island, N.W.T., Canada: palynology and significance.

Short, S.K., Andrews, J.T., *Géographie physique et Quaternaire,* 1988, 42(1), p.75-82, With French and German summaries. 38 refs.

Glaciation, Quaternary deposits, Organic soils, Peat, Soil dating, Pollen, Geochronology, Paleoclimatology, Canada—Northwest Territories—Baffin Island

49-2207

Notes on the morphology and genesis of mud polygons on Mount Kenya, East Africa.

Mahaney, W.C., Boyer, M.G., *Géographie physique et Quaternaire,* 1988, 42(1), p.89-96, With French summary. 32 refs.

Patterned ground, Polygonal topography, Mountain soils, Mud, Soil erosion, Grazing, Kenya—Kenya, Mount

49-2208

Varved sequences of Lake Barlow and the Laverlochere moraine deglaciation of the northern area of Lake Témiscamingue, Quebec. [Séquences varvaires du lac Barlow et moraine de Laverlochère: déglaciation tardive de la partie nord du lac Témiscamingue, Québec]

Daigneault, R.A., Prichonnet, G., *Géographie physique et Quaternaire,* 1988, 42(2), p.107-120, In French with English and German summaries. 28 refs.

Glaciation, Glacial lakes, Glacial deposits, Lacustrine deposits, Moraines, Quaternary deposits, Stratigraphy, Geochronology, Paleoclimatology, Canada—Quebec

49-2209

Calcareous till facies north of Lake Superior, Ontario: implications for Laurentide ice streaming.

Hicock, S.R., *Géographie physique et Quaternaire,* 1988, 42(2), p.121-135, With French and German summaries. 87 refs.

Glaciation, Glacial deposits, Moraines, Quaternary deposits, Pleistocene, Geochronology, Paleoclimatology, Canada—Ontario

49-2210

Sedimentary petrographic study of tephra, glacial and aeolian grains in a quaternary paleosol sequence on Mount Kenya, East Africa.

Mahaney, W.C., Vortisch, W., Fecher, K., *Géographie physique et Quaternaire,* 1988, 42(2), p.137-146, With French and German summaries. 31 refs.

Alpine glaciation, Mountain soils, Quaternary deposits, Lithology, Soil dating, Geochronology, Paleoclimatology, Kenya—Kenya, Mount

49-2211

Soil development in Quaternary glacial deposits, Waterton Park area, southwestern Alberta.

Karlstrom, E.T., *Géographie physique et Quaternaire,* 1988, 42(2), p.147-162, With French and German summaries. 60 refs.

Alpine glaciation, Glacial deposits, Quaternary deposits, Mountain soils, Soil formation, Soil dating, Geochronology, Paleoclimatology, Canada—Alberta

49-2212

Late glacial-early glaciomarine transition in the Ottawa Valley: evidence for a glacial lake?

Naldrett, D.L., *Géographie physique et Quaternaire,* 1988, 42(2), p.171-179, With French and German summaries. 35 refs.

Glaciation, Glacial lakes, Quaternary deposits, Outwash, Marine deposits, Lacustrine deposits, Geochronology, Paleoclimatology, Canada—Ontario, Canada—Quebec

49-2213

Late Wisconsinan deglaciation and Champlain Sea invasion in the St. Lawrence Valley, Quebec.

Parent, M., Occhietti, S., *Géographie physique et Quaternaire,* 1988, 42(3), p.215-246, With French and German summaries. Refs. p.239-243.

Glaciation, Glacial lakes, Glacial deposits, Lacustrine deposits, Marine deposits, Marine geology, Geochronology, Paleoclimatology, Canada—Quebec

49-2214

Quaternary stratigraphy and history, Quesnel, British Columbia.

Clague, J.J., *Géographie physique et Quaternaire,* 1988, 42(3), p.279-288, With French and German summaries. 19 refs.

Alpine glaciation, Glacial deposits, Quaternary deposits, Pleistocene, Geochronology, Stratigraphy, Canada—British Columbia

49-2215

Cryoplanation terraces in the northern Yukon: their distribution, genesis and age. [Les terrasses de cryoplanation dans le nord du Yukon: distribution, genèse et âge]

Lauriol, B., Godbout, L., *Géographie physique et Quaternaire,* 1988, 42(3), p.303-314, In French with English and German summaries. 28 refs.

Altiplanation, Terraces, Solifluction, Frost weathering, Canada—Yukon Territory

49-2216

Glaciotectonic structures in central Sweden and their significance for glacial theory.

Aber, J.S., Lundqvist, J., *Géographie physique et Quaternaire,* 1988, 42(3), p.315-323, With Swedish and French summaries. 50 refs.

Glaciation, Glacial deposits, Glacial geology, Glacial erosion, Tectonics, Geomorphology, Geochronology, Sweden

49-2217

Western environmental interests in the Arctic.

Stokke, O.S., *Scotland. University of Aberdeen. Centre for Defence Studies. Centerpiece,* Winter 1991-92, No.21, 42p., Refs. p.37-42.

DLC TD190.5.S76 1991

Environmental protection, Regional planning, International cooperation

49-2218

Frozen ground. *International Permafrost Association. News bulletin,* Dec. 1994, No.16, 32p., Refs. passim.

Research projects, Organizations, Meetings, Permafrost

49-2219

Ice coring rig manual of procedures. Boston, Anderson-Nichols & Company, 1952, 32p. + figs.
Ice coring drills, Augers, Drilling, Manuals

49-2220

Mass spectrometry analysis of water stable isotopes: reconstruction of past climates from polar ice cores.
Stiévenard, M., Delmotte, M., Jouzel, J., Fléhoc, C., *Analusis*, Sep. 1994, 22(7), p.M21-M24, 3 refs.
Paleoclimatology, Ice cores, Ice composition, Ice spectroscopy, Ice dating, Drill core analysis, Isotope analysis
The determination of D/H and $^{18}O/^{16}O$ isotopic ratios in ice accumulated in polar regions allows one to reconstruct past temperature changes over glacial-interglacial cycles. They are also used to estimate past accumulation changes and thus the age of the ice with respect to depth. In addition, they can give additional information about the origin of polar precipitations. Data on the Vostok core are included.

49-2221

Polar ice bubbles as recorders of past greenhouse gas concentrations.
Chappellaz, J., *Analusis*, Sep. 1994, 22(7), p.M25-M28, 19 refs.
Ice cores, Ice composition, Bubbles, Gas inclusions, Atmospheric composition, Paleoclimatology, Greenhouse effect
Polar ice bubbles are unique tools for the reconstruction of the composition of the Earth's atmosphere in the past. Their analysis is a difficult task, which has been achieved by few laboratories in the world. These small bubbles have already highlighted the unprecedented impact of anthropogenic activity on this life-sustaining envelope, and demonstrated how well greenhouse gases parallel past climate changes. Data on Vostok and GRIP ice cores are included.

49-2222

Radioactivity of arctic and antarctic snow.
Pourchet, M., Pinglot, J.F., *Analusis*, Sep. 1994, 22(7), p.M29-M30, 3 refs.
Snow composition, Snow impurities, Fallout, Radioactive isotopes, Air pollution
In glaciology, the amounts of natural and artificial radionuclides in snow are used for the studies of glaciers or atmospheric transport processes. Fallout in antarctic snow from nuclear tests in the 1950-1980 period, from the disintegration of the Cosmos 1402 satellite in Feb. 1983, and from the Chernobyl accident in Apr. 1986, is summarized. (Auth. mod.)

49-2223

Evidence for the presence of polycyclic aromatic hydrocarbons in the polar atmosphere and in polar ice.
Masclet, P., Hoyau, V., *Analusis*, Sep. 1994, 22(7), p.M31-M33, 6 refs.
Polar atmospheres, Atmospheric composition, Air pollution, Ice composition, Impurities, Greenland

49-2224

Particulate carbon in arctic ice.
Cachier, H., Pertuisot, M.H., *Analusis*, Sep. 1994, 22(7), p.M34-M37, 14 refs.
Polar atmospheres, Atmospheric composition, Air pollution, Ice composition, Impurities, Ice sampling

49-2225

Greenland ice history of the pollution of the atmosphere of the Northern Hemisphere for lead during the last three millennia.
Hong, S., Candelone, J.P., Boutron, C.F., *Analusis*, Sep. 1994, 22(7), p.M38-M40, 16 refs.
Polar atmospheres, Atmospheric composition, Air pollution, Ice composition, Impurities, Paleoclimatology, Greenland

49-2226

Assessing global and local pollution for heavy metals in Antarctica.
Wolff, E.W., Peel, D.A., *Analusis*, Sep. 1994, 22(7), p.M41-M43, 10 refs.
Snow composition, Snow impurities, Air pollution, Antarctica
The antarctic continent is often considered to be the last pristine environment on Earth. However, by analyzing the layers of snow that have accumulated there, it is possible to trace recent increases in concentrations of some heavy metals. Most of this material originates outside Antarctica. (Auth.)

49-2227

Determination of heavy metals in polar snow and ice by laser-excited atomic fluorescence spectrometry.
Bol'shov, M.A., Boutron, C.F., *Analusis*, Sep. 1994, 22(7), p.M44-M46, 11 refs.
Snow composition, Snow impurities, Ice composition, Ice spectroscopy, Impurities, Air pollution, Lasers, Greenland, Antarctica
The new laser-excited atomic fluorescence spectrometry technique offers unrivalled sensitivity for the determination of trace metals in a wide variety of samples. This has allowed the direct determination of Pb, Cd and Bi in antarctic and Greenland snow and ice down to the sub pg/g level. (Auth.)

49-2228

Differential pulse anodic stripping voltammetry for ultratrace determination of cadmium and lead in antarctic snow.
Scarponi, G., Barbante, C., Cescon, P., *Analusis*, Sep. 1994, 22(7), p.M47-M50, 16 refs.
Snow composition, Snow impurities, Snow samplers, Polar atmospheres, Atmospheric composition, Air pollution, Antarctica
Differential pulse anodic stripping voltammetry has sufficient sensitivity to be used for direct determination of heavy metals in antarctic snow, thus avoiding long and contamination-prone enrichment procedures. A result of particular concern to global change studies can be drawn from these preliminary data: lead concentration in antarctic snow decreased rapidly during the 1980s from about 10-15 pg/g to 2-4 pg/g in 1991. (Auth.)

49-2229

Determination of lead isotopes in arctic and antarctic snow and ice.
Rosman, K.J.R., Chisholm, W., *Analusis*, Sep. 1994, 22(7), p.M51-M53, 11 refs.
Ice composition, Impurities, Ice spectroscopy, Snow composition, Snow impurities, Isotope analysis, Polar atmospheres, Atmospheric composition, Air pollution
The development of high sensitivity mass spectrometry to measure Pb isotopes in arctic and antarctic snow and ice has provided a powerful tool for identifying sources of global Pb pollution. The combination of isotope abundance information with concentration measurements adds another dimension to analytical chemistry. (Auth.)

49-2230

Ultratrace analysis for organolead compounds in Greenland snow.
Lobinski, R., Szpunar-Lobinska, J., Adams, F.C., *Analusis*, Sep. 1994, 22(7), p.M54-M57, 9 refs.
Snow composition, Snow impurities, Polar atmospheres, Atmospheric composition, Air pollution, Chemical analysis, Greenland

49-2231

Comments on "Effect of wet snow on the null-reference ILS system".
Lopez, A.R., *IEEE transactions on aerospace and electronic systems*, Oct. 1994, 30(4), p.1086-1090, 8 refs. For paper under discussion see 48-1619.
Aircraft, Aircraft landing areas, Orientation, Antennas, Radio waves, Imaging, Reflectivity, Snow cover effect, Snow air interface, Dielectric properties, Wet snow, Safety

49-2232

Lake-aggregate mesoscale disturbances. Part 2: a case study of the effects on regional and synoptic-scale weather systems.
Sousounis, P.J., Fritsch, J.M., *American Meteorological Society. Bulletin*, Oct. 1994, 75(10), p.1793-1811, 30 refs.
Synoptic meteorology, Lake effects, Air water interactions, Snowstorms, Snow air interface, Atmospheric circulation, Wind factors, Wind direction, Meteorological factors, Weather forecasting, Great Lakes

49-2233

Relative sea-level history and isostatic rebound in Newfoundland, Canada.
Liverman, D.G.E., *Boreas*, Sep. 1994, 23(3), p.217-230, 47 refs.
Pleistocene, Ice sheets, Marine geology, Glacier oscillation, Isostasy, Sea level, Marine deposits, Geochronology, Radioactive age determination, Canada—Newfoundland

49-2234

Specimen geometry effects on fracture of warm pond (S1) ice.

Stehn, L.M., DeFranco, S.J., Dempsey, J.P., *Journal of engineering mechanics*, Jan. 1995, 121(1), p.16-25, 24 refs.

Ice mechanics, Mechanical tests, Ice strength, Ice microstructure, Cracking (fracturing), Crack propagation, Ice solid interface, Loads (forces), Grain size, Brittleness

49-2235

Particle flux, and composition of sedimenting matter, in the Greenland Sea.

Bauerfeind, E., Von Bodungen, B., Arndt, K., Koeve, W., *Journal of marine systems*, Dec. 1994, 5(6), p.411-423, 69 refs.

Oceanography, Marine biology, Oceanographic surveys, Suspended sediments, Sedimentation, Biomass, Sampling, Ice cover effect, Ice edge, Seasonal variations, Greenland Sea

49-2236

Modelling the ice-ocean-plankton interactions in the southern ocean.

Goosse, H., Hecq, J.H., *Journal of marine systems*, Dec. 1994, 5(6), p.471-484, 63 refs.

Oceanography, Marine biology, Plankton, Biomass, Ice water interface, Ice openings, Ice cover effect, Ice melting, Nutrient cycle, Hydrodynamics, Mathematical models, Antarctica—Ross Sea

Using the Ross Sea as a model, this paper examines interactions between sea ice and ocean and their influence on planktonic communities using a physical model which includes explicity melting dynamics and mixed-layer physics. A one-dimensional model of the water column with a k-1 turbulent closure is applied. The sea-ice model is the one proposed by Semtner (1976); added is a parameterization of leads. This study emphasizes the importance in this kind of model of the sharing of the energy between lateral and basal meltings. The biological model comprises two state variables: phytoplankton and zooplankton biomasses. Melting induces a persistent shallow mixed layer and thus appropriate conditions for primary production. If ice melting is present, high biomasses are possible even with high losses. The absence of ice nearly forbids a massive bloom to form. Some sensitivity studies have shown that grazing pressure is a key factor governing the evolution of biomasses. The biomasses are also sensitive to small modifications of photosynthetic production. The initial amount of phytoplankton and the presence of ice algae seem to be of lesser importance. (Auth. mod.)

49-2237

Transport of suspended particulate matter in an antarctic fjord.

Domack, E.W., Foss, D.J.P., Syvitski, J.P.M., McClennen, C.E., *Marine geology*, Nov. 1994, 121(3-4), p.161-170, 19 refs.

Oceanography, Marine geology, Subglacial observations, Suspended sediments, Sediment transport, Glacial hydrology, Meltwater, Ice water interface, Hydrography, Turbidity, Antarctica—Brialmont Cove

Vertical profiles of temperature, salinity, and light attenuation were used in conjunction with underwater photography and water samples to characterize the nature and dynamics of particle transport in an antarctic fjord. Most of the particles are sand-sized (0.1-2 mm) floccules comprised of individual grains in the 5 to 50 micron size range. The quartz silt grains are derived from basal debris-laden meltwater originating from beneath the submerged valley glacier. The meltwater buoyantly rises to form cold water interflows at mid-water depths. Turbulent mixing near the seafloor also plays a role in the transport and breakup of floccules. Together the midwater cold tongues and near-bottom turbidity account for 87% of the total sediment load, thus attesting to the importance of non-surface transport mechanisms in polar fjords. (Auth. mod.)

49-2238

Computer visualization of long-term average Great Lakes temperatures and ice cover.

Assel, R.A., Croley, T.E., II, Schneider, K., *Journal of great lakes research*, 1994, 20(4), p.771-782, 19 refs.

Climatology, Spaceborne photography, Lake ice, Ice cover, Water temperature, Surface temperature, Seasonal variations, Correlation, Imaging, Computer applications, Long range forecasting, Great Lakes

49-2239

Mesoscale and microscale structures of snow clouds over the Sea of Japan. Part 1: evolution of microphysical structures in short-lived convective snow clouds.

Murakami, M., Matsuo, T., Mizuno, H., Yamada, Y., *Meteorological Society of Japan. Journal,* Oct. 1994, 72(5), p.671-694, With Japanese summary. 19 refs.

Precipitation (meteorology), Clouds (meteorology), Marine atmospheres, Cloud physics, Classifications, Sounding, Supercooled clouds, Snow crystal growth, Ice water interface, Japan, Sea

49-2240

Mesoscale and microscale structures of snow clouds over the Sea of Japan. Part 2: time change in airflow structures in isolated snow clouds derived from dual-Doppler radar observations.

Yamada, Y., Matsuo, T., Murakami, M., Mizuno, H., Iwanami, K., *Meteorological Society of Japan. Journal,* Oct. 1994, 72(5), p.695-708, 19 refs.

Precipitation (meteorology), Clouds (meteorology), Cloud physics, Marine atmospheres, Radar echoes, Air flow, Wind direction, Snowstorms, Falling snow, Japan, Sea

49-2241

Seasonal variation of precipitating clouds near Syowa Station, Antarctica derived from liquid water content data.

Konishi, H., Wada, W., Endoh, T., *Meteorological Society of Japan. Journal,* Oct. 1994, 72(5), p.709-717, With Japanese summary. 15 refs.

Polar atmospheres, Precipitation (meteorology), Cloud physics, Radiometry, Radar echoes, Water content, Snowfall, Seasonal variations, Sea ice distribution, Ice cover effect, Ice air interface, Antarctica—Showa Station

Snow clouds were observed by vertically-pointing radar and microwave radiometer at Showa Station in 1989 to measure vertically integrated ice water content (IWC) and liquid water content (LWC) in the clouds. Most of the water-rich clouds appeared in autumn when the area of sea ice was at its annual minimum. On the other hand, the water-poor clouds appeared in almost all seasons, especially frequently in winter and early spring when the sea ice area was at its annual maximum. The occurrence frequency of these clouds seems to correlate with the area of sea ice rather than with air temperature. The convective activity to produce supercooled water droplets becomes suppressed during their passage above the sea ice with less water vapor supplied from the sea. There was a difference in the amount and area of snowfall among the clouds. The water-rich clouds brought much more snowfall within 50 km of the coastline than the water-poor clouds. This localization of snowfall would stem from the orographic effect caused by production of water condensate in clouds due to lifting of air along the slope of the continent. The water-poor clouds brought less condensed water after lifting. (Auth. mod.)

49-2242

New source of dimethylsulfide (DMS) for the arctic atmosphere: ice diatoms.

Levasseur, M., Gosselin, M., Michaud, S., *Marine biology,* Dec. 1994, 121(2), p.381-387, 42 refs.

Oceanography, Marine biology, Polar atmospheres, Climatic factors, Atmospheric composition, Biomass, Water chemistry, Algae, Ice bottom surface, Ice composition, Air ice water interaction, Arctic Ocean

49-2243

Linkage between Eurasian winter snow cover and regional Chinese summer rainfall.

Yang, S., Xu, L.Z., *International journal of climatology,* Aug.-Sep. 1994, 14(7), p.739-750, 30 refs.

Climatology, Snow cover distribution, Snow cover effect, Precipitation (meteorology), Correlation, Seasonal variations, Climatic factors, Meteorological data, China

49-2244

Analysis of spring high water events in the Mackenzie Delta and implications for lake and terrestrial flooding.

Marsh, P., Hey, M., *Geografiska annaler,* 1994, 76A(4), p.221-234, 23 refs.

Deltas, Estuaries, Channels (waterways), Water level, Seasonal variations, Snowmelt, Runoff, Flood forecasting, Lakes, Statistical analysis, Canada—Northwest Territories—Mackenzie River

49-2245

Rock glaciers in Svalbard—tentative dating and inferred long-term velocities.

André, M.F., *Geografiska annaler,* 1994, 76A(4), p.235-245, 43 refs.

Rock glaciers, Arctic landscapes, Beaches, Sediment transport, Velocity measurement, Talus, Tectonics, Geomorphology, Lichens, Radioactive age determination, Norway—Svalbard

49-2246

Palaeoecology of pine *(Pinus sylvestris)* in the Swedish Scandes and a review of the analysis of subfossil wood.

Kullman, L., *Geografiska annaler,* 1994, 76A(4), p.247-259, Refs. p. 257-259.

Paleoecology, Paleobotany, Paleoclimatology, Trees (plants), Wood, Fossils, Radioactive age determination, Forest lines, Accuracy, Sweden

49-2247

Factors affecting the volume of Quaternary glacial deposits in southern Patagonia.

Marden, C.J., *Geografiska annaler,* 1994, 76A(4), p.261-269, 27 refs.

Glacial geology, Pleistocene, Glacier oscillation, Quaternary deposits, Moraines, Glaciation, Glacial erosion, Sediment transport, Geomorphology, Chile—Patagonia

49-2248

Ground penetrating radar sounding of a temperate glacier: modelling of a multilayered medium.

Nicollin, F., Kofman, W., *Geophysical prospecting,* Oct. 1994, 42(7), p.715-734, 19 refs.

Geophysical surveys, Glacier surveys, Glacier thickness, Remote sensing, Radio echo soundings, Profiles, Mathematical models, Ice solid interface, Ice bottom surface, Bedrock, France—Alps

49-2249

Simulated herbivory and air pollution: growth and reproduction of an evergreen dwarf shrub, *Empetrum nigrum.*

Mutikainen, P., Ojala, A., *Acta Œcologica,* 1993, 14(6), p.771-780, With French summary. 35 refs.

Plant ecology, Plant physiology, Ecosystems, Subarctic landscapes, Cold weather survival, Air pollution, Rain, Environmental impact, Environmental tests, Growth, Simulation

49-2250

Oil spill in Russian Arctic.

Sagers, M.J., *Polar geography and geology,* Apr.-June 1994, 18(2), p.95-102, 5 refs.

Oil spills, Pipelines, Soil pollution, Arctic landscapes, Tundra, Environmental impact, Permafrost transformation, Oil recovery, Cost analysis, Russia—Komi Republic

49-2251

Climate of the penultimate ice age: a study of an antarctic ice core.

Kotliakov, V.M., Lorius, C., *Polar geography and geology,* Apr.-June 1994, 18(2), p.103-120, Translated from Izvestiia Akademii nauk, Seriia geograficheskaia, 1993, No.4. 23 refs.

Pleistocene, Paleoclimatology, Climatic changes, Ice sheets, Ice cores, Ice dating, Geochemistry, Geochronology, Isotope analysis, Antarctica—Vostok Station

Climatic conditions of the penultimate ice age are analyzed on the basis of isotopic-geochemical analyses of an ice core from the Vostok research station. Data from the core, which includes material from as deep as 2546 m, permit the compilation of a chronology of glacial sediments and determination of time changes in air temperature and in gas composition of the former atmosphere. It also provides the basis for comparisons with information derived from oceanic cores. This allows interpretation of past climates in East Antarctica as far back as 200,000 years B.P., indicating that a long cold period similar to the last ice age occurred in the region from 220,000-140,000 years B.P.

49-2252

Impact of climatic warming on permafrost conditions in Russia.

Cherniad'ev, V.P., Chekhovskiĭ, A.L., *Polar geography and geology,* Apr.-June 1994, 18(2), p.121-126, Translated from Izvestiia Akademii nauk, Seria geograficheskaia, 1993, No.4. 5 refs.

Permafrost transformation, Climatology, Global warming, Climatic changes, Ground thawing, Permafrost distribution, Snow cover distribution, Snow cover effect, Temperature effects, Thaw depth, Environmental impact, Russia

49-2253

Prospects for a background monitoring network in the Russian Arctic.

Krasovskaia, T.M., Tikunov, V.S., *Polar geography and geology,* Apr.-June 1994, 18(2), p.127-134, Translated from Geografiia i prirodnye resursy, 1993, No.2. 10 refs.

Arctic landscapes, Ecosystems, Monitors, Site surveys, Air pollution, Metals, Environmental impact, Environmental tests, Statistical analysis, Russia

49-2254

Human modification of tundra vegetation at the Bovanenko gas condensate field, Yamal Peninsula.

Teliatnikov, M.IU., *Polar geography and geology,* Apr.-June 1994, 18(2), p.135-143, Translated from Geografiia i prirodnye resursy, 1993, No.2. 6 refs.

Tundra, Vegetation patterns, Ecosystems, Soil erosion, Damage, Petroleum industry, Economic development, Environmental impact, Russia—Siberia

49-2255

Soils and vegetation on the Amguema River floodplain and proposed hydropower construction.

Mazhitova, G.G., Sinel'nikova, N.V., *Polar geography and geology,* Apr.-June 1994, 18(2), p.157-167, Translated from Geografiia i prirodnye resursy, 1992, No.3. 12 refs.

Floodplains, Subarctic landscapes, Tundra, Plant ecology, Dams, Environmental impact, Ecosystems, Flooding, Revegetation, Russia—Chukotka

49-2256

Relationship between the theta aurora and ULF emissions at high latitudes.

Klain, B.I., Kurazhkovskaia, N.A., Dobnia, B.V., *Polar geography and geology,* Apr.-June 1994, 18(2), p.168-174, Translated from Antarktika, No.32, 1993. 12 refs.

Polar atmospheres, Atmospheric physics, Atmospheric electricity, Solar activity, Radio waves, Electromagnetic properties

Variations in the electromagnetic emission accompanying the appearance of theta aurora in the magnetosphere polar regions were studied. It is shown that modulated LF emissions appear within the range of 0.02-2.35 Hz, where the characteristic modulation period is ≈30 min during a theta aurora at the latitude of the dayside cusp. These emissions precede the development of the transpolar arc in the night area of the polar cap by 15-30 min. The revealed effect may be explained by the development of a reconnection process in the cusp region when B_z>0, and subsequent reconfiguration of the magnetospheric tail. (Auth. mod.)

49-2257

Order-of-magnitude estimate of the current uplift-rates in Switzerland caused by the Würm alpine deglaciation.

Gudmundsson, G.H., *Eclogae geologicae Helvetiae,* 1994, 87(2), p.545-557, With German summary. 34 refs.

Alpine glaciation, Glacial geology, Geologic processes, Pleistocene, Isostasy, Tectonics, Ice loads, Ice cover effect, Viscoelasticity, Rheology, Mathematical models, Switzerland—Alps

49-2258

Tectonic modelling in the Bjørnøya West Basin of the western Barents Sea.

Liu, G.J., *Geophysical prospecting,* May 1994, 42(4), p.277-302, 20 refs.

Marine geology, Marine deposits, Tectonics, Thermal regime, Geophysical surveys, Seismic surveys, Subsidence, Pleistocene, Mathematical models, Barents Sea

49-2259

Currents under land-fast ice in the Canadian arctic Archipelago. Part 1: vertical velocities.

Marsden, R.F., Paquet, R., Ingram, R.G., *Journal of marine research,* Nov. 1994, 52(6), p.1017-1036, 20 refs.

Oceanography, Ocean currents, Tidal currents, Velocity measurement, Profiles, Oscillations, Subglacial observations, Fast ice, Ice water interface, Ice cover effect, Acoustic measurement, Wave propagation, Canada—Northwest Territories—Resolute Passage

49-2260

Currents under land-fast ice in the Canadian arctic Archipelago. Part 2: vertical mixing.

Marsden, R.F., Ingram, R.G., Legendre, L., *Journal of marine research,* Nov. 1994, 52(6), p.1037-1049, 15 refs.

Oceanography, Ocean currents, Turbulent diffusion, Subglacial observations, Acoustic measurement, Profiles, Density (mass/volume), Fast ice, Ice cover effect, Wave propagation, Nutrient cycle, Canada—Northwest Territories—Resolute Passage

49-2261

Mechanical properties and durability of polypropylene fiber reinforced high-volume fly ash concrete for shotcrete applications.

Malhotra, V.M., Carette, G.G., Bilodeau, A., *ACI materials journal,* Sep.-Oct. 1994, 91(5), p.478-486, 2 refs.

Concrete aggregates, Concrete durability, Reinforced concretes, Rocks, Weathering, Countermeasures, Physical properties, Freeze thaw tests, Specifications, Composite materials

49-2262

Deicer salt scaling resistance of dry- and wet-process shotcrete.

Beaupré, D., Talbot, C., Gendreau, M., Pigeon, M., Morgan, D.R., *ACI materials journal,* Sep.-Oct. 1994, 91(5), p.487-494, 13 refs.

Concrete structures, Salting, Corrosion, Protection, Concrete durability, Concrete placing, Concrete aggregates, Cement admixtures, Physical properties, Freeze thaw tests, Cold weather tests, Hydraulic jets

49-2263

Thermal structure of the atmospheric layer above water in the presence of spray and a surface oil film.

Masagutov, T.F., IAroshevich, M.I., *Akademii nauk SSSR. Transactions,* 1987, 295(2), p.262-264, Translated from Akademii nauk SSSR. Doklady. 5 refs.

Oceanography, Sea spray, Atmospheric boundary layer, Air water interactions, Oil spills, Films, Air temperature, Heat transfer, Moisture transfer, Simulation

49-2264

Application of the Reiner-Rivlin model to the slow flow of ice gravel past a cylinder.

Shih, L.Y., *Applied mathematical modelling,* May 1994, 18(5), p.288-293, 9 refs.

Sea ice, Ice mechanics, Floating ice, Slush, Ice solid interface, Ice pressure, Pressure ridges, Ice strength, Mechanical properties, Mathematical models

49-2265

Electronic bonding and optical properties of the H_2-H_2O phase at high pressure.

Xu, Y.N., Ching, W.Y., *Physical review B,* Dec. 15, 1994, 50(23)I, p.17,709-17,712, 23 refs.

Water structure, Ice physics, Hydrates, Crystals, Molecular structure, High pressure tests, Physical properties, Optical properties, Hydrogen bonds, Correlation, Molecular energy levels

49-2266

Skiing over the North Pole. [Lyzhnia cherez Severnyĭ polius]

Pestriakov, B.V., Krasnoyarsk, Kn. izd-vo, 1989, 105p., In Russian.

Expeditions, International cooperation

49-2267

Glaciers and glacial systems: fluctuation and self-adjustment. [Ledniki i lednikovye sistemy: neustoĭchivost' i samoorganizatsiia]

Mazo, V.L., *Itogi nauki i tekhniki. Seriia gliatsiologiia,* 1989, Vol.7, 147p., Refs. p.135-147.

Ice air interface, Ice water interface, Ice cover, Hydrodynamics, Glaciers, Glacier ice, Mathematical models, Glaciation, Ice models

49-2268

Canada's arctic waters in international law.

Pharand, D., Cambridge, University Press, 1988, 288p. (Pertinent p.185-257), Refs. p.269-277.

DLC JX4131.P48 1988

Ice navigation, Ice routing, Northwest passage, Route surveys, Legislation, International cooperation, History, Canada

49-2269

Climate variability and Crater Lake water levels.

Redmond, K.T., *California Department of Water Resources. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Technical report,* 1991, No.26, Annual Pacific Climate (PACLIM) Workshop, 7th, Asilomar, CA, Apr. 1990. Proceedings. Edited by J.L. Betancourt and V.L. Tharp, p.67-73, 6 refs.

DLC QC994.55.P33 1990

Lakes, Water level, Water balance, Climatic changes, Evaporation, Snowfall, Snow cover effect, United States—Oregon—Crater Lake

49-2270

Influence of seasonal precipitation and temperature variations on runoff in California and southwestern Oregon.

Riddle, L.G., Cayan, D.R., Aguado, E., *California Department of Water Resources. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Technical report,* 1991, No.26, Annual Pacific Climate (PACLIM) Workshop, 7th, Asilomar, CA, Apr. 1990. Proceedings. Edited by J.L. Betancourt and V.L. Tharp, p.75-90, 9 refs.

DLC QC994.55.P33 1990

Precipitation (meteorology), Snowfall, Stream flow, Runoff forecasting, United States—California

49-2271

"Cool" vs. "warm" winter precipitation and its effect on streamflow in California.

Cayan, D.R., *California Department of Water Resources. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Technical report,* 1991, No.26, Annual Pacific Climate (PACLIM) Workshop, 7th, Asilomar, CA, Apr. 1990. Proceedings. Edited by J.L. Betancourt and V.L. Tharp, p.91-100, 15 refs.

DLC QC994.55.P33 1990

Precipitation (meteorology), Snowfall, Snow cover effect, Stream flow, United States—California

49-2272

Initial global perspective of climate for the last thousand years: the ice core record.

Thompson, L.G., *Acoustical Society of America. Journal,* Dec. 1994, 96(6), p.147-151, 12 refs.

DLC QC994.55.P33 1990

Ice cores, Paleoclimatology, Global change

49-2273

Snow accumulation time series and their climatic interpretation.

Holdsworth, G., *California Department of Water Resources. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Technical report,* 1991, No.26, Annual Pacific Climate (PACLIM) Workshop, 7th, Asilomar, CA, Apr. 1990. Proceedings. Edited by J.L. Betancourt and V.L. Tharp, p.153-156, 11 refs.

DLC QC994.55.P33 1990

Ice cores, Snow accumulation, Paleoclimatology, Global change

49-2274

Evidence from the Pacific Northwest for solar modulation of climate and of northern ecosystems.

Holdsworth, G., *California Department of Water Resources. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Technical report,* 1992, No.31, Annual Pacific Climate (PACLIM) Workshop, 8th, Asilomar, CA, Mar. 10-13, 1991. Proceedings. Edited by K.T. Redmond, p.57-62, 21 refs.

DLC QC994.55.P33 1991

Ice cores, Paleoclimatology, Paleobotany, Paleoecology, Climatic changes, Solar radiation

49-2275

Snow depth as an indicator of weather and climate in the Sierra Nevada.

Riddle, L.G., Cayan, D.R., Aguado, E., *California Department of Water Resources. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Technical report,* 1992, No.31, Annual Pacific Climate (PACLIM) Workshop, 8th, Asilomar, CA, Mar. 10-13, 1991. Proceedings. Edited by K.T. Redmond, p.107-123, 13 refs.

DLC QC994.55.P33 1991

Snow surveys, Snow depth, Snowstorms, Snow water equivalent, Snow water content, Meteorological factors, United States—California—Sierra Nevada

49-2276

Winter climate variability and snowpack in the West.

Cayan, D.R., Riddle, L.G., Garen, D.C., Aguado, E., *California Department of Water Resources. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Technical report,* 1992, No.31, Annual Pacific Climate (PACLIM) Workshop, 8th, Asilomar, CA, Mar. 10-13, 1991. Proceedings. Edited by K.T. Redmond, p.125-134.

DLC QC994.55.P33 1991

Snow surveys, Snow depth, Snow water equivalent, Snow water content, Atmospheric circulation, Meteorological factors

49-2277

Meteorological and hydrologic studies in the Alaskan Arctic in support of long-term ecological research.

Kane, D.L., *California Department of Water Resources. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Technical report,* 1993, No.34, Annual Pacific Climate (PACLIM) Workshop, 9th, Asilomar, CA, Apr. 21-24, 1992. Proceedings. Edited by K.T. Redmond and V.L. Tharp, p.13-21, 13 refs.

DLC QC994.55.P33 1992

Permafrost hydrology, Snowfall, Snow hydrology, Snowmelt, Runoff, Global change, United States—Alaska

49-2278

Changes in frost frequency and desert vegetation assemblages in Grand Canyon, Arizona.

Webb, R.H., Bowers, J.E., *California Department of Water Resources. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Technical report,* 1993, No.34, Annual Pacific Climate (PACLIM) Workshop, 9th, Asilomar, CA, Apr. 21-24, 1992. Proceedings. Edited by K.T. Redmond and V.L. Tharp, p.71-82, 34 refs.

DLC QC994.55.P33 1992

Deserts, Plant ecology, Vegetation patterns, Freezing indexes, Climatic changes, United States—Arizona—Grand Canyon

49-2279

Multi-basin seasonal streamflow model for the Sierra Nevada.

Cayan, D.R., Riddle, L.G., *California Department of Water Resources. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Technical report,* 1993, No.34, Annual Pacific Climate (PACLIM) Workshop, 9th, Asilomar, CA, Apr. 21-24, 1992. Proceedings. Edited by K.T. Redmond and V.L. Tharp, p.141-152, 5 refs.

DLC QC994.55.P33 1992

Snow surveys, Snow water equivalent, Snow water content, Snowmelt, Stream flow, Runoff forecasting, United States—California—Sierra Nevada

49-2280

Patterns of orographic uplift in the Sierra Nevada and their relationship to upper-level atmospheric circulation.

Aguado, E., Cayan, D.R., Reece, B., Riddle, L.G., *California Department of Water Resources. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Technical report,* 1993, No.34, Annual Pacific Climate (PACLIM) Workshop, 9th, Asilomar, CA, Apr. 21-24, 1992. Proceedings. Edited by K.T. Redmond and V.L. Tharp, p.153-163, 8 refs.

DLC QC994.55.P33 1992

Mountains, Topographic effects, Precipitation (meteorology), Snowstorms, Atmospheric circulation, Weather forecasting, United States—California—Sierra Nevada

49-2281

Stochastic model of temporal variations in monthly temperature, precipitation, snowfall, and resulting snowpack.

Orndorff, R.L., Craig, R.G., Stamm, J.F., *California Department of Water Resources. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Technical report,* 1993, No.34, Annual Pacific Climate (PACLIM) Workshop, 9th, Asilomar, CA, Apr. 21-24, 1992. Proceedings. Edited by K.T. Redmond and V.L. Tharp, p.165-172, 15 refs.

DLC QC994.55.P33 1992

Precipitation (meteorology), Snowfall, Snow cover distribution, Weather forecasting, Statistical analysis

49-2282

Pre-adaptation of arctic plants to climate change.

Crawford, R.M.M., Abbott, R.J., *Botanica acta,* Oct. 1994, 107(5), p.271-278, 66 refs.

Biogeography, Geobotanical interpretation, Plant ecology, Vegetation patterns, Migration, Cold weather survival, Climatic changes, Global warming

49-2283

Electrodeposition at an ice-coated electrode.

Glenn, D.F., Ingram, J.C., *Electrochemical Society. Journal,* Sep. 1994, 141(9), p.L113-L114, 6 refs.

Ice solid interface, Ice physics, Substrates, Solutions, Ion diffusion, Electrical measurement, Metals, Coatings, Particles, Chemical properties, Low temperature tests

49-2284

Landscape patterns of litter decomposition in alpine tundra.

O'Lear, H.A., Seastedt, T.R., *Oecologia,* Sep. 1994, 99(1-2), p.95-101, 28 refs.

Alpine tundra, Alpine landscapes, Ecosystems, Organic soils, Soil analysis, Decomposition, Biomass, Plant tissues, Snow cover effect, Soil microbiology, United States—Colorado—Front Range

49-2285

Mid-season gas exchange of an alpine grassland under elevated CO_2.

Diemer, M.W., *Oecologia,* Aug. 1994, 98(3-4), p.429-435, 27 refs.

Alpine landscapes, Ecosystems, Atmospheric composition, Soil air interface, Carbon dioxide, Photosynthesis, Evapotranspiration, Grasses, Vapor diffusion, Climatic changes, Switzerland—Alps

49-2286

Effect of low temperature on BOD in antarctic seawater.

Howington, J.P., McFeters, G.A., Jones, W.L., Smith, J.J., *Water research,* Dec. 1994, 28(12), p.2585-2587, 11 refs.

Sewage disposal, Waste disposal, Sea water, Water pollution, Degradation, Microbiology, Water temperature, Sampling, Environmental tests, Temperature effects, Antarctica—McMurdo Sound

Untreated sewage has been released from McMurdo Station into McMurdo Sound for several years. In this study organic carbon degradation was compared in seawater from McMurdo Sound at -1.8°C and 20°C using the biochemical oxygen demand (BOD) test. The ultimate BOD was 3 times larger at 20°C than at -1.8°C following 25 days of incubation. On the basis of on these findings, sewage from McMurdo Station should receive at least secondary treatment before release to lessen the impact of anthropogenic organic carbon on the polar marine environment of McMurdo Sound. (Auth. mod.)

49-2287

Nonlinear collective proton dynamics in ice crystal: square lattice model for ionic defects.

Zolotariuk, A.V., Savin, A.V., Economou, E.N., *Physical review letters,* Nov. 21, 1994, 73(21), p.2871-2874, 10 refs.

Ice physics, Ice models, Ice crystal structure, Latticed structures, Molecular structure, Molecular energy levels, Proton transport, Hydrogen bonds, Defects, Ion exchange

49-2288

Young's modulus of two-dimensional ice from the electrostatic compression of mercury/water/mercury tunnel junctions.

Porter, J.D., Zinn-Warner, A.S., *Physical review letters,* Nov. 21, 1994, 73(21), p.2883-2886, 23 refs.

Ice physics, Ice elasticity, Monomolecular films, Layers, Liquid solid interfaces, Electrical measurement, Charge transfer, Compressive properties, Thickness

49-2289

Joint investigations of the Middle Pliocene climate. I: PRISM paleoenvironmental reconstructions.

Dowsett, H., et al, *Global and planetary change,* Dec. 1994, 9(3-4), p.169-195, Refs. p.191-195.

Paleoclimatology, Paleobotany, Pleistocene, Ice age theory, Climatic changes, Sea ice distribution, Global change, Sea level, Surface temperature, Periodic variations, Models

Analysis of middle Pliocene (ca. 3 MA) marine and terrestrial records throughout the Northern Hemisphere forms the basis of an integrated synoptic Pliocene paleoclimate reconstruction of the last significantly warmer than present interval in Earth history. This reconstruction, developed primarily from paleontological data, includes middle Pliocene sea level, vegetation, land-ice distribution, sea-ice distribution, and sea-surface temperature. These data indicate that middle Pliocene sea level was at least 25 m higher than present, presumably due in large part to a reduction in the size of the East Antarctic Ice Sheet. Sea surface temperatures were essentially equivalent to modern temperatures in tropical regions but were significantly warmer at higher latitudes. Due to increased heat flux to high latitudes, both the Arctic and Antarctic appear to have been seasonally ice free during the middle Pliocene with greatly reduced sea ice extent relative to today during winter. Vegetation changes, while more complex, are generally consistent with marine SST changes and show increased warmth and moisture at higher latitudes during the middle Pliocene. (Auth. mod.)

49-2290

Joint investigations of the middle Pliocene climate. II: GISS GCM northern hemisphere results.

Chandler, M., Rind, D., Thompson, R., *Global and planetary change,* Dec. 1994, 9(3-4), p.197-219, 50 refs.

Paleoclimatology, Pleistocene, Climatic changes, Temperature variations, Global warming, Global change, Snow cover effect, Climatic factors, Simulation

49-2291

Subsurface temperature—depth profiles, anomalies due to climatic ground surface temperature changes or groundwater flow effects.

Kukkonen, I.T., Čermák, V., Šafanda, J., *Global and planetary change,* Dec. 1994, 9(3-4), p.221-232, 51 refs.

Paleoclimatology, Climatic changes, Geothermy, Hydrogeology, Ground water, Temperature measurement, Profiles, Water flow, Bedrock, Finland

49-2292

Thoughts on monitoring the effects of climate change on the surface elevation of the Greenland ice sheet.

Braithwaite, R.J., *Global and planetary change,* Dec. 1994, 9(3-4), p.251-261, 38 refs.

Ice sheets, Climatology, Climatic changes, Global warming, Glacier ablation, Glacier oscillation, Ice surface, Altitude, Sea level, Greenland

49-2293

Effect of altered arctic sea ice and Greenland ice sheet cover on the climate of the GENESIS general circulation model.

Crowley, T.J., Yip, K.J., Baum, S.K., *Global and planetary change,* Dec. 1994, 9(3-4), p.275-288, 33 refs.

Pleistocene, Paleoclimatology, Climatic changes, Ice sheets, Sea ice distribution, Ice cover effect, Ice melting, Global warming, Simulation, Climatic factors, Greenland

49-2294

Confidence intervals for age estimates and deposition times in late-Quaternary sediment sequences.

Bennett, K.D., *Holocene,* 1994, 4(4), p.337-348, 62 refs.

Quaternary deposits, Paleoecology, Sedimentation, Pollen, Radioactive age determination, Accuracy, Statistical analysis, Simulation

49-2295

Stable isotope record of palaeoclimatic change in a British Holocene tufa.

Andrews, J.E., Pedley, H.M., Dennis, P.F., *Holocene,* 1994, 4(4), p.349-355, 42 refs.

Paleoclimatology, Paleoecology, Climatic changes, Rock properties, Oxygen isotopes, Isotope analysis, Stratigraphy, Geochemistry, Radioactive age determination

49-2296

Holocene glacier activity at the southwestern part of Hardangerjøkulen, central-southern Norway: evidence from lacustrine sediments.

Nesje, A., Dahl, S.O., Løvlie, R., Sulebak, J.R., *Holocene,* 1994, 4(4), p.377-382, 37 refs.

Glacier oscillation, Glacial geology, Lacustrine deposits, Meltwater, Glacial deposits, Drill core analysis, Stratigraphy, Radioactive age determination, Geochronology, Norway

49-2297

New approach to lichenometry: dating single-age and diachronous surfaces.

McCarroll, D., *Holocene,* 1994, 4(4), p.383-396, 48 refs.

Glacial geology, Moraines, Geochronology, Lichens, Age determination, Periglacial processes, Talus, Statistical analysis, Accuracy, Norway

49-2298

AMS-radiocarbon dating of organic-poor lake sediment, an example from Linnévatnet, Spitsbergen, Svalbard.

Snyder, J.A., Miller, G.H., Werner, A., Jull, A.J.T., Stafford, T.W., Jr., *Holocene,* 1994, 4(4), p.413-421, 32 refs.

Arctic landscapes, Paleobotany, Paleoecology, Glacial lakes, Lacustrine deposits, Organic soils, Radioactive age determination, Accuracy, Geochronology, Norway—Spitsbergen

49-2299

Freshwater calving and anomalous glacier oscillations: recent behaviour of Moreno and Ameghino glaciers, Patagonia.

Warren, C.R., *Holocene*, 1994, 4(4), p.422-429, 50 refs.

Glacier oscillation, Climatology, Climatic changes, Glacial hydrology, Glacial lakes, Calving, Periodic variations, Chile—Patagonia

49-2300

Departure into the white wilderness: the history of German polar research. [Aufbruch in die weisse Wildnis: die Geschichte der deutschen Polarforschung]

Reinke-Kunze, C., Hamburg, Kabel, 1992, 479p., In German. Refs. p.431-461.

DLC G587.R45

History, Expeditions, Low temperature research, Polar regions, Weather stations, Ships, Aircraft, Antarctica—Georg von Neumayer Station, Greenland, Norway—Svalbard

A review of German expeditions to Antarctica and the Arctic is presented in chronological order, from the First German Expedition to the South Pole, 1901-1903, to current research activities at the Georg von Neumayer Station and also conducted on board the *Polarstern*. Aircraft used in polar expeditions, specifically dealing with meteorology data gathering, are described.

49-2301

Crustal density structure of the Mizuho Plateau, East Antarctica from gravity survey in 1992.

Kanao, M., Kamiyama, K., Ito, K., NIPR Symposium on Antarctic Geosciences, Proceedings. No.7, Tokyo, National Institute of Polar Research, 1994, p.23-36, Refs. p.34-36.

Ice sheets, Height finding, Gravity anomalies, Seismic velocity, Antarctica—Mizuho Plateau

Gravity measurements with a LaCoste & Romberg gravity meter were conducted on the Mizuho Plateau along the traverse routes from Showa Station to Dome F by the 33rd Japanese Antarctic Research Expedition in 1992. Free-air and simple Bouguer gravity anomalies based on gravity disturbance along the traverse routes were obtained by use of both surface elevation data from GPS positioning and bedrock elevation from radio-echo sounding. A density model of crustal structure between Showa and Mizuho stations was derived on the basis of the *P*-wave velocity model from refraction explosion experiments in 1980 and 1981. The structure of the southern part of Mizuho Station was derived from gravity anomaly data alone. The simple Bouguer gravity anomaly was calculated by assuming the layered structure to fit the observed Bouguer anomaly. An increase of the Bouguer anomaly by about -200 mgal from Showa toward the Dome area indicates crustal thickening of about 40 to 48 km. The resultant Moho depth beneath the Dome area is greater than the average depth (40-45 km) in East Antarctica. (Auth.)

49-2302

Evaluation of crustal structure and bedrock topography around Mizuho Plateau, Antarctica, based on gravity data.

Kudo, T., Nagao, T., NIPR Symposium on Antarctic Geosciences, Proceedings. No.7, Tokyo, National Institute of Polar Research, 1994, p.37-48, 19 refs.

Ice cover thickness, Gravity anomalies, Height finding, Bottom topography, Radio echo soundings, Antarctica—Mizuho Plateau

For the last three decades, gravity surveys around Showa Station have been conducted by the Japanese Antarctic Research Expedition. Especially in the vicinity of Mizuho Plateau, gravity data made it possible to analyze three-dimensional subsurface structures. The data have revealed several contradictions between gravity anomaly and ice thickness measured by radio echo sounding. To explain ice thickness data and gravity anomaly-bedrock height relations without any contradiction, about 5 g/cm^3 of bedrock density is required; such high density is quite unnatural. In this study, the authors tried to construct the three-dimensional bedrock topography and shape of the Moho discontinuity by using gravity anomaly data. Through the analysis, they clarified the characteristics of the contradictions and found that ice thickness as determined by radio echo soundings is always less than the actual thickness by a constant factor. (Auth. mod.)

49-2303

Weathering stage as a relative age of till in the central Sør-Rondane.

Moriwaki, K., Iwata, S., Matsuoka, N., Hasegawa, H., Hirakawa, K., NIPR Symposium on Antarctic Geosciences, Proceedings. No.7, Tokyo, National Institute of Polar Research, 1994, p.156-161, 5 refs.

Glacial geology, Ice sheets, Ice surface, Moraines, Weathering, Antarctica—Sør Rondane Mountains

The Sør Rondane Mountains are covered in places with variously weathered tills that form lateral moraines and/or moraine fields on the flanks of the mountains or supraglacial moraine fields around the mountains. Surface gravels of 47 tills were examined for determining the degree of weathering, and these tills were classified into 5 weathering stages. The measurement and classification methods are very simple but useful for understanding the outline of the glacial history of the region, especially the younger part. (Auth.)

49-2304

Applying the diagnostic method of ranked standards for establishing avalanche hazard. [Opyt primeneniia diagnosticheskogo metoda rangovykh etalonov dlia vyiavleniia lavinnoĭ opastnosti]

Chernous, P.A., Mokrov, E.G., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1987, Vol.70, p.3-8, In Russian. 7 refs.

Avalanche forecasting, Avalanche mechanics

49-2305

Remote method of measuring snow depth in mountains using a laser tachymeter. [Distantsionnyĭ metod izmereniia tolshchiny snega v gorakh s pomoshch'iu lazernogo takheometra]

Urumbaev, N.A., Danil'chenko, V.A., Kir'ianov, V.N., Mekhanik, A.G., *Nal'chik. Vysokogornyi geofizicheskiĭ institut. Trudy*, 1987, Vol.70, p.8-17, In Russian. 5 refs.

Snow depth, Measuring instruments, Remote sensing, Lasers, Analysis (mathematics)

49-2306

Using a pulsed laser range finder in avalanche studies. [Primenenie lazernogo impul'snogo dal'nomera v lavinnykh issledovaniiakh]

Urumbaev, N.A., Ershov, A.G., Provanova, S.V., Strukov, B.B., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1987, Vol.70, p.17-21, In Russian. 2 refs.

Avalanches, Lasers, Remote sensing, Analysis (mathematics)

49-2307

Modelling the processes of electromagnetic radiation generated by movement of a snow mass. [Modelirovanie protsessov elektromagnitnogo izlucheniia, soprovozhdaiushchikh dvizhenie snezhnoĭ massy]

Kardanov, IU.B., Vokalov, I.A., Sozaev, Sh.M., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1987, Vol.70, p.21-25, In Russian. 8 refs.

Snow physics, Radiation, Electromagnetic properties, Models

49-2308

Method of artificially creating an avalanche-hazard snow cover stratigraphy for the purpose of preemptive triggering of avalanches. [Sposob iskusstvennogo sozdaniia lavinoopasnoĭ stratigrafii snezhnogo pokrova dlia tseleĭ predupreditel'nogo spuska lavin]

Bolov, V.R., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1987, Vol.70, p.25-28, In Russian. 6 refs.

Avalanches, Avalanche triggering, Avalanche mechanics, Avalanche protection

49-2309

Problem of analyzing the functional relationship among snow cover parameters under the conditions of the Northern Caucasus. [K voprosu otsenki funktsional'noĭ zavisimosti mezhdu parametrami snezhnogo pokrova v usloviiakh Severnogo Kavkaza]

Samukashvili, R.D., Kozhaev, D.A., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1987, Vol.70, p.28-33, In Russian. 2 refs.

Snow cover, Analysis (mathematics), Snow depth, Snow water content, Snow density, Russia—Caucasus

49-2310

Rock glaciers in the Central Caucasus as sources of mudflows. [Kamennye gletchery Tsentral'nogo Kavkaza kak selevye ochagi]

Dokukin, M.D., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1987, Vol.70, p.33-42, In Russian. 14 refs.

Rock glaciers, Mud, Moraines, Mudflows, Russia—Caucasus

49-2311

Role of ground water runoff in the formation of mudflow. [Rol' podzemnogo stoka v formirovanii seleĭ]

Streshneva, N.P., Demidov, V.M., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1987, Vol.70, p.42-46, In Russian. 11 refs.

Ground water, Mudflows, Runoff, Analysis (mathematics), Seepage

49-2312

Ancient and current glaciation in the Urukh River basin. [O drevnem i sovremennom oledenenii doliny r. Urukh]

Gerasimov, V.A., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1987, Vol.70, p.47-56, In Russian. 6 refs.

Glaciation, River basins, Glaciers, Moraines, Russia—Urukh River, Russia—Tanadon River

49-2313

Data on the morphology and dynamics of rock glaciers in the Central Caucasus (Baksan and Chegen River basins). [Nekotorye dannye o morfologii i dinamike kamennykh gletcherov Tsentral'nogo Kavkaza (basseĭny rek Baksan i Chegen)]

Dokukin, M.D., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1987, Vol.70, p.56-64, In Russian. 11 refs.

Rock glaciers, Geomorphology, Moraines, Russia—Caucasus, Russia—Baksan River, Russia—Chegem River, Russia—Tashorun Glacier, Russia—Bashil'auzskiĭ Glacier

49-2314

Canada's cold environments.

French, H.M., ed, Slaymaker, O., ed, Montreal, McGill-Queen's University Press, 1993, 340p., Refs. passim. For individual papers see 49-2315 through 49-2327.

DLC GB648.15.C34 1993

Permafrost distribution, Sea ice distribution, Glacial geology, Alpine glaciation, Periglacial processes, Hydrologic cycle, Atmospheric circulation, Paleoclimatology, Global warming, Canada

49-2315

Canada's cold land mass.

French, H.M., Slaymaker, O., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.3-27, 31 refs.

Geography, Climatic factors, Arctic landscapes, Permafrost distribution, Canada

49-2316

Canada's cold seas.

Barry, R.G., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.29-61, Refs. p.56-61.

Sea ice distribution, Ice conditions, Ice cover effect, Ice edge, Drift, Ocean currents, Water transport, Salinity, Canada

49-2317

Northern climates.

Rouse, W.R., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.65-92, 49 refs.

Polar atmospheres, Atmospheric circulation, Radiation balance, Hydrologic cycle, Climatic factors, Canada

49-2318

Northern vegetation.

Ritchie, J.C., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.93-116, 47 refs.

Plant ecology, Vegetation patterns, Plant physiology, Acclimatization, Paleobotany, Tundra, Canada

49-2319

Northern hydrology.

Woo, M.K., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.117-142, 44 refs.

Snow hydrology, Snowmelt, Glacial hydrology, Permafrost hydrology, Runoff, Stream flow, Hydrologic cycle, Canada

49-2320

Cold-climate processes and landforms.

French, H.M., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.143-167, Refs. p.162-167.

Periglacial processes, Permafrost distribution, Permafrost indicators, Patterned ground, Active layer, Soil freezing, Frost weathering, Cryoturbation, Ground ice, Canada

49-2321

Cold mountains of western Canada.

Slaymaker, O., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.171-197, 47 refs.

Mountains, Alpine glaciation, Periglacial processes, Alpine tundra, Nivation, Slope processes, Sediment transport, Water balance, Canada

49-2322

Karst in cold environments.

Ford, D.C., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.199-222, 24 refs.

Karst, Glaciation, Glacial geology, Subsurface drainage, Geochemical cycles, Hydrogeochemistry, Subpermafrost ground water, Canada

49-2323

Mountain paleoenvironments of western Canada.

Clague, J.J., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.223-245, Refs. p.241-245.

Alpine glaciation, Glacial geology, Glacial deposits, Quaternary deposits, Pleistocene, Geochronology, Paleoclimatology, Canada

49-2324

Mountain hazards.

Gardner, J.S., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.247-267, 27 refs.

Avalanches, Mudflows, Floods, Accidents, Slope stability, Snow cover stability, Canada

49-2325

Climate variability, change, and sensitivity.

LeDrew, E.F., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.271-290, 31 refs.

Polar atmospheres, Atmospheric circulation, Global warming, Canada

49-2326

Climatic change and permafrost.

Smith, M.W., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.291-311, 39 refs.

Permafrost distribution, Permafrost thickness, Ground thawing, Soil air interface, Global warming, Canada

49-2327

Cold environments and global change.

Slaymaker, O., French, H.M., Canada's cold environments. Edited by H.M. French and O. Slaymaker, Montreal, McGill-Queen's University Press, 1993, p.313-334, 19 refs.

Global warming, Glacier oscillation, Sea ice distribution, Paleoclimatology, Canada

49-2328

Neural network fit to icebreaker resistance data.

Hinchey, M., *Journal of offshore mechanics and arctic engineering,* Nov. 1994, 116(4), p.252-254, 7 refs.

Icebreakers, Ice breaking, Ice solid interface, Ice loads, Dynamic loads, Mechanical tests, Data processing, Mathematical models, Mapping, Simulation, Correlation, Neural networks

49-2329

Retrofit makes snow removal a real blast.

Johnson, P., *Diesel progress engines & drives,* Aug. 1994, 60(8), p.30,32.

Diesel engines, Airports, Runways, Winter maintenance, Snow removal, Snow vehicles, Modification, Cold weather performance

49-2330

Outline of physical geography including Pleistocene glacial landforms of eastern Tibet (provinces Sichuan and Quinghai).

Lehmkuhl, F., Liu, S.J., *GeoJournal,* Sep. 1994, 34(1), p.7-30, 62 refs.

Pleistocene, Glaciation, Geography, Glacial geology, Geomorphology, Landforms, Snow line, Glacial deposits, Stratigraphy, Tibet

49-2331

Paleoclimatic field studies in and along the Qinling Shan (central China).

Rost, K.T., *GeoJournal,* Sep. 1994, 34(1), p.107-120, 32 refs.

Pleistocene, Paleoclimatology, Paleoecology, Climatic changes, Geomorphology, Quaternary deposits, Glacial geology, Glaciation, Snow line, China—Qinling Shan

49-2332

Present and Pleistocene glaciation on the northwestern margin of Tibet between the Karakorum Main Ridge and the Tarim Basin, supporting the evidence of a Pleistocene inland glaciation in Tibet.

Kuhle, M., *GeoJournal,* June-July 1994, 33(2-3), p.133-272, 78 refs.

Pleistocene, Geological surveys, Glaciation, Moraines, Glacier oscillation, Isostasy, Geomorphology, Glacial geology, Mountain glaciers, Glacier mass balance, Tibet

49-2333

Würm glaciation of Lake Issyk-Kul area, Tian Shan Mts.: a case study in glacial history of central Asia.

Grosval'd, M.G., Kuhle, M., Fastook, J.L., *GeoJournal,* June-July 1994, 33(2-3), p.273-310, 37 refs.

Pleistocene, Paleoclimatology, Glaciation, Lakes, Glacial geology, Geomorphology, Mountain glaciers, Snow line, Geography, China—Tian Shan

49-2334

On the cause of glacier mass balance variations in the Tian Shan Mountains.

Diurgerov, M.B., Mikhalenko, V.N., Kunakhovich, M.G., Ushnurtsev, S.N., Liu, C.H., Xie, Z.C., *GeoJournal,* June-July 1994, 33(2-3), p.311-317, 16 refs.

Mountain glaciers, Glacier surveys, Glacier mass balance, Glacier oscillation, Periodic variations, Snow accumulation, Altitude, China—Tian Shan

49-2335

Electrical charging of skis gliding on snow.

Colbeck, S.C., MP 3562, *Medicine and science in sports and exercise,* 1995, 27(1), p.136-141, 10 refs.

Skis, Sliding, Snow electrical properties, Electric charge, Charge transfer, Plastics snow friction, Ice solid interface, Meltwater, Electrical measurement, Dielectric properties

Ski charging was measured using giant-slalom style skis as gliding capacitors. The voltage measured across the plates was proportional to the charge on the base. While resting on dry snow or suspended in the air, the voltage was slowly reduced by the data logger itself. On wet snow the decay was much faster. While stationary on powder snow the ski developed a slightly negative voltage, showed a small transient positive peak when motion began, rapidly dropped to negative values, and then assumed a quasi-steady climb to positive voltages. A great deal of noise was superimposed on the general features of the signal when skiing on hard or bumpy surfaces. The accumulation of charge to high levels was only possible with long runs in deep powder. The rate of charging increased with speed but was not affected by use of one "antistatic" wax, and another such wax actually increased the measured voltage over that of an unwaxed base.

49-2336

Disjoining pressure of thin nonfreezing water interlayers between ice and silica surface.

Churaev, N.V., Bardasov, S.A., Sobolev, V.D., *Langmuir,* Nov. 1994, 10(11), p.4203-4208, 51 refs.

Ice physics, Water films, Thickness, Colloids, Capillary ice, Ice water interface, Ice solid interface, Porosity, Unfrozen water content, Frost resistance, Interfacial tension, High pressure tests

49-2337

Origins of the ice-contact stratified ridges (eskers) of Ireland.

Warren, W.P., Ashley, G.M., *Journal of sedimentary research,* July 1994, A64(3), p.433-449, 47 refs.

Pleistocene, Geomorphology, Ice sheets, Glacial geology, Glacier flow, Glacial deposits, Glacier beds, Ice solid interface, Landforms, Sedimentation, Ireland

49-2338

Calculating the stability of a snow layer lying on an elastic foundation. [Raschet ustoĭchivosti snezhnogo plasta, lezhashchego na uprugom osnovanii]

Bolov, V.R., Zimin, M.I., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.3-6, In Russian. 6 refs.

Snow cover stability, Snow cover effect, Snow depth, Analysis (mathematics), Avalanche mechanics, Slope stability

49-2339

Problem of analyzing the critical height of the snow cover in avalanche-prone areas. [K voprosu otsenki kriticheskoĭ vysoty snezhnogo pokrova v lavinosborakh]

Kozhaev, D.A., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.6-10, In Russian. 10 refs.

Snow cover effect, Avalanche mechanics, Analysis (mathematics), Slope stability, Avalanche formation, Snow depth

49-2340

Foehns as possible precursors of avalanches in the Western Caucasus (in the example of the Arkhyzskiy region). [Feny kak vozmozhnye predvestniki lavin na Zapadnom Kavkaze]

Volodicheva, N.A., Oleĭnikov, A.D., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.10-17, In Russian. 11 refs.

Wind factors, Avalanche forecasting, Avalanche formation, Meteorological factors

49-2341

Problem of the optimal method of affecting snow cover for the purpose of preemptive triggering of avalanches. [K voprosu ob optimal'nom sposobe vozdeĭstviia na snezhnyĭ pokrov s tsel'iu predupreditel'nogo spuska lavin]

Bolov, V.R., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.17-20, In Russian. 8 refs.

Avalanche triggering, Avalanche protection, Snow cover effect, Avalanche mechanics, Analysis (mathematics), Explosives

49-2342

Preparation and execution of procedures for the preemptive triggering of avalanches. [Podgotovka i provedenie rabot po predupreditel'nomu spusku snezhnykh lavin]

Bolov, V.R., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.21-28, In Russian. 1 ref.

Avalanche triggering, Avalanches, Explosion effects, Explosives, Economic analysis

49-2343

Flexible anti-avalanche structures. [Uprugie protivolavinnye konstruktsii]

Bolov, V.R., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.28-33, In Russian. 1 ref.

Avalanche protection, Countermeasures, Design, Structures, Tunnels

49-2344

Evolutionary model of the formation of the glacial mud streams of the Kaiaartysu River (Baksan River basin). [Evoliutsionnaia model' formirovaniia gliatsial'nykh seleĭ r. Kaiaartysu (basseĭn r. Baksan)]

Dokukin, M.D., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.33-47, In Russian. 10 refs.

Moraines, Mudflows, Glacial deposits, Models

49-2345

Characteristics of the morphology of moraines and the distribution of sources of glacial mud streams in the Adyrsu River valley (Baksan River basin). [Osobennosti morfologii moren i rasprostranenie ochagov gliatsial'nykh seleĭ v doline r. Adyrsu (basseĭn r. Baksan)]

Dokukin, M.D., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.47-62, In Russian. 10 refs.

Mudflows, Moraines, Glacial deposits, River basins, Glacial geology, Geomorphology, Rock glaciers, Russia—Baksan River, Russia—Adyrsu River

49-2346

Estimating annual precipitation totals in high mountains using water reserves of annual layers in glaciers (in the example of Adyrsu and Greater Azau glaciers). [Otsenka godovykh summ osadkov v vysokogor'e po vodozapasam godovykh sloev lednikov (na primere lednikov Adyrsu i Bol'shoĭ Azau)]

Kerimov, A.M., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.62-66, In Russian. 7 refs.

Glaciers, Water reserves, Precipitation (meteorology), Russia—Adyrsu River, Russia—Greater Azau River

49-2347

One approach to reducing the volume of raw data when solving statistical problems in avalanche studies. [Ob odnom podkhode k umen'sheniiu ob"ema iskhodnoĭ informatsii pri reshenii statisticheskikh zadach lavinovedeniia]

Tsikanov, M.M., Bolov, V.R., Sozaev, S.Kh., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.66-69, In Russia. 1 ref.

Avalanches, Statistical analysis, Analysis (mathematics)

49-2348

Radiation balance of natural slopes. [Radiatsionnyĭ balans estestvennykh sklonov]

Samukashvili, R.D., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.70-79, In Russian. 4 refs.

Radiation balance, Solar radiation, Slopes, Slope orientation, Analysis (mathematics), Surface temperature, Cloud cover, Russia—Elbrus Mountain

49-2349

Correlation of links between radiation balance and its components for the Caucasus. [O korreliatsionnykh sviaziakh mezhdu radiatsionnym balansom i ego sostavliaiushchimi dlia territorii Kavkaza]

Samukashvili, R.D., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.79-87, In Russian. 1 ref.

Radiation balance, Correlation, Analysis (mathematics), Russia—Caucasus

49-2350

Analyzing dry precipitation of aerosol particles in the high mountains of the Greater Caucasus. [Otsenka sukhovo vypadeniia aerozol'nykh chastits v vysokogor'e Bol'shogo Kavkaza]

Kerimov, A.M., Stepanov, G.V., Stepanova, S.I., Cherniak, M.M., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.87-93, In Russian. 7 refs.

Aerosols, Analysis (mathematics), Glaciers, Russia—Caucasus

49-2351

Characteristics of the thermal regime of soils in the basic facies of the subalpine zone of the Central Caucasus (in the example of the Elbrus region). [Osobennosti termicheskogo rezhima pochv osnovnykh fatsiĭ subal'piĭskogo poiasa Tsentral'nogo Kavkaza (na primere Priel'brus'ia)]

Razumov, V.V., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy,* 1987, Vol.66, p.93-110, In Russian. 18 refs.

Thermal regime, Soil temperature, Forest soils, Meadow soils, Mountain soils, Temperature gradients, Russia—Caucasus, Russia—Elbrus Mountain

49-2352

Test results of anchors sunk in saline permafrost soils. [Rezul'taty ispytaniĭ opusknykh ankerov v vechnomerzlom zasolennom grunte]

Khafizov, R.M., Il'iasov, S.S., Kuznetsov, P.E., Onokhov, A.A., Pomazanov, V.P., Smirnov, V.M., *Stroitel'stvo truboprovodov,* Aug. 1993, No.8, p.31-34, In Russian.

Anchors, Saline soils, Frozen ground mechanics, Frozen ground temperature, Loads (forces), Permafrost

49-2353

Interhemispheric differences in polar stratospheric HNO_3, H_2O, ClO, and O_3.

Santee, M.L., et al, *Science,* Feb. 10, 1995, 267(5199), p.849-852, 41 refs.

Stratosphere, Ozone, Atmospheric composition, Polar stratospheric clouds

Simultaneous global measurements of nitric acid (HNO_3), water (H_2O), chlorine monoxide (ClO), and ozone (O_3) in the stratosphere have been obtained over complete annual cycles in both hemispheres by the Microwave Limb Sounder on the Upper Atmosphere Research Satellite. A sizeable decrease in gas-phase HNO_3 was evident in the lower stratospheric vortex over Antarctica by early June 1992, followed by a significant reduction in gas-phase H_2O after mid-July. By mid-Aug., near the time of peak ClO, abundances of gas-phase HNO_3 and H_2O were extremely low. The concentrations of HNO_3 and H_2O over Antarctica remained depressed into Nov., well after temperatures in the lower stratosphere had risen above the evaporation threshold for polar stratospheric clouds, implying that denitrification and dehydration had occurred. No large decreases in either gas-phase HNO_3 or H_2O were observed in the 1992-1993 arctic winter vortex. Although ClO was enhanced over the Arctic as it was over the Antarctic, arctic O_3 depletion was substantially smaller than that over Antarctica. A major factor currently limiting the formation of an arctic ozone "hole" is the lack of denitrification in the northern polar vortex, but future cooling of the lower stratosphere could lead to more intense denitrification and consequently larger losses of arctic ozone. (Auth.)

49-2354

Step frequency radar experiments on the antarctic sea ice.

Uratsuka, S., Okamoto, K., Mineno, H., Nishio, F., Mae, S., *Journal of the Communications Research Laboratory,* Nov. 1988, 35(146), p.251-258, 11 refs.

Remote sensing, Sea ice, Radar echoes, Antarctica—East Ongul Island, Antarctica—Showa Station

UHF step frequency radar experiments have been carried out on sea ice near Showa Station as part of the 27th JARE to develop an airborne sensor for measuring vertical sea ice structures. The radar transmits 32 different frequencies in a stepwise fashion between 300 and 796 MHz and measures the amplitude and phase of reflected waves at each frequency. The discrete Fourier transform of the 32 complex values of signals indicates the distance of vertical sea ice structures. The range resolution is about 15 cm in sea ice. The experiments are the first application of this radar for measuring sea ice thickness. The experiments showed that the radar system could successfully measure vertical sea ice structures. The distance between the surface and the snow/ice interface or between the surface and the sea ice bottom deduced by this method coincided with practical measurements of sample holes. Snow depth was detected very clearly by the radar system. (Auth.)

49-2355

Millimeter and optical wave propagation experiments under snow, fog, and rain conditions at Arita.

Awaka, J., Kawai, E., Ihara, T., Kitamura, K., Echizenya, Y., Okamoto, K., *Journal of the Communications Research Laboratory,* Nov. 1991, 38(3), p.645-659, 15 refs.

Snow optics, Snow electrical properties, Snow cover effect, Microwaves, Wave propagation, Attenuation

49-2356

Arctic research of the United States, Vol.8.

U.S. Interagency Arctic Research Policy Committee, Myers, C.E., ed, Cate, D.W., ed, Valliere, D.R., ed, MP 3563, Arlington, VA, U.S. National Science Foundation, Office of Polar Programs, Fall 1994, 143p.

Research projects, Organizations, International cooperation, Regional planning, Meetings, Cost analysis

49-2357

Proceedings.

Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993, Prowse, T.D., ed, *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, 390p., Refs. passim. For selected papers see 49-2358 through 49-2374.

River ice, Ice cover effect, Ice water interface, Ice breakup, Ice jams, Frazil ice, River flow, Water chemistry, Water pollution, Water erosion, Suspended sediments

49-2358

Winter stream morphology on the North Slope of Alaska.

Chacho, E.F., Jr., Arcone, S.A., Delaney, A.J., MP 3564, *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.1-2, Abstract only.

River ice, Ice cover effect, Ice water interface, River flow, Taliks beneath rivers, United States—Alaska—North Slope

49-2359

Ice as the geomorphologic agent in an anastomosing river system.

Hicks, F.E., *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.3-20, 8 refs.

River ice, Ice cover effect, Ice jams, Ice breakup, River flow, Channels (waterways)

49-2360

Observations on sediment-chemistry interactions during northern river breakup.

Milburn, D., Prowse, T.D., *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.21-41, 26 refs.

River ice, Ice breakup, Ice cover effect, Ice erosion, Water erosion, Suspended sediments, Water chemistry, Water pollution

49-2361

Riverbank conditions and erosion in winter.

Gatto, L.W., MP 3565, *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.43-56, 22 refs.

River ice, Ice cover effect, Ice erosion, Water erosion, Soil erosion, Banks (waterways)

Winter in cold climates is a season when some of the well-documented processes that contribute to riverbank erosion have either slowed or are inactive. However, numerous field observations show that bank erosion does not cease during the winter. If the freezing and thawing, ground ice processes and river ice actions do not directly remove bank soils, they can individually or collectively disturb the soils sufficiently to make them more susceptible to erosion by processes that are active during other seasons. Thus, year-round measurements are needed to determine the seasonal extent of erosion, including the quantitative effects of winter factors. Only from such studies will we improve the current inadequate capability to predict riverbank recession.

49-2362
Impacts of Missouri River mainstem dams on the ice regime of tributary streams.
Wuebben, J.L., MP 3566, *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.57-58, Abstract only.
River ice, Ice cover effect, Ice jams, Flood forecasting, Flood control, Dams

49-2363
Ice motion detector: advance warning for breakup.
Zufelt, J.E., Tuthill, A.M., MP 3567, *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.59-74, 2 refs.
River ice, Ice breakup, Ice jams, Ice detection, Ice forecasting, Flood forecasting, Warning systems
Ice jams in the northern United States result in over $125 million in damages annually, and the figure for Canada is equally high. In communities where ice jamming and flooding are a recurrent threat, measures are often taken to predict the occurrence of ice jams and minimize their impact. Advance warning that an ice run has actually begun and that flooding is possible can allow downstream communities to evacuate flood-prone areas, close bridges, and mobilize flood-fighting efforts in a timely manner. Present methods of ice run detection rely on either direct around-the-clock river observations, monitoring of stage gauges, or air temperature and precipitation forecasts. Only direct observation provides definite evidence that an ice run has begun but, due to personnel costs, it is often economically prohibitive. Direct observation is also difficult or impossible during nighttime hours. The other two methods merely indicate a probability that breakup can occur and require a thorough knowledge of the river basin and ice processes. This paper describes an inexpensive, automated, around-the-clock ice motion detection system developed at USACRREL that provides a definite indication of ice breakup. Two variations of system configuration and the results obtained over two breakup seasons are presented.

49-2364
Groundwater heat flux into a small headwater stream during the winter.
Calkins, D.J., Shanley, J., MP 3568, *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.75-88, 4 refs.
River ice, Ice cover effect, Ice water interface, Geothermal thawing, Heat flux, Streams, Ground water, Water temperature
Water temperatures during the winter period in small headwater streams can remain above the freezing point for a major portion of the time, even if a snow or ice cover exists over the channel. Two factors are primarily responsible: the air gap that develops between the bottom of the ice/snow cover and the water surface and the thermal energy from groundwater inflow. The data analyzed included longitudinal stream temperature profiles under different winter conditions and selected on flow and temperature data at two weirs. The thermal energy flux from a groundwater source in one stream was calculated to be in the order of 40-60 W/m^2, significantly higher than possible values of frictional heating or streambed conduction.

49-2365
Frazil transport and evolution in channels.
Hammar, L., Shen, H.T., *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.89-105, 17 refs.
River ice, Frazil ice, Ice formation, Ice water interface, Mathematical models

49-2366
Size distribution of frazil flocs.
Tsang, G., *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.107-126, 3 refs.
River ice, Frazil ice, Ice formation, Ice water interface, Turbulent flow, Particle size distribution

49-2367
RIVICE model update.
Martinson, K., Sydor, M., Marcotte, N., Beltaos, S., *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.127-144, 12 refs.
River ice, Ice models, Ice forecasting, Flood forecasting, River flow, Computerized simulation

49-2368
Frazil floe strength measurements: preliminary tests.
White, K.D., MP 3569, *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.145-159, 4 refs.
River ice, Frazil ice, Ice growth, Ice crystal adhesion, Ice cover strength, Ice jams, Ice forecasting, Strain measuring instruments
Frazil ice is a major cause of ice jams and other damaging ice accumulations in northern rivers. The ability to predict ice accumulation locations and rates of progression would aid in mitigating the adverse impacts associated with frazil ice accumulations. However, its accumulation processes are difficult to quantify because frazil ice is a highly variable material. Accumulation and progression rates depend on such factors as the size and concentration of individual particles, frazil floe size and surface concentration, and internal bonding mechanisms of frazil ice floes, all of which are affected by environmental conditions. Understanding the nature of the bonding mechanisms within frazil ice floes, and the conditions under which each type develops or becomes dominant, will allow us to predict the occurrence of such bonds and perhaps estimate the strength of the bonds. This will increase the ability to model the initiation and progression of frazil ice jams as well as to further define the conditions under which frazil ice accumulates. The bonding mechanisms of frazil ice were investigated through field tests of a prototype device. The test results revealed that frazil ice floes do exhibit some type of effective cohesion resulting in some degree of internal strength. The preliminary field tests suggested modifications to the measuring device which should allow us to obtain the data necessary for more detailed analysis of bond mechanisms in frazil ice floes.

49-2369
On the sediment transport capacity of rivers during ice breakup.
Ferrick, M.G., Weyrick, P.B., MP 3570, *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.161-175, 6 refs.
River ice, Ice breakup, Ice cover effect, Ice water interface, River flow, Suspended sediments, Sediment transport, Water erosion, Soil erosion
Rivers transport large quantities of sediment during ice breakup. This transport causes physical, chemical and biological changes to occur in the water, or on the river floodplains, banks and bed. There are several breakup processes that initiate sediment motion or enhance transport. In this paper the authors quantify the bed load and suspended sediment transport capacities of an ice-covered river with the shear stress on the bed and a composite shear stress, respectively, obtained from a model that considers coupled flow and ice motion. The abrupt motion of a river ice cover decreases the resistance to the flow, causing surges to develop that significantly increase the shear stresses and the sediment transport capacities. A case study of breakup on the Connecticut River is generalized by varying model input parameters that may be uncertain, including the relative roughness of the ice and the bed, the ice velocity and acceleration through time, the flow velocity prior to ice motion, and the energy gradient of the flow. The results presented include the surging flow velocities, dimensionless ice/flow velocity ratios, and dimensionless shear stresses for the ice zone, bed zone and composite channel. In each case the authors quantify the relative increases in the shear stresses over time that are a direct result of the ice motion and parameter variation.

49-2370
Research needs—results of panel discussion.
Petryk, S., et al, *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.177-195, 5 refs.
River ice, Ice cover effect, Ice water interface, Ice jams, Frazil ice, River flow, Water pollution, Water chemistry, Research projects

49-2371
Longitudinal dispersion in ice covered rivers.
Beltaos, S., *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.197-216, 17 refs.
River ice, Ice cover effect, Ice water interface, River flow, Suspended sediments, Sediment transport, Water pollution, Water chemistry

49-2372
Chemistry of winter low flows in the Yukon Territory.
Whitfield, P.H., Whitley, W.G., Wade, N.L., *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.217-234, 16 refs.
River ice, Ice cover effect, Stream flow, Ground water, Water chemistry, Hydrogeochemistry, Suspended sediments, Water erosion, Soil erosion, Canada—Yukon Territory

49-2373
Oxygen modelling under river ice covers.
Chambers, P.A., Scrimgeour, G.J., Pietroniro, A., Culp, J.M., Loughran, I., *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.235-260, 30 refs.
River ice, Ice cover effect, Ice water interface, Water chemistry, Water pollution, Nutrient cycle, Oxygen

49-2374
Environmental effects of ice jam flooding on lakes in the Mackenzie Delta.
Marsh, P., Lesack, L.F.W., Roberts, A., *Canada. National Hydrology Research Institute. Subcommittee on Hydraulics of Ice Covered Rivers. NHRI symposium,* 1994, No.12, Workshop on Environmental Aspects of River Ice, Saskatoon, Saskatchewan, Aug. 18-20, 1993. Proceedings. Edited by T.D. Prowse, p.359-381, 22 refs.
River ice, Ice cover effect, Ice breakup, Ice jams, Deltas, Floodplains, Flooding, Water chemistry, Alluvium, Lacustrine deposits, Canada—Northwest Territories—Mackenzie River Delta

49-2375
Self-freezing in an initially wet porous medium.
Basu, R., Boles, M.A., *International journal of energy research,* June 1994, 18(4), p.449-467, 11 refs.
Porous materials, Freeze drying, Frozen liquids, Phase transformations, Liquid solid interfaces, Mass transfer, Ice sublimation, Freezing rate, Mathematical models, Thermodynamics

49-2376
Modelling dense avalanches—a theoretical and digital approach. [Modélisation des avalanches denses—Approches théorique et numérique]
Ancey, C., *La houille blanche,* 1994, 49(5-6), p.25-39, In French with English summary. 49 refs.
Avalanche modeling, Avalanche mechanics, Mathematical models, Rheology, Snow mechanics, Mass flow, Laminar flow, Snow density, Velocity

49-2377
Surface layer temperature of the southern ocean in iceberg penetration zones.
Popov, I.K., *Russian Academy of Sciences. Transactions. Earth science sections,* Nov. 1994, 328(1), p.220-223, 2 refs. For Russian original see 47-3337 or 21J-48305.
Oceanography, Water temperature, Surface temperature, Icebergs, Ice water interface, Ice melting, Ice cover effect, Temperature variations, RADIOMETRY
This paper presents an evaluation of the thermal state of the ocean surface in the iceberg-penetration zones, the initial information for which is the surface temperature distribution. The surface water

temperature around individual drifting icebergs in the southern ocean south of the 60th parallel was observed under various hydrological conditions, with the temperatures of the upper quasihomogeneous level ranging from -1.5 to +2.5°C. During these temperature surveys, the ships circled the iceberg at various distances in the direction of a MGI 4202 temperature sensor. In some cases, remote IR-radiometry was used. In addition, the same towed temperature sensor was used to measure the horizontal distribution of surface-layer temperatures in a zone about 30 km long, located in the southernmost part of the iceberg path to the western Atlantic, at a time when the number of icebergs increased from 13 to 50 (as estimated from the field of view on the 15 mile scale of the ship's radar). (Auth. mod.)

49-2378

Contribution to the theory of glacial periods.

Monin, A.S., *Russian Academy of Sciences. Transactions. Earth science sections,* Oct. 1994, 327(8), p.30-35, 10 refs. For Russian original see 49-1370.

Ice age theory, Pleistocene, Paleoclimatology, Ice sheets, Glacier oscillation, Insolation, Ice loads, Subsidence, Climatic changes, Mathematical models

The theory presented in this paper considers, three processes: 1) the occurrence of global cooling epochs caused by continental drift and pole wanderings, which projected large areas of the continents into circumpolar regions; 2) the quasiperiodic generation of continental ice sheets in the circumpolar regions during such cold epochs because of fluctuations in the latitudinal insolation distribution in response to perturbations of the earth's orbit around the sun, as well as of the inclination of the earth's equator to the plane of that orbit, induced by the gravity of other planets (Milankovitch's astronomical theory); and 3) rapid ice-sheet breakup because of the subsidence of continents into the viscous asthenosphere under the weight of such sheets. (Auth. mod.)

49-2379

Acidification and critical loads in surface waters: Kola, northern Russia.

Moĭseenko, T.I., *Ambio,* Nov. 1994, 23(7), p.418-424, 42 refs.

Subpolar regions, Ecology, Limnology, Surface waters, Sampling, Water pollution, Air pollution, Precipitation (meteorology), Environmental tests, Environmental impact, Chemical properties, Russia—Kola Peninsula

49-2380

1 Ma record of sediment flux south of the Grand Banks used to infer the development of glaciation in southeastern Canada.

Piper, D.J.W., Mudie, P.J., Aksu, A.E., Skene, K.I., *Quaternary science reviews,* Jan. 1994, 13(1), p.23-37, 72 refs.

Pleistocene, Oceanography, Glaciation, Quaternary deposits, Marine deposits, Sedimentation, Bottom sediment, Drill core analysis, Stratigraphy, Mineralogy, Canada—Newfoundland—Grand Banks

49-2381

Vegetation history of northcentral Alaska: a mapped summary of late-Quaternary pollen data.

Anderson, P.M., Brubaker, L.B., *Quaternary science reviews,* Jan. 1994, 13(1), p.71-92, Refs. p.89-92.

Paleobotany, Paleoecology, Pleistocene, Quaternary deposits, Subarctic landscapes, Vegetation patterns, Mapping, Tundra, Plant ecology, Palynology, Radioactive age determination, United States—Alaska—Brooks Range

49-2382

Test of thermoluminescence dating of loess from New Zealand and Alaska.

Berger, G.W., Pillans, B.J., Palmer, A.S., *Quaternary science reviews,* May 1994, 13(4), p.309-333, Refs. p.330-333.

Quaternary deposits, Loess, Soil tests, Soil analysis, Age determination, Luminescence, Accuracy, Correlation, Laboratory techniques, New Zealand, United States—Alaska—Fairbanks

49-2383

Environment and climate in southwestern Switzerland during the last termination, 15-10 ka BP.

Wohlfarth, B., Gaillard, M.J., Haeberli, W., Kelts, K., *Quaternary science reviews,* May 1994, 13(4), p.361-394, Refs. p.390-394.

Pleistocene, Paleoclimatology, Paleobotany, Quaternary deposits, Glacier oscillation, Glacial geology, Glacial deposits, Climatic changes, Radioactive age determination, Stratigraphy, Correlation, Switzerland

49-2384

Changes of snow cover, temperature, and radiative heat balance over the northern hemisphere.

Groisman, P.IA., Karl, T.R., Knight, R.W., Stenchikov, G.L., *Journal of climate,* Nov. 1994, 7(11), p.1633-1656, 75 refs.

Climatology, Snow cover effect, Snow cover distribution, Air temperature, Seasonal variations, Albedo, Heat balance, Statistical analysis, Climatic factors

49-2385

Association between winter precipitation and water level fluctuations in the Great Lakes and atmospheric circulation patterns.

Rodionov, S.N., *Journal of climate,* Nov. 1994, 7(11), p.1693-1706, 42 refs.

Climatology, Precipitation (meteorology), Winter, Atmospheric circulation, Air temperature, Lakes, Water level, Snowmelt, Runoff, Correlation, Mathematical models, Water balance, Great Lakes

49-2386

Arctic sea ice albedo from AVHRR.

Lindsay, R.W., Rothrock, D.A., *Journal of climate,* Nov. 1994, 7(11), p.1737-1749, 37 refs.

Sea ice distribution, Climatology, Pack ice, Ice surveys, Ice openings, Surface temperature, Spaceborne photography, Image processing, Radiometry, Albedo, Seasonal variations, Correlation, Arctic Ocean

49-2387

Global climate for March-May 1993: mature ENSO conditions persist and a blizzard blankets the eastern United States.

Halpert, M.S., Smith, T.M., *Journal of climate,* Nov. 1994, 7(11), p.1772-1793, 18 refs.

Climatology, Meteorological data, Seasonal variations, Snowstorms, Snow depth, Atmospheric circulation

49-2388

On recent climate trends in selected salmon-hatching areas of British Columbia.

Danard, M., Murty, T.S., *Journal of climate,* Nov. 1994, 7(11), p.1803-1808, 5 refs.

Climatology, Climatic changes, Stream flow, Precipitation (meteorology), Snow water equivalent, Air temperature, Global warming, Correlation, Canada—British Columbia

49-2389

Mountain hazard geomorphology of Tyrol and Vorarlberg, Austria.

Aulitzky, H., Heuberger, H., Patzelt, G., *Mountain research and development,* Nov. 1994, 14(4), Symposium on Mountain Hazard Geomorphology, Salzberg, Austria, Aug. 28-Sep. 2, 1989. Proceedings. Edited by H. Heuberger et al, p.273-305, With French and German summaries. 97 refs.

Mountains, Pleistocene, Geomorphology, Glacial geology, Landslides, Mass flow, Safety, Floods, Glacial hydrology, Lake bursts, Austria—Alps

49-2390

Large rockslides: their causes and movement on internal sliding plates.

Abele, G., *Mountain research and development,* Nov. 1994, 14(4), Symposium on Mountain Hazard Geomorphology, Salzberg, Austria, Aug. 28-Sep. 2, 1989. Proceedings. Edited by H. Heuberger et al, p.315-320, With French and German summaries. 18 refs.

Mountains, Geomorphology, Landslides, Slope processes, Rock mechanics, Mass transfer, Glacial geology, Sliding

49-2391

Assessment of geomorphic hazards and priorities for forest management on the Rigi North Face, Switzerland.

Kienholz, H., Mani, P., *Mountain research and development,* Nov. 1994, 14(4), Symposium on Mountain Hazard Geomorphology, Salzberg, Austria, Aug. 28-Sep. 2, 1989. Proceedings. Edited by H. Heuberger et al, p.321-328, With French and German summaries. 5 refs.

Alpine landscapes, Geomorphology, Slope processes, Forestry, Landslides, Mass flow, Rock mechanics, Safety, Countermeasures, Switzerland—Alps

49-2392

Rapid growth of a glacial lake in Khumbu Himal, Himalaya: prospects for a catastrophic flood.

Watanabe, T., Ives, J.D., Hammond, J.E., *Mountain research and development,* Nov. 1994, 14(4), Symposium on Mountain Hazard Geomorphology, Salzberg, Austria, Aug. 28-Sep. 2, 1989. Proceedings. Edited by H. Heuberger et al, p.329-340, With French and German summaries. 40 refs.

Mountains, Glacial lakes, Glacial hydrology, Lake bursts, Periodic variations, Glacier oscillation, Flooding, Forecasting, Safety, Nepal—Khumbu Himal

49-2393

Moraine and valley wall collapse due to rapid deglaciation in Mount Cook National Park, New Zealand.

Blair, R.W., Jr., *Mountain research and development,* Nov. 1994, 14(4), Symposium on Mountain Hazard Geomorphology, Salzberg, Austria, Aug. 28-Sep. 2, 1989. Proceedings. Edited by H. Heuberger et al, p.347-358, With French and German summaries. 10 refs.

Glacial geology, Glacier melting, Glacial erosion, Geomorphology, Rock mechanics, Mass movements (geology), Moraines, Slope processes, New Zealand—Cook National Park, Mount

49-2394

Sledges and sledging in polar regions.

Pearson, M., *Polar record,* Jan. 1995, 31(176), p.3-24, 78 refs.

Sleds, Skis, Traverses, Cold weather performance, Design, Expeditions, History

Sledges have been used for millennia in arctic and sub-arctic regions. Until the advent of British Arctic land exploration in the 19th century, explorers in these regions had relied on indigenous sledges. The British, and individuals from other nations engaging in polar exploration, often faced different conditions and challenges from those that had faced indigenous peoples, and so a period of adaptation and invention began, to develop sledges that better suited the needs of European survey parties. This paper looks at the range of indigenous sledges and the development of various polar sledge types based on indigenous ski-runner, edge-runner, and toboggan styles of sledges. The development of the Nansen sledge, which became the norm in the Antarctic, is discussed, and the issues and debates involving manhauling versus dog-hauling and the relative effectiveness of sledges and motive power as shown by recorded sledging performances are outlined. (Auth.)

49-2395

Relationship between surface water masses, oceanographic fronts and paleoclimatic proxies in surface sediments of the Greenland, Iceland, Norwegian Seas.

Johannessen, T., Jansen, E., Flatøy, A., Ravelo, A.C., NATO Advanced Research Workshop on Carbon Cycling in the Glacial Ocean: Constraints on the Ocean's Role in Global Change, Fellhorst, Germany, Sep. 17-19, 1992. Proceedings. Quantitative approaches in paleoceanography. Edited by R. Zahn et al and NATO Advanced Science Institutes, Series I. Global environmental change. Vol.17, Berlin, Springer Verlag, 1994, p.61-85, 39 refs.

DLC GC190.2.C37 1994

Paleoclimatology, Global change, Subpolar regions, Oceanography, Sea ice distribution, Sedimentation, Surface waters, Sampling, Ocean currents, Ice water interface, Isotope analysis, Greenland Sea

49-2396

Effect of ice covering aquatorium free surface on underkeel clearance for a vessel going in shallow water.

Vorob'ev, IU.L., Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.279-286, 5 refs.

Ports, Ships, Buoyancy, Channels (waterways), Navigation, Ocean waves, Gravity waves, Wave propagation, Ice water interface, Ice cover effect, Hydrodynamics, Mathematical models

49-2397

Pressure-area curve dependence on contact condition between ice sheet and structure.

Takeuchi, T., Saeki, H., Ishii, C., Mawhinney, M., Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.287-294, 4 refs.

Sea ice, Ice strength, Ice mechanics, Stress concentration, Fracture zones, Ice solid interface, Ice pressure, Mechanical tests, Analysis (mathematics)

49-2398

Simulation of ship-ice collision dynamics: ice interface modeling considerations.

Phillips, L.D., Tanaka, H., Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.295-302, 6 refs.

Icebreakers, Design, Ice solid interface, Hydrodynamics, Ice strength, Impact tests, Stress concentration, Computer programs, Simulation, Mathematical models

49-2399

Method of gas transportation in permafrost zone.

Antonov-Druzhinin, V.P., Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.303-310.

Permafrost preservation, Permafrost transformation, Gas pipelines, Thermal regime, Temperature control, Soil temperature, Environmental impact, Geocryology, Ice solid interface

49-2400

Performance of a surface station on an antarctic ice shelf.

Bateman, A.P., Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.311-319, 8 refs.

Buildings, Pile structures, Deformation, Stability, Snowdrifts, Ice solid interface, Snow loads, Snow cover effect, Snow creep, Wind factors, Design, Antarctica—Halley Station

Halley is a scientific station on the Brunt Ice Shelf. The three main buildings are wooden single-storey structures supported about 5 m above the snow surface by steel platforms and columns. The buildings are raised annually to overcome the mean snow accumulation of 1 m per year. This paper shows the development of snow drifts around the buildings over the 5 years since construction began. Differential movement and inclination of the steel columns are described. Possible causes of this deformation, including creep within the snowdrifts, are examined. (Auth. mod.)

49-2401

On the prediction of ship propulsion performance in broken ice fields.

Bratanow, T., De Grande, G., Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.321-328, 27 refs.

Icebreakers, Performance, Ice navigation, Slush, Forecasting, Ice solid interface, Design criteria

49-2402

Compressive strength and structure of sea ice in the Weddell Sea, Antarctica.

Kivimaa, S., Kosloff, P., Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.331-342, 11 refs.

Sea ice, Pack ice, Oceanographic surveys, Sampling, Ice strength, Compressive properties, Ice cores, Salinity, Ice density, Antarctica—Weddell Sea

Field experiments on antarctic sea ice physical properties were performed in the Weddell Sea during the Finnish Antarctic Expedition in 1989-90. The examined ice included shorefast ice and pack ice floes. Altogether 61 ice cores were drilled from 12 test sites. The temperature, salinity and density distributions in the ice cores were measured. Ice thin sections were prepared and photographed through crossed polaroids to study ice structural characteristics. The unconfined uniaxial compressive strength of ice was tested with 165 samples within the ambient temperatures of the ice floes. The tests were made in the brittle range with high strain rate both *in-situ* and in the cold laboratory container on board R/V *Aranda*. The sampling techniques and testing procedures are described. Typical profiles of ice salinity, density, temperature and uniaxial compressive strength in the ice floes are presented. The results of genetic and textural classification of ice samples are given. Ice unconfined uniaxial compressive strength versus ice total porosity is illustrated. (Auth. mod.)

49-2403

Modelling of strength anisotropy for sea ice under 3-D loading conditions.

Evgin, E., Zhan, C., Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.343-351, 11 refs.

Sea ice, Ice mechanics, Ice strength, Shear strength, Anisotropy, Loads (forces), Viscoelasticity, Ice microstructure, Orientation, Ice models, Mathematical models

49-2404

Fractal properties of the underside of arctic sea ice.

Wadhams, P., Davis, N.R., Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.353-363, 21 refs.

Sea ice, Ice cover thickness, Acoustic measurement, Subglacial observations, Ice bottom surface, Surface properties, Surface roughness, Spectra, Fractals, Correlation, Analysis (mathematics)

49-2405

Finite element modelling of the creep behaviour of a small glacier under low stresses.

Azizi, F., Jun, S., Whalley, W.B., Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.365-371, 9 refs.

Glacial geology, Glacier flow, Rheology, Ice mechanics, Ice creep, Geomorphology, Mathematical models, Temperature effects

49-2406

Demonstrator system for monitoring sea ice from space.

Partington, K.C., et al, Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.373-380.

Sea ice distribution, Ice surveys, Ice detection, Drift, Remote sensing, Spaceborne photography, Synthetic aperture radar, Image processing

49-2407

Third order solution wave motion under ice sheet.

Liu, X.D., Hirayama, K., Sakai, S., Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.383-392, 3 refs.

Sea ice, Water waves, Wave propagation, Ice mechanics, Ice water interface, Ice deformation, Ice cover effect, Cracking (fracturing), Analysis (mathematics)

49-2408

Ice control using a newly developed ice boom.

Saeki, H., Hara, F., Kunimatsu, S., Enoki, K., Mawhinney, M., Marine, offshore and ice technology. Edited by T.K.S. Murthy, P.A. Wilson and P. Wadhams and Ice Technology Conference, 4th, Southampton, UK, Sep. 15-16, 1994, Southampton, UK, Computational Mechanics Publications, 1994, p.393-402, 1 ref.

Sea ice, Ports, Ice floes, Ice control, Ice booms, Ice solid interface, Mechanical tests, Performance, Design, Japan, Sea

49-2409

Remote sensing of snow and ice and its relevance to climate change processes.

Wadhams, P., NATO Advanced Study Institute on Remote Sensing and Global Climate Change, Dundee, Scotland, July 19-Aug. 8, 1992. Proceedings. Edited by R.A. Vaughan et al and NATO Advanced Science Institutes, Series I. Global Environmental Change, Vol.24, Berlin, Springer-Verlag, 1994, p.303-339, 40 refs.

Climatic changes, Greenhouse effect, Sea ice distribution, Snow cover distribution, Glacier ablation, Ice melting, Ice cover effect, Climatic factors, Remote sensing, Microwaves

This paper reviews those physical processes in snow and ice which are important to climate change, and will describe how remote sensing techniques are used to map the cryosphere and hence to allow the magnitude and direction of climatic change in the polar regions to be estimated. The review includes an overview of the structure and morphology of ice and snow and the geophysical processes in which ice and snow are involved and the physics of interaction between electromagnetic waves and a snow or ice surface and the remote sensing techniques commonly used to study ice and snow (including acoustic as well as electromagnetic methods). The greenhouse effect is described with reference to the cryospheric processes which cause the rate of warming to be enhanced in north polar regions. The importance of ice and snow processes in amplifying the rate of ground level warming is delineated. Also analyzed in detail is the use of remote sensing techniques to monitor four key parameters. These are (1) the contribution of melting glaciers and ice sheets to the rate of global sea level rise; (2) the evidence for a retreat of sea ice in the polar regions; (3) the problem of the synoptic mapping of sea ice thickness, and the evidence for thinning of sea ice; and (4) the evidence for a retreat of seasonal snowpack in the Northern Hemisphere. (Auth. mod.)

49-2410

Study of Antarctica using the ERS-1 radar altimeter.

Mantripp, D.R., NATO Advanced Study Institute on Remote Sensing and Global Climate Change, Dundee, Scotland, July 19-Aug. 8, 1992. Proceedings. Edited by R.A. Vaughan et al and NATO Advanced Science Institutes, Series I. Global Environmental Change, Vol.24, Berlin, Springer-Verlag, 1994, p.341-354, 31 refs.

Geophysical surveys, Ice sheets, Glacier thickness, Remote sensing, Spacecraft, Radar echoes, Height finding, Topographic surveys, Performance

The ERS-1 Radar Altimeter is proving to be the best instrument to date for mapping the antarctic topography from space and promises to become a major contributor to glaciology. The provision of the ice mode allows areas hitherto inaccessible to radar altimetry to be mapped and the near-polar orbit allows a far greater proportion of Antarctica to be covered than has previously been possible. ERS-1 provides coverage of Antarctica to 82°S, allowing full coverage of the Filchner-Ronne Ice Shelf, most of the Ross Ice Shelf and also vast areas of the Antarctic Plateau which to date have been mapped only by sparse ground and airborne surveys. However, an unsurveyed hole remains, a circular area of 2.5 million km^2, including some of the most important parts of the Ross and Filchner-Ronne drainage basins. Filling this last gap can only begin with missions planned by ESA and NASA for the end of the century and beyond. (Auth. mod.)

49-2411

Toxic trace metal detection in samples of polar ice and snow using laser atomic fluorescence spectroscopy.

Bol'shov, M.A., Koloshnikov, V.G., Rudnev, S.N., Boutron, C.F., *Optics & spectroscopy,* Feb. 1994, 76(2), p.212-216, Translated from Optika i spektroskopiia. 21 refs.

Ice sheets, Sampling, Ice spectroscopy, Ice cores, Snow impurities, Air pollution, Metals, Lasers, Antarctica—Vostok Station

An ultrasensitive method of atomic fluorescence spectroscopy was used for direct determination of Pb, Cd, and Bi content in samples of depth ice layers from Antarctica. The experimental results are compared with the data of other methods. Contributions from various natural sources of metals in the atmosphere are discussed. (Auth.)

49-2412

Spatial statistics of snowmelt flow: data from lysimeters and aerial photos.

Sommerfeld, R.A., Bales, R.C., Mast, A., *Geophysical research letters,* Dec. 15, 1994, 21(25), p.2821-2824, 13 refs.

Snow hydrology, Snow surveys, Aerial surveys, Photointerpretation, Brightness, Snowmelt, Seepage, Flow measurement, Correlation, Statistical analysis

49-2413

Far-infrared spectroscopy of CO_2 clathrate hydrate with Martian applications.

Landry, J.C., England, A.W., *Geophysical research letters,* Dec. 15, 1994, 21(25), p.2829-2832, 19 refs.

Mars (planet), Clathrates, Hydrates, Remote sensing, Simulation, Ice formation, Carbon dioxide, Ice optics, Infrared spectroscopy, Radiation absorption, Low temperature tests

49-2414

Heat transfer for forced flow of a two-phase mixture in a pipe.

Teplitskiĭ, IU.S., Zhuravskiĭ, G.I., *Journal of engineering physics & thermophysics,* Nov. 1993, 64(5), p.449-452, Translated from Inzhenerno-fizicheskiĭ zhurnal. 4 refs.

Pipe flow, Refrigeration, Ice water interface, Phase transformations, Ice melting, Heat transfer coefficient, Solid phases, Frazil ice, Mathematical models

49-2415

Characteristic feature of convective heat transfer at a liquid-solid body phase interface.

Semionov, V.IU., Smorodin, A.I., *Journal of engineering physics & thermophysics,* Nov. 1993, 64(5), p.505-512, Translated from Inzhenerno-fizicheskiĭ zhurnal. 26 refs.

Ice physics, Ice water interface, Liquid solid interfaces, Ice formation, Laminar flow, Stefan problem, Convection, Heat transfer, Analysis (mathematics)

49-2416

Numerical simulation of sea ice cover in Hudson Bay.

Wang, J., Mysak, L.A., Ingram, R.G., *Journal of physical oceanography,* Dec. 1994, 24(12), p.2515-2533, 49 refs.

Oceanography, Estuaries, Sea ice distribution, Drift, Ice cover thickness, Seasonal variations, Ice models, Mathematical models, Air ice water interaction, Climatic factors, Canada—Hudson Bay

49-2417

Aircraft icing measurements in east coast winter storms.

Cober, S.G., Isaac, G.A., Strapp, J.W., *Journal of applied meteorology,* Jan. 1995, 34(1), p.88-100, 25 refs.

Precipitation (meteorology), Storms, Aircraft icing, Aerial surveys, Cloud physics, Supercooled clouds, Water content, Ice conditions, Ice forecasting, Statistical analysis

49-2418

Assessment of seeding effects in snowpack augmentation programs: ice nucleation and scavenging of seeding aerosols.

Warburton, J.A., Young, L.G., Stone, R.H., *Journal of applied meteorology,* Jan. 1995, 34(1), p.121-130, 29 refs.

Precipitation (meteorology), Weather modification, Cloud physics, Cloud seeding, Aerosols, Snowfall, Scavenging, Heterogeneous nucleation, Silver iodide, Chemical analysis

49-2419

Automated quality control procedure for the "water equivalent of snow on the ground" measurement.

Schmidlin, T.W., Wilks, D.S., McKay, M., Cember, R.P., *Journal of applied meteorology,* Jan. 1995, 34(1), p.143-151, 26 refs. For another version see 48-2933.

Snow hydrology, Snow surveys, Snow depth, Snow water equivalent, Periodic variations, Measurement, Meteorological data, Accuracy, Statistical analysis, Mathematical models

49-2420

Improvement of an ice-phase microphysics parameterization for use in numerical simulations of tropical convection.

Krueger, S.K., Fu, Q., Liou, K.N., Chin, H.N.S., *Journal of applied meteorology,* Jan. 1995, 34(1), p.281-287, 20 refs.

Clouds (meteorology), Cloud physics, Convection, Ice volume, Water content, Snow pellets, Snow crystal growth, Simulation, Mathematical models, Ice air interface

49-2421

Formation of the structure of the soil mantle in polar regions.

Vasil'evskaia, V.D., Karavaev, N.A., Naumov, E.M., *Eurasian soil science,* May 1994, 26(5), p.1-16, Translated from Pochvovedenie, 1993, No.7. 15 refs.

Tundra, Global change, Soil formation, Soil mechanics, Soil profiles, Soil texture, Cryogenic soils, Geocryology, Classifications

49-2422

Cryohydromorphic nongley soils of Wrangel Island.

Oganesian, A.S., Susekova, N.G., *Eurasian soil science,* May 1994, 26(5), p.17-25, Translated from Pochvovedenie, 1993, No.12. 15 refs.

Geocryology, Cryogenic soils, Stratigraphy, Soil classification, Soil profiles, Soil formation, Frozen ground mechanics, Frost action, Cryoturbation, Russia—Wrangel Island

49-2423

Correlation of soil classification for northeastern Russia, America, and Russia.

Mazhitova, G.G., Ping, C.L., Moore, J.P., Gubin, S.V., Smith, C.A.S., *Eurasian soil science,* May 1994, 26(5), p.50-62, Translated from Pochvevedenie, 1993, No.12. 16 refs.

Tundra, Taiga, Soil science, Soil surveys, Soil classification, Terminology, Correlation, International cooperation, Russia

49-2424

Application of two-layer hypothesis to fully developed flow in ice-covered curved channels.

Urroz, G.E., Ettema, R., *Canadian journal of civil engineering,* Feb. 1994, 21(1), p.101-110, With French summary. 11 refs.

River ice, River flow, Channels (waterways), Ice cover effect, Ice water interface, Fluid dynamics, Stratification, Simulation, Flow measurement, Topographic effects, Analysis (mathematics)

49-2425

Effect of hydrogen bonds on the thermodynamic behavior of liquid water.

Poole, P.H., Sciortino, F., Grande, T., Stanley, H.E., Angell, C.A., *Physical review letters,* Sep. 19, 1994, 73(12), p.1632-1635, 15 refs.

Water structure, Ice physics, Supercooling, Amorphous ice, Thermodynamic properties, Hydrogen bonds, Molecular energy levels, Mathematical models

49-2426

Induction of freezing tolerance in jack pine seedlings: the role of root plasma membrane H+-ATPase and redox activities.

Zhao, S.Y., Colombo, S.J., Blumwald, E., *Physiologia plantarum,* Jan. 1995, 93(1), p.55-60, 34 refs.

Trees (plants), Plants (botany), Plant physiology, Acclimatization, Plant tissues, Frost resistance, Cold weather survival, Cold tolerance, Cold weather tests

49-2427

International Arctic Seas Assessment Project.

Linsley, G.S., Sjoeblom, K.L., *Radwaste magazine,* July 1994, 1(3), p.64-68, 9 refs.

Research projects, Oceanography, Environmental impact, Radioactive wastes, Waste disposal, Water pollution, Standards, International cooperation

49-2428

Microelements in the composition of arctic aerosol (review).

Vinogradova, A.A., *Izvestiya. Atmospheric and oceanic physics,* Feb. 1994, 29(4), p.417-437, Translated from Izvestiia. Fizika atmosfery i okeana. Refs. p. 434-437.

Polar atmospheres, Atmospheric composition, Air pollution, Haze, Aerosols, Atmospheric circulation, Chemical properties, Microanalysis, Chemical analysis, Environmental impact, Microelement content

49-2429

Decrease in atmospheric transmittance in polar regions (effect of eruptions of volcanoes Pinatubo and Khadson).

Radionov, V.F., Marshunova, M.S., *Izvestiya. Atmospheric and oceanic physics,* Feb. 1994, 29(4), p.549-550, Translated from Izvestiia. Fizika atmosfery i okeana. 4 refs.

Polar atmospheres, Atmospheric density, Aerosols, Solar radiation, Optical properties, Volcanic ash, Antarctica—Mirnyy Station

Photometric measurements at Mirnyy Station from Aug. 1991 through Feb. 1992 revealed an increase in atmospheric optical thickness attributed to invasion of the polar atmosphere by ash from the eruptions of Mt. Pinatubo, Phillipines, and Khadson, Chile.

49-2430

Surface waves of finite amplitude in a basin with broken ice.

Bukatov, A.E., Bukatova, O.M., *Izvestiya. Atmospheric and oceanic physics,* Dec. 1993, 29(3), p.405-409, Translated from Izvestiia. Fizika atmosfery i okeana. 14 refs.

Ice mechanics, Ice water interface, Floating ice, Ice cover effect, Water waves, Gravity waves, Fluid dynamics, Mathematical models

49-2431

Diurnal freeze-thaw depth in rockwalls: field measurements and theoretical considerations.

Matsuoka, N., *Earth surface processes and landforms,* Aug. 1994, 19(5), p.423-435, 32 refs.

Geocryology, Frozen rock temperature, Frost shattering, Periglacial processes, Freeze thaw cycles, Seasonal freeze thaw, Frost penetration, Thaw depth, Temperature measurement, Diurnal variations, Mathematical models

49-2432

Stress-deformed state of a semi-infinite ice sheet under the action of a moving load.

Zhestkaia, V.D., Kozin, V.M., *Journal of applied mechanics and technical physics,* Mar. 1995, 35(5), p.745-749, Translated from Prikladnaia mekhanika i tekhnicheskaia fizika. 8 refs.

Ice sheets, Ice mechanics, Dynamic loads, Ice water interface, Ice breaking, Air cushion vehicles, Ice deformation, Oscillations, Gravity waves, Mathematical models

49-2433
Study of melting phenomenon of frost and ice on the windshield.
Tsunemoto, H., Ishitani, H., Kakubari, Y., *JSAE review,* Jan. 1994, 15(1), p.53-58, 5 refs.
Vehicles, Windows, Cold weather tests, Ice formation, Ice melting, Defrosting, Electric heating, Heat transfer, Ice solid interface

49-2434
Advanced technology of the studless snow tire.
Fukuoka, N., *JSAE review,* Jan. 1994, 15(1), p.59-66.
Tires, Surface structure, Design, Rubber snow friction, Rubber ice friction, Cold weather performance, Traction

49-2435
Investigation of the electronic energy loss of hydrogen ions in H_2O: influence of the state of aggregation.
Bauer, P., Käferböck, W., Nečas, V., *Nuclear instruments and methods in physics research B,* July 1994, 93(2), p.132-136, 33 refs.
Ice physics, Ice spectroscopy, Ionization, Hydrogen ion concentration, Molecular structure, Radiation absorption, Ice solid interface, Spectra, Molecular energy levels

49-2436
Infrared spectra of crystalline phase ices condensed on silicate smokes at T < 20 K.
Moore, M.H., Ferrante, R.F., Hudson, R.L., Nuth, J.A., III, Donn, B., *Astrophysical journal,* June 20, 1994, 428(2)pt.2, p.L81-L84, 20 refs.
Extraterrestrial ice, Cosmic dust, Ice physics, Infrared spectroscopy, Ice spectroscopy, Spectra, Molecular structure, Condensation, Ice formation, Ice solid interface, Simulation

49-2437
Electromagnetic remote sensing of sea ice.
Jordan, A.K., Veysoglu, M.E., *Inverse problems,* Oct. 1994, 10(5), p.1041-1058, 80 refs.
Sea ice, Remote sensing, Electromagnetic properties, Microwaves, Surface roughness, Ice optics, Backscattering, Scattering, Mathematical models, Simulation

49-2438
Preliminary investigation of a method for determining past winter temperatures at Ellis Fjord, eastern Antarctica, from fast-ice diatom assemblages.
McMinn, A., *Tokyo. National Institute of Polar Research. Memoirs. Special issue,* Aug. 1994, No.50, International Workshop on Holocene Environmental Changes in Antarctic Coastal Areas, Tokyo, Oct. 20-22, 1993. Proceedings. Edited by P.A. Berkman and Y. Yoshida, p.34-40, 9 refs.
Sea ice, Ice cover effect, Algae, Climate, Antarctica—Ellis Fjord
The abundance of diatoms from the fast-ice mat community in sediment assemblages from the fjords of the Vestfold Hills has the potential to provide a proxy record of average winter temperature. Fast-ice cover on the fjords determines the proportion of diatoms from the fast-ice mat community in the sedimentary diatom assemblages. ANARE expeditioner records demonstrate a tentative relationship between fjord ice cover and average winter temperature. Short cores from Ellis Fjord, Taynaya Bay and Nella Fjord show fluctuations in the proportion of fast-ice diatoms but so far it has not been possible to correlate these with historical records. (Auth.)

49-2439
Notes on Late-Glacial retreat of the Antarctic Ice Sheet and Holocene environmental changes along the Victoria Land coast.
Baroni, C., *Tokyo. National Institute of Polar Research. Memoirs. Special issue,* Aug. 1994, No.50, International Workshop on Holocene Environmental Changes in Antarctic Coastal Areas, Tokyo, Oct. 20-22, 1993. Proceedings. Edited by P.A. Berkman and Y. Yoshida, p.85-107, Refs. p.96-99.
Glacial deposits, Glacier oscillation, Glacial geology, Geochronology, Geomorphology, Geocryology, Cryobiology, Antarctica—Victoria Land
Distinct recessional phases with minor readvances of the outlet glaciers in Victoria Land are documented during Late Glacial times when the Antarctic Ice Sheet and its fringing ice shelves receded from the continental shelf in the Ross Sea embayment. Abandoned penguin rookeries supply data both on the history of the glacial retreat that followed the LGM and environmental changes during the Holocene. These were found along the Victoria Land coast and supplied more than seventy ^{14}C dates as old as 13070±405 ^{14}C yr BP (GX-18483). Marine ingression and the glacio-isostatic uplift of the coastal areas that led to the formation of Holocene raised beaches accompanied deglaciation. Several ^{14}C dates obtained from shells collected in raised marine sediments and from fossil rookeries resting on the raised beaches constrain a relative sea-level curve for central Victoria Land. Penguins are sensitive to changes in antarctic climate and to the environmental parameters that determine their presence and distribution, which seem to have changed many times during the Holocene in the Ross Sea. Holocene glacier variations in the Terra Nova Bay area are documented for outlet and local glaciers as well as for ice shelves. (Auth.)

49-2440
Taking a bottom-to-sky "slice" of the Arctic Ocean.
Travis, J., *Science,* Dec. 23, 1994, 266(5193), p.1947-1948.
Albedo, Sea ice, Sediments, Research projects, Marine biology, Arctic Ocean

49-2441
Iceberg discharges into the North Atlantic on millennial time scales during the last glaciation.
Bond, G.C., Lotti, R., *Science,* Feb. 17, 1995, 267(5200), p.1005-1010, 38 refs.
Icebergs, Ice rafting, Calving, Climatic changes, Coring, Greenland, North Atlantic Ocean

49-2442
Structural aerofoil for aircraft having de-icing capability.
Leffel, K.L., Putt, J.C., Rauckhorst, R.L., *European Patent Office. Patent,* May 22, 1991, n.p., No.428011.
Aircraft icing, Ice removal, Ice prevention

49-2443
Deicing or dust control compositions for roads contain metal chloride and lignosulphonate.
Neal, J.A., *U.S. Patent Office. Patent,* May 26, 1987, n.p., USP-4,668,416.
Road icing, Chemical ice prevention, Road maintenance

49-2444
Preparation of asphalt paving material with improved compaction characteristics.
Schmanski, D.W., *U.S. Patent Office. Patent,* Mar. 1, 1994, n.p., USP-5,290,833.
Pavements, Bitumens, Weatherproofing, Frost protection, Road maintenance

49-2445
Combination bail and tip for ski pole.
Leon, R., Miranda, T.J., *U.S. Patent Office. Patent,* Mar. 1, 1994, n.p., USP-5,290,064.
Skis, Metal snow friction, Plastics snow friction

49-2446
Foam rubber type thermal insulation material for roofing and flooring.
Maruhiro Kokura Seizai, Ltd., Toyoda Gosei, Ltd., *Japan Patent Office. Patent,* Feb. 1, 1994, n.p., No.6023749.
Buildings, Thermal insulation, Weatherproofing, Waterproofing, Cellular plastics

49-2447
Rubber composition having good wear resistance and fracture properties.
Hamada, T., Hattori, I., Tadaki, T., Yamanaka, E., *European Patent Office. Patent,* Mar. 2, 1994, n.p., No.585012.
Tires, Rubber ice friction, Rubber, Skid resistance

49-2448
Tubular ice screw with cylindrical tube open on both sides.
Lehner, M., *Germany Patent Office. Patent,* Mar. 10, 1994, n.p., No.4304618.
Ice drills, Ice cutting, Portable equipment

49-2449
Lightweight circular inflatable boat.
Potvin, F.L., *Canada Patent Office. Patent,* Dec. 13, 1993, n.p., No.2071128.
Inflatable structures, Floating structures, Sleds

49-2450
Rubber mix for passenger vehicle tyre tread.
Hausmann, B., *European Patent Office. Patent,* Sep. 22, 1993, n.p., No.561761.
Tires, Rubber ice friction, Rubber, Skid resistance

49-2451
Fusion bondable waterproof rubber sheet for building roofs.
Aoshima, M., Sassa, T., Shigematsu, H., *European Patent Office. Patent,* Mar. 18, 1992, n.p., No.475388.
Roofs, Linings, Waterproofing, Frost protection, Rubber

49-2452
Gravity base structure of offshore platform resistant to icebergs.
Huynh, T.L., Pham, G.N., *Canada Patent Office. Patent,* July 31, 1991, n.p., No.2033135.
Offshore structures, Icebergs, Ice loads, Ice solid interface, Ice control

49-2453
Detector for wet and icy conditions.
Whitener, M.B., *U.S. Patent Office. Patent,* Jan. 30, 1990, n.p., USP-4,897,597.
Road icing, Ice detection, Moisture detection, Warning systems, Road maintenance

49-2454
Rubber tyres for snow and ice.
Takiguchi, E., *Germany Patent Office. Patent,* June 20, 1985, n.p., No.3443818.
Tires, Rubber ice friction, Rubber, Skid resistance

49-2455
Inhibiting plant frost injury using bacteria antagonistic to ice-nucleating bacteria.
Lindow, S.E., *European Patent Office. Patent,* Mar. 23, 1983, n.p., No.74718.
Plant physiology, Plant tissues, Frost protection, Ice prevention, Antifreezes, Microbiology, Bacteria, Organic nuclei

49-2456
Scraper bucket for snow and ice removal from roads.
Chuntonov, N.N., Moldabekov, M.U., Nuranov, S.N., *Russia Patent Office. Patent,* Jan. 23, 1993, n.p., No.1790648.
Snow removal, Motor vehicles, Road maintenance

49-2457
Machine for cutting through of slots in ice on pools.
Ryzhukhin, G.S., *Russia Patent Office. Patent,* Nov. 15, 1993, n.p., No.2003007.
Ice drills, Ice cutting, Saws

49-2458
Cross-country ski.
Vozhdaenko, V.V., *Russia Patent Office. Patent,* Nov. 15, 1993, n.p., No.2002477.
Skis, Metal ice friction, Metal snow friction

49-2459
Light concrete for road construction.
Kaden, L., Stracke, M., *Germany Patent Office. Patent,* Mar. 3, 1994, n.p., No.4300330.
Concrete pavements, Lightweight concretes, Concrete admixtures, Frost protection, Ice prevention, Road maintenance

49-2460
Reducing frost damage to plants, especially fruit trees.
Beger, J., Fieseler, C., Luthardt, H., Michael, R., Mittelstädt, H., Röthling, T., *Germany Patent Office. Patent,* Mar. 3, 1994, n.p., No.4228811.
Plant physiology, Plant tissues, Frost protection, Antifreezes, Chemical ice prevention, Microbiology, Bacteria, Organic nuclei

49-2461
Multilayered insulating composite fabric.
Schlecker, R.A., *U.S. Patent Office. Patent,* Feb. 1, 1994, n.p., USP-5,283,111.
Composite materials, Thermal insulation, Weatherproofing, Frost protection, Windows

49-2462

Resin modifier for modifying polyurethane and epoxy resins and resins for paint.

Nippon Unicar Co. Ltd., *Japan Patent Office. Patent,* Dec. 21, 1993, n.p., No.5339511.

Resins, Protective coatings, Frost protection, Weatherproofing

49-2463

Insulation system for mining installations.

Akesson, J.A., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Aug. 13, 1987, n.p., No.8704756.

Mine shafts, Thermal insulation, Linings, Waterproofing, Frost protection, Ice prevention

49-2464

Laser ice detecting system for aircraft wings.

Federow, H.L., Silverman, J.H., *U.S. Patent Office. Patent,* Mar. 22, 1994, n.p., USP-5,296,853.

Aircraft icing, Ice detection, Ice optics, Lasers, Warning systems

49-2465

Train air brake line de-icer.

Wood, D.F., *U.S. Patent Office. Patent,* Mar. 15, 1994, n.p., USP-5,293,904.

Brakes (motion arresters), Ice prevention, Antifreezes

49-2466

Antifreeze admixture for concrete.

Cortez, E.R., Korhonen, C.J., MP 3571, *U.S. Patent Office. Patent,* Mar. 22, 1994, n.p., USP-5,296,028.

Concrete freezing, Concrete admixtures, Antifreezes, Frost protection, Ice prevention

49-2467

Offshore ice technology. [Offshore-Eistechnik]

Schwarz, J., *Schiffbautechnische Gesellschaft. Jahrbuch,* 1993 (Pub. 1994), Vol.87, p.74-78, In German with English summary. 14 refs.

Ice solid interface, Ice loads, Ice pressure, Ice cover strength, Offshore structures, Environmental tests

49-2468

Northern Sea Route. [Der Nördliche Seeweg]

Schwarz, J., *Schiffbautechnische Gesellschaft. Jahrbuch,* 1993 (Pub. 1994), Vol.87, p.313-323, In German with English summary. 10 refs.

Route surveys, Ice navigation, Ice routing, Economic development, Cost analysis, Northern Sea Route

49-2469

Brittle failure of an ice sheet. [Sprödbruchversagen einer Eisdecke]

Harms, U., *Schiffbautechnische Gesellschaft. Jahrbuch,* 1993 (Pub. 1994), Vol.87, p.325-333, In German with English summary. 16 refs.

Ice solid interface, Ice loads, Ice cover strength, Ice pressure, Ice cracks, Ice elasticity

49-2470

On the calculation of the icebreaking resistance of a ship advancing in level ice. [Beitrag zur Berechnung des Eisbrechwiderstandes eines im ebenen Eis fahrenden Schiffes]

Valanto, P., *Schiffbautechnische Gesellschaft. Jahrbuch,* 1993 (Pub. 1994), Vol.87, p.335-347, In German with English summary. 23 refs.

Icebreakers, Ice breaking, Ice navigation, Ice solid interface, Ice loads, Ice cover strength, Ice pressure, Metal ice friction, Mathematical models

49-2471

Environmental overview and hydrogeologic conditions at Aniak, Alaska.

Dorava, J.M., *U.S. Geological Survey. Open-file report,* 1994, No.94-85, 17p. + appends., 38 refs.

Water supply, Water reserves, Hydrogeology, Hydrogeochemistry, Water chemistry, Water pollution, Soil pollution, United States—Alaska

49-2472

Overview of environmental and hydrogeologic conditions at McGrath, Alaska.

Dorava, J.M., *U.S. Geological Survey. Open-file report,* 1994, No.94-119, 15p. + appends., 32 refs.

Water supply, Water reserves, Hydrogeology, Hydrogeochemistry, Water chemistry, Water pollution, Soil pollution, United States—Alaska

49-2473

Overview of environmental and hydrogeologic conditions at Moses Point, Alaska.

Dorava, J.M., Ayres, R.P., Sisco, W.C., *U.S. Geological Survey. Open-file report,* 1994, No.94-310, 11p., 18 refs.

Water supply, Water reserves, Hydrogeology, Hydrogeochemistry, Water chemistry, Water pollution, Soil pollution, United States—Alaska

49-2474

Overview of environmental and hydrogeologic conditions at Barrow, Alaska.

McCarthy, K.A., *U.S. Geological Survey. Open-file report,* 1994, No.94-322, 17p., 40 refs.

Water supply, Water reserves, Hydrogeology, Hydrogeochemistry, Water chemistry, Water pollution, Soil pollution, United States—Alaska

49-2475

Overview of environmental and hydrogeologic conditions at King Salmon, Alaska.

Waythomas, C.F., *U.S. Geological Survey. Open-file report,* 1994, No.94-323, 16p., 23 refs.

Water supply, Water reserves, Hydrogeology, Hydrogeochemistry, Water chemistry, Water pollution, Soil pollution, United States—Alaska

49-2476

Plows for slush removal. [Plogar för moddavröjning]

Wigander, S., *Vägverket bygg- och driftproduktion (Road Department construction and operations). BD rapport,* 1990, No.89401-88, 8p. + appends., In Swedish.

Motor vehicles, Slush, Snow removal, Road maintenance

49-2477

Combating slipperiness with a salt solution. [Halkbekämpning med saltlösning]

Högström, J., Karlsson, J.Å., Ölander, J., Eriksson, Å., *Vägverket bygg- och driftproduktion (Road Department construction and operations). BD rapport,* 1990, No.90501-46, 17p., In Swedish.

Road icing, Salting, Road maintenance

49-2478

Simple prewetting with water: the Åtvidaberg method. [Enkel befuktning med vatten "Åtvidabergsmetoden"]

Karlsson, J.Å., *Vägverket bygg- och driftproduktion (Road Department construction and operations). BD rapport,* 1989, No.89201-46, 8p., In Swedish.

Road icing, Salting, Road maintenance

49-2479

Combating slipperiness with a salt solution. [Halkbekämpning med saltlösning]

Karlsson, J.Å., Ölander, J., Högström, J., *Vägverket bygg- och driftproduktion (Road Department construction and operations). BD rapport,* 1989, No.88302-46, 13p. + appends., In Swedish.

Road icing, Salting, Road maintenance

49-2480

Test on the FFV Company's freezing point sensor. [Test av FFV:s fryspunktsgivare]

Ericsson, B., *Vägverket bygg- och driftproduktion (Road Department construction and operations). BD rapport,* 1990, Publ 1990:32, 6p., In Swedish.

Road icing, Ice detection, Frost forecasting, Salting, Road maintenance

49-2481

Preventive salting with brine. [Preventivsaltning med saltlake]

Sjöberg, L., *Vägverket bygg- och driftproduktion (Road Department construction and operations). BD rapport,* 1989, No.89401-46, Var. p., In Swedish.

Road icing, Salting, Road maintenance

49-2482

4th International Conference on the Bearing Capacity of Roads and Airfields.

Baltzer, S., Ertman Larsen, H.J., Jansen, J.M., Lukanen, E.O., Stubstad, R.N., *Denmark. Vejteknisk Institut. Notat,* 1994, No.248, 39p., With Danish summary. 9 refs.

Road maintenance, Temperature measurement, Frost forecasting, Weather forecasting

49-2483

Atmospheric icing—failure studies and ice load predictions on masts by weather station data.

Sundin, E., Luleå, Sweden, University of Technology, 1994, Var. p., Licentiate thesis. With Swedish summary. Refs. passim.

Power line icing, Ice loads, Ice accretion, Ice forecasting, Towers, Antennas

49-2484

Changes in microstructural parameters of snow during deformation.

Brown, R.L., U.S. Army Research Office, Grant No. DAAL03-91-G-0310, Bozeman, MT, Montana State University, 1994, 7p., 11 refs.

Snow deformation, Metamorphism (snow), Snow cover structure, Microstructure

49-2485

Soil erosion losses under freeze/thaw and winter ground cover using a laboratory rainfall simulator.

Edwards, L.M., Burney, J.R., *Canadian agricultural engineering,* Summer 1987, 29(2), p.109-115, 4 refs.

Soil erosion, Frost weathering, Vegetation factors, Protective vegetation

49-2486

Analysis of river ice cover roughness.

Shen, H.T., Ruggles, R.W., Conference on Applying Research to Hydraulic Practice, Jackson, MS, Aug. 17-20, 1982. Proceedings, New York, American Society of Civil Engineers, 1982, p.160-168, 10 refs.

River ice, Ice bottom surface, Ice cover thickness, Ice cover effect, Ice water interface, River flow, Surface roughness, Mathematical models

49-2487

Tillage-residue effects on snow cover, soil water, temperature and frost.

Benoit, G.R., Mostaghimi, S., Young, R.A., Lindstrom, M.J., *American Society of Agricultural Engineers. Transactions,* Mar.-Apr. 1986, 29(2), p.473-479, 19 refs.

Soil conservation, Vegetation factors, Agriculture, Snow cover effect, Snow retention

49-2488

Speed dependence of the natural modes of an elastically scaled ship model. Test results.

Riska, K., Kukkanen, T., *Helsinki University of Technology. Arctic Offshore Research Centre. Report,* 1994, M-184, 47p., PB95-110904, 18 refs.

Ships, Hydrodynamics, Environmental tests, Strain tests, Damping

49-2489

Oil and gas exploration and production in arctic and subarctic onshore regions. Gland, Switzerland, International Union for Conservation of Nature and Natural Resources (IUCN-The World Conservation Union), 1993, 56p., 8 refs.

Exploration, Petroleum industry, Economic development, Regional planning, International cooperation, Environmental protection

49-2490

Watershed simulation and forecasting system in the National Board of Water and the Environment.

Vehviläinen, B., *Finland. National Board of Waters and the Environment. Water and Environment Research Institute. Publications,* 1994, No.17, p.3-16, With Finnish summary. 19 refs.

Snowmelt, Runoff forecasting, Watersheds, Computerized simulation, Finland

49-2491

Ice reduction of winter discharge by watershed models.

Leppäjärvi, R., Vehviläinen, B., *Finland. National Board of Waters and the Environment. Water and Environment Research Institute. Publications,* 1994, No.17, p.17-25, With Finnish summary. 5 refs.

River ice, Ice cover effect, River flow, Runoff forecasting, Watersheds, Computerized simulation, Finland

49-2492

Thickness and volume of lake ice in Finland in 1961-90.

Kuusisto, E., *Finland. National Board of Waters and the Environment. Water and Environment Research Institute. Publications,* 1994, No.17, p.27-36, With Finnish summary. 7 refs.

Lake ice, Ice cover thickness, Ice volume, Ice surveys, Climatic changes, Finland

49-2493

Water content variations of sandy soil under winter conditions.

Huttunen, L., Kujala, K., *Finland. National Board of Waters and the Environment. Water and Environment Research Institute. Publications,* 1994, No.17, p.51-58, With Finnish summary. 26 refs.

Soil freezing, Frozen ground thermodynamics, Frost penetration, Frost forecasting, Soil water, Unfrozen water content

49-2494

ALBE geographic information system/user interface/graphics. Volume III. Technical design overview (version 2.0). MP 3572, *U.S. Army Waterways Experiment Station. Geotechnical Laboratory. Miscellaneous paper,* Dec. 1992, GL-92-22, Var. p., The U.S. Army Cold Regions Research and Engineering Laboratory was one of the contributing organizations.

Environment simulation, Computerized simulation, Computer programs, Military operation, Terrain identification, Weather forecasting

49-2495

ALBE geographic information system/user interface/graphics. Volume I. Programmer's guide (version 2.0). MP 3573, *U.S. Army Waterways Experiment Station. Geotechnical Laboratory. Miscellaneous paper,* Dec. 1992, GL-92-41, Var. p., The U.S. Army Cold Regions Research and Engineering Laboratory was one of the contributing organizations.

Environment simulation, Computerized simulation, Computer programs, Military operation, Terrain identification, Weather forecasting

49-2496

ALBE geographic information system/user interface/graphics. Volume II. Library reference (version 2.0). MP 3574, *U.S. Army Waterways Experiment Station. Geotechnical Laboratory. Miscellaneous paper,* Sep. 1992, GL-92-37, Var. p., The U.S. Army Cold Regions Research and Engineering Laboratory was one of the contributing organizations.

Environment simulation, Computerized simulation, Computer programs, Military operation, Terrain identification, Weather forecasting

49-2497

ALBE tactical decision aid (TDA) user's guide (version 2.0). AirLand Battlefield Environment technology demonstration program. MP 3575, *U.S. Army Waterways Experiment Station. Geotechnical Laboratory. Miscellaneous paper,* Dec. 1992, GL-92-22, Var. p., The U.S. Army Cold Regions Research and Engineering Laboratory was one of the contributing organizations.
Environment simulation, Computerized simulation, Computer programs, Military operation, Terrain identification, Weather forecasting

49-2498

FEM assessment of large-strain thaw consolidation.
Foriero, A., Ladanyi, B., *Journal of geotechnical engineering,* Feb. 1995, 121(2), p.126-138, 24 refs.
Frozen ground mechanics, Thaw consolidation, Thaw depth, Convection, Settlement (structural), Hot oil lines, Freeze thaw cycles, Stresses, Computerized simulation

49-2499

Winter effects on hydraulic conductivity of compacted clay.
Benson, C.H., Abichou, T.H., Olson, M.A., Bosscher, P.J., *Journal of geotechnical engineering,* Jan. 1995, 121(1), p.69-79, 22 refs.
Frozen ground mechanics, Soil tests, Freeze thaw tests, Clay soils, Linings, Soil compaction, Water content, Seepage, Permeability

49-2500

Natural fluorescence and quantum yields in vertically stationary phytoplankton from perennially ice-covered lakes.
Lizotte, M.P., Priscu, J.C., *Limnology and oceanography,* Sep. 1994, 39(6), p.1399-1410, 32 refs.
Limnology, Icebound lakes, Plankton, Biomass, Water chemistry, Ice cover effect, Chlorophylls, Radiance, Photosynthesis, Antarctica—Hoare, Lake, Antarctica—Bonney, Lake, Antarctica—Fryxell, Lake
Phytoplankton in ice-covered lakes near McMurdo Sound are stratified vertically in distributions similar to deep chlorophyll maxima commonly observed in lakes and seas. Measurements were made of natural fluorescence flux rates, chlorophyll concentration, phytoplankton absorption spectra, photosynthetic efficiency, and spectral irradiance to derive the quantum yields for photosynthesis and fluorescence. Chlorophyll concentrations predicted from natural fluorescence based on mean phytoplankton absorption spectra correlated significantly with measured chlorophyll concentration. Predictions of primary productivity from natural fluorescence based on mean values for fluorescence and photosynthesis were poor. Relationships between photosynthesis:fluorescence and temperature and between fluorescence:photosynthesis and irradiance implied that these environmental variables would not provide good bases for correcting predictions of primary production. Photosynthesis:fluorescence varied most coherently with distance from the nutricline, due primarily to a large increase in maximum photosynthesis with proximity to the nutricline. Results indicate that nutrient supply may be a critical variable to consider when using natural fluorescence methods to estimate primary productivity in vertically stable phytoplankton. (Auth. mod.)

49-2501

On the role of the antarctic continent in forcing large-scale circulations in the high southern latitudes.
Parish, T.R., Bromwich, D.H., Tzeng, R.Y., *Journal of the atmospheric sciences,* Dec 15, 1994, 51(24), p.3566-3579, 26 refs.
Polar atmospheres, Climatic factors, Atmospheric circulation, Atmospheric boundary layer, Atmospheric disturbances, Ice air interface, Ice cover effect, Topographic effects, Wind direction, Mathematical models
The antarctic topography and attendant katabatic wind regime appear to play a key role in the climate of the high southern latitudes. During the nonsummer months, persistent and often intense katabatic winds occur in the lowest few hundred meters of the antarctic atmosphere. These slope flows transport significant amounts of cold air northward and thereby modify the horizontal pressure field over the high southern latitudes. Three-year seasonal cycle numerical simulations using the National Center for Atmospheric Research Community Climate Model Version 1 (CCM1) with and without representation of the antarctic orography were performed to explore the role of the elevated terrain and drainage flows on the distribution and evolution of the horizontal pressure field. The katabatic wind regime is an important part of a clearly defined mean meridional circulation in the high southern latitudes. The position and intensity of the attendant sea level low pressure belt appears to be tied to the antarctic orography. The seasonal movement of mass in the high southern latitudes is therefore constrained by the presence of the antarctic ice sheet. The semiannual oscillation of pressure over Antarctica and the high southern latitudes is well depicted in the CCM1 only when the antarctic orography is included. (Auth. mod.)

49-2502

Reconciling Late Ordovician (440 Ma) glaciation with very high (14X) CO_2 levels.
Crowley, T.J., Baum, S.K., *Journal of geophysical research,* Jan. 20, 1995, 100(D1), p.1093-1101, 52 refs.
Paleoclimatology, Pleistocene, Glaciation, Glacier oscillation, Snow cover effect, Air temperature, Carbon dioxide, Topographic effects, Heat flux, Air ice water interaction
This paper examines the topic of Late Ordovician glaciation in the Southern Hemisphere by repeating the energy balance model experiments with a general circulation model (GCM) that enables explicit calculation of moisture and sea ice fields. CO_2, elevation, and ocean circulation effects can also be more accurately incorporated into the GCM. Utilization of the GCM also enables calculation of moisture budgets, an option which in turn yields results that have implications for the role of weathering feedbacks under altered CO_2 levels. An important assumption in this study is that summer temperature is the constraining factor for ice sheet initiation. Ice cap formation is impossible if it gets too hot in the summer. By thus addressing the problem, the study emphasizes a critical boundary condition necessary for glacial inception without introducing the significantly more complicated problem of subsequent growth of the ice sheet. It is assumed that permanent summer snow cover will lead to ice cap development within a geologically short interval (a few thousand years). (Auth. mod.)

49-2503

Snow cover and sea ice sensitivity to generic changes in Earth orbital parameters.
Gallimore, R.G., Kutzbach, J.E., *Journal of geophysical research,* Jan. 20, 1995, 100(D1), p.1103-1120, 43 refs.
Paleoclimatology, Climatology, Climatic changes, Ice age theory, Sea ice distribution, Ice cover thickness, Snow cover distribution, Snow accumulation, Snowmelt, Insolation, Periodic variations, Simulation

49-2504

Phase equilibria of H_2, HNO_3, and HCl hydrates and the composition of polar stratospheric clouds.
Wooldridge, P.J., Zhang, R.Y., Molina, M.J., *Journal of geophysical research,* Jan. 20, 1995, 100(D1), p.1389-1396, 42 refs.
Polar atmospheres, Stratosphere, Polar stratospheric clouds, Ozone, Cloud physics, Aerosols, Hydrates, Chemical properties, Thermodynamic properties, Heterogeneous nucleation, Simulation, Vapor pressure, Ice vapor interface
Thermodynamic properties and phase equilibria behavior for the hydrates and coexisting pairs of hydrates of common acids which exist in the stratosphere and which participate in the formation polar stratospheric clouds, are assembled from new laboratory measurements and standard literature data. The analysis focuses upon solid-vapor and solid-solid-vapor equilibria at temperatures around 200 K and includes new calorimetric and vapor pressure data. Calculated partial pressures versus 1/T slopes for the hydrates and coexisting pairs agree well with experimental data where available. (Auth. mod.)

49-2505

Origins and variations of light carboxylic acids in polar precipitation.
Legrand, M., De Angelis, M., *Journal of geophysical research,* Jan. 20, 1995, 100(D1), p.1445-1462, 54 refs.
Polar atmospheres, Atmospheric composition, Air pollution, Precipitation (meteorology), Aerosols, Hydrocarbons, Ice sheets, Ice cores, Sampling, Chemical composition, Antarctica—Adélie Coast, Greenland—Summit
This paper presents results of an investigation of variations of the carboxylic acid content of polar (central Greenland and East Antarctica) snow deposited over preindustrial (present climatic conditions as well as past cold climate) and modern time periods. Such data provide useful information on the relative contribution of various sources (hydrocarbon oxidation, biomass-burning, vegetation emissions) to the natural budget of these carboxylic acid species at high latitudes and on the impact of human activities. (Auth. mod.)

49-2506

Precession constant of the Earth: variations through the ice-age.
Peltier, W.R., Jiang, X.H., *Geophysical research letters,* Oct. 15, 1994, 21(21), p.2299-2302, 28 refs.
Pleistocene, Ice age theory, Ice sheets, Glacier oscillation, Ice loads, Geologic processes, Insolation, Periodic variations, Gravity

49-2507

Yearlong performance of satellite broadcasting receiving systems.

Purwanto, Y., Ogawa, Y., Ohmiya, M., Itoh, K, *Institute of Electronics, Information and Communication Engineers. Transactions on communications,* June 1994, E77-B(6), p.808-814, 5 refs.

Telecommunication, Antennas, Performance, Precipitation (meteorology), Snow cover effect, Radio waves, Attenuation, Surface structure

49-2508

Areal extent of seasonal snow cover in a changed climate.

Rango, A., Martinec, J., *Nordic hydrology,* 1994, 25(4), p.233-246, 19 refs.

Snow hydrology, Snowmelt, Climatic changes, Snow cover distribution, River basins, Runoff forecasting, Degree days, Hydrologic cycle, Computerized simulation

49-2509

Climatic variability, climatic change, runoff, and suspended sediment regimes in northern Canada.

Woo, M.K., McCann, S.B., *Physical geography,* May-June 1994, 15(3), p.201-226, 58 refs.

River basins, Geomorphology, Soil erosion, Runoff, Stream flow, Meltwater, Suspended sediments, Sediment transport, Climatic changes, Global warming, Permafrost hydrology, Canada

49-2510

Influence of radiation on the diffusional growth of ice crystals.

Gierens, K.M., *Contributions to atmospheric physics,* Aug. 1994, 67(3), p.181-193, With German summary. 21 refs.

Cloud physics, Ice physics, Ice crystal growth, Ice sublimation, Ice crystal optics, Ice crystal size, Solar radiation, Radiation absorption, Heat balance, Analysis (mathematics)

49-2511

Mesoscale organization and hailfall characteristics of deep convection in southern Germany.

Höller, H., *Contributions to atmospheric physics,* Aug. 1994, 67(3), p.219-234, With German summary. 28 refs.

Atmospheric physics, Precipitation (meteorology), Convection, Thunderstorms, Remote sensing, Radar echoes, Hailstone growth, Classifications, Snow pellets, Ice detection

49-2512

Nature of CO and H_2O ices in the Corona Australis molecular cloud.

Tanaka, M., Nagata, T., Sato, S., Yamamoto, T., *Astrophysical journal,* Aug. 1, 1994, 430(2)pt.1, p.779-785, 36 refs.

Extraterrestrial ice, Cosmic dust, Infrared spectroscopy, Ice detection, Ice sublimation, Spectra

49-2513

Surface cleaning with the carbon dioxide snow jet.

Sherman, R., Hirt, D., Vane, R., *Journal of vacuum science & technology A,* July-Aug. 1994, 12(4)pt.2, National Symposium of the American Vacuum Society, 40th, Orlando, FL, Nov. 15-19, 1993, p.1876-1881, 12 refs.

Carbon dioxide, Dry ice (trademark), Vapor compression, Ice solid interface, Particles, Laboratory techniques

49-2514

Depth distribution of microbial production and oxidation of methane in northern boreal peatlands.

Sundh, I., Nilsson, M., Granberg, G., Svensson, B.H., *Microbial ecology,* May-June 1994, 27(3), p.253-265, 52 refs.

Subarctic landscapes, Soil microbiology, Soil chemistry, Ecology, Water table, Soil air interface, Peat, Natural gas, Bacteria, Sweden

49-2515

ESR studies on reactivity of HO_2 radicals in polycrystalline ice: non-monotonic changes of disproportionation rate in the temperature range 100-200 K.

Bednarek, J., Plonka, A., *Radiation physics and chemistry,* Nov. 1994, 44(5), p.485-489, 8 refs.

Ice physics, Ice relaxation, Ice spectroscopy, Ultraviolet radiation, Spectra, Photochemical reactions, Chemical composition, Molecular energy levels, Radiation absorption, Temperature effects

49-2516

Proceedings.

International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992, Prowse, T.D., ed, Ommanney, C.S.L., ed, Ulmer, K.E., ed, *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, 918p. (2 vols.), Refs. passim. For selected papers see 49-2517 through 49-2562.

Snow hydrology, Snowmelt, Glacial hydrology, River ice, Ice water interface, Ice breakup, Ice cover effect, Water reserves, River basins, Tundra, Global warming

49-2517

Snow modeling, water resources, climate change.

Bergström, S., et al, *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.1-13, 36 refs.

Snow hydrology, Snowmelt, Runoff forecasting, Water reserves, Global warming

49-2518

Surging glaciers in northern Canada: a review of past and current research.

Blake, E.W., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.15-33, Refs. p.27-33.

Glacier surveys, Glacier surges, Glacier flow, Glacier friction, Subglacial drainage, Basal sliding, Canada

49-2519

Mining in a heavily glacierized area: Windy Craggy, B.C.

Brugman, M.M., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.35-58, 27 refs.

Alpine glaciation, Mountain glaciers, Glacial hydrology, Glacial geology, Mining, Exploration, Minerals, Natural resources, Economic development, Environmental impact, Canada—British Columbia

49-2520

Snowmelt runoff and total solids production in a discontinuous permafrost basin.

Chacho, E.F., Jr., MP 3576, *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.59-76, 15 refs.

Snow hydrology, Snowmelt, Discontinuous permafrost, Permafrost beneath rivers, Permafrost hydrology, Runoff, Suspended sediments, United States—Alaska—Fairbanks

Snowmelt runoff and total suspended solids were measured for two years on Glenn Creek, a small, second-order, subarctic stream located near Fairbanks, AK, within the Yukon-Tanana Uplands physiographic province. The stream drains a 2.25 km^2 research watershed of which 70% is underlain by permafrost. The two years of study represent very different snowmelt hydrographs due to differences in the snowpacks. In 1985, the snowpack was 180% of the long-term average, while in 1988 it was only 56% of the average. During both years, 60% of the total snowmelt-season water yield had passed before a significant rate of solids yield was observed. Also in both years the peak in total suspended solids concentration lagged the stream discharge peak by three days. Diurnal fluctuations in discharge and total suspended solids concentration are well-defined, including a peculiar occurrence of double diurnal peaks in the discharge hydrograph during portions of the snowmelt season. The diurnal fluctuations in solids concentration are shown to be consistent with water temperature fluctuations. In 1988, the percentage of organics in the total suspended solids was scattered from 0 to 50% during the snowmelt season.

49-2521

Numerical modelling of phase change in freezing and thawing unsaturated soil.

Englemark, H., Svensson, U., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.79-99, 21 refs.

Frozen ground thermodynamics, Soil freezing, Ground thawing, Freezing front, Soil water migration, Seasonal freeze thaw, Mathematical models

49-2522

River ice motion during dynamic breakup.

Ferrick, M.G., Weyrick, P.B., Nelson, D.F., MP 3577, *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.101-121, 15 refs.

River ice, Ice breakup, Ice jams, Ice water interface, Ice cover effect, River flow, Mathematical models

The authors began a study of the dynamics of ice motion during river breakup by formulating a kinematic analysis. Ice continuity equations are applied to relate the speeds of a breaking front, a convergence front, a stoppage front, and a release front with the ice discharge and volume per unit surface area (unit volume) on either side of each front. Ice velocity data with time during a dynamic breakup were measured at a pair of sites bounding a short reach of the Connecticut River. An ice accumulation developed in this reach while the ice was in motion. The authors simulated the ice motion using the kinematic model and the data with the assumption of uniform accumulation thickness and porosity. Consistency between the model and the data required a specific accumulation length and unit ice volume, and this length was verified by independent measurement.

49-2523

Stable isotope estimates of evaporation from two catchments in northern Canada.

Gibson, J.J., Edwards, T.W.D., Bursey, G.G., Prowse, T.D., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.123-137, 29 refs.

Watersheds, Tundra, Water balance, Hydrologic cycle, Hydrogeochemistry, Soil air interface, Evaporation, Isotope analysis, Canada—Northwest Territories

49-2524

Runoff pathways and flow-contributing areas in a high boreal wetland, upper Mackenzie Valley, Northwest Territories, Canada.

Gibson, J.J., Edwards, T.W.D., Prowse, T.D., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.139-154, 25 refs.

Wetlands, River basins, Snow hydrology, Snowmelt, Runoff, Stream flow, Water chemistry, Hydrogeochemistry, Isotope analysis, Canada—Northwest Territories

49-2525

Reconstructed runoff from the high arctic basin Bayelva in Svalbard based on mass balance measurements.

Hagen, J.O., Lefauconnier, B., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.155-168, 13 refs.

Glacial hydrology, Glacier mass balance, Meltwater, Runoff, River basins, Water balance, Norway—Svalbard

49-2526

Snowmelt at a small Alaskan arctic watershed. 1. Energy related processes.

Hinzman, L.D., Wendler, G., Gieck, R.E., Kane, D.L., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.171-197, 31 refs.

Watersheds, Snow hydrology, Snowmelt, Snow melting, Snow heat flux, Snow air interface, Radiation balance, Slope orientation, United States—Alaska—North Slope

49-2527

Carbon dynamics in permafrost-affected stream systems: implications of global change.

Irons, J.G., III, Oswood, M.W., Slaughter, C.W., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.199-215, Refs. p.211-215.

Permafrost hydrology, Permafrost beneath rivers, Permafrost distribution, Soil air interface, Tundra, Streams, Nutrient cycle, Geochemical cycles, Global warming

49-2528

Historical analysis of ice jamming at Old Crow, Yukon Territory.

Janowicz, J.R., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.217-226, 5 refs.

River ice, Ice breakup, Ice jams, Floods, History, Canada—Yukon Territory—Old Crow

49-2529

Snowmelt at a small Alaskan arctic watershed. 2. Energy related modeling results.

Kane, D.L., Gieck, R.E., Wendler, G., Hinzman, L.D., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.227-247, 19 refs.

Watersheds, Snow hydrology, Snowmelt, Snow heat flux, Snow air interface, Runoff forecasting, Radiation balance, Mathematical models, United States—Alaska—North Slope

49-2530

Glacierized basin hydrological variability and climate change trends.

Kruszynski, G.A., Johnson, P.G., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.269-284, 20 refs.

Alpine glaciation, Mountain glaciers, Glacial hydrology, Meltwater, Runoff, River basins, Climatic changes, Canada—Yukon Territory—St. Elias Mountains

49-2531

Snow and ice in our solar system.

Kuusisto, E., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.285-291, 8 refs.

Extraterrestrial ice, Planetary environments, Satellites (natural)

49-2532

Effect of climatic change on design floods in Finland.

Kuusisto, E., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.293-303.

Snowmelt, Flood forecasting, Global warming, Finland

49-2533

Heavy metal attenuation in northern drainage systems.

Kwong, Y.T.J., Whitley, W.G., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.305-322, 7 refs.

Wetlands, River basins, Geochemical cycles, Hydrogeochemistry, Water chemistry, Soil chemistry, Suspended sediments, Alluvium, Permafrost weathering, Water pollution, Soil pollution, Canada—Yukon Territory

49-2534

Importance of ice in the global water cycle.

Lawford, R.G., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.323-338, 15 refs.

Hydrologic cycle, Air ice water interaction, Ice cover effect, Global warming

49-2535

Effect of environmental change on the hydrologic regime of lakes in the Mackenzie Delta.

Marsh, P., Lesack, L.F.W., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.339-358, 19 refs.

Lake ice, Frozen lakes, Ice cover effect, Deltas, Floodplains, Flooding, Water balance, Permafrost beneath lakes, Climatic changes, Canada—Northwest Territories—Mackenzie River Delta

49-2536

Finnish experience with river ice in China.

Maunula, M., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.359-369, 5 refs.

Channels (waterways), River ice, Ice control, Flow control, China—Beijing

49-2537

Yukon glaciers.

Ommanney, C.S.L., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.373-382, 16 refs.

Glacier surveys, Mountain glaciers, Rock glaciers, Glacial hydrology, Glacial rivers, River basins, Canada—Yukon Territory

49-2538

Relocation of major ions in snow along the tundra-taiga ecotone.

Pomeroy, J.W., Marsh, P., Lesack, L.F.W., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.383-404, 26 refs.

Snow composition, Snow impurities, Snow cover effect, Snow air interface, Scavenging, Geochemical cycles, Nutrient cycle, Ion density (concentration), Forest tundra, Canada—Northwest Territories

49-2539

Spatial and temporal variability of river ice-cover strength.

Prowse, T.D., Demuth, M.N., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.405-421, 19 refs.

River ice, Ice cover strength, Ice deterioration, Ice breakup, Ice water interface, Ice surveys

49-2540

Measuring and modelling the effects of climatic variability and change in a subarctic wetlands research watershed.

Rouse, W.R., Boudreau, L.D., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.1. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.423-444, 15 refs.

Wetlands, Watersheds, Stream flow, Tundra, Permafrost hydrology, Snow cover effect, Climatic changes, Climatic factors

49-2541

Modeling climate change impact on snow cover and runoff.

Sælthun, N.R., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.445-457, 12 refs.

Snow cover distribution, Snowfall, Snow hydrology, Snowmelt, Runoff, Climatic factors, Global warming, Norway

49-2542

Estimation of transit time of water in lysimeters by injected tritium.

Saxena, R.K., Bengtsson, L., Seuna, P., Lepistö, A., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.459-467, 15 refs.

Snow hydrology, Snowmelt, Snow cover effect, Seepage, Soil water migration, Finland

49-2543

Ecological effects of river ice break-up: a perspective.

Scrimgeour, G.J., Prowse, T.D., Culp, J.M., Chambers, P.A., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.469-488, 45 refs.

River ice, Ice breakup, Ice cover effect, Nutrient cycle, Ecology, Ecosystems, Biomass

49-2544

Temporal variation in snowcover area during melt in prairie and alpine environments.

Shook, K., Gray, D.M., Pomeroy, J.W., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.489-507, 11 refs.

Snow cover distribution, Snow hydrology, Snowmelt, Runoff forecasting

49-2545

Establishment of gauging stations under arctic conditions—the Svalbard experience.

Skretteberg, R., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.509-517.

Glacial hydrology, Glacial rivers, Meltwater, Stream flow, Runoff, Norway—Svalbard

49-2546

Hydrology of a glacierized and a glacier free catchment area in Johan Dahl Land, South Greenland.

Svendsen, S.C.K., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.519-536, 6 refs.

Glacial hydrology, Glacial lakes, Precipitation (meteorology), Stream flow, Runoff, Greenland

49-2547

Hydro-power potentials in Greenland—on basis of water resources.

Thomsen, T., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.537-554, 8 refs.

Glacial hydrology, Glacial lakes, Precipitation (meteorology), Runoff, Water reserves, Electric power, Economic development, Greenland

49-2548

Passive microwave derived snow cover for hydrological and climatological applications in northern regions.

Walker, A.E., Goodison, B.E., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.575-588, 13 refs.

Snow surveys, Snow hydrology, Snow cover distribution, Snow water equivalent, Radiometry, Spaceborne photography, Canada

49-2549

Modelling velocity distribution for flow under ice cover.

Wang, D.P., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.589-602, 12 refs.

River ice, Ice cover effect, Ice water interface, Ice bottom surface, River flow, Mathematical models

49-2550

Short- and long-term variability of snow albedo.

Winther, J.G., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.603-626, 26 refs.

Snow hydrology, Snow optics, Snow heat flux, Snow surface, Albedo, Statistical analysis

49-2551

Effects of manipulation of climatic factors on arctic snowmelt.

Woo, M.K., Rowsell, R.D., Edlund, S.A., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.627-641, 11 refs.

Snow hydrology, Snow melting, Snowmelt, Snow air interface, Dust, Runoff, Climatic factors, Dusting

49-2552

What's the connection? The Northern Research Basins and the Northern Affairs Program.

Milburn, D., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.643-652, 8 refs.

Water reserves, Regional planning, Research projects, Canada—Northwest Territories, Canada—Yukon Territory

49-2553

Synthetic ice jam simulations on the Yukon River near Dawson.

Gerard, R., Jasek, M., Hicks, F.E., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.653-672, 21 refs.

River ice, Ice jams, Ice water interface, Ice cover effect, River flow, Flood forecasting, Computer programs, Computerized simulation, Canada—Yukon Territory—Dawson

49-2554

NRB workshop "Environmental Effects of River Ice": rapporteur report.

Chacho, E.F., Jr., MP 3578, *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.701-704.

River ice, Ice cover effect, Environmental impact

49-2555

Climate change impacts on northern water resources in Alaska.

Hinzman, L.D., Kane, D.L., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.715-733, 49 refs.

Snow hydrology, Snowmelt, Permafrost hydrology, Runoff, Water reserves, Polar atmospheres, Atmospheric circulation, Global warming, United States—Alaska

49-2556

Climate change impacts on northern water resources in Finland.

Kuusisto, E., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.735-747, 14 refs.

River ice, Lake ice, Freezeup, Ice breakup, Runoff, Global warming, Finland

49-2557

Climate change impacts on northern water resources in Greenland.

Thomsen, T., Weidick, A., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.749-781, 66 refs.

Glacial hydrology, Glacier mass balance, Runoff, Water reserves, Polar atmospheres, Global warming, Greenland

49-2558

Climate change impacts on northern water resources in Iceland.

Elíasson, J., Snorrason, Á., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.783-799, 27 refs.

Glacial hydrology, Runoff, Water reserves, Polar atmospheres, Atmospheric circulation, Air pollution, Global warming, Iceland

49-2559

Climate change impacts on northern water resources in Norway.

Sælthun, N.R., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.801-826, 38 refs.

Glacial hydrology, Snow hydrology, Runoff, Water reserves, Global warming, Norway

49-2560
Climate change impacts on northern water resources in Sweden.
Bergström, S., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/ Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.827-856, 27 refs.
Snow hydrology, Runoff, Water reserves, Global warming, Sweden

49-2561
Environmental effects of river ice in Finland.
Maunula, M., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/ Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.859-873, 16 refs.
River ice, Ice jams, Ice breakup, Ice cover effect, Floods, Finland

49-2562
Environmental effects of river ice in Sweden.
Bengtsson, L., *Canada. National Hydrology Research Institute. NHRI symposium,* 1992, No.10, International Northern Research Basins Symposium/ Workshop, 9th, Whitehorse, Yukon Territory, Aug. 14-22, 1992. Proceedings. Vol.2. Edited by T.D. Prowse, C.S.L. Ommanney, and K.E. Ulmer, p.875-883, 12 refs.
River ice, Freezeup, Ice breakup, Ice jams, Ice cover effect, Sweden

49-2563
On the low ozone values over Scandinavia during the winter of 1991-1992.
Rabbe, A., Larsen, S.H.H., *Journal of atmospheric and terrestrial physics,* Mar. 1995, 57(4), p.367-373, 7 refs.
Polar atmospheres, Synoptic meteorology, Atmospheric composition, Ozone, Seasonal variations, Atmospheric circulation, Wind direction, Surface temperature, Scandinavia

49-2564
Interannual fluctuations of the stratospheric temperature over the north polar region.
Krzyścin, J.W., *Journal of atmospheric and terrestrial physics,* Mar. 1995, 57(4), p.375-382, 19 refs.
Polar atmospheres, Stratosphere, Air temperature, Temperature variations, Statistical analysis, Seasonal variations, Insolation, Wind factors

49-2565
Diurnal tide in the antarctic and arctic mesosphere/lower thermosphere regions.
Fraser, G.J., Portniagin, IU.I., Forbes, J.M., Vincent, R.A., Lysenko, I.A., Makarov, N.A., *Journal of atmospheric and terrestrial physics,* Mar. 1995, 57(4), p.383-393, 15 refs.
Polar atmospheres, Radar echoes, Atmospheric circulation, Diurnal variations, Antarctica—Molodezhnaya Station, Antarctica—Mawson Station, Antarctica—Amundsen-Scott Station
The behavior of the diurnal tide at 95 km over various years between 1965 and 1986 is studied using radar data from Heiss I., Mawson, Molodezhnaya, and Scott Base. There are substantial fluctuations in amplitude and phase at all stations, particularly in winter. Phase fluctuations can be as large as a uniform random distribution over the 24-h cycle. In summer the phases of the meridional components are well defined and suggest the presence of a dominant symmetric mode. The meridional amplitudes are larger in summer whereas the zonal components have a greater variation and show no significant variation with season. (Auth. mod.)

49-2566
Polar Patrol Balloon.
Nishimura, J., et al, *Journal of aircraft,* Nov.-Dec. 1994, 31(6), p.1264-1267, 4 refs.
Polar atmospheres, Stratosphere, Aerial surveys, Atmospheric composition, Balloons, Performance, Antarctica—Showa Station
From late Dec. of 1990 to early Jan. of 1991 the National Institute of Polar Research, in collaboration with the Institute of Space and Astronautical Science, launched two large zero-pressure balloons from Showa Station. The balloon launched on Dec. 25 returned near Showa Station after 15 days of flight, keeping a constant altitude of about 30 km. It finally accomplished almost a one and half circumpolar flight. The total flight duration was about 40 days. This article will describe the balloon system and the flight behavior of the balloon.

49-2567
Patterning of plant communities and edaphic factors along a high arctic coastline: implications for succession.
Bliss, L.C., Gold, W.G., *Canadian journal of botany,* Aug. 1994, 72(8), p.1095-1107, With French summary. 50 refs.
Arctic landscapes, Plants (botany), Ecosystems, Plant ecology, Shores, Wetlands, Revegetation, Vegetation patterns, Bacteria, Lichens, Soil chemistry, Topographic effects, Canada—Northwest Territories—Devon Island

49-2568
Long-term recovery of vegetation on two experimental crude oil spills in interior Alaska black spruce taiga.
Racine, C.H., MP 3579, *Canadian journal of botany,* Aug. 1994, 72(8), p.1171-1177, With French summary. 22 refs.
Taiga, Subarctic landscapes, Oil spills, Trees (plants), Ecosystems, Soil pollution, Oil recovery, Environmental impact, Environmental tests, Revegetation, Permafrost preservation, United States—Alaska—Glen Creek, United States—Alaska—Caribou-Poker Creeks
Vegetation was sampled on two black spruce taiga sites in interior Alaska, 15 and 20 years after crude oil was experimentally applied as low-volume sprays or high-volume point spills. Low volume spray spills that uniformly covered the ground caused initial damage to vegetation, but after 20 years recovery of the understory vegetation was almost complete, with dramatic recovery and expansion of fruiticose lichens. High-volume point spills created small areas of surface oil saturation with dead vegetation and little sign of recovery but spread out mostly belowground with little or no apparent effect on the shallowly rooted vegetation above even after 15-20 years. Because winter point spills created a much greater area of surface oil, their effects were more damaging. After 15 years on the saturated surface oiled areas, only *Eriophorum vaginatum* tussocks survive and grow. At both sites with surface oil, black spruce mortality was high, with no evidence of long-term recovery and with continuing chronic effects after 15 years. However, from a long-term perspective the black spruce taiga ecosystem appears to be able to recover from low volume spray spills and to retain large amounts of crude oil from high-volume point spills belowground with minimal damage to the vegetation. Because of the permafrost, removal of crude oil from this ecosystem by soil excavation is undesirable. *In situ* acceleration of oil breakdown using fertilizers and bacteria is a possible option; seeding or planting of *E. vaginatum* on surface-oiled areas may also provide some cover and belowground biomass.

49-2569
Development of resistance to *Microdochium nivale* in winter wheat and decline of the resistance under snow.
Nakajima, T., Abe, J., *Canadian journal of botany,* Aug. 1994, 72(8), p.1211-1215, With French summary. 20 refs.
Plants (botany), Viability, Agriculture, Microbiology, Cold stress, Cold tolerance, Cold weather survival, Degree days, Snow cover effect, Cold weather tests

49-2570
Stratigraphy and paleolimnologic record of lower Holocene sediments in northern Lake Huron and Georgian Bay.
Rea, D.K., et al, *Canadian journal of earth sciences,* Nov. 1994, 31(11), p.1586-1605, With French summary. 58 refs.
Paleoclimatology, Pleistocene, Lacustrine deposits, Glacier melting, Meltwater, Stratigraphy, Lithology, Radioactive age determination, Drill core analysis, Water level, United States—Huron, Lake

49-2571
Seismic stratigraphy of Lake Huron—Georgian Bay and postglacial lake level history.
Moore, T.C., Jr., Rea, D.K., Mayer, L.A., Lewis, C.F.M., Dobson, D.M., *Canadian journal of earth sciences,* Nov. 1994, 31(11), p.1606-1617, With French summary. 24 refs.
Pleistocene, Lacustrine deposits, Glacial lakes, Water level, Seismic surveys, Stratigraphy, Sedimentation, Radioactive age determination, United States—Huron, Lake

49-2572
Inferred subglacial meltwater origin of lakes on the southern border of the Canadian Shield.
Gilbert, R., Shaw, J., *Canadian journal of earth sciences,* Nov. 1994, 31(11), p.1630-1637, With French summary. 27 refs.
Pleistocene, Lacustrine deposits, Glacial geology, Glacial erosion, Glacier melting, Geomorphology, Lakes, Meltwater, Floods, Subglacial drainage, Bedrock, Canada—Ontario

49-2573
Post-Lake Minong transgressive event on the north shore of Lake Superior, Ontario: possible evidence of Lake Agassiz inflow.
Phillips, B.A.M., Fralick, P.W., *Canadian journal of earth sciences,* Nov. 1994, 31(11), p.1638-1641, With French summary. 13 refs.
Pleistocene, Glacial lakes, Lake bursts, Water level, Glacial hydrology, Geomorphology, Water erosion, Deltas, Sedimentation, Canada—Ontario—Superior, Lake

49-2574
Effects of climate on radial growth of subalpine conifers in the North Cascade Mountains.
Peterson, D.W., Peterson, D.L., *Canadian Journal of forestry,* Sep. 1994, 24(9), p.1921-1932, With French summary. 65 refs.
Forestry, Plant ecology, Trees (plants), Growth, Forest lines, Climatic factors, Climatic changes, Vegetation patterns, Snowmelt, Snow depth, Snow cover effect, United States—Washington—North Cascade Mountains

49-2575
Water sources and carbon isotope composition ($\delta^{13}C$) of selected tree species of the Italian Alps.
Valentini, R., Anfodillo, T., Ehleringer, J.R., *Canadian journal of forest research,* Aug. 1994, 24(8), p.1575-1578, With French summary. 20 refs.
Plant ecology, Plant physiology, Alpine landscapes, Trees (plants), Water retention, Plant tissues, Isotope analysis, Ground water, Rain, Italy—Alps

49-2576
Siberian vegetation model based on climatic parameters.
Tchebakova, N.M., Monserud, R.A., Nazimova, D.I., *Canadian journal of forest research,* Aug. 1994, 24(8), p.1597-1607, With French summary. 52 refs.
Plant ecology, Biogeography, Taiga, Forest tundra, Vegetation patterns, Climatic factors, Landscape types, Classifications, Models, Statistical analysis, Russia—Siberia

49-2577
Composition and spatial structure of plant communities on southeastern Victoria Island, arctic Canada.
Schaefer, J.A., Messier, F., *Canadian journal of botany,* Sep. 1994, 72(9), p.1264-1272, With French summary. 53 refs.
Arctic landscapes, Plants (botany), Plant ecology, Tundra, Vegetation patterns, Classifications, Statistical analysis, Canada—Northwest Territories—Victoria Island

49-2578
Classification of vegetation communities in which geese rear broods on the Yukon-Kuskokwim delta, Alaska.
Babcock, C.A., Ely, C.R., *Canadian journal of botany,* Sep. 1994, 72(9), p.1294-1301, With French summary. 31 refs.
Subarctic landscapes, Deltas, Ecosystems, Plant ecology, Classifications, Vegetation patterns, Animals, Biomass, United States—Alaska—Kashunuk River

49-2579
Quasi-periodic atmosphere-regolith-cap CO_2 redistribution in the Martian past.
Fanale, F.P., Salvail, J.R., *Icarus,* Oct. 1994, 111(2), p.305-316, 21 refs.
Mars (planet), Extraterrestrial ice, Planetary environments, Atmospheric pressure, Carbon dioxide, Regolith, Geochemistry, Surface energy, Vapor transfer, Insolation, Mathematical models, Periodic variations

49-2580
Gravitational coefficents and internal structure of the icy Galilean satellites: an assessment of the Galileo Orbiter mission.
Schubert, G., Limonadi, D., Anderson, J.D., Campbell, J.K., Giampieri, G., *Icarus,* Oct. 1994, 111(2), p.433-440, 10 refs.
Extraterrestrial ice, Satellites (natural), Remote sensing, Radar echoes, Gravity, Structural analysis, Ice composition, Ice solid interface, Geologic structures, Simulation

49-2581
Near-surface ice on Mercury and the moon: a topographic thermal model.
Salvail, J.R., Fanale, F.P., *Icarus,* Oct. 1994, 111(2), p.441-455, 25 refs.
Extraterrestrial ice, Satellites (natural), Ground ice, Regolith, Geocryology, Thermal analysis, Insolation, Soil temperature, Frozen ground physics, Vapor diffusion, Pit and mound topography, Mathematical models

49-2582
Weichselian Late-glacial in southwestern Europe (Iberian Peninsula, Pyrenees, Massif Central, northern Apennines).
de Beaulieu, J.L., Andrieu, V., Ponel, P., Reille, M., Lowe, J.J., *Journal of Quaternary science,* June 1994, 9(2), p.101-107, 39 refs.
Paleoclimatology, Paleobotany, Pleistocene, Quaternary deposits, Mountains, Palynology, Climatic changes, Radioactive age determination, Spain—Iberian Peninsula, France—Pyrénées, Italy—Apennines

49-2583
Devensian/Weichselian Late-glacial in northwest Europe (Ireland, Britain, north Belgium, The Netherlands, northwest Germany).
Walker, M.J.C., Bohncke, S.J.P., Coope, G.R., O'Connell, M., Usinger, H., Verbruggen, C., *Journal of Quaternary science,* June 1994, 9(2), p.109-118, 89 refs.
Paleoclimatology, Paleoecology, Pleistocene, Quaternary deposits, Radioactive age determination, Climatic changes, Temperature variations, Geomorphology, Periglacial processes, Ireland, United Kingdom, Belgium, Netherlands, Germany

49-2584
Würmian Late-glacial in lowland Switzerland.
Ammann, B., et al, *Journal of Quaternary science,* June 1994, 9(2), p.119-125, 66 refs.
Paleoclimatology, Pleistocene, Quaternary deposits, Climatic changes, Temperature variations, Glacier oscillation, Palynology, Radioactive age determination, Geochronology, Switzerland

49-2585
Late Weichselian environmental change in southern Sweden and Denmark.
Berglund, B.E., Björck, S., Lemdahl, G., Bergsten, H., Nordberg, K., Kolstrup, E., *Journal of Quaternary science,* June 1994, 9(2), p.127-132, 51 refs.
Paleoclimatology, Pleistocene, Climatic changes, Temperature variations, Glacier oscillation, Periglacial processes, Sea level, Paleoecology, Quaternary deposits, Radioactive age determination, Sweden, Denmark

49-2586
Late Weichselian environmental change in Norway, including Svalbard.
Birks, H.H., Paus, A., Svendsen, J.I., Torbjørn, A., Mangerud, J., Landvik, J.Y., *Journal of Quaternary science,* June 1994, 9(2), p.133-145, 66 refs.
Paleoclimatology, Pleistocene, Paleobotany, Climatic changes, Temperature variations, Quaternary deposits, Geochronology, Radioactive age determination, Glacier oscillation, Norway—Svalbard

49-2587
Review of the environmental history of Iceland, 13,000-9,000 yr BP.
Ingólfsson, O., Norddahl, H., *Journal of Quaternary science,* June 1994, 9(2), p.147-150, 10 refs.
Paleoclimatology, Pleistocene, Glacier oscillation, Climatic changes, Quaternary deposits, Marine deposits, Radioactive age determination, Iceland

49-2588
Wisconsinan Late-glacial environmental change in southern New England: a regional synthesis.
Peteet, D.M., Daniels, R., Heusser, L.E., Vogel, J.S., Southon, J.R., Nelson, D.E., *Journal of Quaternary science,* June 1994, 9(2), p.151-154, 24 refs.
Paleoclimatology, Paleobotany, Climatic changes, Pleistocene, Quaternary deposits, Glacier oscillation, Palynology, Stratigraphy, Radioactive age determination, United States—New England

49-2589
Wisconsinan Late-glacial environmental change in Nova Scotia: a regional synthesis.
Mott, R.J., *Journal of Quaternary science,* June 1994, 9(2), p.155-160, 42 refs.
Paleoclimatology, Paleobotany, Pleistocene, Climatic changes, Quaternary deposits, Radioactive age determination, Glacier oscillation, Palynology, Canada—Nova Scotia

49-2590
Wisconsinan Late-glacial environmental change in New Brunswick: a regional synthesis.
Cwynar, L.C., Levesque, A.J., Mayle, F.E., Walker, I., *Journal of Quaternary science,* June 1994, 9(2), p.161-164, 11 refs.
Paleoclimatology, Pleistocene, Paleoecology, Climatic changes, Glacier oscillation, Quaternary deposits, Palynology, Radioactive age determination, Canada—New Brunswick

49-2591
Wisconsinan Late-glacial environmental change in Quebec: a regional synthesis.
Richard, P.J.H., *Journal of Quaternary science,* June 1994, 9(2), p.165-170, 44 refs.
Paleoclimatology, Paleoecology, Pleistocene, Climatic changes, Glacier oscillation, Quaternary deposits, Lacustrine deposits, Palynology, Radioactive age determination, Canada—Quebec

49-2592
Wisconsinan Late-glacial environmental change in Newfoundland: a regional review.
Anderson, T.W., Macpherson, J.B., *Journal of Quaternary science,* June 1994, 9(2), p.171-178, 26 refs.
Paleoclimatology, Paleoecology, Pleistocene, Climatic changes, Glacier oscillation, Palynology, Quaternary deposits, Lacustrine deposits, Radioactive age determination, Canada—Newfoundland

49-2593
Wisconsinan Late-glacial environmental change on the southeast Baffin shelf, southeast Baffin Island and northern Labrador.
Andrews, J.T., *Journal of Quaternary science,* June 1994, 9(2), p.179-183, 39 refs.
Pleistocene, Paleoclimatology, Geochronology, Glacial geology, Glacier oscillation, Quaternary deposits, Marine deposits, Meltwater, Radioactive age determination, Canada—Labrador

49-2594
Climatic changes in areas adjacent to the North Atlantic during the last glacial-interglacial transition (14-9 ka BP): a contribution to IGCP-253.
Lowe, J.J., et al, *Journal of Quaternary science,* June 1994, 9(2), p.185-198, 64 refs.
Paleoclimatology, Pleistocene, Climatic changes, Marine atmospheres, Temperature variations, Quaternary deposits, Glacier oscillation, Geochronology, Stratigraphy, Paleoecology

49-2595
Zonation of agroclimatic risk during the cold season of southern Quebec: 2—Cold hardiness, soil heaving and ice encasement. [Zonage du risque agroclimatique durant la saison froide au Québec méridional: II-endurcissement, déchaussement et prise de racines dans la glace]
Rochette, P., Dubé, P.A., *Climatological bulletin,* Dec. 1993, 27(3), p.96-116, In French with English summary. 39 refs.
Plants (botany), Cold stress, Acclimatization, Cold weather survival, Climatic factors, Frost heave, Ice cover effect, Mapping, Canada—Quebec

49-2596
Temperature trends at coastal stations in eastern Canada.
Morgan, M.R., Drinkwater, K.F., Pocklington, R., *Climatological bulletin,* Dec. 1993, 27(3), p.135-153, With French summary. 20 refs.
Climatology, Meteorological data, Air temperature, Marine atmospheres, Statistical analysis, Correlation, Temperature variations, Periodic variations, Sea ice distribution, Canada

49-2597
Anelasticity and grain boundary relaxation of ice at high temperatures.
Johari, G.P., Pascheto, W., Jones, S.J., *Journal of physics D: applied physics,* Jan. 14, 1995, 28(1), p.112-119, 24 refs.
Ice physics, Ice mechanics, Ice relaxation, Ice microstructure, Cracking (fracturing), Molecular structure, Grain size, Defects, Mechanical tests, Low temperature tests, Temperature effects, Hydrogen bonds

49-2598
Microwave assisted barking of frozen wood.
Gilbert, A.F., Turcotte, C., *Canadian journal of chemical engineering,* Oct. 1994, 72(5), p.920-925, With French summary. 15 refs.
Artificial thawing, Forestry, Microwaves, Wood, Radiation absorption, Low temperature tests, Thawing rate

49-2599
New results in high pressure and low temperature rheology of liquid lubricants for space applications.
Prat, P., Vergne, P., Sicre, J., *Journal of tribology,* July 1994, 116(3), p.629-634, 40 refs.
Lubricants, Low temperature tests, High pressure tests, Rheology, Viscosity, Shear stress, Cryogenics, Polymers, Temperature effects

49-2600
Freeze-thaw injury is enhanced by post-thaw leaching in water.
Zhang, M.I.N., Willison, J.H.M., Xiao, X., Cheung, C.H., *Canadian journal of plant science,* Apr. 1994, 74(2), p.3357-3358, With French summary. 4 refs.
Plant physiology, Plant tissues, Freeze thaw cycles, Damage, Frost resistance, Cold weather survival, Laboratory techniques, Accuracy

49-2601
Chaotic obliquity and the nature of the Martian climate.
Jakosky, B.M., Henderson, B.G., Mellon, M.T., *Journal of geophysical research,* Jan. 25, 1995, 100(E1), p.1579-1584, 38 refs.
Planetary environments, Mars (planet), Polar regions, Climatology, Insolation, Surface temperature, Ground ice, Clathrates, Hydrologic cycle, Ice sublimation, Carbon dioxide, Periodic variations

49-2602
History of antarctic glaciation: an Indian Ocean perspective.
Ehrmann, W.U., et al, *American Geophysical Union. Geophysical monograph series,* 1992, No.70, Synthesis of results from scientific drilling in the Indian Ocean. Edited by R.A. Duncan, D.K. Rea, R.B. Kidd, U. von Rad, and J.K. Weissel, p.423-446, Refs. p.444-446.
DLC QE350.5.I52
Glaciation, Glacial geology, Marine geology, Glacial deposits, Glacier oscillation, Paleoclimatology, —Indian Ocean, —Kerguelen Plateau, Antarctica—Prydz Bay
Legs 119 and 120 of the Ocean Drilling Program cored 16 sites on a S-N transect from the antarctic continental shelf of Prydz Bay to the northern Kerguelen Plateau in the Indian Ocean. Thick sequences of glacigenic sediments were recovered in Prydz Bay, whereas the record on Kerguelen Plateau consists mainly of pelagic and, in part, glaciomarine sediments. This paper is a summary of the principal scientific results from the two legs that were concerned with the Cenozoic glacial and climatic history of Antarctica. It integrates a wide range of investigations, such as sedimentological studies including clay sedimentology and ice-rafted debris, studies of the oxygen isotopic composition of planktonic and benthic foraminifers, and paleontological investigations. Data obtained indicate that a long-term cooling trend started at about 52 Ma, after the thermal maximum in early Eocene time. From Oligocene to recent time, the ice sheet experienced several major advance and retreat phases, some of them

being quite rapid and short-term. However, although no clear evidence was found for a disappearance of the ice as postulated from other parts of Antarctica, the fragmentary nature of the stratigraphic record may hide major recessions of the ice sheet from the coast. (Auth. mod.)

49-2603

Landslide mechanisms in the Cordillera.

Myers, K.L., Canadian Symposium on Geotechnique and Natural Hazards, 1st, Vancouver, British Columbia, May 6-9, 1992, Vancouver, BiTech Publishers Ltd., 1992, p.109-117, 7 refs. Sponsored by the Vancouver Geotechnical Society and the Canadian Geotechnical Society.

DLC QE535.2.C2G46 1992

Landslides, Slope stability, Snow cover effect, Snowmelt

49-2604

Runout prediction for flow-slides and avalanches: analytical methods.

Hungr, O., Canadian Symposium on Geotechnique and Natural Hazards, 1st, Vancouver, British Columbia, May 6-9, 1992, Vancouver, BiTech Publishers Ltd., 1992, p.139-144, 17 refs. Sponsored by the Vancouver Geotechnical Society and the Canadian Geotechnical Society.

DLC QE535.2.C2G46 1992

Avalanche tracks, Avalanche deposits, Avalanche mechanics, Avalanche forecasting

49-2605

Little Doctor Lake landslide, an example of coseismic reactivation of a landslide in permafrost terrain.

Savigny, K.W., Sego, D.C., MacInnes, K.L., Canadian Symposium on Geotechnique and Natural Hazards, 1st, Vancouver, British Columbia, May 6-9, 1992, Vancouver, BiTech Publishers Ltd., 1992, p.203-209, 15 refs. Sponsored by the Vancouver Geotechnical Society and the Canadian Geotechnical Society.

DLC QE535.2.C2G46 1992

Landslides, Slope stability, Earthquakes, Frozen ground strength, Thaw weakening, Permafrost structure, Permafrost physics, Terrain, Canada—Northwest Territories

49-2606

Engineering aspects of land-use planning in snow avalanche terrain.

McClung, D.M., Canadian Symposium on Geotechnique and Natural Hazards, 1st, Vancouver, British Columbia, May 6-9, 1992, Vancouver, BiTech Publishers Ltd., 1992, p.237-242, 8 refs. Sponsored by the Vancouver Geotechnical Society and the Canadian Geotechnical Society.

DLC QE535.2.C2G46 1992

Slope stability, Avalanche forecasting, Avalanche tracks, Terrain

49-2607

Galloping glacier heads for ocean.

Bovy, E., *BLM-Alaska frontiers*, Nov.-Dec. 1994, No.51, p.4-5.

Glacier surges, Glacier flow, Glacier oscillation, Lake bursts, United States—Alaska—Bering Glacier

49-2608

Spectral analysis of the thermohaline fine structure of the active layer in the Arctic Ocean.

Lukin, V.V., Pavlikov, D.A., *Oceanology*, Oct. 1993, 33(2), p.143-146, Translated from Okeanologiia. 7 refs.

Oceanography, Drift stations, Water temperature, Salinity, Sounding, Temperature variations, Subglacial observations, Ice cover effect, Stratification, Arctic Ocean

49-2609

Derived constituents in the glacial sediments of the Vestfold Hills, East Antarctica.

Gore, D.B., Colhoun, E.A., Bell, K., *Quaternary science reviews*, 1994, 13(3), p.301-307, Refs. p.306-307.

Marine geology, Glacial geology, Quaternary deposits, Glacial deposits, Marine deposits, Grounded ice, Sedimentation, Geochronology, Weathering, Antarctica—Vestfold Hills

Sediment derived from pre-existing marine deposits and weathered surfaces is a common constituent of glacial drift in the Vestfold Hills. Ninety-seven samples of glacial drift were examined for marine macrofossils and weathered clasts, and 41 were examined for foraminifera. Fragments or whole specimens of shells, worm tubes, sponge spicules and foraminifera were recovered from 25 samples. Clasts that exhibited evidence of subaerial weathering, such as tafoni and weathering rinds, were found in 53 samples. Derived sediment was found in 62% of all samples. These data indicate that the last advance of ice derived much of its sediment locally. The incorporation of marine fauna in the glacial deposits makes the identification of *in situ* interglacial sequences difficult. (Auth.)

49-2610

Firesafety analysis of the polar icebreaker replacement design.

Fitzgerald, R.W., Richards, R.C., Beyler, C.L., *Journal of fire protection engineering*, Oct.-Nov.-Dec. 1991, 3(4), p.137-150, 12 refs.

Icebreakers, Design, Fires, Safety, Protection, Countermeasures, Computerized simulation

49-2611

Crystal growth during a single-stage opening event and its implications for syntectonic veins.

Wilson, C.J.L., *Journal of structural geology*, Sep. 1994, 16(9), p.1283-1296, 22 refs.

Geologic processes, Tectonics, Rock mechanics, Simulation, Ice mechanics, Ice crystal growth, Ice microstructure, Ice deformation, Stress concentration, Ice solid interface

49-2612

AACI takes up the winter challenge. *Jane's airport review*, Nov. 1992, 4(9), p.23-27.

Airports, Runways, Cold weather operation, Winter maintenance, Snow removal, Ice control, Chemical ice prevention, Snow vehicles

49-2613

US acts to tighten de-icing controls. *Jane's airport review*, Nov. 1992, 4(9), p.32-34.

Aircraft icing, Ice removal, Chemical ice prevention, Standards, Airports, Cold weather operation, Education

49-2614

UPS finds its own solution.

Lopez, R., *Jane's airport review*, Nov. 1992, 4(9), p.34.

Aircraft icing, Ice removal, Chemical ice prevention, Airports, Equipment, Computer applications

49-2615

Cadmium concentrations in recent snow and firn layers in the Canadian Arctic.

Nriagu, J.O., Lawson, G.S., Gregor, D.J., *Bulletin of environmental contamination and toxicology*, May 1994, 52(5), p.756-759, 14 refs.

Glacier ice, Firn, Snow composition, Snow impurities, Sampling, Chemical analysis, Environmental tests, Metals, Air pollution, Aerosols, Canada—Northwest Territories—Ellesmere Island

49-2616

Structure of the ($\sqrt{3}$ X $\sqrt{3}$)R30° bilayer of D_2O on Ru(001).

Held, G., Menzel, D., *Surface science*, Sep. 1, 1994, 316(1-2), p.92-102, 42 refs.

Ice physics, Ice solid interface, Monomolecular films, Adsorption, Water structure, Heavy water, Hydrogen bonds, Ice spectroscopy, Deuterium oxide ice

49-2617

Magnetic resonance imaging studies of the freeze-drying kinetics of potato.

Rutledge, D.N., Rene, F., Hills, B.P., Foucat, L., *Journal of food process engineering*, Sep. 1994, 17(3), p.325-351, 24 refs.

Porous materials, Phase transformations, Freeze drying, Ice water interface, Ice sublimation, Evaporation, Unfrozen water content, Nuclear magnetic resonance, Imaging, Moisture transfer, Mathematical models

49-2618

Reliability of main oil and gas pipelines in Russia. [Nadezhnost' magistral'nykh nefteprovodov i gazoprovodov v Rossii]

Shmal', G.I., Ivantsov, O.M., *Stroitel'stvo truboprovodov*, Jan. 1994, No.1, p.6-14, In Russian.

Gas pipelines, Safety, Petroleum transportation, Pipelines, Environmental impact, Russia

49-2619

Industrial technology for construction of main pipelines. [Industrial'nye tekhnologii sooruzheniia magistral'nykh truboprovodov]

Khomenko, V.I., Zaĭtsev, K.I., *Stroitel'stvo truboprovodov*, Jan. 1994, No.1, p.20-22, In Russian.

Pipelines, Cold weather construction

49-2620

Experience and prospects for field camp construction in the West Siberian region. [Opyt i perspektivy sozdaniia polevykh gorodkov v Zapadno-Sibirskom regione]

Rubinshteĭn, A.B., Taĭgunov, M.G., *Stroitel'stvo truboprovodov*, Jan. 1994, No.1, p.26-33, In Russian.

Cold weather construction, Modular construction, Houses, Russia—Siberia

49-2621

Progress in the scientific-technical program: "Highly safe and reliable pipeline system". [O khode vypolneniia nauchno-tekhnicheskoĭ programmy "Vysokonadezhnyĭ truboprovodnyĭ transport"]

Paton, B.E., *Stroitel'stvo truboprovodov*, May 1994, No.5, p.5-9, In Russian.

Pipelines, Safety, Cold weather operation

49-2622

Designs of anchors and piles for heaving permafrost soils. [Konstruktsii ankerov i svaĭ dlia vechnomerzlykh puchinistykh gruntov]

Goviadovskiĭ, G.G., Cherniĭ, V.P., *Stroitel'stvo truboprovodov*, May 1994, No.5, p.25-26, In Russian. 2 refs.

Anchors, Piles, Design, Cold weather performance, Frost heave

49-2623

Analysis of the safety and reliability of the Northern Autonomous Gas Supply System. [Analiz nadezhnosti severnoĭ avtonomnoĭ sistemy gazosnabzheniia]

Repalov, V.I., Kharionovskiĭ, V.V., *Stroitel'stvo truboprovodov*, May 1994, No.5, p.27-30, In Russian. 2 refs.

Pipelines, Safety, Cold weather operation

49-2624

Use of cast-iron pipes with ball-shaped graphite in industry. [Ispol'zovanie trub iz chuguna s sharovidnym grafitom (ChShG) v promyshlennosti]

Veter, V.V., Samoĭlov, M.I., Babanov, A.A., *Stroitel'stvo truboprovodov*, Apr. 1994, No.4, p.2-5, In Russian. 4 refs.

Pipes (tubes), Gas pipelines, Cold weather operation

49-2625

Analysis of the interaction between pipelines and heaving ground. [Analiz protsessov vzaimodeĭstviia truboprovodov s puchinistymi gruntami]

Khafizov, R.M., *Stroitel'stvo truboprovodov*, June 1994, No.6, p.34-39, In Russian. 4 refs.

Gas pipelines, Underground pipelines, Frost heave

49-2626

Highly safe and reliable pipeline system. [Vysokonadezhnyĭ truboprovodnyĭ transport]

Dinkov, V.A., Ivantsov, O.M., *Stroitel'stvo truboprovodov*, Feb. 1994, No.2, p.5-9, In Russian.

Pipelines, Safety, Environmental protection, Cold weather operation

49-2627

Construction of main pipelines. [Sooruzheniie magistral'nykh truboprovodov]

Khomenko, V.I., Zaĭtsev, K.I., *Stroitel'stvo truboprovodov,* Oct.-Nov. 1993, No.10-11, p.14-16, In Russian.

Pipelines, Cold weather construction

49-2628

Evaluating suitability of the territory. [Otsenka prigodnosti territorii]

Kholmogorov, A.P., *Stroitel'stvo truboprovodov,* Dec. 1993, No.12, p.37, In Russian.

Cold weather construction, Pipelines, Russia—Siberia

49-2629

Stabilization and the deformation of foundations. [Stabilizatsiia i deformiruemost' osnovaniĭ]

Kholmogorov, A.P., *Stroitel'stvo truboprovodov,* Dec. 1993, No.12, p.38-39, In Russian.

Deformation, Foundations, Soil stabilization, Peat, Soil mechanics, Russia—Siberia

49-2630

Laying of engineering structures. [Prokladka inzhenernykh sooruzheniĭ]

Kholmogorov, A.P., *Stroitel'stvo truboprovodov,* Dec. 1993, No.12, p.40, In Russian.

Economic development, Cold weather construction, Soil mechanics, Russia—Siberia

49-2631

Analysis of structural solutions to freezing-in anchors and the technology to sink them into permafrost with a salinity of less than 0.25%. [Analiz konstruktivnykh resheniĭ vmorazhivaemykh ankerov i tekhnologii ikh pogruzheniia v vechnomerzlye grunty s zasolennost'iu menee 0.25%]

Khafizov, R.M., *Stroitel'stvo truboprovodov,* July 1993, No.7, p.28-32, In Russian.

Anchors, Salinity, Permafrost bases, Permafrost beneath structures, Saline soils

49-2632

Temperature dependent CH_3OCl formation in the reaction between CH_3O_2 and ClO.

Helleis, F., Crowley, J., Moortgat, G.K., *Geophysical research letters,* Aug. 15, 1994, 21(17), p.1795-1798, 15 refs.

Polar atmospheres, Chemical properties, Cloud physics, Atmospheric attenuation, Ozone, Simulation, Temperature effects, Heterogeneous nucleation

In this work, the discharge-flow method combined with quantitative detection of both CH_3O_2 and CH_3OCl by mass-spectrometer was employed to directly measure a specific variation in the overall reaction between CH_3O_2 and ClO at the temperatures prevalent in the lower polar stratosphere at springtime. This experiment simulates processes inducing ozone depletion in the antarctic stratosphere. (Auth. mod.)

49-2633

On mass diffusion effects in a Stefan-like problem arising in the melting of antarctic ice shelves.

Minale, M., Astarita, G., *Chemical engineering science,* Oct. 1994, 49(19), p.3205-3215, 16 refs.

Ice shelves, Glacier mass balance, Ice water interface, Ice melting, Mass transfer, Salinity, Water temperature, Phase transformations, Stefan problem, Mathematical models, Antarctica—Drygalski Ice Tongue

This paper analyzes the effect of mass diffusion in a Stefan-like problem, referring to the interaction between ice shelves and seawater in Antarctica. It is concluded that, in this example, the results obtained with a model which takes into account mass diffusion are almost indistinguishable from those obtained from the mass diffusion-free model, and that therefore possible inversion layers are to be attributed to effects other than mass transfer of salt. (Auth. mod.)

49-2634

Hydration forces and membrane stresses: cryobiological implications and a new technique for measurement.

Wolfe, J., Yan, Z.J., Pope, J.M., *Biophysical chemistry,* Feb. 1994, 49(1), International Workshop on Membrane Structure Dynamics and Interactions via Neutron and X-ray Scattering, Saclay, Paris, Apr. 23-26, 1993, p.51-58, 31 refs.

Cryobiology, Nuclear magnetic resonance, Plant tissues, Desiccation, Moisture transfer, Freeze thaw cycles, Stresses, Damage, Simulation, Ice water interface, Deuterium oxide ice, Temperature effects

49-2635

Measurement of grain growth in the recrystallization of rapidly frozen solutions of antifreeze glycoproteins.

Yeh, Y., Feeney, R.E., McKown, R.L., Warren, G.J., *Biopolymers,* Nov. 1994, 34(11), p.1495-1504, 22 refs.

Cryobiology, Frozen liquids, Polymers, Antifreezes, Molecular structure, Ice crystal growth, Grain size, Recrystallization, Molecular energy levels, Ice water interface, Thermodynamics

49-2636

Thermally induced dislocation loops in polycrystalline ice.

Liu, F.P., Baker, I., Dudley, M., *Philosophical magazine A,* Jan. 1995, 71(1), p.1-14, 17 refs.

Ice physics, Ice crystal structure, Orientation, Dislocations (materials), X ray diffraction, X ray analysis, Ice crystal optics, Topographic features, Temperature effects, Imaging

49-2637

Dislocation-grain boundary interactions in ice crystals.

Liu, F.P., Baker, I., Dudley, M., *Philosophical magazine A,* Jan. 1995, 71(1), p.15-42, 21 refs.

Ice physics, Ice mechanics, Mechanical tests, Ice microstructure, Plastic deformation, Orientation, Basal sliding, Dislocations (materials), X ray diffraction, X ray analysis

49-2638

Ice-nucleating activity of *Pseudomonas syringae* cultivated on a natural substrate; influence of phosphate.

Blondeaux, A., Cochet, N., *Applied microbiology and biotechnology,* Aug. 1994, 41(6), p.627-631, 17 refs.

Bacteria, Microbiology, Ice formation, Artificial nucleation, Nucleating agents, Heterogeneous nucleation, Substrates, Ice water interface, Chemical analysis

49-2639

Arctic sea ice-climate system: observations and modeling.

Barry, R.G., Serreze, M.C., Maslanik, J.A., Preller, R.H., *Reviews of geophysics,* Nov. 1993, 31(4), p.397-422, Refs. p.417-422.

Climatology, Oceanography, Air ice water interaction, Sea ice distribution, Periodic variations, Drift, Ice air interface, Heat balance, Ice forecasting, Snow cover effect, Models, Thermodynamics, Arctic Ocean

49-2640

Kinetics of pressure-induced effects in water ice/rock granular mixtures and application to the physics of the icy satellites.

Leliwa-Kopystyński, J., Makkonen, L., Erikoinen, O., Kossacki, K.J., *Planetary and space science,* July 1994, 42(7), p.545-555, 27 refs.

Extraterrestrial ice, Satellites (natural), Geochemistry, Ice mechanics, Rheology, Simulation, Low temperature tests, Ice solid interface, Admixtures, Phase transformations, Compaction, Porosity

49-2641

Formation of amorphous ice in the protoplanetary nebula.

Mekler, Y., Podolak, M., *Planetary and space science,* Oct. 1994, 42(10), p.865-870, 13 refs.

Extraterrestrial ice, Cosmic dust, Ice physics, Amorphous ice, Ice formation, Ice temperature, Ice heat flux, Phase transformations, Radiation absorption, Mathematical models, Stability

49-2642

Using engineering reclamation methods for soils in pipeline construction. [Ispol'zovanie metodov tekhnicheskoĭ melioratsii gruntov v truboprovodnom stroitel'stve]

Spektor, IU.I., *Stroitel'stvo truboprovodov,* Sep. 1994, No.9, p.6-8, In Russian.

Land reclamation, Soil mechanics, Pipe laying, Soil freezing

49-2643

Residual stresses, permafrost and reliability of pipelines. [Ostatochnye napriazheniia, vechnaia merzlota i nadezhnost' truboprovodov]

Ignatov, N.P., *Stroitel'stvo truboprovodov,* Sep. 1994, No.9, p.19-21, In Russian.

Pipelines, Safety, Permafrost beneath structures, Stresses

49-2644

Testing of the frost de-icing salt resistance of concrete paving blocks. [Prüfung des Frost-Tausalz-Widerstandes von Betonpflastersteinen]

Sutej, B., *Betonwerk + Fertigteil-Technik,* Mar. 1994, 60(3), p.78-84, In German with English translation and French summary. 9 refs.

Concrete pavements, Concrete slabs, Frost resistance, Corrosion, Salting, Concrete durability, Mechanical tests, Freeze thaw cycles, Standards, Concrete admixtures, Chemical composition

49-2645

ODP drills in the Arctic Ocean. *Geotimes,* Aug. 1994, 39(8), p.19-20, 3 refs.

Oceanography, Pleistocene, Glacier oscillation, Oceanographic surveys, Offshore drilling, Marine deposits, Drill core analysis, Marine geology, Arctic Ocean

49-2646

Bering Glacier surges into 1994. *Geotimes,* Jan. 1994, 39(1), p.7.

Glaciology, Glacier surges, Periodic variations, Glacier surveys, United States—Alaska—Bering Glacier

49-2647

Measurement of microbial biomass by fumigation-extraction in soil stored frozen.

Winter, J.P., Zhang, Z.Y., Tenuta, M., Voroney, R.P., *Soil Science Society of America. Journal,* Nov.-Dec. 1994, 58(6), p.1645-1651, 28 refs.

Soil science, Soil freezing, Freeze thaw cycles, Cold storage, Stability, Frozen ground chemistry, Soil microbiology, Biomass, Sampling, Accuracy

49-2648

Fallow management and overwinter effects on wind erodibility in southern Alberta.

Larney, F.J., Lindwall, C.W, Bullock, M.S., *Soil Science Society of America. Journal,* Nov.-Dec. 1994, 58(6), p.1788-1794, 42 refs.

Agriculture, Soil conservation, Soil tests, Soil erosion, Wind erosion, Soil aggregates, Particle size distribution, Snow cover effect, Freeze thaw cycles

49-2649

Numerical modeling of the Late Weichselian Svalbard-Barents Sea ice sheet.

Siegert, M.J., Dowdeswell, J.A., *Quaternary research,* Jan. 1995, 43(1), p.1-13, 53 refs.

Pleistocene, Glacier oscillation, Ice sheets, Ice cover thickness, Calving, Marine geology, Climatic factors, Mathematical models, Isostasy, Barents Sea

49-2650

Oxygen-isotope paleothermometer from ice in Siberian permafrost.

Nikolaev, V.I., Mikhalev, D.Y., *Quaternary research,* Jan. 1995, 43(1), p.14-21, 30 refs.

Paleoclimatology, Air temperature, Precipitation (meteorology), Ground ice, Permafrost transformation, Frozen ground chemistry, Oxygen isotopes, Isotope analysis, Snowmelt, Snow cover effect, Correlation, Russia—Siberia

49-2651

Paleoecological studies of a Holocene lacustrine record from the Kangerlussuaq (Søndre Strømfjord) region of West Greenland.

Eisner, W.R., Törnqvist, T.E., Koster, E.A., Bennike, O., van Leeuwen, J.F.N., *Quaternary research,* Jan. 1995, 43(1), p.55-66, 42 refs.

Paleoecology, Pleistocene, Arctic landscapes, Glacier oscillation, Quaternary deposits, Lacustrine deposits, Radioactive age determination, Palynology, Stratigraphy, Greenland—Kangerlussuaq

49-2652

Flow-induced mixing in the GRIP basal ice deduced from the CO_2 and CH_4.

Souchez, R., Lemmens, M., Chappellaz, J., *Geophysical research letters,* Jan. 1, 1995, 22(1), p.41-44, 18 refs.

Ice sheets, Ice cores, Ice composition, Bottom ice, Gases, Isotope analysis, Ice vapor interface, Vapor diffusion

49-2653

Global-mean temperature and sea level consequences of greenhouse gas concentration stabilization.

Wigley, T.M.L., *Geophysical research letters,* Jan. 1, 1995, 22(1), p.45-48, 18 refs.

Climatology, Global warming, Climatic changes, Air temperature, Greenhouse effect, Sea level, Glacier melting, Models, Long range forecasting

The Intergovernmental Panel on Climate Change has defined a set of scenarios for future CO_2 concentrations stabilizing at levels of 350 to 750 ppmv. Using models previously employed, the implied global-mean temperature and sea level changes are calculated out to 2500. While uncertainties are large, the results show that even with concerted efforts to stabilize concentrations of greenhouse gases, substantial temperature and sea level increases can be expected to occur over the next century. Increases in sea level are likely to continue for many centuries after concentration stabilization because of the extremely long time scales associated with the deep ocean (which influences thermal expansion) and with the large ice sheets of Greenland and Antarctica. (Auth. mod.)

49-2654

Seasonal variation of atmospheric nitric acid over the South Pole in 1992.

Van Allen, R., Liu, X., Murcray, F.J., *Geophysical research letters,* Jan. 1, 1995, 22(1), p.49-52, 22 refs.

Polar atmospheres, Atmospheric composition, Climatology, Chemical properties, Ozone, Polar stratospheric clouds, Radiometry, Atmospheric density, Seasonal variations, Antarctica—Amundsen-Scott Station

During year-round measurements of mid infrared atmospheric emission over the South Pole in 1992, a large seasonal change of the total column of nitric acid (HNO_3) vapor was observed. During the summer, the HNO_3 column abundance was about $2x10^{16}$ molecules/cm^2. There was a small increase in the fall. A rapid decrease of 50% was observed in late June, soon after the stratospheric temperature reached the threshold for formation of type I polar stratospheric clouds (PSCs) By early July, the stratospheric temperature was cold enough to form type II PSCs, and the HNO_3 column decreased to $7x10^{15}$ molecules/cm^2. Measured nitric acid values in the spring remained extremely low even after the stratosphere warmed well above PSC temperatures. This may indicate permanent removal of HNO_3 by gravitational settling, or long-term sequestering in large particles. Normal summer values were not observed until the vortex dissipated and allowed the lateral transport of HNO_3 to the south polar region. (Auth. mod.)

49-2655

Velocity and associated echo power variations in the summer polar mesosphere.

Rüster, R., *Geophysical research letters,* Jan. 1, 1995, 22(1), p.65-67, 16 refs.

Polar atmospheres, Atmospheric physics, Gravity waves, Radar echoes, Diurnal variations

49-2656

Collection of papers.

International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993, Landers, D.H., ed, Christie, S.J., ed, *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, 870p., Refs. passim. For selected papers see 49-2657 through 49-2727.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Ecosystems, Nutrient cycle, Soil pollution, Water pollution, Environmental impact, Physiological effects

49-2657

Effects of ecosystem characteristics on contaminant distribution in northern freshwater lakes.

Schindler, D.W., Kidd, K.A., Muir, D.C.G., Lockhart, W.L., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.1-17, Refs. p.14-17.

Polar atmospheres, Air pollution, Lakes, Water pollution, Ecosystems, Nutrient cycle, Lacustrine deposits

49-2658

Global pollution and its effect on the climate of the Arctic.

Weller, G., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.19-24, 23 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Global warming

49-2659

Transport of contaminants to the Arctic: partitioning, processes and models.

Mackay, D., Wania, F., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.25-38, 24 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Soil air interface, Air water interactions, Ecosystems, Nutrient cycle

49-2660

Origin of arctic air pollutants: lessons learned and future research.

Pacyna, J.M., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.39-53, 57 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Aerosols, Haze

49-2661

Toxaphene and other organochlorine compounds in air and water at Resolute Bay, N.W.T., Canada.

Bidleman, T.F., Falconer, R.L., Walla, M.D., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.55-63, 39 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Air water interactions, Water pollution, Nutrient cycle, Canada—Northwest Territories—Resolute Bay

49-2662

Air-water gas exchange and evidence for metabolism of hexachlorocyclohexanes in Resolute Bay, N.W.T.

Falconer, R.L., Bidleman, T.F., Gregor, D.J., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.65-74, 40 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Air water interactions, Water pollution, Nutrient cycle, Microbiology, Canada—Northwest Territories—Resolute Bay

49-2663

Fate of some chlorinated hydrocarbons in arctic and far eastern ecosystems in the Russian Federation.

Cherniak, S.M., McConnell, L.L., Rice, C.P., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.75-85, 19 refs.

Air pollution, Air water interactions, Water pollution, Ocean environments, Ocean currents, Ecosystems, Russia

49-2664

Meteorological analysis of chemical exchange events in the Arctic Basin.

Egan, W.G., Murphey, B.B., Hogan, A.W., MP 3580, *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.87-99, 23 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Atmospheric boundary layer, Air water interactions, Soil air interface, Aerosols, Ozone

Analysis of chemical or aerosol exchange from the troposphere to the arctic surface is considerably more complex than similar analysis of antarctic events. The complexity of chemical or aerosol exchange experiments in the Arctic requires considering occasional frontal exchange similar to that of the mid-latitudes, potential local contamination, and local sources of heat and moisture. These concerns are eliminated through site selection in most antarctic exchange experiments. The inherent stability of near-surface layers in the arctic tropopause causes temporal anomalies when arrival times of aerosol or gaseous contaminants are compared with conservative meteorological tracers, further complicating the analysis. Three cases are presented. One illustrates the complexity in analyzing aerosol related to a warming event, the second describes the dimensions of a deep tropospheric mixing in the Arctic Basin, and the third examines the diurnal exchange of aerosol in the arctic summer. Some criteria relative to temporal resolution of aerosol and chemical measurements with respect to meteorological processes are proposed. Potential problems in distinguishing properties of aerosols transported from lower latitudes, in the presence of local aerosol sources, are discussed.

49-2665

GCM simulations of atmospheric tracers in the polar latitudes: South Pole (Antarctica) and Summit (Greenland) cases.

Genthon, C., Armengaud, A., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.101-116, 33 refs.

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Ice sheets, Ice air interface, Ice composition, Impurities, Aerosols, Dust, Fallout, Greenland, Antarctica—Amundsen-Scott Station

Simulation results from two global atmospheric tracer/climate models in the interior of the two major ice sheets at high northern and southern latitudes are presented and discussed. The models are based on two existing general circulation models (GCMs) of the atmosphere, complemented with tracer formulations (sources, transport, mixing, deposition, etc.). The seasonal and shorter term variability of desert dust, sea salt, ^{222}Rn, ^{210}Pb, and ^{7}Be have been studied at the South Pole in Antarctica and at Summit in Greenland. This choice of tracers and test regions serves to focus on the interactions between atmospheric parameters (e.g. the strong and durable surface inversions characteristic of the ice sheets) and tracers, and to limit other influences such as source variability and chemistry. Comparison with available observations is not consistently favorable. Short-term variability in the atmosphere (^{222}Rn and ^{210}Pb) appears qualitatively seasonable. Seasonal cycles are in some instances opposite to those observed, and mean deposition is clearly too high. The coarseness of model resolution at the high latitudes and the difficulty of setting up efficient formulations for microphysical tracer processes (e.g. dry and wet deposition) are major sources of problems. (Auth. mod.)

49-2666

Historical residue trend of PCBs in the Agassiz Ice Cap, Ellesmere Island, Canada.

Gregor, D.J., Peters, A.J., Teixeira, C.F., Jones, N.P., Spencer, C., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.117-126, 26 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Snow air interface, Snow composition, Snow impurities, Snow stratigraphy, Ice sheets, Canada—Northwest Territories—Ellesmere Island

49-2667

Deposition of sulfate and heavy metals on the Kola Peninsula.

Jaffe, D.A., Cerundolo, B., Rickers, J., Stolzberg, R., Baklanov, A.A., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.127-134, 19 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Snow air interface, Snow impurities, Snow composition, Scavenging, Russia—Kola Peninsula

49-2668

Heavy metals on the Kola Peninsula: aerosol size distribution.

Kelley, J.A., Jaffe, D.A., Baklanov, A.A., Mahura, A., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.135-138, 3 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Aerosols, Snow air interface, Snow impurities, Snow composition, Scavenging, Russia—Kola Peninsula

49-2669

Ambient air levels of persistent organochlorines in spring 1992 at Spitsbergen and the Norwegian mainland: comparison with 1984 results and quality control measures.

Oehme, M., Haugen, J.E., Schlabach, M., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.139-152, 20 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Spectroscopy, Chemical analysis, Norway—Spitsbergen

49-2670

Fire as an agent in redistribution fallout of ^{137}Cs in the Canadian boreal forest.

Paliouris, G., Taylor, H.W., Wein, R.W., Svoboda, J., Mierzynski, B., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.153-166, 49 refs.

Fallout, Air pollution, Atmospheric circulation, Atmospheric composition, Soil air interface, Soil pollution, Taiga, Forest fires, Plant ecology, Canada—Wood Buffalo National Park

49-2671

Recent depositional trend of polycyclic aromatic hydrocarbons and elemental carbon to the Agassiz Ice Cap, Ellesmere Island, Canada.

Peters, A.J., Gregor, D.J., Teixeira, C.F., Jones, N.P., Spencer, C., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.167-179, 56 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Snow air interface, Snow composition, Snow impurities, Snow ice interface, Scavenging, Canada—Northwest Territories—Ellesmere Island

49-2672

Sources of aerosol nitrate and non-sea-salt sulfate in the Iceland region.

Prospero, J.M., Savoie, D.L., Arimoto, R., Olafsson, H., Hjartarson, H., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.181-191, 41 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Aerosols, Air water interactions, Marine atmospheres, Nutrient cycle, Algae, Iceland

49-2673

Present day state of background pollution of the natural environment in the Russian Arctic in the region of the Ust-Lena Reserve.

Rovinskiĭ, F.IA., Pastukhov, B.V., Bouyvolov, Y., Burtseva, L.V., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.193-199, 13 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Soil air interface, Soil pollution, Nutrient cycle, Russia—Lena River Delta

49-2674

Global usage of selected persistent organochlorines.

Voldner, E.C., Li, Y.F., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.201-210, 42 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Air water interactions, Soil air interface, Ecosystems, Nutrient cycle

49-2675

Global distribution model for persistent organic chemicals.

Wania, F., Mackay, D., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.211-232, 29 refs.

Polar atmospheres, Air pollution, Atmospheric circulation, Atmospheric composition, Soil air interface, Air water interactions, Ecosystems, Nutrient cycle

49-2676

Greenland snow and ice cores: unique archives of large-scale pollution of the troposphere of the Northern Hemisphere by lead and other heavy metals.

Boutron, C.F., Candelone, J.P., Hong, S.M., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.233-241, 26 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Snow composition, Snow impurities, Ice composition, Ice cores, Drill core analysis, Greenland

49-2677

Critical evaluation of the use of naturally growing moss to monitor the deposition of atmospheric metals.

Steinnes, E., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.243-249, 19 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Soil air interface, Soil pollution, Plant tissues, Mosses

49-2678

Evidence for short-range transport of polychlorinated biphenyls in the Canadian Arctic using congener signatures of PCBs in soils.

Bright, D.A., Dushenko, W.T., Grundy, S.L., Reimer, K.J., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.251-263, 24 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Soil air interface, Soil pollution, Ecosystems, Nutrient cycle, Canada

49-2679

Effects of local and distant contaminant sources: polychlorinated biphenyls and other organochlorines in bottom-dwelling animals from an arctic estuary.

Bright, D.A., Dushenko, W.T., Grundy, S.L., Reimer, K.J., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.265-283, 28 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Air water interactions, Estuaries, Bottom sediment, Marine biology, Ecosystems, Nutrient cycle, Canada—Northwest Territories

49-2680

Use of remote and ground methods to assess the impacts of smelter emissions in the Kola Peninsula.

Buznikov, A.A., Paianskaia-Gvozdeva, I.I., IUrkovskaia, T.K., Andreeva, E.N., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.285-293, 7 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Snow air interface, Snow impurities, Snow composition, Soil pollution, Vegetation patterns, Russia—Kola Peninsula

49-2681

Evidence for re-distribution of ^{137}Cs in Alaskan tundra, lake, and marine sediments.

Cooper, L.W., Grebmeier, J.M., Larsen, I.L., Solis, C., Olsen, C.R., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.295-306, 27 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Fallout, Tundra, Soil air interface, Soil pollution, Air water interactions, Bottom sediment, United States—Alaska

49-2682

Environmental contaminants in caribou in the Northwest Territories, Canada.

Elkin, B.T., Bethke, R.W., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.307-321, 41 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Soil air interface, Soil pollution, Tundra, Ecosystems, Nutrient cycle, Animals, Physiological effects, Canada—Northwest Territories

49-2683

Inorganic contaminants in arctic Alaskan ecosystems: long-range atmospheric transport or local point sources?

Ford, J., et al, *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.323-335, 30 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Soil air interface, Soil pollution, Tundra, Ecosystems, Nutrient cycle, Mosses, Plant tissues, United States—Alaska

49-2684

Chlorinated hydrocarbons in glaucous gulls (*Larus hyperboreus*) in the southern part of Svalbard.

Gabrielsen, G.W., Skaare, J.U., Polder, A., Bakken, V., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.337-346, 35 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Ecosystems, Nutrient cycle, Physiological effects, Animals, Norway—Svalbard

49-2685

Rates of accumulation and chronologies of atmospherically derived pollutants in arctic Alaska, USA.

Gubala, C.P., et al, *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.347-361, 31 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Soil air interface, Soil pollution, Air water interactions, Water pollution, Lacustrine deposits, Bottom sediment, United States—Alaska

49-2686

Airborne contaminants and their impact on the city of Reykjavík, Iceland.

Gústafsson, L.E., Steinecke, K., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.363-372, 13 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Urban planning, Human factors, Health, Iceland

49-2687

Regional accumulation pattern of heavy metals in lake sediments and forest soils in Sweden.

Johansson, K., Andersson, A., Andersson, T., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.373-380, 31 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Soil air interface, Forest soils, Soil pollution, Air water interactions, Water pollution, Lacustrine deposits, Bottom sediment, Sweden

49-2688

Correlation between stable nitrogen isotope ratios and concentrations of organochlorines in biota from a freshwater food web.

Kidd, K.A., Schindler, D.W., Hesslein, R.H., Muir, D.C.G., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.381-390, 34 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Air water interactions, Lakes, Water pollution, Ecosystems, Nutrient cycle, Physiological effects, Canada

49-2689

Presence of airborne contaminants in the wildlife of northern Québec.

Langlois, C., Langis, R., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.391-402, 33 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Air water interactions, Water pollution, Ecosystems, Nutrient cycle, Animals, Physiological effects, Canada—Quebec

49-2690

Preliminary experiment to examine chemical exchange at the soil-snow interface.

Leggett, D.C., Hogan, A.W., MP 3581, *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.403-408, 16 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Soil air interface, Soil pollution, Snow air interface, Snow impurities, Snow permeability, Snow cover effect, Snow composition, Vapor transfer

Exchange of soil gases with the atmosphere is of current interest to researchers in several fields of geophysics and geochemistry. The authors have begun to examine the exchange of organic vapor at the soil-snow interface. The insights gained from this study may contribute to the general understanding of interfacial exchange processes. Soil specimens, spiked with organic solids having a great range of vapor pressure and aqueous solubility, were placed in shallow trays in contact with the surface prior to snowfall. Snow was allowed to accumulate over the trays and the temperature profiles within the adjacent snow and soil were recorded. Snow specimens were collected above the trays, with a height resolution of 1-5 cm, after exposure periods ranging from days to months. The snow specimens were analyzed with respect to density, particle size and chemical concentration. The preliminary results presented here indicate that organic materials with vapor pressure of the order of 10^{-3} to 10^{-6} torr achieved orderly concentration profiles coordinated with the distance from the source. Materials with greater or lesser vapor pressure were less orderly and refinement of the experimental method is necessary to understand this behavior. The experiment indicates that snowpack provides temporary storage for organic contaminants, which may exchange with air or groundwater. More extensive experiments are necessary to define the processes regulating organic exchange in snow. The authors propose that analysis of overlying snow may provide a non-invasive method of surveying soil contamination.

49-2691

Geographical distribution and identification of methyl sulphone PCB and DDE metabolites in pooled polar bear (*Ursus maritimus*) adipose tissue from western hemisphere arctic and subarctic regions.

Letcher, R.J., Norstrom, R.J., Bergman, Å., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.409-420, 36 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Air water interactions, Marine biology, Ecosystems, Nutrient cycle, Physiological effects, Animals

49-2692

Pesticides in precipitation in Norway.

Lode, O., Eklo, O.M., Holen, B., Svensen, A., Johnsen, Å.M., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.421-431, 21 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Soil pollution, Water pollution, Precipitation (meteorology), Scavenging, Norway

49-2693

Survey of trace elements in lake waters of Finnish Lapland using the ICP-MS technique.

Mannio, J., Järvinen, O., Tuominen, R., Verta, M., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.433-439, 22 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Water pollution, Lake water, Water chemistry, Spectroscopy, Finland

49-2694

PCBs in arctic seabirds from the Svalbard region.

Mehlum, F., Daelemans, F.F., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.441-446, 11 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Ecosystems, Nutrient cycle, Physiological effects, Animals, Norway—Svalbard

49-2695

Spatial trends and historical profiles of organochlorine pesticides in arctic lake sediments.

Muir, D.C.G., Grift, N.P., Lockhart, W.L., Wilkinson, P., Billeck, B.N., Brunskill, G.J., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.447-457, 32 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Snow air interface, Snowmelt, Water pollution, Soil pollution, Lacustrine deposits, Bottom sediment, Canada

49-2696

Trichloroacetic acid as a phytotoxic air pollutant and the dose-response relationship for defoliation of Scots pine.

Norokorpi, Y., Frank, H., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.459-463, 13 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Plant tissues, Plant physiology, Physiological effects, Finland

49-2697

Preliminary results of fasting on the kinetics of organochlorines in polar bears (*Ursus maritimus*).

Polischuk, S.C., Letcher, R.J., Norstrom, R.J., Ramsay, M.A., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.465-472, 30 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Air water interactions, Marine biology, Ecosystems, Nutrient cycle, Physiological effects, Animals

49-2698

Environmental contaminants in wild mink in the Northwest Territories, Canada.

Poole, K.G., Elkin, B.T., Bethke, R.W., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.473-486, 30 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Ecosystems, Nutrient cycle, Physiological effects, Animals, Canada—Northwest Territories

49-2699

Carbonaceous particle record in lake sediments from the Arctic and other remote areas of the Northern Hemisphere.

Rose, N.L., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.487-496, 27 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Water pollution, Soil pollution, Lacustrine deposits, Bottom sediment

49-2700

Chlorinated hydrocarbons in seabirds from the Barents Sea area.

Savinova, T.N., Polder, A., Gabrielsen, G.W., Skaare, J.U., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.497-504, 31 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Ecosystems, Nutrient cycle, Marine biology, Physiological effects, Animals, Barents Sea

49-2701

Theoretical aspects of polychlorinated bornanes and the composition of toxaphene in technical mixtures and environmental samples.

Vetter, W., Luckas, B., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.505-510, 20 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Ecosystems, Nutrient cycle, Physiological effects, Spectroscopy, Chemical analysis

49-2702

Organochlorine contaminants in fish from an arctic lake in Alaska, USA.

Wilson, R., Allen-Gil, S.M., Griffin, D., Landers, D.H., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.511-519, 31 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Lakes, Water pollution, Ecosystems, Nutrient cycle, Physiological effects, Animals, United States—Alaska—Alaska National Wildlife Refuge

49-2703

Influence of the structure and function of the marine food web on the dynamics of contaminants in arctic ocean ecosystems.

Alexander, V., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.593-603, 51 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Air ice water interaction, Ice cover effect, Water pollution, Ocean environments, Ecosystems, Nutrient cycle, Marine biology

49-2704

Impacts of air pollution on far north forest vegetation.

Alekseev, V.A., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.605-617, 48 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Soil pollution, Nutrient cycle, Forest ecosystems, Plant tissues, Plant physiology, Physiological effects, Russia—Kola Peninsula, Russia—Taymyr Peninsula

49-2705

Ecological effects of airborne contaminants in arctic aquatic ecosystems: a discussion on methodological approaches.

Olsson, M., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.619-630, 46 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Water pollution, Ecosystems, Nutrient cycle, Physiological effects

49-2706

Implications of chemical contaminants for aquatic animals in the Canadian Arctic: some review comments.

Lockhart, W.L., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.631-641, 46 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Water pollution, Lacustrine deposits, Bottom sediment, Ecosystems, Nutrient cycle, Physiological effects, Canada

49-2707

Metal distribution in the arctic ecosystems of the Chukotka Peninsula, Russia.

Alekseeva-Popova, N.V., Igoshina, T.I., Drozdova, I.V., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.643-652, 12 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Soil pollution, Ecosystems, Nutrient cycle, Plant tissues, Plant physiology, Russia—Chukotskiy Peninsula

49-2708

Heavy metal burdens in nine species of freshwater and anadromous fish from the Pechora River, northern Russia.

Allen-Gil, S.M., Martynov, V.G., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.653-659, 34 refs.

Water pollution, Rivers, Ecosystems, Nutrient cycle, Physiological effects, Animals, Russia—Pechora River

49-2709

Paleoenvironmental studies of black carbon deposition in the high Arctic: a case study from northern Ellesmere Island.

Doubleday, N.C., Douglas, M.S.V., Smol, J.P., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.661-668, 39 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Haze, Water pollution, Soil pollution, Paleoecology, Lacustrine deposits, Bottom sediment, Carbon black, Canada—Northwest Territories—Ellesmere Island

49-2710

Possible changes in the dose of biologically active ultraviolet radiation received by the biosphere in the summertime Arctic due to total ozone interannual variability.

Gruzdev, A.N., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.669-675, 18 refs.

Polar atmospheres, Atmospheric composition, Ozone, Ultraviolet radiation, Physiological effects

49-2711

Fate of added nitrogen in a moss-sedge arctic community and effects of increased nitrogen deposition.

Jónsdóttir, I.S., Callaghan, T.V., Lee, J.A., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.677-685, 16 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Soil pollution, Nutrient cycle, Mosses, Plant ecology, Plant tissues, Plant physiology, Iceland

49-2712

Modeling potential long-term responses of a small catchment in Lapland to changes in sulfur deposition.

Kämäri, J., Posch, M., Kähkönen, A.M., Johansson, M., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.687-701, 39 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Soil pollution, Water pollution, Lake water, Water chemistry, Soil chemistry, Computerized simulation, Finland

49-2713

Critical loads of acidity to surface waters: Svalbard.

Lien, L., Henriksen, A., Traaen, T.S., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.703-713, 23 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Surface waters, Water pollution, Water chemistry, Norway—Svalbard

49-2714

Airborne contamination by heavy metals and aluminum in the freshwater ecosystems of the Kola subarctic region (Russia).

Moĭseenko, T.I., Kudriavtseva, L.P., Rodiushkin, I.V., Dauvalter, V.A., Lukin, A.A., Kashulin, N.A., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.715-727, 24 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Lake water, Water pollution, Water chemistry, Lacustrine deposits, Bottom sediment, Ecosystems, Nutrient cycle, Russia—Kola Peninsula

49-2715

Use of lichens in atmospheric deposition studies with an emphasis on the Arctic.

Nash, T.H., III, Gries, C., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.729-736, 45 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Soil pollution, Ecosystems, Nutrient cycle, Lichens, Plant tissues, Plant physiology, Canada—Northwest Territories

49-2716

Response of lichens in atmospheric deposition with an emphasis on the Arctic.

Nash, T.H., III, Gries, C., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.737-747, 80 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Soil pollution, Ecosystems, Nutrient cycle, Lichens, Plant tissues, Plant physiology

49-2717

Radionuclides in the moss-lichen cover of tundra communities in the Yamal Peninsula.

Nifontova, M.G., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.749-752, 12 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Fallout, Soil pollution, Ecosystems, Nutrient cycle, Mosses, Lichens, Plant tissues, Russia—Yamal Peninsula

49-2718

Monitoring the effects of air pollution on terrestrial ecosystems in Varanger (Norway) and Nikel-Pechenga (Russia) using remote sensing.

Tømmervik, H.A., Johansen, B.E., Pedersen, J.P., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.753-767, 35 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Soil pollution, Ecosystems, Nutrient cycle, Vegetation patterns, Lichens, Spaceborne photography, Norway, Russia—Kola Peninsula

49-2719

Contaminants affecting the arctic climate, and the role of the oceans.

Kellog, W.W., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.769-775, 43 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Ocean currents, Global warming

49-2720

Interactions among aerosols, clouds, and climate of the Arctic Ocean.

Curry, J.A., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.777-791, 50 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Ocean currents, Marine atmospheres, Aerosols, Cloud cover, Global warming

49-2721

Water vapor-temperature feedback in the formation of continental arctic air: its implication for climate.

Blanchet, J.P., Girard, É., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.793-802, 26 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Marine atmospheres, Air ice water interaction, Global warming

49-2722

Tropospheric hydrogen and carbon oxides in Antarctica and in Greenland.

Corazza, E., Tesi, G., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.803-809, 18 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Air masses, Antarctica—Terra Nova Bay, Greenland

Tropospheric trace gases (H_2, CO, and CO_2) were measured in polar areas for two seasons in Antarctica (Italian base Terra Nova Bay) and two in Greenland (European base Summit, Greenland Icecore Program [GRIP]), yielding the following average concentrations: Antarctica (1989-90): H_2, 528 ppvb; CO, 51 ppbv; CO_2, 354 ppmv; Antarctica (1990-91): H_2, 522; CO, 51; Greenland (1991): H_2, 548; CO, 114; Greenland (1992): CO, 107 (hydrogen discarded). Computer automated gas chromatographic analyses were done *in situ* using a reduction gas detector (RGD) and a complete set of standards each day, for periods of 2 h in Greenland and 3 h in Antarctica. Approximately 200 analyses were conducted during each campaign. Peak areas and standard calibrations in the laboratory were obtained using programs written especially for the purpose. For both Antarctica and Greenland, some differences were found between the two subsequent seasons; the greatest differences, however, were found in Antarctica within the same season (different origins of air masses). The inter-hemispheric asymmetry is clear and significant. It most likely occurs because pollution from the Northern Hemisphere reaches the northernmost regions through the polar vortex, whereas Antarctica is more isolated by the southern ocean. (Auth. mod.)

49-2723

Physical and radiative properties of arctic atmospheric aerosols.

Pueschel, R.F., Kinne, S.A., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.811-824, 54 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Aerosols, Carbon black, Albedo

49-2724

Atmospheric Radiation Measurement (ARM) program: ARM's window on the Arctic.

Stamnes, K.H., Zak, B.D., Shaw, G.E., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.825-829, 13 refs.

Polar atmospheres, Atmospheric circulation, Cloud cover, Radiation balance, Global change, United States—Alaska—North Slope

49-2725

Carbon monoxide and total ozone in arctic and antarctic regions: seasonal variations, long-term trends and relationships.

IUrganov, L.N., Grechko, E.I., Dzhola, A.V., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.831-840, 17 refs.

Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Ozone, Russia—Moscow

49-2726

Airborne contaminants in the Arctic: what we need to know.

Landers, D.H., Bangay, G., Sisula, H., Colburn, T., Liljelund, L.E., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.841-848, 4 refs.

Polar atmospheres, Air pollution, Regional planning, International cooperation, Environmental protection, Research projects

49-2727

Overview of international institutional mechanisms for environmental management with reference to arctic pollution.

Perkins, P.E., *Science of the total environment. Special issue,* Jan. 1995, Vol.160/161, International Symposium on the Ecological Effects of Arctic Airborne Contaminants, Reykjavik, Iceland, Oct. 4-8, 1993. Collection of papers. Edited by D.H. Landers and S.J. Christie, p.849-857, 34 refs.

Polar atmospheres, Air pollution, Regional planning, International cooperation, Environmental protection

49-2728

From the history of formation of engineering geocryology.

Zhukov, V.F., *Soil mechanics and foundation engineering,* July-Aug. 1994(Pub. Jan. 1995), 31(4), p.149-151, Translated from Osnovaniia, fundamenty i mekhanika gruntov, No.4, July-Aug. 1994.

Engineering geology, Geocryology, History, Permafrost bases, Permafrost beneath structures

49-2729

Improvement of methods of constructing pile foundations in permafrost soils.

Targulian, IU.O., Gokhman, M.R., Fedorovich, D.I., Nekliudov, V.S., *Soil mechanics and foundation engineering*, July-Aug. 1994(Pub. Jan. 1995), 31(4), p.152-154, Translated from Osnovaniia, fundamenty i mekhanika gruntov, No.4, July-Aug. 1994.

Piles, Foundations, Permafrost bases, Permafrost beneath structures

49-2730

Leading trends in scientific and applied research of the Arctic and Antarctica (an interview). [Osnovnye napravleniia nauchnykh i prikladnykh issledovaniĭ Arktiki i Antarktiki (interv'iu)]

Mazur, I.I., *Stroitel'stvo truboprovodov*, Mar. 1994, No.3, p.9-13, In Russian.

Research projects, International cooperation, Environmental protection, Marine transportation, Natural resources, Economic development, Antarctica, Russia—Far North

This is an interview with I.I. Mazur, Chairman of the Interdepartmental Committee for the Arctic and Antarctic Regions, conducted by T. Cheremushkina. Mazur discusses the problems to be solved by scientists and industrial personnel in the development of these regions. Among the topics discussed are: Russia's national interests, a long term socio-economic program for the development of these regions, rational use of natural resources, protection of the environment (especially the Yamal Peninsula), formation of a scientific-technical policy (especially for Antarctica), studies conducted in the regions of Spitsbergen and Novaya Zemlya, as well as the role of marine transportation in Arctic oil and gas regions.

49-2731

Analyzing joints for underground pipelines. [Raschet soedineniĭ podzemnykh truboprovodov]

Vorontsov, A.N., Murzakhanov, G.Kh., Shugorev, V.N., *Stroitel'stvo trubuprovodov*, Mar. 1994, No.3, p.33-34, In Russian. 3 refs.

Underground pipelines, Joints (junctions), Analysis (mathematics), Cold weather performance, Plastics

49-2732

Field tests of piles for pipelines in frozen ground. [Naturnye ispytaniia svaĭ dlia truboprovodov v merzlykh gruntakh]

Kharionovskiĭ, V.V., Shilin, A.N., *Stroitel'stvo truboprovodov*, May 1993, No.5, p.23-25, In Russian. 3 refs.

Frost heave, Piles, Anchors, Frozen ground mechanics, Pipelines, Pile load tests

49-2733

Changes in the bearing capacity of anchors freezing in saline soils under repeated tests. [Izmenenie nesushcheĭ sposobnosti vmorazhivaemykh ankerov v zasolennom grunte pri povtornykh ispytaniiakh]

Khafizov, R.M., Il'iasov, S.S., Pomazanov, V.P., *Stroitel'stvo truboprovodov*, May. 1993, No.5, p.32-35, In Russian. 2 refs.

Bearing strength, Anchors, Saline soils, Frozen ground mechanics, Bearing tests

49-2734

Rational areas of application and technical-economic effectiveness of new light dacite concretes. [Ratsional'nye oblasti primeneniia i tekhno-ekonomicheskaia effektivnost' novykh legkikh datsizitobetonov]

Gnatus', N.A., *Stroitel'stvo truboprovodov*, May 1993, No.5, p.36-39, In Russian.

Concretes, Cold weather performance, Lightweight concretes, Thermal insulation, Walls, Economic analysis

49-2735

Explanation of palsa origins—an example of theory formation. [Palsan selittäminen—esimerkki teorian muodostuksesta]

Seppälä, M., *Terra*, 1994, 106(3), p.204-208, In Finnish with English summary. 35 refs.

Frost mounds, Landforms, Geomorphology, Geocryology, Frozen ground mechanics, Frozen ground expansion, Frost heave, Theories

49-2736

Nunatak of the Nuorunen fell? [Nuorusen nunatakki?]

Koutaniemi, L., Huttunen, A., Ekman, I., Lukashov, A., *Terra*, 1994, 106(3), p.232-237, In Finnish with English summary. 20 refs.

Nunataks, Origin, Sedimentation, Geomorphology, Periglacial processes, Subarctic landscapes, Palynology, Glacial geology, Russia—Karelia

49-2737

Pulju and Sevetti moraines. [Lapin omaleimaiset moreenimuodostumat, Puljumoreeni ja Sevettimoreeni]

Aario, R., *Terra*, 1994, 106(3), p.258-266, In Finnish with English summary. 21 refs.

Moraines, Geomorphology, Glacial geology, Subarctic landscapes, Topographic features, Landforms, Photointerpretation, Finland

49-2738

Environmental effects of cold on plants.

Bowers, M.C., Plant-environment interactions. Edited by R.E. Wilkinson, New York, Marcel Dekker, 1994, p.391-411, 148 refs.

DLC QK905.P56

Plants (botany), Plant ecology, Cold stress, Cold weather survival, Frost resistance, Acclimatization, Frost resistance, Temperature effects

49-2739

Proposed mechanism of freezing and thawing in conifer xylem.

Robson, D.J., Petty, J.A., International Workshop on Water Transport in Plants Under Climatic Stress, Vallombrosa, Firenze, Italy, May 29-31, 1991. Proceedings. Edited by M. Borghetti et al, Cambridge, Cambridge University Press, 1993, p.75-85, 24 refs.

DLC QK870.W425

Trees (plants), Cold stress, Cold weather survival, Plant tissues, Freeze thaw cycles, Cavitation, Water pressure, Water transport, Ice water interface, Theories

49-2740

Metabolic and cellular impact of ice encasement on herbage plants.

Gudleifsson, B.E., NATO Advanced Research Workshop on Interacting Stresses on Plants in a Changing Climate, University of London, UK, Sep. 13-19, 1992. Proceedings. Edited by M.B. Jackson et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.16, Berlin, Springer-Verlag, 1993, p.407-421, 54 refs.

DLC QK754.5. I56

Plant physiology, Grasses, Cold stress, Cold weather survival, Ice formation, Ice cover effect, Plant tissues, Damage, Permeability, Oxygen, Ion diffusion

49-2741

Silvics of the circumpolar boreal forest tree species.

Nikolov, N., Helmisaari, H., Systems analysis of the global boreal forest. Edited by H.H. Shugart et al, Cambridge, Cambridge University Press, 1992, p.13-84, Refs. p.471-543.

DLC QK938.T34 S87

Forest ecosystems, Trees (plants), Plant ecology, Distribution, Classifications, Biogeography, Frost resistance, Growth

49-2742

Transition between boreal forest and tundra.

Sirois, L., Systems analysis of the global boreal forest. Edited by H.H. Shugart et al, Cambridge, Cambridge University Press, 1992, p.196-215, Refs. p.471-543.

DLC QK938.T34 S87

Forest ecosystems, Trees (plants), Plant ecology, Forest lines, Tundra, Taiga, Vegetation patterns, Climatic factors, Forest fires

49-2743

Transitions between boreal forest and wetland.

Glebov, F.Z., Korzukhin, M.D., Systems analysis of the global boreal forest. Edited by H.H. Shugart et al, Cambridge, Cambridge University Press, 1992, p.241-266, Refs. p.471-543.

Forest ecosystems, Trees (plants), Forest soils, Peat, Organic soils, Wetlands, Taiga, Vegetation patterns, Paludification, Russia—Siberia

49-2744

Wetlands of Canada and Greenland.

Glooschenko, W.A., Tarnocai, C., Zoltai, S.C., Glooschenko, V., Handbook of vegetation science, Vol.15(2). Wetlands of the world: inventory, ecology and management, Vol.1. Edited by D. Whigham et al, Dordrecht, Kluwer Academic Publishers, 1993, p.415-514, Refs. p.504-514.

DLC QK911.HE

Wetlands, Distribution, Classifications, Geography, Hydrology, Climatic factors, Peat, Plant ecology, Arctic landscapes, Subarctic landscapes, Canada, Greenland

49-2745

Layer moduli determination during freeze-thaw periods.

Janoo, V.C., Berg, R.L., MP 3582, *Transportation research record*, 1993, No.1377, Symposium on Nondestructive Deflection Testing and Backcalculation for Pavements, Nashville, TN, Aug. 19-21, 1991. Proceedings, p.26-35, 6 refs.

DLC TE7.H5

Pavements, Bituminous concretes, Bearing strength, Cold weather tests, Freeze thaw tests, Mechanical properties, Thaw weakening, Structural analysis, Strains, Deformation, Computerized simulation

In seasonal frost areas, a frozen pavement structure undergoes a complex change in its ability to support traffic as the subgrade and base thaw. In an attempt to quantify this change, several test sections of various cross sections were built in the Frost Effects Research Facility at the Cold Regions Research and Engineering Laboratory. These test sections were subjected to freeze-thaw cycles, and changes in their structural capacity were monitored. The performance of only one of these, TS1, is discussed. The structural capacity during the thaw cycles was characterized nondestructively using a falling weight deflectometer (FWD). Other measurements, such as frost and thaw depths, were obtained from subsurface temperature and resistivity gauges. The Corps of Engineers computer program WESDEF was used to backcalulate layer moduli from the FWD data. On the basis of temperature and resistivity gauge measurements, the pavement layers were appropriately subdivided to reflect the thawed and frozen layers. The backcalculated moduli were used to calculate the horizontal strains at the bottom of the asphalt concrete layer and the vertical strain at the top of the subgrade. These results were compared with those of similar strains obtained when the thawed and frozen layers were combined into a single composite layer. It was found that the thicknesses of the frozen and thawed layers were critical in backcalculating layer moduli and damage to pavement structures. Larger errors were introduced between measured and theoretical deflection basins when the frozen and thawed layers were considered as a single composite layer. The horizontal strains at the bottom of the asphalt layer were not greatly affected by ignoring the thawed layer. The damage to pavements with respect to vertical strains was grossly underestimated when the thawed and frozen layers were not considered separately.

49-2746

Measuring cold hardiness.

Ritchie, G.A., Techniques and approaches in forest tree ecophysiology. Edited by J.P. Lassoie and T.M. Hinckley, Boca Raton, CRC Press, 1991, p.557-582, 119 refs.

DLC QK938.F6 T43

Trees (plants), Plant physiology, Plant ecology, Cold stress, Cold tolerance, Frost resistance, Plant tissues, Damage, Measurement, Low temperature tests, Temperature effects

49-2747

Is earth climate poised to jump again.

Broecker, W.S., *Geotimes*, Nov. 1994, 39(11), p.16-18, 6 refs.

Climatology, Paleoclimatology, Climatic changes, Pleistocene, Temperature variations, Ice sheets, Ice cores, Isotope analysis, Glacier oscillation, Greenhouse effect, Greenland—Summit

49-2748

Some limitations in using leaf physiognomic data as a precise method for determining paleoclimates with an example from the Late Cretaceous Pautût flora of West Greenland.

Boyd, A., *Palaeogeography, palaeoclimatology, palaeoecology,* Dec. 1994, 112(3-4), p.261-278, 93 refs.

Paleoclimatology, Paleobotany, Paleoecology, Quaternary deposits, Fossils, Correlation, Structural analysis, Deltas, Vegetation patterns, Greenland—West Greenland

49-2749

Arctic haze and the Arctic Gas and Aerosol Sampling Program (AGASP).

Schnell, R.C., *Geophysical research letters,* May 1984, 11(5), p.361-364, 21 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Haze, Aerial surveys, Sampling, Air pollution

49-2750

Air pollution studies in the Norwegian Arctic.

Joranger, E., Ottar, B., *Geophysical research letters,* May 1984, 11(5), p.365-368, 4 refs.

Polar atmospheres, Atmospheric composition, Air pollution, Aerosols, Aerial surveys, Sampling, Seasonal variations, Norway

49-2751

Vertical and horizontal characteristics of arctic haze during AGASP: Alaskan Arctic.

Schnell, R.C., Raatz, W.E., *Geophysical research letters,* May 1984, 11(5), p.369-372, 9 refs.

Polar atmospheres, Atmospheric composition, Haze, Aerosols, Spectra, Stratification, Aerial surveys, Sampling, Profiles, United States—Alaska

49-2752

Aerosol distributions and an arctic aerosol front during AGASP: Norwegian Arctic.

Raatz, W.E., Schnell, R.C., *Geophysical research letters,* May 1984, 11(5), p.373-376, 4 refs.

Polar atmospheres, Atmospheric composition, Haze, Air pollution, Aerosols, Aerial surveys, Sampling, Profiles, Condensation nuclei, Fronts (meteorology), Atmospheric circulation, Norway

49-2753

Surface aerosol measurements at Barrow during AGASP.

Bodhaine, B.A., Dutton, E.G., DeLuisi, J.J., *Geophysical research letters,* May 1984, 11(5), p.377-380, 8 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Sampling, Haze, Atmospheric boundary layer, Atmospheric circulation, Particle size distribution, United States—Alaska—Barrow

49-2754

Vertical distributions of particulate carbon, sulfur, and bromine in the arctic haze and comparison with ground-level measurements at Barrow, Alaska.

Hansen, A.D.A., Rosen, H., *Geophysical research letters,* May 1984, 11(5), p.381-384, 14 refs.

Polar atmospheres, Atmospheric composition, Haze, Aerial surveys, Sampling, Air pollution, Aerosols, Profiles, Correlation, United States—Alaska—Barrow

49-2755

Features of aerosol optical depth observed at Barrow, March 10-20, 1983.

Dutton, E.G., DeLuisi, J.J., Bodhaine, B.A., *Geophysical research letters,* May 1984, 11(5), p.385-388, 14 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Haze, Atmospheric density, Optical properties, Climatic factors, Photometry, United States—Alaska—Barrow

49-2756

Ground-based measurements of arctic haze made at Alert, N.W.T., Canada, during the Arctic Gas and Aerosol Sampling Project (AGASP).

Hoff, R.M., Trivett, N.B.A., *Geophysical research letters,* May 1984, 11(5), p.389-392, 8 refs.

Polar atmospheres, Atmospheric composition, Haze, Aerosols, Sampling, Particle size distribution, Condensation nuclei, Correlation, Canada—Northwest Territories—Alert

49-2757

Airborne observations of arctic aerosols. 1: characteristics of arctic haze.

Radke, L.F., Lyons, J.H., Hegg, D.A., Hobbs, P.V., Bailey, I.H., *Geophysical research letters,* May 1984, 11(5), p.393-396, 8 refs.

Polar atmospheres, Atmospheric composition, Haze, Stratification, Aerosols, Aerial surveys, Sampling, Particle size distribution, Air pollution, Chemical properties, United States—Alaska—Barrow

49-2758

Airborne observations of arctic aerosols. 2: giant particles.

Bailey, I.H., Radke, L.F., Lyons, J.H., Hobbs, P.V., *Geophysical research letters,* May 1984, 11(5), p.397-400, 12 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Aerial surveys, Sampling, Particle size distribution, Haze, Chemical properties, United States—Alaska—Barrow

49-2759

Airborne observations of arctic aerosols. 3: origins and effects of airmasses.

Radke, L.F., Hobbs, P.V., Bailey, I.H., *Geophysical research letters,* May 1984, 11(5), p.401-404, 12 refs.

Polar atmospheres, Atmospheric composition, Aerial surveys, Aerosols, Sampling, Haze, Air masses, Origin, Wind direction, Air pollution, Beaufort Sea, Chukchi Sea

49-2760

Airborne observations of arctic aerosols. 4: optical properties of arctic haze.

Clarke, A.D., Charlson, R.J., Radke, L.F., *Geophysical research letters,* May 1984, 11(5), p.405-408, 17 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Haze, Radiation absorption, Profiles, Light scattering, Optical properties, Aerial surveys, Sampling, United States—Alaska—Barrow

49-2761

Microparticle size spectrum of arctic haze.

Shaw, G.E., *Geophysical research letters,* May 1984, 11(5), p.409-412, 9 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Haze, Condensation nuclei, Sampling, Particle size distribution, Spectra, Physical properties, United States—Alaska—Ester Dome

49-2762

Elemental composition of arctic particulate matter.

Cahill, T.A., Eldred, R.A., *Geophysical research letters,* May 1984, 11(5), p.413-416, 10 refs.

Polar atmospheres, Atmospheric composition, Air pollution, Aerial surveys, Aerosols, Sampling, Haze, Chemical properties

49-2763

Acidic sulfate particles in the winter arctic atmosphere.

Lazrus, A.L., Ferek, R.J., *Geophysical research letters,* May 1984, 11(5), p.417-419, 11 refs.

Polar atmospheres, Atmospheric composition, Haze, Aerial surveys, Aerosols, Ion density (concentration), Sampling, Air pollution, Chemical properties, United States—Alaska—Barrow

49-2764

El Chichon volcanic debris in an arctic tropopause fold.

Shapiro, M.A., Schnell, R.C., Parungo, F.P., Oltmans, S.J., Bodhaine, B.A., *Geophysical research letters,* May 1984, 11(5), p.421-424, 14 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Volcanic ash, Stratosphere, Aerial surveys, Sampling, Condensation nuclei, Turbulent diffusion

49-2765

Organic gases in the Norwegian Arctic.

Hov, Ø., Penkett, S.A., Isaksen, I.S.A., Semb, A., *Geophysical research letters,* May 1984, 11(5), p.425-428, 19 refs.

Polar atmospheres, Atmospheric composition, Air pollution, Haze, Hydrocarbons, Aerosols, Sampling, Atmospheric circulation, Norway—Svalbard

49-2766

Brominated organic species in the arctic atmosphere.

Berg, W.W., Heidt, L.E., Pollock, W., Sperry, P.D., Cicerone, R.J., Gladney, E.S., *Geophysical research letters,* May 1984, 11(5), p.429-432, 16 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Hydrocarbons, Sampling, Turbulent diffusion, Chemical properties, Ozone, Stratosphere

49-2767

Gaseous bromine in the Arctic and arctic haze.

Rasmussen, R.A., Khalil, M.A.K., *Geophysical research letters,* May 1984, 11(5), p.433-436, 10 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Haze, Air pollution, Aerial surveys, Sampling, Seasonal variations, United States—Alaska—Barrow

49-2768

Statistical analysis of trace gases in arctic haze.

Khalil, M.A.K., Rasmussen, R.A., *Geophysical research letters,* May 1984, 11(5), p.437-440, 15 refs.

Polar atmospheres, Atmospheric composition, Haze, Aerosols, Gases, Sampling, Statistical analysis, Correlation, Air pollution

49-2769

Sources of Ni, Pb, and Zn during the arctic episode in March 1983.

Ottar, B., Pacyna, J.M., *Geophysical research letters,* May 1984, 11(5), p.441-444, 14 refs.

Polar atmospheres, Atmospheric composition, Haze, Aerosols, Metals, Air pollution, Wind direction, Sampling, Chemical composition, Norway

49-2770

Major ions in Spitsbergen snow samples.

Semb, A., Brækkan, R., Joranger, E., *Geophysical research letters,* May 1984, 11(5), p.445-448, 7 refs.

Precipitation (meteorology), Air pollution, Snow composition, Profiles, Sampling, Snow impurities, Chemical analysis, Ion density (concentration), Scavenging, Norway—Spitsbergen

49-2771

Tropospheric circulation patterns during the Arctic Gas and Aerosol Sampling Program (AGASP), March/April 1983.

Raatz, W.E., *Geophysical research letters,* May 1984, 11(5), p.449-452, 15 refs.

Polar atmospheres, Atmospheric composition, Air pollution, Atmospheric circulation, Wind direction, Aerial surveys, Aerosols, Origin

49-2772

Trajectories during AGASP.

Harris, J.M., *Geophysical research letters,* May 1984, 11(5), p.453-456, 11 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Air pollution, Atmospheric circulation, Wind direction, Aerial surveys

49-2773
On the atmospheric transport of pollution to the Arctic.
Iversen, T., *Geophysical research letters,* May 1984, 11(5), p.457-460, 15 refs.
Polar atmospheres, Atmospheric composition, Air pollution, Origin, Atmospheric circulation, Aerosols, Air temperature, Gravity waves

49-2774
Role of combustion-generated carbon particles in the absorption of solar radiation in the arctic haze.
Rosen, H., Hansen, A.D.A., *Geophysical research letters,* May 1984, 11(5), p.461-464, 19 refs.
Polar atmospheres, Atmospheric composition, Haze, Aerosols, Air pollution, Aerial surveys, Radiation absorption, Radiation balance, Climatic factors, Sampling

49-2775
Absorption of solar radiation by the arctic atmosphere during the haze season and its effects on the radiation balance.
Valero, F.P.J., Ackerman, T.P., Gore, W.J.Y., *Geophysical research letters,* May 1984, 11(5), p.465-468, 15 refs.
Polar atmospheres, Atmospheric composition, Haze, Aerosols, Solar radiation, Radiation absorption, Radiation balance, Radiometry, Climatic factors, Heating

49-2776
Vertical structure of arctic haze as determined from airborne net-flux radiometer measurements.
Ackerman, T.P., Valero, F.P.J., *Geophysical research letters,* May 1984, 11(5), p.469-472, 15 refs.
Polar atmospheres, Atmospheric composition, Haze, Aerial surveys, Radiometry, Optical properties, Aerosols, Radiation absorption

49-2777
Solar and terrestrial radiation data from the Sleepers River Research Watershed: a summary report.
Hardy, J.P., SR 94-24, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1994, 25p., ADA-288 444, 37 refs.
Radiation measurement, Solar radiation, Data processing, Radiation measuring instruments, United States—Vermont
A long-term (24-year) database of solar and terrestrial radiation, as monitored in northern Vermont, has been compiled. This extensive database is a result of cooperative efforts among many government agencies. This report summarizes the present status of the solar and terrestrial radiation database, the instrumentation and calibration, and methods of data measurement, acquisition and analysis.

49-2778
Layer coefficients for NHDOT pavement materials.
Janoo, V.C., SR 94-30, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Sep. 1994, 47p., ADA-288 262, 8 refs.
Bearing tests, Bituminous concretes, Analysis (mathematics), Pavements
In 1992, the New Hampshire Department of Transportation (NHDOT) experimented with the use of reclaimed asphalt concrete as a base course material, identified by NHDOT as reclaimed stabilized base (RSB). The RSB and a control test section were placed on Interstate 93 between exits 18 and 19. The RSB test section was designed to the same structural number (SN) as the control. To evaluate the structural capacity of these test sections, the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) conducted deflection tests using a Dynatest 8000 falling weight deflectometer (FWD). Preliminary analysis of the results by NHDOT personnel showed higher deflections in the reclaimed asphalt concrete test sections. The explanation was that the layer coefficient used for the RSB layer in the design was probably incorrect. A total of 10 test sections constituting the base course materials used by NHDOT were built near Bow, NH. CRREL evaluated and estimated the layer coefficients of the base course materials. The test program was developed to characterize the material in more than one way. Tests were conducted with the heavy weight deflectometer (HWD), dynamic cone penetrometer (DCP) and the Clegg hammer. In-situ California bearing ratio (CBR) tests were also conducted. The deflections from the HWD were used with the WESDEF back-calculation program to determine the layer moduli. The moduli were than used with the AASHTO Design Guide to calculate the layer coefficients. The layer coefficients were also determined with the method proposed by Rohde. The CBR values from the Clegg hammer, in-situ CBR and DCP tests were also used in the relationships in the HDM model to determine the layer coefficients.

49-2779
Marine insurance for the Northern Sea Route. Pilot Study.
Torrens, D.L., *International Northern Sea Route Programme (INSROP). Working paper (IV.3.3),* May 16, 1994, No.1, 180p., 9p. refs.
Marine transportation, Ice navigation, International cooperation, Legislation, Ships, Icebreakers, Northern Sea Route

49-2780
Antarctic meteorology and climatology: studies based on automatic weather stations.
Bromwich, D.H., ed, Stearns, C.R., ed, *American Geophysical Union. Antarctic research series,* 1993, Vol.61, 207p., Refs. passim. For individual papers see 49-2781 through 49-2790 or I-52140 through I-52149.
DLC QC994.9.A58 1993
Wind (meteorology), Weather stations, Remote sensing, Climate
This volume provides examples of the application of state-of-the-art technology to fundamental problems in antarctic meteorology and climatology. The technology, particularly as related to instrumentation and satellite communication, has been developed and applied in response to specific scientific needs. In its original conception the volume contents were limited to the U.S. antarctic automatic weather station (AWS) program at the University of Wisconsin-Madison and to the results flowing from analysis of the collected data. The focus subsequently shifted to include a broader collection of papers on atmospherically related topics. Thus this volume, in addition to illustrating the importance and usefulness of antarctic automatic weather station data, can also serve as an introduction to a number of basic issues in antarctic meteorology and climatology.

49-2781
Monthly mean climatic data for antarctic automatic weather stations.
Stearns, C.R., Keller, L.M., Weidner, G.A., Sievers, M., *American Geophysical Union. Antarctic Research Series,* 1993, Vol.61, Antarctic meteorology and climatology: studies based on automatic weather stations. Edited by D.H. Bromwich and C.R. Stearns, p.1-21, 29 refs.
DLC QC994.9.A58 1993
Weather stations, Climate, Measuring instruments, Air temperature, Atmospheric pressure, Antarctica—Ross Ice Shelf, Antarctica—Nansen Ice Sheet, Antarctica—Reeves Glacier
Automatic weather station (AWS) units were installed at remote locations in Antarctica to supplement the few research stations making meteorological observations. Most AWS units were positioned in data-sparse regions in support of field experiments. Monthly means and extremes for air pressure, air temperature, wind speed, and wind direction for the AWS sites are available in tabular form. Since data collection in such a hostile environment is difficult, possible errors and/or problems are discussed. Some analysis of the longer-term climatic record is included for specific AWS sites representing different climatic regimes. The data show that research stations located in protected areas along the coast of Antarctica do not represent the meteorology of the interior of Antarctica. Comparisons made between the AWS and research stations show that the AWS do as well as the research stations in measuring air pressure and air temperature. (Auth.)

49-2782
Katabatic winds in Adélie Coast.
Wendler, G., André, J.C., Pettré, P., Gosink, J., Parish, T.R., *American Geophysical Union. Antarctic Research Series,* 1993, Vol.61, Antarctic meteorology and climatology: studies based on automatic weather stations. Edited by D.H. Bromwich and C.R. Stearns, p.23-46, 76 refs.
DLC QC994.9.A58 1993
Wind velocity, Air temperature, Atmospheric pressure, Blowing snow, Radiation balance, Heat balance, Antarctica—Adélie Coast
A decade ago, a joint U.S.-French experiment commenced in Adélie Coast. The experiment is called IAGO, for Interactions-Atmosphere-Glace-Océan. One of the main purposes of this investigation is to obtain a better understanding of the katabatic wind, which is very well developed in this area. This paper summarizes some of the findings to date. It discusses the climatology of the area, detailed vertical measurements through the boundary layer, radiative and energy budget fluxes, flowing snow and its effects on the gravity flow, the hydraulic jump (Loewe phenomenon), and modeling efforts. (Auth.)

49-2783
Spatial and temporal characteristics of the intense katabatic winds at Terra Nova Bay, Antarctica.
Bromwich, D.H., Parish, T.R., Pellegrini, A., Stearns, C.R., Weidner, G.A., *American Geophysical Union. Antarctic Research Series,* 1993, Vol.61, Antarctic meteorology and climatology: studies based on automatic weather stations. Edited by D.H. Bromwich and C.R. Stearns, p.47-68, 40 refs.
DLC QC994.9.A58 1993
Wind velocity, Weather stations, Measuring instruments, Solar radiation, Seasonal variations, Diurnal variations, Antarctica—Reeves Glacier, Antarctica—Nansen Ice Sheet, Antarctica—Terra Nova Bay
Two years of automatic weather station observations describing the linkage between the inland confluence zone and the intense coastal katabatic wind regime at Terra Nova Bay are analyzed. A highly stable wind regime is described by the data with the air over the plateau converging into the head of Reeves Glacier, descending dry adiabatically to the Nansen Ice Sheet, and apparently accelerating horizontally down the local pressure gradient to Inexpressible I., which is situated along the western shore of Terra Nova Bay. This low-level jet of cold air is laterally confined and is only slightly responsive to synoptic forcing. The internal dynamics of the airstream is the dominant factor determining its behavior. Lateral fluctuations in the katabatic wind are primarily controlled by buoyancy variations. (Auth.)

49-2784
Katabatic winds along the Transantarctic Mountains.
Breckenridge, C.J., Radok, U., Stearns, C.R., Bromwich, D.H., *American Geophysical Union. Antarctic Research Series,* 1993, Vol.61, Antarctic meteorology and climatology: studies based on automatic weather stations. Edited by D.H. Bromwich and C.R. Stearns, p.69-92, 11 refs.
DLC QC994.9.A58 1993
Wind (meteorology), Air temperature, Infrared photography, Measuring instruments, Atmospheric pressure, Antarctica—Transantarctic Mountains, Antarctica—Ross Ice Shelf, Antarctica—Byrd Glacier, Antarctica—Mulock Glacier, Antarctica—Skelton Glacier
Thermal infrared satellite imagery of the Ross Ice Shelf often indicates dark streaks emanating from the major glaciers of the Transantarctic Mountains. Other authors have shown that these streaks indicate katabatic wind activity. In the present study, satellite imagery, automatic weather station (AWS) data and synoptic analyses are used to characterize such activity for the 1982 austral winter. Over 50% of all available thermal infrared satellite images (both with and without cloud cover) containing the Ross I. area and Skelton, Mulock, and Byrd glaciers show katabatic winds at one or more of these glaciers. Comparison of a case of intense katabatic winds in June 1982 with a case during July 1982 devoid of such winds indicates a dramatic difference in the supply of radiationally cooled near-surface air over the polar plateau. During the intense katabatic event, surface temperatures recorded by an AWS on the East Antarctic plateau are up to 45°C colder than surface temperatures at AWS sites on the Ross Ice Shelf, with potential temperatures up to 15 K lower. By contrast, during the case without katabatic winds, surface temperatures on the plateau are up to 15°C warmer (potential temperatures up to 45 K higher) than those on the Ross Ice Shelf. (Auth. mod.)

49-2785
Satellite and automatic weather station analyses of katabatic surges across Ross Ice Shelf.
Carrasco, J.F., Bromwich, D.H., *American Geophysical Union. Antarctic Research Series,* 1993, Vol.61, Antarctic meteorology and climatology: studies based on automatic weather stations. Edited by D.H. Bromwich and C.R. Stearns, p.93-108, 25 refs.
DLC QC994.9.A58 1993
Measuring instruments, Wind (meteorology), Weather stations, Meteorological charts, Infrared radiation, Antarctica—Ross Ice Shelf, Antarctica—Marie Byrd Land
Thermal infrared satellite images from three winter months in 1988 were studied to evaluate the occurrence of dark (warm) signatures coming from southern Marie Byrd Land and extending across the Ross Ice Shelf in a direction generally parallel to the Transantarctic Mountains. The presence of these features around Siple Coast was a very frequent event and is inferred to be caused by the persistent katabatic drainage from Marie Byrd Land. At times the signatures extended all the way across the ice shelf to the Ross Sea, a horizontal distance of about 1000 km. This took place even though the downslope buoyancy force is near zero over the ice shelf. Periods of maximum decrease of pressure over the northeastern Ross Ice Shelf and/or around the Russkaya Station area were associated with the occurrence of this phenomenon. Synoptic analyses indicated that the pressure decreases were caused by the passage of synoptic storms over the southern Amundsen Sea. This led to an increase of the pressure gradient over Marie Byrd Land and the Ross Ice Shelf, which primarily supported the horizontal propagation of katabatic winds from

West Antarctica for great distances across the Ross Ice Shelf. Three detailed case studies are presented to illustrate the typical characteristics of these events. (Auth.)

49-2786

Sensible and latent heat flux estimates in Antarctica.

Stearns, C.R., Weidner, G.A., *American Geophysical Union. Antarctic Research Series,* 1993, Vol.61, Antarctic meteorology and climatology: studies based on automatic weather stations. Edited by D.H. Bromwich and C.R. Stearns, p.109-138, 16 refs.

DLC QC994.9.A58 1993

Weather stations, Measuring instruments, Air temperature, Heat flux, Electronic equipment, Antarctica—Ross Ice Shelf

During the 1983-1984 field season in Antarctica, three units were installed that measured vertical air temperature difference between the nominal heights of 0.5 m and 3.0 m and relative humidity at a nominal height of 3 m. The measurements of the vertical air temperature difference and the relative humidity are the minimum required to estimate the sensible and latent heat fluxes to the air and also do not exceed the available energy requirements for the weather stations. The monthly mean values of the sensible heat fluxes on the Ross Ice Shelf are negatively large near the Transantarctic Mountains during the winter months and less negative to the east of the Transantarctic Mountains. During the summer months the monthly mean sensible heat fluxes are positive on the Ross Ice Shelf. At one site on the blue ice at the base of the Reeves Glacier, the estimated annual sublimation of ice equivalent was 0.23 m, and the estimate of the actual ablation of the ice was 0.26 m. The estimates of the net annual sublimation and deposition on the Ross Ice Shelf amount to 20-80% of the annual accumulation. The authors conclude that the assumption that annual sublimation and deposition are zero is not valid under antarctic conditions. (Auth. mod.)

49-2787

Kernlose winter in Adélie Coast.

Wendler, G., Kodama, Y., *American Geophysical Union. Antarctic Research Series,* 1993, Vol.61, Antarctic meteorology and climatology: studies based on automatic weather stations. Edited by D.H. Bromwich and C.R. Stearns, p.139-147, 33 refs.

DLC QC994.9.A58 1993

Air temperature, Measuring instruments, Weather stations, Heat flux, Antarctica—Adélie Coast

Five automatic weather stations (AWS) provided for the first time year-round data in a region in Antarctica stretching from near the ocean to the high plateau at 3280 m altitude. All of these stations displayed the typical pattern of a kernlose winter, which means there is no systematic temperature change for the six winter months. Some of the more interesting results for the six winter months are as follows: (1) no relationship between temperature and wind speed could be established for any slope stations. Only for the station on Dome Charlie (Dome C), located on a flat ice dome, did increasing wind speeds bring milder temperatures. (2) The wind direction showed a stronger downslope component during cold spells for all slope stations. (3) The atmospheric pressure difference between stations was larger during cold spells than during warm spells. (4) The absolute temperature variation in winter increased when going inland. (5) The interdiurnal pressure variation, which can be taken as an index of cyclonic activity, was not related to temperature. (6) During cold spells, low atmospheric pressure was observed, while for warm spells the atmospheric pressure was above normal. While the first four points can be easily understood, the latter two are surprising and more difficult to explain. Some explanations are offered. (Auth.)

49-2788

Antarctic climate anomalies surrounding the minimum in the southern oscillation index.

Smith, S.R., Stearns, C.R., *American Geophysical Union. Antarctic Research Series,* 1993, Vol.61, Antarctic meteorology and climatology: studies based on automatic weather stations. Edited by D.H. Bromwich and C.R. Stearns, p.149-174, 25 refs.

DLC QC994.9.A58 1993

Climatic changes, Air temperature, Atmospheric pressure

Composites of antarctic monthly surface pressure and temperature anomalies and the Southern Oscillation Index (SOI) were used to analyze the relationships between the climate of Antarctica and the El Niño/Southern Oscillation (ENSO). Annual composites created for the year before and the year after the minimum in the SOI used data surrounding six SOI minima occurring between 1957 and 1984. Comparisons were made between these ENSO warm phase composites and similar annual composites for non-warm phase years. Also compared are the six individual ENSO warm phases and the warm phase annual composites to determine the reliability of the composites. Three-month composites for the 24 months surrounding the SOI minimum look at the evolution of antarctic anomalies in a warm phase. A distinct change in the sign of the annual pressure and temperature anomalies was noted between the year before and the year after the minimum in the SOI. (Auth. mod.)

49-2789

Variation in aerosol concentration associated with a polar climate iteration.

Hogan, A.W., Riley, D., Murphey, B.B., Barnard, S.C., Samson, J.A., MP 3583, *American Geophysical Union. Antarctic Research Series,* 1993, Vol.61, Antarctic meteorology and climatology: studies based on automatic weather stations. Edited by D.H. Bromwich and C.R. Stearns, p.175-199, 119 refs.

DLC QC994.9.A58 1993

Aerosols, Climate, Air temperature, Atmospheric disturbances, Antarctica—Ross Ice Shelf

This paper presents analyses which follow warm, aerosol-laden cyclonic systems across the Ross Ice Shelf, using automatic weather station data. Subsequent discussion indicates that marine aerosol deposits in the interior antarctic ice may reflect a recent climatic iteration of surface temperature and aerosol concentration. The antarctic continental (cA) air mass is rarely displaced from the south polar plateau, but it is frequently modified by exchange with antarctic maritime (mA) air advected from the ice shelves or frozen seas or with polar maritime (mP) air advected from the southern oceans. Because the cA air mass resides over an uninhabited and relatively static ice-covered surface, the concentration of aerosol particles in this unique air mass may reflect aerosol variation in the global atmosphere. Although a large seasonal variation in aerosol concentration is present, little year-to-year variation in mean seasonal aerosol concentration occurred prior to 1982. A consistent diminution of mean annual aerosol concentration occurred during the 1980s, and a concurrent reduction in sodium concentration in snow and firn was also found. (Auth. mod.)

49-2790

Continuous nanoclimate data (1985-1988) from the Ross desert (McMurdo Dry Valleys) cryptoendolithic microbial ecosystem.

McKay, C.P., Nienow, J.A., Meyer, M.A., Friedmann, E.I., *American Geophysical Union. Antarctic Research Series,* 1993, Vol.61, Antarctic meteorology and climatology: studies based on automatic weather stations. Edited by D.H. Bromwich and C.R. Stearns, p.201-207, 29 refs.

DLC QC994.9.A58 1993

Algae, Fungi, Lichens, Microbiology, Microclimatology, Air temperature, Antarctica—McMurdo Dry Valleys, Antarctica—Linnaeus Terrace, Antarctica—Battleship Promontory

The authors collected year-round nanoclimate data for the cryptoendolithic microbial habitat in sandstones of the Ross desert obtained with an Argos satellite data system. Data for two sites in the McMurdo Dry Valleys are available: Linnaeus Terrace (Jan. 1985 to June 1988), and Battleship Promontory (1986-1987). The focus of this research is ecological; hence year-round environmental data have been obtained for the ambient environment as well as for conditions within the rock. Using data from the summer, the authors compare conditions inside the rock to the outside weather. This demonstrates how the rock provides a shelter for the endolithic microbial community. The most important property of the rock is that it absorbs summer sunlight, thereby warming to temperatures above freezing. This warming allows snowmelt to seep into the rock, and the moisture level in the rocks can remain high for weeks against loss to the dry environment. (Auth.)

49-2791

Role of the central trans-Siberian mainline in the development of the transportation system in Siberia and the Far East. [Rol' glavnoĭ transsibirskoĭ magistrali v razvitii transportnoĭ sistemy v Sibiri i na Dal'nem Vostoke]

Pereselenkov, G.S., *Transportnoe stroitel'stvo,* Mar. 1993, No.3, p.10-13, In Russian.

Railroads, Transportation, Cold weather operation, Russia—Siberia, Russia—Far East

49-2792

Development of cryogenic and karst processes on the Ust'-Kut—Kirensk—Nepa route. [Razvitie merzlotnykh i karstovykh protsessov na trasse Ust'-Kut—Kirensk—Nepa]

Shvarev, S.V., *Transportnoe stroitel'stvo,* Apr. 1993, No.4, p.7-10, In Russian. 4 refs.

Geocryology, Ice forecasting, Karst, Hydrogeology, Naleds, Russia—Irkutsk

49-2793

New Meret'-Central Siberia railroad line. [Novaia zheleznodorozhnaia liniia Meret'-Srednesibirskaia]

Birchenko, V.A., *Transportnoe stroitel'stvo,* Nov. 1993, No.11, p.22-26, In Russian.

Railroads, Cold weather operation, Russia—Siberia, Russia—Altay

49-2794

Engineering preparation for and construction of the Meret'-Central Siberian line. [Inzhenernaia podgotovka i khod stroitel'stva linii Meret'-Srednesibirskaia]

Spichkin, A.D., Perevozchikov, A.G., *Transportnoe stroitel'stvo,* Nov. 1993, No.11, p.27-29, In Russian.

Railroads, Construction, Cold weather construction, Cost analysis, Russia—Siberia, Russia—Altay

49-2795

Geotextile material of polycaproamide in road construction. [Geotekstil'nyĭ material iz polikaproamida v dorozhnom stroitel'stve]

Tabakov, N.V., et al, *Transportnoe stroitel'stvo,* Jan. 1994, No.1, p.33-35, In Russian. 9 refs.

Geotextiles, Construction, Roads, Cold weather construction, Construction materials, Russia—Siberia

49-2796

New reinforcing steels for structural use in the north. [Novye armaturnye stali dlia konstruktsiĭ severnogo ispolneniia]

Korotkov, L.I., *Transportnoe stroitel'stvo,* July 1994, No.7, p.21-24, In Russian. 3 refs.

Cold weather construction, Design criteria, Steels, Impact strength

49-2797

Ice sheet-bed rock interaction on the continental margins. [Vzaimodeĭstvie lednikovykh pokrovov s lozhem v predelakh materikovykh okrain]

Glazovskiĭ, A.F., Moscow, Mezhduvedomstvennyĭ geofizicheskiĭ komitet AN SSSR, 1989, 121p., In Russian with English summary and table of contents. Refs. p.110-121.

Ice sheets, Ice cover, Glacial erosion, Glacial deposits, Land ice, Bedrock, Air ice water interaction, Greenland, Antarctica

This book summarizes materials relating to the dynamics of marginal areas in present-day and older glaciations, especially in Antarctica, Greenland, and North America. The activities of ice sheets resulting in the morphology of continental margins are investigated. Glacier drainage patterns, their distribution, and special features in the structure of fjords and bottom troughs are examined. Current concepts are analyzed as to the mechanisms of glacial erosion and processes occurring on the bed within continental margins that are or have been occupied by glaciers. Examples of rates of glacial erosion beneath outlet glaciers are given. The total rate of transformation of continental margins by glaciers is estimated. (Auth. mod.)

49-2798

Winter factor. [Zimniĭ koeffitsient]

Sergutin, V.E., *Lesnoĭ zhurnal,* 1993, No.2-3, p.32-33, In Russian with English summary. 7 refs.

Freezeup, Hydrology, River ice, River flow, Channels (waterways)

49-2799

What is the present and future for Arctic research in Russia.

Dugan, J.P., *European science notes information bulletin,* July 1992, No.7, p.436-446, 1 ref.

Sea ice, Oceanography, Research projects, History, Russia

49-2800

ODP delves into Greenland.

Leg 152 Scientific Party, *Geotimes,* Nov. 1994, 39(11), p.19-21, 4 refs.

Oceanographic surveys, Offshore drilling, Marine geology, Pleistocene, Glaciation, Ice sheets, Tectonics, Drill core analysis, Seismic surveys, Greenland

49-2801

Procedures used for luminescence dating of sediments.

Mejdahl, V., Christiansen, H.H., *Quaternary science reviews,* 1994, 13(5-7), International Specialist Seminar on Thermoluminescence and Electron Spin Resonance Dating, 7th, Krems, Austria, July 5-9, 1993. Proceedings, p.403-406, 31 refs.

Geochronology, Luminescence, Laboratory techniques, Sediments, Quaternary deposits, Age determination, Accuracy

49-2802

Luminescence dating of loess from the Liujiapo section, central China.

Musson, F.M., Clarke, M.L., Wintle, A.G., *Quaternary science reviews,* 1994, 13(5-7), International Specialist Seminar on Thermoluminescence and Electron Spin Resonance Dating, 7th, Krems, Austria, July 5-9, 1993. Proceedings, p.407-410, 10 refs.

Paleoclimatology, Geochronology, Loess, Luminescence, Age determination, Sediment transport, Eolian soils, Quaternary deposits, China—Liujiapo

49-2803

Luminescence dating of the loess profile at Dolní Vestonice, Czech Republic.

Musson, F.M., Wintle, A.G., *Quaternary science reviews,* 1994, 13(5-7), International Specialist Seminar on Thermoluminescence and Electron Spin Resonance Dating, 7th, Krems, Austria, July 5-9, 1993. Proceedings, p.411-416, 17 refs.

Paleoclimatology, Quaternary deposits, Geochronology, Luminescence, Loess, Age determination, Czech Republic

49-2804

Methodological aspects of thermoluminescence dating of late glacial and Holocene dune sands from Brandenburg, Germany.

Baray, M.M., Zöller, L., *Quaternary science reviews,* 1994, 13(5-7), International Specialist Seminar on Thermoluminescence and Electron Spin Resonance Dating, 7th, Krems, Austria, July 5-9, 1993. Proceedings, p.477-480, 17 refs.

Geochronology, Quaternary deposits, Glacial deposits, Sands, Profiles, Luminescence, Age determination, Germany

49-2805

Environmental controls on the TL age of modern (zero-age) proglacial outwash sediments.

Gemmell, A.M.D., *Quaternary science reviews,* 1994, 13(5-7), International Specialist Seminar on Thermoluminescence and Electron Spin Resonance Dating, 7th, Krems, Austria, July 5-9, 1993. Proceedings, p.485-489, 7 refs.

Glacier melting, Meltwater, Suspended sediments, Luminescence, Periodic variations, Accuracy, Geochemistry, Outwash

49-2806

Thermoluminescence dating of nival sediments from Zackenberg, northeast Greenland.

Christiansen, H.H., *Quaternary science reviews,* 1994, 13(5-7), International Specialist Seminar on Thermoluminescence and Electron Spin Resonance Dating, 7th, Krems, Austria, July 5-9, 1993. Proceedings, p.491-496, 7 refs.

Arctic landscapes, Stratigraphy, Quaternary deposits, Snowmelt, Sedimentation, Organic soils, Luminescence, Age determination, Greenland

49-2807

Thermoluminescence dating of an arctic lake core from Alaska.

Berger, G.W., Anderson, P.M., *Quaternary science reviews,* 1994, 13(5-7), International Specialist Seminar on Thermoluminescence and Electron Spin Resonance Dating, 7th, Krems, Austria, July 5-9, 1993. Proceedings, p.497-501, 17 refs.

Geochronology, Luminescence, Bottom sediment, Lacustrine deposits, Sampling, Radioactive age determination, Accuracy, United States—Alaska—Squirrel Lake

49-2808

Limitations of infra-red stimulated luminescence in dating high arctic marine sediments.

Forman, S.L., Lepper, K., Pierson, J., *Quaternary science reviews,* 1994, 13(5-7), International Specialist Seminar on Thermoluminescence and Electron Spin Resonance Dating, 7th, Krems, Austria, July 5-9, 1993. Proceedings, p.545-550, 20 refs.

Geochronology, Marine deposits, Glacial deposits, Luminescence, Infrared radiation, Quaternary deposits, Age determination, Light effects, Accuracy, Norway—Svalbard

49-2809

Two snow disasters in southern Austria between January 31 and February 10, 1986. [Die beiden Schneekatastrophen in Südösterreich zwischen 31. Januar und 10. Februar 1986]

Mohnl, H., Sobitschka, W., *Wetter und Leben,* 1988, Vol.40, p.172-179, In German with English summary. 9 refs.

Snowstorms, Atmospheric disturbances, Accidents, Austria

49-2810

Fresh snow in the area of Vienna. [Neuschnee im Raum Wien]

Mohnl, H., *Wetter und Leben,* 1989, Vol.41, p.269-277, In German with English summary. 4 refs.

Snowfall, Urban planning, Weather forecasting, Statistical analysis, Austria—Vienna

49-2811

Possible consequences of an increased greenhouse effect on snow conditions in Austria. [Mögliche Auswirkungen eines verstärkten Treibhauseffekts auf die Schneeverhältnisse in Österreich]

Koch, E., Rudel, E., *Wetter und Leben,* 1990, 43(3/4), p.137-153, In German with English summary. 29 refs.

Snow cover distribution, Snowfall, Climatic factors, Global warming, Greenhouse effect, Austria—Vienna

49-2812

Fluctuations of snow parameters in the mountainous region of Austria within the last 90 years.

Mohnl, H., *Hydrographischer Dienst in Österreich. Mitteilungsblatt,* 1991, No.65/66, p.264-268, 2 refs. Includes an extended abstract of the poster paper presented at IAHS Symposium H5 held during the 20th General Assembly of IUGG in Vienna, Aug. 11-24, 1991.

Snowfall, Snow cover distribution, Meteorological data, Austria

49-2813

Geomorphological factors in the glacier and volcano disaster at Nevado Del Ruiz, Colombia. [Geomorphologische Aspekte der Gletschervulkankatastrophe am Nevado del Ruiz/Kolumbien]

Jordan, E., Mojica, J., Deutscher Geographentag München, 46th, Oct. 12-16, 1987. Tagungsbericht und wissenschaftliche Abhandlungen, Stuttgart, Franz Steiner Verlag Wiesbaden GMBH, 1988, p.426-430, In German. 13 refs.

Volcanoes, Mountain glaciers, Mudflows, Floods, Accidents, Colombia

49-2814

New analysis of snow data from Austria. [Neue Analysen von Schneedaten aus Österreich]

Lauscher, F., Vienna, Austria, Jan. 1993, 11p., In German. Unpublished manuscript.

Snowfall, Snow cover distribution, Meteorological data, Austria

49-2815

Regional variation in winter snows of the eastern Alps. [Von der regionalen Verschiedenheit der Schneewinter in den Ostalpen]

Lauscher, F., Vienna, Austria, July 1993, 3p., In German. Unpublished manuscript.

Snowfall, Snow cover distribution, Meteorological data, Austria

49-2816

Recent glaciation of the Colombian Andes.

Jordan, E., et al, *Zentralblatt für Geologie und Paläontologie, Teil I,* Nov. 1989, No.5/6, p.1113-1117, With German and Spanish summaries. 3 refs.

Alpine glaciation, Mountain glaciers, Glacier surveys, Colombia

49-2817

Assessment of snowfall proportion in monthly precipitation in Switzerland.

Sevruk, B., International Conference for Alpine Meteorology, 18th, Opatija, Yugoslavia, Sep. 25-29, 1984, [1984], 4p., 9 refs.

Snowfall, Precipitation (meteorology), Weather forecasting, Switzerland

49-2818

Münster—when the torrent came. [Münster—als der Bach kam]

Neininger, B., Haeberli, W., Zürich, Switzerland, Eidgenössische Technische Hochschule (ETH Zürich), 1992, p.55-77, In German. Excerpt only. 4 refs.

Mountain glaciers, Glacier melting, Lake bursts, Floods, Mudflows, Accidents, Switzerland

49-2819

Glacial and periglacial features of the Australian Alps.

Galloway, R.W., Scientific significance of the Australian Alps. Edited by R. Good, Canberra, Australian Alps National Parks Liaison Committee, [1988], p.55-67, 32 refs. Proceedings of the first Fenner Conference on the Environment, Canberra, Sep. 1988.

Alpine glaciation, Periglacial processes, Snow line, Paleoclimatology, Pleistocene, Australia

49-2820

Atlas of snow climatology for the northeastern United States and adjacent Canada, 1955-1992.

Cember, R.P., Wilks, D.S., Conference on Applied Climatology, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.71-76, 3 refs.

Snow surveys, Snowfall, Snow cover distribution, Meteorological charts, United States, Canada

49-2821

Climatic change on Sonnblick—a multi-elemental approach to describe climatic change using a centennial data set.

Auer, I., Boehm, R., Mohnl, H., Conference on Applied Climatology, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.249-252, 10 refs.

Weather stations, Meteorological data, Snowfall, Climatic changes, Austria

49-2822

Remote sensing of water resources: accomplishments, challenges, and relevance to global monitoring.

Rango, A., International Symposium on Remote Sensing of Water Resources. Proceedings, Solihull, England (formerly, Arnhem, Netherlands), International Association of Hydrogeologists (IAH), [1992], 14p., 54 refs.

Water reserves, Snow surveys, Snow cover distribution, Snowmelt, Runoff forecasting, Global change, Spaceborne photography

49-2823

Long-term variability of snow cover in the United States and an evaluation of recent hemispheric changes.

Robinson, D.A., Symposium on Global Change Systems, Anaheim, CA, Feb. 5-9, 1990, Boston, American Meteorological Society, 1990, p.100-103, 23 refs.

Snow surveys, Snow cover distribution, Meteorological data, Global change, United States

49-2824

Representativeness of snow courses assessed from satellite monitoring of the snow cover.

Martinec, J., Rango, A., Van Katwijk, V., International Symposium on Remote Sensing of Water Resources. Proceedings, Solihull, England (formerly, Arnhem, Netherlands), International Association of Hydrogeologists (IAH), [1992], 9p., 10 refs.

Snow surveys, Snow cover distribution, Snow courses, Snow water equivalent, Spaceborne photography

49-2825

Investigation of in-situ tests for shear strength of snow.

Schaerer, P., 1991, 24p. + figs., Unpublished manuscript. 16 refs.

Snow cover stability, Snow strength, Avalanche forecasting

49-2826

Precambrian permafrost horizons as indicators of palaeoclimate.

Williams, G.E., *Precambrian research*, 1986, Vol.32, p.233-242, 31 refs.

Permafrost indicators, Periglacial processes, Paleoclimatology

49-2827

Permafrost response to climatic change.

Koster, E.A., Nieuwenhuijzen, M.E., *Catena supplement*, 1992, No.22, p.37-58, 49 refs.

Permafrost distribution, Permafrost heat transfer, Permafrost forecasting, Ground thawing, Snow cover effect, Soil air interface, Climatic factors, Paleoclimatology, Global warming

49-2828

What's new in fencing for snow, wind and sand.

Tabler, R.D., Annual conference, ARB & BA, 97th, Chicago, Sep. 21-23, 1992, Homewood, IL, American Railway Bridge and Building Association, 1993, p.188-195, 6 refs.

Snow fences, Railroads, Road maintenance

49-2829

Characteristics of arctic synoptic activity, 1952-1989.

Serreze, M.C., Box, J.E., Barry, R.G., Walsh, J.E., *Meteorology and atmospheric physics*, 1993, Vol.51, p.147-164, 66 refs.

Polar atmospheres, Atmospheric circulation, Atmospheric disturbances, Atmospheric pressure, Synoptic meteorology, Weather forecasting

49-2830

Regional model for studies of atmosphere-ice-ocean interaction in the western Arctic.

Walsh, J.E., Lynch, A.H., Chapman, W., Musgrave, D., *Meteorology and atmospheric physics*, 1993, Vol.51, p.179-194, 14 refs.

Air ice water interaction, Ice models, Ice cover effect, Polar atmospheres, Atmospheric circulation, Ocean currents, Surface temperature

49-2831

Impact of clouds on the surface radiation balance of the Arctic Ocean.

Curry, J.A., Schramm, J.L., Ebert, E.E., *Meteorology and atmospheric physics*, 1993, Vol.51, p.197-217, 52 refs.

Air ice water interaction, Ice heat flux, Ice cover effect, Polar atmospheres, Cloud cover, Radiation balance, Arctic Ocean

49-2832

Satellite-derived outgoing longwave radiation, surface temperature and sea ice concentration off the coast of Adélie-Land, Eastern Antarctica.

Wendler, G., Meitner, R., *Meteorology and atmospheric physics*, 1993, Vol.51, p.219-226, 33 refs.

Air ice water interaction, Ice heat flux, Ice cover effect, Sea ice distribution, Ice conditions, Surface temperature, Radiation balance, Global warming, Radiometry, Spaceborne photography, Antarctica—Dumont d'Urville Station

Outgoing longwave radiation (OLR) as seen from satellite (NOAA series), and sea ice concentration at Dumont d'Urville Station were analyzed. For the time period 1974-1990, available radiative flux data showed a slight increase of 1.8 W/m^2 or 1% for the period. If this trend should continue (trends over a 16-year period in any geophysical data is a rather questionable concept in isolation) a 4°C warming would be observed from space for this polar region over a century. The observed increase is, however, in agreement with Dumont d'Urville, the only ground station within the study area, which displayed a similar temperature increase. It is also in agreement with the general temperature increase which has been observed for the high southern latitudes. In addition, models of climate change due to increased CO_2 and other trace gases predict for polar regions values of similar magnitude. (Auth. mod.)

49-2833

Climate sensitivity studies of the Greenland ice sheet using satellite AVHRR, SMMR, SSM/I and in situ data.

Steffen, K., Abdalati, W., Stroeve, J., *Meteorology and atmospheric physics*, 1993, Vol.51, p.239-258, 27 refs.

Ice sheets, Glacier surveys, Glacier thickness, Glacier oscillation, Snow ice interface, Snow air interface, Snow cover effect, Climatic factors, Global warming, Radiometry, Spaceborne photography, Greenland

49-2834

Entering the glaciation with a 2-D coupled climate model.

Berger, A., Fichefet, T., Gallée, H., Tricot, C., van Ypersele, J.P., *Quaternary science reviews*, 1992, 11(4), p.481-493, 91 refs.

Ice age theory, Pleistocene, Paleoclimatology, Climatic changes, Ice sheets, Ice volume, Snow cover effect, Insolation, Seasonal variations, Glacier oscillation, Models, Simulation

49-2835

Approaching 3-D modelling of the global climate system on paleo-climatic time scales.

Herterich, K., Lautenschlager, L., Maier-Reimer, E., *Quaternary science reviews*, 1992, 11(4), p.495-501, 30 refs.

Paleoclimatology, Air ice water interaction, Ice sheets, Glacier oscillation, Hydrologic cycle, Snow line, Climatic changes, Mathematical models, Ice age theory

49-2836

Equatorial glaciers in East Africa. Part 1: Kibo, Kilimanjaro.

Spink, P.C., *Journal of meteorology*, 1992, 17(169), p.154-160.

Mountain glaciers, Alpine landscapes, Glacier surveys, Volcanoes, Tanzania—Kilimanjaro, Mt.

49-2837

Equatorial glaciers in East Africa. Part 2: Mount Kenya.

Spink, P.C., *Journal of meteorology*, Feb. 1993, 18(176), p.53-57, 13 refs.

Mountain glaciers, Alpine landscapes, Glacier surveys, Glaciation, Kenya—Kenya, Mount

49-2838

Remote sensing of snow, permafrost and related features in the Schefferville digital transect.

Granberg, H.B., et al, Canadian Symposium on Remote Sensing, 16th and Congress of the Québec Association of Remote Sensing, 8th, Québec, AQT/CRSS, 1993, p.209-213, With French summary. 28 refs.

Remote sensing, Snow surveys, Permafrost surveys, Sensor mapping, Research projects, Canada—Quebec—Schefferville

49-2839

Estimating the reflectance and albedo of glaciers in the Kluane Range, Yukon Territory, with Landsat TM and digital terrain data.

Crevier, Y., Duguay, C.R., Canadian Symposium on Remote Sensing, 16th and Congress of the Québec Association of Remote Sensing, 8th, Québec, AQT/CRSS, 1993, p.239-244, With French summary. 8 refs.

Remote sensing, Glacier surveys, LANDSAT, Glacier surfaces, Snow cover, Albedo, Reflectivity, Sensor mapping, Radiometry, Terrain, Canada—Yukon Territory—Kluane Range

49-2840

CRYSYS—a cryospheric system to monitor global change in Canada.

Fadaie, K., et al, Canadian Symposium on Remote Sensing, 16th and Congress of the Québec Association of Remote Sensing, 8th, Québec, AQT/CRSS, 1993, p.251-255, With French summary. 4 refs.

Research projects, Remote sensing, Global change, Geophysical surveys, Permafrost surveys, Glacier surveys, Correlation, Data processing

49-2841

Simple polynya model for the North Water, northern Baffin Bay.

Huang, F.T., Canada. McGill University. Centre for Climate and Global Change Research. Report 90-8, Quebec, McGill University, July 1990, 87p., MS thesis. With French summary. 26 refs.

Oceanography, Sea ice distribution, Ice edge, Polynyas, Ice water interface, Air ice water interaction, Heat flux, Wind factors, Upwelling, Air temperature, Mathematical models, Baffin Bay

49-2842

Simulation of the seasonal arctic sea-ice cover with a dynamic thermodynamic sea-ice model.

Manak, D.K., Mysak, L.A., Canada. McGill University. Centre for Climate and Global Change Research. Report 90-10, Quebec, McGill University, July 1990, 72p., 22 refs.

Oceanography, Ice models, Sea ice distribution, Ice cover thickness, Drift, Climatic factors, Seasonal variations, Air ice water interaction, Thermodynamics, Simulation, Mathematical models

49-2843

Deposition of motor vehicle emissions and winter maintenance along roadside assessed by snow analyses.

Hautala, E.L., Rekilä, R., Tarhanen, J., Ruuskanen, J., *Environmental pollution*, 1995, 87(1), p.45-49, 13 refs.

Air pollution, Aerosols, Roads, Winter maintenance, Hydrocarbons, Salting, Snow impurities, Snow cover, Sampling, Environmental tests

49-2844

Composition of rime ice as an indicator of the quality of winter deposition.

Ferrier, R.C., Jenkins, A., Elston, D.A., *Environmental pollution*, 1995, 87(3), p.259-266, 21 refs.

Air pollution, Air masses, Cloud droplets, Hoarfrost, Snow composition, Impurities, Correlation, Sampling, Environmental tests, Wind direction, Chemical properties, United Kingdom—Scotland

49-2845

Effect of ion migration on recombination of subexcitation electrons in solid water.

Dayashankar, Prasad, M.A., *Radiation physics and chemistry*, Jan. 1995, 45(1), Trilateral Meeting on Radiation Chemistry and Physics of Solids, 3rd, Lodz, Poland, Sep 7-11, 1992, p.147-149, 11 refs.

Ice physics, Water films, Photochemical reactions, Molecular structure, Molecular energy levels, Ion diffusion, Charge transfer, Radiation absorption, Simulation

49-2846

Indices of refraction for the HITRAN compilation.

Massie, S.T., *Journal of quantitative spectroscopy & radiative transfer*, Sep.-Oct. 1994, 52(3-4), p.501-513, 43 refs.

Atmospheric composition, Optical properties, Spectroscopy, Aerosols, Volcanic ash, Spectra, Refractivity, Indexes (ratios), Ice optics

49-2847

Rare-earth element geochemistry of Colour Lake, an acidic freshwater lake on Axel Heiberg Island, Northwest Territories, Canada.

Johannesson, K.H., Lyons, W.B., *Chemical geology*, Jan. 5, 1995, 199(1-4), p.209-223, 45 refs.

Hydrogeochemistry, Hydrogeology, Limnology, Lake water, Sampling, Subglacial observations, Profiles, Ion density (concentration), Chemical composition, Mineralogy, Weathering, Canada—Northwest Territories—Axel Heiberg Island

49-2848

Review of the physical oceanography of the Labrador Sea.

Reynaud, T., Canada. McGill University. Centre for Climate and Global Change Research. Report 90-12, Quebec, McGill University, Aug. 1990, 24p., 36 refs.

Oceanography, Ocean currents, Air ice water interaction, Wind factors, Hydrography, Topographic effects, Mathematical models, Labrador Sea

49-2849

Numerical simulation of the Arctic Sea ice and ocean circulation.

Holland, D.M., Canada. McGill University. Centre for Climate and Global Change Research. Report 93-4, Quebec, McGill University, Apr. 1993, 203p., Ph.D. thesis. With French summary. Refs. p.198-203.

Oceanography, Sea ice distribution, Ocean currents, Ice water interface, Ice models, Ice cover thickness, Snow cover effect, Simulation, Thermodynamics, Mathematical models, Arctic Ocean

49-2850

Application of a simple ice-ocean model to the Labrador Sea.

Peng, S.L., Canada. McGill University. Centre for Climate and Global Change Research. Report 89-10, Quebec, McGill University, Apr. 1993, 83p., MS thesis. With French summary. 30 refs.

Oceanography, Sea ice distribution, Ice edge, Air ice water interaction, Ice water interface, Ocean currents, Ice cover thickness, Air temperature, Simulation, Thermodynamics, Mathematical models, Labrador Sea

49-2851

Atlas of April and July arctic ice edge limits, 1901-1956.

Manak, D.K., Mysak, L.A., Canada. McGill University. Centre for Climate and Global Change Research. Report 88-12, Quebec, McGill University, Nov. 1988, 106p., 8 refs.

Sea ice distribution, Climatology, Ice edge, Periodic variations, Maps, Meteorological data, Arctic Ocean

49-2852

Critical analysis of five years of SNOTEL performance in the Rocky Mountains.

Schaefer, G.L., Shafer, B.A., International Symposium on Hydrometeorology, Denver, CO, June 13-17, 1982. Proceedings. Edited by A.I. Johnson et al and American Water Resources Association. Technical publication series. No.82-1, Bethesda, American Water Resources Association, 1983, p.31-37, 6 refs.

DLC GB2801.2.I57

Water supply, Snow surveys, Snow hydrology, Snow water equivalent, Telemetering equipment, Sensors, Precipitation gages, Performance, United States—Rocky Mountains

49-2853

Hydrometeorological significance of rime ice deposits on trees in the Colorado Rockies.

Hindman, E.E., Borys, R.D., DeMott, P.J., International Symposium on Hydrometeorology, Denver, CO, June 13-17, 1982. Proceedings. Edited by A.I. Johnson et al and American Water Resources Association. Technical publication series. No.82-1, Bethesda, American Water Resources Association, 1983, p.95-99, 8 refs.

Precipitation (meteorology), Cloud physics, Snow hydrology, Snow water content, Icing rate, Hoarfrost, Ice accretion, Trees (plants), Snow composition, United States—Colorado

49-2854

Forecasting snowmelt runoff.

Tabios, G.Q., III, Salas, J.D., International Symposium on Hydrometeorology, Denver, CO, June 13-17, 1982. Proceedings. Edited by A.I. Johnson et al and American Water Resources Association. Technical publication series. No.82-1, Bethesda, American Water Resources Association, 1983, p.213-217, 12 refs.

Snow hydrology, Snowmelt, Runoff forecasting, Mathematical models, Statistical analysis, Accuracy

49-2855

On the use of weather types for medium range runoff forecasting.

van de Griend, A.A., International Symposium on Hydrometeorology, Denver, CO, June 13-17, 1982. Proceedings. Edited by A.I. Johnson et al and American Water Resources Association. Technical publication series. No.82-1, Bethesda, American Water Resources Association, 1983, p.241-256, 20 refs.

Climatology, Atmospheric circulation, Classifications, Alpine landscapes, Glacier melting, Snowmelt, Weather forecasting, Runoff forecasting, Statistical analysis, Italy—Zillertal Alps

49-2856

On the evaluation of operational cloud seeding projects.

Hsu, C.F., Changnon, S.A., Jr., International Symposium on Hydrometeorology, Denver, CO, June 13-17, 1982. Proceedings. Edited by A.I. Johnson et al and American Water Resources Association. Technical publication series. No.82-1, Bethesda, American Water Resources Association, 1983, p.383-387, 20 refs.

Weather modification, Precipitation (meteorology), Cloud seeding, Cloud physics, Statistical analysis, Performance, Simulation

49-2857

Results of the shakedown season for the first precipitation augmentation experiment of the Sierra Cooperative Pilot Project.

Vardiman, L., International Symposium on Hydrometeorology, Denver, CO, June 13-17, 1982. Proceedings. Edited by A.I. Johnson et al and American Water Resources Association. Technical publication series. No.82-1, Bethesda, American Water Resources Association, 1983, p.419-422, 5 refs.

Weather modification, Cloud seeding, Cloud physics, Sampling, Ice crystals, Distribution

49-2858

Counter-seeding and how to avoid it.

Todd, C.J., Howell, W.E., International Symposium on Hydrometeorology, Denver, CO, June 13-17, 1982. Proceedings. Edited by A.I. Johnson et al and American Water Resources Association. Technical publication series. No.82-1, Bethesda, American Water Resources Association, 1983, p.423-425, 5 refs.

Weather modification, Cloud seeding, Cloud physics, Supercooled clouds, Precipitation (meteorology), Snow crystal growth

49-2859

Frequency estimates of water available for runoff due to precipitation and/or snowmelt.

Richards, F., Miller, J., Zurndorfer, E., Foat, N., International Symposium on Hydrometeorology, Denver, CO, June 13-17, 1982. Proceedings. Edited by A.I. Johnson et al and American Water Resources Association. Technical publication series. No.82-1, Bethesda, American Water Resources Association, 1983, p.535-540, 8 refs.

Snow hydrology, Precipitation (meteorology), Snowmelt, Snow water equivalent, Runoff forecasting, Simulation

49-2860

Multiple equilibrium states in combined thermal and saline circulation.

Huang, R.X., Luyten, J.R., Stommel, H.M., *Journal of physical oceanography,* Mar. 1992, 22(3), p.231-246, 20 refs.

Mathematical models, Ocean currents, Salinity, Heat balance, Heat flux

49-2861

Proceedings.

Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], 550p., Refs. passim. For selected papers see 49-2862 through 49-2887.

DLC QC929.A8J37 1991

Avalanches, Avalanche forecasting, Avalanche mechanics, Avalanche modeling, Snow cover stability, Mudflows, Landslides

49-2862

Activities of the Japan-U.S. scientific exchange program—a Japanese perspective.

Tominaga, M., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.1-9, 13 refs.

Avalanches, Mudflows, Avalanche forecasting, Organizations, Research projects, International cooperation

49-2863

Benefits and products of Japan-U.S. exchange—a U.S. perspective.

Swanson, F.J., Abromeit, D., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.11-16, 17 refs.

Avalanches, Landslides, Mudflows, Research projects, International cooperation

49-2864

Activities of the Japan/US joint program under the snow and snow avalanche management.

Nakamura, T., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.17-26, 11 refs.

Avalanches, Avalanche forecasting, Snow cover stability, Computer programs, Organizations, Research projects, International cooperation

49-2865

Snow and snow avalanche group recommendations.

Nakamura, T., Yamada, Y., Abromeit, D., Brown, R.L., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.27-30, 2 refs.

Avalanches, Snow cover stability, Blowing snow, Research projects, International cooperation

49-2866

Studies related to clarification of drifting snow and development of disaster prevention technology.

Higashiura, M., et al, Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.39-46, 11 refs.

Snowdrifts, Blowing snow, Snow erosion, Weather forecasting

49-2867
Three dimensional numerical simulation of snowdrift.
Nakata, T., Uematsu, T., Kaneda, Y., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.47-56, 7 refs.
Snowdrifts, Blowing snow, Snow erosion, Environment simulation

49-2868
Observation of blowing snow by a snow particle counter with a real time processor.
Ishimoto, K., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.57-65, 5 refs.
Blowing snow, Snow erosion, Snow optics, Visibility, Particle size distribution

49-2869
Measurement of snow mass flux with snow particle counter.
Sato, A., Kimura, T., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.67-74, 9 refs.
Blowing snow, Snow erosion, Snow optics, Particle size distribution

49-2870
Thermal model for snow on three dimensional terrain.
Adams, E.E., McDowell, S.A., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.75-84, 12 refs.
Snow thermal properties, Snow heat flux, Metamorphism (snow), Snow cover stability, Avalanche forecasting, Computerized simulation, Terrain

49-2871
Variation of stability index in new snow on slopes.
Endo, Y., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.85-94, 9 refs.
Avalanche forecasting, Snow cover stability, Snow strength, Snow density, Mathematical models

49-2872
Method for evaluating snow avalanche occurrence on basis of fuzzy theory.
Terada, H., Nakamura, Y., Chiba, A., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.95-104, 7 refs.
Avalanche forecasting, Snow cover stability, Computerized simulation, Mathematical models

49-2873
Snow avalanche release due to instability of snow glide motion.
Yamada, Y., Nohguchi, Y., Ikarashi, T., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.105-114, 10 refs.
Snow cover stability, Snow slides, Avalanche triggering, Avalanche forecasting

49-2874
Avalanche forecasting in the United States.
Tremper, B., Bowles, D., Case, T., Howlett, D., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.115-124, 9 refs.
Avalanche forecasting, Snow cover stability, Safety, United States

49-2875
Characteristics of road surface temperatures in a snowy region, Japan.
Shimizu, M., Nakawo, M., Takahashi, S., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.125-132, 9 refs.
Road icing, Ice forecasting, Frost forecasting, Road maintenance, Warning systems, Surface temperature, Temperature measurement, Japan

49-2876
Administrative system and undertaking against snow avalanches in Japan.
Nakamura, Y., Terada, H., Watanabe, M., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.133-140, 7 refs.
Avalanche forecasting, Snow hedges, Road maintenance, Regional planning, Legislation, Safety, Warning systems, Japan

49-2877
Snow avalanche hazard mitigation by military artillery and hand delivered explosives.
Abromeit, D., Fitzgerald, L., Decker, R., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.141-149, 9 refs.
Avalanche triggering, Blasting, Explosives, Military equipment, Cost analysis, United States

49-2878
Snow block impact pressures against a wall, a post and disks.
Abe, O., Nakamura, H., Sato, A., Numano, N., Nakamura, T., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.151-159, 6 refs.
Avalanche mechanics, Avalanche modeling, Snow loads, Snow strength, Impact tests

49-2879
Experimental studies of pneumatic dispatch systems of snow.
Kobayashi, T., Kumagai, M., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.161-170, 6 refs.
Snow removal, Road maintenance, Air flow, Ducts

49-2880
Experimental study of structures for deflecting avalanche.
Fujisawa, K., Kobayashi, J., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.171-180, 2 refs.
Avalanche engineering, Avalanche mechanics, Avalanche modeling, Snow loads

49-2881
Experimental study on velocity retarding effect of vertical pile type dissipator.
Terada, H., Nakamura, Y., Fujisawa, K., Shimomura, C., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.181-190, 3 refs.
Avalanche engineering, Avalanche mechanics, Avalanche modeling, Snow loads, Piles, Impact tests

49-2882
Chute flow experiments of ice spheres.
Nishimura, K., Maeno, N., Nakagawa, M., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.191-196, 5 refs.
Avalanche mechanics, Avalanche modeling, Snow mechanics, Ice friction, Viscous flow, Shear flow

49-2883
Study on slush flow disaster.
Kobayashi, S., Izumi, K., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.197-205, 7 refs.
Avalanche mechanics, Avalanche modeling, Avalanches, Mudflows, Slush, Viscous flow, Accidents, Japan

49-2884
Numerical simulation of motions of avalanches by "ball model".
Nakanishi, H., Shimomura, T., Fujisawa, K., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.207-216, 5 refs.
Avalanche modeling, Avalanche mechanics, Avalanche tracks, Avalanches, Mathematical models, Japan

49-2885
Granular flow of finite mass on a boundary moving along circular arc shaped bed.
Nohguchi, Y., Yamada, Y., Nakamura, T., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.217-228, 4 refs.
Avalanche modeling, Avalanche mechanics, Mathematical models

49-2886
Simulations of rapid bimodal granular flows.
Nakagawa, M., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.229-237, 2 refs.
Avalanche modeling, Avalanche mechanics, Shear flow, Mathematical models

49-2887
Observation of the landslide movement in a heavy snow district.
Matsuura, S., Ochiai, H., Takeuchi, Y., Yanase, H., Japan-U.S. Workshop on Snow Avalanche, Landslide, Debris Flow Prediction and Control, Tsukuba, Japan, Sep. 30-Oct. 2, 1991. Proceedings, Tsukuba, Japan, Science and Technology Agency, National Research Institute for Earth Science and Disaster Prevention, [1992], p.353-360.
Landslides, Slope stability, Snow cover effect, Snowmelt, Seepage, Japan

49-2888
Variable narrow bandpass optically stimulated luminescence system for Quaternary geochronology.
Pierson, J., Forman, S.L., Lepper, K., Conley, G., *Radiation measurements,* Apr.-July 1994, 23(2-3), International Specialist Seminar on Thermoluminescence and Electron Spin Resonance Dating, 7th, Krems, Austria, July 5-9, 1993, p.533-535, 8 refs.
Geochronology, Quaternary deposits, Luminescence, Illuminating, Optical filters, Laboratory techniques, Accuracy

49-2889
Zeroing of the OSL signal in quartz from young glaciofluvial sediments.
Rhodes, E.J., Pownall, L., *Radiation measurements,* Apr.-July 1994, 23(2-3), International Specialist Seminar on Thermoluminescence and Electron Spin Resonance Dating, 7th, Krems, Austria, July 5-9, 1993, p.581-585, 14 refs.
Glacier melting, Glacial hydrology, Sediments, Meltwater, Glacial deposits, Age determination, Luminescence, Accuracy, India—Himalaya Mountains

49-2890
Parameterization of the downward long-wave radiation at the Earth's surface in polar regions.
König-Langlo, G., Augstein, E., *Meteorologische Zeitschrift,* Dec. 1994, 3(6), p.343-347, With German summary. 14 refs.
Polar atmospheres, Climatology, Cloud cover, Radiation balance, Heat balance, Surface temperature, Surface energy, Models, Radiometry, Antarctica—Ekström Ice Shelf, Norway—Svalbard
Various parameterization schemes for the downward long-wave radiation at the Earth's surface which have been frequently applied in sea ice and snow cover models are tested with the aid of one year's measurements at the German stations Koldewey and Neumayer in the Arctic and Antarctic, respectively. These concepts are based on the Stefan-Boltzmann radiation law with an empirically derived effective atmospheric emissivity. The data confirm the distinct dependency of the latter on cloudiness, but no other influences, e.g. due to falling ice crystals (diamond dust), were determined to be significant. The low level atmospheric water vapor pressure need not be considered explicitly in the formulae. A simple scheme for atmospheric emissivity which is comparable to the more complex models for polar regions is therefore proposed. (Auth. mod.)

49-2891
Effects of climate change on snow accumulation and melting in the Broye catchment (Switzerland).
Bultot, F., Gellens, D., Schädler, B., Spreafico, M., *Climatic change,* Dec. 1994, 28(4), p.339-363, 14 refs.
Snow hydrology, Snow accumulation, Snow cover distribution, Snow water equivalent, Snow melting, Climatic changes, River basins, Topographic effects, Simulation, Mathematical models, Switzerland

49-2892
Analytical method for white phosphorus in water.
Walsh, M.E., MP 3584, *Bulletin of environmental contamination and toxicology,* 1995, 54(1), p.432-439, 21 refs.
Environmental tests, Military research, Explosives, Water pollution, Water chemistry, Sampling, Laboratory techniques, Chemical analysis, Standards
The objective of this work was to develop an analytical method capable of meeting water quality criteria for the protection of aquatic organisms that uses standard analytical instrumentation. The development focused on a preconcentration step suitable for a volatile, air-sensitive chemical. A nonevaporative preconcentration step is used that takes advantage of the favorable partitioning of white phosphorus (P_4) between organic and aqueous phases and the relatively high solubility of diethyl ether in water. P_4 is extracted from water using diethyl ether (10:1 water:solvent ratio). The ether phase is collected, then reduced in volume by shaking with reagent-grade water. By using the appropriate volume of water, excess ether is dissolved away, resulting in a preconcentration factor of 1000 while heat is avoided and loss of P_4 by volatilization minimized. P_4 is then determined by capillary gas chromatography and a nitrogen-phosphorus detector.

49-2893
Ice core records as a key to understanding the history of atmospheric trace gases.
Raynaud, D., International Symposium on Environmental Biogeochemistry, 10th, San Francisco, CA, Aug. 19-24, 1991. Selected papers. Biogeochemistry of global change—radiatively active trace gases. Edited by R.S. Oremland, London, Chapman & Hall, 1993, p.29-45, 40 refs.
Polar atmospheres, Air pollution, Atmospheric composition, Ice sheets, Sampling, Ice cores, Geochemistry, Global change, Climatic changes, Carbon dioxide, Antarctica—Vostok Station
Analysis of gases trapped in ice now allows the possibility to document widely the anthropogenic influence back in time and to extend the trace gas (TG) record over time periods (Little Ice Age, glacial-interglacial cycle) encompassing climatic change with little or no human disturbance. This paper examines the mechanism through which ice traps air and which parameters could affect the atmospheric TG record frozen in the ice; reviews the existing ice records from CO_2, CH_4, and N_2O and their implications for environmental biogeochemistry and climatic impact from these records; and stresses the potential for other measurements to be performed on trace gases extracted from ice cores. (Auth. mod.)

49-2894
Ancient ice air content of the Vostok ice core.
Semiletov, I.P., International Symposium on Environmental Biogeochemistry, 10th, San Francisco, CA, Aug. 19-24, 1991. Selected papers. Biogeochemistry of global change—radiatively active trace gases. Edited by R.S. Oremland, London, Chapman & Hall, 1993, p.46-60, 39 refs.
Paleoclimatology, Precipitation (meteorology), Global change, Climatic changes, Ice sheets, Ice cores, Metamorphism (snow), Sampling, Atmospheric composition, Carbon dioxide, Antarctica—Vostok Station
A deep ice core drilled at Vostok Station provides a record of atmospheric climate and CO_2 that is representative of global changes over the last glacial-interglacial-penultimate glacial cycle (about 200 kyr). The final Vostok core in 1989 approached 2540 m. This paper discusses the initial CO_2 record obtained to 2340 m. A combination of static head-space extraction and stripping the remaining dissolved gas was followed by gas-chromatographic analysis. The obtained data show the "warm" maxima indicated by CO_2 ice core content at 2280 m. The link between the process of air capture and release during the snowflake formation, snow accumulation, metamorphism, and sintering was considered. It was shown that the carbon ionic species, which were trapped during snowflake formation, might be the cause for the discrepancy between the CO_2 measurements "wet" and "dry" techniques. The possible mechanism at the Younger Dryas signal is also considered. (Auth. mod.)

49-2895
Methane emissions from northern high-latitude wetlands.
Harriss, R., Bartlett, K., Frolking, S., Crill, P., International Symposium on Environmental Biogeochemistry, 10th, San Francisco, CA, Aug. 19-24, 1991. Selected papers. Biogeochemistry of global change—radiatively active trace gases. Edited by R.S. Oremland, London, Chapman & Hall, 1993, p.449-486, 49 refs.
Climatology, Global change, Atmospheric composition, Wetlands, Tundra, Natural gas, Soil air interface, Vapor transfer, Environmental impact, Soil temperature, Geochemistry, Greenhouse effect

49-2896
Studies of permafrost and gas-hydrates as possible sources of atmospheric methane at high latitudes.
Kvenvolden, K.A., Collett, T.S., Lorenson, T.D., International Symposium on Environmental Biogeochemistry, 10th, San Francisco, CA, Aug. 19-24, 1991. Selected papers. Biogeochemistry of global change—radiatively active trace gases. Edited by R.S. Oremland, London, Chapman & Hall, 1993, p.487-501, 24 refs.
Geochemistry, Atmospheric composition, Global change, Climatic changes, Natural gas, Hydrates, Permafrost transformation, Frozen ground chemistry, Ice sublimation, Decomposition, Soil air interface, Environmental impact

49-2897
Flora of the northern Logaty River basin (Central Taymyr). [Flora severnoĭ chasti basseĭna reki Logata (Tsentral'noĭ Taĭmyr)]
Pospelova, E.B., *Botanicheskiĭ zhurnal,* Jan. 1994, 79(1), p.14-24, In Russian with English summary. 9 refs.
Plants (botany), Tundra, Russia—Taymyr Peninsula, Russia—Logaty River

49-2898
Flora of the Yukagir Plateau (Western Chukotka). [O flore IUkagirskogo ploskogor'ia (Zapadnaia Chukotka)]
Petrovskiĭ, V.V., Plieva, T.V., *Botanicheskiĭ zhurnal,* Jan. 1994, 79(1), p.25-33, In Russian with English summary. 5 refs.
Plants (botany), Tundra, Russia—Chukotskiy Peninsula, Russia—Yukagir Plateau

49-2899
Three local flora of carbonate terrain in the northeastern Chukotskiy Peninsula. [Tri lokal'nye flory karbonatnykh landshaftov na severo-vostoke Chukotskogo poluostrova]
IUrtsev, B.A., Katenin, A.E., Rezvanova, G.S., *Botanicheskiĭ zhurnal,* Jan. 1994, 79(1), p.34-46, In Russian with English summary. 15 refs.
Plants (botany), Tundra, Terrain, Russia—Chukotskiy Peninsula

49-2900
Flora and vegetation of Spafar'ev Island, Okhotsk Sea. [Flora i rastitel'nost' ostrova Spafar'eva (Okhotskogo more)]
Kuznetsova, M.G., Berkutenko, A.N., *Botanicheskiĭ zhurnal,* Jan. 1994, 79(1), p.84-95, In Russian with English summary. 7 refs.
Plants (botany), Vegetation, Subarctic landscapes, Okhotsk Sea

49-2901
New genus *Platimelis* in the Late Cretaceous—Early Paleogene flora of the Arctic. [Novyĭ rod *Platimelis* v pozdnemelovykh—rannepaleogenovykh florakh Arktiki]
Golovneva, L.B., *Botanicheskiĭ zhurnal,* Jan. 1994, 79(1), p.98-107, In Russian with English summary. 18 refs.
Plants (botany), Paleobotany, Greenland, Norway—Spitsbergen, Russia—Koryak Highland

49-2902
Relationship between frozen salinized ground strength and the initial freezing point of ground moisture. [Zavisimost' prochnosti merzlykh zasolennykh gruntov ot temperatury nachala zamerzaniia gruntovoĭ vlagi]
Roman, L.T., Artiushina, V.I., Ivanova, L.G., *Geoekologiia: inzhenernaia geologiia, gidrogeologiia, geokriologiia,* Jan. 1994, No.1, p.49-55, In Russian. 6 refs.
Frozen ground strength, Freezing points, Saline soils, Moisture, Soil water, Ice formation, Loams

49-2903
Structural-textural transformations in freezing ground and their relation to moisture migration processes. [Strukturno-teksturnye preobrazovaniia v promerzaiushchikh gruntakh i ikh sviaz' s protsessami migratsii vlagi]
Sakharov, I.I., *Geoekologiia: inzhenernaia geologiia, gidrogeologiia, geokriologiia,* Jan. 1994, No.1, p.56-64, In Russian. 15 refs.
Frozen ground mechanics, Soil freezing, Moisture, Soil water migration, Sound waves

49-2904

Effect of industrial atmospheric pollution on pine forests of the Kola Peninsula. [Vliianie promyshlennogo atmosfernogo zagriaznenia na sosnovye lesa Kol'skogo poluostrova]

Norin, B.N., ed, IArmishko, V.T., ed, Leningrad, AN SSSR, Botanicheskiĭ institut im. V.L. Komarova, 1990, 195p., In Russian with English summary and table of contents. Refs. p.183-191.

DLC QK745.V58 1990

Air pollution, Environmental impact, Snow impurities, Soil pollution, Mosses, Lichens, Forest ecosystems, Russia—Kola Peninsula

49-2905

Humic substances in the nitrogen cycle of polar waters. A comparison between the Arctic and Antarctic.

Lara, R.J., Kattner, G., Humic substances in the global environment and implications on human health: proceedings of the 6th International Meeting of the International Humic Substances Society, Monopoli (Bari), Italy, September 20-25, 1992, edited by N. Senesi and T.M. Miano, Amsterdam, Elsevier, 1994, p.799-804, 20 refs.

DLC QD341.A2I55 1992

Sea water, Water chemistry, Plankton, —Drake Passage, Antarctica—Bransfield Strait, Antarctica—Weddell Sea, Greenland Sea

The contribution of humic substances to the dissolved nitrogen pool in antarctic and arctic waters is compared. Average dissolved organic nitrogen (DON) concentrations were similar in both regions (3-4 microM N). XAD-2 fractionation of dissolved organic matter showed that the hydrophobic acid fraction accounted for 20% of DON in the Antarctic (mean: 0.69 microM N) and 19% in the Arctic (mean: 0.77 microM N). The hydrophobic neutral fraction was 15% of DON in the Antarctic (mean: 0.5 microM N) and 25% in the Arctic (mean: 1.0 microM N). The hydrophilic fraction was ca. 60% of DON. (Auth.)

49-2906

Modulation of hemispheric sea-ice cover by ENSO events.

Gloersen, P., *Nature*, Feb. 9, 1995, 373(6514), p.503-506, 16 refs.

Sea ice distribution, Climatic changes, Periodic variations, Ice edge, Modification, Arctic Ocean, Greenland Sea, Antarctica—Weddell Sea, Antarctica—Bellingshausen Sea, Antarctica—Amundsen Sea

The El Niño/Southern Oscillation (ENSO) is a quasiperiodic variation in climate which arises from a complex interaction between the tropical Pacific Ocean and the atmosphere. ENSO events, which occur every two to seven years, are the largest source of interannual variability of temperature and precipitation on a global scale, although their effects are most profound in the tropics. Observations of sea-ice margins have been used to monitor global climate changes on time scales of greater than a decade, and there is some evidence for interannual variations in records of sea-ice cover. But short-term changes in sea-ice cover are masked by pronounced seasonal variations, making it difficult to correlate them with specific climate phenomena. Using a multiple-window harmonic analysis technique, it is shown here that time series of sea-ice cover from the Arctic and Antarctic contain statistically significant quasi-biennial and quasi-quadrennial periodicities that agree well with variations in the ENSO index. (Auth.)

49-2907

Climatic events and changes in circulation during the Pleistocene in the central Arctic Ocean. [Klimaticheskie sobytiia i izmeneniia tsirkuliatsii v Pleĭstotsene v tsentral'noĭ chasti Severnogo Ledovitogo okeana]

Beliaeva, N.V., Khusid, T.A., Chekhovskaia, M.P., *Biulletin' komissii po izucheniiu chetvertichnogo perioda*, 1994, No.61, p.5-13, In Russian with English summary. 20 refs.

Plankton, Quaternary deposits, Ice cover thickness, Pleistocene, Sea level, Climatic changes, Ocean currents

49-2908

Improved method for decontaminating polar snow or ice cores for heavy metal analysis.

Candelone, J.P., Hong, S.M., Boutron, C.F., *Analytica chimica acta*, Dec. 20, 1994, 299(1), p.9-16, 30 refs.

Ice sheets, Drill core analysis, Ice sampling, Laboratory techniques, Snow composition, Snow impurities, Metals, Chemical analysis, Accuracy, Air pollution, Antarctica—East Antarctica, Greenland—Summit

An improved method has been developed for the decontamination of Greenland and antarctic snow or ice cores for heavy metal analysis. The investigated core sections are chiselled while being held horizontal in a polyethylene lathe inside a laminar flow clean bench in a cold room. Each veneer layer and the final inner core are then analyzed for Pb, Cd, Zn and Cu by graphite furnace atomic absorption spectrometry in clean room conditions. The procedural blank was found to range from 0.015 pg/g for Cd up to 0.25 pg/g for Cu. The quality of the decontamination was checked by studying changes in heavy metal concentrations from the outside to the center of each core section. In most cases, good plateaus of concentrations were observed in the central parts, indicating that contamination present on the outside of the cores was not transferred to these central parts. Various Greenland and antarctic cores were decontaminated, giving new insights into the past and recent occurrence of heavy metals in the atmosphere of both hemispheres. (Auth. mod.)

49-2909

Climatology of the SKYHI troposphere-stratosphere-mesosphere general circulation model.

Hamilton, K., Wilson, R.J., Mahlman, J.D., Umscheid, L.J., *Journal of the atmospheric sciences*, Jan. 1, 1995, 52(1), p.5-43, 80 refs.

Polar atmospheres, Climatology, Atmospheric circulation, Air temperature, Stratosphere, Simulation, Fluid dynamics, Mathematical models

The long-term mean climatology obtained from integrations conducted with different resolutions of the GFDL (Geophysical Fluid Dynamics Laboratory) "SKYHI" finite-difference general circulation model is examined. A number of improvements that have been made recently in the model are also described. The integrations all employ a fixed climatological cycle of sea surface temperature. Over 25 years of integration with the 3° model and shorter integrations with the higher-resolution versions are analyzed. Attention is focused on the Dec.-Feb. and June-Aug. periods. The model does a reasonable job of representing the atmospheric flow in the troposphere and lower stratosphere. The simulated tropospheric climatology has an interesting sensitivity to horizontal resolution. In common with several spectral GCMs that were examined earlier, the surface zonal-mean westerlies in the SKYHI extratropics become stronger with increasing horizontal resolution. However, this "zonalization" of the flow with resolution is not as prominent in the upper troposphere of SKYHI as it is in some spectral models. It is noteworthy that—without parameterized gravity wave drag—the SKYHI model at all three resolutions can simulate a realistic separation of the subtropical and polar night jet streams and a fairly realistic strength of the lower-stratospheric winter polar vortex. (Auth. mod.)

49-2910

Inelastic neutron scattering studies of defect modes of H in D_2O ice Ih.

Li, J.C., Ross, D.K., *Journal of physics—condensed matter*, Dec. 5, 1994, 6(49), p.10823-10837, 26 refs.

Ice physics, Deuterium oxide ice, Ice spectroscopy, Molecular structure, Hydrogen bonds, Molecular energy levels, Neutron irradiation, Neutron scattering, Defects, Spectra

49-2911

Ultratrace determination of Bi in Greenland snow by laser excited atomic fluorescence spectrometry.

Bol'shov, M.A., Rudnev, S.N., Candelone, J.P., Boutron, C.F., Hong, S., *Spectrochimica acta*, Dec. 23, 1994, 49B(12-14), p.1445-1452, 22 refs.

Ice sheets, Snow composition, Snow impurities, Sampling, Metals, Lasers, Spectroscopy, Volcanic ash, Atmospheric composition, Greenland—Summit

49-2912

Antarctic exploration using a non-constant diameter solid towed hydrophone array.

Pearce, R.E., Marschall, R.A., Stinson, D.L., Offshore Technology Conference, 26th, Houston, TX, May 2-5, 1994. Proceedings. Vol.1, 1994, p.9-14, 27 refs. For another version see 49-1183 or 22J-51495.

Subglacial observations, Underwater acoustics, Ocean bottom, Marine geology, Oceanographic surveys, Seismic surveys

Recent marine seismic surveys have been conducted in the Antarctic using non-constant diameter solid towed hydrophone arrays. These compact, robust towed hydrophone arrays were well-suited to antarctic exploration where (1) the levels of ambient noise could range from Knudsen Sea State 4 down to below Sea State Zero, (2) array repair would be extraordinarily difficult, and (3) oil-filled array leakage would be particularly damaging to this unique and pristine environment. (Auth. mod.)

49-2913

Scientific operational ice support for offshore exploration in arctic seas: state and strategy of development.

Appel', I.L., Offshore Technology Conference, 26th, Houston, TX, May 2-5, 1994. Proceedings. Vol.1, 1994, p.241-248, 4 refs.

Ice forecasting, Ice reporting, Ice surveys, Sea ice distribution, Exploration, Offshore drilling

49-2914

Movement and placement of large offshore drilling structures in the Arctic.

Walsh, M.R., Drolet, J.J.P., Eddy, P.R., Offshore Technology Conference, 26th, Houston, TX, May 2-5, 1994. Proceedings. Vol.4, 1994, p.715-725, 2 refs.

Offshore structures, Offshore drilling, Ice navigation, Ice routing, Ice control, Exploration

49-2915

Ice age. [IJstijden]

Brouwer, A., *Natuur & techniek*, Dec. 1990, 58(12), p.860-873, In Dutch. 2 refs.

Ice age theory, Pleistocene, Paleoclimatology, Global change

49-2916

Snow and ice covers: interactions with the atmosphere and ecosystems.

Jones, H.G., ed, Davies, T.D., ed, Ohmura, A., ed, Morris, E.M., ed, *International Association of Hydrological Sciences. IAHS publication*, 1994, No.223, 339p., Refs. passim. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993. The International Association of Meteorology and Atmospheric Physics (IAMAP) was subsequently renamed the International Association of Meteorology and Atmospheric Sciences (IAMAS). For individual papers see 49-2917 through 49-2948 or F-52189, I-52187, I-52188 and I-52190.

Snow air interface, Snow heat flux, Snow hydrology, Snow cover distribution, Snow cover effect, Ice air interface, Ice heat flux, Ice cover effect, Runoff, Polar atmospheres, Atmospheric circulation

Of some 32 papers, mainly on energy exchange between snow and ice covers and the atmosphere, and snow and glacial runoff, four papers are explicitly pertinent to the Antarctic, in particular: the radiative effects of clouds, ice sheet and sea ice; katabatic winds over a sloping ice sheet; modeling of mass and energy exchange over polar snow; and the moisture budget in the antarctic atmosphere.

49-2917

Snow cover-atmosphere interactions.

Davies, T.D., *International Association of Hydrological Sciences. IAHS publication*, 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.3-13, 58 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow air interface, Snow cover effect, Snow cover distribution, Snow heat flux, Snow thermal properties, Albedo, Global warming

49-2918

Microwave radiative transfer model of snow layers on sea ice.

Sasaki, Y., Asanuma, I., Naito, G., *International Association of Hydrological Sciences. IAHS publication*, 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.15-27, 3 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Sea ice, Snow ice interface, Snow air interface, Snow cover effect, Snow heat flux, Radiation balance, Radiometry, Mathematical models

49-2919

Radiative effects of clouds, ice sheet and sea ice in the Antarctic.

Yamanouchi, T., Charlock, T.P., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.29-34, 11 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Ice air interface, Ice cover effect, Ice sheets, Ice heat flux, Albedo, Cloud cover, Radiation balance, Radiometry, Antarctica—Showa Station, Antarctica—Amundsen-Scott Station

The effects of clouds, ice sheet and sea ice on the radiation budget in the Antarctic were examined using the ERBE (Earth Radiation Budget Experiment) data and surface observations at antarctic stations in 1987-88. Long-wave radiation emitted by clouds was found to heat the surface throughout the year and strongly cool the atmosphere over Antarctica. The elevation of the ice sheet surface reduces the outgoing long-wave radiation, making the radiation budget in the two polar regions asymmetric. Sea ice had a significant impact on radiation; however, cloud distribution reduced the effect. (Auth.)

49-2920

Temperature and energy balance at the marine ice-atmosphere interface during the polar winter.

Guest, P., Davidson, K., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.35-40, 8 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Ice air interface, Ice cover effect, Ice heat flux, Surface temperature, Polar atmospheres, Radiation balance

49-2921

Some characteristics of an atmospheric boundary layer on the sloped ice sheet at Mizuho Station, East Antarctica.

Kobayashi, S., Ishikawa, N., Ohata, T., Kawaguchi, S., Chiba, O., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.41-52, 11 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Ice sheets, Ice air interface, Glacial meteorology, Temperature inversions, Wind (meteorology), Antarctica—Mizuho Station

Measurements were made of vertical wind speed components, using two sonic anemothermometers mounted at heights of 3 m and 30 m on a 30 m high micrometeorological tower at Mizuho Station. The existence of a shear instability wave with a period of about 10 to 20 s was revealed. The maximum amplitude of the wave was found when the surface layer had a local gradient Richardson number smaller than 0.24. Such waves were observed when a strong surface inversion was progressing above the snow surface after the katabatic wind had been disturbed by a synoptic scale disturbance. Acoustic sounding was also used in observing a katabatic wind layer at the lowest few hundred meters over Mizuho Station. Observations disclosed that wave-like motion exists in a layer between heights of 100 m and 300 m, and has a shorter period than the calculated value from the Brunt-Väisälä frequency. This discrepancy was explained by a simple two-dimensional wave equation which accounted for katabatic flow. (Auth. mod.)

49-2922

Modelling mass and energy exchange over polar snow using the DAISY model.

Morris, E.M., Anderson, P.S., Bader, H.P., Weilenmann, P., Blight, C., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.53-60, 9 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow air interface, Snow cover effect, Snow heat flux, Snow surface temperature, Mathematical models, Antarctica—Halley Station

In the antarctic winter of 1991 an extensive series of micrometeorological and snow cover measurements were made as part of the second Stable Boundary Layer Experiment (STABLE II) at Halley Station. These data have been used to validate the DAISY distributed snow model using parameter values determined by calibration with independent data collected at Halley during the International Geophysical Year 1957-1958. These "effective" parameter values are consistent with values determined by other independent experiments on polar snow. Simulation of the STABLE data is successful except during periods of very high stability in the boundary layer. A better simulation of the snow surface temperature is obtained by using a roughness length of 5 cm for heat and water vapor transport rather than the value of 0.01 cm used for the aerodynamic roughness length. This suggests that the magnitude of turbulent heat and mass transfer may be larger than hitherto assumed in modelling the response of polar snow to climate change. (Auth.)

49-2923

Moisture budget in the antarctic atmosphere.

Yamazaki, K., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.61-67, 7 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Polar atmospheres, Atmospheric circulation, Precipitation (meteorology), Evaporation, Humidity, Antarctica

Climatologies of moisture flux, its convergence and accumulation rate for the antarctic region are derived from the 5-year (1986-90) twice-daily US NMC (National Meteorological Center) objective analysis data. Over the southern ocean, eastward moisture flux is dominant, while westward flux exists along the antarctic coastline. The estimate of mean annual poleward net water vapor transport across 70°S is 4.8±0.6 kg/m/s. The annual mean moisture flux convergence (accumulation rate) is positive along the coastline; the maximum of 3 mm/day is found on the west coast of the Antarctic Peninsula, while it is small inland. The estimated annual accumulation over Antarctica is 135±18 mm. As for seasonal variation, the accumulation is large in winter along the coast and over Antarctica as a whole, while it is large in summer in the inland elevated region. (Auth. mod.)

49-2924

State-of-the-art arctic fluxes.

Brown, R.A., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.69-76, 5 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Ice edge, Ice air interface, Ice cover effect, Ice heat flux, Polar atmospheres, Marine meteorology, Computerized simulation

49-2925

Atmospheric moisture flux convergence and accumulation on the Greenland ice sheet.

Calanca, P., Ohmura, A., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.77-84, 12 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Ice sheets, Ice air interface, Ice heat flux, Glacier alimentation, Glacial meteorology, Polar atmospheres, Atmospheric circulation, Precipitation (meteorology), Humidity, Greenland

49-2926

Energy balance for the Greenland ice sheet by observation and model computation.

Ohmura, A., et al, *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.85-94, 7 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Ice sheets, Ice air interface, Ice heat flux, Glacier heat balance, Glacial meteorology, Polar atmospheres, Atmospheric circulation, Greenland

49-2927

Response of the Greenland ice sheet to ice age cycles and to recent climate changes.

Abe-Ouchi, A., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.95-105, 25 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Ice sheets, Glacier oscillation, Glacier thickness, Paleoclimatology, Global warming, Greenland

49-2928

New data on macroscale distribution of snow cover over the world.

Kotliakov, V.M., Kostiashkina, T.E., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.107-120, 14 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow surveys, Snow cover distribution, Snow water equivalent, Mountains, Mapping

49-2929

Spatial and temporal distribution of winter snow cover over the Tibetan Plateau and its influence on the hydroclimatic regime of the upper-middle Yangtze.

Zhou, G.L., Peng, G.B., Qi, L.X., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.121-125, 2 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow surveys, Snow cover distribution, Snow cover effect, River flow, Stream flow, Runoff forecasting, Flood forecasting, China—Qinghai-Xizang Plateau

49-2930

Model investigation of the effect of sea ice and sea surface temperature in forming droughts-floods in the Yellow River Valley (China) in July.

Hu, Z.Z., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.127-140, 17 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Sea ice distribution, Ice cover effect, Ice air interface, Air ice water interaction, Water temperature, Surface temperature, Atmospheric circulation, Long range forecasting, Flood forecasting, Computerized simulation, China

49-2931

Dynamic characteristics of snow cover in western China.

Li, P.J., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.141-152, 23 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow surveys, Snow cover distribution, Snow cover effect, Snow air interface, Atmospheric circulation, Long range forecasting, Radiometry, China

49-2932

Distributed snow cover model for a mountainous basin.

Ujihashi, Y., Takase, N., Ishida, H., Hibobe, E., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.153-162, 11 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow surveys, Snow cover distribution, Snow hydrology, Snowmelt, Runoff forecasting, Mathematical models, Japan

49-2933

Snow modelling as an efficient tool to simulate snow cover evolution at different spatial scales.

Brun, E., Durand, Y., Martin, E., Braun, L., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.163-174, 17 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow cover distribution, Snow air interface, Snow cover effect, Snow hydrology, Atmospheric circulation, Computerized simulation

49-2934

Analysis of wind fields in winter by using AMeDAS and considering topography.

Nakayama, K., Hasegawa, K., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.177-186, Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snowfall, Atmospheric circulation, Cloud cover, Wind (meteorology), Weather forecasting, Computerized simulation, Japan

49-2935

Regional division of snow-depositional environments and metamorphism of snow cover in plain areas along the Japan Sea coast.

Kawashima, K., Yamada, T., Wakahama, G., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.187-196, 16 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow surveys, Snow cover distribution, Snow cover structure, Metamorphism (snow), Snow air interface, Japan

49-2936

Surface reflectance in an urbanized area with snow cover.

Takamura, T., Toritani, H., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.197-212, 13 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow air interface, Snow heat flux, Snow surface, Snow optics, Albedo, Urban planning, Japan

49-2937

Sensitivity of snow relocation and sublimation to climate and surface vegetation.

Pomeroy, J.W., Gray, D.M., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.213-225, 12 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow air interface, Blowing snow, Snow erosion, Snow evaporation, Snow retention, Vegetation factors, Canada

49-2938

Snow interception by forest canopies: weighing a conifer tree, meteorological observation and analysis by the Penman-Monteith formula.

Nakai, Y., Sakamoto, T., Terajima, T., Kitahara, H., Saito, T., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.227-236, 13 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow air interface, Snow evaporation, Snow retention, Interception, Forest canopy, Vegetation factors, Japan

49-2939

Effects of forest coverage on snowmelt runoff.

Ishii, T., Fukushima, Y., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.237-245, 2 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow air interface, Snow heat flux, Snow hydrology, Snowmelt, Forest land, Vegetation factors, Runoff forecasting, Japan

49-2940

Heat balance analysis of forest effects on surface snowmelt rates.

Hashimoto, T., Ohta, T., Fukushima, Y., Ishii, T., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.247-258, 9 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow air interface, Snow heat flux, Snow hydrology, Snowmelt, Forest land, Vegetation factors, Heat balance, Runoff forecasting, Japan

49-2941

Effect of water and heat on hydrological processes of a high alpine permafrost area.

Yang, Z.N., Liang, F.X., Yang, Z.H., Wang, Q., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.259-268, 12 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Permafrost hydrology, Permafrost heat transfer, Active layer, Soil air interface, Mountains, Runoff, China—Qilian Mountains

49-2942

Effect of wind speed on the snowmelt runoff process: laboratory experiment.

Hasebe, M., Kumekawa, T., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.269-274, 7 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow air interface, Snow hydrology, Snowmelt, Wind factors, Runoff, Environmental tests

49-2943

Snow line and runoff formation in glacial basins.

Konovalov, V.G., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.275-283, 8 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Glacial hydrology, Glacier melting, Glacier mass balance, Subglacial drainage, Meltwater, Snow line, Snow ice interface, Snow hydrology, Runoff forecasting, Mathematical models

49-2944

Melt-induced relocation of ions in glaciers and in a seasonal snowpack.

Goto-Azuma, K., Nakawo, M., Han, J.K., Watanabe, O., Azuma, N., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.287-297, 20 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow ice interface, Snow hydrology, Snow composition, Firn, Ice composition, Glacial hydrology, Meltwater, Runoff, Water chemistry, Ion density (concentration)

49-2945

Variations in the nitrate concentration of glacial runoff in alpine and sub-polar environments.

Tranter, M., Brown, G.H., Hodson, A., Gurnell, A.M., Sharp, M.J., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.299-311, 29 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow ice interface, Snow hydrology, Snow composition, Glacial hydrology, Meltwater, Runoff, Water chemistry, Nutrient cycle

49-2946

Chemical dynamics in a boreal forest snowpack during the snowmelt season.

Suzuki, K., Ishii, Y., Kodama, Y., Kobayashi, D., Jones, H.G., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.313-322, 12 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow hydrology, Snow composition, Snowmelt, Water chemistry, Forest ecosystems, Nutrient cycle, Canada—Quebec

49-2947

Albedo reduction by biotic impurities on a perennial snow patch in the Japan Alps.

Kohshima, S., Yoshimura, Y., Seko, K., Ohata, T., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.323-330, 8 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Snow hydrology, Snow composition, Snow impurities, Snow surface, Snow melting, Albedo, Algae, Bacteria, Microbiology, Japan

49-2948

Nutrient cycling on the surface of an arctic ice cap: snow-atmosphere exchange of N species and microbiological activity.

Jones, H.G., Duchesneau, M., Handfield, M., *International Association of Hydrological Sciences. IAHS publication,* 1994, No.223, Snow and ice covers: interactions with the atmosphere and ecosystems. Edited by H.G. Jones, T.D. Davies, A. Ohmura, and E.M. Morris, p.331-339, 13 refs. Presented at a joint IAMAP/IAHS symposium in Yokohama, Japan, July 1993.

Polar atmospheres, Snow air interface, Snow composition, Snow impurities, Nutrient cycle, Algae, Bacteria, Microbiology, Canada—Northwest Territories—Ellesmere Island

49-2949

Program to revive the Russian fleet. [Programma vozrozhdeniia Rossiĭskogo flota]

Pashin, V.M., Orlov, O.P., Logachev, S.I., *Sudostroenie,* Nov.-Dec. 1993, No.11-12, p.4-7, In Russian.

Ships, Icebreakers, Marine transportation

49-2950

Revival of the national merchant fleet. [Vozrozhdenie natsional'nogo torgovogo flota]

Dranitsyn, S.N., *Sudostroenie,* Nov.-Dec. 1993, No.11-12, p.8-12, In Russian.

Ships, Tanker ships, Icebreakers, Marine transportation

49-2951

Role of the Central Design Office "Baltsudoproekt" in the development of new transport ships. [Rol' TsKB "Baltsudoproekt" v sozdanii novykh transportnykh sudov]

Rodionov, N.N., *Sudostroenie,* Nov.-Dec. 1993, No.11-12, p.13-15, In Russian.

Ships, Tanker ships, Icebreakers, Marine transportation

49-2952

Arctic fleet and its future. [Flot Arktiki i ego budushchee]

Tsoĭ, L.G., Maksutov, D.D., Zimin, A.D., *Sudostroenie,* Nov.-Dec. 1993, No.11-12, p.16-19, In Russian.

Ships, Icebreakers, Marine transportation

49-2953

Central Design Office "Iceberg" and the development of the Arctic fleet. [TsKB "Aĭsberg" i razvitie arkticheskogo flota]

Makeev, A.N., Starshinov, V.A., *Sudostroenie,* Nov.-Dec. 1993, No.11-12, p.20-21, In Russian.

Ships, Icebreakers

49-2954

Northern Design Office for civilian ship building. [Severnoe PKB—grazhdanskomu sudostroeniiu]

IUkhnin, V.E., *Sudostroenie,* Nov.-Dec. 1993, No.11-12, p.26, In Russian.

Ships, Icebreakers

49-2955

Formation of domestic civilian shipbuilding. [Stanovlenie otechestvennogo grazhdanskogo sudostroeniia]

Narusbaev, A.A., *Sudostroenie,* Nov.-Dec. 1993, No.11-12, p.62-65, In Russian. 5 refs.

Ships, Icebreakers, Marine transportation, History

49-2956

Signal light system for helicopter landings on ships and floating drill rigs. [Sistema svetosignal'nogo oborudovaniia dlia posadki vertoletov na suda i plavuchie burovye ustanovki]

Bibaev, E.IU., Livshits, D.I., Mazanov, V.G., *Sudostroenie,* Feb.-Mar. 1993, no.2-3, p.21-23, In Russian. 4 refs.

Illuminating, Electric equipment, Cold weather performance

49-2957

Mapping heat loss zones for permafrost prediction at the northern/alpine limit of the boreal forest using high-resolution C-band SAR.

Granberg, H.B., *Remote sensing of environment,* Dec. 1994, 50(3), p.280-286, 29 refs.

Permafrost surveys, Permafrost distribution, Permafrost heat balance, Heat loss, Remote sensing, Sensor mapping, Synthetic aperture radar, Radar photography, Snow cover effect, Canada—Quebec—Schefferville

49-2958

COP: a data library of optical properties of hexagonal ice crystals.

Hess, M., Wiegner, M., *Applied optics,* Nov. 20, 1994, 33(33), p.7740-7746, 11 refs.

Ice crystal optics, Optical properties, Cloud physics, Light scattering, Climatic factors, Mathematical models

49-2959

Water ice formation on interstellar carbon dust: wet HAC (WHAC).

Duley, W.W., Williams, D.A., *Royal Astronomical Society. Monthly notices,* Jan. 15, 1995, 272(2), p.442-446, 36 refs.

Extraterrestrial ice, Cosmic dust, Ice formation, Geochemistry, Photochemical reactions, Radiation absorption, Ultraviolet radiation, Spectra

49-2960

Xylem embolism in ring-porous, diffuse-porous, and coniferous trees of northern Utah and interior Alaska.

Sperry, J.S., Nichols, K.L., Sullivan, J.E.M., Eastlack, S.E., *Ecology,* Sep. 1994, 75(6), p.1736-1752, 33 refs.

Plants (botany), Trees (plants), Plant physiology, Plant tissues, Cavitation, Freeze thaw cycles, Water transport, Seasonal variations, Frost resistance, United States—Alaska

49-2961

Climatic influences on the growth of subalpine trees in the Colorado Front Range.

Villalba, R., Veblen, T.T., Ogden, J., *Ecology,* July 1994, 75(5), p.1450-1462, 39 refs.

Trees (plants), Forest ecosystems, Plant ecology, Growth, Age determination, Vegetation patterns, Microclimatology, Topographic effects, Statistical analysis, United States—Colorado—Front Range

49-2962

Early carboniferous transgression on a passive continental margin: deposition of the Kekiktuk Conglomerate, northeastern Brooks Range, Alaska.

LePain, D.L., Crowder, R.K., Wallace, W.K., *AAPG bulletin,* May 1994, 78(5), p.679-699, 91 refs.

Geologic processes, Geologic structures, Sedimentation, Stratigraphy, Tectonics, Petroleum industry, Exploration, United States—Alaska—Brooks Range

49-2963

Proceedings. Vol.2.

Offshore Technology Conference, 26th, Houston, TX, May 2-5, 1994, 1994, 598p., Refs. passim. For selected papers see 49-1243, and 49-2964 through 49-2970.

DLC TC1505.O352a 26th V.2 1994

Offshore structures, Offshore drilling, Ice solid interface, Ice loads, Ice cover strength

49-2964

Technical design and economics of antarctic offshore petroleum development.

Beike, D.K., Offshore Technology Conference, 26th, Houston, TX, May 2-5, 1994. Proceedings. Vol.2, 1994, p.339-348, 24 refs.

Exploration, Offshore drilling, Petroleum industry, Crude oil, Natural resources, Economic development, Cost analysis, Antarctica

Major considerations for antarctic petroleum development are discussed. A hypothetical technical development scheme is described and an economic evaluation is performed. If a petroleum reserve is defined as existing when a mineral deposit is legally, technically and economically feasible to develop, then no antarctic petroleum development will occur in the near future. No petroleum has yet been found, no production structure exists to operate in this environment, unfavorable economic conditions prevail and no mineral regime exists that would allow such development for at least the next fifty years. (Auth. mod.)

49-2965

Arctic marine transportation: state of the art.

Johannson, B.M., Brydon, A., Jolles, W.H., Price, G.E., Offshore Technology Conference, 26th, Houston, TX, May 2-5, 1994. Proceedings. Vol.2, 1994, p.349-357, 18 refs.

Tanker ships, Icebreakers, Ice navigation, Ice breaking

49-2966

Arctic offshore development: managing the risk.

Helmer, C.M., Churcher, A.C., McIvor, G.R., Shields, R.G., Offshore Technology Conference, 26th, Houston, TX, May 2-5, 1994. Proceedings. Vol.2, 1994, p.359-370, 6 refs.

Petroleum industry, Offshore drilling, Offshore structures, Tanker ships, Ice loads

49-2967

Future development of Russian arctic offshore.

Reshetniak, IU.M., Fretheim, I.B., Surkov, A.V., Churcher, A.C., Ciring, J., Offshore Technology Conference, 26th, Houston, TX, May 2-5, 1994. Proceedings. Vol.2, 1994, p.371-380, 4 refs.

Exploration, Petroleum industry, Economic development, Offshore drilling, Offshore structures, Russia—Pechora Sea

49-2968

Evolution of arctic marine structural forms.

Bercha, F.G., Offshore Technology Conference, 26th, Houston, TX, May 2-5, 1994. Proceedings. Vol.2, 1994, p.415-425, 22 refs.

Offshore structures, Offshore drilling, Ice solid interface, Ice loads, Ice control

49-2969

Sea Ice Mechanics Initiative (SIMI).

Coon, M.D., Knoke, G.S., Echert, D.C., Offshore Technology Conference, 26th, Houston, TX, May 2-5, 1994. Proceedings. Vol.2, 1994, p.499-506, 5 refs.

Ice cover strength, Ice deformation, Ice cracks, Ice surveys, Ice models, Drift stations, Research projects, Beaufort Sea

49-2970

Medium-scale uniform pressure tests on first-year sea ice, 1993.

Masterson, D.M., Spencer, P.A., Frederking, R.M.W., Offshore Technology Conference, 26th, Houston, TX, May 2-5, 1994. Proceedings. Vol.2, 1994, p.519-530, 11 refs.

Ice cover strength, Ice loads, Ice deformation, Ice pressure, Ice solid interface, Strain tests

49-2971

Kinetic calorimetry in the study of the mechanism of low-temperature chemical reactions.

Barkalov, I.M., Kiriukhin, D.P., *International reviews in physical chemistry,* Sep. 1994, 13(2), p.337-357, 102 refs.

Temperature measurement, Low temperature research, Cryogenics, Gases, Chemical analysis, Laboratory techniques, Thermodynamic properties, Photochemical reactions

49-2972

Landscape structure and forest dynamics in subcontinental Russian European taiga.

Syrjänen, K., Kalliola, R., Puolasmaa, A., Mattsson, J., *Annales zoologici Fennici,* Jan. 1994, 31(1), p.19-34, 32 refs.

Forest ecosystems, Taiga, Plant ecology, Vegetation patterns, Landscape types, Classifications, Spaceborne photography, Forest fires, Environmental impact, Russia

49-2973

Melting and freezing in a mesoscale convective system.

Braun, S.A., Houze, R.A., Jr., *Royal Meteorological Society. Quarterly journal,* Jan. 1995, 121(521), p.55-77, 51 refs.

Precipitation (meteorology), Cloud physics, Thermodynamics, Ice melting, Freezing rate, Convection, Cooling rate, Radar echoes, Ice air interface

49-2974

Analysis of the scattering properties of particles by the discrete-source method.

Eremin, IU.A., Orlov, N.V., Rozenberg, V.I., *Optics & spectroscopy,* Nov. 1992, 73(5), p.573-576, Translated from Optika i spektroskopiia. 4 refs.

Light scattering, Ice optics, Surface roughness, Wave propagation, Electromagnetic properties, Remote sensing, Mathematical models, Atmospheric physics

49-2975

Coefficient of restitution of ice particles in glancing collisions: experimental results for unfrosted surfaces.

Supulver, K.D., Bridges, F.G., Lin, D.N.C., *Icarus,* Jan. 1995, 113(1), p.188-199, 34 refs.

Extraterrestrial ice, Simulation, Particles, Planetary environments, Atmospheric physics, Impact tests, Ice mechanics, Ice solid interface, Coagulation

49-2976

Bi-polar information initiatives—the needs of polar research; Proceedings.

Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994, Walton, D.W.H., ed, Mills, W., ed, Phillips, C.M., ed, Huntingdon, Bluntisham Books, 1995, 204p., Refs. passim. For selected papers see 49-2977 through 49-3000 or A-52195 through A-52203.

International cooperation, Bibliographies, Data processing, Telecommunication, Computer applications, Computer programs, Education, Research projects, Organizations

This compilation includes 52 papers and abstracts, 13 of which are pertinent to Antarctica, presented at the 15th Polar Libraries Colloquy held in Cambridge, England, on July 3-8, 1994. Central to the Colloquy was a consideration of the contrasts and similarities reflected in the research databases for both the Arctic and the Antarctic, with the view of enhancing the mutual interchange of library and bibliographic records among organizations, and especially of improving the efficiency of bibliographic coverage of scientific publications by eliminating redundancy of citations among individual bibliographies. Also discussed was the conversion of current collection databases to computer network compatibility; certain economic and manpower problems which constrain individual polar libraries in their exploitation of available computer and telecommunication technology; and difficulties inherent in the acquisition and dissemination of grey literature.

49-2977

Theory of polar information.

Flanders, N.E., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.1-4, 5 refs.

Research projects, Data processing, Computer applications, International cooperation, Education, Organizations, Theories

49-2978

Are we information poor? Limitations to accessing polar literature.

Andrews, M., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.5-7, 4 refs.

Bibliographies, International cooperation, Data processing, Education, Accuracy

The several library catalogues and reference databases published on the PolarPac and Arctic & Antarctic Regions CD-ROMs have been analyzed with grant support from The Council on Library Resources (CLR). Results show that approximately one third of the polar literature currently lacks effective bibliographic control. At the same time, there is a high incidence of duplicate accessioning. The "citation gap" resulting from lack of coverage is primarily a function of document type, rather than of scientific discipline or particular geographic area. Technical reports, book chapters, conference papers, dissertations, maps, and articles in "non-polar" (discipline-oriented) journals are less likely to be selected for indexing than articles in peer-reviewed polar regions journals. In order to expand upon this finding, further research, based on the Institute of Arctic and Alpine Research (INSTAAR) Publications List for the past 25 years, was undertaken. The results of this study indicate a shift in publication type away from technical reports and toward "non-polar," peer-reviewed journals. The process of reducing duplicate indexing by distributing responsibilities between database producers is presently being addressed. The process of achieving true bibliographic control over the polar regions literature must also be addressed. Discipline oriented journals and non-journal document types must be scanned regularly for polar regions information. Improved coverage of the literature, which is on the verge of escaping bibliographic control, will benefit the entire international user community. (Auth.)

49-2979

Information needs of polar library users.

Inouye, R.K., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.8-9.

Education, Bibliographies, Data processing, Human factors, Design criteria

49-2980

Arctic "know-how" at the University of Lapland.

Kurppa, L., Karhumaa, L., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.10-11.

Bibliographies, Data processing, Education, Computer applications, Finland

49-2981

Role of the IRF Library in the expanding scientific community in Kiruna—a centre for space research in Sweden.

Ahlström-Bergström, I., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.12-14, 4 refs.

Research projects, Polar atmospheres, Atmospheric physics, Data processing, Bibliographies, Sweden

49-2982

Research libraries in Greenland and the emerging scientific communities—plans for building up databases and electronic networks.

Hansen, K.G., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.15-16.

Research projects, Education, Data processing, International cooperation, Bibliographies, Greenland

49-2983

Permafrost cartobibliography.

Heginbottom, J.A., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.17-24, 67 refs.

Bibliographies, Maps, Mapping, Permafrost surveys, Permafrost distribution, Ground ice, Geological maps, Soil science

49-2984

Polar tourism: do library resources meet researchers' information needs.

Stonehouse, B., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.25-28, 5 refs.

Bibliographies, Data processing, Human factors, Environmental impact, Research projects

Recent development at the Scott Polar Research Institute of an interdisciplinary study on polar tourism has raised the issue of how adequate are current polar library resources in meeting the bibliographic and archival needs of a new research field, and how much help researchers in such a field may expect from the polar library network. In a case like this, where parts of the relevant literature are non-polar and parts non-academic, standard bibliographic databases reflecting the holdings of particular academic libraries, and standard regional reference works are found to be inadequate. The most likely solution appears to be the designation of one center as a specialist library on polar tourism, and employment of a specialist librarian for cataloguing and archiving material from all sources, who will make the material available to other research centers. A parallel is drawn with the existing ICSU World Data Centre organization for glaciology and other scientific topics. (Auth.)

49-2985

Alfred Wegener and his Greenland expeditions: collections of the Alfred Wegener Archive, Bremerhaven, Germany.

Voss, J., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.61-64, 30 refs.

Expeditions, Exploration, Bibliographies, History, Research projects, Greenland

49-2986

Sir George Hubert Wilkins as scientist, geographer, and consultant to the United States military.

Grossi, K.M., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.71-75, 5 refs.

Expeditions, Exploration, Bibliographies, History

The career of Sir George Hubert Wilkins is relatively unknown, especially in his native Australia. Besides being the first to fly the trans-Arctic Sea route, the first to fly an airplane over Antarctica, and the leader of the expedition in which a submarine travelled under arctic pack ice for the first time, Wilkins was a scientist, photographer, newspaper correspondent, lecturer, geographer, author and a consultant to the U.S. military. This paper examines his work in Northern Australia and adjacent islands, and his career as a consultant on hot and cold weather clothing and survival techniques for the United States military, as two examples of the lesser-known accomplishments of this great man. The Sir George Hubert Wilkins Papers are located at the Ohio State University Archives and are open to researchers. The author, with the help of student assistants, has processed the collection and compiled a finding aid. (Auth. mod.)

49-2987

Archival data and the assessment of polar climatic change.

Headland, R.K., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.87-92, 1 ref.

Climatology, Climatic changes, History

Selected examples of the use of various older records are given to extend and improve modern analysis of climatic changes. These particularly concentrate on both polar regions. Indications of what might be useful for future investigation are given. A synopsis of data from ships which wintered in the Canadian Arctic during the last century is given. (Auth.)

49-2988

Supply and demand equilibrium: the marketing of polar information.

Dobrynina, N.G., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.93-94, 3 refs.

Ecology, Environmental protection, International cooperation, Legislation, Organizations, Research projects, Economic analysis, Data processing, Russia

49-2989

Information and library support of basic research in the Far East Branch of the Russian Academy of Sciences.

Markusova, V., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.95-97.

Research projects, Data processing, International cooperation, Bibliographies, Russia—Siberia

49-2990

Grey literature as a main source of information about modern Russian knowledge on the arctic region development.

Vinogradov, A.N., Kabdulova, L.M., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.98-100.

Bibliographies, International cooperation, Research projects, Economic analysis, Russia—Apatity

49-2991

Trials and tribulations of acquiring Russian material: the experience of the Scott Polar Research Institute Library.

Warren, I., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.101-103.

Research projects, Bibliographies, International cooperation, Economic analysis, Russia

49-2992

Access to Russian glaciological literature.

Brennan, A.M., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.104-106, 4 refs.

Glaciology, Bibliographies, Classifications, International cooperation, Russia

The literature on glaciology published in Russia and the other states of the former Soviet Union is extensive. For example, an annotated list of Soviet literature for 1989 published in *Materialy Gliatsiologiskikh Issledovanii* lists almost 800 titles covering all areas of snow and ice research, with the exception of permafrost. This paper describes steps taken to determine what percentage of the Russian literature is received, indexed, and available to researchers in the U.S. It also reports on preliminary discussions between representatives of the Institute of Geography of the Russian Academy of Sciences and the World Data Center A for Glaciology on steps needed to make this literature more readily available. (Auth.)

49-2993

Towards a Russian arctic information database.
Brown, J., Stone, M.L., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.107-114, 20 refs.
Research projects, Organizations, Classifications, International cooperation, Data processing, Computer applications, Russia

49-2994

Conversion of the Cold Regions Bibliography.
Hibben, S.G., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.130.
Bibliographies, Data processing, Computer applications, Computer programs, International cooperation
The Cold Regions Bibliography has been converted to a commercial software called STAR, which has a proven record as a powerful and versatile database management system. The existing database has now been copied from its MARC format into STAR records with equivalent fields, and a new entry form has been designed for future citation input. STAR also includes the FrameMaker desktop printing software which will compose camera-ready copy for production printing. After database definition and software debugging, the full file of some 180,000 records has been copied into STAR in the host Sun computer at the Library of Congress, where it may be accessed over Internet. The paper discusses some features of the database design, and gives examples of data entry and search methods. We now have the technical capability to disseminate the indexing as well as providing search access; the Cold Regions staff will be inputting records via Internet, and others could do the same from any Internet node. As a first step in joint indexing, SPRI and the Cold Regions Project have agreed to collaborate on inputting of antarctic records in the bibliography, and this plan has received the approval of the CRBP sponsors. In addition to sharing the antarctic journal indexing, SPRI can provide valuable input in the area of antarctic grey literature, notably from Australia and New Zealand as well as other European sources. (Auth.)

49-2995

Icelandic research libraries in the natural sciences and the library computer system Gegnir.
Hedinsdottir, P., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.131-133, 4 refs.
Research projects, Computer applications, Computer programs, Bibliographies, Data processing, Organizations, Education, Iceland

49-2996

Full-text arctic databases: the tool, the methodology, the research potential.
Falk, M.W., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.134-137.
Data processing, Computer applications, Image processing, Bibliographies

49-2997

Progress towards a Canadian Polar Information System.
Goodwin, R., Minion, R., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.138-141, 8 refs.
Bibliographies, Research projects, Data processing, Education, Economic analysis, Canada

49-2998

Building a polar want list using the Internet.
West, C.E., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.142-145, 2 refs.
Bibliographies, Data processing, Telecommunication, Computer applications, Research projects
The effort to keep abreast of publications related to polar issues on an international scale can be slow and time consuming. Recent developments in international electronic communication provide opportunities for identification of desirable polar subject items which were not possible as recently as five years ago. This paper presents results of an experiment to determine the utility of using the Internet to compile a want list of desired monographs. The polar collections of the University of Alaska Fairbanks have known areas of subject weakness. A selection of subjects were searched in internationally available library catalogues on the Internet. Publications identified were compared to holdings of the Rasmuson Library to determine items not owned. Results of this process are reported together with time invested per identified desirable monograph. An evaluation of this process for collection building is included together with some discussion of its opportunities and limitations. (Auth.)

49-2999

Polar Libraries Gopher—an information source with potential.

Tull, E., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.146.

Bibliographies, Data processing, Telecommunication, Canada

49-3000

Gateway to Antarctica, an Internet World Wide Web server for antarctic information.

Ashby, D., Polar Libraries Colloquy, 15th, Cambridge, UK, July 3-8, 1994. Proceedings. Bi-polar information initiatives: the needs of polar research. Edited by D.W.H. Walton et al, Huntingdon, Bluntisham Books, 1995, p.147-148.

Research projects, Computer applications, Telecommunication, International cooperation

Over the past few years the numbers of organizations and individuals connected to Internet has grown dramatically, and with this growth there have been significant changes in the way information is transferred over Internet. The World Wide Web (WWW) is one of the latest such advances in information exchange using Internet. WWW is another application like e-mail, Telnet, FTP, Usenet news, and Gopher, that uses the communication channels of Internet to transfer information from one computer to another. In fact, WWW is now the third highest generator of network traffic over Internet. When part of the Internet backbone in the US was monitored earlier this year, over 1/3 of a terabyte of WWW data were seen passing through the network during a one month period. The 'Gateway to Antarctica' is a WWW server specializing in antarctic information, with sections containing scientific, logistic, educational, and treaty information. It also provides links to much of the Antarctic related data already on Internet.

49-3001

On the relevance of the methane oxidation cycle to "ozone hole" chemistry.

Müller, R., Crutzen, P.J., NASA. Goddard Space Flight Center: Ozone in the troposphere and stratosphere, Part 1, Washington, D.C., U.S. National Aeronautics and Space Administration, 1994, p.298-301, N95-10661, 15 refs.

Ozone, Stratosphere, Atmospheric composition, Chemistry, Models, Air pollution

The authors focus on the influence of the methane oxidation cycle on 'ozone hole' chemistry through its effect on HOx and ClOx radicals. They demonstrate the potential importance of the heterogeneous reaction HCl+HOCl yields Cl_2+H_2O and the gas phase reaction $ClO+CH_3O_2$ yields $ClOO+CH_3O$ under sunlight conditions in polar spring. Under these conditions, the heterogeneous reaction is the main sink for HOx radicals. Through this channel the HCl reservoir may be almost completely depleted. The gas phase reaction may control the levels of the CH_3O radical, provided that high levels of ClO exist. Otherwise this radical initiates a sequence of reactions leading to a considerable loss of active chlorine. Moreover, the production of HOx radicals is reduced, and thereby the efficiency of the heterogeneous reaction is limited. The two reactions together may accomplish the complete conversion of HCl into active chlorine, thereby leading to a rapid destruction of ozone. (Auth. mod.)

49-3002

XXI Polar Symposium: 60 years of Polish research of Spitsbergen.

Zalewski, S.M., ed, Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994, Warsaw, Polish Academy of Sciences, 1994, 371p., Refs. passim. For selected papers see 49-3003 through 49-3027 or B-52217, B-52218, B-52220, E-52207 through E-52212, I-52216, J-52215, J-52219, L-52213 and L-52214.

Geology, Glaciology, Cryobiology, Research projects, Antarctica, Norway—Spitsbergen

This volume contains a selection of scientific papers presented at the Symposium, 14 of which concern Antarctica in the areas of geology and paleobiology, geophysics, geography, meteorology, and terrestrial and marine biology.

49-3003

Current investigations of tectonic and glacier tremors on the Polish polar station in Hornsund, Spitsbergen.

Domański, B., Górski, M., Suchcicki, J., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.55-61, 17 refs.

Earthquakes, Seismic surveys, Glacier oscillation, Data processing, Norway—Spitsbergen

49-3004

Geological and morphological conditions of erosion forms development in the region of southern Bellsund (Spitsbergen).

Gawrysiak, L., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.93-106, With Polish summary. 12 refs.

Glacial erosion, Geomorphology, Glacial geology, Valleys, Pleistocene, Norway—Spitsbergen

49-3005

Preliminary report on sedimentary processes in Rev Lake (Hornsund region, south-west Spitsbergen).

Giżejewski, J., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.107-116, With Polish summary. 11 refs.

Reservoirs, Lacustrine deposits, Lakes, Sediments, Norway—Spitsbergen

49-3006

Shore profiles development at Wilczekodden, Hornsund, Spitsbergen.

Giżejewski, J., Rudowski, S., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.117-122, With Polish summary. 5 refs.

Coastal topographic features, Shores, Pack ice, Icebergs, Ice floes, Moraines, Norway—Spitsbergen

49-3007

Lithofacies and structural analysis of crevasse filling deposits of the Svenbreen Foreland (Petuniabukta, Spitsbergen).

Karczewski, A., Kłysz, P., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.123-133, 7 refs.

Crevasses, Moraines, Geomorphology, Outwash, Lithology, Glaciers, Glacial deposits, Norway—Spitsbergen

49-3008

Geomorphological process area in high arctic ecosystems Liefde- and Bockfjorden, northwest Spitsbergen.

King, L., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.135-148, With Polish summary. 15 refs.

Geomorphology, Ecosystems, Ecology, Glaciers, Solifluction, Glaciology, Norway—Spitsbergen

49-3009

Fridtjovbreen sediments and forms (West Spitsbergen).

Musiał, A., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.149-157, With Polish summary. 7 refs.

Mountain glaciers, Moraines, Glacial deposits, Geomorphology, Glacial geology, Norway—Spitsbergen

49-3010

Environments of inlets, coves and lagoons in Admiralty Bay (South Shetland Islands, Antarctica).

Rakusa-Suszczewski, S., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.163-167, 25 refs.

Hydrography, Sea water, Meltwater, Glaciers, Marine biology, Antarctica—Admiralty Bay

Admiralty Bay is the largest bay in the South Shetlands, covering some 122 km^2; the main body of the bay covers 52.3% of this area, with Mackellar and Martel Inlets together constituting 31.5%, and Ezcurra Inlet the remaining 16.2%. The bay's mean depth is 198.6 m, with the deepest part attaining some 279.7 m; Ezcurra, Mackellar, and Martel Inlets are considerably shallower. These inlets form postglacial hanging valleys above the central basin of Admiralty Bay, the latter opening widely into the Bransfield Strait. About 30% of the bottom of Admiralty Bay is covered by macroalgae. Kelps are attached to the bottom to 90-100 m depth. The total biomass of macroalgae in the bay was estimated at approximately 74,000 tons. The type of substrata in Admiralty Bay also affects the specific composition of benthic fauna.

49-3011

Seismic architecture and sedimentation in Spitsbergen fiords (a general report).

Rudowski, S., Solheim, A., Forsberg, C.F., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.169-173, 3 refs.

Sedimentation, Glacier oscillation, Sediments, Glacial deposits, Marine deposits, Underwater acoustics, Norway—Spitsbergen

49-3012

Polish pedological research of the polar landscapes.

Skiba, S., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.175-179, Refs. p.178-179.

Bibliographies, Soil science, Cryogenic soils

49-3013

Environmental contrast between the eastern and western coast of Sørkapp Land, Spitsbergen.

Ziaja, W., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.181-185, With Polish summary. 13 refs.

Shores, Coastal topographic features, Glaciation, Environments, Ecology, Landscape development, Norway—Spitsbergen

49-3014

Mechanical and chemical denudation in the Scott glacier basin (western Spitsbergen).

Bartoszewski, S., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.189-198, With Polish summary. 14 refs.

Analysis (mathematics), Glacial hydrology, Glacial rivers, River basins, River flow, Erosion, Norway—Spitsbergen

49-3015

Physico-chemical properties of precipitation and snow cover in Spitsbergen in the winter season 1992/1993.

Głowacki, P., Leszkiewicz, J., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.199-205.

Snow cover, Snow physics, Salinity, Snow mechanics, Meteorology, Precipitation (meteorology), Chemical properties, Glacier ice, Norway—Spitsbergen

49-3016

Suspended sediment concentrations in the Werenskiold glacier drainage basin in 1986.

Krawczyk, W.E., Opołka-Gądek, J., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.215-224, 6 refs.

Glacial rivers, Sediment transport, Glacial hydrology, Suspended sediments, Norway—Spitsbergen

49-3017

Water cycle in north-west Sørkappland (Spitsbergen).

Pociask-Karteczka, J., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.225-229.

Hydrology, Runoff, Snow cover, Seasonal ablation, Seasonal freeze thaw, Permafrost, Norway—Spitsbergen

49-3018

Polish botanical studies on Spitsbergen—achievements and prospects.

Dubiel, E., Olech, M., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.235-241, Refs. p.237-241.

Plants (botany), Bibliographies, Lichens, Mosses, Vegetation, Ecology, Norway—Spitsbergen

49-3019

Decomposition of plant materials under conditions of Spitsbergen tundra.

Dziadowiec, H., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.243-246, 10 refs.

Tundra, Ecosystems, Plants (botany), Decomposition, Norway—Spitsbergen

49-3020

Contents of Cu, Mn, Zn, Pb and Cd in the plants of Calypsostranda—Bellsund region (western Spitsbergen).

Jóźwik, Z., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.251-254.

Plants (botany), Plant physiology, Plant ecology, Environmental impact, Metals, Lichens, Norway—Spitsbergen

49-3021

High-arctic peat-belt of the northern coast of Hornsund (SW Svalbard): plant diversity, constituents and dynamics.

Kuc, M., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.271-286, 34 refs.

Wetlands, Tundra, Plants (botany), Peat, Mosses, Permafrost, Snow cover effect, Norway—Spitsbergen, Norway—Svalbard

49-3022

Pollution of the beach of Bellsund southern periphery (western Spitsbergen).

Czubla, P., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.301-304, 11 refs.

Pollution, Environmental impact, Waste disposal, Tidal currents, Marine deposits, Norway—Spitsbergen

49-3023

Performance analysis of the prototype waste water treatment plant at the Polish polar station in Hornsund, Spitsbergen.

Kowalewska, H., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.305-323, With Polish summary. 11 refs.

Cold weather performance, Waste treatment, Water treatment, Norway—Spitsbergen

49-3024

Problems linked to navigation in the Northwest Passage (Canadian Arctic).

Kurbiel, J., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.325-345.

Northwest passage, Ice navigation, Marine transportation, Ice conditions, Sea ice, Polynyas, Young ice, Route surveys, History

49-3025

Communicate: a new conception of polar research.

Kurbiel, J., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.347-349.

Ice navigation, Expeditions, Research projects, Ships, Design criteria, Design

49-3026

Polish scientific activities on Spitsbergen in the light of international legal status of the Archipelago.

Machowski, J., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.351-360, With Polish summary. 11 refs.

International cooperation, Legislation, Research projects, History, Poland, Norway—Spitsbergen

49-3027

Changes on Spitsbergen introduced by human activities during the thirty-five year period 1958-1992. [Zmiany na Spitsbergenie wprowadzone działalnością człowieka w trzydziestipięcioleciu 1958-1992]

Schramm, R.W., Polar Symposium, 21st, Warsaw, Poland, Sep. 23-24, 1994. Sixty years of Polish research of Spitsbergen, edited by S.M. Zalewski, Warsaw, Polish Academy of Sciences, 1994, p.361-371, In Polish.

Environmental impact, Environmental protection, Norway—Spitsbergen

49-3028

Air exchange measurements in Army buildings.

Flanders, S.N., CR 94-08, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* July 1994, 28p., ADA-288 246, 6 refs.

Ventilation, Buildings, Flow measurement, Air leakage

Air exchange measurements in buildings are important for testing the effectiveness of the ventilation system and for characterizing air leakage in the building envelope when the ventilation is off. This report discusses such measurements in nine Army buildings—administrative, maintenance, barracks, hospital and laboratory buildings—using a tracer gas method that entails releasing a tracer gas in an initial well-mixed concentration and then monitoring its concentration over time. The faster the tracer gas dilutes, the greater is the air change rate. ASTM Standard E741 offers techniques for tracer gas measurements in single-zone enclosures, but most Army buildings are multiple-zone enclosures. This study, looking at whether such buildings could approximate single-zone enclosures for tracer gas measurements, found that this is difficult. In addition, a number of buildings were detected in which the mechanical ventilation system was working at a fraction of design capacity.

49-3029
Engineering-geological features in construction and deformation regularities in soil foundations in the southeastern part of the West Siberian Lowland. [Inzhenerno-geologicheskie osobennosti stroeniia i zakonomernosti deformirovaniia gruntovykh osnovaniĭ iugo-vostochnoĭ chasti Zapadno-Sibirskoĭ izmennosti]
Ol'khovatenko, V.E., Fursov, V.V., Baliura, M.V., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Nov.-Dec. 1993, No.11-12, p.141-143, In Russian.
Engineering geology, Cold weather construction, Foundations, Rheology, Russia—Siberia

49-3030
Division of Yakutia territory according to snow cover load. [Raĭonirovanie territorii IAkutii po vesu snegovogo pokrova]
Kornilov, T.A., Kopylov, A.T., Rykov, A.V., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Oct. 1993, No.10, p.13-16, In Russian. 5 refs.
Snow cover distribution, Snow cover, Snow loads, Russia—Yakutia

49-3031
Study of the properties of fluoride anhydride construction mortars and examples of the improved water- and frost resistance resulting from them. [Issledovanie svoĭstv ftorangidritovykh stroitel'nykh rastvorov i obraztsov povyshennoĭ vodo- i morozostoĭkosti, poluchennykh iz nikh]
Fedorchuk, IU.M., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Oct. 1993, No.10, p.65-66, In Russian.
Mortars, Frost resistance, Construction materials

49-3032
Modelling the process of consolidating embankments of highways made from frozen soils. [Modelirovanie protsessa konsolidatsii nasypi avtomobil'noĭ dorogi, otsypannoĭ iz merzlykh gruntov]
Shuvaev, A.N., Aksenov, B.G., Fattakhov, B.R., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Oct. 1993, No.10, p.99-104, In Russian. 3 refs.
Roads, Embankments, Settlement (structural), Mathematical models, Thermal regime, Computer applications, Frozen ground settling

49-3033
Introductory research in the Kola North. [Introduktsionnye issledovaniia na Kol'skom Severe]
Viracheva, L.L., ed, Apatity, Kol'skiĭ nauchnyĭ tsentr, RAN, 1994, 105p., In Russian with English summary and table of contents. For selected papers see 49-3034 through 49-3042.
Introduced plants, Plants (botany), Environmental protection, Plant physiology, Russia—Kola Peninsula

49-3034
Naturalization of plants from the Ukrainian Carpathians introduced in the Khibiny Mountains. [Naturalizatsiia rasteniĭ Ukrainskikh Karpat, introdutsirovannykh v Khibinskie gory]
Andreev, G.N., Zueva, G.A., Introduktsionnye issledovaniia na Kol'skom Severe (Introduction researches on the Kola North). Edited by L.L. Viracheva, Apatity, Kol'skiĭ nauchnyĭ tsentr, RAN, 1994, p.5-13, In Russian. 9 refs.
Introduced plants, Plants (botany), Alpine landscapes, Russia—Kola Peninsula, Russia—Khibiny Mountains

49-3035
Biology of some species of Allium under the conditions of the Khibiny Mountains. [Biologiia nekotorykh vidov luka v usloviiakh Khibinskikh gor]
Belova, T.P., Introduktsionnye issledovaniia na Kol'skom Severe (Introduction researches on the Kola North). Edited by L.L. Viracheva, Apatity, Kol'skiĭ nauchnyĭ tsentr, RAN, 1994, p.14-34, In Russian. 8 refs.
Introduced plants, Plants (botany), Plant physiology, Russia—Kola Peninsula, Russia—Khibiny Mountains

49-3036
Seed production of *Doronicum grandiflorum Lam.* in the Kola North. [Semennaia produktivnost' kozul'nika krupnotsvenogo na Kol'skom Severe]
Viracheva, L.L., Introduktsionnye issledovaniia na Kol'skom Severe (Introduction researches on the Kola North). Edited by L.L. Viracheva, Apatity, Kol'skiĭ nauchnyĭ tsentr, RAN, 1994, p.35-42, In Russian. 9 refs.
Introduced plants, Plants (botany), Plant physiology, Russia—Kola Peninsula

49-3037
Seed production of *Trollius asiaticus* L. in the Arctic. [Semennaia produktivnost' kupal'nitsy aziatskoĭ v Zapoliar'e]
Viracheva, L.L., Introduktsionnye issledovaniia na Kol'skom Severe (Introduction researches on the Kola North). Edited by L.L. Viracheva, Apatity, Kol'skiĭ nauchnyĭ tsentr, RAN, 1994, p.42-53, In Russian. 12 refs.
Introduced plants, Plants (botany), Plant physiology, Russia—Kola Peninsula

49-3038
Morphobiological and biochemical traits of *Calendula officinalis* L. in relation to the nutrition regime. [Morfobiologicheskie i biokhimicheskie osobennosti kalenduly lekarstvennoĭ v zavisimosti ot rezhima pitaniia]
Gorelova, A.P., Trosteniuk, N.N., Introduktsionnye issledovaniia na Kol'skom Severe (Introduction researches on the Kola North). Edited by L.L. Viracheva, Apatity, Kol'skiĭ nauchnyĭ tsentr, RAN, 1994, p.54-65, In Russian. 7 refs.
Introduced plants, Plants (botany), Plant physiology, Russia—Kola Peninsula

49-3039
Forcing of tulips in vermiculite. [Vygonka tiul'panov na vermikulite]
Ivanova, L.A., Seliuminova, A.M., Litvinova, S.V., Introduktsionnye issledovaniia na Kol'skom Severe (Introduction researches on the Kola North). Edited by L.L. Viracheva, Apatity, Kol'skiĭ nauchnyĭ tsentr, RAN, 1994, p.66-68, In Russian. 3 refs.
Introduced plants, Plants (botany), Plant physiology, Russia—Kola Peninsula

49-3040
New species of *Chlorophytum* in interior gardening. [Novye vidy khlorofitumov v ozelenenii inter'erov]
Kovalenko, L.V., Introduktsionnye issledovaniia na Kol'skom Severe (Introduction researches on the Kola North). Edited by L.L. Viracheva, Apatity, Kol'skiĭ nauchnyĭ tsentr, RAN, 1994, p.68-70, In Russian. 2 refs.
Introduced plants, Plants (botany), Plant physiology, Russia—Kola Peninsula

49-3041
Main groups of pests and types of plant diseases in the polar-alpine botanical garden and ways to counter them. [Osnovnye gruppy vrediteleĭ i tipy bolezneĭ rasteniĭ v Poliarno-al'piĭskom botanicheskom sadu i mery bor'by s nimi]
Ivanov, S.M., Introduktsionnye issledovaniia na Kol'skom Severe (Introduction researches on the Kola North). Edited by L.L. Viracheva, Apatity, Kol'skiĭ nauchnyĭ tsentr, RAN, 1994, p.71-83, In Russian. 9 refs.
Introduced plants, Plants (botany), Plant physiology, Countermeasures, Russia—Kola Peninsula

49-3042
Characteristics of the development cycle of the fungus *Septoria socia* Pass. [Osobennosti tsikla razvitiia griba *Septoria socia* Pass]
Milina, L.I., Introduktsionnye issledovaniia na Kol'skom Severe (Introduction researches on the Kola North). Edited by L.L. Viracheva, Apatity, Kol'skiĭ nauchnyĭ tsentr, RAN, 1994, p.84-88, In Russian. 4 refs.
Introduced plants, Plants (botany), Plant physiology, Russia—Kola Peninsula

49-3043
Fundamentals of cryogenesis in the lithosphere. [Osnovy kriogeneza litosfery]
Romanovskiĭ, N.N., Moscow, Izd-vo Moskovskogo Universiteta, 1993, 334p., In Russian with English summary and table of contents. Refs. p.324-329.
Geocryology, Taliks, Seasonal freeze thaw, Thermal regime, Permafrost thermal properties, Cryogenic soils, Periglacial processes, Frost heave, Permafrost thickness, Hydrates, Subsea permafrost

49-3044
Landscape regularities in the structure and dynamics of central taiga pine forests of Karelia. [Landshaftnye zakonomernosti struktury i dinamiki srednetaezhnykh sosnovykh lesov Karelii]
Gromtsev, A.N., Petrozavodsk, Karel'skiĭ nauchnyĭ tsentr RAN, 1993, 157p., In Russian. Refs. p.152-157.
Landscape types, Forest land, Forest ecosystems, Trees (plants), Forest fires, Taiga, Peat, Glacial geology, Russia—Karelia

49-3045
Oil and gas bearing basins and regions of Siberia. Volume 5. Tunguska Basin. [Neftegazonosnye basseĭny i regiony Sibiri. Vypusk 5: Tungusskiĭ basseĭn]
Kontorovich, A.E., ed, Novosibirsk, Ob"edinennyĭ institut geologii, geofiziki i mineralogii, SO RAN, 1994, 91p., In Russian. Refs. p.89-91.
Natural resources, Natural gas, Crude oil, Russia—Siberia, Russia—Tunguska Basin

49-3046
Atmosphere-resistance of modified wood for the construction of shafts under the conditions of Western Siberia. [Atmosferostoĭkost' modifitsirovannoĭ drevesiny dlia shakhtostroeniia v usloviiakh Zapadnoĭ Sibiri]
Mashkin, N.A., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Jan. 1994, No.1, p.46-51, In Russian. 4 refs.
Shaft sinking, Cold weather construction, Wood, Wooden structures, Cold weather performance, Construction materials, Strength, Russia—Siberia

49-3047
Industrial roofs for monolithic house building. [Industrial'nye kryshi dlia monolitnogo domostroeniia]
Aĭrapetov, G.A., Panchenko, A.I., Nesvetaev, G.V., Cheremisin, V.V., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Jan. 1994, No.1, p.53-56, In Russian. 8 refs.
Roofs, Frost resistance, Concretes, Houses

49-3048
Methods for building an earthen roadbed in a swamp. [Sposoby vozvedeniia zemlianogo polotna na bolote]
Bazavluk, V.A., Lukashevich, V.N., Kiriakov, E.I., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Jan. 1994, No.1, p.88-91, In Russian. 3 refs.
Roadbeds, Swamps, Geotextiles, Cold weather construction

49-3049
Northern residential house with an interior courtyard. [Severnyĭ zhiloĭ dom s vnutrennim dvorom]
Burkhanov, IU.G., Fominykh, A.IA., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Jan. 1994, No.1, p.109-112, In Russian. 2 refs.
Houses, Design, Cold weather construction

49-3050
Effect of frost heave on foundations and measures to reduce it. [Vozdeĭstvie moroznogo pucheniia gruntov na fundamenty i meropriiatiia po ikh umen'sheniiu]
Fursov, V.V., Baliura, M.V., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Jan. 1994, No.1, p.120-124, In Russian. 5 refs.
Frost heave, Foundations, Frost penetration, Seasonal freeze thaw, Countermeasures, Nomographs

49-3051
Effect of growth form on the evaporation in some subalpine mosses.
Nakatsubo, T., *Ecological research,* Dec. 1994, 9(3), p.245-250, 12 refs.
Plants (botany), Mosses, Plant ecology, Desiccation, Evaporation, Growth, Water balance, Japan—Fuji, Mt.

49-3052
Vegetation structure along the altitudinal gradient at the treeline of Mount Paektu, North Korea.
Šrůtek, M., Kolbek, J., *Ecological research,* Dec. 1994, 9(3), p.303-310, 42 refs.
Forest ecosystems, Vegetation patterns, Revegetation, Classifications, Forest lines, Altitude, Plant ecology, Alpine landscapes, Tundra, North Korea—Paektu, Mount

49-3053
Efflux of carbon dioxide from snow-covered forest floors.
Mariko, S., Bekku, Y., Koizumi, H., *Ecological research,* Dec. 1994, 9(3), p.343-350, 23 refs.
Forest ecosystems, Forest soils, Soil microbiology, Snow cover effect, Thermal insulation, Carbon dioxide, Snow air interface, Vapor diffusion, Seasonal variations, Japan—Yokote, Mt., Japan—Norikura, Mt.

49-3054
^{14}C age corrections in antarctic lake sediments inferred from geochemistry.
Zale, R., *Radiocarbon,* 1994, 36(2), p.173-185, 27 refs.
Limnology, Bottom sediment, Sampling, Radioactive age determination, Accuracy, Geochemistry, Ecology, Glacier oscillation, Antarctica—Boeckella, Lake
Sediment from Lake Boeckella, Antarctic Peninsula, is richer in Ca, Cd, Cu, P, Sr and Zn than that of six other lakes in the area. The elements originate from Adélie penguin guano on the lake shores. Changing Cu and P concentrations in the lake sediment are used as a proxy for penguin influence on the lake sediment from *ca.* 5850 BP to present. A ^{14}C dating model suggests that the ^{14}C correction factor in the lake sediments depends on the penguin proxy, the apparent age of the penguin guano and the amount of particulate carbon originating from the carbon-bearing shales in the watershed. Glacial meltwater and dissolved carbonates do not contain enough "old" carbon to contribute significantly to the correction factor. Ages corrected with the ^{14}C dating model agree with the depth vs. age curve based on independently ^{14}C-dated tephra horizons. The reservoir effect has been constant since at least 5800 BP, implying long-term stability of the currents and water masses in the area. (Auth. mod.)

49-3055
Temperature-snowmelt analysis.
Pick, T.A., Global Climate Change Response Program, Denver, CO, U.S. Bureau of Reclamation, Technical Services Center, Dec. 1994, Var. p.
Snow surveys, Snow water equivalent, Snowmelt, Runoff forecasting, Computer programs, United States—Colorado

49-3056
Studies on avalanches. III. Winter of 1964-65.
Shoda, M., Tokyo, Japanese National Railways, Railway Technical Research Institute, 1965, 26p., In Japanese with English summary. 1 ref.
Avalanches, Avalanche formation, Snow cover stability, Helicopters, Aerial surveys, Japan

49-3057
Studies on avalanches. II. Winter of 1963-64.
Shoda, M., Tokyo, Japanese National Railways, Railway Technical Research Institute, 1964, 26p., In Japanese with English summary. 2 refs.
Avalanches, Avalanche formation, Snow cover stability, Helicopters, Aerial surveys, Japan

49-3058
Basic research on snow disasters. [Sekisetsu saigai no kisoteki kenkyu]
Yoshida, J., Monbusho kagaku kenkyuhi tokutei kenkyu (Ministry of Education Scientific Research Funds. Special study), Sapporo, Hokkaido University, Institute of Low Temperature Science, 1969, 53p. + appends., In Japanese.
Snow cover stability, Snow cover structure, Snow stratigraphy, Snow strength, Snow deformation, Avalanche formation, Avalanche forecasting, Japan

49-3059
Effect of hydrostatic pressure on compressive strength of polycrystalline ice.
Mizuno, Y., *Low temperature science (Teion kagaku). Series A Physical sciences,* 1993, No.52, p.1-13, In Japanese with English summary. 12 refs.
Ice cover strength, Ice pressure, Ice deformation, Ice creep, Ice crystal structure, Strain tests

49-3060
Estimation of net radiation in a forest during the snow melt season.
Nakabayashi, H., Ishikawa, N., Kodama, Y., *Low temperature science (Teion kagaku). Series A Physical sciences,* 1993, No.52, p.15-24, In Japanese with English summary. 5 refs.
Snow air interface, Snow heat flux, Snowmelt, Radiation balance, Forest canopy, Vegetation factors, Japan

49-3061
Snowmelt and meltwater runoff in an alpine basin. I. Seasonal variation in the ablation of a perennial snow patch.
Kodama, Y., Takeuchi, Y., *Low temperature science (Teion kagaku). Series A Physical sciences,* 1993, No.52, p.25-38, In Japanese with English summary. 3 refs.
Snow air interface, Snow heat flux, Snowmelt, Runoff forecasting, Heat balance, Seasonal ablation, Japan

49-3062
Snowmelt and meltwater runoff in an alpine basin. II. Runoff characteristics of meltwater.
Ishii, Y., Nomura, M., Kobayashi, D., *Low temperature science (Teion kagaku). Series A Physical sciences,* 1993, No.52, p.39-50, In Japanese with English summary. 7 refs.
Snow hydrology, Snowmelt, Seepage, Runoff forecasting, Stream flow, Water temperature, Japan

49-3063
Observations of snow cover, air temperature and wind speed in Heilongjiang, China.
Akitaya, E., et al, *Low temperature science (Teion kagaku). Series A Physical sciences,* 1993, No.52, p.51-61, In Japanese with English summary. 7 refs.
Snow air interface, Snow cover stability, Snow stratigraphy, Depth hoar, Snowstorms, Snowdrifts, Wind velocity, Air temperature, Road maintenance, China—Heilongjiang Province

49-3064
Measurement of methane flux in a tundra region near Tiksi, eastern Siberia.
Nakayama, T., Fukuda, M., Sone, T., Nagaoka, D., *Low temperature science (Teion kagaku). Series A Physical sciences,* 1993, No.52, p.63-70, With Japanese summary. 14 refs.
Tundra, Wetlands, Permafrost distribution, Soil air interface, Nutrient cycle, Polar atmospheres, Atmospheric composition, Russia—Yakutia

49-3065
Rotating stage for ultrahigh vacuum applications.
Nakatsubo, S., Segawa, T., Kouchi, A., *Low temperature science (Teion kagaku). Series A Physical sciences,* 1993, No.52, p.71-75, In Japanese with English.summary. 3 refs.
Extraterrestrial ice, Ice sublimation, Planetary environments, Environment simulation, Cryogenics, Low temperature research, Vacuum freezing

49-3066
Modeling and retrieval of snow and sea ice characteristics in the frequency range 6 to 90 GHz.
Grandell, J., Hallikainen, M., *Helsinki University of Technology. Laboratory of Space Technology. Report,* Nov. 1994, No.21, 60p., 22 refs.
Snow surveys, Snow cover distribution, Snow water equivalent, Ice surveys, Sea ice distribution, Ice conditions, Radiometry, Spaceborne photography, Computer programs, Mathematical models

49-3067
Report of pit-wall observations of snow cover in Sapporo 1992-93.
Akitaya, E., Fukuzawa, T., *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1993, No.52, p.1-10, In Japanese with English summary. 3 refs.
Snow surveys, Snow stratigraphy, Snow hardness, Snow density, Snow water equivalent, Snow depth, Japan—Hokkaido

49-3068
Frost depth in the ground under snow cover at Tomakomai experimental forest.
Ishizaki, T., Nakayama, T., Tanaka, Y., *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1993, No.52, p.11-24, In Japanese with English summary. 3 refs.
Snow air interface, Snow depth, Snow cover effect, Soil freezing, Frost penetration, Water balance, Japan—Hokkaido

49-3069
Diurnal variations in electric conductivity of stream water in a headwater basin during the snowmelt period of 1993.
Ishii, Y., Kobayashi, D., Nomura, M., *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1993, No.52, p.25-38, In Japanese with English summary. 4 refs.
Snow composition, Snowmelt, Runoff, Stream flow, Water level, Water chemistry, Electrical resistivity, Diurnal variations, Japan—Hokkaido

49-3070
Melting coefficient of Hisago snow patch in the Daisetsu Mountains.
Kodama, Y., Fukuzawa, T., Takeuchi, Y., *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1993, No.52, p.39-47, In Japanese with English summary. 4 refs.
Snow air interface, Snow hydrology, Snowmelt, Runoff forecasting, Air temperature, Japan

49-3071
Meteorological observation data in Jiayin and Lopei of Heilongjiang Province, northeastern China (1).
Ishii, Y., et al, *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1993, No.52, p.49-67, In Japanese with English summary. 2 refs.
Snowdrifts, Road icing, Air temperature, Meteorological data, China—Heilongjiang Province

49-3072
Atmospheric and oceanographic data report for Saroma-ko Lagoon of the SARES (Saroma-Resolute Studies) Project, 1992.
Shirasawa, K., et al, *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1993, No.52, p.69-167, With Japanese summary. 2 refs.
Ice surveys, Sea ice distribution, Ice conditions, Air ice water interaction, Oceanographic surveys, Water temperature, Salinity, Weather stations, Meteorological data, Japan—Saroma, Lake

49-3073
Distributions of pack ice in the Okhotsk Sea off Hokkaido observed using a sea-ice radar network.
Ishikawa, M., Takatsuka, T., Ikeda, M., Shirasawa, K., Aota, M., *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1993, No.52, p.169-196, In Japanese with English summary.
Ice surveys, Ice reporting, Sea ice distribution, Radar photography, Japan—Hokkaido, Okhotsk Sea

49-3074
Andisols from four different regions of Iceland.
Arnalds, O., Hallmark, C.T., Wilding, L.P., *Soil Science Society of America. Journal,* Jan.-Feb. 1995, 59(1), p.161-169, 44 refs.
Soil formation, Soil structure, Soil classification, Periglacial processes, Arctic landscapes, Eolian soils, Sampling, Geochemistry, Volcanic ash, Iceland

49-3075

Freeze-drying effects on wet and dry soil aggregate stability.

Staricka, J.A., Benoit, G.R., *Soil Science Society of America. Journal,* Jan.-Feb. 1995, 59(1), p.218-223, 16 refs.

Soil aggregates, Soil structure, Frozen ground physics, Stability, Soil tests, Physical properties, Freeze drying, Freeze thaw cycles, Water content

49-3076

Postglacial emergence and distribution of late Weichselian ice-sheet loads in the northern Barents and Kara seas, Russia.

Forman, S.L., et al, *Geology,* Feb. 1995, 23(2), p.113-116, 42 refs.

Marine geology, Glacial geology, Pleistocene, Glacier oscillation, Quaternary deposits, Marine deposits, Ice sheets, Ice volume, Ice loads, Geochronology, Radioactive age determination, Sea level, Barents Sea, Russia—Kara Sea

49-3077

Planar solidification of a finite slab: effects of the pressure dependence of the freezing point.

Conti, M., *International journal of heat and mass transfer,* Jan. 1995, 38(1), p.65-70, 17 refs.

Solidification, Frozen liquids, Phase transformations, Freezing points, Temperature variations, Thermal expansion, Heat transfer, Pressure, Density (mass/volume), Liquid solid interfaces, Stefan problem, Analysis (mathematics)

49-3078

Biomass burning record and black carbon in the GISP2 ice core.

Chýlek, P., Johnson, B., Damiano, P.A., Taylor, K.C., Clement, P., *Geophysical research letters,* Jan. 15, 1995, 22(2), p.89-92, 15 refs.

Ice sheets, Ice cores, Chemical composition, Ice dating, Biomass, Forest fires, Hydrocarbons, Carbon black, Aerosols, Correlation, Periodic variations, Greenland

49-3079

Primary succession of plant assemblages on a glacier foreland—Bødalsbreen, southern Norway.

Vetaas, O.R., *Journal of biogeography,* May 1994, 21(3), p.297-308, 61 refs.

Biogeography, Subarctic landscapes, Trees (plants), Revegetation, Plant ecology, Moraines, Glacier melting, Vegetation patterns, Classifications, Statistical analysis, Norway—Bødalsbreen

49-3080

Molding water content and hydraulic conductivity of compacted soils subjected to freeze/thaw.

Bowders, J.J., Jr., Othman, M.A., *Transportation research record,* 1994, No.1434, p.55-60, 21 refs.

Clay soils, Soil compaction, Soil water, Mechanical tests, Freeze thaw cycles, Frozen ground physics, Water content, Soil structure, Permeability, Statistical analysis

49-3081

Thermal stress restrained specimen test to evaluate low-temperature cracking of asphalt-aggregate mixtures.

Jung, D.W., Vinson, T.S., *Transportation research record,* 1993, No.1417, p.12-20, 9 refs.

Concrete pavements, Concrete aggregates, Bituminous concretes, Cold weather performance, Thermal stresses, Cracking (fracturing), Temperature effects, Low temperature tests, Tensile properties, Fatigue (materials)

49-3082

Growth responses of *Calamagrostis lapponica* to simulated environmental change in the sub-arctic.

Parsons, A.N., et al, *Oikos,* Feb. 1995, 72(1), p.61-66, 27 refs.

Plants (botany), Plant ecology, Grasses, Ecosystems, Subarctic landscapes, Climatic changes, Global warming, Simulation, Growth, Temperature effects, Nutrient cycle, Sweden—Abisko

49-3083

Onset conditions for enhancement of ice accumulation associated with heat-conducting plates located perpendicularly to heat-transfer surfaces. Part 1. Analysis for still water.

Hirata, T., Ishikawa, M., *Heat transfer—Japanese research,* July 1994, 22(7), p.731-746, Translated from Japanese Society of Mechanical Engineers, Transactions, 1993. 6 refs.

Ice water interface, Latent heat, Ice formation, Ice volume, Heat transfer, Phase transformations, Analysis (mathematics), Plates, Thermal conductivity

49-3084

Methodology to interpret downvalley lake sediments as records of neoglacial activity: Coast Mountains, British Columbia, Canada.

Souch, C., *Geografiska annaler,* 1994, 76A(3), p.169-185, 38 refs.

Pleistocene, Geomorphology, Alpine landscapes, Lacustrine deposits, Glacial deposits, Glacial geology, Glacier oscillation, Sedimentation, Geochronology, Canada—British Columbia—Coast Mountains

49-3085

Ventilating attics to minimize icings at eaves.

Tobiasson, W., Buska, J., Greatorex, A., MP 3585, *Home energy,* Mar./Apr. 1995, 12(2), p.35-38, For other versions see 48-3860 or 49-1609.

Cold weather construction, Buildings, Roofs, Icicles, Ice prevention, Ventilation

49-3086

Ice-structure interaction model.

Sodhi, D.S., MP 3586, Mechanics of geomaterial interfaces, Amsterdam, Elsevier Science B.V., 1995, p.57-75, 22 refs.

Ice solid interface, Ice cover strength, Ice loads, Ice deformation, Ice pressure, Ice breaking, Offshore structures, Mathematical models

A theoretical model to simulate ice-structure interaction during intermittent crushing is developed on the basis of experimental results from indentation tests, which were conducted by pushing vertical flat indentors into the edges of freshwater floating ice sheets. An event during intermittent crushing comprises three phases: (1) a loading phase, (2) an extrusion phase and (3) a separation phase. The differential equations and solutions for each phase of interaction are presented along with conditions for termination of each phase. Besides simulating interaction during intermittent crushing, the model simulates the transition from intermittent to continuous crushing at high rates of indentation, as found during indentation tests. A few results from the model are presented to show the effect of various parameters on the velocity at which transition from intermittent to continuous crushing takes place and on the frequency of intermittent crushing.

49-3087

Transfer coefficients of sensible heat on a snowmelt surface.

Ishikawa, N., Kodama, Y., *Meteorology and atmospheric physics,* 1994, 53(3/4), p.233-240, 17 refs.

Snow air interface, Snow heat flux, Snow surface, Snow melting, Snowmelt

49-3088

Reef drowning during the last deglaciation: evidence for catastrophic sea-level rise and ice-sheet collapse.

Blanchon, P., Shaw, J., *Geology,* Jan. 1995, 23(1), p.4-8, 49 refs.

Paleoclimatology, Climatic changes, Insolation, Oceanography, Sea level, Ice sheets, Glacier oscillation, Glacier melting

Elevations and ages of drowned *Acropora palmata* reefs from the Caribbean-Atlantic region document three catastrophic, meter-scale sea-level-rise events during the last deglaciation. These catastrophic rises were synchronous with (1) collapse of the Laurentide and antarctic ice sheets, (2) dramatic reorganization of ocean-atmosphere circulation, and (3) releases of huge volumes of subglacial and proglacial meltwater. This correlation suggests that release of stored meltwater periodically destabilized ice sheets, causing them to collapse and send huge fleets of icebergs into the Atlantic. Massive inputs of ice not only produced catastrophic sea-level rise, drowning reefs and destabilizing other ice sheets, but also rapidly reduced the elevation of the Laurentide ice sheet, flipping atmospheric circulation patterns and forcing warm equatorial waters into the frigid North Atlantic. (Auth. mod.)

49-3089

Relict subglacial deltas on the Antarctic Peninsula outer shelf.

Larter, R.D., Vanneste, L.E., *Geology,* Jan. 1995, 23(1), p.33-36, 30 refs.

Pleistocene, Marine geology, Glacial geology, Glacier oscillation, Seismic surveys, Grounded ice, Ice shelves, Subglacial observations, Deltas, Antarctica—Antarctic Peninsula

The first deep-tow boomer survey on the antarctic continental margin has revealed relict subglacial deltas on the outer continental shelf off the Antarctic Peninsula. Progradation of subglacial deltas is thought to take place at the grounding lines of ice streams which flow on deforming subglacial till. Acoustic characteristics and estimation of likely sediment transport rates suggest that these features were produced by late-stage readvance of grounding lines during the waning of the last ice sheet that covered the shelf. This readvance could have taken place during the Younger Dryas (12.9-11.6 ka), but changes in sea level and climate may not be the only important controls on subglacial delta formation. The discovery of relict subglacial deltas on the outer shelf is consistent with the hypothesis that the grounded ice sheet in these areas was low profile and fast flowing. If low-profile grounded ice extended to the shelf edge in many places around Antarctica at times of glacial maximum, this could explain the greater glacial maximum ice-sheet extent in interpretations based on offshore data, compared with reconstruction based on onshore data and numerical glaciological models. (Auth. mod.)

49-3090

Rates of chemical denudation and CO_2 drawdown in a glacier-covered alpine catchment.

Sharp, M.J., Tranter, M., Brown, G.H., Skidmore, M., *Geology,* Jan. 1995, 23(1), p.61-64, 16 refs.

Alpine landscapes, Geochemistry, Carbon dioxide, Atmospheric composition, Climatic factors, Glacial hydrology, Glacier melting, Weathering, Meltwater, Ice cover effect, Ion diffusion, Switzerland—Valais

49-3091

Seismic images of the Brooks Range, arctic Alaska, reveal crustal-scale duplexing.

Fuis, G.S., Levander, A.R., Lutter, W.J., Wissinger, E.S., Moore, T.E., Christensen, N.I., *Geology,* Jan. 1995, 23(1), p.65-68, 20 refs.

Seismic surveys, Seismic reflection, Geologic structures, Geologic processes, Tectonics, United States—Alaska—Brooks Range

49-3092

Ground-based microwave remote sensing of meteorological variables.

Westwater, E.R., Atmospheric remote sensing by microwave radiometry. Edited by M.A. Janssen, New York, John Wiley & Sons, 1993, p.145-213, 94 refs.

DLC QC871.J26

Atmospheric physics, Remote sensing, Sounding, Radiometry, Microwaves, Cloud physics, Water content, Aircraft icing, Radiation balance, Brightness, Analysis (mathematics)

49-3093

Polar atmosphere and snow chemistry.

Barrie, L.A., Delmas, R.J., Scientific Conference of the International Global Atmospheric Chemistry Project(IGAC), Eilat, Israel, Apr. 18-22, 1993. Proceedings. Global atmospheric-biospheric chemistry. Edited by R.G. Prinn and Environmental science research, Vol.48, New York, Plenum Press, 1994, p.149-164, 51 refs.

DLC QC879.6.P73

Polar atmospheres, Air pollution, Ice cores, Snow impurities, Sampling, Atmospheric composition, Aerosols, Ozone, Global change, Greenland, Antarctica

In IGAC's (International Global Atmospheric Chemistry Project) Polar Atmosphere and Snow Chemistry (PASC) Activity, a group of environmental scientists are studying global change in the polar regions. Experiments include atmospheric composition measurements, atmosphere-snow exchange studies and snow/ice composition measurements on glaciers. The latter are situated at different altitudes and locations in the polar regions, forming a network of glacial atmospheric sampling sites that represent time since at least the last interglacial period. This paper highlights some of the recent results obtained by the PASC group pertaining to global change. Data from both polar regions are included. (Auth. mod.)

49-3094

Terrestrial biosphere-atmosphere exchange in high latitudes.

Reeburgh, W.S., Roulet, N.T., Svensson, B.H., Scientific Conference of the International Global Atmospheric Chemistry Project(IGAC), Eilat, Israel, Apr. 18-22, 1993. Proceedings. Global atmospheric-biospheric chemistry. Edited by R.G. Prinn and Environmental science research, Vol.48, New York, Plenum Press, 1994, p.165-178, 64 refs.

DLC QC879.6.P73

Polar atmospheres, Tundra, Wetlands, Ecosystems, Soil air interface, Natural gas, Soil microbiology, Vapor transfer, Global change, Climatic factors, United States—Alaska, Canada—Yukon Territory

49-3095

Statistical analyses of katabatic winds in the neighborhood of Terra Nova Bay, Antarctica.

Argentini, S., Ocone, R., Fiocco, G., Mastrantonio, G., International Symposium on Acoustic Remote Sensing of the Atmosphere and Oceans, 5th, New Delhi, India, Feb. 6-9, 1990. Proceedings. Edited by S.P. Singal, New Delhi, Tata McGraw-Hill Publishing Co., 1990, p.283-293, 10 refs.

DLC QC871.I48

Polar atmospheres, Atmospheric boundary layer, Turbulent boundary layer, Wind velocity, Sodar, Statistical analysis, Antarctica—Terra Nova Bay

Katabatic winds constitute one of the main features of the antarctic circulation. They originate on the Antarctic Plateau and can reach extremely high speed in their descent towards the low level coastal areas. The katabatic winds, a boundary layer phenomenon, are only weakly coupled to the air flow above and display a high degree of persistence. They are mainly governed by surface temperature inversion and by terrain slope. Statistical analyses of data collected during two successive antarctic summer campaigns in the Terra Nova Bay area with a three-axis monostatic sodar system are presented. In the first campaign the system operated at the Italian base on the coast while in the latter the same system was installed at a distance of about 30 km on the Nansen Ice Sheet. Examples of katabatic wind regimes in the two sites are shown.

49-3096

Alone to the North Pole.

Ousland, B., Storvik, K.O., *The sciences,* July-Aug. 1994, 34(4), p.10-14.

Expeditions, Cold weather survival, Human factors, North Pole

49-3097

Box model study of the Greenland Sea, Norwegian Sea, and Arctic Ocean.

Robitaille, D.Y., Mysak, L.A., Darby, M.S., *Climate dynamics,* Jan. 1995, 11(1), p.51-70, 24 refs.

Climatology, Simulation, Oceanography, Air ice water interaction, Ice cover effect, Ice cover thickness, Ocean currents, Water transport, Convection, Thermodynamics, Ice models, Mathematical models, Arctic Ocean, Greenland Sea, Norwegian Sea

49-3098

Tropical climate and glacier hydrology: a case study in Bolivia.

Ribstein, P., Tiriau, E., Francou, B., Saravia, R., *Journal of hydrology,* Feb. 1995, 165(1-4), p.221-234, 19 refs.

Mountain glaciers, Glacial hydrology, Glacier melting, Glacier surveys, Runoff, Climatic changes, Climatic factors, Seasonal variations, Hydrologic cycle, Bolivia—Cordillera Real

49-3099

Simulated water balance of Scots pine stands in Sweden for different climate change scenarios.

Gärdenäs, A.I., Jansson, P.E., *Journal of hydrology,* Mar. 1995, 166(1-2), p.107-125, 36 refs.

Subpolar regions, Forest canopy, Forest soils, Water balance, Hydrology, Climatic changes, Trees (plants), Snow cover effect, Transpiration, Temperature effects, Mathematical models, Simulation, Sweden

49-3100

Temperature estimation for low-temperature cracking of asphalt concrete.

Stoffels, S.M., Lauritzen, W.R., Roque, R., *Transportation research record,* 1993, No.1417, p.158-167, 8 refs.

Concrete pavements, Bituminous concretes, Cold weather performance, Cracking (fracturing), Temperature variations, Thermal stresses, Forecasting, Computer programs, Simulation

49-3101

Laboratory measurements of radiation characteristics of frozen sandy soils.

Il'in, V.A., Slobodchikova, S.V., *Journal of communications technology and electronics,* Nov. 1994, 39(9), p.141-146, Translated from Radiotekhnika i elektronika, 1994, no.4. 12 refs.

Frozen ground physics, Radiation absorption, Remote sensing, Microwaves, Brightness, Dielectric properties, Sands, Temperature effects, Simulation, Radiometry

49-3102

Environmental phenomena of the Beaufort Sea observed during the Leads Experiment.

Fett, R.W., Burk, S.D., Thompson, W.T., Kozo, T.L., *American Meteorological Society. Bulletin,* Nov. 1994, 75(11), p.2131-2145, 32 refs.

Sea ice distribution, Meteorological data, Ice openings, Synthetic aperture radar, Drift stations, Ice floes, Wind factors, Cloud cover, Atmospheric boundary layer, Air ice water interaction, Beaufort Sea

49-3103

Glaciers of the Bolivian Andes: a photogrammetric-cartographic inventory of Bolivian glaciers as the basis for a climatic interpretation and the potential for economic exploitation. [Die Gletscher der bolivianischen Anden: eine photogrammetrisch-kartographische Bestandsaufnahme der Gletscher Boliviens als Grundlage für klimatische Deutungen und Potential für die wirtschaftliche Nutzung]

Jordan, E., Erdwissenschaftliche Forschung. Bd.23, Stuttgart, Franz Steiner, 1991, 365p. + appends. and enclos., In German with English and Spanish summaries. Refs. p.316-340.

DLC GB2461.J67

Glacier surveys, Photogrammetric surveys, Mapping, Stereomapping, Mountain glaciers, Alpine landscapes, Glacial hydrology, Glacier oscillation, Snow line, Glacier mass balance, Climatology, Water supply, Economic analysis, Bolivia—Andes Mountains

49-3104

Responses of vegetation on northern part of Mt. Daxinganling to strongly enforced permafrost environment and environmental disturbances.

Zhang, Q.B., *Journal of glaciology and geocryology,* June 1994, 16(2), p.97-103, In Chinese with English summary. 3 refs.

Forest ecosystems, Plant ecology, Revegetation, Vegetation patterns, Forest fires, Forest tundra, Permafrost distribution, China—Greater Khingan Range

49-3105

Experimental and theoretical investigation on the cutting resistance of frozen soil.

Zhang, Z.X., Yu, Q., *Journal of glaciology and geocryology,* June 1994, 16(2), p.104-112, In Chinese with English summary. 6 refs.

Frozen ground strength, Excavation, Trenching, Mathematical models

49-3106

Creep and creep strength of frozen soil.

Ma, W., Wu, Z.W., Sheng, Y., *Journal of glaciology and geocryology,* June 1994, 16(2), p.113-118, In Chinese with English summary. 7 refs.

Frozen ground strength, Frozen ground compression, Soil creep, Soil tests, Mathematical models

49-3107

Seasonal variation of mass balance and altitude dependency of total melt in the glacierized source area of the Urumqi River.

Kang, E.S., Liu, C.H., Wang, C.Z., Han, T.D., Zhang, W.C., *Journal of glaciology and geocryology,* June 1994, 16(2), p.119-127, In Chinese with English summary. 6 refs.

Glacier surveys, Mountain glaciers, Glacier mass balance, Glacial hydrology, Meltwater, Runoff, Glacial rivers, River flow, Mathematical models, China—Tian Shan

49-3108

Study on data interpolation and prediction of annual mass balance of Glacier No.1 at the source.

Ji, Z.P., Tang, M.C., *Journal of glaciology and geocryology,* June 1994, 16(2), p.128-137, In Chinese with English summary. 10 refs.

Glacier surveys, Mountain glaciers, Glacier mass balance, Glacial meteorology, Ice air interface, Air temperature, Soil temperature, Mathematical models, China—Tian Shan

49-3109

Water resource transformation and water quality variation in Urumqi River Basin.

Qu, Y.G., Luo, H.Z., *Journal of glaciology and geocryology,* June 1994, 16(2), p.139-146, In Chinese with English summary. 2 refs.

River basins, Water reserves, Water chemistry, Water pollution, China—Tian Shan

49-3110

Climatic characteristic and glacial runoff in the source of Urumqi River.

Yang, X.Y., Han, T.D., *Journal of glaciology and geocryology,* June 1994, 16(2), p.147-155, In Chinese with English summary. 3 refs.

Glacier surveys, Mountain glaciers, Glacial hydrology, Meltwater, Runoff, Climatic factors, China—Tian Shan

49-3111

Mathematical modeling on fractionation process of oxygen isotope in atmospheric precipitation.

Zhang, X.P., Yao, T.D., *Journal of glaciology and geocryology,* June 1994, 16(2), p.156-165, In Chinese with English summary. 6 refs.

Atmospheric circulation, Atmospheric composition, Cloud physics, Precipitation (meteorology), Oxygen isotopes, Isotope analysis, Mathematical models

49-3112

Analysis of characteristics of evaporation in centre of Tibetan Plateau.

Zhang, Y.S., Pu, J.C., Ohta, T., *Journal of glaciology and geocryology,* June 1994, 16(2), p.166-172, In Chinese with English summary. 4 refs.

Soil air interface, Evaporation, Atmospheric circulation, Humidity, China—Qinghai-Xizang Plateau

49-3113

Fluctuations of lakes and their environments since last glaciation in Amdo area, Tibet.

Shen, Y.P., Xu, D.M., *Journal of glaciology and geocryology,* June 1994, 16(2), p.173-180, In Chinese with English summary. 8 refs.

Alpine glaciation, Lakes, Lacustrine deposits, Water level, Paleoclimatology, China—Qinghai-Xizang Plateau

49-3114

Correlation analyses between snow cover in Northern Hemisphere and summer precipitation in eastern China.

Wang, G.Y., Zeng, Q.Z., *Journal of glaciology and geocryology,* June 1994, 16(2), p.181-184, In Chinese with English summary. 9 refs.

Snow cover distribution, Snow cover effect, Snow air interface, Atmospheric circulation, Precipitation (meteorology), China

49-3115

Application of acoustic emission testing on glaciers.

Sun, B., Wang, L.W., *Journal of glaciology and geocryology,* June 1994, 16(2), p.185-189, In Chinese with English summary. 4 refs.

Glacier surveys, Ice acoustics, Icequakes

49-3116

New progress on the glaciological and Quaternary glaciation research in China since the 1980s.

Shi, Y.F., Li, J.J., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.1-14, In Chinese. 74 refs.

Glacier surveys, Glaciology, Ice cores, Paleoclimatology, Research projects, Antarctica, China, Himalaya Mountains

The resurgence of Chinese glaciological and Quaternary research since 1978 after the Cultural Revolution is summarized, particularly in Antarctica, China, and the Himalayas. The emphasis in antarctic glaciological research has been on past and present climates and indications of possible future global change as recorded in ice cores and snow pits from the ice sheet.

49-3117

Strength characteristics of frozen sandy soil.

Wu, Z.W., Ma, W., Zhang, C.Q., Shen, Z.Y., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.15-20, In Chinese with English summary. 7 refs.

Frozen ground strength, Frozen ground compression, Sands, Shear strength

49-3118

Approximate calculating method of some design parameters in drilling shaft of artificial freezing.

Li, S.X., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.21-30, In Chinese with English summary. 3 refs.

Soil freezing, Artificial freezing, Freezing front, Frozen ground thermodynamics, Frozen ground strength, Soil stabilization, Shaft sinking, Mathematical models

49-3119

Relations of oxygen isotopic composition in precipitation with temperature and precipitation amount in some regions of China.

Zhang, X.P., Yao, T.D., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.31-40, In Chinese with English summary. 20 refs.

Atmospheric composition, Atmospheric circulation, Air temperature, Air masses, Precipitation (meteorology), Oxygen isotopes, Isotope analysis, China

49-3120

Climatic feature at the Tanggula Mountain Pass on the centre of Tibetan Plateau.

Zhang, Y.S., Pu, J.C., Ohata, T., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.41-48, In Chinese with English summary. 4 refs.

Atmospheric circulation, Weather stations, Meteorological data, Air temperature, Wind (meteorology), Radiation balance, China—Qinghai-Xizang Plateau

49-3121

Correlation between Northern Hemisphere snow cover and summer temperature over eastern China.

Wang, G.Y., Zeng, Q.Z., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.49-52, In Chinese with English summary. 7 refs.

Snow cover distribution, Snow cover effect, Snow air interface, Atmospheric circulation, Air temperature, China

49-3122

Application of MMFA model on date prediction of river freeze-up.

Zhang, X.C., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.53-59, In Chinese with English summary. 2 refs.

River ice, Freezeup, Ice forecasting, Mathematical models

49-3123

Quaternary glaciation on the west slope of Mt. Gongga.

Ma, Q.H., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.60-65, In Chinese with English summary. 9 refs.

Alpine glaciation, Moraines, Snow line, Quaternary deposits, Pleistocene, Geochronology, Paleoclimatology, China—Sichuan Province

49-3124

Permafrost and climate in future.

Baulin, V.V., Cherniad'ev, V.P., Chekhovskiĭ, A.L., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.66-69, In Chinese, translated from Russian. 4 refs.

Permafrost distribution, Permafrost heat transfer, Soil air interface, Global warming

49-3125

Study of environmental development of forest covered frozen soil region on Mt. Maxian near Lanzhou.

Song, W.X., Zhang, X.M., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.70-74, In Chinese with English summary. 3 refs.

Frozen ground thermodynamics, Forest soils, Forest ecosystems, Plant ecology, Revegetation, Mathematical models, China—Lanzhou

49-3126

Confined shear test on sea ice.

Yue, Q.J., Zhou, X.A., Shen, W., Chen, X.Y., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.75-79, In Chinese with English summary. 6 refs.

Sea ice, Ice cover strength, Ice deformation, Ice pressure, Shear strength, Strain tests

49-3127

Insulation plates as a measure against ice damage.

Jin, N.C., Qu, X.M., Zhang, Y.Y., Lin, Y., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.80-84, In Chinese with English summary.

Reservoirs, Water intakes, Ice loads, Ice control, Thermal insulation

49-3128

Some problems on the research of astronomical theory of ice age.

Zhou, S.Z., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.85-92, In Chinese with English summary. 27 refs.

Ice age theory, Pleistocene, Paleoclimatology, Glaciation, Solar radiation, Global change

The astronomical, also called the Milankovitch, theory of the Ice Age is now widely accepted, though there are still some question whether the Ice Age occurred at high or low eccentricity of the Earth's orbit; whether summer or winter insolation played the greater role; and why glaciations between the northern and southern hemispheres were synchronous. It is suggested that the Ice Age occurred at low eccentricity because then the mean sun-earth distance became long; that lower temperatures and insolation in summer rather than winter were more decisive; and that reduction in global atmospheric CO_2 concentrations may have produced synchronicity between the two hemispheres despite the counter effect of the Earth's precession.

49-3129

On comparison of Chinese geocryological terms with English and Russian.

Liu, J.R., Qiu, G.Q., *Journal of glaciology and geocryology,* Mar. 1994, 16(1), p.93-95, In Chinese. 4 refs.

Permafrost, Geocryology, Terminology

49-3130

Hudson's Bay Company ships' log-books as sources of sea ice data, 1751-1870.

Catchpole, A.J.W., Climate since A.D. 1500. Edited by R.S.Bradley and P.D. Jones, London, Routledge, 1992, p.17-39, 51 refs.

DLC QC884.C576

Sea ice distribution, Marine transportation, Ice conditions, Ice navigation, History, Periodic variations, Recording, Canada—Hudson Bay, Labrador Sea

49-3131

Arctic from Svalbard to Severnaya Zemlya: climatic reconstructions from ice cores.

Tarussov, A., Climate since A.D. 1500. Edited by R.S.Bradley and P.D. Jones, London, Routledge, 1992, p.505-516, 19 refs.

DLC QC884.C576

Climatology, Climatic changes, Air temperature, Ice sheets, Ice cores, Ice dating, Stratigraphy, Glacier ablation, Glacier oscillation, Periodic variations, Norway—Svalbard, Russia—Severnaya Zemlya

49-3132

Bibliography of the European polar seas and adjacent areas. [Bibliographie des europäischen Nordmeeres und angrenzender Meeresgebiete]

Machoczek, D., ed, Hamburg, Bundesamt für Seeschiffahrt und Hydrographie, 1990, 184p., zu Nr.2329, In German with English summary.

DLC Z6004.P6 M33

Bibliographies, Oceanography, Meteorology, Oceanographic surveys, Subpolar regions, Marine biology, Sea ice distribution, Weather observations, Arctic Ocean, Barents Sea, Greenland Sea, Iceland Sea, Norwegian Sea

49-3133

State of the art on description and classification of frozen soils and some suggestions.

Xu, X.Z., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.193-201, In Chinese with English summary. 6 refs.

Frozen ground, Soil classification, Standards, China

49-3134

World spatial characteristics of oxygen isotope ratio in precipitation.

Zhang, X.P., Yao, T.D., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.202-210, In Chinese with English summary. 10 refs.

Atmospheric circulation, Atmospheric composition, Precipitation (meteorology), Humidity, Oxygen isotopes, Isotope analysis

49-3135

River ice modelling in lower reaches of the Yellow River and its utility in Sanmen Gorge Reservoir regulation.

Chen, Z.T., Ke, S.J., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.211-217, In Chinese with English summary. 2 refs.

River ice, Ice forecasting, Ice cracks, River flow, Flow control, Reservoirs, Mathematical models, China—Yellow River

49-3136

Climatic conditions of polar-type glaciers developing in China.

Huang, M.H., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.218-223, In Chinese with English summary. 16 refs.

Mountain glaciers, Alpine glaciation, Glacier formation, Snow line, Climatic factors, Polar atmospheres, China

49-3137

Application of the radial-splitting method to determining tensile strength of frozen soil.

Shen, Z.Y., Liu, Y.Z., Peng, W.W., Chang, X.X., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.224-231, In Chinese with English summary. 3 refs.

Frozen ground strength, Tensile properties, Soil tests, Strain tests

49-3138

Study of naturally thawing and digging method of gold mining in seasonal frozen ground.

Gao, M., Tong, B.L., Lin, J.F., Zhang, Q.B., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.232-237, In Chinese with English summary. 2 refs.

Frozen ground strength, Frozen ground thermodynamics, Ground thawing, Thaw depth, Mining, Excavation, Gold, China

49-3139

Study on the spatial overlaying relationship between winter snow cover and vegetal cover in Xilin Gole steppe of Inner Mongolia by using remote sensing data.

Yong, S.P., Tong, C., Yong, W.Y., Pei, H., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.238-244, In Chinese with English summary. 2 refs.

Snow surveys, Snow cover distribution, Snow cover effect, Vegetation patterns, Plant ecology, Grasses, Steppes, Spaceborne photography, China—Inner Mongolia

49-3140

Experimental researches on salt heaving of sulphate treated soil with different dry densities.

Fei, X.L., Li, B., Wang, J.C., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.245-250, In Chinese with English summary. 2 refs.

Frozen ground strength, Frozen ground chemistry, Frost heave, Frost protection, Soil stabilization, Saline soils, Freeze thaw tests

49-3141

Changing characteristics of hydraulic diffusivity in unsaturated soil.

Deng, Y.S., Xu, X.Z., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.251-258, In Chinese with English summary. 3 refs.

Soil water migration, Soil texture, Soil structure, Soil water, Water content, Moisture detection

49-3142

Creep of polycrystalline ice under cyclic loading at -1°C.

Gao, X.Q., Huang, M.H., Zhang, J.Y., Jin, Z.M., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.259-264, In Chinese with English summary. 8 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice creep, Ice crystal structure, Strain tests

49-3143

Void properties of till from the Altay Mountains and the Tianshan Mountains, Xinjiang, China.

Yi, C.L., Cui, Z.J., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.265-273, In Chinese with English summary. 12 refs.

Glacial deposits, Moraines, Outwash, Soil structure, Soil texture, Porosity, China—Tian Shan, China—Altai Mountains

49-3144

Response of cryosphere to global warming and reduced rise in sea level.

Li, P.J., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.274-282, In Chinese with English summary. 27 refs.

Ice sheets, Glacier mass balance, Glacier oscillation, Ice air interface, Sea level, Global warming

Several recent reports of polar ice-sheet growth concluded that accumulation rates in Antarctica vary in proportion to mean annual air temperature; recent accumulation rates (1975-1985) are 20% above the long-term mean (1930-1985). This increase in accumulation rate should contribute to a lowering of sea level of 0.1-1.2 mm/a. Measurement of Greenland surface elevation by satellite altimetry suggests that the ice-sheet elevation is increasing. The spatially averaged elevation change is 0.23 m/a thickening. The implied global sea level depletion is 0.2 to 0.4 mm/a. It does appear that growth in ice sheets will damp future sea level rise and a reduced threat of sea level rise is likely. On the other hand, present studies supporting recent ice sheet growth depend on limited measurements, and are challenged by a simple model interpretation. (Auth. mod.)

49-3145

Applications of ground probing radar to geological investigation on ground in cold regions.

Gu, Z.W., *Journal of glaciology and geocryology,* Sep. 1994, 16(3), p.283-288, In Chinese with English summary. 11 refs.

Permafrost surveys, Ground ice, Ice detection, Electromagnetic prospecting, Radio echo soundings, Subsurface investigations

49-3146

Primary production in the Weddell Sea pack ice during the austral summer.

Fritsen, C.H., Mordy, C.W., Sullivan, C.W., *Antarctic journal of the United States,* 1993, 28(5), p.124-126, 2 refs.

Biomass, Microbiology, Marine biology, Algae, Pack ice, Sea ice, Antarctica—Weddell Sea

During the drift (Feb. to May 1992) of Ice Station Weddell 1 (ISW-1), time-series investigations of microbial communities were conducted within several types of antarctic pack ice during an austral autumn and winter. The results from these investigations are being analyzed to determine rates of primary production and nutrient dynamics within the sea ice and water column in the western Weddell Sea. Some results suggest that the perennial pack ice of the western Weddell Sea supports an autumn bloom that may be a significant source of new production within this ice-covered region.

49-3147

***Polarstern* "ANT X/3" austral autumn in the ice 1992: sea-ice community studies.**

Garrison, D.L., Thomsen, H.A., *Antarctic journal of the United States,* 1993, 28(5), p.126-128, 7 refs.

Marine biology, Cryobiology, Plankton, Algae, Sea ice

As part of the ANT X/3 research cruise aboard the icebreaker *Polarstern* (Mar. 27 to May 19, 1993), the authors examined the ecology of ice biota in the southeastern Weddell Sea during the autumn-to-winter transition. The studies focused on the following: incorporation, activity, and survival of organisms in newly formed and older sea ice; comparison of planktonic and ice assemblages; and systematic studies of some of the previously neglected and/or more unusual ice-associated flagellates. The findings suggest that algae survive and have photosynthetic activity within ice floes well into the austral autumn under natural conditions of low light, low temperatures, and high salinities.

49-3148

Study on cosmic dust particles in the antarctic ice, snow and non-antarctic region and their origin.

Wang, D.D., Dai, C.D., *Antarctic research (Chinese edition),* Dec. 1994, 6(4), p.1-13, In Chinese with English summary. Refs. p.12-13.

Ice composition, Snow composition, Cosmic dust

A large number of cosmic dust particles, micrometeorites and volcanic dust bands have been found and collected in antarctic ice, snow and glacial sediments, especially in meteorite-concentrated regions. Extraterrestrial spherules also have been discovered from the stratosphere and deep-sea sediments. On the basis of distributive characteristics, cosmic dust particles are classified into interplanetary dust particles and interstellar dust particles. According to their origin, cosmic dust particles can be divided into cometary origin, asteroidal origin, ablation from meteorites and interstellar origin. The criteria for identifying cosmic dust particles have been established, and the origin of cosmic dust particles is discussed. (Auth.)

49-3149

Ground-based measurements of column amounts of ozone and UV-B over Zhongshan Station, Antarctica, in the 93 "ozone hole".

Zhou, X.J., Zheng, X.D., Lu, L.H., Guo, S., *Antarctic research (Chinese edition),* Dec. 1994, 6(4), p.14-22, In Chinese with English summary. 16 refs.

Ozone, Ultraviolet radiation, Atmospheric composition, Air temperature, Antarctica—Zhongshan Station

The Brewer ozone spectrophotometer at Zhongshan Station provided hourly ground-based measurements of O_3 and UV-B in the 1993 ozone hole. These measurements define the column ozone abundance and the UV-B radiation environment of the region and, in conjunction with a daily record of sky conditions and the upper atmospheric temperature, permit a general understanding of the close relationship between the ozone and stratospheric temperature, as well as the role of ozone and cloud cover in regulating UV-B radiation levels at the surface in the period of ozone depletion. Low column ozone abundance (near or below 220DU) was detected from Aug. to the end of Nov., and a normal abundance (near or above 260DU) abundance and the temperature from 70hPa to 50hPa altitude were observed. Daily variations of UV-B radiation are greatly controlled by the solar zenith angle (SZA), ozone and the sky conditions. Preliminary statistical analyses show that noontime biologically weighted damaging UV-B (DUV-B) flux is a negative exponential function of slant ozone column abundance. Spectral scanning shows that in the UV-B range, ground surface irradiance of shorter wavelengths is influenced by the changes of the ozone column abundance. (Auth.)

49-3150

Problems of urban planning and construction in new areas of large Siberian cities (in the example of the city of Tomsk). [K voprosam gradostroitel'nogo osvoeniia novykh territoriĭ v krupnykh gorodakh Sibiri (na primere g. Tomska)]

Boldyrev, V.F., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* Feb. 1994, No.2, p.95-98, In Russian.

Urban planning, Cold weather construction, Economic development, Russia—Tomsk

49-3151

Comparison of deep ice cores.

Alley, R.B., Gow, A.J., Johnsen, S.J., Kipfstuhl, J., Meese, D.A., Thorsteinsson, T., MP 3587, *Nature,* Feb. 2, 1995, 373(6513), p.393-394, 6 refs.

Ice cores, Ice composition, Climatic changes, Greenland

49-3152

Photodesorption from low-temperature water ice in interstellar and circumsolar grains.

Westley, M.S., Baragiola, R.A., Johnson, R.E., Baratta, G.A., *Nature,* Feb. 2, 1995, 373(6513), p.405-407, 29 refs.

Extraterrestrial ice, Clouds (meteorology), Cosmic dust, Ultraviolet radiation, Desorption

49-3153

Seasonal precipitation timing and ice core records.

Steig, E.J., Grootes, P.M., Stuiver, M., *Science,* Dec. 16, 1994, 266(5192), p.1885-1886, 4 refs. For the article being discussed, see 48-2667.

Climatic changes, Air temperature, Paleoclimatology, Precipitation (meteorology), Ice cores, Greenland

49-3154

On the 1992-1993 operation of the Lake Erie-Niagara River ice boom.

International Niagara Working Committee, Sep. 1993, 35p. + figs., WDCA No.93000821.

Lake ice, River ice, Ice conditions, Ice control, Ice booms

49-3155

Airborne Gamma Radiation Snow Survey Program and Satellite Hydrology Program. User's guide, version 4.0.

U.S. National Weather Service. Office of Hydrology. National Operational Hydrologic Remote Sensing Center, Minneapolis, MN, Jan. 1992, 54p. + appends., WDCA No.93000448, 62 refs.

Snow surveys, Snow cover distribution, Snow water equivalent, Soil water, Runoff forecasting, Aerial surveys, Spaceborne photography, Data transmission, Data processing, United States

49-3156

Assessment of the interaction of solar radiation (0.3 to 3.0 μm) with a seasonally dynamic snow covered sea ice volume, from microwave (2.0 to 5.0 cm) scattering.

Barber, D.G., *University of Waterloo. Institute for Space and Terrestrial Science. Earth Observations Laboratory. Report,* [1993], ISTS-EOL-TR93-002, 266p., WDCA No.93000260, Refs. p.231-241.

Ice surveys, Ice detection, Ice reporting, Air ice water interaction, Snow ice interface, Snow air interface, Ice electrical properties, Snow electrical properties, Albedo, Backscattering, Synthetic aperture radar

49-3157

North Slope of Alaska: the Atmospheric Radiation Measurement Program's window on high latitude phenomena.

Zak, B.D., Stamnes, K.H., Atmospheric Radiation Measurement (ARM) Science Team Meeting, 2nd, Denver, CO, Oct. 26-30, 1991. Proceedings, Washington, D.C., U.S. Department of Energy, Environmental Sciences Division, 1992, p.151-153, WDCA No.93000131, 2 refs.

Polar atmospheres, Atmospheric circulation, Radiation balance, Weather stations, Site surveys, United States—Alaska—North Slope

49-3158

Dangerous glacier lakes and their outburst features in the Tibetan Himalayas.

Xu, D.M., Feng, Q.H., *Bulletin of glacier research,* Aug. 1994, No.12, p.1-8, 8 refs.

Glacier surveys, Glacial lakes, Icebound lakes, Lake bursts, Floods, Accidents, Himalaya Mountains, China—Qinghai-Xizang Plateau

49-3159

Features of regime and mass exchange of some glaciers on Central Asia periphery.

Aĭzin, V.B., Aĭzin, E.M., *Bulletin of glacier research,* Aug. 1994, No.12, p.9-24, 28 refs.

Glacier surveys, Mountain glaciers, Alpine glaciation, Glacier alimentation, Glacier mass balance, Glacial meteorology, Ice air interface

49-3160

Seasonal change of the troposphere in the early summer of 1993 over central Tibet observed in the Tanggula mountains.

Endo, N., Ueno, K., Yasunari, T., *Bulletin of glacier research,* Aug. 1994, No.12, p.25-30, 12 refs.

Atmospheric circulation, Atmospheric boundary layer, Air temperature, Humidity, Heat flux, Seasonal variations, China—Qinghai-Xizang Plateau

49-3161

Measurements of ground temperature and soil moisture content in the permafrost area in Tanggula Mountains, Tibetan Plateau.

Yabuki, H., Ohata, T., Ohta, T., Zhang, Y.S., *Bulletin of glacier research,* Aug. 1994, No.12, p.31-38, 3 refs.

Permafrost surveys, Permafrost thermal properties, Permafrost heat transfer, Permafrost hydrology, Active layer, Soil air interface, Soil temperature, Soil water, China—Qinghai-Xizang Plateau

49-3162

Characteristics of precipitation distribution in Tanggula, monsoon, 1993.

Ueno, K., et al, *Bulletin of glacier research,* Aug. 1994, No.12, p.39-47, 16 refs.

Atmospheric circulation, Precipitation (meteorology), Soil air interface, China—Qinghai-Xizang Plateau

49-3163

Hydrological observations in the Tanggula Mountains, the Tibetan Plateau—discharge, soil moisture and ground temperature.

Ohta, T., Yabuki, H., Koike, T., Ohata, T., Koike, M., Zhang, Y.S., *Bulletin of glacier research,* Aug. 1994, No.12, p.49-56, 7 refs.

Permafrost hydrology, Glacial hydrology, Meltwater, Runoff, Soil temperature, Soil water, China—Qinghai-Xizang Plateau

49-3164

Glaciological observations in the Tanggula Mts., Tibetan Plateau.

Seko, K., Pu, J.C., Fujita, K., Ageta, Y., Ohata, T., Yao, T.D., *Bulletin of glacier research,* Aug. 1994, No.12, p.57-67, 13 refs.

Glacier surveys, Mountain glaciers, Glacier oscillation, Glacier mass balance, Glacier heat balance, Glacial hydrology, China—Qinghai-Xizang Plateau

49-3165

Photometric analysis of a 100 m ice core from Asuka Camp, East Antarctica: preliminary results.

Azuma, N., Goto-Azuma, K., Nakawo, M., *Bulletin of glacier research,* Aug. 1994, No.12, p.69-75, 5 refs.

Ice cores, Drill core analysis, Firn stratification, Ice density, Ice structure, Depth hoar, Ice dating, Ice optics, Photometry, Antarctica—Asuka Station

Reflective light intensity was measured continuously on a vertically split flat surface of a 100 m ice core from Asuka Camp, East Antarctica with a newly developed photometric device for rapid stratigraphic analyses. The data obtained by the photometric measurement were compared with the density data and visual stratigraphy. The reflectivity and its standard deviation showed good correlations with density and grain size respectively at the shallower part of the core. This fact suggests that the new photometric method provides stratigraphic information such as the degree of depth hoar development and indications of annual boundaries in the core. (Auth. mod.)

49-3166

Meteorological observations in the Tanggula Mountains, Qingzang (Tibet) Plateau from 1989 to 1993.

Ohata, T., Ueno, K., Endoh, N., Zhang, Y.S., *Bulletin of glacier research,* Aug. 1994, No.12, p.77-86, 6 refs.

Atmospheric circulation, Precipitation (meteorology), Evaporation, Hydrologic cycle, Heat flux, China—Qinghai-Xizang Plateau

49-3167

Outline of the study project on the role of snow and ice in the water cycle on Qingzang Plateau, 1990-1993.

Ageta, Y., Yao, T.D., Ohata, T., *Bulletin of glacier research,* Aug. 1994, No.12, p.87-94, 12 refs.

Snow air interface, Snow cover effect, Snow heat flux, Glacial meteorology, Atmospheric circulation, Atmospheric boundary layer, Hydrologic cycle, China—Qinghai-Xizang Plateau

49-3168

Monitoring ground surface condition on Tibetan Plateau by using satellite remote sensing.

Koike, T., et al, *Bulletin of glacier research,* Aug. 1994, No.12, p.95-104, 6 refs.

Snow air interface, Snow cover effect, Glacial meteorology, Atmospheric circulation, Atmospheric boundary layer, Heat balance, Hydrologic cycle, Spaceborne photography, China—Qinghai-Xizang Plateau

49-3169

Mass balance of glaciers in the east Kunlun and Tanggula mountains, Tibetan Plateau.

Pu, J.C., Yao, T.D., *Bulletin of glacier research,* Aug. 1994, No.12, p.105-107, 2 refs.

Glacier surveys, Mountain glaciers, Glacier mass balance, Glacier oscillation, China—Qinghai-Xizang Plateau

49-3170

Hydraulic properties of soils in Tanggula Mountains.

Kubota, J., Yabuki, H., Igarashi, H., Ohta, T., *Bulletin of glacier research,* Aug. 1994, No.12, p.109-113, 6 refs.

Mountain soils, Soil water migration, Soil water, Soil analysis, China—Qinghai-Xizang Plateau

49-3171

Some thoughts on snowloads.

Tobiasson, W., MP 3588, *Structure,* Winter 1995, 2(1), p.14-15.

Snow loads, Buildings, Building codes, Design criteria, Accidents

49-3172

Canadian sea ice atlas from microwave remotely sensed imagery: July 1987 to June 1990.

LeDrew, E.F., Barber, D., Agnew, T., Dunlop, D., *Environment Canada. Atmospheric Environment Service. Climatological studies,* 1992, No.44, 80p., WDCA No.93000129, In English and French. 68 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice reporting, Ice detection, Air ice water interaction, Radiometry, Spaceborne photography, Image processing, Canada

49-3173

Filchner-Ronne Ice Shelf Programme, Report No.8 (1994).

Oerter, H., ed, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1994, 48p., Refs. passim. For individual papers see 49-3174 through 49-3182 or F-52292 through F-52300.

Research projects, Ice shelves, Snow, Ice models, Ice water interface, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

This report contains 10 written summaries of talks presented at the 9th International Workshop of the Filchner-Ronne Ice Shelf Programme (FRISP). The meeting was held at Bergen, Norway, on June 5-6, 1994. The papers collected in this volume present an overview of FRISP and of the cooperation of participating groups. ERS-1 data, used for the determination of special surface features and ice velocities, are included in the report, as are accumulation studies over long distances by means of airborne radar measurements in Queen Maud Land.

49-3174

Reflection amplitudes of 40 MHz monopulse radio echo sounding: correlation with ice core data and ice dynamics.

Blindow, N., Filchner-Ronne Ice Shelf Programme, Report No.8 (1994), edited by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1994, p.5-8, 9 refs.

Radio echo soundings, Dielectric properties, Ice cores, Data processing, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Correlation of radio echo sounding data and core data is addressed with some notes on forward modelling and inversion of electromagnetic reflection data, and a description of the application of forward modelling. Some aspects of radio echo sounding amplitudes and ice dynamics are discussed.

49-3175

Airborne radio echo sounding on the Evans flowline, Ronne Ice Shelf.

Corr, H., Popple, M., Filchner-Ronne Ice Shelf Programme, Report No.8 (1994), edited by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1994, p.9-11, 3 refs.

Radio echo soundings, Ice shelves, Airborne equipment, Antarctica—Ronne Ice Shelf

Jan. of 1994 saw the first antarctic deployment of a new airborne radio echo system. The radar flew for some 70 hours on dedicated glaciological work and 30 hours in support of an aero-gravity campaign. A figure shows the flight tracks of 8 sorties, representing 24 flying hours, from the remote field camps of Ski-Hi and Haag Nunataks.

49-3176

Melting and freezing rates beneath Filchner-Ronne Ice Shelf from a 3D-ocean circulation model.

Determann, J., Grosfeld, K., Gerdes, R., Hinze, H., Filchner-Ronne Ice Shelf Programme, Report No.8 (1994), edited by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1994, p.12-29, 15 refs.

Ice water interface, Ice shelves, Freezing rate, Ice melting, Ocean currents, Models, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Melting and ice accretion provide fresh-water fluxes as well as latent heat fluxes across the ice-shelf/ocean boundary, causing horizontal pressure gradients and initiating a so-called "thermohaline circulation" in the sub-ice-shelf cavity. By making use of a 3D ocean circulation model, the authors try to quantify the horizontal extent of melting and freezing areas below the FRIS. This becomes especially important because of the influence of melting and accretion on ice-shelf rheology. The formation of ISW (Ice Shelf Water), which is a source for AABW (Antarctic Bottom Water), makes the ice shelf-ocean interaction important for the global abyssal water mass distribution.

49-3177

Tidal induced melting of the Ekström Ice Shelf in the southeastern Weddell Sea.

Fahrbach, E., Nixdorf, U., Oerter, H., Rohardt, G., Filchner-Ronne Ice Shelf Programme, Report No.8 (1994), edited by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1994, p.20-23.

Ice shelves, Ice melting, Oceanographic surveys, Tidal currents, Ice water interface, Antarctica—Ekström Ice Shelf, Antarctica—Weddell Sea

Interaction between ocean and ice shelf represents an important process of water mass formation and affects the stability and the development of an ice shelf. To investigate the relevant processes, CTD-measurements were carried out under the Ekström Ice Shelf in the southeastern Weddell Sea during austral summer 1992-93. The temperature and salinity profiles measured approximately 8 km in-shore from the edge of the ice shelf show a significant layering of the water column and time variability. Three distinct layers were observed. The top layer which is in contact with the base of the ice shelf extends approximately to 20 m. In this layer temperature and salinity normally increase continuously with depth. An intermediate layer with a thickness of about 50 m is characterized by a temperature maximum and salinity still increasing with depth. Depth and temperature of the maximum change significantly during a tidal cycle. In the bottom layer of about 100 m thickness, temperature and salinity increase with depth, however salinity has a weaker vertical gradient than in the upper layers. Due to the increasing salinity from top to bottom, the profile is stable in spite of the temperature inversion.

49-3178

Non-destructive high resolution density measurements of the B15 ice core.

Gerland, S., Kipfstuhl, J., Graf, W., Minikin, A., Filchner-Ronne Ice Shelf Programme, Report No.8 (1994), edited by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1994, p.24-28, 5 refs.

Ice cores, Ice density, Measuring instruments, Ice physics, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Density is one of the basic physical properties of ice. It can be determined conventionally by the principle of Archimedes and weighing. A non-destructive method is based on the attenuation of gamma rays. Here the authors present density data of the upper 165 m of the B15 ice core drilled in the central Filchner-Ronne Ice Shelf in 1992.

49-3179

Snow radar measurement of the accumulation gradient from the coast to 3000 m elevation, Dronning Maud Land.

Holmlund, P., Richardson, C., Filchner-Ronne Ice Shelf Programme, Report No.8 (1994), edited by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1994, p.29-35.

Snow accumulation, Snow depth, Measuring instruments, Mapping, Traverses, Antarctica—Neumayer Station

Snow layers have successfully been mapped in Queen Maud Land by using a snow radar system along two traverses from the coast up to 3000 m elevation. The recordings show large variations in accumulation pattern along the 2300 km measured profiles. These traverses were part of the Swedish contribution to the International Trans-Antarctic Scientific Expedition (ITASE). The snow radar used is a continuous wave step-frequency radar based on a Hewlett-Packard Network Analyzer (8753C). Data was stored on an IBM 486 computer and later on optical discs. The snow radar was operated in the frequency range 800-2300 MHz by using a pair of AEL APN-106AA antennae. The equipment was installed in, and operated from, a Hägglunds terrain carrier. The snow radar data will be calibrated by using snow core data sampled during this expedition, where annual layers will be separated by analyzing the oxygen isotope ratio. Conversely, snow radar recordings will be used to interpolate data between borehole sites. (Auth.)

49-3180

Numerical modelling of Filchner-Ronne Ice Shelf.

Jenkins, A., Vaughan, D.G., Doake, C., Filchner-Ronne Ice Shelf Programme, Report No.8 (1994), edited by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1994, p.36-38, 2 refs.

Ice shelves, Ice models, Velocity measurement, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

A version of the two-dimensional, depth-integrated finite element model described by MacAyeal and Thomas (1982) has been applied to the Filchner-Ronne Ice Shelf. The version of the model currently in use has no time dependency; it simply solves the equations describing the balance of horizontal stresses, given a distribution of ice thicknesses, to yield ice velocity vectors. The elliptical partial differential equations require boundary conditions all around the model domain. At the grounded margins of the ice shelf, velocity magnitudes and directions are specified, while sea water pressure provides the boundary condition at the ice front. An ice hardness parameter must also be specified at all points in the domain, and this is derived from a nominal temperature profile at each point. The solution procedure requires iteration until the ice viscosity, a function of the effective strain rate as well as the specified hardness, is consistent with the computed velocity field.

49-3181

Ekström grounding line experiments—first results.

Mayer, C., Huybrechts, P., Filchner-Ronne Ice Shelf Programme, Report No.8 (1994), edited by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1994, p.39-44, 1 ref.

Ice shelves, Glacier mass balance, Ice surface, Ice models, Geodetic surveys, Seismic velocity, Antarctica—Ekström Ice Shelf

During the 1993-94 season a detailed study of ice dynamics and mass balance was carried out in the southern grounding line zone of the Ekström Ice Shelf. The experiments aimed at collecting enough data on topography, ice thickness, ice velocity and surface deformation along a flowline across the assumed grounding line to be able to determine the stress- and strain rate conditions in a vertical plane across the transition zone. These data will then form the basis for a modeling study focusing on this crucial area of the ice sheet-ice shelf system. Such a study should provide valuable insight into the dynamics of the transition zone between grounded and floating ice.

49-3182

Two-dimensional modelling of stress fields in selected cross sections of Filchner-Ronne-Schelfeis (Antarctica).

Sandhäger, H., Thyssen, F., Filchner-Ronne Ice Shelf Programme, Report No.8 (1994), edited by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1994, p.45-47, 7 refs.

Ice shelves, Ice models, Fracturing, Stresses, Ice structure, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Results are given of several applications of two-dimensional modellings to different selected cross sections of the central part of FRIS. These show that in most cases the simulated stress fields within the cross sections can explain the formation of the observed pattern of fractures in close vicinity to the sections. However, the model investigations also point to the fact that on the one hand in those ice shelf areas where the ice dynamic courses only can be recorded three-dimensionally, limited statements about the real stress conditions in the ice can be deduced from the results of the two-dimensionally vertical model calculations.

49-3183

Historical fluctuations of calving glaciers in south and west Greenland.

Weidick, A., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1994, No.161, p.73-79, 70 refs.

Glacier surveys, Ice sheets, Glacier oscillation, Glacier ablation, Calving, Glacial hydrology, Climatic factors, Statistical analysis, Periodic variations, Greenland

49-3184

Surge of Storstrømmen, a large outlet glacier from the inland ice of north-east Greenland.

Reeh, N., Bøggild, C.E., Oerter, H., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1994, No.162, p.201-209, 24 refs.

Glacier flow, Glacier surges, Glacial hydrology, Glacier ablation, Calving, Ice shelves, Ice water interface, Velocity measurement, Periodic variations, Greenland

49-3185

Carbonate accumulation of the inner continental shelf of Maine: a modern consequence of Late Quaternary glaciation and sea-level change.

Barnhardt, W.A., Kelley, J.T., *Journal of sedimentary research,* Jan. 2,1995, A65(1), p.195-207, 50 refs.

Pleistocene, Marine geology, Marine deposits, Sedimentation, Bottom sediment, Geomorphology, Glaciation, Glacial erosion, Sea level, Quaternary deposits, Seismic surveys, United States—Maine

49-3186

Anti-lock brakes on snow and ice.

Eddie, R., *Automotive engineering,* Apr. 1994, 102(4), p.47-49.

Vehicles, Brakes (motion arresters), Skid resistance, Cold weather performance, Rubber snow friction, Rubber ice friction, Accidents, Air temperature, Temperature variations, Temperature effects, Mechanical tests, Traction

49-3187

Temporal variation of PCB concentrations in the St. Lawrence River (Canada) and four of its tributaries.

Quémerais, B., Lemieux, C., Lum, K.R., *Chemosphere,* Mar. 1994, 28(5), p.947-959, 33 refs.

Watersheds, Estuaries, Water pollution, Suspended sediments, Air pollution, Snow impurities, Snowmelt, Runoff, Sampling, Seasonal variations, Correlation, Canada—Quebec—St. Lawrence River

49-3188

Periglacial landforms at Giant's Castle, Natal Drakensberg, South Africa.

Boelhouwers, J.C., *Permafrost and periglacial processes,* Aug.-Sep. 1994, 5(3), p.129-136, With French summary. 27 refs.

Geomorphology, Landforms, Classifications, Periglacial processes, Geocryology, Frost action, Patterned ground, Cryogenic structures, South Africa

49-3189

Evidence for a cyclic variation of permafrost temperatures in northern Alaska.

Osterkamp, T.E., Zhang, T., Romanovsky, V.E., *Permafrost and periglacial processes,* Aug.-Sep. 1994, 5(3), p.137-144, With French summary. 20 refs.

Permafrost surveys, Permafrost heat balance, Thermal regime, Frozen ground temperature, Surface temperature, Temperature measurement, Temperature variations, Periodic variations, Boreholes, Snow cover effect, Solar radiation, United States—Alaska

49-3190

Glaciological constraints on protalus rampart development.

Ballantyne, C.K., Benn, D.I., *Permafrost and periglacial processes,* Aug.-Sep. 1994, 5(3), p.145-153, With French summary. 31 refs.

Periglacial processes, Talus, Geomorphology, Sediment transport, Glacial geology, Glacier flow, Firn, Snow cover effect, Snow loads, Slope processes

49-3191

Sedimentary structure of a debris flow cone (Vars, French Alps). [Structures sédimentaires d'un cone de flots de débris (Vars, Alpes Françaises Méridionales)]

Bertran, P., Texier, J.P., *Permafrost and periglacial processes,* Aug.-Sep. 1994, 5(3), p.155-170, In French with English summary. 35 refs.

Alpine landscapes, Periglacial processes, Sediment transport, Rock mechanics, Mass movements (geology), Stratification, Slope processes, Soil structure, Microstructure, France—Alps

49-3192

Protalus ramparts and related features along the Niagara Escarpment, Niagara Peninsula, Ontario.

Tinkler, K.J., Pengelly, J.W., *Permafrost and periglacial processes,* Aug.-Sep. 1994, 5(3), p.171-184, With French summary. 19 refs.

Talus, Pleistocene, Periglacial processes, Landforms, Sediment transport, Sedimentation, Snow cover effect, Lithology, Geomorphology, Paleoclimatology, Canada—Ontario

49-3193

Water migration and ice segregation in the transition zone between thawed and frozen soil.

Solomatin, V.I., Xu, X.Z., *Permafrost and periglacial processes,* Aug.-Sep. 1994, 5(3), p.185-190, With French summary. 6 refs.

Geocryology, Permafrost mass transfer, Permafrost hydrology, Clay soils, Soil freezing, Cryogenic structures, Mechanical tests, Soil water migration, Ice lenses, Frozen ground mechanics, Snow cover effect

49-3194

Changes in hydrogeologic regimes in permafrost regions due to climatic change.

Michel, F.A., van Everdingen, R.O., *Permafrost and periglacial processes,* Aug.-Sep. 1994, 5(3), p.191-195, With French summary. 18 refs.

Permafrost transformation, Climatic changes, Ground ice, Ice melting, Permafrost hydrology, Hydrogeology, Suprapermafrost ground water, Water flow

49-3195

Late Quaternary glacial-interglacial changes in sediment composition at the East Greenland continental margin and their paleoceanographic implications.

Nam, S.I., Stein, R., Grobe, H., Hubberten, H.W., *Marine geology,* Jan. 1995, 122(3), p.243-262, 66 refs.

Marine geology, Pleistocene, Paleoclimatology, Oceanography, Ocean currents, Sedimentation, Ice rafting, Glacier oscillation, Quaternary deposits, Marine deposits, Isotope analysis, Radioactive age determination, Greenland Sea

49-3196

Effects of increased nitrogen and phosphorus availability on the photosynthesis and nutrient relations of three arctic dwarf shrubs from Svalbard.

Baddeley, J.A., Woodin, S.J., Alexander, I.J., *Functional ecology,* Dec. 1994, 8(6), p.676-685, 40 refs.

Plant ecology, Plants (botany), Tundra, Nutrient cycle, Photosynthesis, Growth, Biomass, Environmental tests, Climatic factors, Norway—Svalbard

49-3197

Studies of the soil atmosphere and related physical characteristics in peat forest soils.

Magnusson, T., *Forest ecology and management,* Aug. 1994, 67(1-3), p.203-224, 39 refs.

Forest soils, Subarctic landscapes, Peat, Soil tests, Soil chemistry, Soil air interface, Vapor diffusion, Aeration, Seasonal variations, Organic soils, Sweden

49-3198

Modern surge of glacier comes to an end.

Molnia, B.F., *Eos,* Nov. 22, 1994, 75(47), p.549.

Glaciology, Glacier surges, Glacier oscillation, Periodic variations, United States—Alaska—Bering Glacier

49-3199

Demise of Sverdrup Basin: Late Cretaceous-Paleogene sequence stratigraphy and forward modeling.

Ricketts, B.D., Stephenson, R.A., *Journal of sedimentary research,* Nov. 15, 1994, B64(4), p.516-530, 72 refs.

Pleistocene, Tectonics, Stratigraphy, Geologic structures, Geologic processes, Subsidence, Sedimentation, Geography, Canada—Northwest Territories—Sverdrup Basin

49-3200

Eelgrass meadows in a low arctic environment, the northeast coast of James Bay, Québec.

Lalumière, R., Messier, D., Fournier, J.J., McRoy, C.P., *Aquatic botany,* Mar. 1994, 47(3-4), p.303-315, 27 refs.

Plants (botany), Plant ecology, Grasses, Shores, Littoral zone, Subarctic landscapes, Growth, Biomass, Sampling, Canada—Quebec—James Bay

49-3201

Distribution of $\delta^{18}O$ in the Arctic Ocean: Implications for the fresh water balance of the halocline and the sources of deep and bottom waters. [Die Verteilung von $\delta^{18}O$ im Arktischen Ozean: Implikationen für die Süßwasserbilanz der Halokline und die Quellen des Tiefen- und Bodenwassers]

Bauch, D., *Berichte zur Polarforschung,* 1995, No.159, 144p., With German summary. Refs. p.109-115.

Hydrogeochemistry, Hydrography, Meltwater, Isotope analysis, Rivers, Water temperature, Sea ice, Ocean currents, Arctic Ocean, Barents Sea, Russia—Laptev Sea

49-3202

German polar research since the turn of the century and the influence of Erich von Drygalski. [Die deutsche Polarforschung seit der Jahrhundertwende und der Einfluß Erich von Drygalskis]

Lüdecke, C., *Berichte zur Polarforschung,* 1995, No.158, 340p. + 72p. appends., In German with English summary. This work is the unaltered version of a dissertation which was submitted to the Fachbereich Mathematik der Ludwig Maximilians Universität zu München in October 1993. Refs p.305-326.

Expeditions, Research projects, Polar regions

Since Drygalski repeatedly dealt with concerns of polar research in his publications until 1944, he became a natural reference of the work presented here. This treatise covers the period from the turn of the century until WWII; within this time frame the first three German antarctic expeditions took place under the leadership of Drygalski (1901-03), Wilhelm Filchner (1911-1912), and Alfred Ritscher (1938-1939). These expeditions as well as the failed Schröder-Stranz Svalbard Expedition (1912-1913), Alfred Wegener's expeditions to Greenland (1929, 1930-31), the Aeroarctic expedition aboard a zeppelin to the Arctic Ocean (1931) and the participation in the II International Polar Year (1932-33) are analyzed in detail. Also provided are supplementary data dealing with the planning of some expeditions which were not carried out. (Auth. mod.)

49-3203

Current flow in the north-west Weddell Sea.

Barber, M., Crane, D., *Antarctic science,* Mar. 1995, 7(1), p.39-50, 39 refs.

Oceanographic surveys, Ocean currents, Tidal currents, Sea ice, Antarctica—Weddell Sea, —Scotia Sea

Properties of the surface and bottom circulation in the northwest Weddell and south Scotia seas are examined. The bottom currents were recorded at heights from 5-800 m above the seabed, and surface velocities were obtained from the drift tracks of ARGOS buoys deployed in ice floes. The tidal regime is mixed and the power of motions at inertial frequencies is highly variable and most dominant in the Scotia Sea. Flow is influenced by topography, effects of which are seen in eddy features and the damping of inertial motions in some areas. The sea ice motion is shown to be influenced by the topography at very low frequencies whilst tidal periodicities observed in the northwestern Weddell Sea are below the noise threshold in the region of the study. In this area the higher frequency ice motion is mainly wind-driven with little of the energy being transferred to the underlying deep water. (Auth.)

49-3204

Forecasting the performance of reinforced concrete structures under complex effects of an environmental and technological nature. [Prognozirovanie povedeniia zhelezobetonnykh konstruktsiĭ pri slozhnykh vozdeĭstviiakh prirodnogo i tekhnogennogo kharaktera]

Almazov, V.O., et al, *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* Nov. 1994, No.11, p.10-15, In Russian. 7 refs.

Reinforced concretes, Concrete structures, Analysis (mathematics), Frost resistance, Freeze thaw cycles

49-3205

Scientific-applied conference "Problems of wooden architecture in Siberia, the Far North and Far East". [Nauchno-prakticheskaia konferentsiia "Problemy dereviannoĭ arkhitektury Sibiri, Kraĭnego Severa i Dal'nego Vostoka"]

Pivkin, V.M., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* Nov. 1994, No.11, p.151-153, In Russian.

Wooden structures, Meetings, Design criteria, Russia—Siberia, Russia—Far East, Russia—Far North

49-3206

Experimental investigation of the heat shielding properties of a metal casing with cell-like horizontal air seals. [Eksperimental'noe issledovanie teplozashchitnykh svoĭstv metallicheskoĭ opalubki s ustroĭstvom iacheistykh gorizontal'nykh vozdushnykh prosloek]

Terekhov, V.I., Gnyria, A.I., Bystrushkina, R.I., Astanin, A.V., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* July-Aug. 1994, No.7-8, p.54-59, In Russian. 3 refs.

Heat transfer, Thermal conductivity, Winter concreting

49-3207

Effect of the microclimate of rooms and initial moisture content of material on the heat and moisture regime of a single-layer arbolite enclosure. [Vliianie mikroklimata pomeshcheniia i nachal'nogo vlagosoderzhaniia materiala na teplovlazhnostnyĭ rezhim odnosloĭnogo arbolitovogo ograzhdeniia]

Nikitina, L.M., Timoshenko, A.T., Popov, G.G., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* July-Aug. 1994, No.7-8, p.68-72, In Russian. 4 refs.

Cold weather operation, Cold weather construction, Indoor climates, Moisture, Russia—Yakutia

49-3208

Basis for the use of a reagent prepared from byproducts of nitrogen ammonium phosphate fertilizer production as antifreeze (Report 1). [Obosnovanie ispol'zovaniia reagenta, izgotovlennogo iz otkhodov proizvodstva nitroammofoski, v kachestve antiobledenitelia (Soobshchenie 1)]

Taranovskaia, S.I., Sergutkina, O.R., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* July-Aug. 1994, No.7-8, p.117-119, In Russian. 6 refs. For Report 2 see 49-3211; Report 3: 49-4173.

Antifreezes, Manufacturing

49-3209

Environmental protection measures during excavation using hydromechanization in the winter. [Prirodookhrannye mery pri vypolnenii zemlianykh rabot sposobom gidromekhanizatsii v zimnee vremia]

Roshchupkin, D.V., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* Sep.-Oct. 1994, No.9-10, p.74-76, In Russian. 2 refs.

Environmental protection, Excavation, Cold weather construction

49-3210

Ways of increasing the construction of highways in regions of Western Siberia. [Puti intensifikatsii stroitel'stva avtomobil'nykh dorog v raĭonakh Zapadnoĭ Sibiri]

Efimenko, V.N., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* Sep.-Oct. 1994, No.9-10, p.88-93, In Russian. 8 refs.

Roads, Cold weather construction, Russia—Siberia

49-3211

Basis for the use of a reagent prepared from byproducts of nitrogen ammonium phosphate fertilizer production as antifreeze (Report 2). [Obosnovanie ispol'zovaniia reagentov, izgotovlennykh iz otkhodov proizvodstva nitroammofoski, v kachestve antiobledeniteleĭ (Soobshchenie 2)]

Sergutkina, O.R., Taranovskaia, S.I., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* Sep.-Oct. 1994, No.9-10, p.119-122, In Russian. 6 refs. For Report 1 see 49-3208; Report 3: 49-4173.

Antifreezes, Manufacturing

49-3212

Mountain weather forecasts using a mesoscale atmospheric model.

Gibson, C., *Avalanche review,* Jan. 1995, 13(3), p.1,8, 2 refs.

Precipitation (meteorology), Weather forecasting, Avalanche forecasting, Computerized simulation, United States—Utah

49-3213

Man down.

Heywood, L., *Avalanche review,* Jan. 1995, 13(3), p.2-3.

Avalanche triggering, Blasting, Military equipment, Explosives, Accidents, United States—California—Sierra Nevada

49-3214

Alpine Meadows artillery accident.

Abromeit, D., *Avalanche review,* Jan. 1995, 13(3), p.3.

Avalanche triggering, Blasting, Military equipment, Explosives, Accidents, United States—California—Sierra Nevada

49-3215

Effect of GAZ-EX installations on the snowpack Glory Bowl slide path, Teton Pass, Wyoming.

Elder, K., Newcomb, R., *Avalanche review,* Feb. 1995, 13(4), p.1,4,5, 2 refs.

Avalanche triggering, Blasting, Explosives, United States—Wyoming

49-3216

Application of decision trees to predicting avalanche activity.

Davis, R.E., Elder, K., MP 3589, *Avalanche review,* Feb. 1995, 13(4), p.3,7.

Avalanche forecasting, Snow cover stability, Computerized simulation

49-3217

NRCS SNOTEL System: Mountain snowpack data for avalanche forecasting.

Palmer, P.L., *Avalanche review,* Feb. 1995, 13(4), p.6.

Snow surveys, Avalanche forecasting, Data transmission

49-3218

Stuffblock stability test.

Birkeland, K.W., Johnson, R., *Avalanche review,* Feb. 1995, 13(4), p.8.

Avalanche forecasting, Snow cover stability, Snow survey tools

49-3219
Cold weather lessons.
Seeley, R.S., *Independent energy,* Feb. 1995, 25(2), p.33-35.
Electric power, Cold weather operation, Cold weather performance, Cost analysis, United States—Virginia

49-3220
Comparison of commercial colorimetric and enzyme immunoassay field screening methods for TNT in soil.
Myers, K.F., McCormick, E.F., Strong, A.B., Thorne, P.G., Jenkins, T.F., MP 3590, *U.S. Army Corps of Engineers. Waterways Experiment Station. Installation Restoration Research Program. Technical report,* Dec. 1994, IRRP-94-4, 28p., 15 refs.
Soil pollution, Soil chemistry, Soil tests, Military facilities, Explosives
A study comparing two commercially available methods of field screening for TNT in soil used 99 soil samples from the Naval Surface Warfare Center, Crane, IN. All soil samples were analyzed using a commercial colorimetric method (EnSys) and a commercial enzyme immunoassay method (D TECH). The results were compared with those from the standard reversed-phase high performance liquid chromatography (RP-HPLC) laboratory method (SW846 Method 8330). The authors suggest that the D TECH kit is best suited to use in a pure field screening mode, where quantitative results are taken from laboratory analyses. Quantitative results from the EnSys kit appear to be of sufficient quality to permit rapid decisions in the field as to whether TNT concentrations are above or below an action concentration. When used according to manufacturer's directions, the D TECH kit produces results much more rapidly, since the EnSys kit requires that soils be dried prior to use.

49-3221
Technical manual for a coupled sea-ice/ocean circulation model (version 1).
Hedström, K.S., *U.S. Minerals Management Service. Alaska Outer Continental Shelf Region. OCS study,* Apr. 1994, MMS 94-0020, 117p., 40 refs.
Air ice water interaction, Sea ice distribution, Drift, Ice forecasting, Ice models, Ocean currents, Atmospheric circulation, Computer programs, Mathematical models

49-3222
Remote sensing data acquisition, analysis and archival. Volume 1. Final report.
Stringer, W.J., Dean, K.G., Groves, J.E., *U.S. Minerals Management Service. Alaska Outer Continental Shelf Region. OCS study,* Mar. 25, 1993, MMS 93-0038, 36p. + appends., 5 refs. For papers included in Volume 2, Appendices, see 46-2727, 46-2731, 46-3181, 47-2365, and 49-3223.
Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice edge, Oil spills, Spaceborne photography, Image processing, Data processing, Bering Sea, Chukchi Sea, Beaufort Sea

49-3223
Effects of winter storms on offshore ice in the Arctic Ocean.
Byers, C.A., *U.S. Minerals Management Service. Alaska Outer Continental Shelf Region. OCS study. Vol.2. Appendix D,* Mar. 25, 1993, MMS 93-0038, 139p., M.S. thesis submitted to the University of Alaska Fairbanks. 44 refs.
Ice air interface, Drift, Sea ice distribution, Ice deformation, Polar atmospheres, Atmospheric disturbances, Storms, Wind factors, Wind pressure, Statistical analysis

49-3224
Associations between antarctic katabatic flow and the upper level winter vortex.
Simmonds, I., Law, R., *International journal of climatology,* Apr. 1995, 15(4), p.403-421, 26 refs.
Polar atmospheres, Atmospheric circulation, Climatic factors, Wind direction, Atmospheric disturbances, Simulation, Topographic effects, Atmospheric physics, Thermodynamics
This paper addresses the extent to which modifications to the surface wind field over Antarctica impact on the upper level winter vortex. This is approached by performing two sensitivity studies with a general circulation model. The first experiment eliminates the katabatic outflow from the continent by removing the slope; the second experiment weakens the surface flow by increasing the surface momentum drag coefficient over Antarctica. The results show a weakened upper level circulation in the no-topography experiment but a strengthened vortex in the increased-drag experiment. The different response is related to the effect of the boundary forcings on the thermal structure of the atmosphere. In the no-topography simulation, significant warming occurs throughout the antarctic troposphere and this is apparently associated with changes in cyclone behavior. This appears to be the dominant effect on the upper level vortex. In the drag case the impact on temperature is much smaller but is still an important influence on the upper level circulation. (Auth. mod.)

49-3225
Simple shape-from-shading algorithm applied to images of ice-covered terrain.
Cooper, A.P.R., *IEEE transactions on geoscience and remote sensing,* Nov. 1994, 32(6), p.1196-1198, 10 refs.
Ice sheets, Remote sensing, Sensor mapping, Height finding, Topographic surveys, Snow cover effect, Snow optics, Scattering, Image processing, Terrain
Snow surfaces in the polar regions have uniform reflecting properties over large areas. Slopes are usually low; in Antarctica, they rarely exceed 2° except in mountainous regions. Such low slopes permit simplification of the scattering law, allowing the use of an efficient algorithm for extracting height information from images. (Auth.)

49-3226
Comparison of eastern North American seismic strain-rates to glacial rebound strain rates.
James, T.S., Bent, A.L., *Geophysical research letters,* Sep. 15, 1994, 21(19), p.2127-2130, 15 refs.
Pleistocene, Ice sheets, Glacial geology, Isostasy, Tectonics, Ice loads, Seismology, Correlation

49-3227
Singularity free approach to post glacial rebound calculations.
Fang, M., Hager, B.H., *Geophysical research letters,* Sep. 15, 1994, 21(19), p.2131-2134, 14 refs.
Pleistocene, Ice sheets, Glacial geology, Isostasy, Tectonics, Ice loads, Viscosity, Mathematical models

49-3228
Elements of stratospheric and tropospheric chemistry.
Wayne, R.P., NATO Advanced Study Institute on Low-temperature Chemistry of the Atmosphere, Maratea, Italy, Aug. 29-Sep. 11, 1993. Proceedings. Edited by G.K. Moortgat et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.21, Berlin, Springer-Verlag, 1994, p.21-48, 28 refs.
DLC QC879.6.L69
Polar atmospheres, Stratosphere, Polar stratospheric clouds, Atmospheric composition, Atmospheric attenuation, Chemical properties, Ozone, Air pollution
This paper addresses specific topics in the chemistry of the stratosphere and the troposphere. In particular, it considers in some detail the processes that generate and destroy ozone in the two regions of the polar atmospheres. (Auth. mod.)

49-3229
Nucleation processes in the atmosphere.
Mirabel, P., Miloshev, N., NATO Advanced Study Institute on Low-temperature Chemistry of the Atmosphere, Maratea, Italy, Aug. 29-Sep. 11, 1993. Proceedings. Edited by G.K. Moortgat et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.21, Berlin, Springer-Verlag, 1994, p.147-173, 27 refs.
DLC QC879.6.L69
Atmospheric composition, Cloud physics, Homogeneous nucleation, Heterogeneous nucleation, Chemical properties, Phase transformations, Ice formation, Ice vapor interface, Particles, Surface properties, Nucleation rate

49-3230
Phase diagrams.
Mirabel, P., Taleb, D., NATO Advanced Study Institute on Low-temperature Chemistry of the Atmosphere, Maratea, Italy, Aug. 29-Sep. 11, 1993. Proceedings. Edited by G.K. Moortgat et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.21, Berlin, Springer-Verlag, 1994, p.197-217, 14 refs.
DLC QC879.6.L69
Cloud physics, Phase transformations, Liquid phases, Solid phases, Ice formation, Temperature effects, Chemical properties, Liquid solid interfaces

49-3231
Heterogeneous chemistry and kinetics.
Golden, D.M., Williams, L.R., NATO Advanced Study Institute on Low-temperature Chemistry of the Atmosphere, Maratea, Italy, Aug. 29-Sep. 11, 1993. Proceedings. Edited by G.K. Moortgat et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.21, Berlin, Springer-Verlag, 1994, p.235-262, 39 refs.
DLC QC879.6.L69
Polar atmospheres, Atmospheric composition, Polar stratospheric clouds, Cloud physics, Aerosols, Heterogeneous nucleation, Atmospheric attenuation, Chemical properties, Temperature effects, Simulation, Ozone
This paper explores some of the laboratory methods for measurement of uptake coefficients in order to simulate cloud chemical reactions in the polar stratosphere. In addition, some Knudsen cell data on solubility of HNO_3, HCl, and HBr in sulfuric acid representative of stratospheric compositions are presented. (Auth. mod.)

49-3232
Laboratory studies of heterogeneous reactions.
Tolbert, M.A., NATO Advanced Study Institute on Low-temperature Chemistry of the Atmosphere, Maratea, Italy, Aug. 29-Sep. 11, 1993. Proceedings. Edited by G.K. Moortgat et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.21, Berlin, Springer-Verlag, 1994, p.263-285, 72 refs.
DLC QC879.6.L69
Polar atmospheres, Atmospheric composition, Polar stratospheric clouds, Cloud physics, Chemical properties, Heterogeneous nucleation, Ozone, Aerosols, Simulation
In the present review, experimental measurements are summarized for heterogeneous reaction rates on laboratory surfaces that model stratospheric particulate. In addition to measurements of heterogeneous reaction rates, the review also considers laboratory studies of trace gas solubility in stratospheric aerosols. The findings are pertinent to polar stratospheric clouds (PSC).

49-3233
Surface spectroscopy.
Chesters, M.A., Horn, A.B., NATO Advanced Study Institute on Low-temperature Chemistry of the Atmosphere, Maratea, Italy, Aug. 29-Sep. 11, 1993. Proceedings. Edited by G.K. Moortgat et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.21, Berlin, Springer-Verlag, 1994, p.307-327, 20 refs.
DLC QC879.6.L69
Polar atmospheres, Cloud physics, Polar stratospheric clouds, Ice spectroscopy, Infrared spectroscopy, Ice vapor interface, Adsorption, Simulation, Ozone
The use of surface sensitive spectroscopy in the study of heterogeneous processes is receiving much interest because of its potential for detailed elemental and molecular fragment identification. In this paper, some commonly used surface analytical spectroscopies are reviewed and their possible application to the *in situ* laboratory study of atmospheric processes is discussed. The techniques which currently show the greatest promise for the study of reactions on ice and NAT surfaces under realistic stratospheric conditions are discussed at greater length. The most popular current technique is infrared spectroscopy. The application of IR to *in situ* studies is complicated, and methods for optimizing the sensitivity towards surface reactions are discussed at length. Finally, infrared spectroscopic measurements on some real atmospheric systems are described in detail. This work is pertinent to polar ozone chemistry. (Auth. mod.)

49-3234
Spectroscopic studies of PSCs.
Tolbert, M.A., Middlebrook, A.M., Koehler, B.G., NATO Advanced Study Institute on Low-temperature Chemistry of the Atmosphere, Maratea, Italy, Aug. 29-Sep. 11, 1993. Proceedings. Edited by G.K. Moortgat et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.21, Berlin, Springer-Verlag, 1994, p.329-349, 22 refs.
DLC QC879.6.L69
Polar atmospheres, Cloud physics, Aerosols, Polar stratospheric clouds, Infrared spectroscopy, Heterogeneous nucleation, Ice vapor interface, Chemical properties, Simulation
Using Fourier transform infrared (FTIR) spectroscopy, this paper examines nitric-acid/ice films that model polar stratospheric clouds. First it identifies the FTIR spectra of amorphous $H_2O:HNO_3$ mixtures as well as crystalline nitric acid monohydrate (NAM), NAD and two forms of NAT (α and β-NAT). Then these spectra are used

to identify the form of HNO_3/H_2O that grows in laboratory experiments mimicking PSC growth. Finally, the possibility of using FTIR spectroscopy in field observations of type I PSCs is discussed.

49-3235

Matrix isolation spectroscopy: technique and applications.

Barnes, A.J., NATO Advanced Study Institute on Low-temperature Chemistry of the Atmosphere, Maratea, Italy, Aug. 29-Sep. 11, 1993. Proceedings. Edited by G.K. Moortgat et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.21, Berlin, Springer-Verlag, 1994, p.351-372, 47 refs.

DLC QC879.6.L69

Polar atmospheres, Atmospheric composition, Polar stratospheric clouds, Cloud physics, Stratosphere, Photochemical reactions, Chemical properties, Infrared spectroscopy, Ozone, Simulation

Matrix isolation spectroscopy can be a valuable tool in studying species and processes relevant to the low-temperature chemistry of the atmospheres. It is clear from the examples discussed here that the photolytic behavior of substances in low-temperature matrices is determined primarily by the cage effect and this must be taken into account when making comparisons with gas phase photolysis studies. However, photolysis under matrix conditions is likely to provide a better model than the gas phase of the effects of photolysis on species in polar stratospheric clouds or aerosols. The matrix technique also provides a means of studying the structure and photochemical behavior of specific molecular complexes, which may prove to be of considerable importance in atmospheric chemistry.

49-3236

Photochemistry in and on low temperature solid materials.

Sodeau, J.R., NATO Advanced Study Institute on Low-temperature Chemistry of the Atmosphere, Maratea, Italy, Aug. 29-Sep. 11, 1993. Proceedings. Edited by G.K. Moortgat et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.21, Berlin, Springer-Verlag, 1994, p.373-388, 32 refs.

DLC QC879.6.L69

Polar atmospheres, Stratosphere, Cloud physics, Heterogeneous nucleation, Condensation, Photochemical reactions, Low temperature research, Simulation, Polar stratospheric clouds

This paper considers "atmospheric possibilities" associated with results obtained by the matrix isolation technique, which has long been used for the spectroscopic study of free radicals, reactive molecules and conformational isomerism. The approach taken will be to discuss in detail several "case studies" including polar stratospheric clouds, and is therefore highly selective. It is hoped that each example will provide a lesson for those atmospheric chemists who regularly deal with heterogeneous mechanisms.

49-3237

Ice core chemistry: implications for our past atmosphere.

Legrand, M., NATO Advanced Study Institute on Low-temperature Chemistry of the Atmosphere, Maratea, Italy, Aug. 29-Sep. 11, 1993. Proceedings. Edited by G.K. Moortgat et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.21, Berlin, Springer-Verlag, 1994, p.421-445, 56 refs.

DLC QC879.6.L69

Paleoclimatology, Ice sheets, Ice cores, Ice dating, Chemical analysis, Atmospheric composition, Climatic changes

This paper presents the state-of-the-art in glaciochemistry studies, focusing mainly on the soluble mineral and organic species. Also included is a brief presentation of how ice core dating can be established and of difficulties connected with trace measurements. Also discussed are the basics of the ionic composition of snow (achievement and significance) plus origins and sources of impurities in polar regions; the significance of such records obtained in various areas (coastal as well as central areas of Greenland and Antarctica) which span various time periods (from the last decades back to last climatic cycle); and the glaciochemistry of primary (sea salt and soil dust) and secondary aerosols (e.g. aerosol produced during gas conversion, in particular sulphur derived species) and of some reactive gases such as HNO_3, H_2O_2, and organic acids. (Auth. mod.)

49-3238

Trends in global distribution of trace gases inferred from polar ice cores.

Legrand, M., Raynaud, D., Barnola, J.M., Chappellaz, J., NATO Advanced Study Institute on Low-temperature Chemistry of the Atmosphere, Maratea, Italy, Aug. 29-Sep. 11, 1993. Proceedings. Edited by G.K. Moortgat et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.21, Berlin, Springer-Verlag, 1994, p.447-464, 36 refs.

DLC QC879.6.L69

Ice sheets, Ice cores, Paleoclimatology, Atmospheric composition, Sampling, Ice composition, Climatic changes, Greenhouse effect, Geochemical cycles, Antarctica—Vostok Station, Greenland—Summit

This paper discusses ice dating problems and to what extent the composition of the air enclosed in the bubbles of the ice represents a good record of past atmospheric trace gas concentrations. Most of the information extracted from ice cores has been obtained over the last 10 years and the best documented records are for CO_2 and CH_4. These records span various time periods including the last decades and the pre-industrial time back to the last climatic cycle (160,000 years). Included is a discussion of the implications of these ice records in terms of coupled relation "biosphere-atmosphere-climate". (Auth. mod.)

49-3239

Benthos in polar waters. [Benthos in polaren Gewäßern]

Wiencke, C., ed, Arntz, W., ed, *Berichte zur Polarforschung,* 1995, No.155, Kolloquium im Rahmen des DFG-Schwerpunktprogramms "Antarktisforschung mit vergleichenden Untersuchungen in arktischen Eisgebieten," Bremerhaven, am 13. und 14. April 1994, 130p., In German. Literature compilation of Arctic and antarctic benthos, 1990-1994, p.107-130. Refs. passim.

Ecology, Algae, Microbiology, Polar regions, Antarctica—Weddell Sea, Antarctica—Lazarev Sea, Antarctica—Bellingshausen Sea, Antarctica—Amundsen Sea, Antarctica—King George Island, Russia—Laptev Sea, Barents Sea, Russia—White Sea

On April 13-14, 1994 the colloquium "Benthos in polaren Gewäßern" was held at the Alfred Wegener Institute. It featured antarctic research with comparisons to research in arctic ice covered areas and included such topics as taxonomy, macroalgae, and terrestrial vegetation. Following summaries of the individual presentations there were plenary discussions on the goals and changes in benthic research expected during the next five years. The summaries are included in this volume. Among others, the colloquium sessions discussed activities and colonization potential of antarctic cryptogams; first results of long time measurements of maritime cryptogam sites; photosynthetic characteristics of antarctic macroalgae; sea anemones (Actiniaria) in the Arctic; and new ecological aspects (results of EPOS II).

49-3240

Mechanical properties of frozen soils mixed with cement.

Enokido, M., *Tsuchi to kiso (Soil mechanics and foundation engineering),* Apr. 1992, 40(4), p.5-10, In Japanese. 10 refs.

Soil cement, Frozen ground strength, Frozen ground compression, Soil stabilization

49-3241

Winter road administration in urban areas.

Uozumi, M., *Tsuchi to kiso (Soil mechanics and foundation engineering),* Dec. 1992, 40(12), p.1-4, In Japanese.

Snow removal, Road maintenance, Urban planning, Japan

49-3242

Soil stabilization and frost heave prevention of various kinds of volcanic cohesive soils with quicklime.

Ishida, H., *Tsuchi to kiso (Soil mechanics and foundation engineering),* Apr. 1993, 41(4), p.33-38, In Japanese. 9 refs. For another version also in Japanese see 48-1976.

Soil freezing, Frost heave, Frost protection, Soil stabilization, Liming, Volcanic ash, Japan

49-3243

Full scale test on frost prevention methods for multi-anchored retaining walls.

Suzuki, T., Sawada, S., Ueno, K., Adachi, K., *Tsuchi to kiso (Soil mechanics and foundation engineering),* Mar. 1994, 42(3), p.51-56, In Japanese. 6 refs. For an English version see 49-1764.

Soil freezing, Frozen ground strength, Frost heave, Frost protection, Soil stabilization, Walls, Earth fills, Japan

49-3244

Potential transport of pollutants by arctic sea ice.

Pfirman, S.L., Eicken, H., Bauch, D., Weeks, W.F., *Science of the total environment,* Jan. 10, 1995, 159(2/3), p.129-146, 57 refs.

Polar atmospheres, Air pollution, Ice air interface, Ice cover effect, Ice composition, Impurities, Drift, Ice water interface, Water pollution

49-3245

Swelling mechanism of poly(vinyl alcohol)-poly(acrylic acid) dense gels made by repetitive freezing and thawing process.

Tsunemoto, N., Suzuki, M., *Polymer gels and networks,* 1994, Vol.2, p.247-255, 12 refs.

Colloids, Polymers, Frozen liquids, Liquid solid interfaces, Phase transformations, Liquid phases, Solid phases, Freeze thaw cycles

49-3246

Changes in the extractable ammonium- and nitrate-nitrogen contents of soil samples during freezing and thawing.

Esala, M.J., *Communications in soils science and plant analysis,* 1995, 26(1-2), p.61-68, 15 refs.

Soil science, Sampling, Soil tests, Soil microbiology, Cold storage, Frozen ground chemistry, Freeze thaw cycles, Chemical analysis, Accuracy, Laboratory techniques

49-3247

Mathematical theory of freezing for flow in porous media.

Kornev, K., Mukhamadullina, G.L., *Royal Society of London. Proceedings A,* Nov. 8, 1994, 447(1930), p.281-297, 23 refs.

Soil freezing, Artificial freezing, Frozen ground physics, Pipes (tubes), Heat transfer, Ice solid interface, Phase transformations, Solid phases, Porosity, Mathematical models

49-3248

Quantification of late Cenozoic erosion and denudation in the Sognefjord drainage basin, western Norway.

Nesje, A., Sulebak, J.R., *Norsk geografisk tidsskrift,* Sep. 1994, 48(3), p.85-92, 17 refs.

Pleistocene, Glacial geology, Glacial erosion, Bedrock, Topographic surveys, Geomorphology, Norway

49-3249

Problems of local geoecovariance in the central Norwegian mountains. [Probleme der kleinräumigen Geoökovarianz im mittelnorwegischen Gebirge]

Köhler, B., Löffler, J., Wundram, D., *Norsk geografisk tidsskrift,* Sep. 1994, 48(3), p.99-111, In German with English summary. 34 refs.

Biogeography, Subarctic landscapes, Ecosystems, Vegetation patterns, Tundra, Plant ecology, Mountain soils, Snow cover effect, Norway

49-3250

Dependence of a plume heat budget upon lateral advection.

Glendening, J.W., *Journal of the atmospheric sciences,* Dec. 1, 1994, 51(23), p.3517-3530, 21 refs.

Oceanography, Atmospheric boundary layer, Air flow, Buoyancy, Wind direction, Surface temperature, Ice openings, Air ice water interaction, Advection, Heat flux, Ice cover effect, Simulation

49-3251

Low-temperature properties of crankcase motor oils: a fundamental approach to pumpability phenomena.

Riga, A.T., Roby, S.H., *Lubrication engineering,* May 1994, 50(5), p.411-417, 23 refs.

Lubricants, Viscosity, Solidification, Mechanical properties, Shear properties, Cold weather performance, Low temperature tests, Rheology, Temperature effects

49-3252

Deicer salt scaling resistance and chloride permeability.

Johnston, C.D., *Concrete international,* Aug. 1994, 16(8), p.48-55, 9 refs.

Concrete durability, Concrete admixtures, Frost resistance, Cold weather performance, Corrosion, Permeability, Salting, Standards, Specifications, Physical properties, Air entrainment

49-3253

Canadian experience with air-entrained high-performance concrete.

Aïtcin, P.C., Lessard, M., *Concrete international,* Oct. 1994, 16(10), p.35-38, 6 refs.

Concrete structures, Winter concreting, Bridges, Concrete admixtures, Air entrainment, Porosity, Concrete durability, Frost resistance, Standards, Specifications, Temperature control

49-3254

Climatic impact of the A.D. 1783 Asama (Japan) eruption was minimal: evidence from the GISP2 ice core.

Zielinski, G.A., et al, *Geophysical research letters,* Nov. 1, 1994, 21(22), p.2365-2368, 29 refs.

Volcanic ash, Atmospheric composition, Stratosphere, Aerosols, Ice sheets, Ice cores, Ice dating, Ion density (concentration), Correlation, Climatic factors, Japan—Asama, Greenland

49-3255

Hydrological and hydrochemical response of mountainous basins to snow accumulation and melting in northern Slovakia.

Babiakova, G., Bodiš, D., Palkovič, D., *Hydrological processes,* Nov.-Dec. 1994, 8(6), p.551-565, 14 refs.

River basins, Snow hydrology, Hydrogeochemistry, Ion density (concentration), Snow impurities, Snowmelt, Stream flow, Runoff, Seasonal variations, Air pollution, Slovakia

49-3256

Mountain hydrology of Canada and China: a case study in comparative hydrology.

Woo, M.K., Liu, C.M., *Hydrological processes,* Nov.-Dec. 1994, 8(6), p.573-587, 47 refs.

Mountains, Hydrology, Correlation, Classifications, Glacier mass balance, Glacier melting, Snow melting, Runoff, Surface drainage, Canada, China

49-3257

Vertical turbulent structure of currents in shallow sea.

Debol'skaia, E.I., Zyrianov, V.N., *Water resources,* Nov.-Dec. 1994, 21(6), p.535-543, Translated from Vodyne resursy. 16 refs.

Oceanography, Ocean currents, Water waves, Wave propagation, Tidal currents, Turbulent exchange, Ice cover effect, Ice water interface, Wind factors, Mathematical models

49-3258

Storm wind setups on the mouth beach of the Amur River.

Liubitskiĭ, IU.V., Shvetsov, A.E., *Water resources,* Nov.-Dec. 1994, 21(6), p.563-567, Translated from Vodyne resursy. 8 refs.

Estuaries, Shores, Water level, Hydrodynamics, Turbulent boundary layer, Storms, Wind factors, Fast ice, Ice cover effect, Periodic variations, Statistical analysis, Russia—Amur River

49-3259

Regulation of river runoff and river-water regime by artificial icings.

Sokolov, B.L., *Water resources,* Nov.-Dec. 1994, 21(6), p.654-660, Translated from Vodyne resursy. 26 refs.

River basins, Runoff, Water supply, Artificial ice, Ice formation, Ice (water storage), Ice volume, Ice control, Glacial hydrology, Glacier melting

49-3260

Cold weather concreting.

ACI Committee 306, ACI manual of concrete practice. Part 2—construction practices and inspection; pavements, Detroit, American Concrete Institute, 1994, p.306-R-1-306-R-23, ACI 306R-88, 31 refs.

Winter concreting, Standards, Specifications

49-3261

Standard specification for cold weather concreting (306.1-90).

ACI Committee 306, ACI manual of concrete practice. Part 2—construction practices and inspection; pavements, Detroit, American Concrete Institute, 1994, p.306.1-1-306.1-5.

Winter concreting, Standards, Specifications

49-3262

Chemistry of the 1991-1992 stratospheric winter: three-dimensional model simulations.

Lefèvre, F., Brasseur, G.P., Folkins, I., Smith, A.K., Simon, P., *Journal of geophysical research,* Apr. 20, 1994, 99(D4), p.8183-8195, 32 refs.

Atmospheric composition, Ozone, Models, Polar stratospheric clouds

49-3263

Correction to "SO2 uptake on ice spheres: liquid nature of the ice-air interface".

Conklin, M.H., Bales, R.C., *Journal of geophysical research,* Apr. 30, 1994, 99(D4), p.8351, For the item being corrected, see 48-0954.

Ice air interface, Ice composition, Liquid phases

49-3264

FREZCHEM: a chemical-thermodynamic model for aqueous solutions at subzero temperatures.

Marion, G.M., Grant, S.A., SR 94-18, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* July 1994, 35p., ADA-288 456, 13 refs.

Thermodynamics, Freezing, Evaporation, Computerized simulation, Solutions

This report documents a FORTRAN version of the Spencer-Møller-Weare chemical thermodynamic model for aqueous electrolyte solutions at subzero temperatures (FREZCHEM). FREZCHEM is structured to predict the chemical composition and unfrozen water of aqueous solutions between -60°C and +25°C at atmospheric pressure (0.101325 MPa). FREZCHEM includes two reaction pathways: 1) freezing at variable temperature and fixed total water and 2) evaporation at variable water and fixed temperature. Activity coefficients and the activity of water are calculated using the Pitzer equations, which are valid to high solution ionic strengths (≈20 mol/kg). Fifteen chloride and sulfate salts of sodium, potassium, calcium, and magnesium are included in the model. Predicted and experimental measurements of solute molalities and the unfrozen water fraction during seawater freezing are in good agreement. At -50°C, 0.3% of seawater remains unfrozen with 99.7% of Na and 95.5% of Cl having precipitated into one of four salts. FREZCHEM should find many applications in physiochemical studies of aqueous solutions and freezing.

49-3265

Soil moisture prediction during freeze and thaw using a coupled heat and moisture flow model.

Bigl, S.R., Shoop, S.A., CR 94-11, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Nov. 1994, 19p., ADA-289 343, 17 refs.

Frost heave, Soil freezing, Freeze thaw cycles, Computerized simulation, Soil water, Thaw depth, Frost penetration

A coupled heat flow and moisture flow model (FROSTB) was used to simulate large scale freeze-thaw experiments to assess its ability to predict soil moisture conditions during freeze and thaw. The experimental data consist of temperature and soil moisture profiles through freeze-thaw cycles of a 1-m layer of frost-susceptible silty sand over roughly 2 m of gravelly sand. Two experimental conditions were modeled: 1) where the soil moisture was lower than specific retention (less than 12% by weight) and no water table was present (dry case) and 2) where the soil was fairly wet and the water table was approximately 1 m deep (wet case). During freezing, FROSTB tends to predict ice contents higher than those observed, which causes the simulated soil column to thaw slower. During thawing the predicted moisture contents in the thawed soil were close to the measured values for the wet case but were always higher than the measured moisture contents for the dry case. Possible reasons for the discrepancy are discussed.

49-3266

SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean.

Moritz, R.E., ed, Curry, J.A., ed, Thorndike, A.S., ed, Untersteiner, N., ed, *University of Washington, Seattle. Applied Physics Laboratory. Polar Science Center. Arctic System Science Ocean-Atmosphere-Ice Interactions (ARCSS OAII) Science Management Office. Report,* Aug. 1993, No.3, 34p., WDCA No.93000625, 6 refs. Based on contributions to the ARCSS Workshop on Clouds, Radiation, and Surface Energy Balance over the Arctic Ocean, Orlando, FL, Feb. 8-10, 1993.

Polar atmospheres, Air ice water interaction, Ice cover effect, Atmospheric circulation, Cloud cover, Ocean currents, Radiation balance, Global warming, Research projects

49-3267

Passive microwave signatures of "spring" sea ice.

Garrity, C., *Environment Canada. Atmospheric Environment Service. York University, North York, Ontario. Centre for Research in Experimental Space Science. Microwave Group. Report,* Mar. 1989, No.88-8, 34p., WDCA No.93000388, 7 refs.

Ice surveys, Ice detection, Ice conditions, Sea ice distribution, Ice reporting, Snow ice interface, Oceanographic surveys, Radiometry, Spaceborne photography

49-3268

Concept design status report for an arctic research vessel.

Laible, D.H., Kristensen, D.H., Seattle, Glosten Associates, Inc., 1993, 15p. + figs., WDCA No.93000415, Designed for the University National Oceanographic Laboratory System (UNOLS), under the direction of the University of Alaska Fairbanks.

Oceanographic ships, Icebreakers, Ice navigation, Metal ice friction, Cost analysis

49-3269

Statistical description of pack ice in the Beaufort Sea, Lancaster Sound and the Labrador Sea.

Dickins, D., Dickinson, A., Humphrey, B., Vancouver, DF Dickins Associates Ltd., 1985, 77p. + appends., WDCA No.93000279, 68 refs.

Ice surveys, Pack ice, Ice floes, Sea ice distribution, Ice conditions, Ice openings, Drift, Statistical analysis, Beaufort Sea, Labrador Sea, Canada—Northwest Territories—Lancaster Sound

49-3270

Snow-avalanche hazard analysis for land-use planning and engineering.

Mears, A.I., *Colorado Geological Survey. Bulletin,* 1992, No.49, 55p., WDCA No.93000236, 51 refs.

Avalanche forecasting, Avalanche mechanics, Avalanche tracks, Avalanche modeling, Avalanche engineering

49-3271

Microwave measurements produce global climatic, hydrologic data.

Ferraro, R., et al, *Eos,* July 26, 1994, 75(30), p.337-338,343, 4 refs.

Climatology, Global change, Hydrologic cycle, Spacecraft, Microwaves, Radiometry, Sensor mapping, Snow cover distribution, Sea ice distribution, Meteorological data, Periodic variations

49-3272

Ion irradiation experiments relevant to the physics of comets.

Baratta, G.A., Castorina, A.C., Leto, G., Palumbo, M.E., Spinella, F., Strazzulla, G., *Planetary and space science,* Sep. 1994, 42(9), p.759-766, 38 refs.

Extraterrestrial ice, Geochemistry, Simulation, Infrared spectroscopy, Infrared radiation, Radiation absorption, Ice sublimation, Vapor diffusion, Ice physics, Amorphous ice, Phase transformations, Photochemical reactions

49-3273
***Lepadella beyensi* (Rotifera Monogononta: Colurellidae), a new species from the Canadian High Arctic.**
De Smet, W.H., *Hydrobiologia,* Dec. 2, 1994, 294(1), p.61-63, 5 refs.
Plankton, Limnology, Classifications, Subpolar regions, Canada—Northwest Territories—Victoria Island

49-3274
Summer-season mesoscale cyclones in the Bellingshausen-Weddell region of the Antarctic and links with the synoptic-scale environment.
Turner, J., Thomas, J.P., *International journal of climatology,* Oct. 1994, 14(8), p.871-894, 32 refs.
Polar atmospheres, Air masses, Atmospheric circulation, Wind direction, Atmospheric disturbances, Classifications, Ice cover effect, Seasonal variations, Synoptic meteorology, Antarctica—Weddell Sea, Antarctica—Bellingshausen Sea
Results are presented from the first investigation into a summer season of mesoscale vortex activity in a large sector of the antarctic coastal region. The study is based on an analysis of 3 months' meteorological satellite imagery collected at Rothera Station on the Antarctic Peninsula. The study revealed the high frequency with which such systems occur, with 162 individual vortices being found during the period Dec. 1983 to Feb. 1984 inclusive. The preferred area for their development was in the latitude band 60-70°S over the marginal ice zone and ice-free region of the eastern Bellingshausen Sea. A classification scheme for the vortices was developed based on the relationship with the broad-scale synoptic flow, the sea ice, and the geographical location. The most common type of vortex found was the 'classic' polar low, which formed in the southerly flow to the west of synoptic-scale disturbances. Only 23 of the vortices found were correctly represented on the Meteorological Office analyses and of these 15 were small synoptic disturbances. (Auth. mod.)

49-3275
Effect of curvature in the numerical simulation of an electrothermal de-icer pad.
Huang, J.R., Keith, T.G., Jr., De Witt, K.J., *Journal of aircraft,* Jan.-Feb. 1995, 32(1), p.84-92, 7 refs.
Aircraft icing, Ice removal, Ice melting, Electric heating, Ice solid interface, Topographic effects, Design criteria, Analysis (mathematics), Simulation, Accuracy

49-3276
Aerodynamics of a finite wing with simulated ice.
Khodadoust, A., Bragg, M.B., *Journal of aircraft,* Jan.-Feb. 1995, 32(1), p.137-144, 34 refs.
Aircraft icing, Fluid dynamics, Air flow, Pressure, Ice accretion, Ice air interface, Ice surface, Topographic effects, Simulation, Wind tunnels

49-3277
Super-Stefan problem.
Little, T.D., Showalter, R.E., *International journal of engineering science,* Jan. 1995, 33(1), p.67-75, 21 refs.
Stefan problem, Solutions, Ice water interface, Phase transformations, Thermodynamics, Supercooling, Superheated ice, Boundary value problems, Analysis (mathematics)

49-3278
Middle and Late Quaternary evolution of Spitsbergen against global changes.
Lindner, L., Marks, L., *Polish polar research,* 1993, 14(3), p.221-241, With Polish summary. Refs. p.235-241.
Pleistocene, Paleoclimatology, Global change, Glaciation, Quaternary deposits, Radioactive age determination, Isostasy, Glacier oscillation, Glacial geology, Marine geology, Correlation, Stratigraphy, Norway—Spitsbergen

49-3279
Glacial and marine episodes in Kaffiöyra, northwestern Spitsbergen, during the Vistulian and the Holocene.
Niewiarowski, W., Pazdur, M.F., Sinkiewicz, M., *Polish polar research,* 1993, 14(3), p.243-258, With Polish summary. 36 refs.
Pleistocene, Quaternary deposits, Radioactive age determination, Geomorphology, Marine geology, Marine deposits, Glaciation, Isostasy, Norway—Spitsbergen

49-3280
Late Quaternary evolution of the western Nordenskiöld Land.
Musiał, A., Horodyski, B., Kossobudzki, K., *Polish polar research,* 1993, 14(3), p.259-274, With Polish summary. 32 refs.
Pleistocene, Geomorphology, Quaternary deposits, Arctic landscapes, Landscape development, Marine geology, Glaciation, Tectonics, Isostasy, Norway—Svalbard

49-3281
Middle and Late quaternary evolution of the Hornsund region, south Spitsbergen.
Lindner, L., Marks, L., *Polish polar research,* 1993, 14(3), p.275-292, With Polish summary. Refs. p.289-292.
Pleistocene, Geomorphology, Quaternary deposits, Radioactive age determination, Marine geology, Glaciation, Glacier oscillation, Stratigraphy, Geologic structures, Norway—Spitsbergen

49-3282
Relief and Quaternary of the southern Sörkapp Land, Spitsbergen.
Wójcik, A., Ziaja, W., *Polish polar research,* 1993, 14(3), p.293-308, With Polish summary. 32 refs.
Marine geology, Pleistocene, Geomorphology, Arctic landscapes, Topographic features, Marine deposits, Quaternary deposits, Glaciation, Isostasy, Bedrock, Norway—Spitsbergen

49-3283
Changes of glaciation in the northeastern Sörkapp Land, Spitsbergen, 1961-1971.
Sokołowski, J., Ziaja, W., *Polish polar research,* 1993, 14(3), p.309-312, With Polish summary. 3 refs.
Arctic landscapes, Glacier surveys, Photogrammetry, Glacier thickness, Glacier oscillation, Periodic variations, Correlation, Norway—Spitsbergen

49-3284
Operation Order 201. "Operation Deep Freeze" 94/95.
U.S. Naval Support Force Antarctica, Sep. 1994, var. p.
Research projects, Cold weather operation, Logistics, Military operation, Military facilities, Radio communication, Transportation
This Operation Order provides basic guidance for the conduct of "Operation Deep Freeze" 94/95, the annual U.S. Department of Defense operational and logistic support for the United States Antarctic Program (USAP). It lists 11 Annexes, including air and ship operations, logistics, administration, medical/dental services and requirements, field operations and communications. Eleven Appendices include air and ship operation schedules, scientific programs, communications plan, uniform standards and requirements, and a distribution list.

49-3285
Comparative study of the Northern Sea Route and the Northwest Passage: with special reference to the future development of marine transportation along the latter route.
Hume, H., Cambridge, U.K., Scott Polar Research Institute, Cambridge University, 1984, 107p., MA thesis. Refs. p.96-107.
Marine transportation, Northwest passage, Ice navigation, Icebreakers, International cooperation, Economic development, Environmental protection, Northern Sea Route

49-3286
CALGYP: a simulation model for calcite and gypsum precipitation-dissolution in soils.
Marion, G.M., SR 94-19, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* July 1994, 39p., ADA-288 464, 21 refs.
Computerized simulation, Evapotranspiration, Precipitation (meteorology), Rain, Soil mechanics, Freeze thaw cycles
This report documents the CALGYP model which is designed to simulate calcite and gypsum precipitation-dissolution in soils. CALGYP is a process model that is easy to parameterize, and is designed for long-term simulations (>1000 years). The CALGYP model has five components: soil parameterization, chemical thermodynamic relations, deterministic and stochastic rainfall models, an evapotranspiration model, and subroutines that calculate water, calcium, and sulfate fluxes through the soil. The stochastic rainfall model is based on probability distributions for interarrival times (days between rainfall events) and rainfall amounts and is designed to simulate the long-term mean annual rainfall and variability in annual rainfall for specific sites. The model is currently parameterized for seven climatic sites in the desert Southwest. However, climate (temperature and rainfall) can be altered and other minerals included, which makes the CALGYP model potentially applicable across a wider range of environmental conditions including freezing-thawing systems. A separate program, Rainmodule, is included to facilitate inclusion of new sites and to alter rainfall patterns for current sites. Instructions for utilization and a FORTRAN-77 source code listing are included.

49-3287
Applying energy criteria to forecasting concrete durability under loading and climatic effects. [Primenenie energeticheskikh kriteriev dlia prognozirovaniia dolgovechnosti betonov pri silovykh i klimaticheskikh vozdeĭstviiakh]
Nesvetaev, G.V., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* Dec. 1994, No.12, p.44-48, In Russian. 7 refs.
Concrete durability, Forecasting, Climatic factors, Loading, Frost resistance

49-3288
Comparison of the riming growth of snow particles between coastal and inland areas.
Harimaya, T., Kanemura, N., *Meteorological Society of Japan. Journal,* Feb. 1995, 73(1), p.25-36, With Japanese summary. 19 refs.
Precipitation (meteorology), Snowfall, Cloud physics, Sampling, Radar echoes, Snow physics, Snow crystal growth, Marine atmospheres, Meteorological factors

49-3289
Acidity of snowfalls and its variation through the processes of accumulation and melting.
Kikuchi, K., Yoshizawa, M., Asuma, Y., Uyeda, H., *Meteorological Society of Japan. Journal,* Feb. 1995, 73(1), p.47-58, With Japanese summary. 26 refs.
Precipitation (meteorology), Snowfall, Snow cover, Snow composition, Chemical properties, Sampling, Snowmelt, Metamorphism (snow), Seasonal variations, Air pollution

49-3290
Problems in radiocarbon dating of soils.
Chichagova, O.A., Cherkinskiĭ, A.E., *Radiocarbon,* 35(3), 1993, p.351-362, 27 refs.
Soil dating, Organic soils, Soil profiles, Pleistocene, Radioactive age determination, Accuracy, Geochronology

49-3291
Reliability of radiocarbon dating buried soils.
Orlova, L.A., Panichev, V.A., *Radiocarbon,* 1993, 35(3), p.369-377, 21 refs.
Organic soils, Soil dating, Soil profiles, Radioactive age determination, Subsurface investigations, Pleistocene, Accuracy, Russia—Siberia

49-3292
Possibilities for detailed dating of peat bog deposits.
Punning, J.M., Ilomets, M., Koff, T., *Radiocarbon,* 1993, 35(3), p.379-385, 14 refs.
Peat, Sedimentation, Swamps, Paleoecology, Radioactive age determination, Palynology, Geochemistry, Estonia

49-3293
Problems and methods of dating low-activity samples by liquid scintillation counting.
Arslanov, K.A., Tertichnaia, T.V., Chernov, S.B., *Radiocarbon,* 1993, 35(3), p.393-398, 28 refs.
Pleistocene, Geochronology, Radioactive age determination, Accuracy, Organic soils, Sampling, Soil dating, Scintillation, Chemical analysis

49-3294
Radiocarbon chronology of paleogeographic events of the Late Pleistocene and Holocene in Russia.
Kaplin, P.A., Svitoch, A.A., Parunin, O.B., *Radiocarbon,* 1993, 35(3), p.399-407, 10 refs.
Pleistocene, Geomorphology, Shoreline modification, Sedimentation, Tectonics, Radioactive age determination, Scintillation, Accuracy, Correlation, Russia—Black Sea

49-3295

Late Pleistocene geochronology of European Russia.

Arslanov, K.A., *Radiocarbon*, 1993, 35(3), p.421-427, 22 refs.

Pleistocene, Quaternary deposits, Geochronology, Paleobotany, Marine deposits, Sedimentation, Radioactive age determination, Russia

49-3296

Geochronology of Late Quaternary events in northeastern Russia.

Lozhkin, A.V., *Radiocarbon*, 1993, 35(3), p.429-433, 12 refs.

Pleistocene, Quaternary deposits, Geochronology, Radioactive age determination, Palynology, Paleobotany, Paleoclimatology, Vegetation patterns, Russia

49-3297

Geochronology of the Holocene of the Belorussian Polessie.

Matveev, A.V., Krutous, E.A., Zernitskaia, V.P., *Radiocarbon*, 1993, 35(3), p.435-439, 9 refs.

Pleistocene, Paleobotany, Geochronology, Quaternary deposits, Peat, Radioactive age determination, Classifications, Belarus

49-3298

Geochronology of the Pleistocene and Holocene in the Fore-Urals.

Latipova, E.K., Iakheemovich, B.L., *Radiocarbon*, 1993, 35(3), p.441-447, 5 refs.

Pleistocene, Quaternary deposits, Geochronology, Stratigraphy, Radioactive age determination, Peat, Fossils, Russia—Ural Mountains

49-3299

Geochronology of the nival-glacial deposits of the Ukrainian Carpathian Mountains.

Kovaliukh, N.N., Petrenko, L.V., Kovalenko, V.V., *Radiocarbon*, 1993, 35(3), p.457-461, 11 refs.

Pleistocene, Glaciation, Geochronology, Quaternary deposits, Radioactive age determination, Glacial deposits, Stratigraphy, Paleoclimatology, Ukraine—Carpathian Mountains

49-3300

Meal size and sustenance time in the deep-sea amphipod *Eurythenes gryllus* collected from the Arctic Ocean.

Hargrave, B.T., Prouse, N.J., Phillips, G.A., Cranford, P.J., *Deep-sea research*, Oct. 1994, 41(10), p.1489-1508, 39 refs.

Marine biology, Ecology, Classifications, Biomass, Ocean bottom, Sampling, Nutrient cycle, Arctic Ocean

49-3301

Proceedings.

International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993, Artiukhina, T.S., ed, Filipovskaia, T.V., ed, Patrina, M.IU., ed, St. Petersburg, St. Petersburg State Technical University, 1994, 334p., Refs. passim. For individual papers see 49-3302 through 49-3362.

Petroleum industry, Hydrocarbons, Economic development, Offshore drilling, Offshore structures, Ice loads, Ice solid interface, Design criteria, Environmental protection, Arctic Ocean

49-3302

Mineral products of the Russian arctic offshore: current status and prospects for the study.

Orlov, V.P., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.6-9.

Hydrocarbons, Natural resources, Petroleum industry, Offshore drilling, Exploration, Arctic Ocean

49-3303

Economic and legal aspects of organization of design and construction of structures on the Russian arctic offshore.

Nikitin, B.A., Perchik, A.I., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.10-12.

Hydrocarbons, Natural resources, Economic development, Offshore drilling, Offshore structures, Cost analysis, Legislation, International cooperation, Arctic Ocean

49-3304

ROSSHELF and development of oil and gas fields of Russian arctic offshore.

Velikhov, E.P., Nikitin, B.A., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.13-15.

Hydrocarbons, Petroleum industry, Offshore drilling, Economic development, Organizations, Arctic Ocean

49-3305

Conversion of research and development projects in shipbuilding—the basis of the arctic offshore development.

Pashin, V.M., Spiro, V.E., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.16-17.

Research projects, Ships, Offshore structures, Design, Organizations, Economic development, Hydrocarbons, Russia

49-3306

Hydrometeorological support of development of offshore resources and organization of environment monitoring.

Kalatskiĭ, V.I., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.18-22.

Marine meteorology, Meteorological data, Hydrocarbons, Exploration, Weather stations, Environmental impact, Weather forecasting, Arctic Ocean

49-3307

Particulars of structures, of designing process and procedures for construction of facilities for arctic fields development.

Mirzoev, D.A., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.23-28.

Hydrocarbons, Offshore drilling, Offshore structures, Structural analysis, Design criteria, Classifications, Ice loads, Protection

49-3308

Comparison of the Russian and foreign codes and methods for global load estimations.

Shkhinek, K.N., Blanchet, D., Croasdale, K.R., Matskevitch, D.G., Bhat, S.U., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.29-35, 18 refs. For another source see 48-3024.

Hydrocarbons, Offshore structures, Environmental impact, Design criteria, Standards, International cooperation, Ice loads, Ice strength, Accuracy, Correlation

49-3309

Concept of the transportation system for the western Arctic.

Parfenov, A.F., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.36-40.

Hydrocarbons, Petroleum industry, Economic development, Economic analysis, Transportation, Logistics, Russia

49-3310

Prospects for development of Shtockmanovskoye and Prirazlomnoye fields in the Barents Sea.

Doubin, I.B., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.41-43.

Hydrocarbons, Offshore drilling, Economic development, Offshore structures, Design, Barents Sea

49-3311

Utilization of shipbuilding enterprise capacities for production of arctic offshore development facilities.

Pashaev, D.G., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.44-49.

Hydrocarbons, Offshore structures, Ships, Floating structures, Design, Construction, Classifications, International cooperation

49-3312

Underwater complex of engineering facilities for oil and gas production on the arctic offshore of Russia.

Lavkovskiĭ, S.A., Leshev, A.G., Edelev, O.K., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.50-54.

Offshore structures, Hydrocarbons, Gas wells, Design, Construction, Nuclear power, Cost analysis, Ocean bottom, Subsurface structures, Subglacial observations

49-3313

Operating requirements for and historical operations of arctic offshore drilling systems in the United States.

Regg, J.B., Kuranel, R.Y., Breitmeier, J., Smith, R., Walker, J., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.55-57, 4 refs.

Offshore drilling, Offshore structures, Floating structures, Performance, Hydrocarbons, Exploration, Standards, Environmental impact, Arctic Ocean

49-3314

Hydrocarbon production concepts for dynamic annual sea ice regions.

Wang, A.T., Poplin, J.P., Heuer, C.E., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.58-82, 36 refs.

Hydrocarbons, Economic development, Offshore drilling, Offshore structures, Icebreakers, Design, Ice loads, Ice solid interface, Protection, Bering Sea

49-3315

Regulating oil and gas activities in the U.S. Arctic Outer Continental Shelf.

Walker, J., Regg, J.B., Breitmeier, J., Smith, R., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.83-85, 2 refs.

Hydrocarbons, Petroleum industry, Offshore drilling, Oil spills, Economic development, Environmental impact, Standards, Environmental protection

49-3316

Innovative design concept for arctic development.

Ward, D.H., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.86-95.

Offshore drilling, Offshore structures, Oil wells, Caissons, Design, Design criteria, Construction, Ice loads, Protection

49-3317

Oil and gas potential of the sedimentary cover of the Russian arctic offshore.

Gramberg, I.S., Suprunenko, O.I., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.98-101.

Hydrocarbons, Natural resources, Offshore drilling, Economic development, Marine geology, Exploration, Russia

49-3318

Peculiar distribution pattern of the oil and gas accumulation zones and hydrocarbon resources on the Russian arctic offshore.

Prisiazhnyĭ, V.N., Gritsenko, A.I., Zotov, G.A., Zakharov, E.V., Khvedchuk, I.I., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.102-105.

Hydrocarbons, Exploration, Offshore drilling, Natural resources, Distribution, Economic development, Russia

49-3319

Zoning of the Russian arctic offshore by sea ice and geographical features.

Egorov, A.G., Spichkin, V.A., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.106-109.

Sea ice distribution, Ice conditions, Classifications, Seasonal variations, Ice forecasting, Russia

49-3320

Geological and mass properties of the Barents-Kara offshore bottom sediments.

Neizvestnov, IA.V., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.110-113, 7 refs.

Marine geology, Bottom sediment, Physical properties, Quaternary deposits, Geologic structures, Russia—Kara Sea

49-3321

Environmental aspects of the Russian arctic offshore development.

Sadikov, M.A., Dodin, D.A., Bordukov, IU.K., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.114-118, 1 ref.

Hydrocarbons, Bottom sediment, Pollution, Radioactivity, Economic development, Environmental impact, Monitors, Russia

49-3322

Seasonal and annual sea ice variations in the Russian arctic offshore: Barents and Kara Seas.

Mironov, E.IU., Spichkin, V.A., Egorov, A.G., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.119-123.

Sea ice distribution, Ice conditions, Drift, Seasonal variations, Ice forecasting, Ice surveys, Statistical analysis, Barents Sea, Russia—Kara Sea

49-3323

On the number of icebergs in the arctic seas.

Abramov, V.A., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.124-126, 5 refs.

Sea ice distribution, Icebergs, Drift, Periodic variations, Statistical analysis, Ice surveys, Arctic Ocean

49-3324

Geological exploration techniques for the arctic offshore with the fast ice present.

Davydov, P.S., Il'in, O.M., Semenov, IU.P., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.127-129, 1 ref.

Geophysical surveys, Oceanographic surveys, Boreholes, Exploration, Placer mining, Ocean bottom, Bottom sediment, Sounding, Arctic Ocean

49-3325

Magnetic survey methods used in the oil and gas arctic offshore exploration and development.

Demin, B.N., Stavrov, I.G., Filabok, N.N., Palamarchuk, V.K., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.130-134, 5 refs.

Geophysical surveys, Magnetic surveys, Ocean bottom, Magnetic anomalies, Exploration, Hydrocarbons, Geomagnetism, Mapping, Arctic Ocean

49-3326

Sea ice mechanics and arctic offshore development.

Klimov, D.M., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.135-137.

Offshore structures, Sea ice, Ice breaking, Fracture zones, Ice solid interface, Ice loads, Ice mechanics, Design criteria

49-3327

On the spatial-temporal variability of the potential Kara Sea ice resistance.

Gavrilo, V.P., Kovalev, S.M., Nedoshivin, O.A., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.138-139, 2 refs.

Sea ice, Ice cover strength, Flexural strength, Ice cover thickness, Ice mechanics, Seasonal variations, Analysis (mathematics), Russia—Kara Sea

49-3328

About strength characteristics of stamukha on Sakhalin Shelf.

Bekker, A.T., Truskov, P.A., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.140-142, 1 ref.

Sea ice, Ice mechanics, Pressure ridges, Ice strength, Shear stress, Mathematical models

49-3329

Proposals for studying strength properties of sea water ice.

Rogachko, S.I., Evdokimov, G.N., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.143-144.

Sea ice, Offshore structures, Design criteria, Ice cover strength, Standards, Sampling, Mechanical tests, Barents Sea

49-3330

Some approaches for hummocks and grounded hummocks investigation in the arctic seas.

Kolesov, S., Naumov, A., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.145-148, 5 refs.

Sea ice, Pressure ridges, Ice floes, Grounded ice, Ice scoring, Ice mechanics, Mathematical models, Ice solid interface, Arctic Ocean

49-3331

Splitting of ice floes.

Dempsey, J.P., DeFranco, S.J., Blanchet, D., Prodanovic, A., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.149-153, 11 refs. For another source see 48-88.

Sea ice, Ice floes, Ice mechanics, Ice breaking, Crack propagation, Cracking (fracturing), Ice solid interface, Fracture zones, Analysis (mathematics)

49-3332

Ice forces on offshore structures.

Schwarz, J., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.154-160, 7 refs.

Offshore structures, Ice mechanics, Ice solid interface, Loads (forces), Fracture zones, Ice loads, Ice pressure, Design criteria, Simulation

49-3333

Improved method for the calculation of ice loads on sloping structures in first-year ice.

Croasdale, K.R., Cammaert, A.B., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.161-168, 7 refs.

Ice mechanics, Offshore structures, Ice loads, Ice solid interface, Dynamic loads, Fracture zones, Ice override, Analysis (mathematics)

49-3334

Comparison between theory and measurements for ice sheet forces on conical structures.

Nevel, D.E., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.169-176, 18 refs.

Offshore structures, Ice mechanics, Ice solid interface, Loads (forces), Ice breaking, Fracture zones, Theories, Models, Correlation

49-3335

Steady-state vibrations of offshore structures.

Kärnä, T., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.177-185, 27 refs.

Offshore structures, Ice floes, Ice solid interface, Ice breaking, Dynamic loads, Fracture zones, Vibration, Stability, Design criteria, Forecasting

49-3336

Drifting pack-ice modelled as an ensemble of particles with visco-elastic-plastic rheology.

Løset, S., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.186-191, 6 refs.

Sea ice, Pack ice, Ice floes, Drift, Ice mechanics, Rheology, Viscoelasticity, Ice water interface, Mathematical models

49-3337

Impact interactions of iceberg and ice-resistant offshore platform for the Shtockmanovskoye field.

Vershinin, S.A., Nagrelli, V.E., Ermakov, S.V., Onishchenko, D.A., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.192-196.

Offshore structures, Icebergs, Ice solid interface, Impact strength, Dynamic loads, Ice mechanics, Mathematical models, Design criteria

49-3338

Calculation techniques, numerical models and methods of determination of total and local ice forces created in the interaction between an ice strengthened platform and stamukhas/ice ridges.

Rozin, L.A., Rukavishnikov, V.A., Smelov, V.A., Babskii, A.E., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.197-202, 3 refs.

Offshore structures, Ice solid interface, Ice mechanics, Ice floes, Ice loads, Dynamic loads, Stress concentration, Mathematical models, Pressure ridges

49-3339

Calculation of standard ice loads on offshore structures in the Russian arctic seas.

Gladkov, M.G., Shatalina, I.N., Lappo, D.D., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.203-205, 4 refs.

Offshore structures, Ice solid interface, Ice loads, Impact strength, Ice mechanics, Standards, Analysis (mathematics)

49-3340

Spatial task for the calculation of pipeline placement with penetration into the soil in the ice covered sea.

Rozin, L.A., Rukavishnikov, V.A., Smelov, V.A., Koliaskin, S.IU., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.211-214, 3 refs.

Offshore structures, Underground pipelines, Ice floes, Ice scoring, Loads (forces), Ice solid interface, Soil mechanics, Dislocations (materials), Analysis (mathematics)

49-3341

Ice rubble effects on the ice load value when ice floe hits an offshore structure.

Alekseev, IU.N., Sazonov, K.E., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.215-216, 5 refs.

Offshore structures, Ice floes, Ice loads, Dynamic loads, Impact strength, Ice mechanics, Ice solid interface, Analysis (mathematics)

49-3342

Offshore structures and their protection from ice loads.

Karnovich, IU.N., Tregub, G.A., Shatalina, I.N., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.217-221, 5 refs.

Offshore structures, Ice loads, Protection, Design, Ice booms, Floating structures

49-3343

Prediction of potential ice loads on open and ducted propellers by the results of model self propulsion tests in the ice tank.

Andriushin, A.IU., Bitsulia, A.V., Bezzubik, O.N., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.222-227, 12 refs.

Icebreakers, Propellers, Mechanical tests, Simulation, Ice loads, Impact tests, Ice solid interface, Statistical analysis, Design criteria

49-3344

Model tests to study ice loads on offshore structures.

Bäckström, M., Mattsson, T., Nortala-Hoikkanen, A., Vershinin, S.A., Wilkman, G., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.228-233.

Offshore structures, Models, Design, Design criteria, Ice solid interface, Ice loads, Ice mechanics, Mechanical tests, Simulation

49-3345

Joint industry field expedition to study ice conditions in Pechora Sea, 1993.

Wilkman, G., et al, International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.234-238.

Sea ice, Ice conditions, Ice surveys, Aerial surveys, International cooperation, Russia—Pechora Sea

49-3346

Arctic offshore development: construction materials for the Rosshelf projects.

Gorynin, I.V., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.239-242.

Hydrocarbons, Petroleum industry, Economic development, Offshore structures, Construction materials, Pipelines, Specifications

49-3347

Major challenges in platform design for Russian continental shelf.

Eranti, E., Kärnä, T., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.247-252, 5 refs.

Offshore structures, Ice loads, Ice solid interface, Vibration, Dynamic loads, Stability, Design criteria

49-3348

Research, design and construction of steel arctic structures.

Danielewicz, B.W., Churcher, A.C., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.253-259, 9 refs.

Offshore structures, Offshore drilling, Petroleum industry, Steel structures, Ice loads, Design criteria, Design

49-3349

Extreme ice features.

Pilkington, R., Hill, C., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.260-267, 3 refs.

Offshore structures, Ice loads, Ice islands, Design criteria, Ice floes, Ice detection, Remote sensing, Statistical analysis, Arctic Ocean

49-3350

Application of the SSDC in the Russian arctic offshore.

Helmer, C.M., Ciring, J., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.268-276, 3 refs.

Offshore structures, Caissons, Offshore drilling, Construction, Performance, Design, Ice loads, Arctic Ocean

49-3351

Technological challenges for hydrocarbon production in the Barents Sea.

Gudmestad, O.T., Strass, P., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.277-284, 7 refs. For another source see 48-125.

Hydrocarbons, Offshore drilling, Offshore structures, Economic development, Ice conditions, Logistics, Barents Sea

49-3352

Optimization of oil and gas production platforms strengthened for operations in ice infested waters.

Almazov, V.O., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.288-290, 2 refs.

Offshore structures, Concrete structures, Petroleum industry, Design criteria, Ice loads, Physical properties

49-3353

Solution to sub-sea production in regions subjected to ice scouring.

Davies, P., Karelin, IU., Ellis, B.E., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.291-294.

Offshore structures, Ice scoring, Countermeasures, Subsurface structures, Petroleum industry, Caissons, Design, Cost analysis

49-3354

Submersibles and underwater equipment of the "G.P. Kenny Intershelf" for the arctic offshore.

Karev, S.IU., Nesterov, A.V., Voronov, A.F., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.297-299.

Offshore structures, Petroleum industry, Construction equipment, Subsurface structures, Robotics

49-3355

Development of innovative prototype equipment on hydrogen energy source for the arctic offshore development.

Seleznev, K.P., Zharov, V.F., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.300-303.

Offshore drilling, Exploration, Equipment, Design, Floating structures, Heating, Hydrogen, Sea water, Chemical analysis

49-3356

Marine transport and the development of the Russian arctic offshore: prospects and possibilities.

Ivanov, IU.M., Isakov, N.A., Batskikh, IU.M., Beloshistov, IU.R., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.307-309.

Marine transportation, Petroleum industry, Economic development, Natural gas

49-3357

Piecewise-linear methods of numerical modelling of the anchored offshore structure motion under the effects of wind, currents, waves and sea ice.

Bol'shev, A.S., Frolov, S.A., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.310-314, 14 refs.

Offshore structures, Offshore drilling, Floating structures, Stability, Ice solid interface, Wind factors, Loads (forces), Mathematical models

49-3358

Calculation of the support system location for the arctic offshore.

Kozhevnikov, P.M., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.315-320, 6 refs.

Offshore structures, Moorings, Ships, Design, Design criteria

49-3359

Search and rescue operations in the course of the Russian arctic offshore development.

Iliukhin, V.N., IArosh, M.A, International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.321-323.

Petroleum industry, Offshore drilling, Accidents, Oil spills, Rescue operations, Safety

49-3360

Numerical modelling of the arctic offshore hydrology for the purposes of anthropogenic impact assessment.

Doronin, IU.P., Tsarev, A., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.324-327, 4 refs.

Oceanography, Offshore drilling, Environmental impact, Ice conditions, Ice growth, Deltas, Estuaries, Hydrology, Mathematical models

49-3361

Biological evaluation of the environment quality in the course of arctic offshore development.

Pogrebov, V.B., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.328-331, 7 refs.

Marine biology, Ecosystems, Offshore drilling, Environmental impact, Environmental protection, Monitors

49-3362

Environment and the development of the Russian arctic offshore.

Stepanov, A.L., Adamenko, V.N., International Conference on Development of Russian Arctic Offshore, 1st, St. Petersburg, Russia, Sep. 21-24, 1993. Proceedings. Edited by T.S. Artiukhina et al, St. Petersburg, St. Petersburg State Technical University, 1994, p.332-334.

Petroleum industry, Offshore drilling, Pollution, Monitors, Environmental impact, Environmental protection, Ecology

49-3363

Pyrological regionalization in a taiga zone. [Pirologicheskoe raionirovanie v taezhnoi zone]

Sofronov, M.A., Volokitina, A.V., Novosibirsk, Nauka, 1990, 203p., In Russian. Refs. p.195-203.

Forest fires, Climatic factors, Taiga, Snow cover, Air temperature, Mosses, Wind factors, Humidity

49-3364

Belgian scientific research programme on the Antarctic. Phase III. Synopsis.

Belgian Science Policy Office. Prime Minister's Services, Brussels, Belgian Science Policy Office, Feb. 1994, 39p.

Research projects, Oceanographic surveys, Climatic factors, Environmental protection, Marine biology, Air ice water interaction, Paleoclimatology

This volume represents the third phase of the Belgian Scientific Research Programme on the Antarctic. It consists of nine projects covering seven research themes in three fields: marine ecodynamics and climatic interactions; evolution and protection of marine ecosystems; and the role of the Antarctic in global changes. The name of the principal investigator, and the title, theme, objectives and tasks of each project are included.

49-3365

Nuclear waste: an international problem and evaluating the antarctic continent as a disposal site.

Wicks, F., Intersociety Energy Conversion Engineering Conference, 29th, Monterey, CA, Aug. 7-11, 1994. Collection of technical papers. Part 3, [1994], p.1185-1192, 23 refs.

Nuclear power, Radioactive wastes, Waste disposal, Ice sheets, Environmental protection, International cooperation

The end of the cold war is resulting in dismantling of thousands of nuclear weapons in the United States and the former Soviet Union. An estimated 40,000 pits of highly enriched uranium and plutonium must be converted for use in electric power reactors, or be continuously guarded, or safely disposed of. This paper suggests that the time has come to reconsider the entire nuclear fuel and material cycles for both the electric power and weapons programs, and further to re-define nuclear waste as a global environmental problem that should be handled by an international agency with responsibility to collect this waste and dispose of it at a single repository. The best of the bad options may be disposal in the ice of the inland antarctic continent. A preliminary identification of existing treaties and potential sites is presented, along with recommendations for further research. (Auth.)

49-3366

Swedish Arctic Research Programme 1991. International Arctic Ocean Expedition 1991. Icebreaker *Oden*—a cruise report.

Anderson, L.G., ed, Carlsson, M.L., ed, Stockholm, Swedish Polar Research Secretariat, [1992], 128p., Refs. passim.

Oceanographic surveys, Icebreakers, Ice navigation, Ice surveys, Sea ice distribution, Drift, Air ice water interaction, Polar atmospheres, Atmospheric composition, Synthetic aperture radar, Spaceborne photography, Data transmission

49-3367

Navigation in ice-covered waters: a bibliography.

Macqueen, A.D., ed, WDC-C bibliographies. Series A. Glaciological topic 17, Cambridge, England, University, Scott Polar Research Institute, World Data Centre C for Glaciology, 1993, 23p., WDCA 93000661, 260 citations.

Bibliographies, Icebreakers, Ice navigation

This bibliography lists all relevant publications on navigation in ice covered waters entered through June 1993 in the SPRILIB database of the World Data Centre C for Glaciology, Scott Polar Research Institute Library, University of Cambridge, England. Of a total of 260 citations, 25 are explicitly pertinent to Antarctica and others are implied. Each citation is annotated; a subject/geographic index and author index are included.

49-3368

Icebreakers and ice-strengthened vessels: a bibliography.

Macqueen, A.D., ed, WDC-C bibliographies. Series A. Glaciological topic 16, Cambridge, England, University, Scott Polar Research Institute, World Data Centre C for Glaciology, 1993, 46p., WDCA 93000660, 619 citations.

Bibliographies, Icebreakers, Ice navigation

This bibliography lists all relevant publications on icebreakers and ice-strengthened vessels entered through June 1993 in the SPRILIB database of the World Data Centre C for Glaciology, Scott Polar Research Institute Library, University of Cambridge, England. Of a total of 619 citations, 45 are explicitly pertinent to Antarctica and others are implied. Each citation is annotated; a subject/geographic index and author index are included.

49-3369

Glaciohydrology: a bibliography.

Macqueen, A.D., ed, WDC-C bibliographies. Series A. Glaciological topic 11, Cambridge, England, University, Scott Polar Research Institute, World Data Centre C for Glaciology, 1993, 64p., WDCA 93000659, 730 citations.

Bibliographies, Glacial hydrology, Meltwater

This bibliography lists all relevant publications on glaciohydrology entered through June 1993 in the SPRILIB database of the World Data Centre C for Glaciology, Scott Polar Research Institute Library, University of Cambridge, England. Of a total of 730 citations, 62 are explicitly pertinent to Antarctica and others are implied. Each citation is annotated; a subject/geographic index and author index are included.

49-3370

Chemistry of ice: a bibliography.

Macqueen, A.D., ed, WDC-C bibliographies. Series A. Glaciological topic 6, Cambridge, England, University, Scott Polar Research Institute, World Data Centre C for Glaciology, 1993, 45p., WDCA 93000658, 658 citations.

Bibliographies, Ice composition, Ice crystal growth

This bibliography lists all relevant publications on the chemistry of ice entered through June 1993 in the SPRILIB database of the World Data Centre C for Glaciology, Scott Polar Research Institute Library, University of Cambridge, England. Of a total of 658 citations, 13 are explicitly pertinent to Antarctica and others are implied. Each citation is annotated; a subject/geographic index and author index are included.

49-3371

Physics of ice: a bibliography.

Macqueen, A.D., ed, WDC-C Bibliographies. Series A. Glaciological topic 5, Cambridge, England, University, Scott Polar Research Institute, World Data Centre C for Glaciology, 1993, 86p., WDCA 93000657, 1190 citations.

Bibliographies, Ice mechanics, Ice thermal properties, Ice crystal structure

This bibliography lists all relevant publications on the physics of ice entered through June 1993 in the SPRILIB database of the World Data Centre C for Glaciology, Scott Polar Research Institute Library, University of Cambridge, England. Of a total of 1190 citations, 26 are explicitly pertinent to Antarctica and others are implied. Each citation is annotated; a subject/geographic index and author index are included.

49-3372

Ice coring and ice cores: a bibliography.

Macqueen, A.D., ed, WDC-C Bibliographies. Series A. Glaciological topic 3, Cambridge, England, University, Scott Polar Research Institute, World Data Centre C for Glaciology, 1993, 55p., WDCA 93000656, 672 citations.

Bibliographies, Ice cores

This bibliography lists all relevant publications on ice coring and ice cores entered through June 1993 in the SPRILIB database of the World Data Centre C for Glaciology, Scott Polar Research Institute Library, University of Cambridge, England. Of a total of 672 citations, 222 are explicitly pertinent to Antarctica and others are implied. Each citation is annotated; a subject/geographic index and author index are included.

49-3373

Glacier advance and retreat: a bibliography.

Macqueen, A.D., ed, WDC-C bibliographies. Series A. Glaciological topic 2, Cambridge, England, University, Scott Polar Research Institute, World Data Centre C for Glaciology, 1993, 51p., WDCA 93000655, 671 citations.

Bibliographies, Glaciation, Glacier surveys, Glacier oscillation, Paleoclimatology

This bibliography lists all relevant publications on glacier advance and retreat entered through June 1993 in the SPRILIB database of the World Data Centre C for Glaciology, Scott Polar Research Institute Library, University of Cambridge, England. Of a total of 671 citations, 75 are explicitly pertinent to Antarctica and others are implied. Each citation is annotated; a subject/geographic index and author index are included.

49-3374

Ice and climate: a bibliography.

Macqueen, A.D., ed, WDC-C bibliographies. Series A. Glaciological topic 1, Cambridge, England, University, Scott Polar Research Institute, World Data Centre C for Glaciology, 1993, 70p., WDCA 93000654, 852 citations.

Bibliographies, Ice air interface, Air ice water interaction, Polar atmospheres, Climatic changes

This bibliography lists all relevant publications on ice and climate entered through June 1993 in the SPRILIB database of the World Data Centre C for Glaciology, Scott Polar Research Institute Library, University of Cambridge, England. Of a total of 852 citations, 111 are explicitly pertinent to Antarctica and others are implied. Each citation is annotated; a subject/geographic index and author index are included.

49-3375

Deep ice drilling on Law Dome: initial environmental evaluation.

Australian Antarctic Division. Department of the Arts, Sport, the Environment, Tourism and Territories, 1989, 25p. + Attachments, 6 refs.

Research projects, Ice cores, Drilling, Boreholes, Chemistry, Legislation, Environmental impact, Health, Environmental protection, Pollution, Antarctica—Law Dome

A preliminary evaluation has been made of the environmental impact of the proposed project 'Deep Ice Drilling on Law Dome'. This report focuses on the choice of constituents for the borehole loading fluid, and on comparative evaluations of their possible environmental impacts. It is acknowledged that emission of ozone depleting substances should be avoided wherever possible, and for this reason, the use of chlorofluorocarbons (CFCs) in the borehole fluid has been ruled out in favor of tetrachloroethylene. The major impact of the proposal is the eventual escape of the fluid into the atmosphere and marine environment many thousands of years into the future. This assessment considers the benefits to scientific understanding which can be expected from the intended research on the ice cores, and takes into account the precautionary procedures to be followed during the project and in handling borehole fluid constituents. (Auth. mod.)

49-3376

Palaeo-perspectives: reducing uncertainties in global change?

Lorius, C., Oeschger, H., *Ambio,* Feb. 1994, 23(1), p.30-36, 54 refs.

Paleoclimatology, Air ice water interaction, Air pollution, Atmospheric composition, Climatic changes, Ice cores, Ice composition, Glacier oscillation, Human factors

Information on the history of the Earth system is an important element in assessing global change. Analysis of air trapped in natural ice has provided data on the pre-industrial concentrations of greenhouse gases like CO_2 and CH_4, and their recent increase—and has shown that the latter effect can be unequivocally attributed to human activities. Such data also provide the basis for estimating that the present anthropogenic greenhouse forcing is 2.5 W/m^2. Records for the last 150,000 years show the variation of Earth system parameters during one and a half glacial cycles. The frequencies of the orbital forcing indicates that changes in these parameters are the main cause of the glacial-interglacial cycles. The concentrations of CO_2 and CH_4 vary in parallel with global temperature; whilst CH_4 closely follows the climatic variations, the relationship of CO_2 with climate is much more complex. (Auth. mod.)

49-3377

Palaeo-perspectives: changes in terrestrial ecosystems.

Street-Perrott, F.A., *Ambio,* Feb. 1994, 23(1), p.37-43, 40 refs.

Paleoclimatology, Air pollution, Atmospheric composition, Climatic changes, Ice cores, Ice composition, Soil erosion

Over the last 25 years, the study of marine cores and ice cores from the Greenland and antarctic ice sheets has yielded spectacular insights into the natural variability of the planetary environment, notably the large glacial/interglacial variations in ice-sheet extent, ocean circulation, greenhouse gases and tropospheric aerosols. This paper focuses on specific examples of state-of-the-art research that highlight the potential contribution of palaeodata to the International Geosphere-Biosphere Programme as a whole. They include: glacial/interglacial changes in carbon storage on land; the feedback effects of variations in atmospheric CO_2 on tropical and high-latitude ecosystems; the climatic mechanisms governing variations in methane generation by tropical wetlands; and the environmental repercussions of human activity during the last 2,000 years, including accelerated soil erosion and acid rain. (Auth. mod.)

49-3378

Method for the design and simulation of developable surface snowplow moldboards.

Crane, R.L., Laramie, University of Wyoming, 1994, 217p., Ph.D. thesis. 22 refs.

Snow removal, Metal snow friction, Plastics snow friction, Snow compression, Snow erosion, Snow deformation, Road maintenance, Computerized simulation, Computer programs, Mathematical models

49-3379

Hydrological yearbook 1991. [Hydrologinen vuosikirja 1991]

Leppäjärvi, R., ed, Helsinki, Vesi- ja ympäristöhallitus (National Board of Waters and the Environment), 1994, 169p., In Finnish and English with Swedish summary.

Water reserves, Water level, River flow, Runoff, Stream flow, Precipitation (meteorology), Snow water equivalent, Snow depth, Frost penetration, Freezeup, Ice breakup, Finland

49-3380

Corps of Engineers technology transfer.

Link, L.E., Jr., MP 3591, *Army RD&A,* Mar.-Apr. 1995, p.10-13.

Research projects, Military research, Organizations, Laboratories

49-3381

Snow in the Spanish cordilleras. ERHIN Program. 1991/92. [La nieve en las cordilleras españolas. Programa ERHIN. Año 1991/92]

Spain. Ministerio de Obras Públicas, Transportes y Medio Ambiente. Dirección General de Obras Hidráulicas (Ministry of Public Works, Transportation and Environment. General Administration of Hydraulic Works), Madrid, 1994, 245p., In Spanish. The acronym ERHIN is for Estudio de los Recursos Hidráulicos producidos por la Innivación en la alta montaña española (Study of Hydraulic Resources Produced by Snowfall in the High Spanish Mountains).

Snow surveys, Snow cover distribution, Snowfall, Snowmelt, Runoff, Glacier surveys, Glacier mass balance, Spain

49-3382

Studies on the dynamics of saltation in drifting snow.

Kosugi, K., Nishimura, K., Maeno, N., *National Research Institute for Earth Science and Disaster Prevention. Report,* Jan. 1995, No.54, p.111-154, With Japanese summary. 16 refs.

Blowing snow, Snow erosion, Snow air interface, Snowdrifts, Particle size distribution, Statistical analysis, Mathematical models

49-3383

Observations of snow crystals using low-temperature scanning electron microscopy.

Wergin, W.P., Rango, A., Erbe, E.F., *Scanning,* Jan./Feb. 1995, 17(1), p.41-50, 17 refs.

Snowflakes, Snow crystal structure, Ice crystal optics, Ice crystal replicas, Scanning electron microscopy

49-3384

Quaternary of the Karakoram and Himalaya.

Derbyshire, E., ed, Owen, L.A., ed, *Zeitschrift für Geomorphologie. Supplementband,* 1989, No.76, 255p., Refs. passim. For selected papers see 49-3385 through 49-3394.

Alpine glaciation, Mountain glaciers, Glacial deposits, Quaternary deposits, Moraines, Outwash, Geochronology, Tectonics, Paleoclimatology, Karakoram Mountains

49-3385

Altitudinal organisation of Karakoram geomorphic processes and depositional environments.

Hewitt, K., *Zeitschrift für Geomorphologie. Supplementband,* 1989, No.76, Quaternary of the Karakoram and Himalaya. Edited by E. Derbyshire and L.A. Owen, p.9-32, 48 refs. For another version see 49-2007.

Alpine glaciation, Mountain glaciers, Glacial erosion, Glacial deposits, Outwash, Periglacial processes, Avalanche erosion, Avalanche deposits, Nivation, Slope processes, Karakoram Mountains

49-3386

Karakoram glacial depositional system.

Owen, L.A., Derbyshire, E., *Zeitschrift für Geomorphologie. Supplementband,* 1989, No.76, Quaternary of the Karakoram and Himalaya. Edited by E. Derbyshire and L.A. Owen, p.33-73, Refs. p.69-73.

Alpine glaciation, Mountain glaciers, Glacier surveys, Glacial deposits, Moraines, Outwash, Avalanche deposits, Sediment transport, Karakoram Mountains

49-3387

Influence of Himalayan uplift on the development of Quaternary glaciers.

Zheng, B.X., *Zeitschrift für Geomorphologie. Supplementband,* 1989, No.76, Quaternary of the Karakoram and Himalaya. Edited by E. Derbyshire and L.A. Owen, p.89-115, 44 refs.

Alpine glaciation, Mountain glaciers, Glacier formation, Glacial deposits, Moraines, Glacial geology, Quaternary deposits, Paleoclimatology, Geochronology, Tectonics, Himalaya Mountains

49-3388

Terraces, uplift and climate in the Karakoram Mountains, northern Pakistan: Karakoram intermontane basin evolution.

Owen, L.A., *Zeitschrift für Geomorphologie. Supplementband,* 1989, No.76, Quaternary of the Karakoram and Himalaya. Edited by E. Derbyshire and L.A. Owen, p.117-146, 48 refs.

Alpine glaciation, Mountain glaciers, Glacial deposits, Glacial erosion, Moraines, Outwash, Quaternary deposits, Terraces, Mass movements (geology), Tectonics, Geochronology, Paleoclimatology, Karakoram Mountains

49-3389

Problems of the Quaternary geomorphology of the Xixabangma region in south Tibet and Nepal.

Osmaston, H.A., *Zeitschrift für Geomorphologie. Supplementband,* 1989, No.76, Quaternary of the Karakoram and Himalaya. Edited by E. Derbyshire and L.A. Owen, p.147-180, 63 refs.

Alpine glaciation, Mountain glaciers, Glacial deposits, Glacial erosion, Moraines, Quaternary deposits, Geomorphology, Geochronology, Tectonics, Paleoclimatology, Himalaya Mountains

49-3390

Gongba conglomerates: glacial or tectonic.

Fort, M., *Zeitschrift für Geomorphologie. Supplementband,* 1989, No.76, Quaternary of the Karakoram and Himalaya. Edited by E. Derbyshire and L.A. Owen, p.181-194, 28 refs.

Alpine glaciation, Glacial deposits, Moraines, Outwash, Lacustrine deposits, Quaternary deposits, Tectonics, Geochronology, Paleoclimatology, Himalaya Mountains

49-3391

Quaternary glacial history of Kashmir, northwest Himalaya: a revision of de Terra and Paterson's sequence.

Holmes, J.A., Street-Perrott, F.A., *Zeitschrift für Geomorphologie. Supplementband,* 1989, No.76, Quaternary of the Karakoram and Himalaya. Edited by E. Derbyshire and L.A. Owen, p.195-212, 27 refs.

Alpine glaciation, Moraines, Outwash, Quaternary deposits, Mass movements (geology), Tectonics, Geochronology, Paleoclimatology, Kashmir

49-3392

Chronology and stratigraphy of Kashmir loess.

Rendell, H.M., Gardner, R.A.M., Agrawal, D.P., Juyal, N., *Zeitschrift für Geomorphologie. Supplementband,* 1989, No.76, Quaternary of the Karakoram and Himalaya. Edited by E. Derbyshire and L.A. Owen, p.213-223, 20 refs.

Alpine glaciation, Quaternary deposits, Loess, Eolian soils, Soil dating, Stratigraphy, Geochronology, Paleoclimatology, Kashmir

49-3393

Late Quaternary loess and paleosols, Kashmir Valley, India.

Gardner, R.A.M., *Zeitschrift für Geomorphologie. Supplementband,* 1989, No.76, Quaternary of the Karakoram and Himalaya. Edited by E. Derbyshire and L.A. Owen, p.225-245, 28 refs.

Quaternary deposits, Loess, Lacustrine deposits, Weathering, Soil dating, Stratigraphy, Geochronology, Paleoclimatology, Kashmir

49-3394

Loess deposition during the Late Pleistocene in northern Pakistan.

Rendell, H.M., *Zeitschrift für Geomorphologie. Supplementband,* 1989, No.76, Quaternary of the Karakoram and Himalaya. Edited by E. Derbyshire and L.A. Owen, p.247-255, 12 refs.

Loess, Quaternary deposits, Alluvium, Soil dating, Stratigraphy, Geochronology, Paleoclimatology, Pakistan

49-3395

Quaternary of South America and Antarctic Peninsula. Volume 1.

Rabassa, J.D., ed, Rotterdam, A.A. Balkema, 1983, 156p., Refs. passim. Based on contributions presented at the South American Regional Meeting of INQUA (International Union for Quaternary Research), held in Neuquén, Argentina, Mar. 1982. For selected papers see 49-3396 through 49-3398. DLC QE696.Q337 1983 Vol.1

Glacier surveys, Glacier oscillation, Glacial hydrology, Alpine glaciation, Quaternary deposits, Paleoclimatology

49-3396

Quaternary palynology of Chile.

Heusser, C.J., Quaternary of South America and Antarctic Peninsula. Vol.1. Edited by J. Rabassa, Rotterdam, A.A. Balkema, 1983, p.5-22, With Spanish summary. 37 refs.

Paleoclimatology, Paleobotany, Pollen, Pleistocene, Quaternary deposits, Soil dating, Chile

49-3397

Fluctuations of some glaciers in the upper Atuel River basin, Mendoza, Argentina.

Cobos, D.R., Boninsegna, J.A., Quaternary of South America and Antarctic Peninsula. Vol.1. Edited by J. Rabassa, Rotterdam, A.A. Balkema, 1983, p.61-82, With Spanish summary. 30 refs.

Glacier surveys, Alpine glaciation, Mountain glaciers, Glacier oscillation, Glacier melting, Snow line, River basins, Paleoclimatology, Argentina

49-3398

Utility of a glacier inventory to developing countries such as Bolivia.

Jordan, E., Quaternary of South America and Antarctic Peninsula. Vol.1. Edited by J. Rabassa, Rotterdam, A.A. Balkema, 1983, p.125-134, With Spanish summary. 3 refs.

Glacier surveys, Glacial hydrology, Subglacial drainage, Meltwater, Runoff, Water reserves, Natural resources, Electric power, Economic development, Bolivia

49-3399

Mechanical freezing of alum sludge.

Martel, C.J., MP 3592, *Water science & technology,* 1994, 30(8), p.177-184, 9 refs. For another source see 48-5376.

Waste treatment, Sewage treatment, Sludges, Refrigeration, Freezing, Moisture transfer, Ice water interface, Mechanical tests, Design

This paper presents a new mechanical freezing concept for freezing alum or other hydroxide sludges as a conditioning step for dewatering. The basic concept is to freeze a thin layer of sludge on a continuously moving fabric belt. Sludge is attached to the belt by a vacuum drum belt filter which also removes one-half of the water and thus reduces the amount of sludge to be frozen. Filter leaf tests were conducted to determine the operational parameters and approximate production rates of this concept. The tests show that freezing alum sludge in thin layers will separate out the water as ice crystals and transform the solids into the same type of granular material produced in natural freezing beds. The average production rate of frozen sludge was 6.5 kg/hr/m^2 at -20°C. The belt area needed for a 10,000 m^3/day plant was estimated to be 48 m^2. This concept has been patented by the U.S. Patent Office.

49-3400

Round-robin study of performance evaluation of soils vapor-fortified with volatile organic compounds.

Hewitt, A.D., Grant, C.L., MP 3593, *Environmental science & technology,* Mar. 1995, 29(3), p.769-774, 22 refs.

Soil tests, Environmental tests, Soil pollution, Soil chemistry, Stability, Sampling, Laboratory techniques, Vapor diffusion, Soil air interface, Hydrocarbons, Standards, Correlation, Accuracy

Three soils were vapor-fortified with volatile organic compounds (VOCs) to produce materials suitable for performance evaluation and related quality assurance/quality control functions. Twelve laboratories analyzed two independently prepared sets of three different soil subsamples fortified with four VOCs. Analyte concentration estimates were reported for each soil subsample following a methanol extraction, purge-and-trap gas chromatography/mass spectrometry analysis (Method 8240, SW846). Relative standard deviations within individual soils ranged from 8.5 to 28.2%, with a pooled standard deviation of <13%. The best precision was for Ben (pooled RSD, 9.0%), while TDCE showed the greatest overall uncertainty (pooled RSD, 20.3%). These results confirm that vapor fortification, followed by confinement in sealed glass ampules, is a precise means of preparing and storing VOC-contaminated soil subsamples for use in quality assurance programs.

49-3401

Spray contribution to net evaporation from the sea: a review of recent progress.

Andreas, E.L., Edson, J.B., Monahan, E.C., Rouault, M.P., Smith, S.D., MP 3594, *Boundary-layer meteorology,* 1995, 72(1), p.3-52, Refs. p.47-52.

Atmospheric boundary layer, Marine atmospheres, Climatology, Sea spray, Air water interactions, Evaporation, Drops (liquids), Heat flux, Moisture transfer, Wind factors, Mathematical models

This paper reviews recent work on how sea spray contributes to the sea surface heat and moisture budgets. In the presence of spray, the near-surface atmosphere is characterized by a droplet evaporation layer (DEL) with a height that scales with the significant-wave amplitude. The majority of spray transfer processes occur within this layer. As a result, the DEL is cooler and more moist than the atmospheric surface layer would be under identical conditions but without the spray. Also, because the spray in the DEL provides elevated sources and sinks for heat and moisture, the vertical heat fluxes are no longer constant with height. Eulerian and Lagrangian models and a simple analytical model are used to study the processes important in spray droplet dispersion and evaporation within this DEL. These models all point to the conclusion that, in high winds (above 15 m/s), sea spray begins to contribute significantly to the air-sea fluxes of heat and moisture. It is estimated that in a 20-m/s wind, with an air temperature of 20°C, a sea surface temperature of 22°C, and a relative humidity of 80%, the latent and sensible heat fluxes resulting from spray alone will have magnitudes of order 150 and 15 W/m^2 respectively in the DEL.

49-3402

Record drilling depth struck in Greenland.

Mayewski, P.A., et al, *Eos,* Mar. 8, 1994, 75(10), p.113,119,124.

Ice sheets, Glaciology, Drilling, Ice cores, Drill core analysis, Bedrock, Paleoclimatology, Greenland

49-3403

Exploring arctic history through scientific drilling.

ODP Leg 151 Shipboard Scientific Party, *Eos,* June 21, 1994, 75(25), p.281,285-286, 3 refs.

Oceanographic surveys, Marine deposits, Offshore drilling, Bottom sediment, Sedimentation, Drill core analysis, Pleistocene, Glacier oscillation, Arctic Ocean

49-3404

Investigating the marginal ice zone on the Newfoundland Shelf.

Smith, P.C., Tang, C.L., MacPherson, J.I., McKenna, R.F., *Eos,* Feb. 8, 1994, 75(6), p.57,60-62, 9 refs.

Oceanographic surveys, Sea ice distribution, Pack ice, Ice conditions, Ice forecasting, Drift, Air ice water interaction, Atmospheric boundary layer, Wind factors, Remote sensing, Labrador Sea

49-3405

New program to research issues of global climate in the Arctic.

SHEBA Science Working Group, *Eos,* May 31, 1994, 75(22), p.249,253.

Climatology, Global change, Polar atmospheres, Air ice water interaction, Sea ice distribution, Climatic factors, Research projects

49-3406

Freezing and melting water in lamellar structures.

Gleeson, J.T., Erramilli, S., Gruner, S.M., *Biophysical journal,* Aug. 1994, 67(2), p.706-712, 22 refs.

Ice formation, Dispersions, Water chemistry, Freezing, Melting

49-3407

Use of tephrochronology in the evaluation of accumulation rates on Nelson Ice Cap, South Shetland Islands, Antarctica.

Qin, D.H., Zielinski, G.A., Germani, M.S., Ren, J.W., Wang, X.X., Wang, W.T., *Science in China. Series B,* Oct. 1994, 37(10), p.1272-1278 + 2 plates, 11 refs.

Volcanoes, Ice sheets, Ice cores, Antarctica—Nelson Island, Antarctica—South Shetland Islands

A volcanic ash layer was observed in 3 ice cores from Nelson Ice Cap. A comparison of major elemental composition of glass shards from the 3 tephra layers with average whole-rock compositions of 1967-1970 eruptions on Deception I., and of glass shards from other suspected Deception I. eruptions collected from antarctic ice and firn, indicate that the most reasonable source for the tephra in the Nelson Ice Cap cores is the 1970 eruption on Deception I. From the depth of the volcanic ash layer and measured density profile of the cores, the net accumulation rate at the summit, Core GW, is 1200 g/cm^2/a during the past 20 years. The net accumulation rates are 700 g/cm^2/a and 6 g/cm^2/a at sites N30 and N50, respectively. In the eastern part of the Nelson Ice Cap the accumulation rate may be higher than that in the northern part, because no volcanic ash in ice cores was observed at similar depths collected from this region. (Auth.)

49-3408

From the greenhouse to the icehouse: a southern ocean perspective of Paleogene climate.

Zachos, J.C., *Oceanus,* 1993/94, 36(4), p.57-61.

Paleoclimatology, Glacial deposits, Marine deposits, Glacial geology, Glaciation, Ice volume

In 1985, with the initiation of ***JOIDES Resolution*** and the second phase of scientific drilling, scientists gained the capacity to drill in some of the more remote and inhospitable reaches of the world oceans, including the polar oceans. One immediate regional target was the southern ocean, where nearly 10 km of sediment were recovered at more than 25 sites during 4 legs of drilling. As a result of antarctic drilling it became evident that ice sheets were present on Antarctica as long ago as the earliest Oligocene. Thick sequences of glacially deposited debris found in Prydz Bay, together with similar deposits found earlier in McMurdo Sound on the opposite side of the continent, indicated widespread glacial activity not atypical of continental ice sheets. Some of the oldest glacial sediments, however, were deposited in the late Eocene, suggesting that the very first ice sheets, albeit small, formed nearly 40 mya. Thus, it appears that glacial activity was limited regionally to portions of East Antarctica until about the earliest Oligocene (about 35 mya).

49-3409

NMR studies of non-freezing water in randomly packed beds of porous particles.

Hills, B.P., Le Floc'h, G., *Molecular physics,* July 1994, 82(4), p.751-763, 24 refs.

Porous materials, Nuclear magnetic resonance, Freeze thaw cycles, Protons, Microanalysis, Liquid solid interfaces, Ice water interface, Unfrozen water content, Relaxation (mechanics), Temperature effects

49-3410
Wave method for evaluating the effective thickness of sea ice in climate monitoring.
Nagurnyĭ, A.P., Korostelev, V.G., Abaza, V.P., *Bulletin of the Russian Academy of Sciences. Physics. Supplement—Physics of vibrations,* 1994, 58(suppl.3), p.168-174, Translated from Rossiĭskoi Akademiĭ nauk. Izvestiia. Seriia fizicheskaia.
Sea ice, Ice mechanics, Ice cover thickness, Vibration, Resonance, Gravity waves, Wave propagation, Nomographs, Seismology, Air ice water interaction, Analysis (mathematics)

49-3411
Damage evolution during impact of an ice bar with lateral confinement.
Karr, D.G., Sun, X., *International journal of offshore and polar engineering,* Mar. 1995, 5(1), p.23-31, 23 refs. For another version see 48-4334.
Ice mechanics, Ice loads, Ice solid interface, Stress concentration, Impact strength, Fracture zones, Cracking (fracturing), Analysis (mathematics), Boundary value problems

49-3412
Laboratory evaluation of aircraft ground de/anti-icing products.
Louchez, P.R., Laforte, J.L., Bouchard, G., Farzaneh, M., *International journal of offshore and polar engineering,* Mar. 1995, 5(1), p.32-36, 13 refs. For another version see 49-2159.
Aircraft icing, Ice removal, Antifreezes, Viscosity, Fluid dynamics, Simulation, Tests, Air flow, Liquid solid interfaces, Performance

49-3413
New method of modelling ice accretion on objects of complex geometry.
Szilder, K., Lozowski, E.P., *International journal of offshore and polar engineering,* Mar. 1995, 5(1), p.37-42., 11 refs. For another source see 49-2161.
Ice physics, Power line icing, Ice formation, Ice accretion, Ice water interface, Water flow, Ice solid interface, Ice surface, Topographic features, Icicles, Mathematical models

49-3414
Icing rate meter estimation of atmospheric cable icing.
McComber, P., Druez, J., Laflamme, J., *International journal of offshore and polar engineering,* Mar. 1995, 5(1), p.43-50, 14 refs.
Power line icing, Icing rate, Ice accretion, Ice solid interface, Ice loads, Ice detection, Probes, Measuring instruments, Performance, Simulation

49-3415
Weeping wings for singles.
Horne, T.A., *AOPA pilot,* Feb. 1995, 38(2), p.61-65.
Aircraft icing, Ice removal, Chemical ice prevention, Airborne equipment, Solutions, Fluid flow, Pumps, Performance

49-3416
Theory for dual-wavelength CO_2 lidar method to distinguish ice, mixed-phase, and water clouds.
Eberhard, W.L., *Journal of atmospheric and oceanic technology,* Feb. 1995, 12(1), p.130-140, 19 refs.
Clouds (meteorology), Cloud physics, Optical properties, Remote sensing, Infrared radiation, Lidar, Ice detection, Water content, Ice crystal optics, Backscattering, Wave propagation

49-3417
Snow.
Kocin, P.J., Graf, D.H., Gartner, W.E., *Weatherwise,* Feb.-Mar. 1995, 48(1), p.24-29.
Snow accumulation, Seasonal variations, Snowstorms, Weather observations, Meteorological data, United States

49-3418
Temperature extremes.
Hickcox, D.H., *Weatherwise,* Feb.-Mar. 1995, 48(1), p.30-34.
Air temperature, Temperature variations, Records (extremes), Seasonal variations, Meteorological data, Weather observations, United States

49-3419
Preparation of cement slurry.
Dolganskaia, S.I., Il'in, M.S., Sharipov, A.U., *Russia Patent Office. Patent,* Jan. 23, 1993, n.p., No.1790670.
Oil wells, Drilling, Drilling fluids, Soil cement, Cold weather performance

49-3420
Outboard water intake, purification and cooling device.
Kuptsov, V.V., Slavutin, G.I., *Russia Patent Office. Patent,* Jan. 30, 1993, n.p., No.1791268.
Ships, Ice navigation, Water intakes, Water treatment

49-3421
Device for clearing snow and ice formations from pavements.
Ivanov, V.G., Klimenko, IU.V., *Russia Patent Office. Patent,* Jan. 30, 1993, n.p., No.1791514.
Road icing, Snow removal, Road maintenance

49-3422
Method of removing ice from surfaces of structures.
Drozdov, V.S., Golubkov, S.K., Shatalina, I.N., *Russia Patent Office. Patent,* Jan. 30, 1993, n.p., No.1791515.
Hydraulic structures, Ice removal, Ice prevention, Artificial melting

49-3423
Heating unit for reservoir.
Kartashev, V.P., *Russia Patent Office. Patent,* Jan. 30, 1993, n.p., No.1791526.
Reservoirs, Ice control, Heat pipes

49-3424
Ice-forming aerosol generator.
Karpushin, G.A., Kumchenko, IA.A., Ryzhkov, I.E., *Russia Patent Office. Patent,* Feb. 15, 1993, n.p., No.1794404.
Artificial nucleation, Ice nuclei, Fog dispersal, Smoke generators

49-3425
Rotary implement for cleaning land cleared of trees.
Filippov, V.A., Mazurkin, P.M., *Russia Patent Office. Patent,* Feb. 15, 1993, n.p., No.1794407.
Frozen ground strength, Permafrost, Excavation, Trenching, Land reclamation

49-3426
Method of forming ice crossing over river.
Kolotilov, IU.V., Lysov, V.A., Shchepin, N.F., *Russia Patent Office. Patent,* Feb. 15, 1993, n.p., No.1794973.
River ice, River crossings, Ice crossings, Snow (construction material), Snow compaction

49-3427
Method of improving shipping conditions in freezing rivers.
Silin, A.V., Zlatoverkhovnikov, L.F., *Russia Patent Office. Patent,* Feb. 15, 1993, n.p., No.1794976.
River ice, Icebound rivers, Ice control, Ice dams, Ice navigation

49-3428
Ice axe.
Blinov, D.IU., Vedernikov, E.A., Zaritskiĭ, V.I., *Russia Patent Office. Patent,* Feb. 23, 1993, n.p., No.1796219.
Mountains, Traverses, Ice cutting, Portable equipment

49-3429
Mountaineer's removable ice stake.
Nosov, A.P., *Russia Patent Office. Patent,* Feb. 23, 1993, n.p., No.1796222.
Mountains, Traverses, Ice cutting, Portable equipment

49-3430
Composition of artificial ice for frozen-type dams.
Razgovorova, E.L., Shatalina, I.N., Vasil'ev, N.K., *Russia Patent Office. Patent,* Feb. 23, 1993, n.p., No.1796650.
Artificial ice, Ice (construction material), Ice strength, Dams

49-3431
Machine for removing ice from roads and runways.
Karpenko, V.A., Robin, G.M., *Russia Patent Office. Patent,* Feb. 23, 1993, n.p., No.1796738.
Road icing, Ice removal, Snow removal, Artificial melting, Road maintenance

49-3432
Method and equipment for determining thickness of ice on water.
Bekirov, I.M., Brum, A.I., Denisov, M.G., *Russia Patent Office. Patent,* Feb. 23, 1993, n.p., No.1796842.
Ice cover thickness, Ice surveys, Ice pressure, Thickness gages

49-3433
Machine for cutting openings in ice of water reservoir.
Alatin, S.D., Kulepov, V.F., Romanov, V.V., *Russia Patent Office. Patent,* Feb. 23, 1993, n.p., No.1796843.
Reservoirs, Lake ice, Ice cutting, Ice control

49-3434
Underwater mined rock storage.
Kamyshnikov, I.G., Papulov, V.I., Zhukov, A.V., *Russia Patent Office. Patent,* Feb. 23, 1993, n.p., No.1797660.
Ice cover effect, Mining, Rock fills, Tailings

49-3435
Hydraulic hammer.
Atamanov, V.F., *Russia Patent Office. Patent,* Feb. 28, 1993, n.p., No.1798165.
Permafrost beneath structures, Frozen ground strength, Rock excavation, Pile driving, Hammers

49-3436
Composition for preventing ice formation on surfaces.
Chirikalov, I.I., Solov'ev, V.I., Sviderskiĭ, V.A., *Russia Patent Office. Patent,* Feb. 28, 1993, n.p., No.1798357.
Ice adhesion, Ice accretion, Chemical ice prevention, Protective coatings

49-3437
Snow plough.
Laptev, I.I., *Russia Patent Office. Patent,* Feb. 28, 1993, n.p., No.1798425.
Snow removal, Road maintenance, Motor vehicles

49-3438
Tooth of bucket excavator for digging permafrost ground.
Kazakov, N.G., Moroshnichenko, V.A., Polovinko, V.A., *Russia Patent Office. Patent,* Feb. 28, 1993, n.p., No.1798445.
Permafrost, Frozen ground strength, Excavation, Mining

49-3439
Composite stabiliser for well.
Medvedskiĭ, R.I., Rebiakin, A.N., Skliar, IU.G., *Russia Patent Office. Patent,* Feb. 28, 1993, n.p., No.1798472.
Permafrost, Frozen ground strength, Rock drilling, Soil stabilization, Composite materials

49-3440
Test tank of ice navigation ship models.
Kozin, V.M., Novolodskiĭ, I.D., *Russia Patent Office. Patent,* Mar. 7, 1993, n.p., No.1799799.
Ice navigation, Ice solid interface, Ice loads, Metal ice friction, Ships, Environmental tests, Test chambers

49-3441
Machine for removing snow and ice from roads.
Afonin, K.A., Biriuchev, B.N., Sapozhnikov, V.V., *Russia Patent Office. Patent,* Mar. 7, 1993, n.p., No.1799945.
Road icing, Ice removal, Ice cutting, Ice breaking, Road maintenance, Machinery

49-3442
Method of making canal in ice covering of water area.
Roshchupkin, D.V., *Russia Patent Office. Patent,* Mar. 7, 1993, n.p., No.1799947.
Channels (waterways), River ice, Ice cutting, Ice breaking, Ice control, Ice navigation

49-3443
Water collector for holes in ice.
Snegurev, K.N., *Russia Patent Office. Patent,* Mar. 7, 1993, n.p., No.1799960.
Ice cutting, Water supply, Pumps

49-3444
Method of mounting column into frozen ground.
Doev, R.B., Shevchenko, I.A., Zavizion, V.G., *Russia Patent Office. Patent,* Mar. 7, 1993, n.p., No.1800036.
Frozen ground strength, Drilling, Boreholes, Pile driving, Soil stabilization

49-3445
Power generation platform for use in ice floes.
Pikul', V.N., *Russia Patent Office. Patent,* Mar. 7, 1993, n.p., No.1800090.
Ice cover effect, Offshore structures, Hydraulic structures, Electric power

49-3446
Trench-laid pipeline retaining band.
Genin, V.B., Mukhametdinov, Kh.K., Poliakov, V.E., *Russia Patent Office. Patent,* Mar. 7, 1993, n.p., No.1800198.
Frozen ground strength, Permafrost beneath structures, Underground pipelines, Pipe laying, Trenching, Excavation

49-3447
Radar detection of anomalies such as cloudiness and volcanoes, ice and snow cover.
Arakelian, A.K., *Russia Patent Office. Patent,* Mar. 7, 1993, n.p., No.1800414.
Terrain identification, Radar photography, Radar echoes, Ice surveys, Snow surveys

49-3448
Anti-skid device for pneumatic tyres.
Kukoba, IU.P., *Russia Patent Office. Patent,* Mar. 15, 1993, n.p., No.1801790.
Tires, Motor vehicles, Vehicle wheels, Skid resistance, Rubber ice friction

49-3449
Electric starter system for IC engine.
Domanin, M.G., Ivanov, A.V., Poliashov, L.I., *Russia Patent Office. Patent,* Mar. 15, 1993, n.p., No.1802199.
Motor vehicles, Engine starters, Batteries, Cold weather performance

49-3450
Ice-field radar mapping device.
Kiselev, IU.M., Trepov, G.V., Uchvatov, V.I., *Russia Patent Office. Patent,* Mar. 23, 1993, n.p., No.1803343.
Ice surveys, Glacier surveys, Terrain identification, Aerial surveys, Balloons, Radar photography, Radar echoes, Mapping, Data transmission

49-3451
Railway points thermo-cleaning device, for ice and snow clearance.
Fedechev, A.F., Kalabukhov, V.N., Kravtsov, V.N., *Russia Patent Office. Patent,* Nov. 30, 1993, n.p., No.2003755.
Railroads, Railroad tracks, Snow removal, Ice prevention, Artificial melting

49-3452
Procedure for freezing pipeline into trench in permafrost ground.
Khafizov, R.M., Stasev, V.V., Zheludkov, N.N., *Russia Patent Office. Patent,* Nov. 30, 1993, n.p., No.2003910.
Permafrost beneath structures, Frozen ground strength, Underground pipelines, Pipe laying, Artificial freezing, Trenching, Excavation

49-3453
Pipe laying procedure, for use in permafrost ground.
Fazletdinov, K.A., Mukhametdinov, Kh.K., Poliakov, V.E., *Russia Patent Office. Patent,* Nov. 30, 1993, n.p., No.2003912.
Permafrost beneath structures, Frozen ground strength, Underground pipelines, Pipe laying, Trenching, Excavation

49-3454
AC substation with DC wire de-icing facility.
Bakhor, Z.M., Varetskiĭ, IU.E., Zhuravovskiĭ, A.V., *Russia Patent Office. Patent,* Nov. 30, 1993, n.p., No.2004042.
Power line icing, Ice removal, Ice prevention, Electric equipment

49-3455
Double layered corrosion resistant high duty steel.
Gorynin, I.V., Legostaev, IU.L., Maslennikov, A.V., *Russia Patent Office. Patent,* Dec. 15, 1993, n.p., No.2004611.
Ships, Steels, Ice navigation, Corrosion

49-3456
Drainage canal in cold region.
Ukhov, N.V., *Russia Patent Office. Patent,* Dec. 15, 1993, n.p., No.2004683.
Frozen ground strength, Soil stabilization, Drains, Channels (waterways), Embankments, Land reclamation

49-3457
Working head of single-bucket excavator.
Orenboĭm, B.D., Saltan, S.S., *Russia Patent Office. Patent,* Dec. 15, 1993, n.p., No.2004702.
Frozen ground strength, Excavation, Construction equipment

49-3458
Gas dynamic ripper for hard and frozen ground.
Ivkin, V.S., *Russia Patent Office. Patent,* Dec. 15, 1993, n.p., No.2004702.
Frozen ground strength, Excavation, Construction equipment

49-3459
Mobile drilling rig.
Golubev, V.A., Priĭmak, M.V., Simchuk, V.I., *Russia Patent Office. Patent,* Dec. 15, 1993, n.p., No.2004753.
Frozen ground strength, Permafrost, Drilling, Construction equipment

49-3460
Drilling tool for rotation drilling of wells in permafrost ground.
Dunaev, G.B., Startsev, V.G., Tatarinov, P.G., *Russia Patent Office. Patent,* Dec. 15, 1993, n.p., No.2004761.
Frozen ground strength, Permafrost, Rotary drilling, Construction equipment

49-3461
Starting mixture for production of wood-peat building materials.
Gordin, I.V., Lokochinskiĭ, A.A., *Russia Patent Office. Patent,* Dec. 30, 1993, n.p., No.2005108.
Permafrost beneath structures, Permafrost beneath roads, Cold weather construction, Construction materials, Frost resistance, Thermal insulation

49-3462
Method of forming frozen anti-filtration screen.
Bitiurin, A.K., Loginov, V.N., Sobol', S.V., *Russia Patent Office. Patent,* Dec. 30, 1993, n.p., No.2005124.
Soil freezing, Artificial freezing, Soil stabilization, Seepage, Waterproofing

49-3463
Cold-weather-resistant autoclaved lightweight cellular concrete.
Asahi Chemical Industry Co. Ltd., *Japan Patent Office. Patent,* July 6, 1985, n.p., No.60127274.
Cellular concretes, Lightweight concretes, Concrete freezing, Concrete durability, Frost resistance, Frost protection

49-3464
Tyre production rubber composition.
Asahi Chemical Industry Co. Ltd., *Japan Patent Office. Patent,* Jan. 24, 1986, n.p., No.61016937.
Road icing, Tires, Rubber, Rubber ice friction, Skid resistance

49-3465
Chlorosulphonated polymer for automobile hoses.
Toyo Soda Mfg. Co. Ltd., *Japan Patent Office. Patent,* July 2, 1986, n.p., No.61145204.
Motor vehicles, Polymers, Synthetic materials, Frost resistance, Cold weather performance

49-3466
All weather skid-resistant tire. [All weather low fuel cost tyre]
Yokohama Rubber Company Ltd., *Japan Patent Office. Patent,* Nov. 5, 1987, n.p., No.62253644.
Motor vehicles, Tires, Rubber, Rubber ice friction, Skid resistance

49-3467
Durable snow tyre manufacture.
Sumitomo Rubber Industries Ltd., *Japan Patent Office. Patent,* July 1, 1991, n.p., No.3153344.
Motor vehicles, Tires, Rubber snow friction, Rubber ice friction, Traction

49-3468
Pneumatic tyre with good on-ice performance.
Bridgestone Corporation, *Japan Patent Office. Patent,* Feb. 15, 1994, n.p., No.6040213.
Motor vehicles, Tires, Rubber snow friction, Rubber ice friction, Traction

49-3469
Rubber composition for studless tyre.
Ohtsu Tire and Rubber Co. Ltd., *Japan Patent Office. Patent,* Feb. 15, 1994, n.p., No.6041355.
Motor vehicles, Tires, Rubber, Rubber snow friction, Rubber ice friction, Traction

49-3470
Pneumatic tyre for icy roads.
Sumitomo Rubber Industries Ltd., *Japan Patent Office. Patent,* Feb. 22, 1994, n.p., No.6048119.
Motor vehicles, Tires, Rubber snow friction, Rubber ice friction, Traction

49-3471
Chipping-resistant coating composition having rubber elasticity in wide temperature range.
Cemedine Co. Ltd., *Japan Patent Office. Patent,* Mar. 1, 1994, n.p., No.6057208.
Protective coatings, Polymers, Frost resistance, Frost protection, Thermal insulation, Weatherproofing

49-3472
Radial tyre improved in rut overriding performance.
Bridgestone Corporation, *Japan Patent Office. Patent,* Mar. 8, 1994, n.p., No.6064408.
Motor vehicles, Tires, Rubber ice friction, Rubber snow friction, Traction

49-3473
Vulcanising adherable rubber composition.
Mitsui Petrochemical Industries Co. Ltd., *Japan Patent Office. Patent,* Mar. 8, 1994, n.p., No.6065455.
Electrical insulation, Rubber, Thermal insulation, Weatherproofing, Frost resistance, Cold weather performance

49-3474
Pneumatic tyre for improved on-ice performance.
Bridgestone Corporation, *Japan Patent Office. Patent,* Apr. 19, 1994, n.p., No.6106918.
Motor vehicles, Tires, Rubber ice friction, Rubber snow friction, Traction

49-3475

Proceedings of the Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils.

Kimble, J.M., ed, Ahrens, R.J., ed, Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, 232p.+ appends., Refs. passim. For individual papers see 49-3476 through 49-3493.

Soil classification, Correlation, Frozen ground, Permafrost, Soil surveys, Soil profiles, Soil formation, Cryogenic soils

49-3476

Review of the classification of permafrost-affected soils in the United States and Canada.

Ahrens, R.J., Smith, C.A.S., Moore, J.P., Ratliff, L., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.3-15, 49 refs.

Soil classification, Frozen ground, Permafrost, Cryogenic soils, Permafrost distribution

49-3477

Thermic control on soil formation in northeastern Asia and probable effects of global change.

Alfimov, A.V., Mazhitova, G.G., Berman, D.I., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.16-24, 18 refs.

Soil formation, Taiga, Mountain soils, Tundra, Ecosystems, Fires, Thermal properties, Soil temperature, Frozen ground temperature, Global change, Russia—Magadan, Russia—Kolyma River, Russia—Amguema River, Russia—Chukotskiy Peninsula

49-3478

Gelisols: a new proposed order for permafrost-affected soils.

Bockheim, J.G., Ping, C.L., Moore, J.P., Kimble, J.M., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.25-44, 63 refs.

Soil classification, Frozen ground, Permafrost, Cryoturbation, Frost action, Cryogenic soils

49-3479

Traces of Pleistocene periglacial processes and their recent presence in relief of the Republic of Croatia.

Bognar, A., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.45-50, 5 refs.

Periglacial processes, Pleistocene, Loess, Sediments, Croatia

49-3480

Micromorphology of permafrost-affected soils.

Fox, C.A., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.51-62, 39 refs.

Geocryology, Microstructure, Cryogenic soils, Frozen ground, Permafrost, Soil freezing, Soil mechanics, Soil compaction

49-3481

Relic features in recent tundra soil profiles and tundra soils classification.

Gubin, S.V., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.63-65, 6 refs.

Soil formation, Soil classification, Tundra, Permafrost, Soil profiles, Cryogenic soils

49-3482

Main regularities of soil formation on calcareous rocks of the North.

Koniushkov, D.E., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.66-76, 19 refs.

Soil formation, Permafrost, Cryogenic soils, Tundra, Taiga, Soil profiles

49-3483

Permafrost-affected soils and cryopedology.

Makeev, O.V., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.77-81, 8 refs.

Cryogenic soils, Geocryology, Permafrost, Soil science, Soil classification

49-3484

Main soil types in northeastern Eurasia.

Naumov, E.M., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.82-89, 9 refs.

Soil formation, Soil classification, Soil profiles, Permafrost, Cryogenic soils, Podsol, Geocryology

49-3485

Characterization of organic carbon, using the δ13C-value of a permafrost site in the Kolyma-Indigirka-Lowland, northeast Siberia.

Pfeiffer, E.M., Janssen, H., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.90-98, 10 refs.

Permafrost, Carbon isotopes, Sediments, Global change, Cryogenic soils, Climatic changes, Russia—Siberia, Russia—Indigirka River, Russia—Kolyma River

49-3486

Reflection of bedrock on the soil geochemistry and weathering in the tundra region of northernmost Finland.

Räisänen, M.L., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.99-111, 24 refs.

Bedrock, Soil chemistry, Geochemistry, Weathering, Tundra, Soil profiles, Alpine tundra, Finland

49-3487

Permafrost dynamics and soil formation.

Shur, IU.L., Ping, C.L., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.112-117, 17 refs.

Soil formation, Cryogenic soils, Permafrost, Active layer

49-3488

Soil cover of the North of Russia and its cartographic modeling.

Sokolov, I.A., Naumov, E.M., Koniushkov, D.E., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.118-133, 30 refs.

Soil mapping, Soil classification, Cryogenic soils, Soil surveys, Tundra, Taiga, Mountain soils, Podsol, Russia

49-3489

Soils and landscapes of the Upper Kobuk Valley, Alaska.

Swanson, D.K., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.134-142, 27 refs.

Soil surveys, Moraines, Floodplains, Landscape development, Taiga, Forest soils, Forest fires, United States—Alaska—Upper Kobuk Valley

49-3490

Genesis of permafrost-affected soils.

Tarnocai, C., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.143-154, 45 refs.

Cryogenic soils, Geocryology, Soil formation, Permafrost, Frozen ground temperature, Freeze thaw cycles

49-3491

Peculiar features of microstructure and genesis of cryosols of the permafrost regions of Russia.

Tursina, T.V., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.155-159, 7 refs.

Microstructure, Cryogenic soils, Alassy, Taiga, Russia—Yakutia

49-3492

Mineralogical and particle-size relationships of two alluvial soils from Alaska.

Wilson, M.A., Lynn, W.C., Moser, D.W., Sarata, A.B., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.160-169, 9 refs.

Soil surveys, X ray diffraction, Clay minerals, Particle size distribution, Alluvium, Glacial deposits, United States—Alaska—Gerstle River, United States—Alaska—Alaska Range

49-3493
Frozen soils of China.
Zhao, Q.G., Wang, H.Q., Meeting on the Classification, Correlation, and Management of Permafrost-Affected Soils, July 18-30, 1993, Alaska, USA, Yukon and Northwest Territories, Canada. Proceedings. Edited by J.M. Kimble and R.J. Ahrens, Lincoln, NE, USDA-Soil Conservation Service, National Soil Service Center, Aug. 1994, p.170-183.
Frozen ground, Cryogenic soils, Soil classification, Frozen ground temperature, Frost penetration, Permafrost depth, Permafrost thermal properties, China

49-3494
Getting to know nature and snow in Hokkaido. [Hokkaido no shizen yuki o shiru]
Kashiwabara, T., Sapporo, Hokkaido shinbunsha (Hokkaido News Agency), 1993, 206p., In Japanese.
DLC GB2752.H65K37 1993 Orien Japan
Snowfall, Snow removal, Road maintenance, Weather forecasting, Japan—Hokkaido

49-3495
Pneumatic tyre with good all weather running performance.
Yuto, K., *European Patent Office. Patent,* Apr. 1, 1987, n.p., No.216588.
Motor vehicles, Tires, Rubber, Rubber ice friction, Rubber snow friction, Traction

49-3496
Modified diene polymer rubbers having increased impact resilience.
Takao, H., Imai, A., Seki, T., Tsuji, M., *European Patent Office. Patent,* June 8, 1988, n.p., No.270071.
Motor vehicles, Tires, Rubber, Rubber ice friction, Rubber snow friction, Traction

49-3497
High transmittance, low emissivity, heatable article especially window.
Finley, J.J., *European Patent Office. Patent,* July 27, 1988, n.p., No.275474.
Motor vehicles, Windows, Protective coatings, Defrosting

49-3498
Conduit for heating fluid passing through it.
Baigrie, S.M., Park, G.B., Peacock, D.G., *European Patent Office. Patent,* Apr. 19, 1989, n.p., No.312204.
Motor vehicles, Defrosting, Fuels, Electric heating, Diesel engines, Cold weather performance

49-3499
Recovery of microorganism with ice-nucleating activity.
Lindsey, C.B., *European Patent Office. Patent,* Sep. 13, 1989, n.p., No.332023.
Ice nuclei, Organic nuclei, Artificial nucleation, Bacteria, Microbiology, Cryobiology

49-3500
Ice prevention and de-icing using salt solution.
Prieurblan, S., Chopin, F., Heuber, C., *European Patent Office. Patent,* May 30, 1990, n.p., No.370358.
Road icing, Salting, Chemical ice prevention, Road maintenance

49-3501
Slide fastener slider.
Terada, Y., Ishii, S., *European Patent Office. Patent,* Oct. 3, 1990, n.p., No.390585.
Clothing, Cold weather performance, Thermal insulation

49-3502
Aircraft optical ice detector with built in test function.
Federow, H.L., *European Patent Office. Patent,* Jan. 2, 1991, n.p., No.405625.
Aircraft icing, Ice detection, Ice optics, Lasers

49-3503
Control device for heat collection type ventilation equipment.
Kanuma, Y., Kawagoe, T., *European Patent Office. Patent,* Jan. 27, 1991, n.p., No.414231.
Buildings, Ventilation, Defrosting, Ice prevention, Cold weather performance

49-3504
Electro-impulse de-icer for aircraft.
Adams, L.J., Wohlwender, T.E., Weisend, N.A., *European Patent Office. Patent,* June 26, 1991, n.p., No.433763.
Aircraft icing, Ice removal, Electric equipment

49-3505
Artificial snow granule and snow improver.
Hirano, K., Kambayashi, T., Miura, Y., Nagai, T., Nate, T., Ohtsuka, M., *European Patent Office. Patent,* Aug. 7, 1991, n.p., No.440257.
Artificial snow, Snow manufacturing

49-3506
Electrical system for motor vehicle.
Cerizza, G., *European Patent Office. Patent,* Sep. 11, 1991, n.p., No.446184.
Motor vehicles, Windows, Electric heating, Defrosting

49-3507
Mixture for tyre treads incorporating anti-skid granules.
Borgonovo, P., Ghilardi, G., *European Patent Office. Patent,* Oct. 30, 1991, n.p., No.454025.
Motor vehicles, Tires, Rubber, Rubber ice friction, Skid resistance

49-3508
Hydrophobic filler powder for bitumen traffic surface.
Annemaier, D., Kämereit, W., Keipl, S., Schmitt, O., *European Patent Office. Patent,* Mar. 10, 1993, n.p., No.530687.
Road icing, Runways, Pavements, Bituminous concretes, Concrete admixtures, Antifreezes, Ice prevention, Road maintenance

49-3509
Artificial snow and preparation.
Fujiura, Y., Sakakibara, M., *European Patent Office. Patent,* Mar. 9, 1994, n.p., No.585938.
Artificial snow, Snow manufacturing

49-3510
Pneumatic tyre for use on snowy and icy conditions.
Aoki, N., *European Patent Office. Patent,* Apr. 6, 1994, n.p., No.590916.
Motor vehicles, Tires, Rubber snow friction, Rubber ice friction, Traction

49-3511
Pneumatic deicing assembly.
Fahrner, A.J.N.W., Weisend, N.A., *European Patent Office. Patent,* Apr. 6, 1994, n.p., No.590916.
Aircraft icing, Ice removal, Ice prevention, Inflatable structures

49-3512
Heater for e.g. motor vehicle engine cooling water.
Langen, H., *Germany Patent Office. Patent,* Oct. 13, 1988, n.p., No.3709444.
Motor vehicles, Cooling systems, Engine starters, Heating, Cold weather performance

49-3513
Rubber compositions particularly for running surfaces of tyres.
Takino, H., et al, *Germany Patent Office. Patent,* Aug. 23, 1990, n.p., No.4005493.
Motor vehicles, Tires, Rubber, Rubber ice friction, Rubber snow friction, Skid resistance

49-3514
Device for ejecting foreign matter.
Frost, W., Wood, P., Bobo, M., Little, D.R., *Germany Patent Office. Patent,* Sep. 26, 1991, n.p., No.4108083.
Aircraft icing, Jet engines, Ice prevention, Ice removal

49-3515
Road condition data detection apparatus.
Hotze, J., *Germany Patent Office. Patent,* Apr. 2, 1992, n.p., No.4029615.
Road icing, Ice detection, Moisture detection, Road maintenance

49-3516
Motor vehicle de-icing device for windows.
Binder, J., *Germany Patent Office. Patent,* Jan. 14, 1993, n.p., No.4122462.
Motor vehicles, Windows, Defrosting, Ice removal, Electric heating

49-3517
Ice scooter for travelling on flat or slightly inclined ice surfaces using muscular force.
Neumeister, K., *Germany Patent Office. Patent,* July 15, 1993, n.p., No.4200626.
Sleds, Snow vehicles, Human factors engineering

49-3518
HV breaker switch operating mechanism.
Grasselt, H., *Germany Patent Office. Patent,* Mar. 24, 1994, n.p., No.4224593.
Power line icing, Electric equipment, Ice prevention, Ice control

49-3519
Removing snow and ice in front of car drive wheels.
Schultz, T., *Germany Patent Office. Patent,* Mar. 10, 1994, n.p., No.4229541.
Motor vehicles, Vehicle wheels, Snow removal, Ice prevention, Ice removal, Traction

49-3520
Valve for fluids subject to partial solidification in cold temperatures.
Kreutmair, J., Simpkin, D.M., Zöbl, A., *Germany Patent Office. Patent,* Mar. 10, 1994, n.p., No.4230057.
Motor vehicles, Valves, Temperature control, Cold weather performance

49-3521
Laying streets, runways, railway lines and pipelines.
Hayakawa, K., Ogawa, K., Oshima, T., *Germany Patent Office. Patent,* Mar. 10, 1994, n.p., No.4330113.
Subgrade preparation, Antifreezes, Frost protection, Ice prevention, Cold weather construction

49-3522
Variable rim system for vehicle tyre.
Wehner, E., *Germany Patent Office. Patent,* Mar. 31, 1994, n.p., No.4328044.
Vehicle wheels, Tires, Rubber ice friction, Traction

49-3523
Road condition detecting unit identifying state of road surface lying before moving motor vehicle.
Böhm, M., *Germany Patent Office. Patent,* Apr. 21, 1994, n.p., No.4235104.
Road icing, Ice detection, Ice optics

49-3524
Defrosting device for windscreen of motor vehicle.
Zenker, H., *Germany Patent Office. Patent,* Apr. 21, 1994, n.p., No.4235114.
Motor vehicles, Windows, Defrosting, Ice prevention

49-3525
Vehicle for deicing aircraft has truck with support arm carrying cabin, with pivoted spray nozzle on boom.
Vestergaard, G., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* June 23, 1983, n.p., No.8302100.
Aircraft icing, Chemical ice prevention, Ice removal, Motor vehicles

49-3526
Calcium magnesium acetate double salt compositions for road deicing.
Todd, H.E., Walters, D.L., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* July 28, 1988, n.p., No.8805457.
Road icing, Chemical ice prevention, Salting, Road maintenance

49-3527
Non-slip pin unit for tyre.
Hojo, H., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Dec. 13, 1990, n.p., No.9014966.
Motor vehicles, Tires, Rubber ice friction, Skid resistance

49-3528
Artificial snow maker for ski slopes.
Bucceri, A., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* July 11, 1991, n.p., No.9110104.
Artificial snow, Snow manufacturing

49-3529
Thermally controlled composite laminate especially for aircraft wing.
Hastings, O.H., Hastings, O.M., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Aug. 8, 1991, n.p., No.9111891.
Aircraft icing, Ice removal, Ice prevention, Artificial melting, Composite materials

49-3530
Cross-country ski binding with holding shell.
Spitaler, E., Wittmann, H., Erdei, R., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Oct. 17, 1991, n.p., No.9115274.
Skis, Clothing

49-3531
Rubber collecting mat for ground de-icing of aircraft.
Rasmussen, L.B., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Nov. 28, 1991, n.p., No.9117918.
Aircraft icing, Chemical ice prevention, Ice removal

49-3532
Vehicle tyre treads for icy or snow covered surfaces.
Lagnier, A., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Apr. 16, 1992, n.p., No.9205969.
Motor vehicles, Tires, Rubber ice friction, Traction

49-3533
Swedish antarctic research report to SCAR No.7, 1994: report on scientific activities 1993/94; planned activities 1994/95.
Swedish National Committee for Antarctic Research, Stockholm, Sep. 1994, 28p., 19 refs.
Research projects, Expeditions, Antarctica—Svea Station, Antarctica—Wasa Station, —South Georgia
The report provides the following: information on, and a map of, Swedish stations in Antarctica; highlights of the 1993-94 science activities, including research carried out during the Swedish ITASE Expedition on firn cores, snow accumulation and ice thickness; glaciological studies in Queen Maud Land; geodetic surveys to validate ERS-1 data; biological and environmental investigations; the Swedish-American Amanda project to build a neutrino detector at the South Pole; research carried out on South Georgia on King penguins and southern elephant seals; activities planned for 1994-95 involving the Amanda project, Quaternary studies in Victoria Land and studies on antarctic fishes; and a list of principal investigators and responsible authorities.

49-3534
Microwave scatterometry in support of spaceborne scientific missions.
Khanifar, A., Ridley, J.K., Bamber, J.L., Card, R.P., *Electronics & communication engineering journal,* Dec. 1994, 6(6), p.281-288, 6 refs.
Microwaves, Radar echoes, Measuring instruments, Ice shelves, Antarctica—Ronne Ice Shelf, Antarctica—Filchner Ice Shelf
The interpretation of satellite radar observations of the Earth's surface requires models to link the observations to physical processes. These models require validation through surface measurements. This paper describes a mobile radar scatterometer designed to complement the vertical incidence measurements of satellite radar altimeters. The instrument has been successfully deployed in Antarctica and an Australian desert to make measurements contemporaneous with satellite observations. The key findings from these field experiments are briefly described and results which have implications for synthetic aperture radar studies of similar terrain are presented.

49-3535
Variations in atmospheric methane concentration during the Holocene epoch.
Blunier, T., Chappellaz, J., Schwander, J., Stauffer, B., Raynaud, D., *Nature,* Mar. 2, 1995, 374(6517), p.46-49, 32 refs.
Ice cores, Atmospheric composition, Hydrologic cycle, Greenland

49-3536
Optical properties of the South Pole ice at depths between 0.8 and 1 kilometer.
Askebjer, P., et al, *Science,* Feb. 24, 1995, 267(5201), p.1147-1150, 17 refs.
Ice sheets, Light transmission, Ice optics, Refractivity, Measuring instruments, Antarctica—Amundsen-Scott Station
The optical properties of the ice at the geographical South Pole have been investigated at depths between 0.8 and 1 km. The absorption and scattering lengths of visible light (515 nm) were measured in-situ with the use of the laser calibration setup of the Antarctic Muon and Neutrino Detector Array (AMANDA) neutrino detector. The ice is intrinsically extremely transparent. The measured absorption length is 59 m, comparable with the quality of the ultrapure water used in the Irvine-Michigan-Brookhaven and Kamiokande proton-decay and neutrino experiments and more than twice as long as the best value reported for laboratory ice. Because of the residual density of air bubbles at these depths, the trajectories of photons in the medium are randomized. If the bubbles are assumed to be smooth and spherical, the average distance between collisions at a depth of 1 km is about 25 cm. The measured inverse scattering length on bubbles decreases linearly with increasing depth in the volume of ice investigated. (Auth.)

49-3537
Report 1992/93.
Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany, [1994], 188p., Refs. p.167-187.
Research projects, Organizations, Expeditions, Cost analysis
Antarctic and arctic research programs of the Alfred Wegener Institute for Polar and Marine Research for 1992 and 1993 are summarized. Research pertinent to Antarctica includes marine biology, extent of sea ice past and present, environmental history in lake sediments, satellite imaging of sea ice, sea ice algae, and global ocean circulation. In Mar. 1992, the Potsdam Research Unit was incorporated into the Alfred Wegener Institute to continue the former East German research, particularly on the unglaciated oases and stratospheric ozone in Antarctica. A review of the budget, personnel, publications list, and expeditions sponsored by the institute are also included.

49-3538
Persistent organochlorine residues in sediments from the Chukchi Sea, Bering Sea and Gulf of Alaska.
Iwata, H., Tanabe, S., Aramoto, M., Sakai, N., Tatsukawa, R., *Marine pollution bulletin,* Dec. 1994, 28(12), p.746-753, 57 refs.
Oceanography, Air pollution, Water pollution, Hydrocarbons, Bottom sediment, Suspended sediments, Environmental impact, Environmental tests, Sampling, Chukchi Sea, Bering Sea, United States—Alaska—Alaska, Gulf

49-3539
Under cover transport and accumulation of frazil granules.
Shen, H.T., Wang, D.S., *Journal of hydraulic engineering,* Feb. 1995, 121(2), p.184-195, 35 refs.
River ice, Ice jams, Hydraulics, Frazil ice, Aggregates, Underwater ice, Water flow, Sediment transport, Ice cover effect, Subglacial observations

49-3540
Field studies of photoinhibition show non-correlations between oxygen and fluorescence measurements in the arctic red alga *Palmaria palmata*.
Hanelt, D., Nultsch, W., *Journal of plant physiology,* Jan. 1995, 145(1-2), p.31-38, 34 refs.
Algae, Marine biology, Littoral zone, Photosynthesis, Solar radiation, Light effects, Cold weather survival, Acclimatization, Plant physiology, Norway

49-3541
Glaciotectonics of the Itterbeck-Uelsen push moraines, Germany.
Kluiving, S.J., *Journal of Quaternary science,* Sep. 1994, 9(3), p.235-244, 28 refs.
Pleistocene, Glacial geology, Quaternary deposits, Glacial deposits, Moraines, Tectonics, Geologic processes, Germany

49-3542
Glacial dynamics and transport of debris during the final phases of the Weichselian glaciation, southwest Skåne, Sweden.
Persson, K.M., Lagerlund, E., *Journal of Quaternary science,* Sep. 1994, 9(3), p.245-256, 34 refs.
Pleistocene, Glacial geology, Quaternary deposits, Glacial deposits, Sediment transport, Moraines, Stratigraphy, Lithology, Sweden

49-3543
Degree of rock surface weathering as an indicator of ice-sheet thickness along an east-west transect across southern Norway.
Nesje, A., McCarroll, D., Dahl, S.O., *Journal of Quaternary science,* Dec. 1994, 9(4), p.337-347, 45 refs.
Glacial geology, Pleistocene, Geomorphology, Ice sheets, Rock properties, Age determination, Weathering, Glacial erosion, Lithology, Sweden

49-3544
Heterogeneous reactions of $ClONO_2$ HCl, and HOCl on liquid sulfuric acid surfaces.
Zhang, R.Y., Leu, M.T., Keyser, L.F., *Journal of physical chemistry,* Dec. 22, 1994, 98(51), p.13563-13574, 44 refs.
Cloud physics, Polar stratospheric clouds, Chemical properties, Aerosols, Adsorption, Ozone, Simulation
The aim of this work is to perform direct laboratory experiments on liquid sulfuric acid surfaces under stratospheric conditions conducive to the formation of polar stratospheric clouds. The reaction probabilities for $ClONO_2$ hydrolysis and HCl reactions with $ClONO_2$ and HOCl at the reactant concentrations characteristic of the lower stratosphere have been measured. The temperature dependence of these reactions was investigated at a fixed H_2O partial pressure corresponding to a mixing ratio of about 5 ppmv at 100 mb (16 km) and at temperatures from 195 to 220 K. The relative importance or competition between the hydrolysis of $ClONO_2$ and the $ClONO_2$ reaction with HCl was also examined so that accurate chlorine activation processes on the stratospheric sulfate aerosols can be applied and simulated in atmospheric models. Also investigated was the effect of HNO_3 on the reaction probabilities due to the formation of the ternary $H_2SO_4/HNO_3/H_2O$ system, which has been proposed to occur prior to the onset of type I polar stratospheric clouds (PSC). (Auth. mod.)

49-3545
High-frequency forward scattering from the arctic canopy: experiment and high-frequency modeling.
Williams, K.L., Funk, D.E., *Acoustic Society of America. Journal,* Nov. 1994, 96(5) pt.1, p.2956-2964, 15 refs.
Sea ice, Ice acoustics, Underwater acoustics, Subglacial observations, Acoustic measurement, Wave propagation, Scattering, Simulation, Correlation, Ice water interface

49-3546
Experimental characterization of elastic waves in a floating ice sheet.
Yang, T.C., Giellis, G.R., *Acoustic Society of America. Journal,* Nov. 1994, 96(5) pt.1, p.2993-3009, 29 refs.
Sea ice, Ice acoustics, Ice mechanics, Vibration, Elastic waves, Acoustic measurement, Wave propagation, Velocity measurement, Statistical analysis

49-3547
Acoustic scattering losses in the Greenland Sea marginal ice zone during the 1988-89 tomography experiment.
Jin, G.L., Lynch, J.F., Pawlowicz, R., Worcester, P.F., *Acoustic Society of America. Journal,* Nov. 1994, 96(5) pt.1, p.3045-3053, 22 refs.
Oceanography, Underwater acoustics, Subglacial observations, Sound waves, Wave propagation, Velocity measurement, Scattering, Pack ice, Ice cover effect, Attenuation, Statistical analysis

49-3548

Acoustic scattering from elemental arctic ice features: experimental results.

Fricke, J.R., Unger, G.L., *Acoustic Society of America. Journal,* Jan. 1995, 97(1), 192-198, 12 refs.

Sea ice, Ice bottom surface, Pressure ridges, Ice structure, Physical properties, Underwater acoustics, Ice acoustics, Wave propagation, Scattering, Artificial ice, Ice models, Simulation, Analysis (mathematics)

49-3549

D-D fusion induced by oxygen clusters impacting deuterated ice targets.

Liang, J.F., Vandenbosch, R., Will, D.I., *Physical review A,* Feb. 1995, 51(2), p.1691-1693, 13 refs.

Ice physics, Molecular structure, Molecular energy levels, Spectra, Ions, Protons, Impact tests

49-3550

Potential of combining SSM/I and SSM/T2 measurements to improve the identification of snowcover and precipitation.

Bauer, P., Grody, N.C., *IEEE transactions on geoscience and remote sensing,* Mar. 1995, 33(2), p.252-261, 24 refs.

Snow cover, Precipitation (meteorology), Sensor mapping, Remote sensing, Classifications, Albedo, Spaceborne photography, Radiometry, Microwaves, Scattering, Snow optics, Simulation

49-3551

Determination of the age distribution of sea ice from Lagrangian observations of ice motion.

Kwok, R., Rothrock, D.A., Stern, H.L., Cunningham, G.F., *IEEE transactions on geoscience and remote sensing,* Mar. 1995, 33(2), p.392-400, 12 refs.

Sea ice distribution, Ice surveys, Ice cover thickness, Ice growth, Classifications, Drift, Spaceborne photography, Synthetic aperture radar, Image processing, Statistical analysis, Arctic Ocean

49-3552

Mid-latitude ice sheets through the last glacial cycle: glaciological and geological reconstructions.

Boulton, G.S., Payne, T., NATO Advanced Study Institute on Long Term Climatic Variations—Data and Modelling, Siena, Italy, Sep. 27-Oct. 11, 1992. Proceedings. Edited by J.C. Duplessy et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.22, Berlin, Springer-Verlag, 1994, p.177-212, 39 refs.

DLC QC981.8.C5 N4

Pleistocene, Paleoclimatology, Ice sheets, Glacier oscillation, Calving, Glacial geology, Marine geology, Ice cover effect, Mathematical models

49-3553

Climatic record from antarctic ice now extends back to 220 kyr BP.

Jouzel, J., et al, NATO Advanced Study Institute on Long Term Climatic Variations—Data and Modelling, Siena, Italy, Sep. 27-Oct. 11, 1992. Proceedings. Edited by J.C. Duplessy et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.22, Berlin, Springer-Verlag, 1994, p.213-237, 48 refs.

Paleoclimatology, Ice sheets, Ice cores, Isotope analysis, Ice dating, Profiles, Climatic changes, Air temperature, Temperature variations, Antarctica—Vostok Station

The isotopic content of ancient waters (deuterium and oxygen 18) gives a key access to past climatic changes because of the essentially linear relationship that exists between the isotopic content of a precipitation and the temperature of the site (at least for middle and high latitudes). This approach has been extensively used for extracting high resolution climatic records from both antarctic and Greenland ice that now extend beyond 200 kyr BP. Presented here are the Vostok isotope temperature record which has been extended back to 220 kyr BP and the associated glaciological timescale. Differences and similarities between this antarctic record and the new climatic records recently obtained in Central Greenland are discussed. (Auth. mod.)

49-3554

Andean snowline evidence for cooler subtropics at the last glacial maximum.

Seltzer, G.O., NATO Advanced Study Institute on Long Term Climatic Variations—Data and Modelling, Siena, Italy, Sep. 27-Oct. 11, 1992. Proceedings. Edited by J.C. Duplessy et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.22, Berlin, Springer-Verlag, 1994, p.371-378, 35 refs.

Paleoclimatology, Pleistocene, Snow line, Glacier oscillation, Glacial geology, Climatic changes, Precipitation (meteorology), Geomorphology, Correlation, Peru—Andes Mountains, Bolivia—Andes Mountains

49-3555

Effects of short and long term climatic changes on permafrost—sedimentological data.

Worsley, P., NATO Advanced Study Institute on Long Term Climatic Variations—Data and Modelling, Siena, Italy, Sep. 27-Oct. 11, 1992. Proceedings. Edited by J.C. Duplessy et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.22, Berlin, Springer-Verlag, 1994, p.379-387, 8 refs.

Permafrost distribution, Permafrost transformation, Climatic changes, Frozen ground mechanics, Sedimentation, Ice wedges, Permafrost indicators

49-3556

Last two glacial-interglacial cycles simulated by the LLN model.

Berger, A., Tricot, C., Gallée, H., Fichefet, T., Loutre, M.F., NATO Advanced Study Institute on Long Term Climatic Variations—Data and Modelling, Siena, Italy, Sep. 27-Oct. 11, 1992. Proceedings. Edited by J.C. Duplessy et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.22, Berlin, Springer-Verlag, 1994, p.411-452, Refs. p.439-444.

Paleoclimatology, Pleistocene, Ice sheets, Insolation, Climatic changes, Glacier oscillation, Ice volume, Periodic variations, Simulation, Antarctica—Vostok Station

A 2-dimensional model which links the atmosphere, the mixed layer of the ocean, the sea ice, the continents, ice sheets in both polar regions and their underlying bedrock has been used to test the Milankovitch theory over the last two glacial-interglacial cycles. It was found that orbital variations alone can induce, in such a system, feedbacks sufficient to generate the low frequency part of the climatic variations over the last 122 kyr. These simulated variations at the astronomical time scale are broadly in agreement with reconstructions of ice-sheet volume and of sea level independently obtained from geological data. Imperfections in the simulated climate were the insufficient southward extent of the ice sheets and the too small hemispheric cooling at the last glacial maximum. These deficiencies were partly remedied in a further experiment by using the time-dependent atmospheric CO_2 concentration given by the Vostok ice core in addition to the astronomical forcing. In this transient simulation, 70% of the Northern Hemisphere ice volume is related to the astronomical forcing and the related changes in the albedo, the remaining 30% being due to the CO_2 changes. Analysis of the processes involved shows that variations of ablation are more important for the ice-sheet response than are variations of snow precipitation. (Auth. mod.)

49-3557

Physics of the ice age cycle.

Peltier, W.R., NATO Advanced Study Institute on Long Term Climatic Variations—Data and Modelling, Siena, Italy, Sep. 27-Oct. 11, 1992. Proceedings. Edited by J.C. Duplessy et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.22, Berlin, Springer-Verlag, 1994, p.453-479, 33 refs.

Pleistocene, Ice age theory, Glacier oscillation, Ice volume, Periodic variations, Paleoclimatology, Bottom sediment, Radioactive age determination, Stratigraphy

49-3558

Mid-latitude depressions during the last ice-age.

Valdes, P.J., Hall, N.M.J., NATO Advanced Study Institute on Long Term Climatic Variations—Data and Modelling, Siena, Italy, Sep. 27-Oct. 11, 1992. Proceedings. Edited by J.C. Duplessy et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.22, Berlin, Springer-Verlag, 1994, p.511-531, 27 refs.

Pleistocene, Paleoclimatology, Ice age theory, Ice sheets, Mass balance, Glacier oscillation, Ice cover effect, Meteorological factors, Atmospheric circulation, Moisture transfer, Simulation

49-3559

Physics of glaciers. 3rd edition.

Paterson, W.S.B., Oxford, Elsevier Science Ltd., 1994, 480p., Refs. passim. For previous editions see 35-4009/12F-25038 and 25-108/5F-952.

Glaciology, Glacier flow, Glacial hydrology, Glacier oscillation, Ice sheets, Ice physics, Ice mechanics, Ice cores, Glacier mass balance, Glacier heat balance, Climatic factors, Ice solid interface, Ice air interface

The aim of this book and the level of treatment remains unchanged from earlier editions. The text has, however, been completely revised in order to keep pace with the extensive developments since the second edition was published. Changes in structure include a new chapter about the deformation of subglacial till, a previously neglected topic that is now of major interest, and reorganization of the chapters about flow in the different types of ice mass. Lack of space has forced the elimination of the chapter on measurement techniques and is also the reason for the continued absence of any discussion of glacial erosion and sedimention. (Auth. mod.)

49-3560

Effect of preagitation on freeze-thaw-conditioned sludge dewaterability.

Vesilind, P.A., Chen, J.L., *Journal of cold regions engineering,* Dec. 1994, 8(4), p.113-120, 15 refs.

Waste treatment, Water treatment, Sludges, Freeze thaw cycles, Suspended sediments, Turbulent diffusion, Fluid dynamics, Mechanical tests, Vibration

49-3561

Hydrostatic pressure loading due to ice formation in manholes.

Tanary, S., Fahim, A., Munro, M., *Journal of cold regions engineering,* Dec. 1994, 8(4), p.121-132, 7 refs.

Telecommunication, Subsurface structures, Flooding, Pipes (tubes), Water pressure, Ice formation, Ice water interface, Ice mechanics, Thermal expansion, Simulation

49-3562

Depositional regimes in the Norwegian-Greenland Sea: the last two glacial to interglacial transitions.

Henrich, R., Wagner, T., Goldschmidt, P., Michels, K., *Geologische Rundschau,* Feb. 1995, 84(1), p.28-48, 73 refs.

Pleistocene, Oceanographic surveys, Ocean currents, Ice rafting, Marine deposits, Lithology, Bottom sediment, Sampling, Sediment transport, Glacier oscillation, Greenland Sea, Norwegian Sea

49-3563

Late Quaternary changes in surface water and deep water masses of the Nordic Seas and northeastern North Atlantic: a review.

Sarnthein, M., Altenbach, A.V., *Geologische Rundschau,* Feb. 1995, 84(1), p.89-107, Refs. p.104-107.

Oceanography, Pleistocene, Paleoclimatology, Ocean currents, Marine deposits, Stratigraphy, Drill core analysis, Radioactive age determination, Glacier oscillation, Meltwater, Norwegian Sea

49-3564

Three-dimensional numerical modelling of Late Quaternary paleoceanography and sedimentation in the northern North Atlantic.

Haupt, B.J., Schäfer-Neth, C., Stattegger, K., *Geologische Rundschau,* Feb. 1995, 84(1), p.137-150, 35 refs.

Oceanography, Pleistocene, Ocean currents, Marine deposits, Sedimentation, Sea ice distribution, Ice cover effect, Ice edge, Correlation, Mathematical models, Greenland Sea

49-3565
Marginal ice zone and ocean waves.
Squire, V.A., Oceans: physical-chemical dynamics and human impact, Easton, Pennsylvania Academy of Sciences, 1994, p.269-281, 47 refs.
DLC GC150.5.O24
Oceanography, Ocean waves, Sea ice distribution, Ice edge, Pack ice, Ice water interface, Wave propagation, Attenuation, Models

49-3566
Salt composition for melting and removing snow and ice.
Simper, J.L., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Dec. 10, 1992, n.p., No.9221732.
Road icing, Chemical ice prevention, Salting, Road maintenance

49-3567
Production of synthetic gravel or chippings, especially for use in bitumen-bound road surfaces.
Bös, A., Kämereit, W., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Mar. 17, 1994, n.p., No.9405740.
Pavements, Gravel, Synthetic materials, Frost resistance, Frost protection, Road maintenance

49-3568
Non-thickened, long-lasting de-icing compositions for aircraft.
Archambault, G., Boluk, M.Y., Brymer, B.J., Jarrett, M.S., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Mar. 17, 1994, n.p., No.9405741.
Aircraft icing, Chemical ice prevention, Ice removal

49-3569
Laminated construction method for fixing roof shingles or composition tiles.
Ragsdale, J.J., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Mar. 31, 1994, n.p., No.9406978.
Roofs, Construction materials, Waterproofing, Weatherproofing, Ice control

49-3570
Fog dispelling system.
Hamarsnes, J., Kielland, J.O., Kjolseth, P., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Apr. 14, 1994, n.p., No.9408096.
Fog dispersal, Artificial nucleation, Ice nuclei, Dry ice (trademark)

49-3571
Layered substance identifying and quantifying apparatus.
Brobeck, C., Hall, J., Inkpen, S., Marshall, C., Nolan, C., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Apr. 14, 1994, n.p., No.9408233.
Aircraft icing, Ice detection, Moisture detection, Electrical measurement

49-3572
Cam type differential gear for motor vehicles with oil pump.
Chippendale, J.P., Spooner, J., Young, A.J., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Apr. 28, 1994, n.p., No.9409291.
Motor vehicles, Vehicle wheels, Skid resistance, Rubber ice friction

49-3573
Detector system for ice on aerodynamic surfaces e.g. aircraft wings.
Stern, H., *World Intellectual Property Organization. Patent Cooperation Treaty. Patent,* Apr. 28, 1994, n.p., No.9409463.
Aircraft icing, Ice detection, Ice optics

49-3574
Asphaltic concrete composition for use as paving.
Long, H.W., *Canada Patent Office. Patent,* Apr. 12, 1994, n.p., No.1328334.
Concrete pavements, Bituminous concretes, Road icing, Ice removal, Artificial melting, Road maintenance

49-3575
Liquid anti-corrosive and anti-scaling de-icing composition.
Ireland, D.T., *Canada Patent Office. Patent,* Feb. 24, 1992, n.p., No.2049723.
Road icing, Chemical ice prevention, Salting, Road maintenance

49-3576
Petroleum and mineral deposit detecting method.
Krasnov, IU., *Canada Patent Office. Patent,* Jan. 30, 1994, n.p., No.2074845.
Ice surveys, Sea ice distribution, Drift, Exploration, Minerals, Crude oil, Spaceborne photography, Image processing

49-3577
Wooden gasket preventing icing of railway.
Cui, Y., *China Patent Office. Patent,* July 14, 1993, n.p., No.1074260, Citation only, no abstract.
Railroads, Subgrades, Road icing, Frost protection, Frost resistance, Ice prevention, Subgrade maintenance

49-3578
Groundwater drainage device made of sewn geotextile fibres.
Buffard, J., Chapuis, P., *France Patent Office. Patent,* Feb. 18, 1994, n.p., No.2694773.
Soil freezing, Ground thawing, Frost protection, Ice prevention, Soil stabilization, Ground water, Drains, Geotextiles

49-3579
Electroconductive plastic materials prepared from polyvinyl chloride.
Perichaud, A., Tomi, P., Viskov, C., *France Patent Office. Patent,* Apr. 1, 1994, n.p., No.2696182.
Radomes, Ice prevention

49-3580
Gritting composition for melting snow and ice.
Muggli, C., *Switzerland Patent Office. Patent,* Apr. 29, 1994, n.p., No.683704.
Sidewalks, Road icing, Artificial melting, Chemical ice prevention, Sanding, Road maintenance

49-3581
Fuel heater for IC engine.
Bradford, P.F., Bungay, M.R., Kember, C.J., Peltret, P.H., *United Kingdom Patent Office. Patent,* Jan. 2, 1986, n.p., No.2160921.
Motor vehicles, Fuels, Engine starters, Heating, Cold weather performance

49-3582
Ice detector for aircraft and helicopter.
Thomson, R.C., *United Kingdom Patent Office. Patent,* June 24, 1992, n.p., No.2250967.
Helicopters, Aircraft icing, Ice detection, Ice optics, Photographic equipment

49-3583
Diverter for rainwater from downpipes.
Taylor, W.C., *United Kingdom Patent Office. Patent,* Mar. 30, 1994, n.p., No.2270949.
Water pipes, Drains, Pipeline freezing, Frost protection, Ice prevention

49-3584
Aviation carburettor icing advising device.
Gadsby, T.J., *United Kingdom Patent Office. Patent,* Apr. 4, 1994, n.p., No.2271190.
Carburetors, Aircraft icing, Ice detection, Warning systems

49-3585
Recovering ice nucleating microorganisms.
Lindsey, C.B., *U.S. Patent Office. Patent,* Nov. 17, 1987, n.p., USP-4,706,463.
Ice nuclei, Organic nuclei, Artificial nucleation, Bacteria, Microbiology, Cryobiology

49-3586
Preheater for water cooled diesel engine.
Nakai, G.T., *U.S. Patent Office. Patent,* Nov. 17, 1987, n.p., USP-4,706,644.
Motor vehicles, Diesel engines, Engine starters, Cooling systems, Cold weather performance, Heating

49-3587
Composite building wall.
Gibbar, J.H., *U.S. Patent Office. Patent,* May 15, 1990, n.p., USP-4,924,641.
Buildings, Walls, Composite materials, Polymers, Thermal insulation, Frost resistance, Frost protection, Concrete freezing, Winter concreting, Cold weather construction

49-3588
Portable de-icer unit for ground surfaces.
Terry, T.A., *U.S. Patent Office. Patent,* May 15, 1990, n.p., USP-4,926,026.
Road icing, Artificial melting, Snow removal, Ice removal, Portable equipment, Road maintenance

49-3589
Multiple-layer coating for vehicle windscreen.
Finley, J.J., *U.S. Patent Office. Patent,* July 2, 1991, n.p., USP-5,028,759.
Motor vehicles, Windows, Defrosting, Protective coatings

49-3590
Improving viscosity of coating fluid without use of thinning solvent.
Maugans, J.R., *U.S. Patent Office. Patent,* Sep. 15, 1992, n.p., USP-5,146,946.
Protective coatings, Viscosity, Cold weather performance

49-3591
Anti-ice system for aircraft.
Bubello, R., Maier, G.P., Nikkanen, J.P., *U.S. Patent Office. Patent,* Nov. 2, 1993, n.p., USP-5,257,498.
Aircraft icing, Jet engines, Ice prevention, Heating

49-3592
Ventilation system for homes and buildings located in cold climate areas.
Roy, D., *U.S. Patent Office. Patent,* Nov. 2, 1993, n.p., USP-5,257,736.
Buildings, Ventilation, Air conditioning, Indoor climates, Climate control, Cold weather performance

49-3593
Ice crush resistant caisson for arctic offshore oil well drilling.
Scott, W.A., *U.S. Patent Office. Patent,* Mar. 8, 1994, n.p., USP-5,292,207.
Offshore drilling, Offshore structures, Hydraulic structures, Caissons, Ice loads, Ice solid interface, Ice pressure, Ice control

49-3594
Method of rapidly heating a mass to an operative temperature, in particular a vehicle engine during cold starting.
Schatz, O., *U.S. Patent Office. Patent,* Apr. 5, 1994, n.p., USP-5,299,630.
Motor vehicles, Engine starters, Heating, Cold weather performance

49-3595
Device for preventing ice accumulation of coupling valves for inorganic fluids.
Goode, J.E., *U.S. Patent Office. Patent,* Apr. 12, 1994, n.p., USP-5,301,723.
Tank trucks, Liquefied gases, Valves, Ice prevention

49-3596
Aircraft icing detection system.
Blaha, D.A., *U.S. Patent Office. Patent,* Apr. 12, 1994, n.p., USP-5,301,905.
Aircraft icing, Ice detection, Warning systems

49-3597
Modular storm water gutter system.
Schneider, D.R., *U.S. Patent Office. Patent,* Apr. 19, 1994, n.p., USP-5,303,517.
Buildings, Roofs, Drains, Ice prevention

49-3598
Composition and method for preserving and restoring de-icer surfaces.
Padgett, T.A., *U.S. Patent Office. Patent,* Apr. 19, 1994, n.p., USP-5,304,425.
Aircraft icing, Ice removal, Protective coatings

49-3599
Flexible toboggan modified for use as rescue toboggan.
Jesse, T.A., *U.S. Patent Office. Patent,* Apr. 26, 1994, n.p., USP-5,306,026.
Sleds, Rescue equipment

49-3600
Ice penetrating type buoy.
DiGirolamo, R.D., Travor, B.W., *U.S. Patent Office. Patent,* May 3, 1994, n.p., USP-5,308,270.
Subglacial observations, Ice acoustics, Underwater acoustics, Ice blasting, Projectile penetration, Submarines

49-3601
Dimple pattern pneumatic deicer assembly.
Weisend, N.A., Jr., *U.S. Patent Office. Patent,* May 10, 1994, n.p., USP-5,310,142.
Aircraft icing, Ice removal, Inflatable structures

49-3602
Detector system of ice accretion region on aircraft wing or helicopter blade.
Dershowitz, A.L., Hansman, R.J., Jr., *U.S. Patent Office. Patent,* May 17, 1994, n.p., USP-5,313,202.
Helicopters, Aircraft icing, Ice detection, Infrared equipment

49-3603
Dynamic deicer and method of deicing aircraft surfaces in flight.
Rauckhorst, R.L., *U.S. Patent Office. Patent,* May 24, 1994, n.p., USP-5,314,145.
Aircraft icing, Ice removal, Inflatable structures

49-3604
H_2-rich interstellar grain mantles: an equilibrium description.
Dissly, R.W., Allen, M., Anicich, V.G., *Astrophysical journal,* Nov. 10, 1994, 535(2)pt.1, p.685-692, 26 refs.
Extraterrestrial ice, Cosmic dust, Ice physics, Amorphous ice, Ice composition, Ice vapor interface, Sublimation, Hydrogen, Adsorption, Simulation, Infrared spectroscopy

49-3605
Compiled reports.
U.S. Ice Core Research Workshop, Durham, NH, June 13-17, 1988, Durham, University of New Hampshire, 1988, 74p.
Ice sheets, Paleoclimatology, Isotope analysis, Drill core analysis, Ice cores, Ice dating, Ice volume, Site surveys, Global change, Antarctica—West Antarctica, Greenland
From June 13-17, 1988 a National Science Foundation Division of Polar Programs-sponsored workshop entitled "The U.S. Ice Core Research Workshop" was held in Durham, NH. The Workshop brought together a relatively large number (42) of U.S. researchers interested in ice core research and representatives of the European ice core research community. The purpose of the Workshop was to develop a consensus on the direction of U.S. ice core research through the 1990s. Emphasis was placed on the newest major proposed U.S. deep drilling effort, GISP II (Greenland Ice Sheet Project II) and the development of a global strategy for U.S. ice core research to include deep drilling efforts not only in Greenland but also in Antarctica, plus shallow-to intermediate-core recovery programs at low, middle and high latitudes sites. Results of the workshop are presented here. (Auth. mod.)

49-3606
Lattice constants and thermal expansion of H_2O and D_2O ice Ih between 10 and 265K.
Röttger, K., Endriss, A., Ihringer, J., Doyle, S., Kuhs, W.F., *Acta crystallographa B,* Dec. 1,1994, B50(6), p.644-648, 36 refs.
Ice physics, Molecular structure, Deuterium oxide ice, Low temperature tests, Radiation absorption, Scattering, Latticed structures, Thermal expansion, Temperature effects

49-3607
Ice-on-ice impact experiments.
Kato, M., et al, *Icarus,* Feb. 1995, 113(2), p.423-441, 29 refs.
Extraterrestrial ice, Ice mechanics, Rock mechanics, Geologic processes, Simulation, Impact tests, Ice solid interface, Cracking (fracturing), Pit and mound topography

49-3608
Remote sensing of sea ice and icebergs.
Haykin, S., ed, Lewis, E.O., ed, Raney, R.K., ed, Rossiter, J.R., ed, New York, John Wiley & Sons, 1994, 686p., Refs. passim. For individual papers see 49-3609 through 49-3620.
DLC GB2401.72.R42 R46
Remote sensing, Sea ice distribution, Ice surveys, Icebergs, Ice detection, Ice reporting, Radar tracking, Radar echoes, Data processing, Spaceborne photography, Mathematical models

49-3609
Introduction.
Lewis, E.O., Rossiter, J.R., Remote sensing of sea ice and icebergs. Edited by S. Haykin et al, New York, John Wiley & Sons, 1994, p.1-19, 41 refs.
DLC GB2401.72.R42 R46
Sea ice distribution, Icebergs, Ice surveys, Ice detection, Sensor mapping, Remote sensing, Research projects, Oceanography, Canada

49-3610
Properties of snow and ice.
Lewis, E.O., Livingstone, C.E., Garrity, C., Rossiter, J.R., Remote sensing of sea ice and icebergs. Edited by S. Haykin et al, New York, John Wiley & Sons, 1994, p.21-96, 116 refs.
DLC GB2401.72.R42 R46
Remote sensing, Sea ice, Glacier ice, Icebergs, Ice structure, Ice physics, Snow physics, Physical properties, Ice water interface, Electromagnetic properties

49-3611
Acoustic and seismic sensing techniques.
Farmer, D.M., Xie, Y.B., Remote sensing of sea ice and icebergs. Edited by S. Haykin et al, New York, John Wiley & Sons, 1994, p.97-139, 34 refs.
DLC GB2401.72.R42 R46
Sea ice, Remote sensing, Subglacial observations, Ice acoustics, Acoustic measurement, Seismic reflection, Ice breaking, Cracking (fracturing), Wave propagation, Ice water interface, Mathematical models

49-3612
Ice-thickness measurement.
Rossiter, J.R., Holladay, J.S., Remote sensing of sea ice and icebergs. Edited by S. Haykin et al, New York, John Wiley & Sons, 1994, p.141-176, 69 refs.
DLC GB2401.72.R42 R46
Sea ice, Ice cover thickness, Profiles, Remote sensing, Aerial surveys, Electrical measurement, Electric fields, Electromagnetic properties, Sensors, Radar echoes, Sounding, Snow cover effect

49-3613
Passive microwave systems.
Rubinstein, I.G., Nazarenko, D.M., Tam, S., Remote sensing of sea ice and icebergs. Edited by S. Haykin et al, New York, John Wiley & Sons, 1994, p.177-257, 97 refs.
DLC GB2401.72.R42 R46
Sea ice distribution, Ice conditions, Remote sensing, Microwaves, Radiometry, Brightness, Snow cover effect, Spacecraft, Performance

49-3614
Active microwave systems.
Raney, R.K., Remote sensing of sea ice and icebergs. Edited by S. Haykin et al, New York, John Wiley & Sons, 1994, p.259-297, 25 refs.
DLC GB2401.72. R42 R46
Sea ice, Remote sensing, Radar echoes, Scattering, Polarization (waves), Analysis (mathematics)

49-3615
Over-the-horizon radar.
Srivastava, S.K., Walsh, J., Remote sensing of sea ice and icebergs. Edited by S. Haykin et al, New York, John Wiley & Sons, 1994, p.299-339, 57 refs.
DLC GB2401.72.R42 R46
Oceanography, Remote sensing, Radar echoes, Wave propagation, Sea ice, Ice detection, Icebergs, Classifications, Sea clutter

49-3616
Surface-based radar: noncoherent.
Lewis, E.O., Currie, B.W., Haykin, S., Remote sensing of sea ice and icebergs. Edited by S. Haykin et al, New York, John Wiley & Sons, 1994, p.341-442, 69 refs.
DLC GB2401.72.R42 R46
Oceanography, Sea ice distribution, Icebergs, Ice detection, Classifications, Sea clutter, Remote sensing, Radar echoes, Data processing, Wave propagation, Polarization (waves), Analysis (mathematics)

49-3617
Surface-based radar: coherent.
Haykin, S., Currie, B.W., Kezys, V., Remote sensing of sea ice and icebergs. Edited by S. Haykin et al, New York, John Wiley & Sons, 1994, p.443-504, 25 refs.
DLC GB2401.72.R42 R46
Sea ice, Oceanography, Remote sensing, Icebergs, Ice detection, Radar echoes, Scattering, Polarization (waves), Sea clutter, Analysis (mathematics)

49-3618
Operational airborne radars.
Lowry, R.T., Remote sensing of sea ice and icebergs. Edited by S. Haykin et al, New York, John Wiley & Sons, 1994, p.505-540, 39 refs.
DLC GB2401.72.R42 R46
Sea ice, Remote sensing, Airborne radar, Ice detection, Ice surveys, Ice reporting, Side looking radar, Synthetic aperture radar, Spaceborne photography, Canada

49-3619
Synthetic aperture radar images of sea ice.
Livingstone, C.E., Remote sensing of sea ice and icebergs. Edited by S. Haykin et al, New York, John Wiley & Sons, 1994, p.541-609, 83 refs.
DLC GB2401.72.R42 R46
Sea ice, Ice surveys, Ice detection, Remote sensing, Radar photography, Synthetic aperture radar, Spaceborne photography, Image processing, Sensor mapping, Resolution

49-3620
RADARSAT and operational ice information.
Raney, R.K., Falkingham, J.C., Remote sensing of sea ice and icebergs. Edited by S. Haykin et al, New York, John Wiley & Sons, 1994, p.611-657, 47 refs.
DLC GB2401.72.R42 R46
Sea ice, Ice surveys, Remote sensing, Spaceborne photography, Synthetic aperture radar, Radiometry, Image processing, Ice reporting, Data processing
RADARSAT will be the first high-resolution imaging system on a spacecraft to provide complete global coverage, including, in particular, the North and the South polar regions. Observations of the Arctic are of operational importance, particularly to Canada. Observations of Antarctica are of scientific importance and are a keystone of the cooperative agreement between Canada and the United States supporting the spacecraft launch. This chapter describes the RADARSAT mission and instrument, in the context of polar ice observations. Emphasis is placed on the capabilities of the imaging system and on the use of RADARSAT data in the context of operational ice monitoring in Canada. (Auth. mod.)

49-3621
Tracking of antarctic tabular icebergs using passive microwave radiometry.
Phillips, H.A., Laxon, S.W., *International journal of remote sensing,* Jan. 20, 1995, 16(2), p.399-405, 16 refs.
Spaceborne photography, Radiometry, Ice surveys, Oceanography, Icebergs, Drift, Ocean currents, Sensor mapping, Antarctica—Weddell Sea, Antarctica—Scotia Sea
Passive microwave images of Antarctica from the Special Sensor Microwave Imager (SSM/I) were used to track giant tabular icebergs that originated from the Larsen ice shelf in 1986. Since microwave radiation is relatively insensitive to weather and unaffected by lighting conditions, the SSM/I instrument provides all-weather, year-round viewing. The icebergs are visible almost every day, giving an ideal temporal resolution for tracking their motion. One of the icebergs was tracked until Oct. 1988, six months after its last position noted in the Navy/NOAA Joint Ice Centre ice charts. The tracks of both icebergs reveal motion in agreement with observed oceanographic currents and eddies. (Auth. mod.)

49-3622
Symmetry-faithful theory of the Ih-XI transition in ice.
Ishibashi, Y., *Physical Society of Japan. Journal*, Sep. 1994, 63(9), p.3528-3532, 4 refs.
Ice physics, Phase transformations, Molecular structure, Protons, Orientation, Classifications, Molecular energy levels, Temperature effects, Theories

49-3623
Compositions and mass fluxes of the Mount Erebus volcanic plume.
Sheppard, D.S., Le Guern, F., Christenson, B.W., *American Geophysical Union. Antarctic research series*, 1994, Vol.66, Volcanological and environmental studies of Mount Erebus, Antarctica. Edited by P.R. Kyle, p.83-96, Refs. p.95-96.
Aerosols, Volcanoes, Geochemistry, Atmospheric composition, Environmental impact, Ice composition, Snow composition, Antarctica—Erebus, Mount
In Dec. 1989 and Jan. 1990, gas and aerosol samples were collected in the plume of Mount Erebus to evaluate its impact on the antarctic environment and to evaluate the processes and reactions occurring in the plume. Using an SF_6 injection technique, a flux of SO_2 of 2.4 Mg/d was determined, much lower than most other determinations. H_2S was detected at very low concentrations, whereas H_2SO_4 varied in concentration but at times exceeded SO_2. The presence of elevated levels of plume components in snow some distance from the crater indicates that processes removing material from the plume are significant. Elevated levels of CO_2 in soils and ice tower gases indicate that flank degassing does occur on the volcano. (Auth.)

49-3624
Elemental tracers of volcanic emissions from Mount Erebus in antarctic snow samples.
Palais, J.M., Mosher, B.W., Lowenthal, D., *American Geophysical Union. Antarctic research series*, 1994, Vol.66, Volcanological and environmental studies of Mount Erebus, Antarctica. Edited by P.R. Kyle, p.103-113, Refs. p.111-113.
Geochemistry, Volcanoes, Atmospheric composition, Aerosols, Snow impurities, Antarctica—Erebus, Mount
Mount Erebus was evaluated as a source of trace elements and other impurities for the antarctic environment. Snow samples were collected to determine whether a trace element signature characteristic of Erebus could be identified in antarctic snow samples. The snow was analyzed by instrumental neutron activation analysis for a suite of trace elements. The source of contaminants in the snow samples was determined using receptor-modeling estimates of source contributions. Most snow samples contained significant contributions from crustal sources and minor marine components. A signature characteristic of the volcanic gas plume of Erebus was found mainly in snow samples collected close to the volcano. (Auth.)

49-3625
Glaciochemical studies of aerosol fallout from Mount Erebus.
Palais, J.M., Spencer, M.J., Chuan, R.L., *American Geophysical Union. Antarctic research series*, 1994, Vol.66, Volcanological and environmental studies of Mount Erebus, Antarctica. Edited by P.R. Kyle, p.115-128, Refs. p.127-128.
Snow composition, Snow impurities, Volcanoes, Geochemistry, Aerosols, Atmospheric composition, Antarctica—Erebus, Mount
Six snow pits were sampled on and around Ross I. and analyzed for major cations, anions, microparticles and oxygen isotopes to assess the geochemical impact of Mount Erebus on the local atmosphere and snow chemistry. The sources, background concentrations and seasonal variations of impurities in the snow around Erebus have been evaluated. Although there is some evidence that emissions from Erebus affect the chemistry of snow at sites on and around Ross I., the volcanic signature is not unambiguous. Chloride and sulfate found in the snow are the most characteristic products emitted from Mount Erebus. (Auth.)

49-3626
Quaternary geology in Xizang. [Xizang disiji dizhi], Chinese Academy of Sciences. Qinghai-Xizang Plateau Comprehensive Scientific Survey Team. Series of the Scientific Expedition to the Qinghai-Xizang Plateau (Zhongguo kexue yuan Qingzang gaoyuan zonghe kexue kaochadui. Qingzang gaoyuan kexue kaocha zongshu), Beijing, Science Press (Kexue chubanshe), 1983, 192p. + plates, In Chinese with English table of contents. Refs. passim.
DLC QE696.H78 1983 Orien China
Geological surveys, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Tectonics, Alpine glaciation, Pollen, China—Qinghai-Xizang Plateau

49-3627
Selected papers on the Quaternary geology and glacial geology of Xinjiang. [Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji], Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1981(1983), 248p. + plates, In Chinese. Refs. passim. Presented at the Xinjiang Regional Quaternary Geology and Quaternary Glaciology Symposium (Xinjiang diqu disiji dizhi ji disiji bingchuan xueshu taolunhui), Urumqi, China, Sep. 1979. For selected papers see 49-3628 through 49-3641.

DLC QE696.H79 1983 Orien China

Alpine glaciation, Glacial geology, Glacial deposits, Quaternary deposits, Paleoclimatology, Pleistocene, Stratigraphy, Geochronology, Geological surveys, China—Xinjiang, China—Tian Shan

49-3628
Effect of Quaternary ice age climates on loess deserts. [Disiji bingqi qihou dui huangtu shamo de yingxiang]
Yang, H.R., Xu, X., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.6-18, In Chinese. 34 refs.

Paleoclimatology, Glaciation, Pleistocene, Quaternary deposits, Desert soils, Loess, Global change, Desiccation, Geochronology

49-3629
Using paleomagnetism in loess stratigraphy. [Gudicixue zai huangtu fenceng shang de yingyong]
Wang, Y.T., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.19-26, In Chinese.

Paleoclimatology, Quaternary deposits, Loess, Soil dating, Remanent magnetism, Stratigraphy

49-3630
Current research on sea level fluctuations off Fujian. [Fujian hai pingmian shengjiang yundong de yanjiu xianzhuang]
Lin, G.D., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.27-31, In Chinese. 14 refs.

Paleoclimatology, Glaciation, Sea level, Marine geology, Geochronology, China

49-3631
Problems of the Quaternary in Xinjiang. [Xinjiang disiji dizhi wenti]
Zhou, M.L., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.32-35, In Chinese.

Research projects, Paleoclimatology, Geological surveys, Quaternary deposits, China—Xinjiang

49-3632
Outline of the Quaternary in Xinjiang. [Xinjiang disiji dizhi gaiyao]
Hong, L., Qi, G.Y., Lu, S.A., Zhong, H., Qiao, L.Y., Wu, Z.A., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.36-58, In Chinese. 7 refs.

Paleoclimatology, Quaternary deposits, Stratigraphy, Tectonics, Geochronology, China—Xinjiang

49-3633
Relationship between neotectonic movements and Quaternary stratigraphy in Xinjiang. [Shilun Xinjiang xin gouzao yundong yu disiji diceng huafen de guanxi]
Peng, D.F., Huang, D.M., Wang, Z.D., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.59-66, In Chinese. 2 refs.
Quaternary deposits, Tectonics, Stratigraphy, Paleoclimatology, Geochronology, China—Xinjiang

49-3634
Loess and loess-like rock in northern Xinjiang. [Bei Jiang huangtu ji huangtu zhuang yanshi]
Feng, X.Y., Wu, X.L., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.67-80, In Chinese. 10 refs.
Soil surveys, Loess, Eolian soils, Desert soils, Soil composition, Lithology, Minerals, Geochemistry, China—Xinjiang

49-3635
Preliminary findings on Quaternary stratigraphy in the Aksu region of the southern Tian Shan—the Tailan River as an example. [Guanyu nan Tianshan Akesu diqu disiji diceng huafen de yixie chubu renshi—yi Tailanhe wei li]
Mao, D.H., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.81-90, In Chinese. 7 refs.
Geological surveys, Glaciation, Glacial deposits, Quaternary deposits, Stratigraphy, Paleoclimatology, Geochronology, China—Tian Shan

49-3636
Study on paleoglaciation in the Tian Shan. [Tianshan gu bingchuan zuoyong yanjiu]
Wang, Z.C., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.91-106, In Chinese. 4 refs.
Alpine glaciation, Glacial erosion, Glacial deposits, Glacial geology, Moraines, Quaternary deposits, Paleoclimatology, Geological surveys, China—Tian Shan

49-3637
Quaternary glaciers and the extent of the Ice Age in the northern Tian Shan—both the northern and southern slopes of Mt. Bogda as an example. [Bei Tianshan disiji bingchuan yu binqi huafen—yi Bogeda feng nanbei po wei li]
Wang, S.J., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.107-114, In Chinese. 16 refs.
Alpine glaciation, Glacial geology, Glacial deposits, Quaternary deposits, Pleistocene, Paleoclimatology, Geochronology, China—Tian Shan

49-3638
Quaternary Ice Age extent and stratigraphy in the northern foothills of Mt. Bogda in the eastern Tian Shan of Xinjiang. [Xinjiang dong Tianshan Bogeda feng bei lu disiji bingqi huafen yu diceng]
Yan, J.H., Wang, C.L., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.115-126, In Chinese. 3 refs.
Alpine glaciation, Glacial geology, Glacial deposits, Quaternary deposits, Pleistocene, Stratigraphy, Paleoclimatology, Geochronology, China—Tian Shan

49-3639

Preliminary study on the early Pleistocene Ice Age in the northern Bogda foothills of the eastern Tian Shan in Xinjiang. [Xinjiang dong Tianshan Bogeda bei lu zao gengxinshi bingqi chubu tantao]

Yang, Z.X., Zhao, Z.Y., Huang, D.Q., Wang, Q., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.127-142, In Chinese. 10 refs.

Alpine glaciation, Glacial geology, Glacial erosion, Glacial deposits, Quaternary deposits, Pleistocene, Paleoclimatology, Geochronology, Geological surveys, China—Tian Shan

49-3640

Preliminary findings on the origin of Tianchi Lake. [Dui Tianchi chengyin de chubu renshi]

Han, S.T., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.143-147, In Chinese. 6 refs.

Alpine glaciation, Glacial geology, Glacial lakes, Pleistocene, Tectonics, Paleoclimatology, Geochronology, China—Tian Shan

49-3641

Traces of Quaternary glaciation in the Altai Mountains of Xinjiang. [Xinjiang Aertai shanqu disiji bingchuan yiji]

Li, P.J., Xinjiang disiji dizhi ji bingchuan dizhi lunwen xuanji (Selected papers on the Quaternary geology and glacial geology of Xinjiang), Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1983, p.148-156, In Chinese. 6 refs.

Alpine glaciation, Glacial geology, Glacial deposits, Moraines, Quaternary deposits, Paleoclimatology, Geochronology, China—Altai Mountains

49-3642

Problems of Quaternary glaciation and environment in eastern China. [Zhongguo dongbu disiji bingchuan yu huanjing wenti]

Shi, Y.F., ed, Cui, Z.J., ed, Li, J.J., ed, Beijing, Science Press (Kexue chubanshe), 1989, 462p., In Chinese. Refs. p.375-390.

DLC GB2537.C53 1989 Orien China

Alpine glaciation, Glacial geology, Glacial deposits, Moraines, Quaternary deposits, Paleoclimatology, Pleistocene, Geochronology, Geological surveys, China

49-3643

Distribution of river waters in the Kara Sea. [O rasprostranenii rechnykh vod v Karskom more]

Vasil'kov, A.P., Monin, A.S., *Rossiĭskaia akademiia nauk. Doklady,* Oct. 1994, 338(6), p.818-821, In Russian. 1 ref.

River flow, Water temperature, Surface temperature, Salinity, River ice, Russia—Kara Sea, Russia—Baydaratskaya Bay, Russia—Ob' River, Russia—Yenisey River

49-3644

Planetary gas-bearing pole in the Western Siberian oil- and gas-bearing province and its genetic link to potential fields in the Kara Sea shelf. [Polius planetarnoĭ gazonosnosti Zapadno-Sibirskoĭ neftegazonosnoĭ provintsii i ego geneticheskaia sviaz' s potentsial'nymi mestorozhdeniiami shel'fa Karskogo moria]

Kortsenshteĭn, V.N., *Rossiĭskaia akademiia nauk. Doklady,* Nov. 1994, 339(2), p.227-230, In Russian. 14 refs.

Hydrocarbons, Natural gas, Natural resources, Russia—Kara Sea, Russia—Siberia

49-3645

Annual variation of characteristics of the tropopause in the Arctic. [Mezhgodovaia izmenchivost' kharakteristik tropopauzy v Arktike]

Alekseev, G.V., Nagurnyĭ, A.P., Timerev, A.A., *Rossiĭskaia akademiia nauk. Doklady,* Nov. 1994, 339(2), p.243-245, In Russian. 4 refs.

Polar atmospheres, Temperature gradients, Air temperature, Tropopause

49-3646

Evaluating primary productivity and dynamics of mineral phosphate in the Weddell Sea and Bransfield Strait. [K otsenke pervichnoĭ produktsii i dinamiki mineral'nogo fosfata v more Uedella i v prolive Bransfilda (Antarktika)]

Sorokin, IU.I., *Rossiĭskaia akademiia nauk. Doklady,* Nov. 1994, 339(3), p.401-403, In Russian. 13 refs.

Biomass, Photosynthesis, Plankton, Marine biology, Antarctica—Weddell Sea, Antarctica—Bransfield Strait

The data indicate that biogenic limitation as a factor regulating the development of phytoplankton is practically nonexistent. The low temperature of antarctic waters during the period of vegetation (0.5-1.5°C) also does not appear to be a factor. Among the basic factors determining the development of phytoplankton in these waters, vertical stability of the water mass within the boundaries of the photosynthesis zone and extended daylight should be noted. (Auth.)

49-3647

Variation in atmospheric processes in the Arctic and its calculation in long-range forecasting. [Izmenchivost' atmosfernykh protsessov Arktiki i ee uchet v dolgosrochnykh prognozakh]

Dmitriev, A.A., St. Petersburg, Gidrometeoizdat, 1994, 207p., In Russian. 81 refs.

Polar atmospheres, Long range forecasting, Atmospheric circulation, Sea level, Air ice water interaction, Air temperature

49-3648

Advanced marine technology for the Soviet Arctic.

Brigham, L.W., *Oceanus,* Spring 1991, 34(1), p.74-75.

Icebreakers, Marine transportation, Ships, Design

49-3649

Ice jams and floods on the Lower Vistula River: mechanism and processes. [Zatory i powodzie zatorowe na dolnej Wiśle: mechanizmy i warunki]

Grześ, M., 184p., In Polish with English table of contents and summary. Refs. p.139-144.

Ice jams, River ice, Floods, Countermeasures, Ice cover, Frazil ice, River flow, Freezeup, Ice breakup, Poland—Vistula River

49-3650

Design and evaluation of a towed snowplow for the Small Unit Support Vehicle (SUSV): full-scale prototype development and 1992 field tests.

Richmond, P.W., Walsh, M.R., CR 94-10, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Oct. 1994, 17p. + appends., ADA-289 688, 6 refs.

Snow removal, Equipment, Machinery, Military equipment, Design, Mechanical tests

Light Infantry Division elements require a system to allow them to conduct semi-autonomous operations and limited self-resupply with existing wheeled vehicles in snow deeper than 15 cm. Since many roads and trails will not have been kept open prior to deployment, truck-mounted plows (if available) would be ineffective. In most instances, heavy tracked vehicles, which can cause extensive environmental damage, are required to move deep snow. Over-snow vehicles can be equipped with front- or rear-mounted plow blades. But to adapt a plow to the U.S. Army's only over-snow vehicle, the small unit support vehicle (SUSV), would require major vehicular modifications. A towed plow assembly for the SUSV was proposed. To adapt the plow for this application, a unique four-bar parallel linkage towing assembly was developed, which bolts directly on to the SUSV's pintle hook mounting bracket. This assembly controls the pitch, and the plow geometry stabilizes the roll of an attached plow. The plow was constructed primarily of aluminum, has three plowing widths, and can be towed over the road (minimum width 2.3 m). This report describes the design, operation and results of field tests of the towing assembly and plow. The SUSV successfully towed the plow through deep (85 cm) unbonded snow, creating a path wide enough for a wheeled vehicle. In hard, dense, windblown snow the plow was less successful, requiring several passes to open a trail. No major failures occurred, although some minor problems were identified. Recommendations for design improvements are presented.

49-3651

Subsurface radar investigations at the Pegasus Glacial-Ice Runway and Williams Field, McMurdo Station, Antarctica.

Arcone, S.A., Delaney, A.J., Tobiasson, W., CR 94-12, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Nov. 1994, 23p., ADA-289 232, 29 refs.

Ice runways, Runways, Subsurface investigations, Data processing, Radar, Ice cover thickness, Ice structure, Environmental impact, Antarctica—McMurdo Station, Antarctica—Ross Ice Shelf

Subsurface radar was used to profile ice and snow conditions on the Ross Ice Shelf at McMurdo Station during mid-Jan. 1993. Deconvolution and migration were often used to improve vertical resolution and spatial imaging. Profiles at a pulse center frequency of 400 MHz along the 3.2-km long Pegasus ice runway show many low-density horizons above 9 m depth that are up to 30 m long. They are associated with air bubbles included during refreezing of meltwater and are interpreted as layers between a few to tens of centimeters thick. There is a strong reflecting horizon at about 9 m depth that is probably from brine intrusion, as it is continuous with the intrusion into the snow to the east. Diffraction asymptotes give a dielectric constant near 3.2 for material above the brine level, a value that implies near-solid ice. Profiles at 100 MHz along the road between Pegasus runway and Williams Field in the accumulation zone show snow features such as layer deformation and intrusive brine layers that both abruptly and gradually change in depth. A single profile at a relic solid waste dump at Williams Field detected buried debris and ice within the upper 7 m. A survey of a suspected fuel spill shows some local disturbances near the center, but no excavation was done to verify the findings. Profiles traversing the sewage sumps at Williams Field outline the extent of the sewage deposition, and give depths to contaminated snow that closely agree with observations. Despite variability in dielectric properties, single-layer migration effectively improves the resolution of subsurface conditions. Recommendations are made for future surveys. (Auth.)

49-3652

Upper-air data collected on Ice Station Weddell.

Claffey, K.J., Andreas, E.L., Makshtas, A.P., SR 94-25, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1994, 61p., ADA-289 707, 23 refs.

Air ice water interaction, Air temperature, Atmospheric boundary layer, Temperature inversions, Wind velocity, Radio echo soundings, Dew point, Antarctica—Weddell Sea

From Feb. to June 1992, as Ice Station Weddell (ISW) drifted through the uncharted western Weddell Sea, the authors launched radiosondes, typically twice a day, to study the structure of the lower atmosphere. Here they describe the ISW radiosounding program, report on the availability of the data, and offer preliminary analyses of some of the atmospheric features observed. For 10 days in late May and early June, as the Russian icebreaker *Akademik Fedorov* approached ISW from the northeast to help remove the ice camp, simultaneous soundings were made four times a day from ISW and from the *Fedorov.* The authors also describe the radiosounding system on the *Fedorov,* report on the availability of these data, and present preliminary comparisons of the simultaneous ISW and *Fedorov* soundings. Soundings showed that temperature inversions were very common in this part of the Weddell Sea in fall and winter. Over 95% of the ISW soundings and 100% of the *Fedorov* soundings showed low-level temperature inversions. Of these, over 40% of the ISW soundings and over 67% of the *Fedorov* soundings were surface-based. A low-level jet in the wind speed profile was also common. Such a jet was found in almost 80% of the ISW soundings for which the authors had wind information. The jet core was usually between 25 and 75 m above the surface, with speeds in the core commonly between 4 and 10 m/s. (Auth.)

49-3653

Variation in visual and near-infrared contrast with a snow background.

Peck, L., SR 94-28, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1994, 27p., ADA-289 710, 25 refs.

Albedo, Snow surface temperature, Snow cover effect, Solar radiation, Snow depth, Reflectivity, Reflection

Visual and near-infrared concealment against a snow cover are considered in terms of the daily and longer-term variation in albedo of a shallow (≤26 cm) snow cover. Examples of albedo of a Vermont snow cover demonstrate the influence of time of day (solar angle), incident solar radiation, snow depth, and snow wetness. Most albedos fell within the range 0.75-0.98. The most consistent variation was a decrease in albedo during the morning as the sun angle increased and corresponding increase with decreasing sun angle in the afternoon. Albedo was low when the snow surface temperature indicated melting was occurring or when an increase in temperature of the soil beneath the snow cover indicated solar radiation was being absorbed by the soil. Examples of the diurnal variation in sun angle and the seasonal variation in maximum potential solar radiation, as calculated from site latitude and longitude and calendar date, are presented.

49-3654

Establishment and persistence of cool- and warm-season grasses on sandy soils.

Palazzo, A.J., SR 94-31, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Nov. 1994, 6p., ADA-289 462, 19 refs.

Grasses, Revegetation, Cold tolerance, Plants (botany), Sands

This study investigated the establishment and early persistence of warm- and cool-season grasses sown on sandy soils in a cool, humid climate. Two studies, conducted with several cool-season fine fescue species (*Festuca* sp.) and the warm-season species Blackwell switchgrass (*Panicum virgatum* L.) and little bluestem (*Andropogon scoparius* Michx.), also looked at straw mulch as an aid for early establishment. The results show that the two warm-season grasses and the cool-season fine fescue types have different growth habits, but all species are suitable for reducing erosion on coarse-textured soils containing more than 90% sand. The fine fescues established more quickly and produced a greater vegetative soil cover than little bluestem; they persisted for up to 3 years after seeding. Switchgrass, a warm-season grass, was taller and produced greater yields than the cool-season types. The straw mulch aided the establishment of the cool-season grasses. Both types of grasses are appropriate for revegetating sandy soils in a cool, humid climate.

49-3655

Bacteria in sea ice and underlying water of the eastern Weddell Sea in midwinter.

Helmke, E., Weyland, H., *Marine ecology progress series*, Feb. 9, 1995, 117(1-3), p.269-287, Refs. p.285-287.

Microbiology, Sea ice, Ecology, Marine biology, Sea water, Antarctica—Weddell Sea

Bacteria in the water beneath the sea ice of the eastern Weddell Sea were homogeneously distributed. Direct counts resembled values from spring and autumn, whereas viable cell counts, total ATP concentrations as well as heterotrophic assimilation and extracellular enzymatic activities were very low, implying a metabolic inactive bacterioplankton. The consolidated sea ice had a very heterogeneous horizontal distribution of microbes. A close relation between bacterial colonization of sea ice and genetic ice classes was revealed. Sea ice of predominantly congelation ice had the lowest bacterial biomass and displayed very low heterotrophic activities, comparable to those of the water column. Samples of older sea ice belonging to the mainly frazil and mixed ice had maximal numbers of bacteria. They often included high proportions of culturable cells and dividing cells as well as large bacteria. The bacteria of these ice classes were active and contributed significantly to the productivity in the Weddell Sea during winter. Predominantly frazil ice was less colonized. (Auth. mod.)

49-3656

Overview of environmental and hydrogeologic conditions at the Merle K. "Mudhole" Smith Airport near Cordova, Alaska.

Dorava, J.M., Sokup, J.M., *U.S. Geological Survey. Open-file report*, 1994, No.94-328, 15p. + appends., 28 refs.

Water supply, Water reserves, Meltwater, Hydrogeochemistry, Soil pollution, Water pollution, Airports, United States—Alaska—Cordova

49-3657

Research report No.56. Study on northern-type of apartment house.

Hokkaido Prefectural Cold Region Housing and Urban Research Institute (Hokkaidoritsu kanchi jutaku toshi kenkyujo), Sapporo, Japan, Mar. 1994, 122p., In Japanese with English summary. 22 refs.

Residential buildings, Cold weather construction, Cold weather performance, Urban planning, Regional planning, Japan

49-3658

Research report No.55. Study on northern-type house—study on the cost of northern-type house.

Hokkaido Prefectural Cold Region Housing and Urban Research Institute (Hokkaidoritsu kanchi jutaku toshi kenkyujo), Sapporo, Japan, Mar. 1994, 74p., In Japanese with English summary.

Houses, Residential buildings, Cold weather construction, Cold weather performance, Cost analysis, Japan

49-3659

Betaklit—a new type of concrete. [Betaklit—novyĭ vid betona]

Fridman, V.V., Smirnov, N.V., Khubova, N.G., Shcherbakov, E.N., Azhidinov, S.S., *Transportnoe stroitel'stvo*, June 1994, No.6, p.20-22, In Russian.

Concretes, Concrete freezing, Frost resistance, Freeze thaw cycles

49-3660

Tunnels constructed of girders and arches. [Galerei balochnoĭ i arochnoĭ konstruktsii]

IAdroshnikov, V.I., *Transportnoe stroitel'stvo*, June 1994, No.6, p.23-27, In Russian. 5 refs.

Tunnels, Roads, Avalanche protection, Design

49-3661

Improving the technology of injecting prestressed precast channels along bridge structures. [Sovershenstvovanie tekhnologii in"ektirovaniia kanalov predvaritel'no napriazhennykh sostavnykh po dline konstruktsiĭ mostov]

Sakanskiĭ, IU.N., *Transportnoe stroitel'stvo*, June 1994, No.6, p.32-36, In Russian.

Frost resistance, Bridges, Standards, Concrete admixtures, Concrete freezing, Countermeasures

49-3662

Protection from corrosion with prestressed K-7 cable reinforcement: review of data. [Zashchita ot korrozii napriagaemoĭ armatury iz kanatov K-7: obzor informatsii]

Laskina, I.G., Kungurov, G.V., *Transportnoe stroitel'stvo*, May 1994, No.5, p.14-16, In Russian. 4 refs.

Corrosion, Countermeasures, Frost resistance, Cables (ropes), Bridges

49-3663

Accelerated tests for the frost resistance of concrete for offshore hydrotechnical structures. [Uskorennye ispytaniia na morozostoĭkost' betona dlia morskikh gidrotekhnicheskikh sooruzheniĭ]

Gladkov, V.S., Anin, IU.M., *Transportnoe stroitel'stvo*, May 1994, No.5, p.20-21, In Russian.

Frost resistance, Concrete freezing, Freeze thaw cycles, Freeze thaw tests, Offshore structures

49-3664

Some ecological problems in developing the Arctic (the foreign experience).

Brinken, A.O., Pyzhin, V.A., *Polar geography and geology*, Jan.-Mar. 1993, 17(1), p.72-78, Translated from Russkoe geograficheskoe obshchestvo. Izvestiia, Vol.124, No.2, 1992. 16 refs.

Environmental impact, Environmental protection, Ecology, Oil recovery, Oil spills, Cold weather operation

49-3665

Antarctica as a nature reserve.

Korotkevich, E.S., Slevich, S.V., Rogovtsev, A.N., *Polar geography and geology*, Jan.-Mar. 1993, 17(1), p.79-84, Translated from Russkoe geograficheskoe obshchestvo. Izvestiia, Vol.124, No.3, 1992. 6 refs.

International cooperation, Ecology, Environmental protection, Legislation, Antarctica

In terms of its ecology, the antarctic continent is unique. Perhaps the most crucial aspect is the delicate equilibrium existing among the flora, fauna, and the physical environment, an equilibrium which is extremely vulnerable to uncontrolled exploitation. Starting with the signing of the Antarctic Treaty in Dec. 1959, the authors trace the sequence of measures taken to safeguard the delicately balanced antarctic environment. They conclude that the signing of the Protocol on the Protection of the Environment in Madrid in 1991, which established a 50-year moratorium on mineral exploration or development, has made Antarctica the largest nature preserve in the world. (Auth.)

49-3666

Southern boundary of the last Kara ice sheet.

Grosval'd, M.G., Goncharov, S.V., *Polar geography and geology*, Oct.-Dec. 1991, 15(4), p.291-298, 13 refs. For Russian original see 47-2806.

Pleistocene, Moraines, Glacial deposits, Geomorphology, Glaciers, Ice cover, Radioactive age determination

49-3667

Arctic Ocean Hydrographic Expedition 1910-1915.

Kuksin, I.E., *Polar geography and geology*, Oct.-Dec. 1991, 15(4), p.299-309, Translated from Geografiia i prirodnye resursy, No.1, 1991. 10 refs.

Expeditions, History

49-3668

Index of German language place names of the Antarctic. Second edition. [Verzeichnis deutschsprachiger geographischer Namen der Antarktis. 2. Ausgabe]

Institut für Angewandte Geodäsie, Frankfurt am Main, [Germany], Institut für Angewandte Geodäsie, 1993, 30p., In German. Front matter in German and English. Refs. p.23-30.

Gazetteers

This list is an extract of an antarctic place-names database created at the Institut für Angewandte Geodäsie (IFAG), Frankfurt am Main. It includes those antarctic topographical and geographical features which have been first given names in German since 1870. IFAG has decided, after comprehensive consultation with the Ständiger Ausschuß für geographische Namen and following its recommendations, to work according to the principle of "one object-one name" for published maps, other scientific publications and in this index. According to this principle, place-names should be referred to only in the language in which their original nomination was made. Names in German, derived by simple translation from other languages and listed in the first edition, have been deleted from the second edition. Those names dedicated to German-speaking participants or other personages during foreign expeditions, but in languages other than German, have also been deleted.

49-3669

Current ANARE machinery and vehicles.

Corry, M., Sheers, B., *Aurora*, Sep. 1992, 12(1), p.8-12, 9 refs.

Tractors, Tracked vehicles, Construction equipment, All terrain vehicles, Sleds, Antarctica—Mawson Station, Antarctica—Casey Station, Antarctica—Davis Station

In photographs and text a summary is given of the array of oversnow vehicles in use at Australian antarctic stations in 1992. Included are general details of type, use, power packs, fuel type, speed, manufacturer, transmissions, amphibious or overland capabilities, and purchase and maintenance costs.

49-3670

Strength and durability of rapid highway repair concretes.

Whiting, D., Nagi, M., *Concrete international*, Sep. 1994, 16(9), p.36-41, 9 refs.

Concrete pavements, Concrete strength, Concrete durability, Concrete admixtures, Physical properties, Winter maintenance, Freeze thaw cycles, Frost resistance, Performance

49-3671

International equations for the pressure along the melting and along the sublimation curve of ordinary water substance.

Wagner, W., Saul, A., Pruß, A., *Journal of physical and chemical reference data*, May-June 1994, 23(3), p.515-525, 21 refs.

Ice physics, Ice sublimation, Temperature variations, Melting points, High pressure ice, Liquid phases, Solid phases, Phase transformations, Thermodynamics, Vapor pressure, Analysis (mathematics), Correlation, Standards

49-3672

Analysis of cryoscopy data.

Wloch, P., Cherniak, E.A., *Journal of chemical education*, Jan. 1995, 72(1), p.59-61, 7 refs.

Solutions, Chemical composition, Statistical analysis, Freezing points, Temperature measurement, Thermistors, Thermocouples, Education, Experimentation

49-3673

Light scattering by hexagonal ice crystals: comparison of finite-difference time domain and geometric optics models.

Yang, P., Liou, K.N., *Optical Society of America. Journal A*, Jan. 1995, 12(1), p.162-176, 47 refs.

Ice physics, Ice crystal optics, Light scattering, Wave propagation, Radiation absorption, Mathematical models, Refraction, Cloud physics, Polarization (waves)

49-3674

Comparison of predicted and observed responses of pipeline to differential frost heave.

Rajani, B., Morgenstern, N.R., *Canadian geotechnical journal,* Dec. 1994, 31(6), p.803-816, With French summary. 25 refs.

Underground pipelines, Gas pipelines, Frost heave, Deformation, Dislocations (materials), Frozen ground mechanics, Simulation, Rheology, Mathematical models, Ice solid interface

49-3675

Ground freezing and sampling of foundation soils at Duncan Dam.

Sego, D.C., Robertson, P.K., Sasitharan, S., Kilpatrick, B.L., Pillai, V.S., *Canadian geotechnical journal,* Dec. 1994, 31(6), p.939-950, With French summary. 17 refs.

Dams, Subgrade soils, Noncohesive soils, Soil stabilization, Soil tests, Sampling, Soil freezing, Artificial freezing, Boreholes, Drill core analysis, Accuracy

49-3676

Transient, high-pressure solidification associated with cavitation in water.

Hickling, R., *Physical review letters,* Nov. 21, 1994, 73(21), p.2853-2856, 21 refs.

Water temperature, Cooling, Cavitation, Luminescence, High pressure ice, Phase transformations, Solidification, Shock waves, Fluid dynamics, Ultrasonic tests

49-3677

Use of capillary electrophoresis to monitor concentrations of organic acids in snow and rain water.

Turcat, S., Masclet, P., Lissolo, T., *Science of the total environment,* Dec. 18, 1994, Vol.158, p.21-29, 19 refs.

Precipitation (meteorology), Air pollution, Snow composition, Sampling, Snow impurities, Chemical properties, Chemical analysis, Environmental tests, France—Alps

49-3678

Thermodynamic models of wet-snow accretion: axial growth and liquid water content on a fixed conductor.

Poots, G., Skelton, P.L.I., *International journal of heat and fluid flow,* Feb. 1995, 16(1), p.43-49, 17 refs.

Transmission lines, Snow accumulation, Wet snow, Metamorphism (snow), Ice water interface, Unfrozen water content, Snow physics, Snowflakes, Thermodynamics, Mathematical models, Snow loads, Wind factors

49-3679

Convective heat transfer for the cold tube bundles with ice formations in a stream of water at steady state.

Intemann, P.A., Kazmierczak, M., *International journal of heat and fluid flow,* Dec. 1994, 15(6), p.491-500, 13 refs.

Pipes (tubes), Water flow, Phase transformations, Ice formation, Heat transfer, Ice solid interface, Ice water interface, Ice cover effect, Convection, Topographic effects

49-3680

Strain localization analysis by elasto-viscoplastic softening model for frozen sand.

Oka, F., Adachi, T., Yashima, A., Chu, L.L., *International journal for numerical and analytical methods in geomechanics,* Dec. 1994, 18(12), p.813-832, 19 refs.

Frozen ground mechanics, Soil tests, Sands, Mechanical properties, Loading, Deformation, Strains, Mechanical tests, Stress concentration, Mathematical models, Plastic properties, Rheology

49-3681

Hydrology of a patterned bog-fen complex in southeastern Labrador, Canada.

Price, J.S., Maloney, D.A., *Nordic hydrology,* 1994, 25(5), p.313-330, 36 refs.

Wetlands, Peat, Subarctic landscapes, Hydrology, Water balance, Water transport, Evapotranspiration, Topographic effects, Canada—Labrador

49-3682

Annual variability in summer evapotranspiration and water balance at a subarctic forest site.

Lafleur, P.M., *Nordic hydrology,* 1994, 25(5), p.331-344, 23 refs.

Forest ecosystems, Forest land, Hydrology, Soil water, Water balance, Evapotranspiration, Precipitation (meteorology), Seasonal variations, Soil air interface, Correlation, Canada—Manitoba—Churchill

49-3683

Optical precipitation gauge—determination of precipitation and intensity by light attenuation technique.

Lundberg, A., Johansson, R.M., *Nordic hydrology,* 1994, 25(5), p.359-370, 24 refs.

Precipitation (meteorology), Classifications, Precipitation gages, Sensors, Snowfall, Light transmission, Attenuation, Wind factors, Temperature effects, Correlation

49-3684

Assessment of spatial variability of major-ion concentrations and DEL oxygen-18 values in surface snow, upper Fremont Glacier, Wyoming, U.S.A.

Naftz, D.L., Schuster, P.F., Reddy, M.M., *Nordic hydrology,* 1994, 25(5), p.371-388, 34 refs.

Glaciology, Glacier surfaces, Snow composition, Ion density (concentration), Variations, Sampling, Isotope analysis, Ion diffusion, Ice cores, Correlation, United States—Wyoming—Fremont Glacier

49-3685

Experimental study on the initiation and growth of frost formation on a horizontal plate.

Şahin, A.Z., *Experimental heat transfer,* Apr.-June 1994, 7(2), p.101-119, 25 refs.

Ice physics, Hoarfrost, Ice crystal growth, Ice cover thickness, Ice density, Ice solid interface, Ice air interface, Temperature effects, Heat transfer, Low temperature tests

49-3686

Paleoecology of the high-latitude Eocene swamp forests from Axel Heiberg Island, Canadian High Arctic.

Greenwood, D.R., Basinger, J.F., *Review of palaeobotany and palynology,* Mar. 1994, 81(1), p.83-97, 46 refs.

Paleoecology, Paleobotany, Arctic landscapes, Vegetation patterns, Sediments, Fossils, Stratigraphy, Forest ecosystems, Classifications, Canada—Northwest Territories—Axel Heiberg Island

49-3687

Impact of the greenhouse effect on sea-ice characteristics and snow accumulation in the polar regions.

Hunt, B.G., Gordon, H.B., Davies, H.L., *International journal of climatology,* Jan. 1995, 15(1), p.3-23, 56 refs.

Climatology, Climatic changes, Polar atmospheres, Greenhouse effect, Global warming, Sea ice distribution, Ice cover thickness, Snow accumulation, Periodic variations, Simulation, Ice cover effect, Thermodynamics

An extensive analysis has been made of the simulated sea-ice behavior for current and doubled carbon dioxide levels for both polar regions. The sea-ice variations were computed as a component of the overall performance of a global climatic model. This model simulated the major climatic processes, but used an elementary oceanic representation. For current conditions the sea-ice extent, thickness, seasonal and interannual variability were reasonably simulated, particularly for the Northern Hemisphere. The major deficiency was the lack of regions with very thick sea-ice, which is known to be generated in the real world by dynamical interactions. Very substantial reductions occurred in the sea-ice thickness, and to a lesser extent in sea-ice area, under greenhouse conditions, with the major impact being in summer. Water mass accumulation over the great ice-sheets agreed moderately well with limited observations for control conditions. (Auth. mod.)

49-3688

Recent frost date trends in the north-eastern USA.

Cooter, E.J., Leduc, S.K., *International journal of climatology,* Jan. 1995, 15(1), p.65-75, 28 refs.

Climatology, Climatic changes, Air temperature, Seasonal variations, Frost, Statistical analysis, Weather observations, Environmental impact, United States

49-3689

Modelling evaporation from a high subarctic willow-birch forest.

Blanken, P.D., Rouse, W.R., *International journal of climatology,* Jan. 1995, 15(1), p.97-106, 21 refs.

Forest ecosystems, Trees (plants), Subarctic landscapes, Plant physiology, Evaporation, Moisture transfer, Vegetation factors, Global warming, Climatic changes, Environmental impact, Mathematical models, Canada—Manitoba—Churchill

49-3690

Enhancing aircraft flight safety with primary ice detection sensors.

Feely, R., *Sensors,* June 1994, 11(6), p.28,30.

Aircraft icing, Ice accretion, Ice detection, Safety, Sensors, Probes, Vibration, Ice cover effect, Design

49-3691

Measuring wind, ice, and fog in the "home of the world's worst weather".

Schoof, J., Rancourt, K., *Sensors,* Jan. 1995, 12(1), p.18, 22,62-63.

Weather observations, Meteorological instruments, Meteorological data, Cloud physics, Sensors, Ice detection, Design

49-3692

Energy balance of the northern polar region. [Energeticheskiĭ balans Severnoĭ poliarnoĭ oblasti]

Khrol, V.P., St. Petersburg, Gidrometeoizdat, 1993, 167p., In Russian with English summary. 283 refs.

Heat balance, Heat flux, Polar atmospheres, Air water interactions, Analysis (mathematics), Solar radiation, Ice cover effect, Air ice water interaction, Enthalpy, Albedo, Norwegian Sea, Arctic Ocean

49-3693

Interaction of mechanized supports with rock sides in placer shafts in the North. [Vzaimodeĭstvie mekhanizirovannykh krepeĭ s bokovymi porodami na rossypnykh shaktakh Severa]

Sleptsov, A.E., Elshin, V.K., Markov, V.S., Novosibirsk, Nauka, 1993, 132p., In Russian. 214 refs.

Frozen ground mechanics, Permafrost, Deformation, Mine shafts, Ice veins, Frozen rocks, Supports, Analysis (mathematics)

49-3694

Origins of gold-bearing placer deposits in the cryolithozone of northeastern Asia. [Istochniki zolotonosnykh rossypeĭ kriolitozony severo-vostoka Azii (po fliuidnym vkliucheniiam v mineralakh)]

Davidenko, N.M., Kiev, Naukova Dumka, 1992, 198p., In Russian with Ukrainian summary. 342 refs.

Gold, Geocryology, Natural resources, Forecasting, Hydrothermal processes

49-3695

Cosmic physical geography. [Kosmicheskoe zemlevedenie]

Sadovnichiĭ, V.A., ed, Moscow, Izd. Moskovskogo Universiteta, 1992, 266p., In Russian. Refs. p.258-265.

Remote sensing, Snow cover, Ice cover, Thermodynamics, Air water interactions, Lidar, Lasers, Radiometry

49-3696

Freeze-thaw and deicing salt resistance of concrete testing by the CDF method—CDF resistance limit and evaluation of precision.

Setzer, M.J., Auberg, R., *Materials and structures,* Jan.-Feb. 1995, 28(175), p.16-31, With French summary. 16 refs.

Concrete durability, Concrete admixtures, Mechanical properties, Cold weather tests, Freeze thaw tests, Capillarity, Salting, Corrosion, Standards, Statistical analysis, Accuracy

49-3697

Basal till fabric and deposition at Burroughs Glacier, Glacier Bay, Alaska.

Ham, N.R., Mickelson, D.M., *Geological Society of America. Bulletin,* Dec. 1994, 106(12), p.1552-1559, 31 refs.

Glacial geology, Moraines, Glacial deposits, Glacier ablation, Glacier ice, Ice composition, Sedimentation, United States—Alaska—Burroughs Glacier

49-3698

Aspects of lead/acid battery technology. 10. Cold-start performance.

Prout, L., *Journal of power sources,* Oct. 1994, 51(3), p.463-487, 4 refs.

Batteries, Cold weather performance, Temperature effects, Electric charge, Electrical resistivity, Design

49-3699

V→V, R excitation of librational energy for CO physisorbed on ice and silica.

Dzegilenko, F., Herbst, E., *Chemical physics letters,* Mar. 3, 1995, 234(1-3), p.216-220, 16 refs.

Ice physics, Extraterrestrial ice, Cosmic dust, Simulation, Molecular energy levels, Vibration, Ice vapor interface, Adsorption, Mathematical models

49-3700

Temperature dependence of fluorescence lifetime of 2-naphthol in ice (Ih) crystal. A study of the proton motion in ice.

Qi, P., Okazaki, K., Akiyama, T., Abe, K., Shigenari, T., *Chemical physics letters,* Dec. 2, 1994, 230(4-5), p.322-328, 17 refs.

Ice physics, Doped ice, Proton transport, Low temperature tests, Molecular energy levels, Molecular structure, Defects, Ice spectroscopy, Temperature effects

49-3701

"Jigsaw puzzle" of the arctic pack ice viewed by the radar of the ERS-1 satellite. [Le "puzzle" de la banquise arctique vue par le radar du satellite ERS-1]

Kergomard, C., *Mappemonde,* 1994, No.1, p.31-36, In French with English and German summaries. 10 refs.

Sea ice distribution, Pack ice, Classifications, Drift, Ice surveys, Remote sensing, Spaceborne photography, Synthetic aperture radar, Radar tracking, Arctic Ocean

49-3702

Permafrost-geothermal conditions of the southern part of the Kalar Ridge.

Zheleznìak, M.N., *Russian geology and geophysics,* 1994, 35(4), p.78-82, Translated from Geologiia i geofizika. 9 refs.

Geophysical surveys, Geocryology, Permafrost surveys, Permafrost depth, Frozen rock temperature, Heat flux, Boreholes, Temperature measurement, Russia

49-3703

Place of common pine in the ecosystem of the Siberian taiga.

Safronova, G.P., *Russian forest sciences,* 1993, No.5, p.40-45, Translated from Lesovedenie. 40 refs.

Forest ecosystems, Taiga, Revegetation, Trees (plants), Biogeography, Plant ecology, Russia—Siberia

49-3704

Determination of diagnostic criteria and the subdivision of periglacial slope deposits, with examples from the Bayerischer Wald region of eastern Bavaria. [Zur Frage der Merkmalcharakteristik und Gliederung periglazialer Deckschichten am Beispiel des Bayerischen Waldes]

Völkel, J., *Petermanns Geographische Mitteilungen,* 1994, 138(4), p.207-217, In German with English and Russian summaries. 40 refs.

Geomorphology, Mountain soils, Slope processes, Periglacial processes, Soil classification, Stratigraphy, Germany—Bavaria

49-3705

Long-term studies of the budget development of the Dshankuat, a representative glacier of the central Caucasus. [Langzeituntersuchungen zur Budgetentwicklung des Repräsentativgletschers Dshankuat im zentralen Kaukasus]

Baume, O., Popovnin, V.V., *Petermanns Geographische Mitteilungen,* 1994, 138(5), p.273-286, In German with English and Russian summaries. 17 refs.

Glacier oscillation, Glacier surveys, Mountain glaciers, Glacier mass balance, Glacier thickness, Precipitation (meteorology), Periodic variations, Russia—Caucasus Mountains

49-3706

Automated system for measuring snow surface energy balance components in mountainous terrain.

Sauter, K.A., McDonnell, J.J., *Hydrological processes,* Sep.-Oct. 1994, 8(5), p.437-446, 23 refs.

Snow cover, Snow depth, Albedo, Snow thermal properties, Radiation balance, Insolation, Snow air interface, Meteorological instruments, Telemetering equipment, Meteorological factors, Snow cover effect

49-3707

Link between glacier velocity and the drainage of ice-dammed lakes: comment on a paper by Knight and Tweed.

Lawler, D.M., *Hydrological processes,* Sep.-Oct. 1994, 8(5), p.447-456, 33 refs. For paper under discussion see 46-208.

Glacial hydrology, Glacial lakes, Ice dams, Subglacial drainage, Glacier flow, Velocity, Ice water interface, Iceland

49-3708

Impact of post-mixing chemical reactions on the major ion chemistry of bulk meltwaters draining the Haut glacier d'Arolla, Valais, Switzerland.

Brown, G.H., Sharp, M.J., Tranter, M., Gurnell, A.M., Nienow, P.W., *Hydrological processes,* Sep.-Oct. 1994, 8(5), p.465-480, 31 refs.

Glacial hydrology, Mountain glaciers, Glacier melting, Meltwater, Runoff, Subglacial drainage, Geochemistry, Weathering, Ion density (concentration), Sampling, Switzerland—Alps

49-3709

Neutron scattering study of liquid D_2O under pressure and at various temperatures.

Bellissent-Funel, M.C., Bosio, L., *Journal of chemical physics,* Mar. 1, 1995, 102(9), p.3727-3735, 54 refs.

Water structure, Ice physics, Heavy water, Supercooling, Phase transformations, Amorphous ice, Low temperature tests, High pressure tests, Neutron scattering, Temperature effects

49-3710

Quaternary glacier and environment of western China. [Zhongguo xibu disiji bingchuan yu huanjing], Beijing, Science Press (Kexue chubanshe), 1991, 330p. + plates, In Chinese with English summary on the outside back cover. Refs. passim. Edited by the China Quaternary Glacier and Environment Research Center (Zhongguo disiji bingchuan yu huanjing yanjiu zhongxin) and the China Quaternary Research Association (Zhongguo disiji yanjiu weiyuanhui). Presented at the 13th INQUA (International Union for Quaternary Research) Congress, Beijing, Aug. 2-9, 1991. For individual papers see 49-3711 through 49-3749.

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Paleoclimatology, Quaternary deposits, Glaciation, Glacial deposits, Moraines, Lacustrine deposits, Loess, Soil dating, Stratigraphy, Pleistocene, Geochronology, Global change, China

49-3711

Study on the relationship between the East Asian monsoon and Qinghai-Tibet Plateau in their formation and evolution processes.

Zhang, L.Y., Jiang, Z.L., Liu, X.D., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.1-14, In Chinese with English summary. 31 refs.

Atmospheric circulation, Paleoclimatology, Tectonics, Global change, Deserts, China—Qinghai-Xizang Plateau

49-3712

Evolution of Quaternary glaciers and environmental change in the west Kunlun Mountains, West China.

Zheng, B.X., Jiao, K.Q., Li, S.J., Ma, Q.H., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.15-23, In Chinese with English summary. 15 refs.

Alpine glaciation, Glacial deposits, Moraines, Quaternary deposits, Lacustrine deposits, Volcanic ash, Paleoclimatology, Pleistocene, China—Kunlun Mountains

49-3713

Study of the ice cores in Dunde Ice Cap and its significance.

Yao, T.D., Xie, Z.C., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.24-32, In Chinese with English summary. 16 refs.

Mountain glaciers, Ice cores, Drill core analysis, Ice composition, Impurities, Fallout, Atmospheric circulation, Global change, China—Qilian Mountains

49-3714

Study of the Pleistocene glaciation and environmental evolution of Kunlun Mountains.

Wang, Z.C., Su, Z., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.33-37, In Chinese with English summary.

Alpine glaciation, Glacial deposits, Moraines, Quaternary deposits, Loess, Paleoclimatology, China—Kunlun Mountains

49-3715

Glacial scale and climatic conditions during last glaciation in west China.

Wang, J.T., Li, S.J., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.38-45, In Chinese with English summary. 17 refs.

Alpine glaciation, Glacial deposits, Moraines, Quaternary deposits, Snow line, Pleistocene, Atmospheric circulation, Paleoclimatology, China—Qinghai-Xizang Plateau

49-3716

Late Quaternary glaciers and environment of Maxian Mt., Gansu Province.

Liu, Y., Li, J.J., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.46-56, In Chinese with English summary. 19 refs.

Alpine glaciation, Mountain glaciers, Glacial deposits, Quaternary deposits, Moraines, Rock glaciers, Periglacial processes, Snow line, Paleoclimatology, China—Lanzhou

49-3717
Climatic environment and surface runoff of Daxigou Basin of the Urumqi River during Little Ice Age.
Wang, Z.T., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.57-66, In Chinese with English summary. 10 refs.
Alpine glaciation, Mountain glaciers, Glacier oscillation, Glacial meteorology, Snow line, Meltwater, Runoff, Air temperature, Climatic changes, Paleoclimatology, China—Lanzhou

49-3718
New understanding of Pleistocene glaciers in Qinghai-Tibet Plateau.
Zhou, S.Z., Li, J.J., Li, S.J., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.67-74, In Chinese with English summary. 20 refs.
Glaciation, Ice sheets, Glacial geology, Pleistocene, Ice age theory, Paleoclimatology, Geochronology, Global change, China—Qinghai-Xizang Plateau

49-3719
Elemental geochemical characteristics of the tills of last ice age near Dalijia Pass.
Zhang, H.C., Zhang, L.Y., Mahaney, W.C., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.75-84, In Chinese with English summary. 5 refs.
Alpine glaciation, Glacial deposits, Moraines, Soil composition, Soil dating, Weathering, Geochemistry, Pleistocene, Paleoclimatology, China—Qinghai-Xizang Plateau

49-3720
Stage division and characteristics of Holocene moraine at Rongpu Valley on the north slope of Mt. Qomolangma.
Kang, J.C., Burbank, D.W., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.85-90, In Chinese with English summary. 5 refs.
Alpine glaciation, Glacial geology, Glacial deposits, Moraines, Soil dating, Geochronology, Paleoclimatology, Himalaya Mountains

49-3721
Preliminary study on the Holocene periglacial landforms in Helan Mountains.
Geng, K., Qiu, W.L., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.91-98, In Chinese with English summary. 15 refs.
Alpine glaciation, Periglacial processes, Geomorphology, Paleoclimatology, Climatic changes, China—Helan Mountains

49-3722
Periglacial environment and environmental problems in the west China.
Qiu, G.Q., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.99-105, In Chinese with English summary. 19 refs.
Periglacial processes, Permafrost distribution, Climatic changes, Global change, China—Qinghai-Xizang Plateau

49-3723
Preliminary studies on Holocene climatic and environmental changes in loess plateau, China.
Sun, J.Z., Ke, M.H., Zhao, J.B., Wei, M.J., Sun, X.Y., Li, B.C., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.106-119, In Chinese with English summary. 12 refs.
Loess, Soil dating, Quaternary deposits, Paleoclimatology, Pollen, Paleobotany, Global change, Soil erosion, China—Xian

49-3724
Studies of Lanzhou loess stratigraphy.
Chen, F.H., Li, J.J., Zhang, W.X., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.120-130, In Chinese with English summary. 25 refs.
Loess, Quaternary deposits, Soil surveys, Soil dating, Stratigraphy, Paleoclimatology, Global change, China—Lanzhou

49-3725
Holocene environment changes in west China glaciers, loess and climate.
Kang, J.C., Chen, F.H., Shen, Y.P., He, Y.Q., Pan, B.T., Yang, T.B., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.131-137, In Chinese with English summary. 12 refs.
Glaciation, Quaternary deposits, Loess, Soil dating, Stratigraphy, Paleoclimatology, China

49-3726
Preliminary discussion of material source, origin and environmental change of loess from the surface texture features of quartz sand of loesses in Lanzhou region, China.
Fang, X.M., Shi, Z.T., Shen, M.Z., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.138-148, In Chinese with English summary. 17 refs.
Loess, Sands, Quaternary deposits, Eolian soils, Soil surveys, Soil dating, Soil composition, Soil formation, Soil texture, Stratigraphy, Paleoclimatology, China—Lanzhou

49-3727
Microfabric characteristics of Holocene loess in Xi'an and their paleoclimate significance.
Lei, X.Y., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.149-155, In Chinese with English summary. 11 refs.
Loess, Quaternary deposits, Soil surveys, Soil dating, Soil texture, Soil structure, Microstructure, Paleoclimatology, China—Xian

49-3728
Paleomagnetic age of Dunwashan loess profile in Lanzhou and its significance.
Zhang, Y.T., Chen, F.H., Cao, J.X., Zhang, W.X., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.156-163, In Chinese with English summary. 8 refs.
Loess, Quaternary deposits, Soil dating, Remanent magnetism, Stratigraphy, Geochronology, Paleoclimatology, China—Lanzhou

49-3729
Cenozoic paleo-eolian sands in the south marginal area of Taklimakan Desert.
Dong, G.R., Chen, H.Z., Jin, J., Wang, Y., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.164-170, In Chinese with English summary. 13 refs.
Desert soils, Eolian soils, Sands, Quaternary deposits, Soil dating, Desiccation, Geochronology, Paleoclimatology, China—Taklimakan Desert

49-3730
Preliminary observation and study of dustfall of Qira County in south edge of Tamir Basin.
Liu, Y.Z., Dong, G.R., Li, B.S., Jin, J., Li, C.Z., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.171-176, In Chinese with English summary. 7 refs.
Atmospheric circulation, Atmospheric composition, Air pollution, Dust, Soil air interface, Eolian soils, Desert soils, Loess, Sands, China—Taklimakan Desert

49-3731
Evolution of the Daihai Lake in Inner Mongolia since Holocene.
Feng, M., Wang, S.M., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.177-183, In Chinese with English summary. 4 refs.
Glaciation, Glacial lakes, Salt lakes, Lacustrine deposits, Quaternary deposits, Limnology, Paleoclimatology, China—Inner Mongolia

49-3732
Climatic changes in Barkol Basin since the late stage of late Pleistocene.
Han, S.T., Li, Z.Z., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.184-196, In Chinese with English summary. 8 refs.
Glaciation, Lacustrine deposits, Quaternary deposits, Soil composition, Geochemistry, Drill core analysis, Stratigraphy, Global change, Paleoclimatology, China—Tian Shan

49-3733
Quaternary sedimentology and stratigraphy in eastern area of Qaidam Basin.
Liu, Z.C., Sun, S.Y., Wang, Y.J., Li, Q.C., Li, X.S., Chen, Y.A., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.197-210, In Chinese with English summary. 6 refs.
Quaternary deposits, Lacustrine deposits, Soil dating, Drill core analysis, Stratigraphy, Geochronology, Geological surveys, Pleistocene, Paleoclimatology, China—Qaidam Basin

49-3734
Lacustrine deposits and sedimentary environment during the late Pleistocene on the southern slope of the west Kunlun Mountains.
Li, S.J., Zheng, B.X., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.211-221, In Chinese with English summary. 10 refs.
Quaternary deposits, Lacustrine deposits, Soil dating, Stratigraphy, Geochronology, Pleistocene, Paleoclimatology, China—Kunlun Mountains

49-3735
Discovery of Holocene beachrock at Qinghai Lake and its significance.
Li, Y.C., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.222-225, In Chinese with English summary. 5 refs.
Quaternary deposits, Lacustrine deposits, Lakes, Beaches, Lithology, Paleoclimatology, China—Qinghai Lake

49-3736
Lake level fluctuations and environmental changes in Kumkol Basin since 17000 year B.P.
Li, S.K., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.226-236, In Chinese with English summary. 4 refs.
Quaternary deposits, Lacustrine deposits, Lakes, Water level, Limnology, Stratigraphy, Global change, Paleoclimatology, China—Kunlun Mountains

49-3737
Palynological record of climatic cycle from the loess profile in Lanzhou area.
Tang, L.Y., Kang, J.C., Feng, Z.D., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.237-243, In Chinese with English summary. 9 refs.
Quaternary deposits, Loess, Soil profiles, Soil dating, Paleobotany, Pollen, Stratigraphy, Paleoclimatology, China—Lanzhou

49-3738

Early Pleistocene spore-pollen assemblages and paleoclimate in Lanzhou region.

Wang, R., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.244-248, In Chinese with English summary. 4 refs.

Quaternary deposits, Loess, Soil profiles, Soil dating, Paleobotany, Pollen, Pleistocene, Paleoclimatology, China—Lanzhou

49-3739

Chengchuan fauna and the Rouyuan fauna—fauna in the desert facies adjacent to fluvial-lacustrine deposits and in a loess facies adjacent to mountain in the late period of late Pleistocene in north China.

Xie, J.Y., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.249-253, In Chinese with English summary. 8 refs.

Quaternary deposits, Lacustrine deposits, Alluvium, Loess, Soil dating, Deserts, Paleoecology, Fossils, Pleistocene, Geochronology, Paleoclimatology, China—Inner Mongolia, China—Gansu Province

49-3740

Preliminary discussion on the Quaternary debris-flow history and sedimentation environments in China.

Cui, Z.J., Xie, Y.Y., Xiong, H.G., Zeng, S.W., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.254-263, In Chinese with English summary. 17 refs.

Quaternary deposits, Mass movements (geology), Mudflows, Sediment transport, Stratigraphy, Pleistocene, Geochronology, Paleoclimatology, China

49-3741

Discovery of paleo-debris flow at the upper reaches of Yarkant River in Xinjiang.

Ren, B.H., Li, N.J., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.264-270, In Chinese with English summary. 3 refs.

Alpine glaciation, Quaternary deposits, Glacial deposits, Moraines, Outwash, Mass movements (geology), Mudflows, Geochronology, Paleoclimatology, China—Karakoram Mountains

49-3742

Terrace development of the Yellow River and geomorphic evolution in Lanzhou area.

Pan, B.T., et al, Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.271-277, In Chinese with English summary. 11 refs.

Quaternary deposits, Floodplains, Terraces, Soil dating, Tectonics, Geomorphology, Geochronology, Paleoclimatology, China—Lanzhou

49-3743

Moisture corridor of the lower reaches of the Yarlung Zangbo River and the environment evolution of the southeastern Tibet.

Yang, Y.C., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.278-284, In Chinese with English summary. 4 refs.

Atmospheric circulation, Precipitation (meteorology), Humidity, Moisture transfer, Vapor transfer, Paleoclimatology, China—Qinghai-Xizang Plateau

49-3744

Age and formation environment of Gongba conglomerate at Tingri County, Tibet.

Qian, F., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.285-291, In Chinese with English summary. 5 refs.

Alpine glaciation, Glacial deposits, Moraines, Outwash, Tectonics, Stratigraphy, Geochronology, Paleoclimatology, China—Qinghai-Xizang Plateau

49-3745

Lower Pleistocene stratigraphy of Nyalam region, Tibet, and their paleogeographical environment.

Shen, Y.P., Zheng, B.X., Jiao, K.Q., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.292-298, In Chinese with English summary. 15 refs.

Alpine glaciation, Glacial deposits, Quaternary deposits, Tectonics, Stratigraphy, Pleistocene, Geochronology, Paleoclimatology, Himalaya Mountains

49-3746

Study on the neotectonic movement and the environmental evolution in the Helan Mountain area.

Shan, P.F., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.299-305, In Chinese with English summary. 5 refs.

Alpine glaciation, Tectonics, Pleistocene, Geochronology, Paleoclimatology, China—Helan Mountains

49-3747

Gypsum polygons in the north piedmont of Kunlun and Altun mountains and their paleo-environment significance.

Chen, H.Z., Dong, G.R., Jin, J., Wang, Y., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.306-311, In Chinese with English summary. 8 refs.

Quaternary deposits, Polygonal topography, Patterned ground, Soil dating, Soil composition, Soil chemistry, Weathering, Deserts, Pleistocene, Paleoclimatology, China—Kunlun Mountains

49-3748

R. Schleyer's goodness-of-fit to ideal Gauss and Rosin distribution and its application of distinguish diamictic environments.

Mou, Y.Z., Li, X.M., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.312-316, In Chinese with English summary. 10 refs.

Glacial deposits, Moraines, Marine deposits, Quaternary deposits, Soil dating, Soil texture, Grain size, Statistical analysis, Paleoclimatology, China—Kunlun Mountains

49-3749

Deliberation on CO_2 changes and its greenhouse effect.

Wang, G.Y., Dong, G.R., Zhongguo xibu disiji bingchuan yu huanjing (Quaternary glaciation and environment in western China), Beijing, Science Press (Kexue chubanshe), 1991, p.317-323, In Chinese with English summary. 30 refs.

Global warming, Atmospheric composition, Atmospheric circulation, Carbon dioxide

49-3750

Avalanche climatology of the western United States with an emphasis on Alta, Utah.

Mock, C.J., Kay, P.A., *Professional geographer,* Aug. 1992, 44(3), p.307-318, 46 refs.

DLC G3.P7 44 1992

Avalanches, Avalanche forecasting, Snow cover stability, Climatic factors, Statistical analysis, United States—Utah

49-3751

Numerical fixed domain mapping solution of free-surface flows coupled with an evolving interior field.

Hindmarsh, R.C.A., Hutter, K., *International journal for numerical and analytical methods in geomechanics,* July-Aug. 1988, 12(4), p.437-459, 25 refs.

DLC TA710.A1I5197 12 1988

Ice sheets, Glacier flow, Glacier friction, Basal sliding, Ice mechanics, Ice creep, Computerized simulation, Mathematical models

49-3752

Shore-parallel snow bands over northwest Indiana and southwest lower Michigan during a major arctic outbreak.

DeLisi, M.P., Przybylinski, R.W., *National weather digest,* May 1992, 17(2), p.16-34, 7 refs.

DLC QC983.N38 17 1992

Snowstorms, Snowfall, Lake effects, Atmospheric disturbances, Wind factors, Fronts (meteorology), United States—Michigan, Lake

49-3753

Dynamics of avalanches of granular materials from initiation to runout. Part I: analysis.

Savage, S.B., Hutter, K., *Acta mechanica,* 1991, 86(1-4), p.201-223, 38 refs.

DLC TA349.A3 84-86 1990-91

Avalanche mechanics, Avalanche modeling, Avalanche triggering, Avalanche tracks, Mathematical models

49-3754

Isotopic changes during the formation of depth hoar in experimental snowpacks.

Sommerfeld, R.A., Judy, C., Friedman, I., *Geochemical Society. Special publication,* 1991, No.3, Stable isotope geochemistry: a tribute to Samuel Epstein. Edited by H.P. Taylor, Jr., J.R. O'Neill, and I.R. Kaplan, p.205-209, 19 refs.

DLC QE501.4.N9S73 1991

Depth hoar, Snow recrystallization, Metamorphism (snow), Snow composition, Isotope analysis

49-3755

Isotopic changes during snow metamorphism.

Friedman, I., Benson, C., Gleason, J., *Geochemical Society. Special publication,* 1991, No.3, Stable isotope geochemistry: a tribute to Samuel Epstein. Edited by H.P. Taylor, Jr., J.R. O'Neill, and I.R. Kaplan, p.211-221, 20 refs.

DLC QE501.4.N9S73 1991

Metamorphism (snow), Depth hoar, Snow air interface, Snow permeability, Snow composition, Isotope analysis

49-3756

Glacial/interglacial temperature range of the surface water of the oceans at low latitudes.

Emiliani, C., Ericson, D.B., *Geochemical Society. Special publication,* 1991, No.3, Stable isotope geochemistry: a tribute to Samuel Epstein. Edited by H.P. Taylor, Jr., J.R. O'Neill, and I.R. Kaplan, p.223-228, 42 refs.

DLC QE501.4.N9S73 1991

Paleoclimatology, Pleistocene, Global change, Water temperature, Surface temperature, Marine atmospheres, Marine geology, Marine deposits, Bottom sediment, Drill core analysis, Isotope analysis

49-3757

Is the Postglacial artificial.

Emiliani, C., Price, D.A., Seipp, J., *Geochemical Society. Special publication,* 1991, No.3, Stable isotope geochemistry: a tribute to Samuel Epstein. Edited by H.P. Taylor, Jr., J.R. O'Neill, and I.R. Kaplan, p.229-231, 23 refs.

DLC QE501.4.N9S73 1991

Paleoclimatology, Ice age theory, Pleistocene, Global warming, Human factors, Forest fires, Marine deposits, Bottom sediment, Drill core analysis, Isotope analysis

49-3758

Correlation of onshore and offshore Quaternary in China. [Zhongguo hai lu disiji duibi yanjiu]

Liang, M.S., ed, Zhang, J.L., ed, Beijing, Science Press (Kexue chubanshe), 1991, 294p. + plates, In Chinese with English summary on the outside back cover. Refs. passim. Presented at the Symposium on Correlation of Onshore and Offshore Quaternary in China, Qingdao, Apr. 1990, and at and the 13th INQUA (International Union for Quaternary Research) Congress, Beijing, Aug. 2-9, 1991. For selected papers see 49-3759 through 49-3769.

DLC QE696.C554 1991 Orien China

Paleoclimatology, Pleistocene, Quaternary deposits, Marine deposits, Soil dating, Geochronology, Stratigraphy, Paleobotany, Global change, China

49-3759

Evolution of eastern shelf of China in Quaternary and its environmental consequences.

Yang, Z.G., Correlation of onshore and offshore Quaternary in China (Zhongguo hai lu disiji duibi yanjiu). Edited by M.S. Liang and J.L. Zhang, Beijing, Science Press (Kexue chubanshe), 1991, p.1-22, In Chinese with English summary. 35 refs.

Marine geology, Marine deposits, Sea level, Ocean currents, Quaternary deposits, Pleistocene, Geochronology, Stratigraphy, Paleoclimatology, China

49-3760

New progress in study of sedimentation model of China's shelf area.

Qin, Y.S., Zhao, S.L., Correlation of onshore and offshore Quaternary in China (Zhongguo hai lu disiji duibi yanjiu). Edited by M.S. Liang and J.L. Zhang, Beijing, Science Press (Kexue chubanshe), 1991, p.23-39, In Chinese with English summary. 36 refs.

Marine geology, Marine deposits, Bottom sediment, Quaternary deposits, Geochemistry, Deserts, Pleistocene, Geochronology, Paleoclimatology, China

49-3761

Late Pleistocene and the future rapid climatic and sea-level changes.

Yang, H.R., Correlation of onshore and offshore Quaternary in China (Zhongguo hai lu disiji duibi yanjiu). Edited by M.S. Liang and J.L. Zhang, Beijing, Science Press (Kexue chubanshe), 1991, p.40-49, In Chinese with English summary. 29 refs.

Marine geology, Marine deposits, Quaternary deposits, Sea level, Pleistocene, Geochronology, Paleoclimatology, Global warming, China

49-3762

Approach to the origin of loess in coast of east China and the desertization of Bohai Sea during glacial periods.

Li, P.Y., Xia, D.X., Liu, G.H., Correlation of onshore and offshore Quaternary in China (Zhongguo hai lu disiji duibi yanjiu). Edited by M.S. Liang and J.L. Zhang, Beijing, Science Press (Kexue chubanshe), 1991, p.50-60, In Chinese with English summary. 16 refs.

Marine deposits, Bottom sediment, Quaternary deposits, Loess, Deserts, Desiccation, Pleistocene, Paleoclimatology, China—Bohai Sea

49-3763

Study on Quaternary sporopollen, vegetational and climatic cycles in China.

Tong, G.B., et al, Correlation of onshore and offshore Quaternary in China (Zhongguo hai lu disiji duibi yanjiu). Edited by M.S. Liang and J.L. Zhang, Beijing, Science Press (Kexue chubanshe), 1991, p.150-164, In Chinese with English summary. 29 refs.

Quaternary deposits, Soil dating, Pollen, Paleobotany, Stratigraphy, Pleistocene, Geochronology, Global change, Paleoclimatology, China

49-3764

Dramatic changes in vegetation and climate since Late Pleistocene in eastern China.

Kong, Z.C., Du, N.Q., Correlation of onshore and offshore Quaternary in China (Zhongguo hai lu disiji duibi yanjiu). Edited by M.S. Liang and J.L. Zhang, Beijing, Science Press (Kexue chubanshe), 1991, p.165-172, In Chinese with English summary. 30 refs.

Quaternary deposits, Soil dating, Pollen, Paleobotany, Vegetation patterns, Pleistocene, Geochronology, Global change, Paleoclimatology, China

49-3765

Preliminary study on the relationship between century-long climatic fluctuations and celestial body movements during the recent 20 ka B.P. in China.

Lu, H.Y., Wang, Y.J., Wu, J.Q., Wang, J., Correlation of onshore and offshore Quaternary in China (Zhongguo hai lu disiji duibi yanjiu). Edited by M.S. Liang and J.L. Zhang, Beijing, Science Press (Kexue chubanshe), 1991, p.173-187, In Chinese with English summary. 20 refs.

Ice age theory, Global change, Paleoclimatology, China

49-3766

Vegetational and environmental changes of north Shandong plain in the past 30 ka B.P.

Xu, Q.H., et al, Correlation of onshore and offshore Quaternary in China (Zhongguo hai lu disiji duibi yanjiu). Edited by M.S. Liang and J.L. Zhang, Beijing, Science Press (Kexue chubanshe), 1991, p.188-199, In Chinese with English summary. 15 refs.

Quaternary deposits, Soil dating, Pollen, Paleobotany, Vegetation patterns, Stratigraphy, Paleoclimatology, China—Shandong Province

49-3767

Volcanic, glacial and periglacial processes on the Changbai Mountains.

Lu, J.F., Xiao, R.H., Correlation of onshore and offshore Quaternary in China (Zhongguo hai lu disiji duibi yanjiu). Edited by M.S. Liang and J.L. Zhang, Beijing, Science Press (Kexue chubanshe), 1991, p.200-207, In Chinese with English summary. 1 ref.

Volcanoes, Alpine glaciation, Periglacial processes, Alpine tundra, Pleistocene, Paleoclimatology, China—Jilin Province

49-3768

Classification of peat deposits in China and minerogenetic forecast.

Gao, F.Q., Correlation of onshore and offshore Quaternary in China (Zhongguo hai lu disiji duibi yanjiu). Edited by M.S. Liang and J.L. Zhang, Beijing, Science Press (Kexue chubanshe), 1991, p.208-216, In Chinese with English summary. 9 refs.

Peat, Soil surveys, Soil classification, Exploration, Natural resources, China

49-3769

Peat development and peatification periods since the later stage of Late Pleistocene in east China.

Li, H.D., Gao, F.Q., Correlation of onshore and offshore Quaternary in China (Zhongguo hai lu disiji duibi yanjiu). Edited by M.S. Liang and J.L. Zhang, Beijing, Science Press (Kexue chubanshe), 1991, p.217-223, In Chinese with English summary. 9 refs.

Peat, Soil dating, Soil formation, Pleistocene, Paleoclimatology, China

49-3770

On the generation of the Northeast Water Polynya.

Schneider, W., Budéus, G., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4269-4286, 22 refs.

Oceanographic surveys, Polynyas, Seasonal variations, Sea ice distribution, Hydrography, Ice water interface, Air ice water interaction, Surface temperature, Ice heat flux, Ice melting, Greenland Sea

49-3771

On the hydrography of the Northeast Water Polynya.

Budéus, G., Schneider, W., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4287-4299, 22 refs.

Oceanographic surveys, Polynyas, Ocean currents, Hydrography, Stratification, Water transport, Bottom topography, Topographic effects, Greenland Sea

49-3772

1992 summer circulation in the Northeast Water Polynya from acoustic Doppler current profiler measurements.

Johnson, M., Niebauer, H.J., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4301-4307, 13 refs.

Oceanographic surveys, Polynyas, Ocean currents, Hydrography, Underwater acoustics, Velocity measurement, Stratification, Fast ice, Ice cover effect, Bottom topography, Topographic effects, Greenland Sea

49-3773

Measurements of the summer surface heat budget of the Northeast Water Polynya in 1992.

Minnett, P.J., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4309-4322, 47 refs.

Oceanographic surveys, Polynyas, Surface temperature, Heat flux, Temperature measurement, Radiation balance, Solar radiation, Air water interactions, Sea ice distribution, Greenland Sea

49-3774

Nutrients, oxygen, and inferred new production in the Northeast Water Polynya, 1992.

Wallace, D.W.R., Minnett, P.J., Hopkins, T.S., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4323-4340, 34 refs.

Oceanographic surveys, Hydrography, Ocean currents, Polynyas, Marine biology, Biomass, Oxygen, Water chemistry, Nutrient cycle, Spaceborne photography, Ice cover effect, Greenland Sea

49-3775

Particulate matter and phytoplankton and bacterial biomass distributions in the Northeast Water Polynya during summer 1992.

Smith, W.O., Jr., Walsh, I.D., Booth, B.C., Deming, J.W., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4341-4356, 57 refs.

Oceanographic surveys, Polynyas, Marine biology, Sampling, Biomass, Plankton, Suspended sediments, Sea ice distribution, Ice cover effect, Ice water interface, Greenland Sea

49-3776

Primary productivity and new production in the Northeast Water (Greenland) Polynya during summer 1992.

Smith, W.O., Jr., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4357-4370, 51 refs.

Oceanographic surveys, Polynyas, Marine biology, Biomass, Ecology, Nutrient cycle, Suspended sediments, Sampling, Ice cover effect, Photosynthesis, Greenland Sea

49-3777

Northeast Water Polynya during summer 1992: distribution and aspects of secondary production of copepods.

Ashjian, C.J., Smith, S.L., Lane, P.V.Z., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4371-4388, 86 refs.

Oceanographic surveys, Marine biology, Biomass, Polynyas, Water transport, Ecology, Plankton, Classifications, Distribution, Greenland Sea

49-3778
Northeast Water Polynya as an atmospheric CO_2 sink: a seasonal rectification hypothesis.
Yager, P.L., Wallace, D.W.R., Johnson, K.M., Smith, W.O., Jr., Minnett, P.J., Deming, J.W., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4389-4398, 65 refs.
Oceanographic surveys, Climatic factors, Polynyas, Surface waters, Marine biology, Sampling, Biomass, Geochemical cycles, Carbon dioxide, Air water interactions, Seasonal variations, Ice cover effect, Greenland Sea

49-3779
Thorium-234/Uranium-238 disequilibrium as an indicator of scavenging rates and particulate organic carbon fluxes in the Northeast Water Polynya, Greenland.
Cochran, J.K., Barnes, C., Achman, D., Hirschberg, D.J., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4399-4410, 26 refs.
Oceanographic surveys, Polynyas, Marine biology, Sea water, Isotope analysis, Biomass, Geochemical cycles, Suspended sediments, Scavenging, Seasonal variations, Greenland Sea

49-3780
Benthic response to water column productivity patterns: evidence for benthic-pelagic coupling in the Northeast Water Polynya.
Ambrose, W.G., Jr., Renaud, P.E., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4411-4421, 57 refs.
Oceanographic surveys, Polynyas, Marine biology, Biomass, Sampling, Ecology, Ice cover effect, Nutrient cycle, Geochemical cycles, Greenland Sea

49-3781
Abundance of benthic calcareous foraminifera and other meiofauna at a time series station in the Northeast Water Polynya, Greenland.
Newton, A.C., Rowe, G.T., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4423-4438, 33 refs.
Oceanographic surveys, Polynyas, Marine biology, Biomass, Sampling, Distribution, Classifications, Ecology, Greenland Sea

49-3782
Influence of the St. Lawrence Island Polynya upon the Bering Sea benthos.
Grebmeier, J.M., Cooper, L.W., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4439-4460, 76 refs.
Oceanographic surveys, Polynyas, Marine biology, Ecology, Ocean bottom, Ocean currents, Biomass, Sampling, Nutrient cycle, Bering Sea

49-3783
Passage of a shallow front across a Beaufort Sea polynya.
Burk, S.D., Thompson, W.T., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4461-4472, 24 refs.
Fronts (meteorology), Wind direction, Polynyas, Synoptic meteorology, Marine meteorology, Atmospheric boundary layer, Turbulent diffusion, Heat flux, Air ice water interaction, Mathematical models, Beaufort Sea

49-3784
Method to estimate subpixel-scale coastal polynyas with satellite passive microwave data.
Markus, T., Burns, B.A., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4473-4487, 29 refs.
Spaceborne photography, Oceanographic surveys, Radiometry, Polynyas, Ice detection, Ice growth, Sea ice distribution, Synthetic aperture radar, Accuracy, Correlation, Simulation, Antarctica—Weddell Sea
This paper presents a method to estimate the open water area in subpixel-scale antarctic polynyas from passive microwave data. To quantify systematic errors, the method is applied to synthetic satellite images with known polynya geometry and brightness temperature statistics. In addition, a comparison with high-resolution synthetic aperture radar (SAR) and infrared data is carried out to determine the maximum ice thickness included in the area estimates and the influence of clouds on the results, especially because of the use of 85 GHz. To examine small changes in polynya area, the method is applied to a data time series and the results interpreted with the aid of a model which describes the development of wind-driven coastal polynyas. (Auth. mod.)

49-3785
Numerical study of dense water formation and transport on a shallow, sloping continental shelf.
Gawarkiewicz, G., Chapman, D.C., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4489-4507, 29 refs.
Oceanography, Ocean currents, Stability, Polynyas, Water transport, Buoyancy, Boundary layer, Friction, Mathematical models

49-3786
Topographic control of thermohaline frontal structure in the Barents Sea Polar Front on the south flank of Spitsbergen Bank.
Gawarkiewicz, G., Plueddemann, A.J., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4509-4524, 20 refs.
Oceanography, Ocean currents, Hydrography, Water transport, Topographic effects, Velocity measurement, Salinity, Water temperature, Mathematical models, Barents Sea

49-3787
Accuracy of sea ice temperature derived from the advanced very high resolution radiometer.
Yu, Y., Rothrock, D.A., Lindsay, R.W., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4525-4532, 24 refs.
Sea ice, Geophysical surveys, Ice temperature, Surface temperature, Temperature measurement, Remote sensing, Spacecraft, Radiometry, Snow cover effect, Correlation, Accuracy, Barents Sea, Chukchi Sea

49-3788
Arctic sea ice leads from advanced very high resolution radiometer images.
Lindsay, R.W., Rothrock, D.A., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4533-4544, 25 refs.
Sea ice distribution, Spaceborne photography, Radiometry, Ice openings, Ice floes, Surface properties, Detection, Image processing, Resolution, Climatology, Barents Sea

49-3789
Yield curves and flow rules of pack ice.
Ukita, J., Moritz, R.E., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4545-4557, 28 refs.
Sea ice, Ice models, Rheology, Pack ice, Ice mechanics, Ice deformation, Mechanical properties, Pressure ridges, Shear properties, Stress concentration, Sliding, Mathematical models

49-3790
Hierarchy and sea ice mechanics: a case study from the Beaufort Sea.
Overland, J.E., Walter, B.A., Curtin, T.B., Turet, P., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4559-4571, 27 refs.
Sea ice, Ice mechanics, Ice conditions, Surface structure, Classifications, Fractals, Aggregates, Ice models, Ice air interface, Beaufort Sea

49-3791
On treatments of fetch and stability sensitivity in large-area estimates of sensible heat flux over sea ice.
Maslanik, J.A., Key, J., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4573-4584, 33 refs.
Climatology, Oceanography, Marine meteorology, Sea ice distribution, Ice heat flux, Air ice water interaction, Ice openings, Turbulent boundary layer, Heat transfer coefficient, Analysis (mathematics)

49-3792
Comparison of satellite-derived and aircraft-measured regional surface sensible heat fluxes over the Beaufort Sea.
Walter, B.A., Overland, J.E., Turet, P., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4585-4591, 10 refs.
Geophysical surveys, Sea ice, Surface temperature, Ice heat flux, Radiometry, Spaceborne photography, Aerial surveys, Image processing, Correlation, Ice cover effect, Wind velocity, Beaufort Sea

49-3793
Ice pack and lead surface energy budgets during LEADEX 1992.
Ruffieux, D., Persson, P.O.G., Fairall, C.W., Wolfe, D.E., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4593-4612, 41 refs.
Sea ice, Ice surveys, Ice heat flux, Remote sensing, Surface energy, Ice openings, Pack ice, Atmospheric boundary layer, Air ice water interaction, Diurnal variations, Snow cover effect, Arctic Ocean

49-3794
Horizontally integrated atmospheric heat flux from an arctic lead.
Glendening, J.W., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4613-4620, 15 refs.
Marine meteorology, Ice openings, Air ice water interaction, Ice cover effect, Heat flux, Thermal diffusion, Air temperature, Stratification, Wind factors, Mathematical models

49-3795
Atmospheric convective plumes emanating from leads. 1. Thermodynamic structure.
Pinto, J.O., Curry, J.A., McInnes, K.L., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4621-4631, 21 refs.
Marine meteorology, Atmospheric boundary layer, Turbulent exchange, Heat flux, Convection, Ice openings, Air water interactions, Cloud cover, Models, Thermodynamics

49-3796
Atmospheric convective plumes emanating from leads. 2. Microphysical and radiative processes.
Pinto, J.O., Curry, J.A., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4633-4642, 27 refs.
Marine meteorology, Ice openings, Atmospheric boundary layer, Air water interactions, Convection, Turbulent exchange, Precipitation (meteorology), Cloud physics, Snow crystal growth, Radiation balance, Mathematical models

49-3797
Lead-induced atmospheric circulations.
Alam, A., Curry, J., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4643-4651, 32 refs.
Marine meteorology, Atmospheric circulation, Atmospheric boundary layer, Ice openings, Air water interactions, Heat flux, Turbulent exchange, Buoyancy, Mathematical models

49-3798
Numerical model of arctic leads.
Kantha, L.H., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4653-4672, 33 refs.
Oceanography, Sea ice, Ice openings, Air ice water interaction, Ice growth, Frazil ice, Regelation, Turbulent exchange, Convection, Mathematical models

49-3799
***In situ* experimental study of young sea ice formation on an antarctic lead.**
Mel'nikov, I., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4673-4680, 26 refs.
Marine biology, Biomass, Algae, Microbiology, Ice composition, Ice openings, Ice growth, Sampling, Ecology, Antarctica—Weddell Sea
A multidisciplinary study of the sea ice during the joint U.S.-Russian Expedition on Ice Station Weddell 1 (ISW 1) provided an excellent opportunity to examine ice dynamics, the microbiological community, and the nature and rates of biotic processes during initial ice formation and colonization of lead ice. This paper presents hourly, daily, and monthly observations of physical, chemical, and biological processes during the formation and growth of young sea ice in

austral autumn. These observations were taken in a region of perennial ice in the western Weddell Sea during the drift of ISW 1 from 72 to 65°S and 51 to 53°W. (Auth. mod.)

49-3800

Convection beneath freezing leads: new observations compared with numerical model results.

Muench, R.D., Smith, D.C., IV, Paulson, C.A., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4681-4692, 17 refs.

Oceanography, Ice openings, Ice formation, Ice water interface, Convection, Ocean currents, Water temperature, Salinity, Turbulent flow, Mathematical models, Beaufort Sea

49-3801

Probing the interior of arctic leads: investigations using high-frequency sound.

Pinkel, R., Merrifield, M., Ramm, H., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4693-4705, 13 refs.

Oceanographic surveys, Sea ice distribution, Ice openings, Acoustic measurement, Underwater acoustics, Backscattering, Wave propagation, Ice edge, Drift, Ice water interface, Ice cover effect, Ocean currents, Beaufort Sea

49-3802

Breakdown of line plumes in turbulent environments.

Ching, C.Y., Fernando, H.J.S., Robles, A., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4707-4713, 31 refs.

Oceanography, Ice openings, Simulation, Ocean currents, Sea water freezing, Buoyancy, Ice water interface, Turbulent flow, Convection, Fluid mechanics

49-3803

Note on seasonal cycles of temperature and salinity in the upper waters of the Greenland Sea Gyre from historical data.

Pawlowicz, R., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4715-4726, 33 refs.

Oceanography, Climatology, Ocean currents, Salinity, Surface temperature, Seasonal variations, Sea ice distribution, Ice water interface, Ice cover effect, Ice edge, Convection, Correlation, Greenland Sea

49-3804

Thermal evolution of the Greenland Sea Gyre in 1988-1989.

Pawlowicz, R., Lynch, J.F., Owens, W.B., Worcester, P.F., Morawitz, W.M.L., Sutton, P.J., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4727-4750, 60 refs.

Oceanography, Ocean currents, Water temperature, Thermal diffusion, Hydrography, Sea ice distribution, Ice formation, Ice cover effect, Ice water interface, Seasonal variations, Greenland Sea

49-3805

Numerical simulation of the sea ice cover in the northern Greenland Sea.

Holland, D.M., Ingram, R.G., Mysak, L.A., Oberhuber, J.M., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4751-4760, 14 refs.

Oceanography, Sea ice distribution, Climatic factors, Air ice water interaction, Ice models, Pack ice, Drift, Polynyas, Ice cover thickness, Ice cover strength, Stress concentration, Mathematical models, Ice forecasting, Greenland Sea

49-3806

Simulated internannual variability of the Greenland Sea deep water formation and its connection to surface forcing.

Häkkinen, S., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4761-4770, 29 refs.

Oceanography, Ocean currents, Stratification, Convection, Climatic factors, Air ice water interaction, Ice cover effect, Drift, Wind factors, Mathematical models, Greenland Sea

49-3807

Modeling of the Greenland, Iceland, and Norwegian Seas with a coupled sea ice-mixed layer-isopycnal ocean model.

Aukrust, T., Oberhuber, J.M., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4771-4789, 77 refs.

Oceanography, Ocean currents, Air ice water interaction, Ice cover effect, Sea ice distribution, Drift, Hydrography, Mathematical models, Climatic factors, Greenland Sea, Norwegian Sea, Iceland Sea

49-3808

Responses of climate and cyclones to reductions in arctic winter sea ice.

Murray, R.J., Simmonds, I., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4791-4806, 39 refs.

Climatology, Marine meteorology, Synoptic meteorology, Sea ice distribution, Ice cover effect, Ice air interface, Ice openings, Atmospheric circulation, Wind direction, Storms, Global warming, Simulation, Arctic Ocean

49-3809

Laser profiling of the ice surface topography during the Winter Weddell Gyre Study 1992.

Dierking, W., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4807-4820, 32 refs.

Sea ice distribution, Surface properties, Pressure ridges, Remote sensing, Lasers, Profiles, Topographic features, Ice air interface, Ice cover thickness, Wind factors, Surface roughness, Antarctica—Weddell Sea

As part of the Winter Weddell Gyre Study 1992, several surface elevation profiles were measured from R/V *Polarstern* using a helicopter as a remote sensing platform. The measurements covered the areas from 69 to 72°S and 0 to 20°W and from 59 to 66°S and 33 to 51°W. From the laser profiler data the statistical properties of the ice surface roughness in the Weddell Sea during austral winter were determined. In this paper the results are described, and the use of laser data in studies of ice accumulation and of atmospheric forcing on the pack ice is discussed. (Auth. mod.)

49-3810

Air-ice drag coefficients in the western Weddell Sea. 1. Values deduced from profile measurements.

Andreas, E.L., Claffey, K.J., MP 3595, *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4821-4831, 40 refs.

Sea ice, Ice air interface, Friction, Atmospheric pressure, Surface roughness, Topographic effects, Wind velocity, Profiles, Velocity measurement, Correlation, Snow cover effect, Turbulent boundary layer, Antarctica—Weddell Sea

From 197 hourly averaged, four-level wind-speed profiles collected on Ice Station Weddell (ISW) in Feb. and Mar. 1992, the authors compute the neutral stability, 10 m, air-drag coefficient, C_{DN10}. Values range from 1.3×10^{-3} to 2.5×10^{-3} for the multiyear ice floe that was ISW. Individual C_{DN10} values depend critically on how well the mean wind is aligned with the dominant snowdrift patterns. On ISW, 20% of the time there was drifting or blowing snow; when the wind speed at 5 m exceeded 8 m/s, such wind-driven snow was a virtual certainty. Consequently, the surface was continually changing, drifts were building and eroding. As the wind continued from a constant direction and the building drifts streamlined the surface, C_{DN10} could decrease by as much as 30% in 12 hours. If the wind direction then shifted by as little as 20°, C_{DN10} would immediately increase significantly. The implications are that snow-covered sea ice does not present an isotropic surface; it has a preferred direction dictated by the wind's history. Consequently, computing surface stress using an average value for C_{DN10} will produce errors of up to 30%. (Auth. mod.)

49-3811

Air-ice drag coefficients in the western Weddell Sea. 2. A model based on form drag and drifting snow.

Andreas, E.L., MP 3596, *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4833-4843, 32 refs.

Sea ice, Surface roughness, Ice air interface, Turbulent boundary layer, Pressure ridges, Friction, Snow cover effect, Drift, Stress concentration, Wind velocity, Topographic effects, Mathematical models, Antarctica—Weddell Sea

To investigate behavior of the neutral stability air-ice drag coefficient at a reference height of 10 m (C_{DN10}), the author adapts a model developed by Raupach (1992) that partitions the total surface stress into contributions from form drag and skin friction. An essential part of this development was extending Raupach's model to the more complex geometry of sastrugi-like roughness elements. Assuming that 10 cm high sastrugi cover 15% of the surface, this physically based model reproduces the three main observations listed above. Thus the model seems to include the basic physics of air-ice momentum exchange. The main conclusion from this modeling is that 10 cm, sastrugi-like snowdrifts, rather than pressure ridges, sustain most of the form drag over compact sea ice in the western Weddell Sea. Secondly, the model suggests that skin friction accounts for about 60% of the surface stress when the wind is well aligned with the sastrugi; but when the wind is not well aligned, form drag accounts for about 80% of the stress. The sastrugi are thus quite effective in streamlining the surface. (Auth. mod.)

49-3812

Simulations of the mesoscale circulation of the Greenland-Iceland-Norwegian Seas.

Heburn, G.W., Johnson, C.D., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.4921-4941, 38 refs.

Oceanography, Ocean currents, Water transport, Hydrodynamics, Stratification, Mathematical models, Air water interactions, Wind factors, Greenland Sea, Iceland Sea, Norwegian Sea

49-3813

Note on the evolution equations for the area fraction and the thickness of a floating ice cover.

Schulkes, R.M.S.M., *Journal of geophysical research,* Mar. 15, 1995, 100(C3), p.5021-5024, 5 refs.

Sea ice distribution, Ice cover thickness, Floating ice, Ice volume, Pressure ridges, Ice deformation, Ice mechanics, Mathematical models

49-3814

Digital photogrammetric modeling of mountainous terrain and snow cover distribution patterns.

Novakovskiĭ, B.A., Sapunov, V.N., Volkov, P.S., *Mapping sciences and remote sensing,* Apr.-June 1994, 31(2), p.147-156, Translated from Geomorfologia, 1993, No. 3. 11 refs.

Mountains, Photogrammetric surveys, Snow surveys, Imaging, Computer applications, Snowmelt, Snow cover distribution, Snow depth, Avalanche forecasting, Avalanche protection, Slope orientation, Geomorphology, Russia—Aykuayvenchorr, Mt.

49-3815

Ammonium uptake in alpine streams in the High Tatra Mountains (Slovakia).

Kopáček, J., Blažka, P., *Hydrobiologia,* Dec. 9, 1994, 294(2), p.157-165, 31 refs.

Limnology, Watersheds, Alpine landscapes, Streams, Water chemistry, Weathering, Chemical properties, Vegetation factors, Nutrient cycle, Sampling, Ecosystems, Slovakia

49-3816

International Russian-Finnish ecological expedition to the Pechora Sea, July 1993 (RV *Dal'nye Zelentsy*). [Mezhdunarodnaia rossiĭsko-finskaia ekologicheskaia ekspeditsiia v Pechorskoe more, iiul' 1993 g. (NIS "Dal'nye Zelentsy")]

Matishov, G.G., Apatity, Kol'skiĭ nauchnyĭ tsentr RAN, 1993, 24p., In Russian with English title page, summary and table of contents.

Ecology, Expeditions, Water pollution, Environmental impact, Hydrology, Plankton, Ocean bottom, Marine biology, Russia—Pechora Sea, Barents Sea

49-3817

Prediction of the frozen soil deformation by using the method of the temperature-time analogy by means of die.

Roman, L.R., Tsyrendorzhieva, M.D., *Moscow University. Geology bulletin,* 1994, 49(1), p.65-70, Translated from Vestnik Moskovskogo Universiteta. Geologiia. 6 refs.

Frozen ground mechanics, Frozen ground strength, Soil tests, Mechanical tests, Loading, Soil creep, Deformation, Viscoelasticity, Temperature effects

49-3818

Indentation and splitting of freshwater ice floes.
Sodhi, D.S., Chin, S.N., MP 3597, *Journal of offshore mechanics and arctic engineering,* Feb. 1995, 117(1), p.63-69, 16 refs. For another version see 47-3751.

Ice floes, Ice mechanics, Mechanical tests, Ice solid interface, Ice breaking, Ice strength, Cracking (fracturing), Impact tests, Crack propagation, Ice microstructure, Loads (forces)

Small-scale indentation and floe-splitting experiments were conducted on columnar ice floes of various sizes and at different speeds. During low-speed indentation, the ice floes always split apart, while at higher indentation speeds they did not. The reason is attributed to differences in the process of deformation and failure. At low speed, a large zone of microcracked ice forms in front of the indentor. Development of compressive stresses in the microcracked ice zone leads to buildup of transverse forces that drive crack propagation. These zones of microcracked ice are not observed during high-speed indentation. Rather, the ice fails by continuous crushing. The theoretical effective pressure required to split an ice floe, as predicted by Bhat (1988), agrees to some extent with those measured during experiments.

49-3819

Snow-ice cover boundaries of the earth in the past.
Zakharova, O.K., *Russian meteorology and hydrology,* 1993, No.10, p.20-26, Translated from Meteorologiia i gidrologiia. 13 refs.

Paleoclimatology, Climatic factors, Air temperature, Periodic variations, Snow cover distribution, Sea ice distribution, Ice age theory, Snow cover effect, Ice cover effect, Albedo, Heat balance

49-3820

Zonality of the cryolithic zone of Russia under anthropogenic climate change.
Anisimov, O.A., Nelson, F.E., *Russian meteorology and hydrology,* 1993, No.10, p.70-74, Translated from Meteorologiia i gidrologiia. 9 refs.

Geocryology, Freezing indexes, Climatic changes, Global warming, Permafrost distribution, Permafrost transformation, Thermal regime, Ground thawing, Russia

49-3821

Climate change impact on development of disastrous situations on mountain rivers.
Mukhin, V.M., *Russian meteorology and hydrology,* 1994, No.5, p.68-72, Translated from Meteorologiia i gidrologiia. 3 refs.

River basins, Snowmelt, Snow hydrology, Runoff forecasting, Hydrography, Climatic changes, Global warming, Precipitation (meteorology)

49-3822

Viable microorganisms in permafrost.
Gilichinskiĭ, D.A., ed, Pushchino, Pushchino Scientific Center, Institute of Soil Science and Photosynthesis, RAN, 1994, 115p., All papers were presented at the round table session "Cryoprotectors in soil biological systems and long-term preservation of viable microorganisms in permafrost," during the 1st International Conference on Cryopedology and Joint Russian-American Seminar on Cryopedology and Global Change, Nov. 1992, Pushchino, Russia (see 47-1699). For individual papers, see 49-3823 through 49-3831.

Cryobiology, Permafrost, Soil microbiology, Bacteria, Sediments, Russia—Siberia

49-3823

Microbial life in permafrost.
Gilichinskiĭ, D.A., Wagener, S., Viable microorganisms in permafrost. Edited by D. Gilichinskiĭ, Pushchino, Pushchino Scientific Center, Institute of Soil Science and Photosynthesis, RAN, 1994, p.7-20, Refs. p.18-20.

Cryobiology, Soil microbiology, Bacteria, Permafrost physics, Ice composition, Ice physics

49-3824

Permafrost as microbial habitat.
Friedmann, I., Viable microorganisms in permafrost. Edited by D. Gilichinskiĭ, Pushchino, Pushchino Scientific Center, Institute of Soil Science and Photosynthesis, RAN, 1994, p.21-26, 19 refs.

Cryobiology, Soil microbiology, Permafrost physics, Bacteria

An extremely long generation time, which slows down evolutionary processes, is the principal factor in the apparent absence of successful adaptations in cold terrestrial (permafrost and antarctic cryptoendolithic) environments. In both environments, the level of metabolic activity is low to very low. The net ecosystem productivity is so low that, as shown in the case of the antarctic cryptoendolithic community, it is measurable only on geological time scales. The ecology of permafrost and of antarctic cryptoendolithic communities, besides certain remarkable parallel features, show further fundamental differences. (Auth. mod.)

49-3825

Profiles of amonium, nitrite and nitrate in the permafrost soils.
Janssen, H., Bock, E., Viable microorganisms in permafrost. Edited by D. Gilichinskiĭ, Pushchino, Pushchino Scientific Center, Institute of Soil Science and Photosynthesis, RAN, 1994, p.27-36.

Permafrost, Soil microbiology, Cryobiology, Bacteria, Frozen ground chemistry, Russia—Yakutia, Russia—Indigirka River, Russia—Kolyma River, Russia—Chukoch'ya River, Russia—Alazeya River

49-3826

Preservation of microbial cell structures in the permafrost.
Soĭna, V.S., Vorob'eva, E.I., Viable microorganisms in permafrost. Edited by D. Gilichinskiĭ, Pushchino, Pushchino Scientific Center, Institute of Soil Science and Photosynthesis, RAN, 1994, p.37-48, 10 refs.

Permafrost, Cryobiology, Soil microbiology, Sediments, Bacteria, Fungi

49-3827

Cryobiological studies of ancient microorganisms isolated from the Siberian permafrost.
McGrath, J., Wagener, S., Gilichinskiĭ, D.A., Viable microorganisms in permafrost. Edited by D. Gilichinskiĭ, Pushchino, Pushchino Scientific Center, Institute of Soil Science and Photosynthesis, RAN, 1994, p.48-67, Refs. p.65-67.

Cryobiology, Soil microbiology, Permafrost, Russia—Siberia

Studies were conducted on viable microorganisms isolated from ancient Siberian permafrost soil. These microorganisms were probably frozen in conditions similar to those in Antarctica today. Light microscopy revealed that permafrost microbes produce gelatinous sheaths detected by electron microscopy that are consistent with similar structures in antarctic microbes. Cold adaptation associated with alterations in cellular fatty acid saturation is reported for the first time for Siberian permafrost microbes. Whole cell fatty acid analysis revealed an increase in mono-unsaturated fatty acid content and a decrease in saturated fatty acid content for cells grown at 4°C relative to those grown at 15°C. These results are in agreement with general patterns of cold adaptation in modern organisms, including microorganisms. (Auth. mod.)

49-3828

Sulfate-reducing bacterium from the permafrost.
Vaĭnshteĭn, M.B., Gogotova, G., Hippe, H., Viable microorganisms in permafrost. Edited by D. Gilichinskiĭ, Pushchino, Pushchino Scientific Center, Institute of Soil Science and Photosynthesis, RAN, 1994, p.68-74, 6 refs.

Bacteria, Cryobiology, Soil microbiology, Permafrost

49-3829

Nitrifying bacteria as a promising group for paleobiological investigations in the permafrost.
Lebedeva, E.V., Soĭna, V.S., Viable microorganisms in permafrost. Edited by D. Gilichinskiĭ, Pushchino, Pushchino Scientific Center, Institute of Soil Science and Photosynthesis, RAN, 1994, p.74-82, 11 refs.

Bacteria, Cryobiology, Soil microbiology, Permafrost, Sediments, Paleoecology, Tundra, Pleistocene, Russia—Siberia

49-3830

Recovery of DNA, denitrifiers and patterns of antibiotic sensitivity in microorganisms from ancient permafrost soils of Eastern Siberia.
Tiedje, J.M., Smith, G.B., Simkins, S., Holben, W.E., Finney, C., Gilichinskiĭ, D.A., Viable microorganisms in permafrost. Edited by D. Gilichinskiĭ, Pushchino, Pushchino Scientific Center, Institute of Soil Science and Photosynthesis, RAN, 1994, p.83-98, 19 refs.

Cryobiology, Soil microbiology, Bacteria, Tundra, Permafrost, Russia—Siberia, Russia—Kolyma River, Russia—Chukoch'ya River

49-3831

Evaluation of the biochemical activity of permafrost deposits during thawing: physiological and biochemical characteristics of some isolated microorganisms.
Vorob'eva, E.I., Soĭna, V.S., Viable microorganisms in permafrost. Edited by D. Gilichinskiĭ, Pushchino, Pushchino Scientific Center, Institute of Soil Science and Photosynthesis, RAN, 1994, p.99-115, 15 refs.

Cryobiology, Soil microbiology, Permafrost, Bacteria, Sediments, Tundra, Russia—Siberia, Russia—Kolyma River

49-3832

Diagnosing the imbalance of Yanamarey Glacier in the Cordillera Blanca of Peru.
Hastenrath, S., Ames, A., *Journal of geophysical research,* Mar. 20, 1995, 100(D3), p.5105-5112, 19 refs.

Glacier surveys, Glacier mass balance, Glacier oscillation, Mountain glaciers, Glacier flow, Velocity measurement, Topographic features, Climatic factors, Peru—Cordillera Blanca

49-3833

Global perspective of nitrate flux in ice cores.
Yang, Q.Z., et al, *Journal of geophysical research,* Mar. 20, 1995, 100(D3), p.5113-5121, 58 refs.

Ice sheets, Climatology, Ice cores, Sampling, Snow composition, Snow accumulation, Snow impurities, Ion density (concentration), Air pollution, Correlation, Greenland

49-3834

Assessment of the quality of TOVS retrievals obtained with the 3I algorithm for antarctic conditions.
Köpken, C., Heinemann, G., Chédin, A., Claud, C., Scott, N.A., *Journal of geophysical research,* Mar. 20, 1995, 100(D3), p.5143-5158, 41 refs.

Polar atmospheres, Air temperature, Water vapor, Sounding, Radiometry, Spacecraft, Correlation, Data processing, Accuracy, Antarctica—Weddell Sea

The quality of layer-mean temperatures and humidities retrieved with the improved initialization inversion (3I) algorithm from measurements of the TIROS operational vertical sounder (TOVS) radiometer was studied for two summer periods in 1987 and 1990 in the Weddell Sea region by means of collocations with radiosoundings, European Centre for Medium-Range Weather Forecasts (ECMWF) analyses and special sensor microwave/imager (SSM/I) retrievals. Appropriate corrections of the atmospheric transmission functions have been used for the two periods. Collocation statistics with radiosoundings for layer-mean temperatures based on 160 cases show very satisfying results. The standard deviation is very close to the deviations expected from collocation errors alone, but an overall negative bias of the retrieved temperatures is observed. Inconsistencies appear in the ability to register varying water vapor contents caused by weak signals under the very dry antarctic conditions. Comparisons of the total water vapor content to results based on SSM/I measurements show a good agreement between the two different instruments and retrieval methods. (Auth. mod.)

49-3835

Topographic enhancement of tidal motion in the western Barents Sea.
Kowalik, Z., Proshutinskiĭ, A.IU., *Journal of geophysical research,* Feb. 15, 1995, 100(C2), p.2613-2637, 34 refs.

Oceanography, Tidal currents, Topographic effects, Bottom topography, Diurnal variations, Sea level, Ice floes, Drift, Mathematical models, Barents Sea

49-3836

Statistical characterization of the geophysical and electrical properties of snow on landfast first-year sea ice.
Barber, D.G., Reddan, S.P., LeDrew, E.F., *Journal of geophysical research,* Feb. 15, 1995, 100(C2), p.2673-2686, 26 refs.

Sea ice, Fast ice, Snow cover, Snow ice interface, Snow morphology, Snow physics, Grain size, Snow electrical properties, Physical properties, Statistical analysis, Seasonal variations

49-3837

Accuracy of satellite altimeter elevations over the Greenland ice sheet.

Ekholm, S., Forsberg, R., Brozena, J.M., *Journal of geophysical research,* Feb. 15, 1995, 100(C2), p.2687-2696, 26 refs.

Ice sheets, Geophysical surveys, Remote sensing, Topographic surveys, Height finding, Profiles, Geodetic surveys, Aerial surveys, Radar echoes, Correlation, Accuracy, Greenland

49-3838

Transportation options in the Chukchi and Beaufort seas: on site oil tanker loadings or seabed pipelines.

Parker, W.B., Keith, V., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.1., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.22-25, 6 refs.

Petroleum transportation, Pipelines, Tanker ships, Marine transportation, Ice navigation, Oil spills, Environmental impact, Cost analysis, Chukchi Sea, Beaufort Sea

49-3839

Numerical dispersion studies of passive tracers in the Barents and Kara seas.

Harms, I.H., Backhaus, J.O., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.1., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.31-37, 10 refs.

Water pollution, Radioactive wastes, Oil spills, Ocean currents, Barents Sea, Russia—Kara Sea

49-3840

Effect of oil contamination on the behavior of an arctic offshore structure.

Evgin, E., Altaee, A., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.1., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.376-383, 9 refs.

Offshore structures, Artificial islands, Caissons, Earth fills, Oil spills, Soil pollution, Soil strength

49-3841

Marine transport of natural gas in hydrate form.

Berner, D., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.1., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.636-643, 14 refs.

Natural gas, Hydrates, Liquefied gases, Petroleum transportation, Marine transportation, Tanker ships

49-3842

Atmospheric climate changes and the stability of the in-situ methane hydrates in the Arctic.

Englezos, P., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.1., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.644-651, 32 refs.

Polar atmospheres, Atmospheric composition, Global warming, Soil air interface, Natural gas, Hydrates

49-3843

Natural gas hydrate resources of the Alaskan Arctic and their recovery potential.

Sharma, G.D., Kamath, V.A., Patil, S.L., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.1., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.652-659, 21 refs.

Natural gas, Hydrates, Gas production, Natural resources, Exploration, United States—Alaska—North Slope

49-3844

Detection development needs for gas hydrates in sediments.

Malone, R.D., Dillon, W., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.1., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.660-668, 14 refs.

Natural gas, Hydrates, Exploration, Seismic surveys, Offshore drilling, Well logging, Subsea permafrost, Bottom sediment, Geochemistry

49-3845

Gas hydrates in arctic regions: risk to drilling and production.

IAkushev, V.S., Collett, T.S., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.1., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.669-673, 21 refs.

Natural gas, Hydrates, Gas production, Exploration, Permafrost, Gas wells, Offshore drilling

49-3846

Hydrate control at Russian northern gas field.

Istomin, V.A., Kolushev, N.R., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.1., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.684-687, 10 refs.

Natural gas, Hydrates, Gas production, Exploration, Gas wells, Russia

49-3847

Water waves in variable depth under continuous sea ice.

Kirby, J.T., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.3., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.70-76, 19 refs.

Ice water interface, Ice cover effect, Ocean waves, Wave propagation, Mathematical models

49-3848

Development and actual testing results of paint for arctic waters.

Akamine, K., Matsuda, N., Takagaki, T., Hirai, Y., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.4., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.42-48, 5 refs. For another version in Japanese see 46-1463.

Protective coatings, Chemical ice prevention, Ice adhesion, Ice friction, Offshore structures, Ships

49-3849

Verification of Canadian Standards Association CSA S471 and S474 for frontier structures: an overview.

Cichanski, W.J., Allyn, N., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.4., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.68-73, 9 refs.

Offshore structures, Building codes, Standards, Ice solid interface, Ice loads, Ice control, Canada

49-3850

High-ductility, high-strength, ice resistant peripheral concrete wall study.

Berner, D.E., Sisodiya, R., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.4., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.74-81, 6 refs.

Offshore structures, Concrete structures, Concrete strength, Ice solid interface, Ice loads, Ice control

49-3851

Unique artificial steel/concrete islands in China.

Wu, Z.R., Zhao, A.R., Gao, X.L., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.4., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.88-92.

Artificial islands, Offshore structures, Concrete structures, Steel structures, Ice loads, Ice control, China—Bohai Sea

49-3852

Toughness required of frigid zone offshore structure steel plate 400 MPa in yield point and a newly developed heavy-thickness plate.

Yajima, H., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.4., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.116-121, 6 refs.

Offshore structures, Steel structures, Plates, Ice loads, Ice control

49-3853

Temperature dependent crack propagation in steel A537 at room and lower temperatures.

Fang, H.C., Duan, M.L., Zhao, Y., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.4., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.130-136, 10 refs.

Offshore structures, Steel structures, Frost resistance, Ice loads, Ice control, Cold stress, Crack propagation

49-3854

Energy problems in the arctic regions of Russia.

Pavlenko, V., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.4., Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.612-614.

Electric power, Nuclear power, Economic development, Regional planning, Russia

49-3855

Impacts of a destructive and well-observed cross-country winter storm.

Martner, B.E., Rauber, R.M., Rasmussen, R.M., Prater, E.T., Ramamurthy, M.K., *American Meteorological Society. Bulletin,* Feb. 1992, 73(2), p.169-172, 13 refs.

DLC QC851.A6 73 Jan.-June 1992

Snowstorms, Ice storms, Atmospheric disturbances, Cost analysis, Accidents, United States

49-3856

Late Pleistocene and Holocene sea-level change along the Australian coast.

Lambeck, K., Nakada, M., *Global and planetary change,* Oct. 1990, 3(1/2), p.143-176, 80 refs.

DLC QE1.G715 3-5 Oct.-Dec. 1990-91

Marine geology, Sea level, Glaciation, Isostasy, Shoreline modification, Pleistocene, Global change, Geochronology, Paleoclimatology, Australia

49-3857

Glacial-interglacial mean sea level pressure change due to sea level, ice sheet and atmospheric mass changes.

Mélières, M.A., Martinerie, P., Raynaud, D., Lliboutry, L.A., *Global and planetary change,* Dec. 1990, 3(3), p.333-340, 24 refs.

DLC QE1.G715 3-5 Oct.-Dec. 1990-91

Atmospheric pressure, Atmospheric density, Atmospheric composition, Air ice water interaction, Glaciation, Global change, Pleistocene, Paleoclimatology

49-3858

Carboniferous glaciation in Gondwana. Evidence for grounded marine ice and continental glaciation in southwestern Argentina.

González-Bonorino, G., *Palaeogeography, palaeoclimatology, palaeoecology,* Feb. 1992, 91(3/4), p.363-375, 42 refs.

DLC QE500.P25 91-93 Jan.-June 1992

Glaciation, Glacial deposits, Glacial geology, Marine deposits, Marine geology, Stratigraphy, Geochronology, Continental drift, Paleoclimatology, Argentina—Patagonia

49-3859

Ocean-atmosphere responses to climatic change in the Labrador Sea: Pleistocene plankton and pollen records.

Aksu, A.E., Mudie, P.J., De Vernal, A., Gillespie, H., *Palaeogeography, palaeoclimatology, palaeoecology,* Mar. 1992, 92(1/2), p.121-138, 52 refs.

DLC QE500.P25 91-93 Jan.-June 1992

Marine geology, Marine deposits, Bottom sediment, Plankton, Pollen, Fossils, Air water interactions, Pleistocene, Global change, Paleoclimatology, Labrador Sea

49-3860

[Proceedings].

United States/People's Republic of China Flood Forecasting Symposium/Workshop, Portland, OR, Mar. 29-Apr. 4, 1989, Washington, D.C., U.S. National Oceanic and Atmospheric Administration, National Weather Service, Office of Hydrology, [1992], 757p. (2 vols.), Refs. passim. For selected papers see 49-3861 through 49-3868.

DLC GB1399.2.U56 1989

Flood forecasting, Runoff forecasting, Stream flow, Snow surveys, Snow hydrology, Snowmelt, Precipitation (meteorology)

49-3861

Development and operation of the SNOTEL system in the western United States.

Schaefer, G.L., Johnson, D.E., United States/People's Republic of China Flood Forecasting Symposium/Workshop, Portland, OR, Mar. 29-Apr. 4, 1989. Vol.1, Washington, D.C., U.S. National Oceanic and Atmospheric Administration, National Weather Service, Office of Hydrology, [1992], p.29-48, 3 refs.

Snow surveys, Snow water equivalent, Snowmelt, Runoff forecasting, Weather stations, Meteorological data, Data transmission, Computer applications, Cost analysis, United States

49-3862

Modular watershed modeling and data management system.

Leavesley, G.H., Stannard, L.G., United States/People's Republic of China Flood Forecasting Symposium/Workshop, Portland, OR, Mar. 29-Apr. 4, 1989. Vol.1, Washington, D.C., U.S. National Oceanic and Atmospheric Administration, National Weather Service, Office of Hydrology, [1992], p.71-95, 32 refs.

Watersheds, Snow hydrology, Snow water equivalent, Snowmelt, Runoff forecasting, Flood forecasting, Precipitation (meteorology), Data processing, Computerized simulation

49-3863

Dependence of seasonal precipitation and runoff volumes in the Pacific Northwest on an index of the El Niño Southern Oscillation.

Koch, R.W., United States/People's Republic of China Flood Forecasting Symposium/Workshop, Portland, OR, Mar. 29-Apr. 4, 1989. Vol.1, Washington, D.C., U.S. National Oceanic and Atmospheric Administration, National Weather Service, Office of Hydrology, [1992], p.129-145, 12 refs.

Atmospheric circulation, Precipitation (meteorology), Snow hydrology, Snowmelt, Runoff forecasting, Stream flow, United States

49-3864

Automated data acquisition techniques for forecasting Pacific Northwest rivers.

Pasteris, P.A., Hartman, R.K., United States/People's Republic of China Flood Forecasting Symposium/Workshop, Portland, OR, Mar. 29-Apr. 4, 1989. Vol.1, Washington, D.C., U.S. National Oceanic and Atmospheric Administration, National Weather Service, Office of Hydrology, [1992], p.161-179, 11 refs.

Precipitation (meteorology), Snow surveys, Snow hydrology, Snowmelt, Runoff forecasting, Stream flow, Data transmission, Computerized simulation, United States

49-3865

Water supply forecasting.

Jones, K.C., Shafer, B.A., United States/People's Republic of China Flood Forecasting Symposium/Workshop, Portland, OR, Mar. 29-Apr. 4, 1989. Vol.2, Washington, D.C., U.S. National Oceanic and Atmospheric Administration, National Weather Service, Office of Hydrology, [1992], p.485-492, 10 refs.

Snow surveys, Snow hydrology, Snowmelt, Runoff forecasting, Stream flow, United States

49-3866

Forecasting for flood control operations in the Columbia River.

Speers, D.D., United States/People's Republic of China Flood Forecasting Symposium/Workshop, Portland, OR, Mar. 29-Apr. 4, 1989. Vol.2, Washington, D.C., U.S. National Oceanic and Atmospheric Administration, National Weather Service, Office of Hydrology, [1992], p.517-531, 4 refs.

Snow hydrology, Snowmelt, Runoff forecasting, Flood forecasting, Flood control

49-3867

Design and implementation of an automated centralized forecasting system (CFS).

Shafer, B.A., United States/People's Republic of China Flood Forecasting Symposium/Workshop, Portland, OR, Mar. 29-Apr. 4, 1989. Vol.2, Washington, D.C., U.S. National Oceanic and Atmospheric Administration, National Weather Service, Office of Hydrology, [1992], p.591-615.

Snow surveys, Snow hydrology, Snowmelt, Runoff forecasting, Stream flow, Computerized simulation

49-3868

Ice forecasting and regulation of Sanmenxia Reservoir for ice prevention on the Yellow River.

Chen, Z.T., United States/People's Republic of China Flood Forecasting Symposium/Workshop, Portland, OR, Mar. 29-Apr. 4, 1989. Vol.2, Washington, D.C., U.S. National Oceanic and Atmospheric Administration, National Weather Service, Office of Hydrology, [1992], p.709-726, 5 refs.

Reservoirs, River ice, Freezeup, Ice breakup, Ice jams, Ice forecasting, Ice control, China—Yellow River

49-3869

Two- and three dimensional evolution of granular avalanche flow—theory and experiments revisited.

Hutter, K., *Acta mechanica. Supplementum,* 1991, Vol.1, Aeolian grain transport 1: mechanics, p.167-181, 22 refs.

DLC GB611.A36 1991 Vol.1

Avalanche mechanics, Avalanche modeling, Mathematical models

49-3870

History of snow disasters in Japan. [Nihon no setsugaishi], Niigata, Japan, Nihon sekisetsu rengo (Japan Snow Association), 1981, 283p., In Japanese. Refs. p.267-276.

DLC QC929.S7N5 1981 Orien Japan

Snowstorms, Avalanches, Floods, Accidents, History, Japan

49-3871

Influence of the hydrologic cycle on the extent of sea ice with climatic implications.

Dean, K.G., Gosink, J., *U.S. National Aeronautics and Space Administration. Contractor report,* Aug. 1991, NASA-CR-188716, 14p. + appends., N91-30607.

Sea ice distribution, Air ice water interaction, Fast ice, Ice melting, Hydrologic cycle, Deltas, River flow, Canada—Northwest Territories—Mackenzie River Delta

49-3872

Talk on avalanches. [Nadare no hanashi]

Shoda, M., *Tetsudo doboku (Railway civil engineering),* 1969, 11(6), p.369-373, In Japanese. 1 ref.

Avalanches, Avalanche forecasting, Snow cover stability, Accidents, Japan

49-3873

Road snow melting by low temperature water. [Teion mizu ni yoru doro no shosetsu]

Saito, H., *Nihon sekisetsu rengo shiryo (Japan Snow Association, Niigata. Publications),* June 1969, No.100, 11p., In Japanese.

Snow removal, Snow melting, Artificial melting, Road maintenance

49-3874

Antifreezes used as road snow and ice countermeasures. [Toketsu boshi yakuhin o shiyo shita doro no seppyo taisaku]

Saito, H., *Nihon sekisetsu rengo shiryo (Japan Snow Association, Niigata. Publications),* June 1969, No.99, 16p., In Japanese.

Road icing, Chemical ice prevention, Antifreezes, Road maintenance

49-3875

Snow melting methods on feed crop lands. [Shiryo sakuchi no shosetsuho]

Onuma, M., *Nihon sekisetsu rengo shiryo (Japan Snow Association, Niigata. Publications),* June 1969, No.98, 7p., In Japanese.

Agriculture, Snow cover effect, Snow removal, Snow melting, Artificial melting

49-3876

Microclimates affecting crops under a snow cover. [Sekisetsuka no sakumotsu ni taisuru bikiko]

Onuma, M., *Nihon sekisetsu rengo shiryo (Japan Snow Association, Niigata. Publications),* June 1969, No.95, 9p., In Japanese. 47 refs.

Snow cover effect, Snow thermal properties, Microclimatology, Agriculture, Plant physiology

49-3877

Current status and future prospects of roof snow management. [Yane yuki shori no genjo to shorai]

Saito, H., *Nihon sekisetsu rengo shiryo (Japan Snow Association, Niigata. Publications),* Mar. 1969, No.94, 8p., In Japanese.

Roofs, Snow removal, Snow melting, Artificial melting, Japan

49-3878

Studies on roof snow management (1st report). [Yane yuki shori ni kansuru kenkyu (dai ichi ho)]

Kimura, T., Shimizu, M., *Nihon sekisetsu rengo shiryo (Japan Snow Association, Niigata. Publications),* Mar. 1969, No.94, 26p., In Japanese. 8 refs.

Roofs, Snow removal, Snow melting, Artificial melting, Japan

49-3879

What about the De Geer moraines. [Mitä ovat De Geer-moreenit]

Hellemaa, P., *Terra,* 1994, 106(4), p.384-389, In Finnish. 28 refs.

Moraines, Glacial deposits, Glacier oscillation, Glacial geology, Geomorphology, Finland

49-3880

Model for deuterium and oxygen 18 isotope changes during evergreen interception of snowfall.

Claassen, H.C., Downey, J.S., *Water resources research,* Mar. 1995, 31(3), p.601-618, 44 refs.

Snowfall, Forest canopy, Interception, Snow physics, Snow composition, Snow temperature, Isotope analysis, Snow air interface, Vapor diffusion, Sublimation, Mathematical models, Water balance

49-3881

Century/millennium internal climate oscillations in an ocean-atmosphere-continental ice sheet model.

Birchfield, E.G., Wang, H.X., Rich, J.J., *Journal of geophysical research,* June 15, 1994, 99(C6), p.12,459-12,470, 53 refs.

Paleoclimatology, Climatic factors, Air ice water interaction, Ice sheets, Glacier oscillation, Meltwater, Ocean currents, Salinity, Hydrologic cycle, Thermodynamics, Simulation

49-3882

Atmospheric aerosol loading and transport due to the 1783-84 Laki eruption in Iceland, interpreted from ash particles and acidity in the GISP2 ice core.

Fiacco, R.J., Jr., et al, *Quaternary research,* Nov. 1994, 42(3), p.231-240, 67 refs.

Ice sheets, Ice cores, Ice dating, Stratigraphy, Volcanic ash, Aerosols, Chemical properties, Climatic factors, Climatic changes, Air temperature, Atmospheric composition, Greenland

49-3883

Comments on "Debris-covered glaciers in the Sierra Nevada, California, and their implications for snowline reconstruction," by D.H. Clark, M.M. Clark, and A.R. Gillespie.

Jakob, M., Clark, D.H., Gillespie, A.R., Clark, M.M., *Quaternary research,* Nov. 1994, 42(3), p.356-362, 55 refs. Includes reply. For paper under discussion see 48-5062.

Periglacial processes, Pleistocene, Geocryology, Rock glaciers, Snow line, Glacial geology, Alpine glaciation, Discontinuous permafrost, Geomorphology, United States—California—Sierra Nevada

49-3884

Limit cycles in the basal thermal regime of ice sheets.

Payne, A.J., *Journal of geophysical research,* Mar. 10, 1995, 100(B3), p.4249-4263, 40 refs.

Pleistocene, Ice age theory, Glacial geology, Glacier oscillation, Ice sheets, Periodic variations, Thermodynamics, Thermal regime, Ice solid interface, Ice heat flux, Mathematical models

49-3885

Characteristics of temperature depressions associated with snow cover across the northeast United States.

Leathers, D.J., Ellis, A.W., Robinson, D.A., *Journal of applied meteorology,* Feb. 1995, 34(2), p.381-390, 27 refs.

Climatology, Atmospheric boundary layer, Air temperature, Temperature variations, Seasonal variations, Snow cover effect, Snow air interface, Correlation, Heat flux, United States

49-3886

Rain-rate estimation in the presence of hail using S-band specific differential phase and other radar parameters.

Aydin, K., Bringi, V.N., Liu, L., *Journal of applied meteorology,* Feb. 1995, 34(2), p.404-410, 24 refs.

Precipitation (meteorology), Rain, Remote sensing, Cloud physics, Hail, Detection, Radar echoes, Attenuation, Forecasting

49-3887

Mobile microwave radiometer observations: spatial characteristics of supercooled cloud water and cloud seeding implications.

Huggins, A.W., *Journal of applied meteorology,* Feb. 1995, 34(2), p.432-446, 22 refs.

Precipitation (meteorology), Clouds (meteorology), Cloud physics, Cloud seeding, Radiometry, Supercooled clouds, Water content, Moisture transfer, Topographic effects, Portable equipment

49-3888

Considerations for modeling thin cirrus effects via brightness temperature differences.

Schmidt, E.O., Arduini, R.F., Wielicki, B.A., Stone, R.S., Tsay, S.C., *Journal of applied meteorology,* Feb. 1995, 34(2), p.447-459, 33 refs.

Clouds (meteorology), Cloud physics, Remote sensing, Radiometry, Light scattering, Optical properties, Brightness, Ice crystal optics, Ice crystal size, Particle size distribution, Simulation

49-3889

Removal of the solar component in AVHRR 3.7-µm radiances for the retrieval of cirrus cloud parameters.

Rao, N.X., Ou, S.C., Liou, K.N., *Journal of applied meteorology,* Feb. 1995, 34(2), p.482-499, 32 refs.

Cloud physics, Temperature measurement, Radiance, Light scattering, Optical properties, Ice crystal optics, Ice crystal size, Radiometry, Radiation absorption, Analysis (mathematics)

49-3890

Influence of forests on atmospheric heating during the snowmelt season.

Yamazaki, T., *Journal of applied meteorology,* Feb. 1995, 34(2), p.511-519, 15 refs.

Climatology, Air temperature, Heating, Heat flux, Forest canopy, Vegetation factors, Snow surface temperature, Snow thermal properties, Mathematical models, Japan

49-3891

Ice formation in the system $NaCl$-$MgCl_2$-H_2O.

Vaserman, L.Z., Titova, G.I., *Russian journal of applied chemistry,* Aug. 20, 1994, 67(3)pt.1, p.324-326, Translated from Zhurnal prikladnoĭ khimiĭ. 4 refs.

Solutions, Ice physics, Ice water interface, Ice formation, Freezing points, Isotherms, Chemical composition, Forecasting, Analysis (mathematics)

49-3892

Heat, momentum and moisture budgets of the katabatic layer over the melting zone of the West Greenland ice sheet in summer.

Van den Broeke, M.R., Duynkerke, P.G., Henneken, E.A.C., *Boundary-layer meteorology,* Dec. 1994, 71(4), p.393-413, 40 refs.

Ice sheets, Glacial meteorology, Wind (meteorology), Turbulent boundary layer, Stratification, Ice air interface, Ice cover effect, Gravity waves, Surface energy, Ice melting, Moisture transfer, Evaporation, Mathematical models, Greenland

49-3893

Nonlinear interaction of surface waves in a basin covered with broken ice.

Bukatov, A.E., *Fluid dynamics,* Jan. 1995, 29(4), p.549-555, Translated from Rossiĭskaia akademiia nauk. Izvestiia. Mekhanika zhidkosti i gaza. 16 refs.

Sea ice, Pack ice, Ice water interface, Elastic waves, Wave propagation, Ice cover effect, Ice cover thickness, Mathematical models, Fluid dynamics

49-3894

Norway may open new areas; Barents Sea rules may change. *Oil & gas journal,* Mar. 28, 1994, 92(13), p.33.

Petroleum industry, Exploration, Offshore drilling, Legislation, Barents Sea

49-3895

One-dimensional ecological model of summer oxygen distributions within the Chukchi Sea.

Penta, B., Walsh, J.J., *Continental shelf research,* Feb.-Mar. 1995, 15(2-3), p.337-356, 43 refs.

Marine biology, Plankton, Biomass, Nutrient cycle, Water chemistry, Oxygen, Surface waters, Ice cover effect, Mathematical models, Ecology, Chukchi Sea

49-3896

Impact of enhanced ultraviolet-B radiation on litter quality and decomposition processes in *Vaccinium* leaves from the subarctic.

Gehrke, C., Johanson, U., Callaghan, T.V., Chadwick, D., Robinson, C.H., *Oikos,* Mar. 1995, 72(2), p.213-222, 37 refs.

Plant ecology, Subarctic landscapes, Ultraviolet radiation, Plant tissues, Biomass, Decomposition, Soil tests, Organic soils, Soil microbiology, Soil air interface, Atmospheric attenuation, Simulation, Light effects, Sweden

49-3897

Footprint/altitude ratio for helicopter electromagnetic sounding of sea-ice thickness: comparison of theoretical and field estimates.

Kovacs, A., Holladay, J.S., Bergeron, C.J., Jr., MP 3598, *Geophysics,* Mar.-Apr. 1995, 60(2), p.374-380, 10 refs.

Sea ice, Ice cover thickness, Geophysical surveys, Aerial surveys, Remote sensing, Magnetometers, Sounding, Electromagnetic properties, Accuracy, Ice water interface, Design

Helicopter-towed electromagnetic (HEM) induction sounding systems are typically used for geologic surveys. More recently, HEM systems have been used for the remote measurement of sea-ice thickness and shallow sea bathymetry. An important aspect of this remote sensing technology is the area, or footprint, in which the secondary field is predominantly generated by induced currents. A knowledge of the size of the footprint is important to understanding the accuracy of HEM sounding results over lateral variations in relief or conductivity. The view that the footprint diameter is a few times the HEM antenna altitude is confirmed using airborne measurements over sea ice to calculate the footprint size/antenna altitude ratio. These findings are compared to various theoretical estimates and are found to be in reasonable agreement. For a vertical coaxial coil antenna arrangement, the apparent footprint diameter was found to be about 1.3 times the antenna height above the sea-ice/water interface, and for a horizontal coplanar coil configuration the ratio is about 3.8 times the antenna height.

49-3898

Late Quaternary stratigraphy and soils of Gydan, Yamal and Taz Peninsulas, northwestern Siberia.

Mahaney, W.C., Michel, F.A., Solomatin, V.I., Hütt, G., *Palaeogeography, palaeoclimatology, palaeoecology,* Feb. 1995, 113(2-4), p.249-266, 31 refs.

Pleistocene, Paleoclimatology, Arctic landscapes, Geocryology, Soil formation, Ground ice, Ice composition, Stratigraphy, Ice dating, Geochronology, Russia—Siberia

49-3899

Late Quaternary vegetation history of the central Mackenzie Mountains, Northwest Territories, Canada.

Szeicz, J.M., MacDonald, G.M., Duk-Rodkin, A., *Palaeogeography, palaeoclimatology, palaeoecology,* Feb. 1995, 113(2-4), p.351-371, 50 refs.

Paleoecology, Quaternary deposits, Lacustrine deposits, Forest tundra, Vegetation patterns, Forest lines, Radioactive age determination, Stratigraphy, Palynology, Glacier oscillation, Canada—Northwest Territories—Mackenzie Mountains

49-3900

Further evidence of marine organic matter transport in antarctic snow via air-sea exchange.

Cini, R., Degli Innocenti, N., Loglio, G., Stortini, A.M., Tesei, U., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.45, Bologna, Italian Physical Society, 1994, p.193-206, 9 refs.

Aerosols, Snow impurities, Snow air interface, Atmospheric composition, Antarctica—Terra Nova Bay Station, Antarctica—Melbourne, Mount

A comparison of marine aerosol components concentration in different antarctic snow samples is reported. Further evidence of biogenic fluorescent matter associated with marine aerosol transport is given. The marine humic nature of examined organic matter is confirmed by IR-FT analysis. The variation of the ratio between the HS concentration (humic substances) and Cl-concentrations, for coastal snow samples taken at different height above the sea, is discussed in terms of the selected dimensional distribution with height during the transport events, according to the models of McIntyre and Blanchard on aerosol formation. (Auth.)

49-3901

Continuous trans-Atlantic and Pacific meteorological and climatic measurements in both hemispheres.

Lenaz, R., Anav, A., Bonasoni, P., Giovanelli, G., Gasparotto, G., Gasperini, L., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.45, Bologna, Italian Physical Society, 1994, p.207-215, 19 refs.

Ozone, Atmospheric composition, Particles, Meteorological data, Climatic factors, Solar radiation

Data of tropospheric trace gases and airborne particles, recorded during the 5th Italian Antarctic Expedition in 1990-91 aboard the R/V *OGS Explora*, enabled the authors to calculate the life span of ozone and to compare patterns in both hemispheres. The qualitative and quantitative composition of airborne particles was determined. A comparison of the latitude trends of several meteorological parameters and solar radiation is also presented. Extending these measurements beyond the antarctic circle should enable the distribution of ozone and other trace gases near the antarctic continent to be measured in order to determine the accuracy of the concentration patterns for surface ozone distribution generated by models. At the same time, the sampling of atmospheric particles should further elucidate airborne transport phenomena via the circumantarctic belt and the amount of remote wind-borne supply to antarctic marine sediments. (Auth. mod.)

49-3902

Detection of clouds over polar oceans from AVHRR daylight images.

Zibordi, G., Van Woert, M.L., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.45, Bologna, Italian Physical Society, 1994, p.217-223, 18 refs.

Spaceborne photography, Meteorological data, Radiometry, Clouds (meteorology), Photointerpretation, Marine meteorology

A cloud detection scheme based on Advanced Very High Resolution Radiometer (AVHRR) data from the National Oceanic and Atmospheric Administration (NOAA) polar orbiting satellites has been developed and applied to daylight images taken over arctic and antarctic seas. After masking the continent and ice shelves, clouds are discriminated from sea ice and open sea using thresholds applied to the multidimensional space formed by AVHRR channels 2, 3 and 4 radiances. Results based on the analysis of more than 75 images show that the proposed scheme is capable of properly discriminating clouds from sea ice and open sea under most conditions. (Auth.)

49-3903

Infrared radiometer for ozone column density measurements.

Dall'Oglio, G., Dalu, G., Pietranera, L., Pizzo, L., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.45, Bologna, Italian Physical Society, 1994, p.243-250, 6 refs.

Ozone, Meteorological instruments, Measuring instruments, Infrared equipment

The authors describe a feasibility study for measurements in the 8-12 μm region of ozone integrated column amount. Preliminary data show the feasibility of this kind of measuring technique. A particularly favorable application could be ozone monitoring during the antarctic winter and early spring. An infrared instrument in such conditions should achieve its best performance due to the low level of water vapor in the atmosphere. (Auth. mod.)

49-3904

Preliminary results for the interactive formation and growth of sulfate, NAT and ice particles in a photochemical 2D model.

Pitari, G., Ricciardulli, L., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.45, Bologna, Italian Physical Society, 1994, p.259-282, Refs. p.280-282.

Aerosols, Atmospheric composition, Polar stratospheric clouds, Stratosphere, Ice formation, Clouds (meteorology), Models

The authors present a comprehensive study of sulfur, aerosol and polar stratospheric clouds (PSC) in a photochemical two-dimensional (2D) model where full interaction is allowed between gases and particles. A rather simple scheme is described for nucleation and condensation processes leading to the formation and growth of NAT and ice particles, still using grid point temperature data taken from the zonally averaged climatology of the lower stratosphere. Model results for the aerosol size distribution and for the available surface densities appear reasonable when compared to satellite and balloon measurements and to independent numerical calculations. Data for the Southern Hemisphere to 90°S are included. (Auth. mod.)

49-3905

Ozone and aerosols lidar measurements in 1991 and 1992 in Dumont d'Urville.

Godin, S., David, C., Stefanutti, L., Del Guasta, M., Morandi, M., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.45, Bologna, Italian Physical Society, 1994, p.283-294, 7 refs.

Ozone, Aerosols, Lidar, Stratosphere, Clouds (meteorology), Antarctica—Dumont d'Urville Station

In the beginning of 1991, a new lidar system intended to measure both aerosols and ozone profile was installed at Dumont d'Urville Station, the ozone measurements being performed according to the DIAL method. The results after 18 months of operation of the system, concerning stratospheric ozone and aerosols on this particular site located at the edge of the polar vortex, are presented here, with special attention given to the winter and spring periods, characterized by the appearance of polar stratospheric clouds and depleted ozone levels. The description of the evolution of the stratosphere during these periods is completed by comparison with other routine measurements performed at Dumont d'Urville, such as ECC ozonesonde profiles and total ozone content obtained with SAOZ UV-Visible spectrometer measurements, in connection with the eruptions of Mount Pinatubo and Mount Hudson. (Auth. mod.)

49-3906

Multiwavelength and depolarization stratospheric lidar measurements: a procedure to determine optical parameters and particle size distribution.

Morandi, M., Del Guasta, M., Matthey, R., Sacco, V.M., Stefanutti, L., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.45, Bologna, Italian Physical Society, 1994, p.295-315, 8 refs.

Aerosols, Stratosphere, Atmospheric composition, Lidar, Ozone, Antarctica—Dumont d'Urville Station

A method to derive particle size and optical parameters of stratospheric aerosol by means of a multiwavelength depolarization lidar is described. The method has been applied to a lidar system operating during the European Arctic Stratospheric Ozone Experiment (EASOE) in Sodankylä in northern Finland, in a cooperation among the Freie Universität Berlin, SA-CNRS, Observatoire Cantonal Neuchatel, Università de' Aquila and IROE-CNR. The evaluated Pinatubo particle sizing has been used for the aerosol correction necessary to retrieve ozone vertical distribution from the lidar signal measured at Dumont d'Urville Station. (Auth. mod.)

49-3907

1992 late winter observations of polar stratospheric clouds and middle atmosphere temperatures at McMurdo Station, Antarctica.

Di Donfrancesco, G., Adriani, A., Gobbi, G.P., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.45, Bologna, Italian Physical Society, 1994, p.317-321, 6 refs.

Stratosphere, Clouds (meteorology), Polar stratospheric clouds, Ozone, Air temperature, Climatic factors, Antarctica—McMurdo Station

Late winter studies of polar stratospheric clouds (PSCs) have been in progress since 1990 at McMurdo Station. Middle atmosphere temperatures have been measured by lidar since 1991. In 1992, PSCs were detected in two major events, on Aug. 26 and Sep. 9. These and stratospheric temperature observations are summarized in this paper, with a general overview of the meteorological and climatic context in which the phenomena took place. (Auth.)

49-3908

EASOE measurements of O_3, NO_2 and OClO total columns by UV-Vis spectrometer at Åre-Ostersund.

Giovanelli, G., Bonasoni, P., Evangelisti, F., Ravegnani, F., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.45, Bologna, Italian Physical Society, 1994, p.323-332, 10 refs.

Stratosphere, Ozone, Measuring instruments, Ultraviolet radiation, Sweden

49-3909

Use of Brewer #035 and #050 in Antarctica.

Anav, A., Ciattaglia, L., Guerrini, A., Valenti, C., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.45, Bologna, Italian Physical Society, 1994, p.333-338.

Measuring instruments, Meteorological instruments, Ozone, Antarctica—Scott Base, Antarctica—Belgrano II Station, Antarctica—Marambio Station

Ozone measurements carried out at the Scott Base and Belgrano II and Marambio stations with Brewer and Dobson instruments in 1989, 1990 and 1992 are discussed. The data are presented in figures.

49-3910

Southern ozone hole and auroral activity.

Marcucci, F., Candidi, M., Orsini, S., Storini, M., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.45, Bologna, Italian Physical Society, 1994, p.341-350, 16 refs.

Ozone, Meteorological data, Geomagnetism

The ozone daily average total content maps obtained for the years 1980-1985 (Aug. to Nov.) by the TOMS instrument on Nimbus-7, as available from the NASA Climate Data System at NSSDC, are correlated with the AE index time series. Possible auroral influences on the dynamics of the Southern Hemisphere ozone hole are investigated. The value of the correlation coefficient and the distribution of experimental points in the scatter plots show that auroral activity is a factor in the decrease of polar ozone, even if it is not the main contributor to such dynamics. Possible mechanisms for the interaction are discussed. (Auth.)

49-3911

Regional and seasonal variability in the vertical distribution of mesozooplankton in the Greenland Sea.

Richter, C., *Berichte zur Polarforschung*, 1994, No.154, 87p. + 3p. appends., Refs. p.81-87.

Biomass, Plankton, Ecology, Marine biology, Ocean currents, Greenland Sea

49-3912

Adjoint model for the determination of the mean oceanic circulation, air-sea fluxes and mixing coefficients. [Bestimmung von mittlerer ozeanischer Zirkulation, Oberflächenflüssen und Mischungskoeffizienten mittels der Adjungierten Methode]

Schlitzer, R., *Berichte zur Polarforschung*, 1995, No.156, 103p., With German summary. 54 refs.

Sea water, Water temperature, Salinity, Ocean currents, Models, Hydrography, Atlantic Ocean, Antarctica—Weddell Sea

The adjoint method has been successfully applied to obtain optimal circulation, air-sea fluxes and mixing coefficients that, in a steady model with exact mass, heat and salt conservation, can satisfactorily reproduce the measured distributions of temperature and salinity in the Atlantic. Profiles of horizontal velocities in the optimal model solution resemble initial geostrophic velocity profiles except for constant velocity shifts (the previously unknown reference velocities u_r) and the model circulation is considered to be consistent with the principle of geostrophy. Changes to the shapes of the geostrophic profiles can be controlled and kept small. The present method is a new approach to the classical problem of determining the reference velocities left unknown by pure geostrophic calculations. Here, the reference velocities are chosen such that the resulting circulation conserves field mass and leads to a correct prediction of temperature and salinity distributions in the ocean while satisfying heat and salt budgets exactly. The model is applied to the entire Atlantic Ocean from 80N through the Weddell Sea, about 70S. (Auth. Mod.)

49-3913

FTIR-spectroscopic studies of polar stratospheric cloud model surfaces: characterization of nitric acid hydrates and heterogeneous reactions involving N_2O_5 and HBr.

Peil, S., Seisel, S., Schrems, O., *Journal of molecular structure*, Mar. 15, 1995, Vol.348, European Congress on Molecular Spectroscopy, 22nd, Essen, Germany, Sep.11-16, 1994. Proceedings, pt.B, p.449-452, 6 refs.

Polar atmospheres, Polar stratospheric clouds, Cloud physics, Aerosols, Ice vapor interface, Chemical properties, Condensation, Hydrates, Infrared spectroscopy, Simulation

FTIR spectroscopy has been applied to study model surfaces and processes on cold surfaces which are related to the role of polar stratospheric clouds (PSCs) in ozone depletion in polar regions. Thin solid films of nitric acid hydrates were prepared by deposition of gas-phase HNO_3 and H_2O on a cold substrate. Hydrates of HNO_3 have been found to be major components of PSCs (type I). In this investigation the mono- and dihydrate as well as the two modifications of nitric acid trihydrate, α- and β-NAT, were obtained and characterized by their FTIR spectra. The heterogeneous reaction between gas-phase H_2O and solid ionic N_2O_5 leads to the formation of both the α- and β-modifications of NAT. Gas-phase HBr is hydrolized on the surface of a water ice film resulting in the formation of amorphous and crystalline hydrogen bromide monohydrates. (Auth.)

49-3914
Electrical resistivity sounding of the East Antarctic ice sheet.
Shabtaie, S., Bentley, C.R., *Journal of geophysical research,* Feb. 10, 1995, 100(B2), p.1933-1954, 60 refs.
Ice sheets, Glaciology, Sounding, Electrical resistivity, Boreholes, Firn, Ice density, Ice crystal size, Impurities, Ice electrical properties, Correlation, Antarctica—Charlie, Dome
Electrical resistivity soundings using a Schlumberger array have been carried out at Dome C, East Antarctica to sound the entire 3500-m depth of the ice sheet. Changes in density and temperature are largely separated in the ice at Dome C, so activation energies for both firn and ice could be determined: an activation energy of 0.25 eV in both solid ice and firn between -15°C and -58°C was found. A common value of the activation energy points to a single transport regime in which the charge carriers and conduction paths are the same in firn and ice. To evaluate the variation of resistivity with density, five dielectric mixture models that fit the available data on the high-frequency dielectric constant of firn are considered. In the upper 900 m of the ice sheet, where impurity concentrations are known from core samples, no correlation between resistivities and the concentrations of salts or acids is found. It is likely that resistivities are correlated with the crystal size, hence with the Holocene-Wisconsin boundary in the ice column. (Auth. mod.)

49-3915
Sensitivity analysis of a model of CO_2 exchange in tundra ecosystems by the adjoint method.
Waelbroeck, C., Louis, J.F., *Journal of geophysical research,* Feb. 20, 1995, 100(D2), p.2801-2816, 38 refs.
Climatic changes, Tundra, Ecosystems, Soil microbiology, Decomposition, Geochemical cycles, Soil air interface, Carbon dioxide, Vapor transfer, Seasonal variations, Mathematical models

49-3916
Evaluation of the potential impact of methane clathrate destabilization on future global warming.
Harvey, L.D.D., Huang, Z., *Journal of geophysical research,* Feb. 20, 1995, 100(D2), p.2905-2926, 69 refs.
Global warming, Natural gas, Clathrates, Stability, Greenhouse effect, Permafrost transformation, Frozen ground chemistry, Marine deposits, Air water interactions, Models

49-3917
Evolution of microwave limb sounder ozone and the polar vortex during winter.
Manney, G.L., Froidevaux, L., Waters, J.W., Zurek, R.W., *Journal of geophysical research,* Feb. 20, 1995, 100(D2), p.2953-2972, 35 refs.
Polar atmospheres, Atmospheric attenuation, Stratosphere, Ozone, Atmospheric composition, Sounding, Radiometry, Seasonal variations
The evolution of polar ozone observed by the Upper Atmosphere Research Satellite Microwave Limb Sounder is described for the Northern Hemisphere (NH) winters of 1991-1992, 1992-1993, and 1993-1994 and the Southern Hemisphere (SH) winters of 1992 and 1993. Interannual and interhemispheric variability in polar ozone evolution are closely related to differences in the polar vortex and to the frequency, duration and strength of stratospheric sudden warmings. Ozone in the midstratospheric vortices increases during the winter, with largest increases associated with stratospheric warmings and a much larger increase in the NH than in the SH. The SH vortex remains strong throughout the stratosphere during wintertime warmings, and ozone increases only below the mixing ratio peak, due to enhanced diabatic descent. Ozone mixing ratios decrease rapidly in the lower stratosphere in both SH late winters, as expected from chemical destruction due to enhanced reactive chlorine. (Auth. mod.)

49-3918
Meteor 3/total ozone mapping spectrometer observations of the 1993 ozone hole.
Herman, J.R., et al, *Journal of geophysical research,* Feb. 20, 1995, 100(D2), p.2973-2983, 26 refs.
Polar atmospheres, Atmospheric density, Ozone, Atmospheric attenuation, Stratosphere, Spectroscopy, Spacecraft, Seasonal variations
The development of the springtime (Sep.-Nov.) antarctic ozone hole was observed by the Meteor 3/total ozone mapping spectrometer (TOMS) to result in the lowest ozone value, 85 DU (Dobson units) on Oct. 8, 1993, ever measured by TOMS. During late Sep. and early Oct. the region of extremely low ozone values was centered on the geographical pole between 85°S and 90°S. The geographical extent of the ozone hole region, the area within the 220-DU contour, reached a maximum during the first week in Oct. at a near-circular area covering 24 x 10^6 km^2 reaching to the southern tip of South America. This approximately matched the 1992 area record. After the maximum area was reached in early Oct., the 1993 ozone hole region remained significantly larger than during 1992 throughout the remainder of the month of Oct. The very low ozone values over the antarctic continent have been confirmed by independent ground-based data. Unlike 1992, the formation of the 1993 antarctic ozone hole does not coincide with unusually low ozone values observed over most of the globe for the past 2 years. The most recent ozone data from Meteor 3/TOMS show that there has been a recovery at all latitudes from the extraordinarily low values observed during 1992 and part of 1993 after the June 1991 eruption of Mount Pinatubo. (Auth. mod.)

49-3919
Stratospheric ClO profiles from McMurdo Station, Antarctica, spring 1992.
Emmons, L.K., Shindell, D.T., Reeves, J.M., De Zafra, R.L., *Journal of geophysical research,* Feb. 20, 1995, 100(D2), p.3049-3055, 20 refs.
Polar atmospheres, Atmospheric attenuation, Atmospheric density, Profiles, Chemical properties, Spectroscopy, Seasonal variations, Turbulent diffusion, Antarctica—McMurdo Station
Described here are ground-based measurements of ClO made at McMurdo Station during Sep. and Oct. 1992. Vertical profiles were retrieved from molecular rotational emission spectra at 278 GHz. Peak mixing ratios of 1.6 ppbv were seen in mid-Sep. at approximately 18 km altitude, suggestive of somewhat larger quantities than were measured at the same site and season in 1987. As the core of the polar vortex moved away from McMurdo by early Oct., the ClO mixing ratio at this altitude dropped to less than 0.2 ppbv, coincident with increasing temperature, ozone, and NO_2. A diurnal variation of ClO was also observed. The lower stratospheric layer from 15 to 27 km was found to reach approximately midday abundance by 2-3 hours after sunrise. The column abundance in this layer began to decrease in the period 4-2 hours before sunset and had declined to approximately one quarter of its midday value by 2-0 hours before sunset. In contrast, the ClO column in the upper stratosphere, from 28 to 50 km, built up slowly until midday and remained large while sunlight persisted. (Auth. mod.)

49-3920
On the accuracy of TOVS temperature fields in an arctic case study.
Loechner, F., Buell, R., *Journal of geophysical research,* Feb. 20, 1995, 100(D2), p.3201-3211, 22 refs.
Polar atmospheres, Air temperature, Radiometry, Sounding, Profiles, Accuracy, Data processing, Computer programs

49-3921
Ground-based FTIR spectroscopic absorption measurements of stratospheric trace gases in the Arctic with the sun and the moon as light sources.
Notholt, J., Schrems, O., *Journal of molecular structure,* Mar. 1, 1995, Vol.347, European Congress on Molecular Spectroscopy, 22nd, Essen, Germany, Sep. 11-16, 1994. Proceedings, pt.A, p.407-416, 17 refs.
Polar atmospheres, Stratosphere, Atmospheric density, Cloud physics, Ozone, Radiation absorption, Solar radiation, Infrared spectroscopy, Spectra, Norway

49-3922
Avalanche register of the USSR: Siberia and the Far East. [Kadastr lavin SSSR: Sibir' i Dal'nii Vostok]
Kanaev, L.A., ed, Leningrad, Gidrometeoizdat, 1986, 179p., Altay and Western Siberia; Angara-Yenisey Region; Lena-Indigirka Region; Far East; North East; Kamchatka. In Russian. Refs. passim.
Avalanches, Avalanche protection, Countermeasures, Avalanche formation, Russia—Siberia, Russia—Far East, Russia—Altay, Russia—Lena River, Russia—Indigirka River, Russia—Kamchatka Peninsula, Russia—Yenisey River, Russia—Angara River

49-3923
Avalanche register of the USSR: Central Asia and Kazakhstan. [Kadastr lavin SSSR: Sredniaia Aziia i Kazakhstan]
Kanaev, L.A., ed, Leningrad, Gidrometeoizdat, 1985, 266p., Central and Southern Kazakhstan; Central Asia. In Russian. Refs. passim.
Avalanches, Avalanche protection, Avalanche formation, Countermeasures, Kazakhstan, Kyrgyzstan

49-3924
Permafrost in Canada references (1988-1990) and recent work.
Ommanney, C.S.L., *Environment Canada. National Hydrology Research Institute. Contribution,* Aug. 1990, No.90053, 47p., WDCA 93001199, About 350 citations.
Permafrost surveys, Permafrost distribution, Permafrost hydrology, Frozen ground thermodynamics, Research projects, Bibliographies, Canada

49-3925
Snowmaking scenarios under a doubling of carbon dioxide for ski resorts within the southern Appalachians.
Rehder, M.C., Chapel Hill, University of North Carolina, 1993, 101p., WDCA 93000731, M.A. thesis. 59 refs.
Global warming, Atmospheric circulation, Atmospheric composition, Carbon dioxide, Snow air interface, Snowfall, Snow manufacturing, United States—Virginia, United States—West Virginia, United States—North Carolina

49-3926
Sensitivity study for modelling ice temperatures in Jakobshavns-Isbrae, Greenland.
Fabri, K., Funk, M., Iken, A., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Arbeitsheft,* Mar. 1992, No.11, 118p., WDCA 93000309, Introduction and conclusion in English, graphs and calculations in German. 8 refs.
Ice sheets, Glacier flow, Glacier mass balance, Glacier heat balance, Glacier ice, Ice temperature, Computer programs, Mathematical models, Greenland

49-3927
Sea ice statistical data. [Kaihyo tokei shiryo]
Japan Meteorological Agency. Marine Meteorology Department (Kishocho kaiyo kishobu), Tokyo, Nov. 1982, 38p., WDCA 93000454, In Japanese.
Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Statistical analysis, Japan

49-3928
Rime accretion at the top areas of fells. [Huurrekertymät tunturien lakialueilla]
Tammelin, B., Säntti, K., *Finnish Meteorological Institute. Meteorological publications (Ilmatieteen laitos. Meteorologisia julkaisuja),* 1992, No.19, 39p., WDCA 93000392, In Finnish with English summary. 17 refs.
Power line icing, Ice accretion, Glaze, Ice loads, Wind power generation, Finland

49-3929
Sea ice off the Icelandic coasts, October 1986-September 1987. [Hafís vid strendur Íslands, október 1986-september 1987], Reykjavík, Icelandic Meteorological Office (Vedurstofa Íslands), 1987, 31p., WDCA 93000648, In Icelandic with English summary.
Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Iceland

49-3930
Impact behavior of the active zone within a frozen soil profile.
Picornell, M., ed, Nazarian, S., ed, U.S. Army Research Office. Study DAAL03-90-G-0196, El Paso, University of Texas, Center for Geotechnical and Highway Materials Research, Feb. 1995, 144p., Refs. passim.
Soil freezing, Frozen ground strength, Subgrade soils, Soil trafficability, Active layer, Pavements, Frost resistance, Freeze thaw tests, Road maintenance

49-3931
Heat and water transfer model for seasonally frozen soils with application to a precipitation-runoff model.
Emerson, D.G., *U.S. Geological Survey. Water-supply paper,* 1994, No.2389, 72p., 44 refs.
Soil freezing, Frozen ground thermodynamics, Frost penetration, Soil water migration, Snowmelt, Seepage, Runoff forecasting, Computerized simulation, Computer programs

49-3932

Summary of workshop on remote detection of potential aircraft icing conditions.
Smith, P.L., *South Dakota School of Mines and Technology. Institute of Atmospheric Sciences. Report,* June 1985, SDSMT/IAS/R-85/06, 20p., 6 refs. Summary of a workshop held at the Center for Aerospace Sciences, University of North Dakota, Grand Rapids, ND, Jan. 1985.
Aircraft icing, Ice detection, Frost forecasting, Weather forecasting, Meetings

49-3933

Insulated tents for cold weather operations.
Cain, B., *Canada. Defence Research Establishment Ottawa. Report,* Apr. 1987, No.957, 24p., ADA-187 475, With French summary. 20 refs.
Portable shelters, Thermal insulation, Ventilation, Cold weather tests

49-3934

Remote sensing and GIS for emergency management.
Bruzewicz, A.J., MP 3599, Federal Geographic Technology Conference, 1st, Washington, D.C., Sep. 26-28, 1994. GIS in government: the federal perspective, 1994, Fort Collins, CO, GIS World Books, 1995, p.161-164, 15 refs.
Remote sensing, Spaceborne photography, Data processing, Regional planning, Accidents, Rescue operations

49-3935

Survey of coastal environments in the vicinity of Nain, Labrador.
Gilbert, R., Aitken, A., McLaughlin, B., *Maritime sediments and Atlantic geology,* 1984, Vol.20, p.143-155, With French summary. 33 refs.
Ice cover effect, Fast ice, Ice push, Marine geology, Beaches, Littoral zone, Marine biology, Ecology, Ecosystems, Canada—Labrador

49-3936

Water masses and phytoplankton biomass distribution during summer in the Weddell Sea marginal ice zone.
Pérez, F.F., Tokarczyk, R., Figueiras, F.G., Ríos, A.F., *Oceanologica acta,* 1994, 17(2), p.191-199, With French summary. 43 refs.
Sea water, Water chemistry, Plankton, Sea ice, Ice edge, Antarctica—Weddell Sea

This study, carried out between the Elephant and the Orkney islands, showed that spatial variability in the marginal ice-edge zone (MIZ) was greater than that found in open sea. Salinity and silicate contents point to the existence of two fronts: the first, near Elephant I., separates the Surface Antarctic Water coming from Drake Passage from the winter water originating in the Weddell Sea. This water is characterized by its high concentrations of nitrate and silicates. The second front, near the South Orkney Is., which undergoes the influence by a less saline water lens, is poor in nutrients and rich in chlorophyll. Water mass circulation reveals the existence of a series of convergences and divergences which alternate along the MIZ, together with different haline fronts. (Auth. mod.)

49-3937

Closing off the southern ocean surface.
Heinze, C., Broecker, W.S., *Paleoceanography,* Feb. 1995, 10(1), p.49-58, 28 refs.
Atmospheric composition, Atmospheric circulation, Models

Equilibrium integrations with the three-dimensional Hamburg ocean carbon cycle circulation model show the effect of a southern ocean surface outcrop that is closed off for gas exchange with the atmosphere and export production of particulate organic carbon and $CaCO_3$ south of 32.5°S. For such a close-off, the northern Atlantic outcrop assumes a greater degree of control of atmospheric CO_2 partial pressure. Contrary to expectations, the atmospheric pCO_2 increases compared to a control run without close-off. Maximizing the nutrient utilization in the North Atlantic can compensate for this increase. However, it does not draw down the pCO_2 to glacial levels. (Auth.)

49-3938

Diagnostic analysis of Heinrich glacial surge events.
Verbitsky, M., Saltzman, B., *Paleoceanography,* Feb. 1995, 10(1), p.59-65, 19 refs.
Icebergs, Glacier surges, Ice sheets, Basal sliding, Ice melting, North Atlantic Ocean

49-3939

Relationship among submarine instabilities, sea level variations, and the presence of an ice sheet on the continental shelf: an example from the Verrill Canyon area, Scotian Shelf.
Mulder, T., Moran, K., *Paleoceanography,* Feb. 1995, 10(1), p.137-154, 54 refs.
Ice sheets, Sea level, Marine geology, Submarine instabilities, North Atlantic Ocean

49-3940

Reflection of continental ice sheets in late Quaternary sediments from the Nordic seas.
Baumann, K.H., Lackschewitz, K.S., Spielhagen, R.F., Henrich, R., *Zentralblatt für Geologie und Paläontologie, Teil I,* Aug. 1994, No.7/8, p.897-912, With German summary. 35 refs.
Glaciation, Ice sheets, Ice rafting, Glacial deposits, Marine geology, Marine deposits, Bottom sediment, Quaternary deposits, Stratigraphy, Pleistocene, Paleoclimatology, Norwegian Sea, Greenland Sea

49-3941

Paleoclimates of the late glacial and Holocene. [Paleoklimaty pozdnelednikov'ia i golotsena]
Khotinskiĭ, N.A., ed, Moscow, Nauka, 1989, 167p., In Russian. For selected papers see 49-3942 through 49-3957.
Paleoclimatology, Paleobotany, Climatic changes, Pleistocene, Soil formation, Air temperature, Tundra, Ice veins, Russia—Siberia

49-3942

Holocene as an element of general planetary natural processes. [Golotsen kak element obshcheplanetarnogo prirodnogo protsessa]
Velichko, A.A., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.5-12, In Russian. 10 refs.
Temperature variations, Precipitation (meteorology), Paleoclimatology, Atmospheric circulation

49-3943

Controversial problems in the reconstruction and correlation of paleoclimates in the Holocene. [Diskussionnye problemy rekonstruktsii i korreliatsii paleoklimatov golotsena]
Khotinskiĭ, N.A., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.12-17, In Russian. 16 refs.
Paleoclimatology, Climatic changes, Isotherms, Russia—Siberia

49-3944

Reconstruction of the dynamics of humidity and air temperature for an historical period (according to natural indicators). [Rekonstruktsiia dinamiki uvlazhneniia i temperatury vozdukha za istoricheskiĭ period (po prirodnym pokazateliam)]
Krenke, A.N., Zolotokrylin, A.N., Popova, V.V., Chernavskaia, M.M., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.34-38, In Russian. 10 refs.
Air temperature, Humidity, Age determination, Temperature variations, Climatic changes

49-3945

Paleoclimate modeling. [O modelirovanii paleoklimata]
Arkhipov, P.L., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.38-43, In Russian. 13 refs.
Paleoclimatology, Mathematical models, Atmospheric circulation, Climatology

49-3946

Reflection of terrain-climatic changes of the Holocene in the evolution of forest-steppe soils. [Otrazhenie landshaftno-klimaticheskikh izmeneniĭ golotsena v evoliutsii pochv lesostepi]
Velichko, A.A., Morozova, T.D., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.57-61, In Russian. 13 refs.
Forest soils, Steppes, Soil formation, Cryogenic soils, Climatic changes, Landscape development

49-3947

Evolution of soils in the steppe zone as an indicator of changes in the climatic conditions during the Holocene. [Evoliutsiia pochv stepnoĭ zony kak indikator izmeneniia klimaticheskikh usloviĭ v golotsene]
Ivanov, I.V., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.68-75, In Russian. 17 refs.
Soil formation, Climatic changes, Steppes, Cryogenic soils, Chernozem, Kazakhstan

49-3948

Comparison of the range of changes in paleoclimates of the Late Pleistocene and Holocene in various regions of the USSR. [Sopostavlenie amplitudy izmenchivosti paleoklimatov pozdnego pleĭstotsena i golotsena razlichnykh raĭonov SSSR]
Boiarskaia, T.D., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.85-90, In Russian. 12 refs.
Paleoclimatology, Pleistocene, Climatic changes, Precipitation (meteorology), Russia

49-3949

Vegetation and climate of the Holocene in Western Siberia. [Rastitel'nost' i klimat golotsena Zapadnoĭ Sibiri]
Volkova, V.S., Bakhareva, V.A., Levina, T.P., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.90-95, In Russian. 14 refs.
Vegetation, Precipitation (meteorology), Air temperature, Taiga, Tundra, Trees (plants), Russia—Siberia

49-3950

Changes in the Holocene climate in the Yenisey region of Siberia (according to paleocarpological data). [Izmenenie klimata golotsena v Prieniseĭskoĭ Sibiri (po paleokarpologicheskim dannym)]
Koshkarova, V.L., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.96-98, In Russian. 4 refs.
Paleobotany, Climatic changes, Taiga, Forest tundra, Plants (botany), Russia—Yenisey River

49-3951

Climatic changes and paleogeographic conditions in Central Kazakhstan during the Late Glacial and Holocene. [Izmenenie klimata i paleogeograficheskikh usloviĭ Tsentral'nogo Kazakhstana v pozdnelednikov'e i golotsene]
Aubekerov, B.Zh., Chalykh'ian, E.V., Zhakupova, Sh.A., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.98-102, In Russian. 5 refs.
Climatic changes, Paleoclimatology, Quaternary deposits, Kazakhstan

49-3952

Climate of the late glacial and Holocene in Yakutia (according to palynological data). [Klimat pozdnelednikov'ia i golotsena IAkutii (po palinologicheskim dannym)]
Tomskaia, A.I., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.109-116, In Russian. 16 refs.
Palynology, Paleoclimatology, Climatic changes, Russia—Yakutia

49-3953
History of vegetation and climate in northern Tien Shan during the Holocene (according to palynological data). [Istoriia rastitel'nosti i klimata Severnogo Tian'-Shania v golotsene (po palinologicheskim dannym)]
Aleshinskaia, Z.V., Mel'nikova, A.P., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial Period and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.131-138, In Russian. 19 refs.
Vegetation, Climatic changes, Paleoclimatology, Palynology, Peat, Trees (plants), Tien Shan

49-3954
Climatic changes in some regions of northern Asia during the late glacial and Holocene. [Klimaticheskie izmeneniia v nekotorykh raĭonakh Severnoĭ Azii v pozdnelednikov'e i golotsene]
Nikol'skaia, M.V., et al, Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.141-145, In Russian. 7 refs.
Climatic changes, Paleoclimatology, Air temperature, Precipitation (meteorology)

49-3955
Paleoclimatology of the Late Pleistocene and Holocene in northwest Siberia and the Pechora Plain. [Paleoklimat pozdnego pleĭstotsena i golotsena severa Zapadnoĭ Sibiri i Pechorskoĭ nizmennosti]
Danilov, I.D., Poliakova, E.I., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.145-151, In Russian. 14 refs.
Paleoclimatology, Pleistocene, Ice veins, Climatic changes, Frozen ground mechanics, Russia—Siberia

49-3956
Characteristics of the climate in Western Chukotka during the Late Pleistocene-Holocene. [Osobennosti klimata Zapadnoĭ Chukotki v pozdnem pleĭstotsene-golotsene]
Boiarskaia, T.D., Kiselev, S.V., Kuz'mina, S.A., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.151-154, In Russian. 7 refs.
Paleoclimatology, Pleistocene, Climatic changes, Tundra, Humidity, Russia—Chukotskiy Peninsula

49-3957
Vegetation and climate of the late glacial and Holocene of the littoral zone of Central Primor'ye. [Rastitel'nost' i klimat pozdnelednikov'ia i golotsena pribrezhnoĭ zony Srednego Primor'ia]
Shumova, G.M., Klimanov, V.A., Paleoklimaty pozdnelednikov'ia i golotsena (Paleoclimates of the late glacial and Holocene). Edited by N.A. Khotinskiĭ, Moscow, Nauka, 1989, p.154-160, In Russian. 10 refs.
Vegetation, Climatic changes, Paleoclimatology, Pleistocene, Russia—Primor'ye

49-3958
International Association for Hydraulic Research Working Group on Thermal Regimes: report on frazil ice.
Daly, S.F., ed, SR 94-23, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1994, 43p., ADA-288 678, Refs. p.39-43.
Frazil ice, Bottom ice, Ice crystal nuclei, Ice cover, Ice physics, Ice models, Mathematical models, Ice crystal growth
This report, prepared by members of the Working Group on Thermal Regimes of the Section on Ice Research and Engineering of the International Association for Hydraulic Research, is a comprehensive overview of frazil ice. Starting from the initial nucleation of single frazil ice crystals to the formation of ice covers that may be many kilometers long, the physics and evolution of frazil ice in natural water bodies are described. Laboratory experiments conducted over the last 30 years on frazil ice dynamics and other aspects of frazil are described and classified. A physically based quantitative model that describes the dynamic evolution of the crystal size distribution function is presented. In addition, the development of numerical models of frazil ice in oceans and rivers is discussed and their results described. This report serves as a review of the state of the art of the present understanding of frazil, and the extensive references are a comprehensive resource.

49-3959
Freezing phenomena in adsorbed water as studied by NMR.
Overloop, K., Van Gerven, L., *Journal of magnetic resonance. Series A,* 1993, Vol.101, p.179-187, 11 refs.
Ice formation, Phase transformations, Ice water interface, Ice vapor interface, Freezing points, Hygroscopic water, Adsorption, Nuclear magnetic resonance

49-3960
Equilibrium shape of an ice-soil body formed by liquid flow past a pair of freezing columns.
Alimov, M.M., Kornev, K.G., Mukhamadullina, G.L., *Journal of applied mathematics and mechanics,* Mar. 1995, 58(5), p.873-888, Translated from Prikladnaia matematika i mekhanika. 19 refs.
Soil freezing, Artificial freezing, Frozen ground mechanics, Porous materials, Ice solid interface, Mathematical models, Phase transformations, Freezing front, Heat transfer, Boundary value problems

49-3961
Simple approaches to modelling solar radiation in the Arctic.
Young, K.L., Woo, M.K., Munro, D.S., *Solar energy,* Jan. 1995, 54(1), p.33-40, 38 refs.
Polar atmospheres, Solar radiation, Cloud physics, Cloud cover, Mathematical models, Correlation, Accuracy, Ecology

49-3962
Ground penetrating synthetic pulse radar: dynamic range and modes of operation.
Hamran, S.E., Gjessing, D.T., Hjelmstad, J., Aarholt, E., *Journal of applied geophysics,* Jan. 1995, 33(1-3), p.7-14, 12 refs.
Geophysical surveys, Glacier surveys, Profiles, Subsurface investigations, Remote sensing, Radio echo soundings, Design, Performance, Analysis (mathematics)

49-3963
Mars 96 GPR program.
Barbin, Y., Nicollin, F., Kofman, W., Zolotarev, V., Glotov, V., *Journal of applied geophysics,* Jan. 1995, 33(1-3), p.27-37, 16 refs.
Mars (planet), Extraterrestrial ice, Geophysical surveys, Ground ice, Permafrost surveys, Profiles, Subsurface investigations, Radio echo soundings, Sounding, Balloons, Design

49-3964
Numerical studies of the radiation patterns of resistively loaded dipoles.
Arcone, S.A., MP 3600, *Journal of applied geophysics,* Jan. 1995, 33(1-3), p.39-52, 29 refs.
Geophysical surveys, Subsurface investigations, Profiles, Glacier surveys, Radio echo soundings, Antennas, Performance, Orientation, Dielectric properties, Wave propagation, Analysis (mathematics)
The objective of these studies is to determine the two-way radar radiation patterns for finite resistivity loaded dipoles excited by a transient current pulse. Transient excitation of an infinitesimal dipole was first synthesized from the known steady-state solutions. Progressive transient excitations of each amplitude-weighted dipole element of an array were then superposed to yield the far-field response of a finite size antenna. Radiation response patterns are synthesized for several examples of media dielectric constants and antenna parameters based upon field applications in water, ice and permafrost ground. Comparisons between the numerical responses and field observations are presented.

49-3965
Infrared spectrum of matrix-isolated hexamethylenetetramine in AR and H_2O at cryogenic temperatures.
Bernstein, M.P., Sandford, S.A., Allamandola, L.J., Chang, S., *Journal of physical chemistry,* Nov. 24, 1994, 98(47), p.12206-12210, 30 refs.
Extraterrestrial ice, Cosmic dust, Cryogenics, Simulation, Ice spectroscopy, Geochemistry, Photochemical reactions, Infrared spectroscopy, Spectra

49-3966
Magnetic properties of deep-sea sediments off southwest Greenland: evidence for major differences between the last two deglaciations.
Stoner, J.S., Channell, J.E.T., Hillaire-Marcel, C., *Geology,* Mar. 1995, 23(3), p.241-244, 20 refs.
Pleistocene, Glacier oscillation, Glaciation, Grounded ice, Marine deposits, Quaternary deposits, Magnetic properties, Magnetic surveys, Labrador Sea

49-3967
Comprehensive, automated approach to determining sea ice thickness from SAR data.
Haverkamp, D., Soh, L.K., Tsatsoulis, C., *IEEE transactions on geoscience and remote sensing,* Jan. 1995, 33(1), p.46-57, 22 refs.
Sea ice, Ice cover thickness, Classifications, Synthetic aperture radar, Spaceborne photography, Image processing, Analysis (mathematics), Accuracy

49-3968
Scattering from ice crystals at 94 and 220 GHz millimeter wave frequencies.
Tang, C., Aydin, K., *IEEE transactions on geoscience and remote sensing,* Jan. 1995, 33(1), p.93-99, 21 refs.
Cloud physics, Remote sensing, Ice detection, Ice crystal optics, Radar echoes, Scattering, Attenuation, Ice models, Orientation, Polarization (waves), Analysis (mathematics), Simulation

49-3969
Removal of terrain effects from SAR satellite imagery of arctic tundra.
Goering, D.J., Chen, H., Hinzman, L.D., Kane, D.L., *IEEE transactions on geoscience and remote sensing,* Jan. 1995, 33(1), p.185-194, 15 refs.
Geophysical surveys, Spaceborne photography, Soil classification, Synthetic aperture radar, Radiometry, Tundra, Arctic landscapes, Image processing, Resolution, Topographic effects

49-3970
Report on scientific activity in glaciology 1987-1990.
Akademiia nauk SSSR. Sovetskiĭ geofizicheskiĭ komitet, Kotliakov, V.M., ed, Glazovskiĭ, A.F., ed, Moscow, VINITI, 1991, 61p., Presented to the International Association of Hydrological Sciences for the XX General Assembly of the International Union of Geodesy and Geophysics. With title page in Russian and English. Refs. p.43-61.
Glaciology, Snow cover, Snow physics, Avalanches, Avalanche forecasting, Glaciers, Glacier oscillation, Glacier mass balance, Glacier surges, Glacier alimentation, Research projects, Bibliographies

49-3971
Report on scientific activity in glaciology 1979-1982. [Soobshchenie o nauchnykh rabotakh po gliatsiologii 1979-1982]
Akademiia nauk SSSR. Sovetskiĭ geofizicheskiĭ komitet, Moscow, VINITI, 1983, 45p., Presented to the International Association of Hydrological Sciences for the XVIII General Assembly of the International Union of Geodesy and Geophysics. In Russian with English table of contents. 225 refs.
Glaciology, Maps, Glaciers, Snow cover, Avalanches, Sea ice, River ice, Research projects, Bibliographies

49-3972
Analysis of glaciological maps using the techniques of information theory. [Analiz gliatsiologicheskikh kart s ispol'zovaniem priemov teorii informatsii]
Zverkova, N.M., *Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia,* July-Aug. 1983, No.4, p.87-95, In Russian. 7 refs.
Maps, Glaciers, Glacier alimentation, Glacier surveys

49-3973
Temperature ecotypes and biogeography of Acrosiphoniales (Chlorophyta) with Arctic-Antarctic disjunct and Arctic/cold-temperate distributions.
Bischoff, B., Wiencke, C., *European journal of phycology,* Feb. 1995, 30(1), p.19-27, 41 refs.
Algae, Growth, Survival, Air temperature, Antarctica—King George Island, Greenland

The temperature requirements for growth and the upper survival temperatures (UST) of the Antarctic-Arctic disjunct green alga *Acrosiphonia arcta* and of the Arctic/cold-temperate *A. sonderi* (Acrosiphoniales) from several localities within their distribution areas were determined. Ecotypic variation with regard to growth optima as well as survival temperatures were demonstrated in both species. While cold-temperate strains had relatively high or optimal growth rates at 15°C, polar isolates had very low rates at this temperature and showed growth optima between 0 and 10°C. The UST of the polar isolates of *A. arcta* is 22°C, i.e. slightly lower than those of the cold-temperate strains at 23-25°C. The cold-temperate isolate of *A. sonderi* survived to 25°C, whereas arctic strains had USTs of 22-24°C. The data indicate that changes in growth responses to temperature as well as small changes in UST can be achieved in relatively short time periods of exposure (3 million years) to low temperatures as exemplified in arctic populations of *A. arcta* as well as *A. sonderi*. (Auth. mod.)

49-3974

Glacier retreat and morphodynamic changes at the southeast margin of Cook Glacier (Kerguelen, subantarctic). [Le retrait glaciaire et les modifications morphodynamiques dans la marge s-e du glacier Cook (Kerguelen, taaf)]

Benjamin, D., Bougere, J., *Zeitschrift für Geomorphology,* Dec. 1994, 38(4), p.475-486, In French with English and German summaries. 20 refs.

Glacier melting, Glacier mass balance, Air temperature, Aerial surveys, —Kerguelen Islands

The retreat of Cook Glacier has been measured by aerial photographs, field photographs, and mapping of topography for the period of 1962 to 1991. During this time different glacier tongues, Dufour, Jussieu, Périer and Diosaz, disappeared and all glacier fronts retreated. The rapidity of this retreat varies as a function of height, mass budget of the glacier, distance to the center of the ice cap and the presence of a proglacial lake. In the case of Ampère glacier there is a frontal retreat of about 2.5 km since 1962 with a variable rapidity of retreat: 35 m/a from 1962 to 1974, 125 m/a from 1975 to 1983 and 100 m/a from 1984 to 1991. The common retreat of the glacier fronts leads to the hypothesis of a rise in temperature, in spite of the absence of meteorological data over a longer period. (Auth. mod.)

49-3975

Ice Age world: an introduction to Quaternary history and research with emphasis on North America and Northern Europe during the last 2.5 million years.

Andersen, B.G., Borns, H.W., Jr., Oslo, Scandinavian University Press, 1994, 208p., Refs. p.195-196, 199-201.

Ice age theory, Quaternary deposits, Paleoclimatology, Glacial rivers, Moraines, Glacial erosion, Radiometry, Periglacial processes, Glacial deposits

49-3976

Regime of the Abramov Glacier. [Rezhim lednika Abramova]

Glazyrin, G.E., Kamnianskiĭ, G.M., Pertsiger, F.I., St. Petersburg, Gidrometeoizdat, 1993, 228p., In Russian. 175 refs.

Glaciers, Glacier surveys, Glacier mass balance, Glacier formation, Glacier flow, Firn, Moraines, Russia—Altay, Russia—Abramov Glacier, Russia—Koksa River

49-3977

Mass balance, runoff and meteorological conditions of Sary-Tor Glacier, Akshiyrak Range (Interior Tian-Shan) 1985-1989. [Balans massy, stok i meteorologicheskie usloviia lednika Sary-Tor v khrebte Akshiĭrak (Vnutrenniĭ Tian'-Shan') 1985-1989 gg.]

Diurgerov, M.B., Kunakhovich, M.G., Mikhalenko, V.N., Sokal'skaia, A.M., Ushnurtsev, S.N., Chichagov, A.V., Moscow, Institut geografii RAN, 1992, 69p., In Russian and English. 9 refs.

Mountain glaciers, Glacier mass balance, Runoff, Glacier oscillation, Snow cover distribution, Ice temperature, Glacier ice, Glacial hydrology, Glacial meteorology, Air temperature, Tien Shan, Kyrgyzstan—Akshiyrak Range, Kyrgyzstan—Sary-Tor Glacier

49-3978

Sea ice transported lithogenic finefraction of Late Quaternary deep-sea sediments of the east central Arctic Ocean and the Fram Strait. [Meereistransportiertes lithogenes Feinmaterial in spätquatären Tiefseesedimenten des zentralen östlichen Arktischen Ozeans und der Framstraße]

Letzig, T., *Berichte zur Polarforschung,* 1995, No.162, 98p., In German with English summary. Refs. p.69-77.

Sea ice, Sediments, Clay minerals, Marine geology, Arctic Ocean

49-3979

Effects of salinity and light intensity on osmolyte concentrations, cell volumes and growth rates of the antarctic sea ice diatoms *Chaetoceros* sp. and *Navicula* sp. with emphasis on the amino acid proline. [Der Einfluß von Salinität und Lichtintensität auf die Osmolytkonzentrationen, die Zellvolumina und die Wachstumsraten der antarktischen Eisdiatomeen *Chaetoceros* sp. und *Navicula* sp. unter besonderer Berücksichtigung der Aminosäure Prolin]

Nothnagel, J., *Berichte zur Polarforschung,* 1995, No.161, 115p., In German with English summary. Refs. p.106-114.

Algae, Sea ice, Light effects, Salinity, Marine biology

The effect of light intensity and salinity on growth rates, cell volume and concentrations of osmolytes of the antarctic ice diatoms *Chaetoceros* aff. *neogracile* and *Navicula* sp. were investigated in laboratory experiments. No severe effect of salinity on the growth rates and cell volumes could be observed in the range of 17 to 51 PSU (= per mill) at high photon flux density (50 µmol photons/m²/s) for *Navicula* sp., whereas *Chaetoceros* sp. showed significant responses: with increasing salinity, growth rates and cell volumes decreased. Under low light conditions (5 µmol photons/m²/s) growth rates and cell volumes were clearly reduced and no salinity effect could be detected. The population density increased with rising salinity at both low and high light intensities. The ice algae survived long-term dark incubations of 56 d and 84 d. The diatoms, pre-incubated at low light intensities, showed a slight increase in cell number and a considerable decrease in proline concentration with advancing incubation period. The proline concentration of all samples did not decrease below a salinity-dependent, species specific minimum, which was enhanced with increasing salinity. Proline probably acts as a nitrogen source during the dark period. (Auth. mod.)

49-3980

Surface energy balance of antarctic snow and blue ice.

Bintanja, R., Van den Broeke, M.R., *Journal of applied meteorology,* Apr. 1995, 34(4), p.902-926, 40 refs.

Heat balance, Albedo, Colored ice, Snow heat flux, Ice heat flux, Ice models, Antarctica—Heimefront Range, Antarctica—Queen Maud Land

Little is known about the surface energy balance of antarctic blue-ice areas, although there have been some studies of the energy balance of snow surfaces. Therefore, a detailed meteorological experiment was carried out in the vicinity of a blue-ice area in the Heimefront Range, Queen Maud Land, during the austral summer of 1992-93. Since not all the surface fluxes could be measured directly, the use of a model was necessary. The main purpose of the model is to calculate the surface and subsurface temperatures from which the emitted longwave radiation and the turbulent fluxes can be calculated. The surface energy balance was evaluated at four locations: one on blue ice and three on snow. Differences are due mainly to the fact that ice has a lower albedo (0.56) than snow (0.80). To compensate for the larger solar absorption of ice, upward fluxes of longwave radiation and turbulent fluxes are larger over ice. Moreover, the energy flux into the ice is larger than into snow due to the differences in the radiative and conductive properties. Surface temperatures, snow subsurface temperatures, and ice sublimation rates evaluated with the model compare well with the measurements, which yields confidence in the surface energy balance results. (Auth.)

49-3981

Dynamics of the Ross Ice Shelf.

Casassa, G., Turner, J., *Eos,* Oct. 29, 1991, 72(44), p.473, 481, 11 refs.

Ice creep, Ice shelves, Remote sensing, Antarctica—Ross Ice Shelf

The Ross Ice Shelf in its entirety was examined in 1991 using Advanced Very High Resolution Radiometer data. A new glaciological feature provided the most thought-provoking aspect of this high altitude survey: flow stripes on Byrd Glacier, Ice Streams D and E, and Crary Ice Rise. It is concluded that the stripes are relict ice flow features produced by increased ice stream activity at the time the stripes were formed.

49-3982

Glacier mass-balance standards.

Lyons, W.B., ed, *Eos,* Nov. 12, 1991, 72(46), Workshop on Glacier Mass Balance Standards, Nov. 28-29, 1990. Seattle, WA, p.511, 514, 11 refs.

Glacier mass balance, Climatic changes, Hydrology

49-3983

Technical report.

PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, 772p. (2 vols.), In English, French and German. The French version of PIARC is AIPCR (Association Internationale Permanente des Congrès de la Route). For individual papers see 49-3984 through 49-4086.

Road icing, Road maintenance, Ice forecasting, Weather forecasting, Chemical ice prevention, Salting, Snow removal, Cold weather operation, Safety, Highway planning

49-3984

Winter Maintenance Decision Aiding Systems (SADVH) at ASF. [Les Systèmes d'Aide à la Décision Hivernale (SADVH) à l'ASF]

Cat, M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.1-7, In French with English and German summaries.

Road icing, Ice forecasting, Weather forecasting, Road maintenance, Data processing, France

49-3985

Winter maintenance by VINTERMAN.

Jaquet, J., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.8-15, With French and German summaries.

Road icing, Ice forecasting, Ice detection, Weather forecasting, Road maintenance, Warning systems, Computer applications, Data processing, Data transmission, Denmark

49-3986

Road condition and weather information system (SWIS) in Germany. [Straßenzustands- und Wetter-Informationssystem in Deutschland (SWIS)]

Hahn, S., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.16-24, In German with English and French summaries. 4 refs.

Road icing, Ice detection, Ice forecasting, Weather forecasting, Road maintenance, Data processing, Germany

49-3987

Increase of winter maintenance effectiveness by the improvement of decision making process.

Ikwanty, H., Kamela, R., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.25-31, With French and German summaries.

Road icing, Road maintenance, Highway planning, Cold weather operation, Poland

49-3988

Road-weather information system.

Lipićnik, M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.32-38, With French and German summaries.

Road icing, Ice detection, Ice forecasting, Weather forecasting, Data processing, Road maintenance, Slovenia

49-3989

ROAD-94 (VEG-94)—a data system for road weather and traffic surveillance to be used by the roadmasters and road traffic centers in Norway.

Norstrøm, E., Berg, F.E., Paulsen, T., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.39-46, With French and German summaries.

Road icing, Ice detection, Ice forecasting, Weather forecasting, Computer applications, Data processing, Data transmission, Road maintenance, Norway

49-3990

Utilization of snow removal information system in the Jo-etsu District.

Sakai, T., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.47-54, With French and German summaries.

Road maintenance, Weather forecasting, Snowstorms, Snowfall, Snow removal, Data processing, Data transmission, Japan

49-3991

Weather controlled traffic signs.

Pilli-Sihvola, Y., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.55-60, With French and German summaries.

Road icing, Ice detection, Ice forecasting, Weather forecasting, Safety, Road maintenance, Data transmission, Finland

49-3992

Studies of road surface temperature with infrared techniques.

Lindqvist, S., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.61-67, With French and German summaries.

Road icing, Ice detection, Road maintenance, Infrared photography, Sweden

49-3993

Combined statistical and energy balance model for prediction of road surface temperature.

Bogren, J., Gustavsson, T., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.68-76, With French and German summaries. 6 refs.

Road icing, Ice forecasting, Weather forecasting, Road maintenance, Statistical analysis, Sweden

49-3994

Complete meteorological information and forecast system.

Brundin, C., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.77-82, With French and German summaries.

Road icing, Ice forecasting, Weather forecasting, Road maintenance, Data processing, Computer applications, Sweden

49-3995

Regional road traffic centres in Norway.

Christiansen, I., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.83-90, With French and German summaries.

Road icing, Weather forecasting, Road maintenance, Data processing, Data transmission, Norway

49-3996

Structure of the Swedish road weather information system (VViS).

Eriksson, P., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.91-97, With French and German summaries.

Road icing, Weather forecasting, Road maintenance, Data processing, Computer applications, Sweden

49-3997

Organization and use of meteorological and weather forecast information systems.

Fridh, L., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.98-105, With French and German summaries.

Road icing, Weather forecasting, Road maintenance, Data processing, Computer applications, Sweden

49-3998

Glaze ice forecasting for winter service. [Glatteisvorhersage für den Winterdienst]

Hertl, S., Schaffar, G., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.106-116, In German with English and French summaries.

Road icing, Glaze, Ice forecasting, Road maintenance

49-3999

Using the road weather service system in traffic information collection.

Kantonen, J., Pilli-Sihvola, Y., Toivonen, K., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.117-124, With French and German summaries.

Road icing, Ice forecasting, Weather forecasting, Road maintenance, Data processing, Computer applications, Finland

49-4000

Road information during extreme weather conditions.

Leiren, K., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.125-128, With French and German summaries.

Road icing, Ice forecasting, Weather forecasting, Road maintenance, Data processing, Norway

49-4001

Appreciating the current quality of decision aiding systems for winter road maintenance, verification, approval. [Comment apprécier la qualité actuelle des systèmes d'aide à la décision pour le service hivernal, contrôle, homologation]

Livet, J., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.129-135, In French with English and German summaries. 1 ref.

Road icing, Ice forecasting, Weather forecasting, Road maintenance, Data processing, Computer applications, France

49-4002

France's approach to defining, selecting and controlling road salt quality. [La démarche française pour définir, choisir et maîtriser la qualité des sels routiers]

Livet, J., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.136-143, In French with English and German summaries. 4 refs.

Road icing, Salting, Road maintenance, France

49-4003

Forecasting of radiation and cloud cover and their influence on pavement temperature. [Vorhersage von Strahlung und Bewölkung und deren Einfluß auf die Fahrbahntemperatur]

Nefzger, H., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.144-151, In German with English and French summaries. 5 refs.

Road icing, Ice forecasting, Weather forecasting, Road maintenance, Solar radiation, Austria

49-4004

Road weather forecasting as part of the German Road State and Weather Information System (SWIS).

Raatz, W.E., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.152-157, With French and German summaries.

Road icing, Ice forecasting, Weather forecasting, Road maintenance, Data processing, Germany

49-4005

Road user survey as a means to improve winter road maintenance in Norway.

Resen-Fellie, O.P., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.158-165, With French and German summaries. 4 refs.

Road maintenance, Highway planning, Cold weather operation, Human factors engineering, Norway

49-4006

Preventive brine spreading. [Die Präventive Feuchtsalzstreuung]

Rother, G., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.166-173, In German with English and French summaries.

Road icing, Salting, Road maintenance

49-4007

New French methodology for quality objectives in winter maintenance. [La nouvelle méthodologie française des objectifs de qualité en viabilité hivernale]

Roussel, J.J., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.174-180, In French with English and German summaries.

Road icing, Road maintenance, Highway planning, France

49-4008

Road information database as a part of a decision-making system.

Strøm, P.H., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.181-185, With French and German summaries.

Road icing, Weather forecasting, Road maintenance, Data processing, Norway

49-4009

Daily level of service on winter conditions.

Teppo, M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.186-193, With French and German summaries.

Road icing, Snow removal, Road maintenance, Finland

49-4010

Comparing actual road-weather conditions to conditions registered by road weather stations.

Toivonen, K., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.194-201, With French and German summaries.

Road icing, Weather forecasting, Weather stations, Road maintenance, Finland

49-4011

Case based reasoning systems for winter road maintenance.

Whitaker, L.A., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.202-209, With French and German summaries. 9 refs.

Road icing, Weather forecasting, Avalanche forecasting, Road maintenance, Data processing, Computer applications

49-4012

Winter road maintenance on porous asphalt. [Winterdienst auf Drainasphalt]

Schmitt, E., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.210-216, In German with English and French summaries. 1 ref.

Road icing, Bituminous concretes, Concrete pavements, Frost resistance, Road maintenance

49-4013

Specific winter behaviour of porous asphalt—the status in France. [Le comportement hivernal spécifique des enrobés drainants—le point de la situation française]

Livet, J., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.217-223, In French with English and German summaries. 2 refs.

Road icing, Bituminous concretes, Concrete pavements, Frost resistance, Road maintenance, France

49-4014

Winter maintenance on porous asphalt.

Noort, M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.224-231, With French and German summaries.

Road icing, Pavements, Bitumens, Frost resistance, Road maintenance

49-4015

Rates of costs for winter maintenance of roads in west Siberia and problems of winter slipperiness.

Smirnov, A., Khristoliubov, I., Triniv, D., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.232-234, With French and German summaries.

Road icing, Concrete pavements, Bituminous concretes, Skid resistance, Road maintenance, Cost analysis, Russia—Omsk

49-4016

Influence of road layout and reorganisation of winter maintenance for local thoroughfares. [Einfluß der Straßenraumgestaltung auf den Winterdienst in Ortsdurchfahrten]

Kirchknopf, H., Schrammel, E., Zibuschka, F., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.235-242, In German with English and French summaries. 1 ref.

Streets, Urban planning, Highway planning, Road maintenance, Snow removal, Austria

49-4017

Snow removal and de-icing on air fields with regard to ecological and economic aspects. [Schneeräumung und Enteisung auf Flugbetriebsflächen unter Berücksichtigung von ökologischen und ökonomischen Gesichtspunkten]

Pastari, G., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.243-251, In German with English and French summaries.

Runways, Road icing, Snow removal, Chemical ice prevention, Road maintenance, Germany

49-4018

Visibility reduction caused by snow and its counter measures.

Ishimoto, K., Fukuzawa, Y., Kajiya, T., Hagiwara, T., Takeuchi, M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.252-257, With French and German summaries. 1 ref.

Blowing snow, Falling snow, Visibility, Human factors engineering, Road maintenance

49-4019

Susceptibility to icing on different road pavements.

Gustafson, K., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.258-265, With French and German summaries.

Road icing, Pavements, Skid resistance, Chemical ice prevention, Road maintenance

49-4020

Effects of winter tyre qualities on driver behaviour and accidents.

Roine, M., Mäkinen, T., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.266-275, With French and German summaries.

Road icing, Tires, Safety, Accidents, Human factors

49-4021

Management of winter maintenance during extreme weather conditions.

Danielson, U., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.276-279, With French and German summaries.

Road icing, Snow removal, Highway planning, Road maintenance, Safety, Sweden

49-4022

Winter maintenance operations in Iran.

Havaei-Torshizi, M.H., Bazzan, M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.280-289, With French and German summaries. 2 refs.

Road icing, Snow removal, Salting, Highway planning, Road maintenance, Iran

49-4023

Computer based education and training programs.

Ingulstad, A., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.290-295, With French and German summaries.

Road maintenance, Snow removal, Education, Computer applications, Cost analysis, Norway

49-4024

Winter maintenance in a Danish county.

Kjær, N.P., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.296-303, With French and German summaries.

Road icing, Weather forecasting, Salting, Snow removal, Road maintenance, Highway planning, Denmark

49-4025

Experience with automatic de-icing sprinkler installations. [Erfahrungen mit Taumittelsprühanlagen (TMS)]

Kutter, M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.304-312, In German with English and French summaries. 4 refs.

Road icing, Artificial melting, Snow removal, Road maintenance

49-4026

Road Traffic in Winter Project—general aims and the results of the first year.

Leppänen, A., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.313-320, With French and German summaries.

Road icing, Tires, Salting, Road maintenance, Highway planning, Finland

49-4027

Pedestrians transportation capacity on different slippery surfaces during winter.

Gard, G., Lundborg, G., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.321-327, With French and German summaries. 6 refs.

Road icing, Sidewalks, Safety, Clothing, Skid resistance, Human factors engineering, Sweden

49-4028

Basic orientation and objectives of winter road maintenance in the Czech Republic. [Grundorientierung und Ziele des Winterdienstes der Tschechischen Republik]

Melcher, K., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.328-336, In German with English and French summaries.

Road icing, Chemical ice prevention, Snow removal, Road maintenance, Highway planning, Czech Republic

49-4029

Use of salt as deicing agent in the winter road maintenance.

Vaa, T., Resen-Fellie, O.P., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.337-344, With French and German summaries. 2 refs.

Road icing, Salting, Road maintenance, Accidents, Norway

49-4030

Winter Olympics 1994 at Lillehammer, Norway—an enormous challenge for the Norwegian Public Roads Administration.

Ruud, O.W., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.345-353, With French and German summaries.

Road maintenance, Highway planning, Regional planning, Cold weather operation, Cost analysis, Norway

49-4031

Relation between winter road maintenance and road safety.

Sävenhed, H., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.354-359, With French and German summaries. 5 refs.

Road icing, Snow removal, Salting, Road maintenance, Safety, Accidents, Sweden

49-4032

Vienna winter maintenance concept. [Das Wiener Winterdienstkonzept]

Skerlan, M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.360-367, In German with English and French summaries.

Road icing, Snow removal, Sanding, Road maintenance, Streets, Urban planning, Austria

49-4033

Introducing new technology for winter road maintenance in Lithuania. [Die Einsetzung der neuen Winterdiensttechnologie in Litauen]

Skerys, K., Laurinavičius, A., Čygas, D., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.368-373, In German with English and French summaries.

Road icing, Salting, Sanding, Road maintenance, Highway planning, Cost analysis, Lithuania

49-4034

Winter maintenance of Croatian roads under war conditions.

Sršen, M., Glad, M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.1, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.374-381, With French and German summaries.

Road maintenance, Snow removal, Sanding, Military operation, Cold weather operation, Highway planning, Cost analysis, Croatia

49-4035

Method for allocating funds for winter maintenance.

Duass, L.I., Gabestad, K.O., Solberg, K.A., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.382-388, With French and German summaries.

Road maintenance, Snow removal, Highway planning, Cost analysis, Norway

49-4036

Winter index—Definition of a parameter for describing winter severity. [Winterindex—Entwicklung einer Kenngröße zur Beschreibung der Winterstrenge]

Breitenstein, J., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.389-396, In German with English and French summaries.

Road icing, Salting, Road maintenance

49-4037

Increased performance and lower costs in winter road maintenance. [Leistungssteigerung und Kostensenkung im Strassenwinterdienst]

Schlup, U., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.397-404, In German with English and French summaries.

Road icing, Snow removal, Salting, Road maintenance, Cost analysis, Switzerland

49-4038

Cost-benefit analyses in winter maintenance. [Kostenuntersuchungen in Winterdienst]

Fortin, W., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.405-412, In German with English and French summaries.

Road icing, Snow removal, Road maintenance, Highway planning, Cost analysis, Austria

49-4039

Total optimizing of the storage and transportation process for salt and sand.

Rahja, J., Korhonen, P., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.413-420, With French and German summaries. 2 refs.

Road icing, Road maintenance, Salting, Sanding, Highway planning, Cost analysis, Finland

49-4040

Evaluation of the efficiency of winter maintenance. [Untersuchung der Wirksamkeit des Winterdienstes]

Durth, W., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.421-428, In German with English and French summaries. 3 refs.

Road icing, Road maintenance, Safety, Accidents, Cost analysis, Germany

49-4041

Economic impact of winter road maintenance on road users.

Hanbali, R.M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.429-439, With French and German summaries. 18 refs.

Road icing, Road maintenance, Snow removal, Salting, Highway planning, Safety, Accidents, Cost analysis

49-4042
Optimization in winter maintenance—improvement of performance and economy. [Winterdienstoptimierung—Steigerung der Wirtschaftlichkeit des Straßenwinterdienstes, Verfahren und Erfahrungen]
Blesik, K.H., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.440-446, In German with English and French summaries.
Road icing, Snow removal, Road maintenance, Highway planning, Cost analysis

49-4043
Brine spreading in winter maintenance—saving potential and economic aspects. [Feuchtsalz-Streuung im Straßenwinterdienst— Einsparungspotentiale und Wirtschaftlichkeit]
Hanke, H., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.447-454, In German with English and French summaries. 7 refs.
Road icing, Chemical ice prevention, Salting, Brines, Road maintenance, Cost analysis

49-4044
Training people for winter maintenance. [La formation des hommes en viabilité hivernale]
Pinetti, M., Legout, L., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.455-467, In French with English and German summaries. English version p.461-467.
Road maintenance, Cold weather operation, Education, Cost analysis, France

49-4045
"Less salt, better salting" campaign. [L'opération "Salez moins—Salez mieux"]
Roussel, J.J., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.468-473, In French with English and German summaries.
Road icing, Chemical ice prevention, Salting, Road maintenance, France

49-4046
Automatic data collection of winter maintenance operations. [Automatische Datenerfassung von Winterdiensteinsätzen]
Steinhauser, L., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.474-477, In German with English and French summaries.
Road maintenance, Cold weather operation, Highway planning, Data processing, Computer applications, Cost analysis

49-4047
Traffic safety in winter. [Die eigene Sicherheit des Wegverkehrs während des Winters]
Udvardy, L., Lazie, I., Ionescu, N., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.478-485, In German with English and French summaries. 14 refs.
Road maintenance, Cold weather operation, Safety, Highway planning, Data processing, Computer applications, Romania

49-4048
Environmental effects of chemical de-icing.
Bäckman, L., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.486-490, With French and German summaries.
Road icing, Chemical ice prevention, Salting, Road maintenance, Environmental impact, Water pollution, Soil pollution, Sweden

49-4049
Alternative deicers: recent developments in acetate-based deicing compounds.
Johnson, K.L., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.491-496, With French and German summaries. 7 refs.
Road icing, Chemical ice prevention, Salting, Road maintenance, Environmental protection, United States—Iowa

49-4050
Slipping and sliding? The effects of reduced deicing in Finland.
Kallberg, V.P., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.497-503, With French and German summaries.
Road icing, Salting, Road maintenance, Skid resistance, Safety, Accidents, Finland

49-4051
Influence of road fluxes on ecosystems near a heavy-traffic road. [Influence des fondants routiers sur les écosystèmes proches d'une voirie à grande circulation]
Warnon, C., Ledent, L., Staquet, F., Vandevenne, L., Vanderdonck, P., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.504-511, In French with English and German summaries. 4 refs.
Road icing, Salting, Road maintenance, Water pollution, Belgium

49-4052
A.40 Motorway—protecting the waters of Lake Sylans against salt pollution. [Autoroute A.40—protection des eaux du lac de Sylans contre la pollution saline]
Roussel, J.C., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.512-518, In French with English and German summaries.
Road icing, Salting, Road maintenance, Water pollution, France

49-4053
Proposal for an optoelectronic process for determining the quantitative distribution of melting agents on pavement. [Beitrag für optoelektronisches Verfahren zur Feststellung der quantitativen Verteilung von Taumitteln auf der Fahrbahn]
Scharsching, H., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.519-526, In German with English and French summaries. 6 refs.
Road icing, Salting, Road maintenance, Soil pollution, Water pollution, Environmental impact

49-4054
Recycling of inert winter spreading materials. [Recycling vom inerten Winterstreusplitt]
Belošovič, Š., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.527-531, In German with English and French summaries.
Road icing, Sanding, Road maintenance, Environmental protection, Waste disposal, Slovakia

49-4055
Repercussions of winter road maintenance on the environment. [Auswirkungen des Winterdienstes auf die Umwelt]
Brod, H.G., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.532-539, In German with English and French summaries. 19 refs.
Road icing, Salting, Road maintenance, Environmental impact, Soil pollution, Water pollution, Germany

49-4056
Requirements of inert spreading materials for winter maintenance. [Anforderungen an inerte Streumaterialien für die winterliche Verkehrwegeerhaltung]
Belošovič, Š., Kuchtová, J., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.540-544, In German with English and French summaries.
Road icing, Sanding, Road maintenance, Environmental protection, Soil pollution, Water pollution, Slovakia

49-4057
Winter maintenance and ground water in the Uusimaa Road District, Finland. [Winterdienst und Grundwasser im Straßenbezirk Uusimaa, Finland]
Nevala, E., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.545-549, In German with English and French summaries.
Road icing, Salting, Road maintenance, Environmental impact, Ground water, Soil pollution, Water pollution, Finland

49-4058
Quality requirements of spreading materials to control slippery roads. [Güteanforderungen an Streustoffe zur Glättebekämpfung]
Wagner, F.J., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.550-556, In German with English and French summaries.
Road icing, Sanding, Salting, Road maintenance, Standards, Environmental protection, Germany

49-4059
New technological developments in winter maintenance in Italy. [Nouveaux développements technologiques pour la viabilité en hiver en Italie]
Peroni, G., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.557-564, In French with English and German summaries. 5 refs.
Road icing, Chemical ice prevention, Salting, Road maintenance, Italy

49-4060

Snowmelting system using the solar energy accumulated in the embankment.

Suzuki, T., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.565-572, With French and German summaries.

Road icing, Snow removal, Snow melting, Artificial melting, Road maintenance, Solar radiation, Heat recovery, Heat pipes, Japan

49-4061

Automatic measurement of road status.

Axelson, L., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.573-578, With French and German summaries.

Road icing, Road maintenance, Weather forecasting, Computer applications, Data transmission, Sweden

49-4062

Deicing of roads in Norway with brine.

Stoetterud, R., Reitan, K.M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.579-586, With French and German summaries.

Road icing, Chemical ice prevention, Salting, Brines, Road maintenance, Norway

49-4063

Winter maintenance research in Minnesota—a nationally recognized program.

Keranen, P.F., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.587-594, With French and German summaries.

Road icing, Salting, Sanding, Snow removal, Road maintenance, Highway planning, Research projects, Cost analysis, United States—Minnesota

49-4064

New developments of snow plows.

Syrén, P., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.595-600, With French and German summaries.

Snow removal, Motor vehicles, Road maintenance, Equipment, Finland

49-4065

Neural network for short term temperature forecast for roads. [Ein neuronales Netz zur Kurzzeit-Temperaturprognose auf Straßen]

Fröhling, P.W., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.601-608, In German with English and French summaries. 8 refs.

Road icing, Ice forecasting, Weather forecasting, Weather stations, Road maintenance, Data processing, Computer applications, Austria

49-4066

ASB-TRANSPO II (Electronic data acquisition in operational maintenance and as police traffic monitoring of national thoroughfares). [ASB-TRANSPO II (Elektronische Datenerfassung im betrieblichen Unterhalt und bei der polizeilichen Verkehrsüberwachung der Nationalstraßen)]

Wieser, M., Hunger, B., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.609-616, In German with English and French summaries.

Road maintenance, Cold weather operation, Highway planning, Safety, Data processing, Data transmission, Computer applications, Switzerland

49-4067

Measurement of residual salt on roads by SOBO 20. [Mesure du sel résiduel sur route par le SOBO 20]

Framhout, J.P., Van Heystraeten, G., De Wit, M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.617-624, In French with English and German summaries. 7 refs.

Road icing, Chemical ice prevention, Salting, Road maintenance, Belgium

49-4068

Manufacture of NaCl salt brine—principle of Schmidt France Neige Brine Plants. [Fabrication de saumure de chlorure de sodium NaCl—Principe des centrales à saumure Schmidt France Neige]

Hueber, C., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.625-634, In French with English and German summaries.

Road icing, Chemical ice prevention, Salting, Brines, Road maintenance, France

49-4069

Automated salt dosage based on road condition and surface temperature. [Automatisierung der Streusatzdosierung in Abhängigkeit vom Fahrbahnzustand und der Oberflächentemperatur]

Niebrügge, L., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.635-642, In German with English and French summaries. 2 refs.

Road icing, Chemical ice prevention, Salting, Equipment, Road maintenance

49-4070

Design of a new distribution system for spreading rock salt.

Burtwell, M.H., Berg, F.W., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.643-652, With French and German summaries. 3 refs.

Road icing, Chemical ice prevention, Salting, Motor vehicles, Equipment, United Kingdom

49-4071

Winter maintenance on bike paths. [Winterdienst auf Radwegen]

Van der Kamp, W.J., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.653-658, In German with English and French summaries.

Road icing, Chemical ice prevention, Salting, Road maintenance, Human factors engineering, Netherlands

49-4072

Trends in the development of winter maintenance vehicles in line with environmental protection. [Entwicklungstendenzen bei Straßendienstfahrgestellen mit Zielrichtung Umweltfreundlichkeit]

Randig, K., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.659-665, In German with English and French summaries.

Road maintenance, Motor vehicles, Cold weather operation, Cold weather performance, Austria

49-4073

New Variman. [Der neue Variman]

Pertlik, R., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.666-671, In German with English and French summaries.

Snow removal, Motor vehicles, Equipment, Road maintenance, Austria

49-4074

Cleaning of road signs, marker posts and road marking.

Berg, J., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.672-679, With French and German summaries.

Road maintenance, Highway planning, Cold weather operation, Safety, Cost analysis, Norway

49-4075

Winter maintenance and drainage surfacing, the advantage of decision aiding systems. [Viabilité hivernale et enrobés drainants, le plus des systèmes d'aide à la décision]

Barbry, J.H., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.680-686, In French with English and German summaries.

Road maintenance, Cold weather operation, Highway planning, Safety, Weather forecasting, Weather stations, Data processing, France

49-4076

Innovative, flexible system for data transmission and remote control on highways. [Ein neues, flexibles System zur Lösung von Datenübertragungs- und Steuerungsaufgaben auf Hochleistungsstraßen]

Fröhling, P.W., Wantra, W., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.687-692, In German with English and French summaries.

Road icing, Ice forecasting, Weather forecasting, Weather stations, Road maintenance, Data transmission, Computer applications, Austria

49-4077

Results of road condition radar operation in winter road maintenance. [Praktische Erfahrungen mit dem Straßenzustandsradar im Straßenwinterdienst]

Fröhling, P.W., Pritzl, W., Wantra, W., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.693-699, In German with English and French summaries. 6 refs.

Road icing, Ice detection, Weather forecasting, Weather stations, Road maintenance, Radar photography, Data transmission, Austria

49-4078

Methods and strategies to achieve a chosen winter road standard.

Gustafson, K., Henrysson, G., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.700-707, With French and German summaries. 2 refs.

Road icing, Chemical ice prevention, Salting, Brines, Road maintenance, Sweden

49-4079

Ecological and economic aspects of new developments in snow plows. [Entwicklung zur ökologischen und ökonomischen Räumung mit Schneepflügen]

Isecke, J., Reeb, H.P., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.708-715, In German with English and French summaries.

Road icing, Snow removal, Road maintenance, Motor vehicles, Equipment, Germany

49-4080

Brine production, storing and de-icing strategy.

Kuusela, R., Raukola, T., Lappalainen, H., Piirainen, A., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.716-722, With French and German summaries. 3 refs.

Road icing, Chemical ice prevention, Salting, Brines, Road maintenance, Finland

49-4081

Review of ideas and equipment for winter maintenance in Finland.

Kuusela, R., Raukola, T., Lappalainen, H., Piirainen, A., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.723-729, With French and German summaries.

Road icing, Snow removal, Chemical ice prevention, Salting, Sanding, Road maintenance, Finland

49-4082

Cost effective ice prediction.

McDonald, A., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.730-741, With French and German summaries. 7 refs.

Road icing, Ice forecasting, Weather forecasting, Salting, Road maintenance, Computer applications, Cost analysis, United Kingdom

49-4083

Collection of performance data in winter maintenance. [Einsatzdatenerfassung im Straßenwinterdienst und bei der Straßenunterhaltung]

Reeb, H.P., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.742-750, In German with English and French summaries.

Road icing, Weather forecasting, Salting, Road maintenance, Data transmission, Computer applications, Germany

49-4084

Environmentally sound snow and ice removal. [Umweltgerechte Schneeräumung und Glatteisbekämpfung]

Rösli, T., Zaugg, W., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.751-756, In German with English and French summaries.

Road icing, Snow removal, Salting, Road maintenance, Motor vehicles, Equipment, Germany

49-4085

Deicing system on the bridge over the river IJssel near Arnhem NL.

Van der Kamp, W.J., Noort, M., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.757-764, With French and German summaries. 3 refs.

Road icing, Chemical ice prevention, Salting, Bridges, Pavements, Bitumens, Road maintenance, Netherlands

49-4086

Ice-inhibiting bituminous layers with "salt concrete". [Die eishemmenden bituminösen Verschleißschichten mit dem Salzbeton]

Zavřel, J., PIARC [Permanent International Association of Road Congresses] International Winter Road Congress, 9th, Seefeld, Austria, Mar. 21-25, 1994. Technical report. Vol.2, Vienna, Austria, Bundesministerium für wirtschaftliche Angelegenheiten (Ministry for Economic Affairs), 1994, p.765-772, In German with English and French summaries. 2 refs.

Road icing, Concrete pavements, Bituminous concretes, Concrete admixtures, Antifreezes, Frost resistance, Frost protection, Road maintenance, Czech Republic

49-4087

Aspects of some chemical parameters of ice and snow in the antarctic continent.

Paganelli, A., Meeting on Antarctic Biology, 2nd, Padova, Italy, Feb. 26-28, 1992. Proceedings. Edited by B. Battaglia, P.M. Bisol and V. Varotto, Padova, Edizioni Universitarie Patavine, 1944, p.77-81, With Italian summary. 7 refs.

Ice composition, Snow composition, Antarctica—Victoria Land

Forty-three samples of water from ice and snow from different areas of Victoria Land, collected during the Italian antarctic expeditions of 1989-90 and 1990-91, were analyzed. The following chemical parameters were determined: conductivity, pH, total phosphorus, reactive phosphorus, nitric nitrogen and ammoniacal nitrogen. Tabulated results are presented.

49-4088

Ice core hot-fluid drilling.

Kudriashov, B.B., Menshikov, N.G., *Antarctic record,* 1994, 38(3), p.193-198, With Japanese summary. 4 refs.

Ice coring drills, Boreholes, Drilling fluids, Thermal drills, Antarctica—Vostok Station

Fast hole production is possible using ice core hot-fluid drilling. The present paper describes a method for calculation of drill penetration rate dependent on the fluid flux, fluid temperature, physical properties of fluid, size of hot-fluid drill head and properties of the ice. The design and description of an experimental model of an ice core hot-fluid drill and the experimental data obtained are given. Calculated and measured rates of the drill penetration are compared. (Auth.)

49-4089

Substances deposited on an inland plateau, Antarctica.

Kamiyama, K., Watanabe, O., *Antarctic record,* 1994, 38(3), p.232-242, In Japanese with English summary. 17 refs.

Snow composition, Atmospheric composition, Atmospheric circulation, Climate, Antarctica—East Antarctica

Various substances are transported over the inland plateau of Antarctica through the atmosphere and deposited onto the snow surface. The chemical composition of the snow reflects the transportation process and the amounts of the substances present in the atmospheric environment. In this report, investigations on the snow chemistry on the inland plateau are briefly reviewed. The concentrations of some substances, for example tritium, have increased. This was produced both by the local effect over the inland plateau, caused by the extremely low temperature air mass, and by the global circulation through the stratosphere, which transports substances directly from remote areas. By considering the special chemical features of the accumulated snow in the interior of the antarctic continent, one can more effectively interpret ice and snow cores in the study of the global atmospheric environment. (Auth. mod.)

49-4090

Review of the coastal marine ecosystem research at Syowa Station, Antarctica.

Hoshiai, T., *Antarctic record,* 1994, 38(3), p.243-251, With Japanese summary. Refs. p.249-251.

Ice cover effect, Biomass, Marine biology, Algae, Antarctica—Showa Station

Results of marine biological research on the coastal marine ecosystem in the Showa Station area in conjunction with BIOMASS are reviewed. This research aimed at the collection of year-round information on the basic elements in the ecosystem of the region in the 1982-84 winters. General information on the ecology of bacteria, phytoplankton, ice algae and zooplankton; sinking and decomposing processes of organic particulates produced; overwintering strategy of krill; and ecology of benthos are given. Based on the above investigations, some research topics for a recently proposed international program, "Coastal and Shelf Studies in the Ecology of the Antarctic Sea Ice Zone" are suggested. (Auth.)

49-4091

Meteorological observations at Syowa Station and Asuka Station in 1991 by the 32nd Japanese Antarctic Research Expedition.

Abe, T., Iwamoto, M., Sukegawa, Y., Inayoshi, H., Aono, M., *Antarctic record,* 1994, 38(3), p.268-321, In Japanese with English summary. 13 refs.

Ozone, Meteorological data, Ultraviolet radiation, Snowfall, Wind (meteorology), Meteorological instruments, Antarctica—Showa Station, Antarctica—Asuka Station

Results of meteorological observations carried out by JARE-32 from Feb. 1, 1991, to Jan. 31, 1992, are discussed and shown in tables. Radiation data, including ultraviolet-B radiation, were obtained at Showa Station; at Asuka Station, aerological observations were carried out. The number of blizzards at Showa was 34; at Asuka, 82; the annual total sunshine duration was 1,684.9 hours; the ozone hole was observed during 3 successive years, with the lowest daily total ozone value of 159 m atm-cm recorded on Sep. 30. (Auth. mod.)

49-4092

Report on Workshop "Use of a Multi-Purpose Satellite Data Receiving System at Syowa Station" and "Study on the Polar Atmosphere and Hydrosphere Using Satellite Data with Surface Validation Observations".

Hirasawa, N., Yamanouchi, T., Ejiri, M., *Antarctic record,* 1994, 38(3), p.322-328, In Japanese with English summary. 1 ref.

Meteorological data, Imaging, Spacecraft, Ice sheets, Sea ice distribution, Solar radiation, Clouds (meteorology), Antarctica—Showa Station

The purposes of this workshop were as follows: to discuss algorithms to derive parameters of the polar atmosphere and hydrosphere comparing data and surface observations; and to select the satellites to be received at Showa Station through discussion about their sensors and the orbital elements. The contents of the workshop include analysis of the character of the ice sheet surface by NOAA or DMSP, detection of sea ice distribution by ERS or JERS, detection of cloud by NOAA multi-channel radiation data, and effect of clouds on radiation budget. (Auth. mod.)

49-4093

Analyzing the stability of floating ice floes.
Coutermarsh, B., McGilvary, R., CR 94-13, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Dec. 1994, 19p., ADA-292 149, 9 refs.

Ice floes, Ice pressure, River ice, Ice cover, Ice density, Ice cover thickness, Analysis (mathematics), Hydrodynamics

This report describes an experimental study to measure the pressure caused by fluid acceleration beneath a floating parallelepiped block. Dynamic fluid pressure was measured at discrete points beneath the block for several flow velocities, flow depths, block angles of attack and block-thickness-to-depth ratios. The measured pressures were used to calculate block underturning moments, and a hydrostatic analysis was used to calculate a block righting moment. From this, a densimetric Froude underturning criterion is presented. The measured hydrodynamic pressure distribution on the bottom of a single model ice floe is used to estimate the dynamic stability at three thickness-to-depth ratios. The energy-based analysis details the conditions required for instability, metastability and stability. At three thickness-to-depth ratios, block rotational inertia has the effect of reducing the Froude stability number by 5 to 10% over a completely static stability criterion.

49-4094

Biology of the southern ocean.
Knox, G.A., Cambridge, University Press, 1994, 444p., Refs. p.[381]-429. Pertinent pages to CRREL, p.39-65 and 221-263.

DLC QH95.58.K58 1994

Marine biology, Sea ice, Ice edge, Plankton, Microbiology, Biomass

This book commences with a description of the physico-chemical environment and then follows a logical sequence covering phytoplankton and primary production, the sea ice microbial community and zooplankton. There is an extended chapter on the biology and ecology of antarctic krill in view of its central position in the southern ocean food web. In addition, krill have been the subject of intensive research programs over the past two decades, especially during BIOMASS. A series of chapters considers the higher consumers, nekton (with an emphasis on cephalopods), fish, seals, whales and seabirds. Then follows a series of chapters on selected ecosystems: the benthic communities, life beneath the fast ice and ice shelves, marginal ice edge processes, recent advances in understanding the decomposition process and the roles of bacteria and protozoa. These are followed by an attempt at a synthesis of ecosystem dynamics with an emphasis on the pelagic ecosystem. The following three chapters deal with resource exploitation, the impact of such exploitation on the marine ecosystem of the southern ocean, and the problems involved in the management of the living resources. (Auth.)

49-4095

Buried dry ice on Mars.
Haberle, R.M., *Nature,* Apr. 13, 1995, 374(6523), p.595-596, 8 refs.

Extraterrestrial ice, Mars (planet), Climatic changes, Carbon dioxide

49-4096

Bottom melting on the Filchner-Ronne Ice Shelf, Antarctica, using different measuring techniques.
Grosfeld, K., Blindow, N., Thyssen, F., *Polarforschung,* 1992 (Publ. 1994), 62(2/3), p.71-76, With German summary. 13 refs.

Ice shelves, Ice bottom surface, Ice melting, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

During the 1989-90 field season on Filchner-Ronne Ice Shelf special interest was focussed on the examination of the bottom-melting rate by different measuring techniques. Access to the sea water underneath the ice shelf was gained by means of hot-water drillings. The installation of temperature cable and TDR-sensor lines yielded a distinct value of the bottom mass-balance parameter after re-measurement in 1992. In addition a seasonal dependence for bottom melting is indicated. The results of the long-term observation conform with a mass-balance study performed in the same region from surface-based measurements in the same season. The influence of tidal-induced ice shelf/ocean interaction with regard to bottom melting can be derived from a continual registration of sea-water temperatures. (Auth.)

49-4097

Ultraviolet (A) and short-wave radiation on the Juneau Icefield, Alaska.
Quakenbush, T., Wendler, G., *Polarforschung,* 1992 (Publ. 1994), 62(2/3), p.77-82, With German summary. 23 refs.

Glacier ice, Ultraviolet radiation, Measuring instruments, United States—Alaska—Juneau

49-4098

Sandar formation and glacier drainage of Kötlujökull (Höfdabrekkujökull), southern Iceland. [Sandergenese und Gletscherentwässerung am Kötlujökull (Höfdabrekkujökull), Südisland]
Heim, D., *Polarforschung,* 1992 (Publ. 1994), 62(2/3), p.95-128, In German with English summary. 78 refs.

Glacier melting, Subglacial drainage, Glacial hydrology, Meltwater, Sediments, Iceland

49-4099

Drilling into antarctic ice - the new BGR ice drill.
Zeibig, M., Delisle, G., *Polarforschung,* 1994 (Publ. 1992), 63(2/3), p.147-150, With German summary. 6 refs.

Ice drills, Thermal drills, Antarctica—Ricker Hills, Antarctica—Howard, Mount, Antarctica—Billing, Mount

Described here is a new ice drill consisting of an electrically heated probe that melts its way through the ice. The meltwater produced is recovered periodically with a bailer. The instrument is mounted in a closed container on a sledge and is operable irrespective of weather conditions. Forty-eight boreholes in antarctic ice have been drilled so far in two seasons by this system. The deepest hole reached 102 m. (Auth.)

49-4100

Ozone "miniholes" initiated by energetic solar protons.
Shumilov, O.I., Kasatkina, E.A., Henriksen, K., Raspopov, O.M., *Journal of atmospheric and terrestrial physics,* May 1995, 57(6), p.665-671, 29 refs.

Ozone, Atmospheric composition, Aerosols, Stratosphere, Solar activity

In this study it is shown that during four solar proton events (SPE) (May 1990, Sep. and Oct. 1989, and Mar. 1989) inside the polar cap in the Arctic (or the Antarctic), short-term depletions were observed (up to 20%) in the ozone total content. These depletions, or so-called ozone "miniholes", seem to be caused by energetic solar protons with energies of 150-300 MeV. For May 1990, the gas phase photochemical model includes only 1% ozone depletion compared with 18% observed at Barentsburg (Svalbard), and for none of the other events can homogeneous processes explain the observed depletion. The problem seems to be solved by considering heterogeneous reactions in the presence of increased amounts of aerosol particles in the stratosphere which may be triggered by penetrating solar protons, or through an additional decrease of temperature, or through an increase of volume electric charge in the stratosphere or troposphere. (Auth.)

49-4101

Mathematical foundation of flow of glaciers and large ice masses.
Hutter, K., Polish Academy of Sciences. Banach Center Publications. Vol.15: Mathematical models and methods in mechanics. Edited by W. Fiszdon and K. Wilmański, Warsaw, PWN-Polish Scientific Publishers, 1985, p.277-322, 53 refs.

DLC QA805.M37 1986

Mathematical models, Ice mechanics, Glacier flow, Ice models, Ice water interface, Ice cover, Stresses

49-4102

Antarctic automatic weather station data for the calendar year 1993.
Keller, L.M., Weidner, G.A., Stearns, C.R., Whittaker, M.T., Madison, University of Wisconsin, 1995, 473p.

Weather stations, Meteorological data, Air temperature, Atmospheric pressure, Wind velocity

A network of automatic weather station (AWS) units is deployed to collect antarctic surface weather observations in support of specific meteorological research projects as well as operational activities at McMurdo Station. The 1993 network consisted of 39 installed AWS units providing observations on the Ross Ice Shelf, east of the Transantarctic Mountains and north of McMurdo to the Adélie Coast, along the Antarctic Peninsula and at climatological locations such as the South Pole. Each unit measures air temperature, wind speed, and wind direction at a nominal height of 3 m, and air pressure at the electronics enclosure. Some AWS units also measure the relative humidity at 3 m and vertical air temperature difference between 0.5 and 3 m.

49-4103

Quasi-steady problems in freezing soils: IV. Traveling wave solutions.
Nakano, Y., MP 3601, *Cold regions science and technology,* Nov. 1994, 23(1), p.1-17, 10 refs.

Soil freezing, Frozen ground mechanics, Freezing front, Frost heave, Ice growth, Mathematical models

In this work the steady growth of ice-rich frozen soil is studied. By deriving a traveling wave solution to the problem, it is found that the condition of steady growth of ice-rich frozen soil is uniquely determined by a set of two physical variables used earlier (Nakano, 1990) under given hydraulic conditions and overburden pressures. The traveling wave solution converges to the solution to the problem of a steadily growing ice layer when the velocity of the 0°C isotherm relative to the unfrozen part of the soil vanishes.

49-4104

Micromechanics-based constitutive model of polycrystalline ice and FEM analysis for prediction of ice forces.
Premachandran, R., Horii, H., *Cold regions science and technology,* Nov. 1994, 23(1), p.19-39, 27 refs.

Ice mechanics, Ice models, Rheology, Ice deformation, Mathematical models, Loading, Crack propagation, Stress concentration, Nucleation rate, Ice solid interface

49-4105

Mechanical properties of rafted annual sea ice.
Poplin, J.P., Wang, A.T., *Cold regions science and technology,* Nov. 1994, 23(1), p.41-67, 20 refs.

Sea ice, Mechanical properties, Compressive properties, Mechanical tests, Ice rafting, Ice cover strength, Temperature effects, Correlation

49-4106

Analysis of ice fragmentation process from measured particle size distributions of crushed ice.
Tuhkuri, J., *Cold regions science and technology,* Nov. 1995, 23(1), p.69-82, 35 refs.

Ice mechanics, Ice solid interface, Cracking (fracturing), Mechanical tests, Fractals, Brittleness, Particle size distribution, Crack propagation, Statistical analysis

49-4107

Sub-permafrost water storage beneath subpolar ice sheets.
Shoemaker, E.M., *Cold regions science and technology,* Nov. 1994, 23(1), p.83-91, 22 refs.

Ice sheets, Glacial hydrology, Subpermafrost ground water, Water storage, Upwelling, Water pressure, Water transport, Subglacial drainage

49-4108

Is the thermal regime of permafrost determined by solar rhythms.
Kazantsev, V.V., *Cold regions science and technology,* Nov. 1994, 23(1), p.93-98, 8 refs.

Soil temperature, Permafrost thermal properties, Thermal regime, Temperature variations, Solar activity, Correlation

49-4109

Sensitive and robust strain-meter for ice studies.
Haskell, T.G., Robinson, W.H., *Cold regions science and technology,* Nov. 1994, 23(1), p.99-104, 6 refs.

Strain measuring instruments, Glacier ice, Ice mechanics, Glacier tongues, Portable equipment, Strain tests, Wave propagation, Antarctica—Erebus Glacier

A strain gage to measure the relative horizontal displacement between two plates embedded 500 mm apart in ice, for use in both fresh and sea ice, has been developed and tested in the Antarctic at temperatures down to -20°C. The strain gage has a sensitivity of about $8x10^{-9}$ and is unaffected by the vertical accelerations which can occur when waves propagate through floating ice sheets. It is robust enough to allow quick installation, can be buried in the ice, has precise autozeroing functions which enable creep to be monitored, has a response time less than 0.02 sec and can present the strain results in a variety of formats. The gage has been used to study waves in floating ice-sheets generated by moving vehicles, and to monitor strains within the Erebus Glacier Tongue. (Auth. mod.)

49-4110

Ice-screw system for anchoring test equipment on to ice.
Haskell, T.G., Robinson, W.H, *Cold regions science and technology,* Nov. 1994, 23(1), p.105-107.

Hydraulics, Equipment, Sea ice, Anchors, Mechanical properties, Performance

In order to attach hydraulic test equipment to sea ice, a system using ice-screws has been developed over the last few seasons in Antarctica. The ice-screws used to date all have an outside diameter of 90 mm to match that of a tapping device which ensures accurate placement of the screws in pre-drilled holes in the ice. The lengths of the screws vary from 200 to 900 mm, depending on the intended use. The load-carrying capabilities of the shorter ice-screws has been found to be typically 75 kN; that of full-length screws exceeded the maximum force available in the hydraulic test equipment, approximately 200 kN. (Auth. mod.)

49-4111

Observations of ice-sheet motion in Greenland using satellite radar interferometry.

Joughin, I.R., Winebrenner, D.P., Fahnestock, M.A., *Geophysical research letters,* Mar. 1, 1995, 22(5), p.571-574, 14 refs.

Glacier flow, Ice sheets, Remote sensing, Glacier oscillation, Spaceborne photography, Synthetic aperture radar, Image processing, Greenland

49-4112

Ice flow dynamics of the Greenland ice sheet from SAR interferometry.

Rignot, E.J.M., Jezek, K.C., Sohn, H.G., *Geophysical research letters,* Mar. 1, 1995, 22(5), p.575-578, 17 refs.

Glacier flow, Ice sheets, Glacier oscillation, Remote sensing, Synthetic aperture radar, Image processing, Mapping, Greenland

49-4113

Radar internal layers from the Greenland summit.

Jacobel, R.W., Hodge, S.M., *Geophysical research letters,* Mar. 1, 1995, 22(5), p.587-590, 14 refs.

Ice sheets, Remote sensing, Airborne radar, Radar echoes, Structural analysis, Profiles, Layers, Ice deformation, Greenland

49-4114

Relation of Na+ concentration and $\delta^{18}O$ in winter precipitation with weather conditions.

Suzuki, K., Endo, Y., *Geophysical research letters,* Mar. 1, 1995, 22(5), p.591-594, 15 refs.

Precipitation (meteorology), Sampling, Chemical analysis, Snow composition, Isotope analysis, Oxygen isotopes, Turbulent diffusion, Snow air interface, Ion density (concentration)

49-4115

Snow survey bulletin.

British Columbia. BC Environment. Water Management Division, Victoria, British Columbia, Mar. 1994, 57p.

Snow surveys, Snow depth, Snow water equivalent, Stream flow, Runoff forecasting, Canada—British Columbia

49-4116

Snow survey bulletin.

British Columbia. BC Environment. Water Management Division, Victoria, British Columbia, Apr. 1994, 45p.

Snow surveys, Snow depth, Snow water equivalent, Stream flow, Runoff forecasting, Canada—British Columbia

49-4117

Snow survey bulletin.

British Columbia. BC Environment. Water Management Division, Victoria, British Columbia, May 1994, 45p.

Snow surveys, Snow depth, Snow water equivalent, Stream flow, Runoff forecasting, Canada—British Columbia

49-4118

Snow survey bulletin.

British Columbia. BC Environment. Water Management Division, Victoria, British Columbia, June 1994, 49p.

Snow surveys, Snow depth, Snow water equivalent, Stream flow, Runoff forecasting, Canada—British Columbia

49-4119

Review of freeze-up forecasts for the lower Great Lakes and St. Lawrence River. Task 1: documentation of methods.

Lapp, D., Ottawa, Environment Canada, Ice Center, Apr. 1988, 30p., WDCA 93000475, 9 refs.

Lake ice, River ice, Freezeup, Ice forecasting, Ice reporting, Great Lakes, Canada—Quebec—St. Lawrence River

49-4120

Review of freeze-up forecasts for the lower Great Lakes and St. Lawrence River. Task 2: distribution and use of forecasts.

Lapp, D., Ottawa, Environment Canada, Ice Center, Apr. 1988, 11p., WDCA 93000476.

Lake ice, River ice, Freezeup, Ice forecasting, Ice reporting, Great Lakes, Canada—Quebec—St. Lawrence River

49-4121

Review of freeze-up forecasts for the lower Great Lakes and St. Lawrence River. Task 3: proposed methodology for comparing forecasts.

Lapp, D., Ottawa, Environment Canada, Ice Center, Apr. 1988, 15p., WDCA 93000477.

Lake ice, River ice, Freezeup, Ice forecasting, Ice reporting, Great Lakes, Canada—Quebec—St. Lawrence River

49-4122

ETH Greenland Expedition. Progress report No.1: April 1989 to February 1991. Energy and mass balance during the melt season at the equilibrium line altitude, Paakitsoq, Greenland ice sheet (69° 34' 25.3" North, 49° 17' 44.1" West, 1175 m a.s.l.).

Ohmura, A., ed, Zurich, Swiss Federal Institute of Technology (Eidgenössische Technische Hochschule), Department of Geography, 1991, 108p., WDCA 93000280, Refs. passim.

Glacier surveys, Ice sheets, Glacier mass balance, Glacier heat balance, Glacial hydrology, Glacial meteorology, Ice air interface, Polar atmospheres, Greenland

49-4123

South east Australian alpine climate study.

Ruddell, A.R., Budd, W.F., Smith, I.N., Keage, P.L., Jones, R., Melbourne, University, Department of Meteorology, Aug. 1990, 115p., WDCA 93000849, 51 refs.

Snow surveys, Snow cover distribution, Snow depth, Snowfall, Snow water equivalent, Meteorological data, Weather forecasting, Australia

49-4124

Remote sensing for the Lincoln Sea winterover experiment.

Crout, R.L., Fetterer, F.M., Pressman, A.E., *U.S. Naval Oceanographic and Atmospheric Research Laboratory. Technical note,* Mar. 1992, NOARL-TN-231, 28p. + appends., WDCA 93000215, 3 refs.

Ice surveys, Sea ice distribution, Ice openings, Ice conditions, Drift, Ice acoustics, Underwater acoustics, Spaceborne photography, Lincoln Sea

49-4125

Sea ice dynamics.

Gray, J.M.N.T., Cambridge, University, Jesus College, 150p., WDCA 93000383, Ph.D. thesis. Refs. p.139-150.

Ice floes, Drift, Ice mechanics, Ice cover strength, Ice deformation, Ice plasticity, Ice pressure, Pressure ridges, Ice models, Mathematical models

49-4126

Design and construction of highways and bridges in Siberia. [Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri]

Mironov, A.A., ed, Tomsk, Tomsk universitet, 1992, 147p., In Russian. Refs. passim. For selected papers see 49-4127 through 49-4146.

DLC TE110.S52P76 1992

Concretes, Roads, Bridges, Cements, Bitumens, Cold weather construction, Bituminous concretes, Steels, Steel structures, Concrete pavements, Construction, Russia—Siberia

49-4127

Improving the reliability of cement-concrete pavements under conditions of the Kemerovo district. [Povyshenie nadezhnosti tsementobetonnykh pokrytiĭ v usloviiakh Kemerovskoĭ oblasti]

Afinogenov, O.P., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.3-5, In Russian.

DLC TE110.S52P76 1992

Pavements, Cold weather performance, Cements, Roads, Concretes, Mathematical models, Russia—Siberia, Russia—Kemerovo

49-4128

Using water-logged clayey soil in the construction of an earthen roadbed in a deep swamp. [Opyt ispol'zovaniia pereuvlazhennykh glinistykh gruntov v konstruktsii zemlianogo polotna na glubokikh bolotakh]

Bazavluk, V.A., Kiriakov, E.I., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.6-11, In Russian. 3 refs.

DLC TE110.S52P76 1992

Roadbeds, Geotextiles, Construction, Cold weather construction, Clay soils, Swamps, Russia—Siberia

49-4129

Improving the adhesion of bitumens by foaming while preparing asphalt concrete mixtures. [Povyshenie adgezii bitumov putem ikh vspenivaniia v protsesse prigotovleniia asfal'tobetonnykh smeseĭ]

Barinov, E.N., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.12-15, In Russian.

DLC TE110.S52P76 1992

Concretes, Bitumens, Adhesion, Bituminous concretes

49-4130

Analyzing the stress state of bi-steel beams with an approximated σ-ε diagram, beyond its elastic limits. [Otsenka napriazhennogo sostoianiia bistal'nykh balok approksimatsieĭ diagrammy σ-ε za predelom uprugosti]

Borovikov, A.G., Kartopol'tsev, V.M., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.16-19, In Russian. 1 ref.

DLC TE110.S52P76 1992

Steels, Steel structures, Analysis (mathematics), Plastic deformation, Stress strain diagrams

49-4131

Using ultra-high frequency energy for thermal treatment of soils. [Ispol'zovanie SVCh-energii dlia termoobrabotki gruntov]

Goncharova, L.V., Baranova, V.I., Egorov, IU.M., Fedorov, V.M., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.20-28, In Russian. 8 refs.

DLC TE110.S52P76 1992

Soil stabilization, Loess, Microstructure, Soil mechanics, Soil physics, Heating

49-4132

Analysis of the characteristics of cohesive soils, treated with low temperature plasma. [Analiz svoĭstv sviaznykh gruntov, obrabotannykh nizkotemperaturnoĭ plazmoĭ]

Efimenko, V.N., Durnin, V.B., Charykov, IU.M., Esipov, S.I., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.29-39, In Russian. 10 refs.

DLC TE110.S52P76 1992

Soil stabilization, Soil chemistry, Soil water, Loams, Frost resistance, Drainage, Frozen ground, Deformation, Plasma, Cohesive soils

49-4133

Effectiveness of the application of thermally stabilized soils in secondary layers of highway road surfaces. [Effektivnost' primeneniia v dopolnitel'nykh sloiakh dorozhnykh odezhd avtomobil'nykh dorog termoukreplennykh gruntov]

Efimenko, V.N., Durnin, V.B., Nuzhina, I.P., Charykov, IU.M., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.40-47, In Russian. 1 ref.

DLC TE110.S52P76 1992

Soil stabilization, Roads, Construction materials

49-4134

Studying structural changes in residual petroleum asphalt with the viscosimetry method. [Issledovanie strukturnykh izmenenii neftianogo gudrona metodom viskozimetrii]

Kaznacheev, S.V., Romanov, S.I., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.48-51, In Russian. 2 refs.

DLC TE110.S52P76 1992

Bitumens, Structural changes, Temperature effects, Viscosity, Shear stress

49-4135

Designing road pavements and platforms for swamps allowing for the interaction of a peat foundation with compression and shear. [Raschet dorozhnykh pokrytii i ploshchadok na bolotakh s uchetom raboty torfianogo osnovaniia na szhatie i srez]

Katsyn, P.A., Ioch, V.A., Sitnikov, S.V., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.52-58, In Russian. 2 refs.

DLC TE110.S52P76 1992

Pavements, Peat, Foundations, Swamps, Analysis (mathematics), Deformation, Shear stress, Compressive properties

49-4136

Effect of bridge crossings on the natural regime of rivers and its consideration in the plan of objectives for the national economy in Siberia. [Vliianie mostovykh perekhodov na bytovoi rezhim rek i uchet ego pri proektirovanii ob"ektov narodnogo khoziaistva Sibiri]

Kostelianets, B.A., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.59-63, In Russian.

DLC TE110.S52P76 1992

Bridges, River crossings, Economics, Environmental protection, Russia—Siberia

49-4137

Vibrational-compaction of clayey soils with a higher than optimal moisture content. [Vibrouplotnenie glinistykh gruntov s vlazhnost'iu vyshe optimal'noi]

Kukanov, V.I., Kosarev, V.M., Rastorguev, M.IU., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.68-75, In Russian. 3 refs.

DLC TE110.S52P76 1992

Soil compaction, Clay soils, Soil water, Geotextiles

49-4138

Earthen roadbed with grooved guardrails for oil field highways. [Zemlianoe polotno neftepromyslovykh avtomobil'nykh dorog v shpuntovykh ograzhdeniiakh]

Lukashevich, V.N., Bazavluk, V.A., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.76-79, In Russian. 1 ref.

DLC TE110.S52P76 1992

Roadbeds, Roads, Construction materials, Swamps, Cost analysis, Russia—Siberia

49-4139

Fatigue properties of asphalt-concretes from industrial waste products. [Ustalostnye svoistva asfal'tobetonov iz promyshlennykh otkhodov]

Mironov, A.A., Bazuev, V.P., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.80-86, In Russian. 10 refs.

DLC TE110.S52P76 1992

Bitumens, Concretes, Fatigue (materials), Bituminous concretes, Wastes, Analysis (mathematics)

49-4140

Ecological changes in marshy-wooded and tundra terrains during the construction of oil field roads in Western Siberia. [Ekologicheskie izmeneniia lesisto-bolotistykh i tundrovykh landshaftov pri stroitel'stve neftepromyslovykh dorog v Zapadnoi Sibiri]

Mironov, A.A., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.87-97, In Russian. 9 refs.

DLC TE110.S52P76 1992

Roads, Construction, Forest tundra, Environmental impact, Russia—Siberia

49-4141

Improving the method of calculating rigid road pavements taking into consideration the performance characteristics of cement-concrete pavements. [Sovershenstvovanie metodiki rascheta zhestkikh dorozhnykh odezhd s uchetom osobennostei raboty tsementobetonnykh pokrytii]

Orlovskii, V.S., Koganzon, M.S., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.98-105, In Russian. 1 ref.

DLC TE110.S52P76 1992

Concrete pavements, Cements, Construction, Roads

49-4142

Asphalt-concrete with an active mineral filler. [Asfal'tovyi beton s aktivnym mineral'nym napolnitelem]

Samodurov, S.I., Rasstegaeva, G.A., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.106-112, In Russian.

DLC TE110.S52P76 1992

Bitumens, Concretes, Bituminous concretes, Roads, Construction, Freeze thaw cycles, Composite materials

49-4143

Analyzing thermophysical safety in winter road construction processes. [Ob otsenke teplofizicheskoi nadezhnosti zimnikh dorozhno-stroitel'nykh protsessov]

Shestakov, V.N., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.119-124, In Russian. 7 refs.

DLC TE110.S52P76 1992

Roads, Cold weather construction, Air temperature, Temperature effects, Safety

49-4144

Effect of the technology of preparing asphalt-concrete mixtures with foaming bitumens on the durability of asphalt-concrete. [Vliianie tekhnologii prigotovleniia asfal'tobetonnykh smesei s ispol'zovaniem vspenennogo bituma na dolgovechnost' asfal'tobetonov]

Efa, A.K., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.125-128, In Russian. 2 refs.

DLC TE110.S52P76 1992

Bitumens, Concretes, Bituminous concretes, Concrete admixtures, Concrete durability, Temperature effects

49-4145

Selecting a type of pile foundation for deep foundations. [K vyboru tipa svainogo osnovaniia fundamentov glubokogo zalozheniia]

Kostelianets, B.A., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.129-133, In Russian.

DLC TE110.S52P76 1992

Foundations, Pile structures, Bridges, Russia—Tomsk, Russia—Tom' River

49-4146

Problem of swaying in bi-steel bridge beams. [K voprosu o kolebanii bistal'nykh mostovykh balok]

Kartopol'tsev, V.M., Proektirovanie i stroitel'stvo avtomobil'nykh dorog i mostov v Sibiri (Design and construction of highways and bridges in Siberia). Edited by A.A. Mironov, Tomsk, Tomsk universitet, 1992, p.134-138, In Russian. 3 refs.

DLC TE110.S52P76 1992

Bridges, Internal friction, Steels, Steel structures, Mathematical models

49-4147

General report on the 1991/92 NARP expedition.

Østerhus, S., *Norsk Polarinstitutt. Meddelelser,* 1994, No.124, Report of the Norwegian Antarctic Research Expedition 1991/1992. Edited by S. Østerhus, p.5-7.

Research projects, Expeditions, Low temperature research, Antarctica

The Norwegian Antarctic Research Expedition (NARE) 1991-92 was part of the Nordic Antarctic Research Programme (NARP) which also includes the Finnish Antarctic Research Programme (FINNARP) and the Swedish Antarctic Research Programme (SWEDARP). FINNARP was in charge of transportation to and from the Antarctic. The Russian ship *Akademik Fedorov* was used for transport of equipment and personnel from Montevideo to Queen Maud Land. Three research programs were carried out: monitoring of seabirds at Svarthamaren; oceanography, glaciology, and geology at Fimbul Ice Shelf; and glaciology at Riiser-Larsen Ice Shelf and Kraul Mountains.

49-4148

Oceanographic and glaciologic investigations through Jutulgryta, Fimbulisen in the 1991/92 season.

Østerhus, S., Orheim, O., *Norsk Polarinstitutt. Meddelelser,* 1994, No.124, Report of the Norwegian Antarctic Research Expedition 1991/1992. Edited by S. Østerhus, p.21-28, 2 refs.

Ice shelves, Salinity, Temperature measurement, Instruments, Oceanographic surveys, Antarctica—Queen Maud Land

A long-term program to investigate conditions underneath antarctic ice shelves was initiated by NARE 1989-90. The first stage of this program was the deployment of sub-ice instruments in Queen Maud Land to test various concepts and obtain data from a medium-size ice shelf. The long-term objective was to deploy such recording instruments underneath the Filchner-Ronne Ice Shelf. The instrument rig was deployed on Feb. 10, 1990. The thickest fragments of ice shelf were 2-300 m thick, but the instrument rig was deployed in a fissure through 11.1 m of solid ice, which was underlain by 27 m of slush. The latter indicated rapid freezing conditions at this site, perhaps mainly caused by advection of supercooled water. The rig contained altogether 39 sensors. Details of recovery of instruments and data recorded in 1990-1992 are presented in tables.

49-4149

Proximal sub ice-shelf sedimentation, Jutulgryta, East Antarctica.

Solheim, A., *Norsk Polarinstitutt. Meddelelser,* 1994, No.124, Report of the Norwegian Antarctic Research Expedition 1991/1992. Edited by S. Østerhus, p.29-33, 13 refs.

Ice cores, Ice shelves, Bottom sediment, Glacial deposits, Fossils, Antarctica—East Antarctica

A small coring and sea floor photography program was carried out in Jutulgryta with the following main objectives: to obtain cores of up to 2.4 m length (restricted by equipment) and sea floor photographs from a series of closely spaced locations during the period of occupation of the field camp; to investigate the nature of sedimentation in this sub ice-shelf environment relatively close to the grounding line, particularly sediment composition and sedimentation rates; to study possible grounding line fluctuations and other paleoclimatic events through biostratigraphy. Data processing and preliminary results are discussed.

49-4150

Chemical fractionation of sea salt in snow.

Gjessing, Y., Erlingsson, B., *Norsk Polarinstitutt. Meddelelser,* 1994, No.124, Report of the Norwegian Antarctic Research Expedition 1991/1992. Edited by S. Østerhus, p.35-41, 5 refs.

Snow composition, Salinity, Antarctica—Riiser-Larsen Ice Shelf

The purpose of this project is a detailed study of the relation between the excess-deficit of sulfate in snow vs. distance from the coast in the Riiser-Larsen Ice Shelf area. Snow samples were collected every 1 km from the shelf edge to 5 km inland, and every 5 km over the next 40 km. Further inland samples were collected every 20 km. The maximum of the total concentrations of ions of marine origin is found 2-3 km inland from the shelf edge. As expected, further inland the concentrations decrease with distance from the shelf edge. There is a close correlation between the ions except for the surface layer, which shows only a weak correlation between sulfate and the other ions. The comparatively low concentrations near the shelf edge are probably due to wind transport to the sea of the surface snow by the prevailing katabatic winds.

49-4151

Detailed studies of bottom freezing under an ice shelf and mapping of accumulation by use of multi-frequency pulse-aperture radar.

Erlingsson, B., Gjessing, Y., Hamran, S.E., Holmlund, P., *Norsk Polarinstitutt. Meddelelser,* 1994, No.124, Report of the Norwegian Antarctic Research Expedition 1991/1992. Edited by S. Østerhus, p.43-46, 5 refs.

Ice shelves, Bottom topography, Ice accretion, Radar, Mapping, Antarctica—Riiser-Larsen Ice Shelf

The radar system used in this study is a step frequency radar or a synthetic pulse radar collecting 201 frequencies at equidistant steps over the desired bandwidth. Radio echo soundings were carried out on the 100 km profile from the grounding line of the Riiser-Larsen Ice Shelf to the ice front. Bottom topography of the inner part, and bottom profile of the outermost part of the ice shelf, are shown in figures and discussed.

49-4152

End of season report: Operation Deep Freeze 94/95.

U.S. Naval Support Force Antarctica, Apr. 1995, var. p.

Research projects, Cold weather operation, Logistics, Military operation, Military facilities, Radio communication, Transportation, Antarctica

This report describes the military support to the National Science Foundation in conjunction with the U.S. antarctic program. Support was provided by various organizations and commands from the Department of Defense and Department of Transportation under the operational control of Commander, U.S. Naval Support Force, Antarctica from June 1994 to Mar. 1995 as Operation DEEP FREEZE 94-95. The Naval Support Force provided command and control facilities and medical services to McMurdo Station residents and the logistics and communications pipeline for resupply of McMurdo, Amundsen-Scott, Byrd Surface Camp, and other seasonal field camps, plus support for the nearby New Zealand station at Scott Base, the Italian station at Terra Nova Bay and the Russian station at Vostok. This report provides a summary of significant events during the operating period.

49-4153

Numerical modelling of the energy balance and the englacial temperature at the ETH Camp, West Greenland.

Greuell, W., *Zürcher Geographische Schriften,* 1992, No.51, 81p., WDCA 93000223, With German summary. 52 refs.

Ice sheets, Glacier surveys, Glacier heat balance, Glacier mass balance, Glacial meteorology, Glacial hydrology, Mathematical models, Greenland

49-4154

Water balance in the catchment of the Rhone at Gletsch. Studies on precipitation, evaporation and runoff in a partially glacierized catchment. [Zum Wasserhaushalt im Einzugsgebiet der Rhône bis Gletsch. Untersuchungen zu Niederschlag, Verdunstung und Abfluss in einem teilweise vergletscherten Einzugsgebiet]

Bernath, A., *Zürcher Geographische Schriften,* 1991, No.43, 283p., WDCA 93000224, In German with English summary. Refs. p.281-291.

Snow hydrology, Snowmelt, Glacial hydrology, River basins, Water balance, Precipitation (meteorology), Evaporation, Runoff, Stream flow, Switzerland

49-4155

Glacial climate research in the Tianshan. Progress report on Project Glacier No.1, 1985-1987.

Ohmura, A., ed, Lang, H., ed, Blumer, F., ed, Grebner, D., ed, *Zürcher Geographische Schriften,* 1990, No.38, 181p., WDCA 93000136, Refs. p.125-130.

Alpine glaciation, Mountain glaciers, Glacier surveys, Glacier mass balance, Glacier heat balance, Glacier oscillation, Glacial meteorology, China—Tian Shan

49-4156

Climatic changes, ice sheet dynamics and sea level variations.

Hutter, K., Blatter, H., Ohmura, A., *Zürcher Geographische Schriften,* 1990, No.37, 83p., WDCA 93000221, With German summary. Refs. p.75-83.

Ice sheets, Glacier oscillation, Air ice water interaction, Ice age theory, Paleoclimatology, Sea level, Global warming

This report is an attempt to demonstrate that there is a coherent interplay among global ice sheet dynamics, the greenhouse effect and sea level. Ice sheets do respond to climatic variations, but their modes of operation depend on whether they are grounded or afloat. Response times of the former are 10 kyrs, those of the latter are 1 kyr or shorter. Peculiar features are exhibited by the grounding zones of marine ice-sheets. The issue of the stability or instability of the West Antarctic Ice Sheet is regarded as still open. The prediction of the future sea level does not only depend on a clear answer to this stability issue but equally also on many other factors such as the movement of the Earth's crust, the change in density of sea water with temperature, the global mass balance of glaciers and ice sheets, and—very significant and least understood—the residence time of the water in the various components of the hydrological cycle. A sea level forecast for the year 2088 and based on a doubling or quadrupling of the atmospheric CO_2-content will depend on all these factors. (Auth. mod.)

49-4157

Ice sheet response to climate changes: a modelling approach.

Abe-Ouchi, A., *Zürcher geographische Schriften,* 1993, No.54, 134p., With German summary. Refs. p.128-134.

DLC QC981.8.C5A24 1993

Ice sheets, Glaciation, Glacier formation, Glacier oscillation, Glacier mass balance, Ice age theory, Paleoclimatology, Climatic changes, Global change, Mathematical models, Greenland

49-4158

Antarctic field measurements of radar backscatter from snow and comparison with ERS-1 altimeter data.

Ridley, J.K., Bamber, J.L., *Journal of electromagnetic waves and applications,* 1995, 9(3), p.355-371, 8 refs.

Ice shelves, Snow ice interface, Firn stratification, Snow stratigraphy, Snow surface, Snow cover effect, Radio echo soundings, Backscattering, Spaceborne photography, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Two identical Ku band scatterometers were deployed at a number of locations in the region of the Filchner-Ronne Ice Shelf during the austral summer '91-92. These were used to investigate the vertical incidence radar properties of the top 10 m of firn; these measurements were compared with those made by the ERS-1 radar altimeter over the region. The radar backscatter coefficient on the ice shelf was found to remain constant over a period of 18 days, but the value differed significantly from that obtained on the nearby Coats Land plateau. Field measurements, coincident with ERS-1 overpasses, were made throughout a 4-week field season during the three-day repeat cycle of the 'Ice Phase' of the satellite's operation. These show spatial agreement with the ERS-1 altimeter backscatter coefficient to within 1dB. (Auth. mod.)

49-4159

Comparison of radar backscatter from antarctic and arctic sea ice.

Hosseinmostafa, A.R., Lytle, V.I., Jezek, K.C., Gogineni, S.P., Ackley, S.F., Moore, R.K., MP 3602, *Journal of electromagnetic waves and applications,* 1995, 9(3), p.421-438, 11 refs.

Ice surveys, Sea ice distribution, Ice cover thickness, Ice detection, Ice conditions, Snow ice interface, Slush, Snow cover effect, Radio echo soundings, Backscattering, Antarctica—Weddell Sea

Backscatter measurements were made at C band (5.3 GHz) over sea ice in the Weddell Sea from the German research vessel F.S. *Polarstern* during Sep. and Oct., 1989. Data were acquired on first-year (FY) and second-year (SY) snow-covered sea ice at stations where the ship stopped and detailed snow and ice characterizations were performed. Data were collected at incidence angles from 30° to 75° with all four linear polarizations. The results showed that the presence of slush at the snow-ice interface effectively masked the distinction between FY and SY ice in the Weddell Sea. Perhaps more importantly, it was found that it is possible to distinguish slush-covered and slush-free FY ice floes, depending on incidence angle. It was found that scattering from roughened slush-free ice was stronger than slush-covered ice at large incidence angles. At small incidence angles, quasi-specular reflection from slush-covered ice dominated the radar signal. The results further indicated that the volume scattering from the snow and from the ice was small at up to 50° angle of incidence. (Auth. mod.)

49-4160

Empirical microwave backscattering over Antarctica: application to radar altimetry.

Rémy, F., Féménias, P., Ledroit, M., Minster, J.F., *Journal of electromagnetic waves and applications,* 1995, 9(3), p.463-474, 17 refs.

Ice sheets, Glacier surveys, Glacier thickness, Snow ice interface, Snow cover effect, Radio echo soundings, Backscattering, Spaceborne photography, Antarctica

In order to validate satellite altimeter measurements over Antarctica, the Seasat scatterometer backscatter coefficient which has been measured at different incidence and azimuth angles and for the two polarizations is analyzed. The authors show that the signal at large incidence angles is a mixed signal of volume, backscattered by subsurface layering and surface scattering whose proportions depend on physical characteristics of the snow. Only the effect of the volume scattering by spherical grains on the altimetric signal can be estimated: it is of the order of a few percent of the total altimetric signal and the induced height error is less than 25±20 cm if the echo is properly retracked. Other effects such as internal density boundary are not estimated. (Auth. mod.)

49-4161

"Theseus": multipurpose Canadian AUV.

Ferguson, J., Pope, A., *Sea technology,* Apr. 1995, 36(4), p.19-26.

Subglacial navigation, Subglacial observations, Submarines, Oceanographic surveys

49-4162

Ice age mechanics.

Tellefsen, O., Newark, CA, Olaf Tellefsen, 1992, 91p., WDCA 93000226, 2nd edition, updated and expanded. Refs. passim.

Ice age theory, Paleoclimatology, Pleistocene, Glaciation, Ice sheets, Glacier oscillation, Glacier formation, Tectonics, Continental drift, Global change

It is argued that the generally accepted theory that ice ages in the northern and southern hemispheres are synchronous is false, and that instead, they oscillate, that is, when it is abnormally cold in the Northern Hemisphere, it is abnormally warm in Antarctica. Between 18,000 and 10,000 years ago, the Atlantic side was shifted about 10 degrees north, North America poleward, and South America equatorward. It was abnormally cold in the northern Atlantic and abnormally warm in Antarctica. By 10,000 years ago, the northern ice load had grown to the extent that it upset the Earth's spin equilibrium and forced a displacement of the Earth's crust on the Atlantic side about 10 degrees southward so that at present, the Northern Hemisphere is experiencing an interglacial period and Antarctica is in the midst of a full-fledged ice age, hence we are still in the Pleistocene.

49-4163

Were micrometeorites a source of prebiotic molecules on the early earth.

Maurette, M., Brack, A., Kurat, G., Perreau, M., Engrand, C., *Advances in space research,* Mar. 1995, 15(3), Life Sciences and Space Research XXV (4): Planetary Biology and Origins of Life. Proceedings of the Topical Meeting of the COSPAR Interdisciplinary Scientific Commission F (Meeting F3) of the COSPAR Twenty-ninth Plenary Meeting held in Washington, DC, USA, 28 August-5 September, 1992, p.(3)113-(3)126, 34 refs.

Ice sheets, Geochemistry, Mineralogy, Meltwater

Interplanetary dust particles of sizes ≈10 μm collected in the stratosphere (IDPs), as well as much larger "giant" micrometeorites retrieved from antarctic ice melt water (AMMs), are mostly composed of unequilibrated assemblages of minerals, thus being related to primitive unequilibrated meteorites. Two independent evaluations of the mass flux of micrometeorites measuring ≈50 μm to ≈200 μm, recovered from either the Greenland or the antarctic ice sheets, have been reported (≈20,000 tons/a). Micrometeorites represent about 99.5% of the extraterrestrial material falling on the Earth's surface each year, and are the major contributors of extraterrestrial C-rich matter accreting to the Earth today. They contain not only a variety of C-rich matter, such as a new "dirty" magnetite phase enriched in P, S, and minor elements, but also a diversity of potential catalysis such as hydrous silicates, oxides, sulfides and metal grains of Fe/Ni composition. (Auth. mod.)

49-4164

Preliminary comparison of two perennially ice-covered lakes in Antarctica: analogs of past Martian lacustrine environments.

Andersen, D.T., et al, *Advances in space research,* Mar. 1995, 15(3), Life Sciences and Space Research XXV (4): Planetary Biology and Origins of Life. Proceedings of the Topical Meeting of the COSPAR Interdisciplinary Scientific Commission F (Meeting F3) of the COSPAR Twenty-ninth Plenary Meeting held in Washington, DC, USA, 28 August-5 September, 1992, p.(3)199-(3)202, 17 refs.

Frozen lakes, Ice cover, Mars (planet), Antarctica—Bunger Hills, Antarctica—Hoare, Lake

Perennially ice-covered lakes in the Antarctic have been suggested as analogs to lakes which may have existed on the surface of Mars 3.5 billion years ago. During the 1991-1992 austral summer, a joint Russian/American research effort was directed at studies of ice-covered lakes in the Bunger Hills Oasis. The primary objective of the expedition was to investigate this ice-free area for features analogous to ancient Martian environments that may have been capable of supporting life, and to compare the ice-covered lakes of the Bunger Hills with those in the McMurdo Dry Valleys as part of the continuing studies of Antarctica-Mars analogs. (Auth.)

49-4165

Preservation of cell structures in permafrost: a model for exobiology.

Soĭna, V.S., Vorob'eva, E.A., Zviagintsev, D.G., Gilichinskiĭ, D.A., *Advances in space research,* Mar. 1995, 15(3), Life Sciences and Space Research XXV (4): Planetary Biology and Origins of Life. Proceedings of the Topical Meeting of the COSPAR Interdisciplinary Scientific Commission F (Meeting F3) of the COSPAR Twenty-ninth Plenary Meeting held in Washington, DC, USA, 28 August-5 September, 1992, p.(3)237-(3)242, 10 refs.

Extraterrestrial ice, Soil microbiology, Permafrost, Models, Russia—Siberia

49-4166

Very low temperature formaldehyde reactions and the build-up of organic molecules in comets and interstellar ices.

Schutte, W.A., Allamandola, L.J., Sanford, S.A., *Advances in space research,* Mar. 1995, 15(3), Life Sciences and Space Research XXV (4): Planetary Biology and Origins of Life. Proceedings of the Topical Meeting of the COSPAR Interdisciplinary Scientific Commission F (Meeting F3) of the COSPAR Twenty-ninth Plenary Meeting held in Washington, DC, USA, 28 August-5 September, 1992, p.(3)401-(3)406, 8 refs.

Molecular structure, Organic nuclei, Extraterrestrial ice, Chemical composition

49-4167

Late Pleistocene climate trajectory in the phase space of global ice, ocean state, and CO_2: observations and theory.

Saltzman, B., Verbitsky, M., *Paleoceanography,* Dec. 1994, 9(6), p.767-779, 58 refs.

Ice sheets, Carbon dioxide, Climatic changes, Ice cores, Water temperature

Under study here is the evolution of three main slow-response variables describing the state of the climate system as measured, respectively, by the SPECMAP $\delta^{18}O$ record, the Vostok CO_2 record, and the North Atlantic sea surface temperature record at 50°N (core K708-1), which is coherent with other ocean state properties. Their coevolution is portrayed in the form of a trajectory in the phase space of the three variables and its projections on its three phase planes. The oscillatory nature and phase lags of the variables are clearly illustrated, suggesting a "physical process" scenario that can account for the observations. The basic element of this scenario is a free, near-100 kyr-period oscillation driven by internal instability, involving feedbacks among all three variables under the influence of Earth-orbital (Milankovitch) forcing and long-term tectonic CO_2 forcing. It is shown that a phenomenological theory advanced by the authors, emphasizing the role of CO_2, provides a credible account of the phase-space trajectory. (Auth.)

49-4168

News about the organization of the transportation of petroleum products in the Arctic. [Novoe v organizatsii perevozok nefteproduktov v Arktike]

Kazimirov, A., *Morskoĭ flot,* Nov.-Dec. 1994, No.11-12, p.5-6, In Russian.

Marine transportation, Petroleum products

49-4169

Structure and dynamics of the last ice sheet of Europe. Xth Congress of INQUA (Great Britain, 1977). [Struktura i dinamika poslednego lednikovogo pokrova Evropy. K X Kongressu INQUA (Velikobritaniia, 1977)]

Chebotareva, N.S., ed, Moscow, Nauka, 1977, 143p. + 3 fold. maps, In Russian with English summary and table of contents. Refs. p.131-141.

DLC QE697.S874

Ice cover, Meltwater, Glacial hydrology, Glacial streams, Barents Sea, Russia—Novaya Zemlya, Russia—Ladoga Lake, Russia—Kola Peninsula, Russia—White Sea, Russia—Karelia

49-4170

Numerical modeling of freezing and swelling processes in the "foundation-bed" system.

Fadeev, A.B., Sakharov, I.I., Repina, P.I., *Soil mechanics and foundation engineering,* Sep.-Oct. 1994(Pub. Mar. 1995), 31(5), p.161-165, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 5 refs.

Mathematical models, Foundations, Computer programs, Stress strain diagrams, Soil freezing, Frost heave

49-4171

Experience gained with the construction and occupancy of buildings on three-dimensional ventilated envelope foundations.

Goncharov, IU.M., *Soil mechanics and foundation engineering,* Sep.-Oct. 1994(Pub. Mar. 1995), 31(5), p.181-185, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 1 ref.

Foundations, Permafrost beneath structures, Thermal regime, Cold weather construction, Design

49-4172

Effective method of regulating the thermal regime of the enclosing dam of an alluvial reservoir under complex cryogenic-geological conditions. [Effektivnyĭ sposob regulirovaniia teplovogo rezhima ograzhdaiushcheĭ damby namyvnogo nakopitelia v slozhnykh merzlotno-geologicheskikh usloviiakh]

Kuznetsov, G.I., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* Jan. 1995, No.1, p.75-79, In Russian. 6 refs.

Thermal regime, Cold weather operation, Reservoirs, Earth dams, Taliks, Frozen ground

49-4173

Basis for the use of a reagent prepared from by-products of nitrogen ammonium phosphate fertilizer production as antifreeze (Report 3). [Obosnovanie ispol'zovaniia reagentov, izgotovlennykh iz otkhodov proizvodstva nitroammofoski, v kachestve antiobledeniteleĭ (Soobshchenie III)]

Zarechanskaia, V.V., Grekova, I.I., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* Jan. 1995, No.1, p.133-136, In Russian. 6 refs. For Report 1 see 49-3208; Report 2: 49-3211.

Antifreezes, Manufacturing

49-4174

Total ozone response to major geomagnetic storms during non-winter period.

Mlch, P., *Studia geophysica & geodaetica,* Oct. 1994, 38(4), p.423-429, 12 refs.

Ozone, Polar atmospheres, Geomagnetism, Storms, Russia—Siberia

49-4175

Chlorine nitrate and nitric acid profiles in the Arctic vortex derived from limb emission measurements with MIPAS-B.

Oelhaf, H., et al, *Technical digest series,* 1993, Vol.5, Optical Remote Sensing of the Atmosphere. Topical Meeting, Salt Lake City, UT, Mar. 8-12, 1993. Postconference edition, p.TuB5-1/101-TuB5-3/103, 9 refs.

DLC QC878.5.O78

Ozone, Stratosphere, Atmospheric composition, Measurement, Measuring instruments

49-4176

Evolution of Pinatubo and Cerro Hudson aerosol over the Antarctic during the 1991 austral spring.

Pitts, M.C., Thomason, L.W., Chu, W.P., *Technical digest series,* 1993, Vol.5, Optical Remote Sensing of the Atmosphere. Topical Meeting, Salt Lake City, UT, Mar. 8-12, 1993. Postconference edition, p.288/ThA3-1-ThA3-4/291, 11 refs.

DLC QC878.5.O78

Stratosphere, Atmospheric composition, Aerosols, Volcanoes, Air pollution, Ozone

The eruption of Mt. Pinatubo on June 15, 1991 injected large amounts of SO_2 into the stratosphere as high as 30 km. Substantial amounts of aerosol were transported to the mid-latitudes of both hemispheres, and by early Sep., satellite observations indicated a layer of Pinatubo aerosol centered near 21 km had reached as far south as the outer edge of the antarctic polar vortex. In addition, the Cerro Hudson volcano in southern Chile erupted intermittently from Aug. 12-15, 1991, sending significant amounts of SO_2 into the lower stratosphere. At the onset of the 1991 austral spring, two distinct volcanic aerosol clouds were present in the stratosphere over the polar regions of the Southern Hemisphere. In this study, the authors use SAM II and SAGE II data to identify and track the movement of these volcanic clouds and study transport processes associated with the antarctic polar vortex during the spring.

49-4177

HALOE observations of ozone, halogen, nitrogen, and hydrogen compounds made from the UARS Platform.

Russell, J.M., III, Gordley, L.L., Park, J.H., Drayson, S.R., *Technical digest series,* 1993, Vol.5, Optical Remote Sensing of the Atmosphere. Topical Meeting, Salt Lake City, UT, Mar. 8-12, 1993. Postconference edition, p.342/ThD3-1-ThD3-4/345, 1 ref.

DLC QC878.5.O78

Ozone, Atmospheric composition, Meteorological instruments, Experimentation, Spacecraft, Solar activity

The Halogen Occultation Experiment (HALOE) was launched Sep. 12, 1991 by the Space Shuttle Discovery into a 57°, 585 km, near-circular orbit onboard the Upper Atmosphere Research Satellite (UARS). The experiment was allowed to outgas for about 1 month before science observations began on Oct. 11, 1991. The experiment approach is solar occultation. The data set will be used to pursue a number of scientific investigations, including stratospheric photochemistry and dynamics studies, evaluation of the impact of natural versus anthropogenic chlorine sources on total chlorine, the effect of volcanic aerosols on the chemistry, and study of antarctic processes which occur during the ozone hole development and recovery phases. It is concluded that the quality of the HALOE data is very good and will allow all scientific objectives to be met.

49-4178
Boreal forest and tundra ecosystems as components of the climate system.
Bonan, G.B., Chapin, F.S., III, Thompson, S.L., *Climatic change*, Feb. 1995, 29(2), p.145-167, 65 refs.
Climatology, Global change, Ecosystems, Tundra, Soil air interface, Vegetation patterns, Climatic changes, Geochemical cycles, Biogeography

49-4179
Monolithologic erosion of hard beds by temperate glaciers.
Lliboutry, L.A., *Journal of glaciology*, 1994, 40(136), p.433-450, 61 refs.
Glacial erosion, Glacial geology, Glacier beds, Bedrock, Surface structure, Lithology, Sediment transport, Ice solid interface, Mathematical models

49-4180
Crack propagation and fracture resistance in saline ice.
DeFranco, S.J., Dempsey, J.P., *Journal of glaciology*, 1994, 40(136), p.451-462, 37 refs.
Sea ice, Ice mechanics, Cracking (fracturing), Crack propagation, Loading, Simulation, Ice models, Temperature effects

49-4181
Extent and duration of antarctic surface melting.
Zwally, H.J., Fiegles, S., *Journal of glaciology*, 1994, 40(136), p.463-476, 13 refs.
Ice sheets, Glacier surveys, Radiometry, Glacier melting, Glacier oscillation, Seasonal variations, Spaceborne photography, Brightness, Correlation
The extent and duration of surface melting on the antarctic ice shelves and margins of the antarctic ice sheet are derived from satellite passive microwave data for 1978-87. The occurrence of surface melting in daily maps is indicated by a marked increase in microwave brightness temperature (T_b), which is caused by moisture in the near-surface firn. T_b increases of more than 30° above the annual-mean T_b are chosen to indicate melting. Most antarctic surface melting occurs during Dec. and Jan. The observed melting is correlated with regional air temperatures, but some melt patterns also appear to be related to katabatic wind effects. The correlations suggest that the surface melting in Antarctica increases about 3.5 x 10^6 d km^2 per degree of summer temperature increase. The surface-melt index calculated for Antarctica is 24 x 10^6 d km^2, averaged over nine summers. The observed inter-annual and regional variability is large. Surface melting was most extensive during the 1982-83 summer and least extensive during the 1985-86 summer. (Auth. mod.)

49-4182
Variations of near-surface firn density in the lower accumulation area of the Greenland ice sheet, Pâkitsoq, West Greenland.
Braithwaite, R.J., Laternser, M., Pfeffer, W.T., *Journal of glaciology*, 1994, 40(136), p.477-485, 40 refs.
Ice sheets, Glacier melting, Glacier thickness, Regelation, Ice density, Firn stratification, Climatic changes, Periodic variations, Greenland

49-4183
Recent variations of Ghiacciaio del Calderone, Abruzzi, Italy.
Gellatly, A.F., Smiraglia, C., Grove, J.M., Latham, R., *Journal of glaciology*, 1994, 40(136), p.486-490, 18 refs.
Glacier surveys, Mountain glaciers, Glacier oscillation, Topographic surveys, Periodic variations, Glacier mass balance, Italy—Abruzzi

49-4184
Shear-wave detection of asymmetric c-axis fabrics in the GISP2 ice core, Greenland.
Anandakrishnan, S., Fitzpatrick, J.J., Alley, R.B., Gow, A.J., Meese, D.A., MP 3603, *Journal of glaciology*, 1994, 40(136), p.491-496, 17 refs.
Ice sheets, Ice mechanics, Ultrasonic tests, Ice deformation, Ice cores, Ice structure, Orientation, Shear stress, Wave propagation, Greenland
The c-axis fabrics of the GISP2 ice core from central Greenland have been measured rapidly and accurately in the field, using both compressional and shear waves generated by an inexpensive, commercially available "idiot-proof" device. Compressional-wave data were collected at 10 m intervals for the upper 2250 m of the ice sheet, and show progressive clustering of c axes toward the vertical with increasing depth but no large steps at climatic boundaries in the core. The degree of clustering measured by ultrasound agrees closely with that measured using traditional optical techniques but the ultrasound technique is easier and faster than optical methods. A slight asymmetry in the c-axis clustering is revealed by the shear-wave data and increases with increasing depth, indicating that deformation is not symmetric about the vertical at the site.

49-4185
In-situ measurement of the strength of deforming subglacial till.
Iverson, N.R., Jansson, P., Hooke, R.L., *Journal of glaciology*, 1994, 40(136), p.497-503, 32 refs.
Glacial geology, Subglacial observations, Glacial deposits, Shear strength, Deformation, Strain measuring instruments, Accuracy

49-4186
Polar ice stratigraphy from laser-light scattering: scattering from meltwater.
Ram, M., Illing, M., *Journal of glaciology*, 1994, 40(136), p.504-508, 11 refs.
Ice sheets, Ice cores, Ice dating, Meltwater, Dust, Seasonal variations, Lasers, Light scattering, Stratigraphy, Accuracy

49-4187
Theoretical limitations to englacial velocity calculations.
Bahr, D.B., Pfeffer, W.T., Meier, M.F., *Journal of glaciology*, 1994, 40(136), p.509-518, 20 refs.
Glacier flow, Glacier beds, Velocity measurement, Boundary value problems, Analysis (mathematics), Stress concentration, Accuracy

49-4188
Investigation of terrain irradiance in a mountain-glacier basin.
Gratton, D.J., Howarth, P.J., Marceau, D.J., *Journal of glaciology*, 1994, 40(136), p.519-526, 26 refs.
Mountain glaciers, Spaceborne photography, Radiometry, Radiation balance, Image processing, Topographic effects, Albedo

49-4189
Role of the margins in the dynamics of an active ice stream.
Echelmeyer, K.A., Harrison, W.D., Larsen, C., Mitchell, J.E., *Journal of glaciology*, 1994, 40(136), p.527-538, 30 refs.
Glacier oscillation, Glacier flow, Glacier mass balance, Profiles, Shear stress, Velocity measurement, Analysis (mathematics), Friction, Antarctica—Marie Byrd Land
The present paper describes measurements made on Ice Stream B, which are directed at the problem of the margins and their role in controlling ice-stream flow. Measurements of surface velocity were made along a transverse profile extending from near the center of the ice stream across the shear margin and into the slow-moving ice sheet. These observations are discussed in terms of flow models which indicate that the margins do play an important role in controlling ice-stream motion, with marginal drag being equal to or greater than basal drag at some locations. (Auth. mod.)

49-4190
Hydrology, erosion and sediment production in a surging glacier: Variegated Glacier, Alaska, 1982-83.
Humphrey, N.F., Raymond, C.F., *Journal of glaciology*, 1994, 40(136), p.539-552, 21 refs.
Glacier flow, Glacier surges, Glacial hydrology, Sediment transport, Hydraulics, Periodic variations, Basal sliding, Water transport, United States—Alaska

49-4191
Tectonic processes in Svalbard tide-water glacier surges: evidence from structural glaciology.
Hodgkins, R., Dowdeswell, J.A., *Journal of glaciology*, 1994, 40(136), p.553-560, 24 refs.
Glacier flow, Glacier surges, Tectonics, Stress concentration, Periodic variations, Glacial geology, Ice mechanics, Norway—Svalbard

49-4192
Temperature and movement measurements at a bergschrund.
Mair, R., Kuhn, M., *Journal of glaciology*, 1994, 40(136), p.561-565, 9 refs.
Glacier flow, Crevasses, Alpine glaciation, Ice structure, Basal sliding, Velocity measurement, Ice temperature, Austria

49-4193
Ductile saline ice.
Kuehn, G.A., Schulson, E.M., *Journal of glaciology*, 1994, 40(136), p.566-568, 6 refs.
Sea ice, Mechanical tests, Tensile properties, Compressive properties, Ice mechanics, Ice creep

49-4194
Mechanisms of fast flow in Jakobshavns Isbræ, West Greenland: part II. Modeling of englacial temperatures.
Funk, M., Echelmeyer, K.A., Iken, A., *Journal of glaciology*, 1994, 40(136), p.569-585, 28 refs.
Glacier flow, Ice deformation, Ice temperature, Velocity measurement, Mathematical models, Temperature distribution, Profiles, Greenland

49-4195
Simulation of ice accretion on a cylinder due to freezing rain.
Szilder, K., *Journal of glaciology*, 1994, 40(136), p.586-594, 15 refs.
Precipitation (meteorology), Power line icing, Ice accretion, Simulation, Mathematical models, Physical properties, Statistical analysis, Classifications

49-4196
Direct measurement of sliding at the glacier bed.
Blake, E.W., Fischer, U.H., Clarke, G.K.C., *Journal of glaciology*, 1994, 40(136), p.595-599, 29 refs.
Glacier flow, Basal sliding, Measuring instruments, Design, Performance, Ice solid interface, Periodic variations

49-4197
Glacier sliding, regelation water flow and development of basal ice.
Knight, P.G., Knight, D.A., *Journal of glaciology*, 1994, 40(136), p.600-601, 10 refs. For paper under discussion see 47-3904.
Glacier flow, Basal sliding, Regelation, Theories, Glacial hydrology, Ice structure

49-4198
Strategic significance of the Arctic.
Jalonen, O.P., *University of Tampere. Department of Political Science. Unit of Peace Research and Development Studies. Reports*, 1988, No.27, 35p., 48 refs.
DLC UA880.J35 1988
Military operation, Ships

49-4199
Mountain environments in changing climates.
Beniston, M., ed, London, Routledge, 1994, 461p., Refs. passim. For selected papers see 49-4200 through 49-4209.
DLC QC993.6.M66 1994
Alpine glaciation, Mountain glaciers, Snowfall, Snowmelt, Forest lines, Plant ecology, Paleoclimatology, Climatic changes, Global warming

49-4200
Past and potential future changes in mountain environments: a review.
Barry, R.G., Mountain environments in changing climates. Edited by M. Beniston, London, Routledge, 1994, p.3-33, Refs. p.27-33.
Alpine glaciation, Mountain glaciers, Snowfall, Snow cover distribution, Snowmelt, Snow line, Paleoclimatology, Global change

49-4201
Using multiple high-resolution proxy climate records to reconstruct natural climate variability: an example from the Canadian Rockies.
Luckman, B.H., Mountain environments in changing climates. Edited by M. Beniston, London, Routledge, 1994, p.42-59, 43 refs.
Alpine glaciation, Mountain glaciers, Glacier oscillation, Forest lines, Paleobotany, Paleoclimatology, Canada—Rocky Mountains

49-4202
Accelerated glacier and permafrost changes in the Alps.
Haeberli, W., Mountain environments in changing climates. Edited by M. Beniston, London, Routledge, 1994, p.91-107, 43 refs.
Alpine glaciation, Mountain glaciers, Rock glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Glacial meteorology, Permafrost distribution, Permafrost thickness, Paleoclimatology, Global warming, Alps

49-4203

Monitoring snow cover variations in the Alps using the Alpine Snow Cover Analysis System (ASCAS).

Baumgartner, M.F., Apfl, G., Mountain environments in changing climates. Edited by M. Beniston, London, Routledge, 1994, p.108-120, 9 refs.

Snow surveys, Snow cover distribution, Snowfall, Snowmelt, Runoff forecasting, Spaceborne photography, Data transmission, Computerized simulation, Alps

49-4204

Impact of atmospheric changes on high mountain vegetation.

Körner, C., Mountain environments in changing climates. Edited by M. Beniston, London, Routledge, 1994, p.155-166, Refs. p.162-166.

Mountains, Plant ecology, Plant physiology, Phenology, Acclimatization, Forest lines

49-4205

Long-term vegetation change in mountain environments: palaeoecological insights into modern vegetation dynamics.

Graumlich, L.J., Mountain environments in changing climates. Edited by M. Beniston, London, Routledge, 1994, p.167-179, 64 refs.

Mountains, Plant ecology, Forest lines, Paleoecology, Paleoclimatology, Glaciation

49-4206

Ecological aspects of climatically-caused timberline fluctuations: review and outlook.

Holtmeier, F.K., Mountain environments in changing climates. Edited by M. Beniston, London, Routledge, 1994, p.220-233, Refs. p.229-233.

Forest lines, Plant ecology, Plant physiology, Vegetation patterns, Climatic factors, Climatic changes, Global warming

49-4207

Recent changes in the growth and establishment of subalpine conifers in western North America.

Peterson, D.L., Mountain environments in changing climates. Edited by M. Beniston, London, Routledge, 1994, p.234-243, 39 refs.

Plant ecology, Vegetation patterns, Revegetation, Snow cover effect, Climatic changes

49-4208

Climate change and winter tourism: impact on transport companies in the Swiss Canton of Graubünden.

Abegg, B., Froesch, R., Mountain environments in changing climates. Edited by M. Beniston, London, Routledge, 1994, p.328-340, 9 refs.

Snowfall, Snow cover effect, Climatic changes, Global warming, Regional planning, Cost analysis, Switzerland

49-4209

Sensitivity of mountain runoff and hydro-electricity to changing climate.

Garr, C.E., Fitzharris, B.B., Mountain environments in changing climates. Edited by M. Beniston, London, Routledge, 1994, p.366-381, 15 refs.

Snowfall, Snowmelt, Stream flow, Runoff forecasting, Electric power, Climatic changes, Global warming, New Zealand

49-4210

Mathematical analysis of the steady response of floating ice to the uniform motion of a rectangular load.

Milinazzo, F., Shinbrot, M., Evans, N.W., *Journal of fluid mechanics,* Mar. 25, 1995, Vol.287, p.173-197, 21 refs.

Floating ice, Loading, Ice breaking, Air cushion vehicles, Mathematical models, Ice deformation, Gravity waves, Ice water interface, Mathematical models

49-4211

Atmospheric observations of aerosol black carbon, carbon dioxide, and methane in the high arctic.

Hopper, J.F., Worthy, D.E.J., Barrie, L.A., Trivett, N.B.A., *Atmospheric environment,* Oct. 1994, 28(18), p.3047-3054, 24 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Sampling, Carbon black, Haze, Air pollution, Seasonal variations, Canada—Northwest Territories—Alert

49-4212

Study of the influence of riming of ice crystals on snow chemistry during different seasons in precipitating continental clouds.

Kalina, M.F., Puxbaum, H., *Atmospheric environment,* Nov. 1994, 28(20), p.3311-3328, 50 refs.

Cloud physics, Snow crystal growth, Precipitation (meteorology), Hoarfrost, Snow composition, Scavenging, Particle size distribution, Water content

49-4213

On the frequency of long-range transport events at Point Barrow, Alaska, 1983-1992.

Bridgman, H.A., Bodhaine, B.A., *Atmospheric environment,* Dec. 1994, 28(21), p.3537-3549, 25 refs.

Air pollution, Atmospheric composition, Haze, Periodic variations, Carbon dioxide, Aerosols, Atmospheric circulation, United States—Alaska

49-4214

Seasonal fluxes of major ions to a high altitude cold alpine glacier.

Maupetit, F., Wagenbach, D., Weddeling, P., Delmas, R.J., *Atmospheric environment,* Jan. 1995, 29(1), p.1-9, 30 refs.

Mountain glaciers, Glacial meteorology, Climatic changes, Firn, Sampling, Precipitation (meteorology), Air pollution, Ion density (concentration), Seasonal variations, Snow air interface, France—Mont Blanc

49-4215

Influence of pressure ridges on seismic signals due to thermal cracking of sea ice.

Xie, Y.B., Farmer, D.M., *Acoustical Society of America. Journal,* Feb. 1995, 97(2), p.962-970, 14 refs.

Sea ice, Ice mechanics, Thermal stresses, Cooling, Cracking (fracturing), Acoustic measurement, Wave propagation, Seismic velocity, Pressure ridges, Attenuation, Analysis (mathematics)

49-4216

Flexural waves in a floating ice sheet: modeling and comparison with data.

Yang, T.C., Yates, T.W., *Acoustical Society of America. Journal,* Feb. 1995, 97(2), p.971-977, 22 refs.

Sea ice, Ice mechanics, Elastic waves, Wave propagation, Ice acoustics, Vibration, Mathematical models

49-4217

Rock mass strength and the stability of some glacial valley slopes.

Augustinus, P., *Zeitschrift für Geomorphologie,* Mar. 1995, 39(1), p.55-68, With German and French summaries. 38 refs.

Geomorphology, Glacial geology, Slope processes, Slope stability, Rock properties, Classifications

49-4218

Improved measurements of the ice water content in cirrus using a total-water probe.

Brown, P.R.A., Francis, P.N., *Journal of atmospheric and oceanic technology,* Apr. 1995, 12(2), p.410-414, 10 refs.

Cloud physics, Probes, Ice composition, Water content, Water vapor, Hygrometers, Accuracy

49-4219

Rayleigh lidar detection of aerosol echoes from noctilucent cloud altitudes at the Arctic Circle.

Langer, M., Müller, K.P., Fricke, K.H., *Geophysical research letters,* Feb. 15, 1995, 22(4), p.381-384, 10 refs.

Polar atmospheres, Cloud physics, Atmospheric density, Aerosols, Lidar, Backscattering, Detection

49-4220

Heterogeneous chemistry of bromine species in sulfuric acid under stratospheric conditions.

Hanson, D.R., Ravishankara, A.R., *Geophysical research letters,* Feb. 15, 1995, 22(4), p.385-388, 19 refs.

Cloud physics, Heterogeneous nucleation, Polar stratospheric clouds, Simulation, Chemical properties, Ozone

49-4221

Carbonyl sulfide (COS) measurements in the arctic polar vortex.

Kourtidis, K.A., Borchers, R., Fabian, P., Harnisch, J., *Geophysical research letters,* Feb. 15, 1995, 22(4), p.393-396, 35 refs.

Polar atmospheres, Atmospheric composition, Sampling, Chemical properties, Stratosphere, Subsidence, Profiles

49-4222

VLBI baseline variations from the ICE-4G model of postglacial rebound.

Peltier, W.R., *Geophysical research letters,* Feb. 15, 1995, 22(4), p.465-478, 17 refs.

Ice age theory, Pleistocene, Glacier oscillation, Models, Isostasy, Accuracy

49-4223

Reclaiming an abandoned placer mine site in Alaska.

Nelson, M.G., Packee, E.C., Jr., Helm, D.J., *Mining engineering,* Mar. 1995, 47(3), p.240-242, 5 refs.

Placer mining, Land reclamation, Environmental tests, Environmental impact, Monitors, Revegetation, United States—Alaska

49-4224

Wet deposition of ionic alkylleads and total lead in urban areas of Croatia.

Mikac, N., Branica, M., *Atmospheric environment,* Nov. 1994, 28(19), p.3171-3179, 28 refs.

Cloud physics, Air pollution, Snow impurities, Precipitation (meteorology), Sampling, Ion density (concentration), Environmental tests, Vehicles, Croatia

49-4225

Kinetics of conversion of air bubbles to air hydrate crystals in antarctic ice.

Price, P.B., *Science,* Mar. 24, 1995, 267(5205), p.1802-1804, 20 refs.

Ice cores, Bubbles, Antarctica—Vostok Station, Antarctica—Byrd Station, Antarctica—Amundsen-Scott Station

The depth dependence of bubble concentration at pressure above the transition to the air hydrate phase and the optical scattering length due to bubbles in deep ice at the South Pole are modeled with diffusion-growth data from the laboratory, taking into account the dependence of age and temperature and depth in the ice. The model fits the available data on bubbles in cores from Vostok and Byrd and on scattering length in deep ice at the South Pole. It explains why bubbles and air hydrate crystals coexist in deep ice over a range of depths as great as 800 m, and predicts that at depths below ca. 1400 m the AMANDA neutrino observatory at the South Pole will operate unimpaired by light scattering from bubbles. (Auth.)

49-4226

Report of the British Antarctic Survey for the period April 1993 to 31 March 1994 (but reporting the full antarctic field season).

British Antarctic Survey, Cambridge, Natural Environment Research Council, [1994], 124p., Pubs. p.107-116.

Research projects, Glaciology

General remarks are made concerning staff changes and activities in various divisions at BAS stations; personnel awards are announced; distinguished visitors, and British and international meetings attended, are listed. Logistic and operational activities are reviewed, including ship and air operations. A science strategy plan is presented; 5 principal and 2 minor "Science Themes" provide a framework for 21 research programs which are reviewed in detail and consist of the following: pattern and change in the physical environment of Antarctica; geological evolution of West Antarctica; dynamics of antarctic terrestrial and freshwater ecosystems; structure and dynamics of the southern ocean ecosystem; physics of solar-terrestrial phenomena from Antarctica; humans in isolated polar communities; and antarctic geographic information and mapping. Included are 4 appendices providing BAS' financial background, and lists of 1993 publications and staff in various locations, divisions and ships.

49-4227

Swedish Antarctic Research Programme 1993/94; a cruise report.

Melander, O., ed, Grönlund, E., ed, New Zealand Antarctic Society, Stockholm, Swedish Polar Research Secretariat, 1995, 96p., Refs. passim.

Low temperature research, Research projects, Glacier mass balance, Glacier flow, Snow, Paleoclimatology, Geodetic surveys, Ecology, Atmospheric physics, Antarctica—Queen Maud Land, Antarctica—Amundsen-Scott Station, Antarctica—Bellingshausen Sea, Antarctica—Amundsen Sea, —South Georgia

SWEDARP 1993-94 (Swedish Antarctic Research Programme) consisted of a variety of projects performed in four different geographical regions: Queen Maud Land, South Pole, Amundsen and Bellingshausen seas and South Georgia. This cruise report contains a preliminary account of a number of scientific studies that will be reported in detail in appropriate scientific journals. The aim of the report is to present an overview of what has been achieved. The main part of the SWEDARP 1993-94 expedition went to Queen Maud Land and the Swedish stations Wasa and Svea. A second party of SWEDARP 1993-94 went to the South Pole. The Antarctic Muon and Neutrino Detector Array (AMANDA) project was one of the 1993-94 expedition highlights for studying particles from outer space.

49-4228

Defrost cycle performance for an air-source heat pump with a scroll and a reciprocating compression.

Payne, V., O'Neal, D.L., *International journal of refrigeration,* 1995, 18(2), p.107-112, With French summary. 5 refs.

Heat pumps, Ice accretion, Defrosting, Performance, Mechanical tests, Compressors, Correlation

49-4229

Outwash plains and thermokarst on Mars.

Costard, F.M., Kargel, J.S., *Icarus,* Mar. 1995, 114(1), p.93-112, 95 refs.

Mars (planet), Extraterrestrial ice, Ground ice, Geocryology, Thermokarst, Outwash, Periglacial processes, Spaceborne photography, Topographic features

49-4230

Temperature of nitrogen ice on Pluto and its implications for flux measurements.

Tryka, K.A., Brown, R.H., Cruikshank, D.P., Owen, T.C., Geballe, T.C., DeBergh, C., *Icarus,* Dec. 1994, 112(2), p.513-527, 42 refs.

Extraterrestrial ice, Ice temperature, Surface temperature, Spectroscopy, Spectra, Heat flux, Simulation

49-4231

On the friction velocity during blowing snow.

Wamser, C., Lykossov, V.N., *Contributions to atmospheric physics,* Feb. 1995, 68(1), p.85-94, With German summary. 13 refs.

Snow physics, Cloud physics, Blowing snow, Drift, Snow air interface, Friction, Stratification, Analysis (mathematics), Turbulent boundary layer, Wind velocity

Snow concentration and wind profile measurements made during the Byrd Snow Drift Project in the western Antarctic are the basis of the investigation in this paper. It is shown that during episodes of snow drift, which is a common feature in Antarctica, the influence of drifting snow particles on the density stratification cannot be neglected in studies of turbulence parameters. A new approach is introduced by which these effects on the friction velocity can be described. It is shown that generally snowdrifts near the surface lead to a significant stabilizing of the surface layer and a corresponding drag reduction. Inclusion of this effect results in an improved formulation of the snow drift densities. Comparison between calculations and observations are presented. (Auth.)

49-4232

Ice formation for turbulent flow in curved rectangular channels.

Braun, J., Beer, H., *International journal of heat and mass transfer,* May 1995, 38(8), p.1505-1515, 28 refs.

Turbulent flow, Channels (waterways), Ice formation, Ice cover thickness, Turbulent boundary layer, Topographic effects, Hydrodynamics, Analysis (mathematics)

49-4233

Spatial and temporal effect of cloud cover on the acquisition of high quality Landsat imagery in the European arctic sector.

Marshall, G.J., Dowdeswell, J.A., Rees, W.G., *Remote sensing of environment,* Nov. 1994, 50(2), p.149-160, 37 refs.

LANDSAT, Spaceborne photography, Cloud cover, Classifications, Glacier surveys, Image processing, Accuracy, Sensor mapping

49-4234

Coastal dune development in cold-climate environments.

Ruz, M.H., Allard, M., *Physical geography,* July-Aug. 1994, 15(4), p.372-380, 46 refs.

Landscape development, Subarctic landscapes, Shoreline modification, Eolian soils, Geomorphology, Sediment transport

49-4235

On the response of polarimetric synthetic aperture radar signatures at 24-cm wavelength to sea ice thickness in arctic leads.

Winebrenner, D.P., Farmer, L.D., Joughin, I.R., *Radio science,* Mar.-Apr. 1995, 30(2), p.373-402, 46 refs.

Sea ice, Ice openings, Ice surveys, Spaceborne photography, Ice cover thickness, Synthetic aperture radar, Backscattering, Polarization (waves), Ice optics, Analysis (mathematics)

49-4236

Laboratory measurements of radar backscatter from bare and snow-covered saline ice sheets.

Beaven, S.G., et al, MP 3604, *International journal of remote sensing,* Mar. 20, 1995, 16(5), p.851-876, 25 refs.

Sea ice, Radar echoes, Backscattering, Snow cover effect, Polarization (waves), Snow air interface, Surface roughness, Ice optics, Dielectric properties

Experiments were performed to collect radar backscatter data at K_u and C bands over simulated sea ice at the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) during the 1990 and 1992 winter seasons. Experiments were conducted over bare saline ice grown in an indoor tank and an outdoor pond facility. The radar data were calibrated using a complex vector calibration scheme to reduce systematic effects. In conjunction with the radar measurements, ice physical properties were measured. These measurements demonstrate that the dominant backscatter mechanism for bare saline ice is surface scattering. Both the copolarized and cross-polarized measurements compare favorably with the predictions of surface scattering models at two frequencies.

49-4237

Analysis of ERS-1 synthetic aperture radar data from Nordaustlandet, Svalbard.

Rees, W.G., Dowdeswell, J.A., Diament, A.D., *International journal of remote sensing,* Mar. 20, 1995, 16(5), p.905-924, 39 refs.

Spaceborne photography, Radar photography, Synthetic aperture radar, Glacier surveys, Surface structure, Backscattering, Snow cover effect, Image processing, Norway—Svalbard

49-4238

Physical and chemical characterization of Martian permafrost as a possible habitat for viable microorganisms.

Ostroumov, V., *Advances in space research,* Mar. 1995, 15(3), Life Sciences and Space Research XXV (4): Planetary Biology and Origins of Life. Proceedings of the Topical Meeting of the COSPAR Interdisciplinary Scientific Commission F (Meeting F3) of the COSPAR Twenty-ninth Plenary Meeting held in Washington, DC, USA, 28 August-5 September, 1992, p.(3)229-(3)236, 28 refs.

Mars (planet), Microbiology, Carbon dioxide, Soil chemistry, Permafrost thermal properties

49-4239

House on skis for BAS. *NERC news,* Jan. 1995, No.31, p.13.

Cold weather construction, Houses, Skis, Antarctica—Halley Station

British designers have developed a two-storey prefab house on skis to withstand the harsh conditions faced by British Antarctic Survey scientists and technicians working at Halley Station. A description of the building and its specifications are given.

49-4240

Converging glacier flow—a case study: the Unteraarglacier.

Gudmundsson, G.H., *Zürich. Eidgenösische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1994, No.131, 120p., With German summary. Refs. p.113-119.

Mountain glaciers, Glacier flow, Glacier friction, Glacial erosion, Glacier beds, Moraines, Glacier surveys, Radio echo soundings, Mathematical models, Switzerland

49-4241

Permafrost and glacier in Upper Engadin. Principles and examples of application for an automated estimation method. [Permafrost und Gletscher im Oberengadin. Grundlagen und Anwendungsbeispiele für automatisierte Schätzverfahren]

Hölzle, M., *Zürich. Eidgenösische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1994, No.132, 121p., In German with English summary. Refs. p.107-117.

Alpine glaciation, Mountain glaciers, Glacier surveys, Glacier mass balance, Glacier oscillation, Permafrost surveys, Permafrost distribution, Permafrost heat balance, Permafrost forecasting, Global warming, Mathematical models, Switzerland

49-4242

Variation in ground water patterns under the effect of glaciers and permafrost. [Änderung des Grundwasserregimes unter dem Einfluss von Gletschern und Permafrost]

Speck, C.K., *Zürich. Eidgenösische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1994, No.134, 164p., In German with English summary. Refs. p.153-158.

Alpine glaciation, Mountain glaciers, Rock glaciers, Glacial hydrology, Subglacial drainage, Permafrost hydrology, Subpermafrost ground water, Ground water, Paleoclimatology, Switzerland

49-4243

Vibrational spectra of water complexes with H_2, N_2, and CO.

Sadlej, J., Rowland, B., Devlin, J.P., Buch, V., *Journal of chemical physics,* Mar. 22, 1995, 102(12), p.4804-4818, 86 refs.

Ice physics, Water structure, Ice spectroscopy, Infrared spectroscopy, Spectra, Adsorption, Molecular energy levels, Vibration, Charge transfer

49-4244

Calorimetric effects of intergranular water in ice.

Salvetti, G., Tombari, E., Johari, G.P., *Journal of chemical physics,* Mar. 22, 1995, 102(12), p.4987-4990, 8 refs.

Ice physics, Ice thermal properties, Heat capacity, Temperature measurement, Ice melting, Ice water interface, Thermodynamics, Impurities

49-4245

Effects of boundary conditions on the basal glide of ice crystals in compression.

Barrette, P.D., Sinha, N.K., Stander, E., Michel, B., *Journal of materials science,* Jan. 1, 1995, 30(1), p.63-68, 33 refs.

Ice mechanics, Ice deformation, Sliding, Ice crystal structure, Mechanical tests, Strain tests, Accuracy, Ice solid interface

49-4246

Nucleation rates in freezing and solid-state transitions. Molecular clusters as model systems.

Bartell, L.S., *Journal of physical chemistry,* Jan. 26, 1995, 99(4), p.1080-1089, 87 refs.

Phase transformations, Solutions, Nucleation rate, Ice physics, Ice formation, Molecular energy levels, Molecular structure, Simulation

49-4247

Refractive-index measurements in freezing sea-ice and sodium chloride brines.

Maykut, G.A., Light, B., *Applied optics,* Feb. 20, 1995, 34(6), p.950-961, 26 refs.

Sea ice, Ice optics, Optical properties, Light scattering, Refractivity, Brines, Temperature effects, Sea water chemistry, Ice structure

49-4248

Portable vector reflectometer and its application for thickness and permittivity measurements.

Joseph, P.J., Joseph, J.C., Glynn, D.P., III, Perkins, T.O., III, *Microwave journal,* Dec. 1994, 37(12), p.84,86,88,90.

Portable equipment, River ice, Ice cover thickness, Electrical measurement, Design, Dielectric properties, Microwaves

49-4249

Holocene climatic records from Agassiz Ice Cap, Ellesmere Island, NWT, Canada.

Fisher, D.A., Koerner, R.M., Reeh, N., *Holocene,* 1995, 5(1), p.19-24, 26 refs.

Ice sheets, Ice cores, Climatic changes, Paleoclimatology, Isotope analysis, Stratigraphy, Ice dating, Glacier mass balance, Periodic variations, Canada—Northwest Territories—Ellesmere Island

49-4250

Paraglacial debris-cone formation on recently deglaciated terrain, western Norway.

Ballantyne, C.K., *Holocene,* 1995, 5(1), p.25-33, 25 refs.

Glacial geology, Glacial deposits, Age determination, Landforms, Geomorphology, Sediment transport, Slope processes, Norway

49-4251

Holocene climatic variations in southern Finland reconstructed from peat-initiation data.

Korhola, A., *Holocene,* 1995, 5(1), p.43-58, 63 refs.

Peat, Paludification, Radioactive age determination, Climatic changes, Paleoecology, Ecosystems, Finland

49-4252

Coupling global models of vegetation structure and ecosystem processes—an example from arctic and boreal ecosystems.

Plöchl, M., Cramer, W., *Tellus,* Feb.-Apr. 1995, 47B(1-2), p.240-250, 12 refs.

Ecosystems, Geochemical cycles, Simulation, Climatic changes, Climatology, Vegetation patterns, Vegetation factors, Biomass, Soil air interface

49-4253

CO_2 evolution during the last millennium as recorded by antarctic and Greenland ice.

Barnola, J.M., Anklin, M., Porcheron, J., Raynaud, D., Schwander, J., Stauffer, B., *Tellus,* Feb.-Apr. 1995, 47B(1-2), p.264-272, 26 refs.

Atmospheric composition, Ice sheets, Sampling, Carbon dioxide, Periodic variations, Correlation, Greenland, Antarctica—Siple Station, Antarctica—Amundsen-Scott Station

In order to study in detail the pre-industrial CO_2 level (back to about 900 AD) and its temporal variations, several ice cores from Greenland and Antarctica were analyzed in two laboratories, and compared with previous records. The agreement between the two laboratories and between the different cores of the same hemisphere is good. However, comparison of Greenland and Antarctica records shows values systematically higher in the north than in the south, ranging from 20 ppmv at the turn of this millennium to nearly zero around the 18th century. Based on the present knowledge of the carbon cycle, an inter-hemispheric gradient of 20 ppmv is unrealistic. Thus, in the oldest part of the record, at least one profile must not represent the true atmospheric CO_2 concentrations. The new results from D47 and D57 (Adélie Land) presented in this paper confirm the CO_2 fluctuation of about 10 ppmv at the end of the 13th century, previously observed by Siegenthaler et al. (1988) on an ice core drilled at the South Pole. (Auth. mod.)

49-4254

North Slope of Alaska and adjacent arctic ocean cloud and radiation testbed: science and siting strategies.

Zak, B.D., Stamnes, K.H., Atmospheric Radiation Measurement (ARM) Science Team Meeting, 4th, Charleston, SC, Feb. 28-Mar. 3, 1994. Proceedings, Washington, D.C., U.S. Department of Energy. Environmental Sciences Division, 1995, p.19-25, 10 refs.

Polar atmospheres, Atmospheric circulation, Cloud cover, Air ice water interaction, Ice cover effect, Snow cover effect, Radiation balance, Weather stations, United States—Alaska—North Slope

49-4255

Surface Heat Budget of the Arctic Ocean (SHEBA).

Curry, J.A., Moritz, R.E., Untersteiner, N., Randall, D.A., McPhee, M., Atmospheric Radiation Measurement (ARM) Science Team Meeting, 4th, Charleston, SC, Feb. 28-Mar. 3, 1994. Proceedings, Washington, D.C., U.S. Department of Energy. Environmental Sciences Division, 1995, p.27-30.

Polar atmospheres, Atmospheric circulation, Air ice water interaction, Heat balance, Research projects

49-4256

Overview of North Slope of Alaska/adjacent arctic ocean science issues.

Ellingson, R.G., Curry, J.A., Stamnes, K.H., Walsh, J.E., Zak, B.D., Atmospheric Radiation Measurement (ARM) Science Team Meeting, 4th, Charleston, SC, Feb. 28-Mar. 3, 1994. Proceedings, Washington, D.C., U.S. Department of Energy. Environmental Sciences Division, 1995, p.31-38, 13 refs.

Polar atmospheres, Atmospheric circulation, Cloud cover, Air ice water interaction, Ice cover effect, Snow cover effect, Radiation balance, Weather stations, Research projects

49-4257

Effects of arctic stratus clouds on the solar energy budget in the atmosphere-sea ice-ocean system.

Jin, Z., Stamnes, K.H., Zak, B.D., Atmospheric Radiation Measurement (ARM) Science Team Meeting, 4th, Charleston, SC, Feb. 28-Mar. 3, 1994. Proceedings, Washington, D.C., U.S. Department of Energy. Environmental Sciences Division, 1995, p.193-197, 6 refs.

Polar atmospheres, Cloud cover, Air ice water interaction, Radiation balance

49-4258

Glacier atlas of Svalbard and Jan Mayen.

Hagen, J.O., Liestøl, O., Roland, E., Jørgensen, T., *Norsk Polarinstitutt. Meddelelser,* 1993, No.129, 141p. + maps, Refs. p.36-41,139.

Glacier surveys, Glacier mass balance, Glacier oscillation, Glacial hydrology, Glacier surges, Norway—Svalbard, Norway—Jan Mayen

49-4259

Seismic atlas of western Svalbard.

Eiken, O., *Norsk Polarinstitutt. Meddelelser,* 1994, No.130, 73p. + enclosures, Refs. p.65-73.

Seismic surveys, Geological surveys, Exploration, Stratigraphy, Marine geology, Bottom sediment, Glacial deposits, Norway—Svalbard

49-4260

Organochlorine pollutants in polar bears—occurrence, level and possible effects. [Klorerte organiske miljøgifter i isbjørn—forekomst, nivå og mulige effekter]

Kleivane, L., Skåre, J.U., Wiig, Ø., *Norsk Polarinstitutt. Meddelelser,* 1994, No.132, 46p., In Norwegian with English summary. Refs. p.39-46.

Polar atmospheres, Air pollution, Water pollution, Ecosystems, Nutrient cycle, Marine biology, Animals, Physiological effects

49-4261

Proceedings.

Rotary-Wing Aircraft In-Flight Icing/De-Icing Workshop, Ottawa, June 1993, Ottawa, National Research Council Canada, 1993, 17p. + appends., Appendixes consist of notes and slides of presentations.

Helicopters, Aircraft icing, Chemical ice prevention, Ice forecasting, Ice detection

49-4262

1994 annual report on Alaska's mineral resources.

Schneider, J.L., ed, *U.S. Geological Survey. Circular,* 1994, No.1113, 69p., Refs. p.55-66.

Exploration, Geological surveys, Minerals, Petroleum industry, Economic development, Natural resources, Cost analysis, United States—Alaska

49-4263

ETH Greenland Expedition. Progress report No.2: April 1991 to October 1992. Energy and mass balance during the melt season at the equilibrium line altitude, Paakitsoq, Greenland ice sheet (69° 34' 25.3" North, 49° 17' 44.1" West, 1155 m a.s.l.).

Ohmura, A., ed, Zurich, Swiss Federal Institute of Technology (Eidgenössische Technische Hochschule), Department of Geography, 1992, 94p., WDCA 93000082, Refs. passim.

Glacier surveys, Ice sheets, Glacier mass balance, Glacier heat balance, Glacial hydrology, Glacial meteorology, Ice air interface, Polar atmospheres, Greenland

49-4264

Detection and estimation using an adaptive rational function filter.

Leung, H., Haykin, S., *IEEE transactions on signal processing,* Dec. 1994, 42(12), p.3366-3376, 24 refs.

Data processing, Filters, Remote sensing, Radar echoes, Sea ice, Ice detection, Analysis (mathematics)

49-4265

Flash freezing of protein crystals: investigation of mosaic spread and diffraction limit with variation of cryoprotectant concentration.

Mitchell, E.P., Garman, E.F., *Journal of applied crystallography,* Dec. 1, 1994, 27(6), p.1070-1074, 15 refs.

Cryobiology, Preserving, Freezing, Antifreezes, Laboratory techniques, Crystals, X ray diffraction

49-4266

Radar observations of changing orientations of hydrometeors in thunderstorms.

Metcalf, J.I., *Journal of applied meteorology,* Apr. 1995, 34(4), p.757-772, 16 refs.

Cloud physics, Thunderstorms, Atmospheric electricity, Precipitation (meteorology), Sounding, Radar echoes, Ice crystal optics, Orientation, Electric fields

49-4267

Comparison of seeded and nonseeded orographic cloud simulations with an explicit cloud model.

Meyers, M.P., DeMott, P.J., Cotton, W.R., *Journal of applied meteorology,* Apr. 1995, 34(4), p.834-846, 31 refs.

Precipitation (meteorology), Cloud physics, Cloud seeding, Weather modification, Heterogeneous nucleation, Artificial nucleation, Ice formation, Aerosols, Mathematical models, Correlation

49-4268

Ozone profiles at McMurdo Station, Antarctica during the spring of 1993; record low ozone season.

Johnson, B.J., Deshler, T., Zhao, R., *Geophysical research letters,* Feb. 1, 1995, 22(3), p.183-186, 11 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Ozone, Atmospheric density, Sounding, Aerosols, Periodic variations, Antarctica—McMurdo Station

Record low ozone was measured by balloon-borne ozonesondes (40 flights) at McMurdo Station during the 1993 austral spring. Total column ozone declined by 55% from an initial 275 Dobson Units (DU) on 30 Aug. to a minimum of 130 DU on 2 Oct. Ozone within the 12-20 km showed a 95% decrease from an initial 138 DU in Aug. to a record low 7 DU on 19 Oct. Probable causes of the 1993 record low ozone include: the presence of the Pinatubo volcanic aerosol layer between 11 and 16 km (though decreased from the 1992 season); a colder than normal stratosphere over McMurdo (183 K minimum); and a relatively stable polar vortex which delayed the intrusion of high levels of ozone from outside the polar vortex wall until after 22 Oct. These conditions provided an optimum environment for the formation of polar stratospheric clouds (PSCs), essential to the heterogeneous chemistry that subsequently leads to the catalytic destruction of ozone by reactive chlorine. (Auth.)

49-4269

Decline of hexachlorocyclohexane in the arctic atmosphere and reversal of air-sea gas exchange.

Bidleman, T.F., Jantunen, L.M., Falconer, R.L., Barrie, L.A., Fellin, P., *Geophysical research letters,* Feb. 1, 1995, 22(3), p.219-222, 30 refs.

Polar atmospheres, Marine atmospheres, Air pollution, Sampling, Atmospheric composition, Periodic variations, Air water interactions

49-4270

Vapour pressures of $H_2SO_4/HNO_3/HCl/HBr/H_2O$ solutions to low stratospheric temperatures.

Luo, B.P., Carslaw, K.S., Peter, T., Clegg, S.L., *Geophysical research letters,* Feb. 1, 1995, 22(3), p.247-250, 18 refs.

Polar atmospheres, Polar stratospheric clouds, Simulation, Cloud physics, Aerosols, Chemical properties, Vapor pressure, Temperature effects

Vapor pressures of H_2O, HNO_3, HCl and HBr over supercooled aqueous mixtures with sulfuric acid have been calculated using an activity coefficient model for 185 K<T<235 K and assuming HCl and HBr to be minor constituents. Predicted vapor pressures agree well with most laboratory data, and give confidence in the validity of the model. The results are parameterized as simple formulae, which reproduce the model results to within 40% and cover the entire stratospherically relevant range of composition and temperature. The study is pertinent to polar stratospheric clouds. (Auth. mod.)

49-4271

Interaction of HCl with crystalline and amorphous ice: implications for the mechanisms of ice-catalyzed reactions.

Graham, J.D., Roberts, J.T., *Geophysical research letters,* Feb. 1, 1995, 22(3), p.251-254, 22 refs.

Polar atmospheres, Cloud physics, Chemical properties, Polar stratospheric clouds, Ice vapor interface, Amorphous ice, Simulation

To study the formation of polar stratospheric clouds, the interaction of HCl with ice under ultrahigh vacuum has been studied using temperature programmed desorption and single reflection Fourier transform infrared spectroscopy. Both amorphous and crystalline ice were investigated. At 120 K, HCl is initially absorbed by ice to form a stoichiometric hydrate phase identified as $HCl\cdot 6H_2O$. Upon completion of the bulk phase, HCl is adsorbed to the surface. This initial HCl adsorption probability on crystalline ice is ~60% of that on amorphous ice. Furthermore, the adsorption probability on crystalline ice decreases more rapidly with increasing HCl uptake. As a result, $HCl\cdot 6H_2O$ is more rapidly formed in amorphous ice. The difference in adsorption probabilities is tentatively attributed to a lower coverage of dangling OH groups at the crystalline ice surface. (Auth. mod.)

49-4272

Glancing-angle x-ray scattering studies of the premelting of ice surfaces.

Dosch, H., Lied, A., Bilgram, J.H., *Surface science,* Apr. 1, 1995, 327(1-2), p.145-164, 42 refs.

Ice physics, Ice crystal optics, X ray analysis, Scattering, Ice melting, Surface structure, Phase transformations

49-4273

Intra-annual variations in glacier motion: a review.

Willis, I.C., *Progress in physical geography,* Mar. 1995, 19(1), p.61-106, Refs. p.102-106.

Glaciology, Glacier oscillation, Glacial hydrology, Glacier flow, Subglacial drainage, Ice mechanics, Velocity measurement, Periodic variations

49-4274

Radiation and energy budgets of alpine tundra environments of North America.

Saunders, I.R., Bailey, W.G., *Progress in physical geography,* Dec. 1994, 18(4), p.517-538, 104 refs.

Alpine landscapes, Alpine tundra, Climatic factors, Radiation balance, Heat balance, Soil air interface, Topographic effects

49-4275

Analysis of the vulnerability and conservational value of seabirds in relation to oil and gas exploration in the northern Barents Sea. [Sårbarhets-og verneverdianalyse for sjøfugl i forbindelse med leteboring etter olje/gass i Barentshavet Nord]

Fjeld, P.E., Bakken, V., *Norsk Polarinstitutt. Meddelelser,* 1993, No.123, 67p., In Norwegian with English summary. Refs. p.39-48.

Offshore drilling, Oil spills, Water pollution, Environmental impact, Ecosystems, Marine biology, Barents Sea

49-4276

Sea ice off the Icelandic coasts, October 1991-September 1992. [Hafís vid strendur Íslands, október 1991-september 1992], Reykjavík, Icelandic Meteorological Office (Vedurstofa Íslands), 1994, 38p., In Icelandic with English summary.

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Icebergs, Iceland

49-4277

Yukon Territory snow survey bulletin and water supply forecast, March 1, 1995.

Canada. Indian and Northern Affairs. Water Resources Division, Whitehorse, 1995, 27p.

Snow surveys, Runoff forecasting, Snow depth, Snow water equivalent, Stream flow, Canada—Yukon Territory

49-4278

Yukon Territory snow survey bulletin and water supply forecast, April 1, 1995.

Canada. Indian and Northern Affairs. Water Resources Division, Whitehorse, 1995, 27p.

Snow surveys, Runoff forecasting, Snow depth, Snow water equivalent, Stream flow, Canada—Yukon Territory

49-4279

Avalanche rescue dogs: some thoughts from a rescuer.

Atkins, D., *Avalanche review,* Mar. 1995, 13(5), p.1,7,8, 2 refs.

Avalanches, Accidents, Rescue operations, Animals

49-4280

Of wet snow, slush and snowballs.

Colbeck, S.C., MP 3605, *Avalanche review,* Mar. 1995, 13(5), p.4-5.

Wet snow, Slush, Snow crystal structure, Snow crystal growth, Metamorphism (snow), Snow permeability

49-4281

Fulvic acids in the antarctic snow "via marine aerosol".

Cini, R., Petronio, B.M., Degli Innocenti, N., Stortini, A.M., Braguglia, C., Calace, N., *Annali di chimica,* 1994, Vol.84, p.425-430, 11 refs.

Snow composition, Snow impurities, Snow air interface, Polar atmospheres, Marine atmospheres, Aerosols, Air pollution, Antarctica—Melbourne, Mount

Fulvic acids were found for the first time in antarctic snow in the summer of 1990-91 on Mt. Melbourne at an elevation of 1130 m a.s.l, and again in the summer of 1993-94 also on Mt. Melbourne at 200 m a.s.l. The FTIR spectra of the fulvic acids extracted from the snow samples were very similar to fulvic acids extracted from sea water samples, indicating that the fulvic acids in the snow were transported by marine aerosols. Since chlorinated compounds and heavy metals interact with fulvic acids, the presence of fulvic acids in antarctic snow also indicates that such pollutants may also be transported by marine aerosols.

49-4282

Antarctic pack-ice ecosystem.

Stevens, J.E., *BioScience,* Mar. 1995, 45(3), p.128-132.

Pack ice, Ecosystems, Ecology, Marine biology, Cryobiology, Nutrient cycle, Biomass, Antarctica

Cruises into the pack ice of the Weddell Sea in the winters of 1986 and 1992, and into the pack ice of the Amundsen and Ross seas in the winter of 1994, found that algae live and grow in pockets of meltwater, in brine channels, and at the snow ice interface, throughout the ice all winter. Previously it was thought that algae lived only on the bottom surface of the ice and that krill dropped to the sea floor and hibernated during the winter. The evidence now indicates that adult and larval krill graze on the ice algae through the winter, so that in effect the pack ice is a krill nursery.

49-4283

Construction of a glacial ice runway and wheeled flight operations at McMurdo, Antarctica.

Blaisdell, G.L., Lang, R., Crist, G., Kurtti, K., Harbin, J., Flora, D., MP 3606, Cambridge, England, Scientific Committee on Antarctic Research, [1994], 12p., 4 refs. Presented at the 6th SCALOP (Standing Committee on Antarctic Logistics and Operations) Symposium of the 23rd SCAR meeting, Aug. 29-31, 1994, Rome, Italy.

Ice runways, Cold weather construction, Logistics, Site surveys, Ice (construction material), Ice strength, Antarctica—McMurdo Station

Beginning in the 1989-90 summer season, engineering studies were directed at determining the feasibility of producing a runway for wheeled aircraft on the Ross Ice Shelf near McMurdo, specifically for use during the period after the sea ice deteriorates. Based on historical records and air photos, a site 13 km south of McMurdo was chosen in an area with a thin, but permanent and complete, snow cover. At this location, called the Pegasus site, the snow is underlain by a contiguous mass of glacial ice that is derived from a combination of natural seasonal melt water (near the surface) and ice formed by metamorphosis of snow. A C-141 flight at the Pegasus runway in Feb. 1994 marked the final test in a five-year development program to demonstrate the feasibility of a semipermanent glacial ice runway capable of supporting heavy wheeled aircraft at a site easily accessible to McMurdo. In the later phases of developing the runway, numerous working flights took place using LC-130s operating on wheels and a conventional C-130. (Auth. mod.)

49-4284

Safety zone as a barrier to root-shoot ice propagation.

Zámečník, J., Bieblová, J., Grospietsch, M., *Plant and soil,* 1994, Vol.167, p.149-155, 14 refs.

Plant physiology, Plant tissues, Plant ecology, Roots, Cryobiology, Cold tolerance, Frost resistance, Ice nuclei, Organic nuclei

49-4285

Glacier fluctuations and climate change detection—operational elements of a worldwide monitoring strategy.

Haeberli, W., *World Meteorological Organization. Bulletin,* Jan. 1995, 44(1), p.23-31, 47 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Glacial meteorology, Climatic changes, Global warming, Data processing

49-4286

Pulp mills and the environment: an annotated bibliography for northern Alberta.

Holmberg, R.G., Athabasca, Alberta, University, 1992, 32p., About 350 citations.

Air pollution, Water pollution, Waste treatment, Economic development, Environmental impact, Environmental protection, Bibliographies, Canada—Alberta

49-4287

Long-Range Ice Forecasting System (LRIFS) applied for the Beaufort Sea.

Davidson, L.W., *Canada. Environmental Studies Research Funds. Report,* 1993, No.125, 58p., With French summary. 15 refs.

Sea ice distribution, Ice conditions, Icebergs, Ice forecasting, Statistical analysis, Computerized simulation, Beaufort Sea

49-4288

Glacier mass balance bulletin. Bulletin No.3 (1992-1993).

World Glacier Monitoring Service, Haeberli, W., ed, Hoelzle, M., ed, Bösch, H., ed, Zurich, 1994, 79p.

Mountain glaciers, Glacier surveys, Glacier mass balance, Glacier oscillation

49-4289

Law and snow science: legal aspects of avalanche accidents. [Nivologia legale: gli aspetti giuridici relativi agli incidenti da valanga]

Munter, W., *Neve e valanghe,* July 1994, No.22, p.6-19,78, In Italian with English summary.

Avalanches, Avalanche forecasting, Snow cover stability, Accidents, Legislation

49-4290

Snow surfing: a way of life or just a fad? [Surf da neve sicurezza: modo di vita o moda, semplicemente]

Raspaud, M., Reynier, V., *Neve e valanghe,* July 1994, No.22, p.20-27,78, In Italian with English summary. 43 refs.

Avalanches, Accidents, Skis, Safety

49-4291

ARVA 94: latest international tests on avalanche research transceivers. [ARVA 94: le recenti prove internazionali sugli Apparecchi di Ricerca in Valanga]

Good, W., Peretti, G., *Neve e valanghe,* July 1994, No.22, p.28-39,78-79, In Italian with English summary.

Avalanches, Accidents, Rescue equipment, Radio beacons

49-4292

Risk of landslides in the mountain: the use of dendrochronology and lichenometry for the location of avalanche and landslide prone areas. [Il rischio di dissesti in montagna: la dendrocronologia e la lichenometria per l'individuazione di aree franose e valanghive]

Giambastiani, M., *Neve e valanghe,* July 1994, No.22, p.46-54,79, In Italian with English summary.

Avalanche forecasting, Avalanche deposits, Lichens, Age determination, Soil dating

49-4293

New classification for alpine glaciers: a proposal by the Lombard Glaciologic Service. [Una nuova classificazione per i ghiacciai alpini: la proposta del Servizio Glaciologico Lombardo]

Galluccio, A., Catasta, G., Bonardi, L., Righetti, F., *Neve e valanghe,* July 1994, No.22, p.58-73,79, In Italian with English summary. 17 refs.

Mountain glaciers, Glacier surveys, Terminology, Italy

49-4294

Results from optical scintillometers operated at Sevilleta, New Mexico.

Otto, W.D., et al, MP 3607, *U.S. National Oceanic and Atmospheric Administration. Environmental Research Laboratories. Environmental Technology Laboratory. NOAA technical memorandum,* Jan. 1995, ERL ETL-248, 29p., 7 refs.

Atmospheric boundary layer, Atmospheric attenuation, Soil air interface, Turbulence, Heat flux, Lasers, Lidar, Scintillation

The inner scale of turbulence l_0 and refractive structure parameter C^2_n were obtained from measured atmospheric scintillation. Simultaneous propagation over two paths of different lengths was continuously monitored for 15 days; the two paths were nearly parallel. Two different diameters of the large aperture were used simultaneously on the long path. This results in three sets of l_0 and C^2_n for intercomparison. The authors evaluate the use of inner-scale scintillometers on long (606 m) paths and the efficacy of correcting for strong scintillation. Design recommendations are given for a long-path inner-scale scintillometer. The authors also evaluate obtaining inner scale from the ratio of irradiance variances from HeNe and CO_2 lasers operated simultaneously over the same path.

49-4295

Anatomy of a snowflake.

Suszkiw, J., Wergin, W.P., Erbe, E.F., Rango, A., *Agricultural research,* Apr. 1995, p.18-21.

Snowflakes, Snow crystal structure, Ice crystal optics, Ice crystal replicas, Scanning electron microscopy, Runoff forecasting

49-4296

Air filtration with moisture and frosting phase changes in fiberglass insulation. 1. Experiment.

Mitchell, D.R., Tao, Y.X., Besant, R.W., *International journal of heat and mass transfer,* June 1995, 38(9), p.1587-1596, 17 refs.

Insulation, Construction materials, Cellular plastics, Heat loss, Moisture transfer, Air flow, Seepage, Temperature effects, Cold weather tests, Ice formation

49-4297

Air filtration with moisture and frosting phase changes in fiberglass insulation. 2. Model validation.

Mitchell, D.R., Tao, Y.X., Besant, R.W., *International journal of heat and mass transfer,* June 1995, 38(9), p.1597-1604, 17 refs.

Insulation, Cellular plastics, Cold weather performance, Moisture transfer, Air flow, Seepage, Heat loss, Ice formation, Mathematical models, Simulation

49-4298

Joint width and freeze/thaw effects on joint sealant performance.

Al-Qadi, I.L., Abo-Qudais, S.A., *Journal of transportation engineering,* May-June 1995, 121(3), p.262-266, 5 refs.

Pavements, Sealing, Joints (junctions), Construction materials, Cold weather performance, Freeze thaw cycles, Mechanical tests, Loading

49-4299

Glacial cirques in Scandinavia.

Rudberg, S., *Norsk geografisk tidsskrift,* Dec. 1994, 48(4), p.179-197, 28 refs.

Glacial geology, Cirques, Distribution, Maps, Classifications, Geomorphology

49-4300

Operational grid method for estimation of the areal water equivalent of snow.

Reuna, M., *Geophysica,* 1994, 30(1-2), p.107-121, 7 refs.

Snow hydrology, Snow water equivalent, Snow surveys, Computer applications, Monitors, Topographic effects

49-4301

Tidal flexure at ice shelf margins.

Vaughan, D.G., *Journal of geophysical research,* Apr. 10, 1995, 100(B4), p.6213-6224, 33 refs.

Ice shelves, Rheology, Ice deformation, Tidal currents, Ice water interface, Grounded ice, Models, Ice elasticity, Antarctica—Ronne Ice Shelf

Observations on Rutford Ice Stream and Ronne Ice Shelf using the kinematic method of Global Positioning System have yielded the first continuous tidal displacement profiles from an ice sheet hinge zone. The form of these tidal displacement profiles indicates that the flexure can be fitted to an elastic beam model using a parameter space optimization technique. The model matches the observed tidal deflection profile to within 5 cm, which is similar to the observational uncertainty. The same model and parameter fitting technique is then successfully applied to various other published and unpublished tidal displacement data from Doake Ice Rumples, Bach Ice Shelf, and Ekström Ice Shelf, Antarctica, and Jakobshavns Glacier, Greenland. The elastic beam model with a single value of the elastic modulus (0.88±0.35 GPa) adequately describes almost all the data and so can usefully be applied elsewhere. (Auth. mod.)

49-4302

Simulating iceberg calving with a percolation model.

Bahr, D.B., *Journal of geophysical research,* Apr. 10, 1995, 100(B4), p.6225-6232, 34 refs.

Sea ice, Icebergs, Calving, Ice mechanics, Simulation, Mathematical models, Crack propagation

49-4303

Lattice model of network-forming fluids with orientation-dependent bonding: equilibrium, stability, and implications for the phase behavior of supercooled water.

Borick, S.S., Debenedetti, P.G., Sastry, S., *Journal of physical chemistry,* Mar. 16, 1995, 99(11), p.3781-3792, 86 refs.

Supercooling, Water structure, Phase transformations, Molecular structure, Molecular energy levels, Thermodynamics, Fluid dynamics, Temperature effects, Mathematical models

49-4304

Isotope and temperature effects on the hyperfine interaction of atomic hydrogen in liquid water and ice.

Roduner, E., Percival, P.W., Han, P., Bartels, D.M., *Journal of chemical physics,* Apr. 15, 1995, 102(15), p.5989-5997, 46 refs.

Ice physics, Hydrogen, Isotope analysis, Molecular energy levels, Molecular structure, Temperature effects, Clathrates

49-4305

Phase transition and entropy of amorphous ices.

Johari, G.P., *Journal of chemical physics,* Apr. 15, 1995, 102(15), p.6224-6229, 37 refs.

Ice physics, Amorphous ice, Phase transformations, Water structure, Ice density, Thermodynamic properties, Molecular energy levels

49-4306

Dual-Doppler and multiparameter radar observations of a bow-echo hailstorm.

Kennedy, P.C., Rutledge, S.A., *Monthly weather review,* Apr. 1995, 123(4), p.921-943, 50 refs.

Precipitation (meteorology), Atmospheric physics, Thunderstorms, Air flow, Radar tracking, Hail clouds, Ice detection, Radar echoes

49-4307

Mesoscale modeling study of the atmospheric circulation of high southern latitudes.

Hines, K.M., Bromwich, D.H., Parish, T.R., *Monthly weather review,* Apr. 1995, 123(4), p.1146-1165, 35 refs.

Polar atmospheres, Turbulent boundary layer, Wind direction, Wind velocity, Topographic effects, Simulation, Models

The meteorology of high southern latitudes during winter is simulated using a cloud-free version of The Pennsylvania State University-National Center for Atmospheric Research Mesoscale Model version 4 (MM4) with a 100 km horizontal resolution. Comparisons between idealized simulations of Antarctica with MM4 and with the mesoscale model of Parish and Waight reveal that both models produce similarly realistic velocity fields in the boundary layer. The latter model tends to produce slightly faster drainage winds over East Antarctica. The intensity of the katabatic winds produced by MM4 is sensitive to parameterizations of boundary layer fluxes. A simulation of the period from 0000 UTC 2 June to 0000 UTC 8 June produces realistic synoptic phenomena including ridge development over East Antarctica, frontogenesis over the Amundsen Sea, and a katabatic surge over the Ross Ice Shelf. The lack of latent heating in the simulations apparently causes in some bias in the results. In particular, the cloud-free version of MM4 underpredicts the intensity of lows in the sea level pressure field. (Auth. mod.)

49-4308

Use of drilling by the U.S. Antarctic Program.

Wade, M.C., Webb, J.W., Hedberg, W.H., *Oak Ridge National Laboratory. Technical report,* Aug. 1994, ORNL/TM-12809, 37p., DE94017744, Refs. p.35-36.

Research projects, Drilling, Environmental impact, Environmental protection, Pollution

This report on drilling in the Antarctic has been prepared by the U.S. National Science Foundation (NSF) to assist principal investigators and others in complying with the National Environmental Policy Act (NEPA) and the Antarctic Treaty of 1961. In the United States, responsibility for compliance with these requirements rests with the NSF Office of Polar Programs (OPP), which manages the U.S. Antarctic Program (USAP). The USAP maintains three year-round stations on the continent to support scientific research. Research and associated support operations at these stations and camps sometimes involve drilling into ice, soil, or ocean sediments. In order to comply with NEPA and the Protocol, it is necessary for principal investigators and others to assess the environmental effects of drilling. This report describes various drilling technologies currently available for use in Antarctica, generally characterizing the potential environmental impacts associated with these drilling techniques, and identifying possible mitigation measures to reduce impacts.

49-4309

Interim results of 1993/94 soil climate, active layer and permafrost investigations at Scott Base, Vanda and Beacon Heights, Antarctica.

Balks, M.R., Campbell, D.I., Campbell, I.B., Claridge, G.G.C., *Waikato. University. Antarctic Research Unit. Special report,* Jan. 1995, No.1, 61p. + 64p. in Appendix, Refs. p.59-61.

Permafrost, Geocryology, Soil analysis, Soil water, Active layer, Human factors, Soil profiles, Antarctica—Scott Base, Antarctica—Beacon Heights, Antarctica—Vanda, Lake

Investigations of water characteristics in the active layer and permafrost of soils at Scott Base, Marble Point, Lake Vanda and Beacon Heights were undertaken during the 1993-94 antarctic summer as part of a program to assess the impact of humans on terrestrial ecosystems. The physical impact on soils from foot traffic disturbance was also assessed. At Scott Base, an experiment was established to measure the rate at which water is lost from the permafrost following the removal of the active layer and to relate water content changes to site microclimate and weather. Soil water content in soils in a disturbed area are compared with that in an adjacent undisturbed area. Initial results of measurements made using a neutron probe showed that, following removal of the active layer, the previously frozen soil warmed rapidly, melting the ice within the soil. Because of the low water contents in these soils, physical human disturbances are much less likely to impact on soil hydrological properties than in the coastal regions. Soil profile descriptions are appended in an additional 64 pages. (Auth. mod.)

49-4310

Newsletter, No.39, Dec. 1994.

Antarctic Society of Australia, Pymble, New South Wales, 1994, 20p.

Ozone

The news items presented in this issue deal with the following: the 1st joint conference of Australian and New Zealand professional conservators discussing preservation of antarctic historic sites; the international electronic database on antarctic research being established at the Antarctic Centre in Christchurch; an antarctic agreement between New Zealand and France; antarctic trips for tourists available by sea and air; the search for the wreck of a Spanish warship believed to have sunk near Livingston I. in 1819; and a scientific assessment of ozone depletion in 1994.

49-4311

Newsletter, No.40, Mar. 1995.

Antarctic Society of Australia, Pymble, New South Wales, 1995, 20p.

Pack ice, Marine geology

The news items presented in this issue deal with the following: the report on SCAR Working Group on Biology, including subsidiary group reports and recommendations; an information brochure issued by NZAP on environmental protection; help needed for saving whales; the Antarctic Centre as part of Hobart redevelopment; environmental protection measures at the four Australian stations; comments from aboard the *Nathaniel B. Palmer* on winter pack ice; and an antarctic drilling program which could fill geological gaps.

49-4312

Geologic studies in Alaska by the U.S. Geological Survey, 1993.

Till, A.B., ed, Moore, T.E., ed, *U.S. Geological Survey. Bulletin,* 1994, No.2107, 217p., Refs. passim. For selected papers see 49-4313 through 49-4323.

Geological surveys, Exploration, Natural resources, Hydrogeochemistry, Geochemistry, Gold, Minerals, Mining, Soil pollution, Water pollution, United States—Alaska

49-4313

Mercury in the environment and its implications, Kuskokwim River region, southwestern Alaska.

Gray, J., Theodorakos, P.M., Budahn, J., O'Leary, R., *U.S. Geological Survey. Bulletin,* 1994, No.2107, Geologic studies in Alaska by the U.S. Geological Survey, 1993. Edited by A.B. Till and T.E. Moore, p.3-13, 41 refs.

Mining, Soil pollution, Water pollution, Environmental impact, Hydrogeochemistry, Nutrient cycle, Physiological effects, United States—Alaska—Kuskokwim River

49-4314

High arsenic content in sediments from the Koyukuk National Wildlife Refuge, west-central Alaska.

Eppinger, R.G., Motooka, J.M., Sutley, S.J., *U.S. Geological Survey. Bulletin,* 1994, No.2107, Geologic studies in Alaska by the U.S. Geological Survey, 1993. Edited by A.B. Till and T.E. Moore, p.15-20, 19 refs.

Streams, Ponds, Bottom sediment, Lacustrine deposits, Hydrogeochemistry, Soil pollution, Water pollution, United States—Alaska—Koyukuk National Wildlife Refuge

49-4315

Environmental geochemistry of mesothermal gold deposits, Kenai Fjords National Park, south-central Alaska.

Cieutat, B.A., Goldfarb, R.J., Borden, J.C., McHugh, J., Taylor, C.D., *U.S. Geological Survey. Bulletin,* 1994, No.2107, Geologic studies in Alaska by the U.S. Geological Survey, 1993. Edited by A.B. Till and T.E. Moore, p.21-25, 8 refs.

Mining, Gold, Hydrothermal processes, Hydrogeochemistry, Suspended sediments, Environmental impact, Water pollution, Soil pollution, United States—Alaska—Kenai Fjords National Park

49-4316

Paleowind directions for late Holocene dunes on the western arctic coastal plain, northern Alaska.

Galloway, J.P., Carter, L.D., *U.S. Geological Survey. Bulletin,* 1994, No.2107, Geologic studies in Alaska by the U.S. Geological Survey, 1993. Edited by A.B. Till and T.E. Moore, p.27-30, 6 refs.

Eolian soils, Quaternary deposits, Sands, Wind direction, Paleoclimatology, Soil dating, United States—Alaska—North Slope

49-4317

Methane in the Fox permafrost tunnel near Fairbanks, Alaska.

Kvenvolden, K.A., Lorenson, T.D., Barber, V., *U.S. Geological Survey. Bulletin,* 1994, No.2107, Geologic studies in Alaska by the U.S. Geological Survey, 1993. Edited by A.B. Till and T.E. Moore, p.31-37, 12 refs.

Permafrost surveys, Frozen ground chemistry, Soil chemistry, Soil air interface, Atmospheric composition, Global warming, United States—Alaska—Fairbanks

49-4318

1993 Nelson Mountain landslide, Chitina Valley, southern Alaska, an aerial view.

Yehle, L.A., Rosenkrans, D., *U.S. Geological Survey. Bulletin,* 1994, No.2107, Geologic studies in Alaska by the U.S. Geological Survey, 1993. Edited by A.B. Till and T.E. Moore, p.39-41, 2 refs.

Landslides, Avalanche deposits, Avalanche tracks, Slope stability, Frost weathering, United States—Alaska—Chitina River

49-4319

Importance of landslides in the geomorphic development of the upper Caribou Creek area, Talkeetna Mountains, Alaska.

Nelson, S.W., *U.S. Geological Survey. Bulletin,* 1994, No.2107, Geologic studies in Alaska by the U.S. Geological Survey, 1993. Edited by A.B. Till and T.E. Moore, p.43-47, 10 refs.

Landslides, Avalanche deposits, Avalanche tracks, Avalanche erosion, Slope stability, Alpine glaciation, United States—Alaska—Talkeetna Mountains

49-4320

Isotopic constraints on the genesis of base-metal-bearing mineral occurrences near Columbia Glacier, northern Prince William Sound, Alaska.

Goldfarb, R.J., Gent, C.A., Gray, J.E., Nelson, S.W., *U.S. Geological Survey. Bulletin,* 1994, No.2107, Geologic studies in Alaska by the U.S. Geological Survey, 1993. Edited by A.B. Till and T.E. Moore, p.73-82, 33 refs.

Exploration, Geochemistry, Minerals, Natural resources, Isotope analysis, United States—Alaska—Prince William Sound

49-4321

Gold in heavy-mineral-concentrate samples from the Howard Pass quadrangle, Brooks Range, Alaska.

Kelley, K.D., Bailey, E.A., Cieutat, B.A., Borden, J.C., *U.S. Geological Survey. Bulletin,* 1994, No.2107, Geologic studies in Alaska by the U.S. Geological Survey, 1993. Edited by A.B. Till and T.E. Moore, p.83-89, 27 refs.

Exploration, Geochemistry, Minerals, Gold, Natural resources, United States—Alaska—Brooks Range

49-4322

Calculated gold resource in Circle and Fortymile placers.

Yeend, W., *U.S. Geological Survey. Bulletin,* 1994, No.2107, Geologic studies in Alaska by the U.S. Geological Survey, 1993. Edited by A.B. Till and T.E. Moore, p.91-93, 10 refs.

Exploration, Gold, Placer mining, Natural resources, United States—Alaska

49-4323

Miocene coal-bearing strata of the Tyonek Formation: braided-stream deposits in the Chuit Creek-Chuitna River drainage basin, southern Alaska.

Flores, R.M., Stricker, G.D., Roberts, S.B., *U.S. Geological Survey. Bulletin,* 1994, No.2107, Geologic studies in Alaska by the U.S. Geological Survey, 1993. Edited by A.B. Till and T.E. Moore, p.95-114, 41 refs.

Exploration, Stratigraphy, Coal, Natural resources, United States—Alaska—Cook Inlet

49-4324

Australian antarctic and subantarctic research program. Report to the Scientific Committee for Antarctic Research No.35, 1993. April 1992-March 1993: record of activities; April 1993-March 1994: planned activities.

Australian National Committee for Antarctic Research. Australian Antarctic Division, Kingston, Tasmania, 1993, 214p., Refs. p.175-188.

DLC QC807.6.A57A98b

Research projects, Glaciology, Low temperature research

Highlights of the program conducted from Apr. 1992 to Mar. 1993 in atmospheric sciences, biology, geosciences, glaciology, human biology and medicine, and oceanography are given. These are followed by details of specific projects, including title of project, names of participating investigators, location, project aims, field work conducted, significant findings and collections. The projected program for Apr. 1993-Mar. 1994 includes a description of observatory functions and outlines of projects in atmospheric sciences, biology, engineering, environmental studies, geodesy and geographic information, geosciences, glaciology, human biology and medicine, oceanography, and social sciences. An extensive bibliography, a glossary, and 3 appendices conclude this report.

49-4325

Acute thermal tolerance of two antarctic copepods, *Calanoides acutus* and *Calanus propinquus*.

Lahdes, E., *Journal of thermal biology,* Feb.-May 1995, 20(1/2), p.75-78, 26 refs.

Marine biology, Ice edge, Thermal stresses, Water temperature, Antarctica—Lazarev Sea

The thermal tolerance of antarctic copepod species *Calanoides acutus* and *Calanus propinquus* was tested with a short-term exposure (15 min) at three constant temperatures of 14, 16 and 18°C and after 12-h exposure at three constant temperatures of 14, 15 and 16°C. Lethal temperatures (LT_{50}) after an exposure time of 15 min and a recovery time of 30 min were 18.1°C for *C. acutus* and 16.1°C for *C. propinquus*. In 12 h exposure LT_{50} for *C. acutus* was 14.3°C. The results give support to some recent observations that at least in short-term exposure, antarctic copepods exhibit a higher tolerance for elevated temperatures than suggested before for antarctic marine poikilotherms. (Auth.)

49-4326

Influence of the wind forcing and of the changing of Coriolis parameter on the Ross Sea tidal circulation.

Pontrelli, G., Purini, R., *Il nuovo cimento,* July/Aug. 1993, 16C(4), p.335-347, 22 refs.

Tidal currents, Wind velocity, Mathematical models, Sea ice, Coriolis effect, Antarctica—Ross Sea

The combined effect of wind stress and the latitudinal variation of the Coriolis parameter on the tidal circulation of the Ross Sea is studied. To enhance the role of these forcing terms, the present model, based on two-dimensional shallow-water equations, echoes that of an earlier study to facilitate the comparison of the basic tidal regime. The numerical technique is described in detail along with its stability and accuracy properties. The numerical results are compared with data from direct measurements and with earlier simulations. (Auth.)

49-4327

Response of a coupled ocean-atmosphere model to increasing atmospheric carbon dioxide.

Manabe, S., Stouffer, R.J., Spelman, M.J., *Ambio,* Feb. 1, 1994, 23(1), p.44-49, 29 refs.

Atmospheric composition, Carbon dioxide, Models, Air temperature

This study investigates the response of a climate model to a 1% per year increase of atmospheric carbon dioxide. The model is a general circulation model of the coupled ocean-atmosphere-land surface system, with a global computational domain, smoothed geography, and seasonal variation of insolation. The simulated increase of sea-surface temperature is very slow in the northern North Atlantic and the Circumpolar Ocean of the Southern Hemisphere, where the vertical mixing of water penetrates deeply and the rate of deep water formation is relatively fast. Transient responses of the coupled model to the doubling and quadrupling of atmospheric CO_2 over a period of several centuries were investigated. During the entire 500-yr period of the experiment, the global mean surface air temperature increases almost 3.5°C when CO_2 is doubled, and 7°C when it is quadrupled. (Auth. mod.)

49-4328

Debris flows and slush avalanches in northern Swedish Lappland—distribution and geomorphological significance.

Nyberg, R., Sweden. University of Lund. Department of Geography. Avhandlingar 97, Lund, 1985, 222p., Refs. p.208-222.

Geomorphology, Slope processes, Mass movements (geology), Avalanche mechanics, Slush, Periglacial processes, Topographic effects, Sweden

49-4329

Melting-layer model and its use in correcting for the bright band in single-polarization radar echoes.

Hardaker, P.J., Holt, A.R., Collier, C.G., *Royal Meteorological Society. Quarterly journal A*, Apr. 1995, 121(523), p.495-525, 41 refs.

Precipitation (meteorology), Remote sensing, Forecasting, Classifications, Radar echoes, Snowfall, Snow melting, Accuracy, Mathematical models

49-4330

Biomass allocation near an alpine treeline: causes and consequences for diversity.

Wilson, S.D., *Ecoscience*, 1994, 1(2), p.185-189, With French summary. 24 refs.

Forest ecosystems, Forest lines, Alpine landscapes, Biomass, Altitude, Vegetation patterns, Australia—Snowy Mountains

49-4331

Collection, handling, and storage: keys to improved data quality for volatile organic compounds in soil.

Hewitt, A.D., Jenkins, T.F., Grant, C.L., MP 3608, *American environmental laboratory*, Feb. 1995, 6p., 28 refs.

Soil pollution, Soil chemistry, Soil tests, Chemical analysis

49-4332

Hat wavelets yield inconclusive evidence of Richardson cascade.

Treviño, G., Andreas, E.L., MP 3609, Symposium on Boundary Layers and Turbulence, 11th, Charlotte, NV, Mar. 27-31, 1995. Preprint volume, Boston, American Meteorological Society, 1995, p.361-364, 7 refs.

Atmospheric boundary layer, Turbulent boundary layer, Turbulence, Image processing, Data processing, Computerized simulation, Mathematical models

49-4333

Sensitivity studies of TOVS retrievals with 3I and ITPP retrieval algorithms: application to the resolution of meso-scale phenomena in the Antarctic.

Heinemann, G., Noël, S., Chédin, A., Scott, N., Claud, C., *Meteorology and atmospheric physics*, 1995, 55(1/2), p.87-100, 35 refs.

Polar atmospheres, Marine meteorology, Air temperature, Humidity, Atmospheric pressure, Weather observations, Data processing, Data transmission, Computerized simulation, Spaceborne photography, Antarctica—Weddell Sea

Retrievals from TIROS-N Operational Vertical Sounder (TOVS) data with the International TOVS Processing Package (ITPP version 3.3) and the Improved Initialization Inversion (3I version 2) algorithms are investigated. The comparative study comprises the retrieval mechanism from the first guess to the final result for collocated radiosonde/satellite data as well as the problem of horizontal resolution for simulated antarctic cold air pools. Simulations of cold air pools for cloud-free conditions show that cold air pools with a strong temperature anomaly and with diameters of 800 km and greater are well reproduced by ITPP and 3I. For smaller cold air pools with a moderate temperature perturbation, the resolution limits are reached if the diameter is smaller than 400 and 200 km for ITPP and 3I, respectively. The better performance of the 3I retrievals for smaller cold air pools is a consequence of the better first guess of the TIGR dataset compared with the regression first guess of the ITPP. (Auth. mod.)

49-4334

Study of the paleoclimate in polar regions using deep ice cores from ice sheets. [Izuchenie paleoklimata poliarnykh oblasteĭ po glubokim ledianym kernam iz lednikovykh pokrovov]

Barkov, N.I., Petrov, V.N., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.10-24, In Russian. 29 refs.

Paleoclimatology, Ice cover, Ice cores, Pleistocene, Climatic changes, Ice sheets, Carbon dioxide, Isotopes, Insolation, Air temperature, Marine deposits, Antarctica—Vostok Station

Paleoclimatic events for the last 160,000 years are characterized. The age scale of ice cores taken at Vostok Station and the isotope content of the ice are determined. A correlation of the data obtained from the ice cores and deep-sea marine sediments is conducted. The amount of atmospheric precipitation, variations in air temperature, atmospheric dust control, and percentage of carbon dioxide in the atmosphere are assessed. Finally, the effect of planetary parameters and related insolation fluctuations on climatic fluctuations is shown. (Auth. mod.)

49-4335

Statistical analysis and modelling of natural climatic fluctuations in the northern polar region and northern hemisphere. [Statisticheskiĭ analiz i modelirovanie estestvennykh kolebaniĭ klimata severnoĭ poliarnoĭ oblasti i severnogo polushariia]

Alekseev, G.V., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.25-39, In Russian. 47 refs.

Climatic changes, Statistical analysis, Models, Air temperature, Polar atmospheres

49-4336

Dynamics of the transformation of large-scale circulation structures in the Arctic. [O dinamike preobrazovaniia krupnomasshtabnykh tsirkuliatsionnykh struktur v Arktike]

Dmitriev, A.A., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.40-50, In Russian. 8 refs.

Polar atmospheres, Atmospheric circulation

49-4337

Statistical analysis of ice drift in the Arctic basin based on data from automatic buoys. [Statisticheskiĭ analiz dreĭfa l'da v arkticheskom basseĭne po dannym avtomaticheskikh buev]

Losev, S.M., Gorbunov, IU.A., Kulakov, I.IU., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.51-63, In Russian. 7 refs.

Drift, Sea ice, Statistical analysis, Canada, Russia—Chukotskiy Peninsula, Greenland, Norway—Spitsbergen, United States—Alaska

49-4338

Mathematical modelling of the effect of external and internal factors on mean latitudinal temperature of Antarctica. [Matematicheskoe modelirovanie vozdeĭstviia vneshnikh i vnutrennikh faktorov na sredneshirotnuiu temperaturu Antarktiki]

Liubarskiĭ, A.N., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.64-74, In Russian. 12 refs.

Mathematical models, Volcanoes, Air temperature, Temperature variations, Carbon dioxide, Aerosols, Antarctica

An incorrect inverse problem of modelling variations in the anomalies in mid-latitude temperatures is examined. With the help of a correct model, each of the factors in the variations of the antarctic climatic system is analyzed. It is shown that volcanic activity has the strongest influence. (Auth. mod.)

49-4339

Relation of physical processes in the lower atmosphere to the 11-year cycle of solar activity. [Sviaz' fizicheskikh protsessov v nizhneĭ atmosfere s 11-letnim tsiklom solnechnoĭ aktivnosti]

Sytinskiĭ, A.D., Kashkina, G.A., Panchugin, R.G., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.75-83, In Russian. 14 refs.

Solar activity, Atmospheric physics, Polar atmospheres

49-4340

Spectroscopic measurements of carbon monoxide in the atmosphere of Antarctica (1977-1985). [Spektroskopicheskie izmereniia okisi ugleroda v atmosfere Antarktidy (1977-1985 gg.)]

Voskresenskiĭ, A.I., Dianov-Klokov, V.I., Malkov, I.P., Radionov, V.F., IUrganov, L.N., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.84-89, In Russian. 14 refs.

Atmospheric composition, Air pollution, Atmospheric physics, Polar atmospheres, Spectroscopy, Antarctica—Mirnyy Station, Antarctica—Molodezhnaya Station, Antarctica—Palmer Station

Variations in the percentage of carbon monoxide in the atmosphere for Mirnyy and Molodezhnaya stations, 1977-1985 are presented. The seasonal course and long-term trend of the concentration of carbon monoxide in the atmosphere is analyzed. (Auth. mod.)

49-4341

Using the analysis of data from observations of drift, wind and barometric conditions to determine seasonal changes in the forces affecting ice cover. [Ispol'zovanie analiza dannykh nabliudeniĭ za dreĭfom, vetrom i baricheskoĭ obstanovkoĭ dlia opredeleniia sezonnykh izmeneniĭ sil, deĭstvuiushchikh na ledianoĭ pokrov]

Appel', I.L., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.90-107, In Russian. 23 refs.

Ice cover, Drift, Wind factors, Seasonal variations, Analysis (mathematics), Atmospheric pressure

49-4342

Results of modelling the dynamics of ice in the Arctic basin over long time intervals. [Rezul'taty modelirovaniia dinamiki l'dov Arkticheskogo basseĭna za dlitel'nye promezhutki vremeni]

Appel', I.L., Gudkovich, Z.M., Nikolaev, S.IU., Pozdnyshev, S.P., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.108-120, In Russian. 15 refs.

Ice models, Sea ice, Drift

49-4343

Study of a quasi-stationary anticyclonic eddy in the Norwegian Sea. [Issledovanie kvazistatsionarnogo antitsiklonicheskogo vikhria v Norvezhskom more]

Doronin, N.IU., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.121-128, In Russian. 7 refs.

Ocean currents, Mathematical models, Norwegian Sea

49-4344

Variability in the thickness of multiyear drift ice in the Arctic basin. [Izmenchivost' tolshchiny dreĭfuiushchikh mnogoletnikh l'dov v Arkticheskom basseĭne]

Mironov, E.U., Uralov, N.S., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.129-143, In Russian. 30 refs.

Sea ice, Ice cover thickness, Ablation, Ice growth, Drift, Drift stations

49-4345

Physical-statistical and solar-geophysical aspects of the analysis of the Vangengeĭm-Girs classification. [Fiziko-statisticheskie i geliogeofizicheskie aspekty analiza tipizatsii Vangengeĭma-Girsa]

Liubarskiĭ, A.N., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.144-153, In Russian. 26 refs.

Atmospheric circulation, Polar atmospheres, Analysis (mathematics)

49-4346

Modelling anomalies in the ice conditions in the Arctic Ocean. [Modelirovanie anomaliĭ ledovykh usloviĭ v Severnom Ledovitom okeane]

Appel', I.L., Aksenov, E.O., *Problemy Arktiki i Antarktiki; sbornik stateĭ*, 1994, Vol.67-68, p.153-159, In Russian. 2 refs.

Ice conditions, Sea ice, Ice models, Ice cover thickness, Seasonal variations, Ice edge, Arctic Ocean

49-4347

Characteristics of atmospheric circulation during the rise of strong stable winds in the Vil'kitskiy Strait. [Nekotorye kharakteristiki tsirkuliatsii atmosfery pri vozniknovenii sil'nykh ustoichivykh vetrov v prolive Vil'kitskogo]

Korzhikov, A.IA., Bulokhov, E.N., *Problemy Arktiki i Antarktiki; sbornik statei*, 1994, Vol.67-68, p.160-164, In Russian. 2 refs.

Atmospheric circulation, Wind factors, Wind velocity, Polar atmospheres, Atmospheric disturbances, Russia—Vil'kitskiy Strait

49-4348

Microclimate of mobile buildings in the coastal zone of Antarctica. [Mikroklimat mobil'nykh zdanii v pribrezhnoi zone Antarktidy]

Teshebaev, Sh.B., *Problemy Arktiki i Antarktiki; sbornik statei*, 1994, Vol.67-68, p.165-169, In Russian. 4 refs.

Microclimatology, Buildings, Heating, Panels, Windows, Walls, Cold weather performance, Antarctica

The possibilities of using mobile buildings made of lightweight construction materials as residences in Antarctica are examined from a hygiene point of view. Full-scale investigations were conducted in these homes. It was determined that supplementary heating of wall panels and at notch points in wood and window openings, as well as a balanced heating system, were indispensable. (Auth. mod.)

49-4349

Sanitation-bacteriological characteristics of the air in houses on the drift station "North Pole-31". [Sanitarno-bakteriologicheskaia kharakteristika vozdukha zhilishch na dreifuiushchei stantsii "Severnyi polius-31"]

Teshebaev, Sh.B., Karuzina, E.A., *Problemy Arktiki i Antarktiki; sbornik statei*, 1994, Vol.67-68, p.170-173, In Russian. 5 refs.

Microclimatology, Drift stations, Houses, Microanalysis

49-4350

Nature of microbe pollution of the snow cover on a drift station. [Kharakter mikrobnogo zagriazneniia snezhnogo pokrova dreifuiushchei stantsii]

Teshebaev, Sh.B., Karuzina, E.A., Troiashkin, A.A., *Problemy Arktiki i Antarktiki; sbornik statei*, 1994, Vol.67-68, p.174-178, In Russian. 8 refs.

Snow cover, Snow impurities, Drift stations, Microanalysis, Sanitary engineering, Waste disposal

49-4351

Iceberg production, debris rafting, and the extent and thickness of Heinrich layers (H-1, H-2) in North Atlantic sediments.

Dowdeswell, J.A., Maslin, M.A., Andrews, J.T., McCave, I.N., *Geology*, Apr. 1995, 23(4), p.301-304, 20 refs.

Oceanography, Ice age theory, Pleistocene, Bottom sediment, Sedimentation, Ice rafting, Icebergs, Ice melting

49-4352

Icebergs along 67°S in the Pacific sector of the Antarctic in February-March of 1992.

Koshliakov, M.N., Belkin, I.M., Radikevich, V.M., Romanov, IU.A., *Oceanology*, June 1994, 33(6), p.720-726, Translated from Okeanologiia. 16 refs.

Sea ice distribution, Oceanographic surveys, Ocean currents, Icebergs, Climatic factors

The paper contains results of iceberg observations on a transect along 67°S in the Pacific sector of the Antarctic used by R/V *Akademik Ioffe* in Feb.-Mar. of 1992 within the framework of the WOCE international program. The major results show a sharp nonuniformity in the iceberg distribution along the section and a large number of icebergs in the eastern part of the section. The latter could be explained by the coincidence of the positions of the transect and of an intensified jet of the Antarctic Circumpolar Current. At the same time, the results of some simultaneous oceanographic, meteorological and glaciological observations in the western part of the Atlantic sector of Antarctica and in the Antarctic Peninsula area do not exclude the possibility of a general increase in iceberg number in a large part of the Pacific and Atlantic sectors of the southern ocean as a result of the arrival of an anomalous warm period in this part of the Antarctic. (Auth.)

49-4353

On the frontal zone near the northern boundary of sea ice distribution in the southern ocean.

Kliausov, A.V., *Oceanology*, June 1994, 33(6), p.727-734, Translated from Okeanologiia. 21 refs.

Sea ice distribution, Ice edge, Hydrology, Oceanographic surveys, Indian Ocean

Features of a frontal zone near the northern boundary of sea ice during the period of its maximum spreading were studied, using long-term observations of YugNIRO and Yugrybpoisk for the Indian Ocean sector of the southern ocean. The influence of this zone on the amount of sea ice, hydrological regime, plankton and nekton distributions is discussed. (Auth.)

49-4354

Details of thermohaline structure of summer arctic ice glades.

Golovin, P.N., Kochetov, S.V., Timokhov, L.A., *Oceanology*, June 1994, 33(6), p.735-739, Translated from Okeanologiia. 6 refs.

Sea ice distribution, Oceanographic surveys, Ice openings, Surface waters, Water temperature, Salinity, Ice water interface, Profiles

49-4355

Last glacial cycles in East Greenland, an overview.

Funder, S., Hjort, C., Landvik, J.Y., *Boreas*, Dec. 1994, 23(4), p.283-293, 55 refs.

Pleistocene, Glacier oscillation, Glacial geology, Glaciation, Quaternary deposits, Stratigraphy, Greenland

49-4356

Late Quaternary sedimentary record in Scoresby Sund, East Greenland.

Dowdeswell, J.A., Uenzelmann-Neben, G., Whittington, R.J., Marienfeld, P., *Boreas*, Dec. 1994, 23(4), p.294-310, 34 refs.

Pleistocene, Quaternary deposits, Glacial geology, Marine geology, Ice rafting, Glacier oscillation, Radioactive age determination, Greenland—Scoresby Sund

49-4357

Distribution of different glacial landscapes on southern Jameson Land, East Greenland, according to Landsat Thematic Mapper data.

Ronnert, L., Nyborg, M.R., *Boreas*, Dec. 1994, 23(4), p.311-319, 33 refs.

Glacial geology, Pleistocene, Glacier oscillation, Quaternary deposits, Terrain identification, Classifications, LANDSAT, Geological maps, Lithology, Greenland—Jameson Land

49-4358

Glacial history of interior Jameson Land, East Greenland.

Möller, P., Hjort, C., Adrielsson, L., Salvigsen, O., *Boreas*, Dec. 1994, 23(4), p.320-348, 66 refs.

Pleistocene, Glacial geology, Quaternary deposits, Glacial deposits, Glaciation, Geochronology, Stratigraphy, Greenland—Jameson Land

49-4359

Interglacial-glacial record at the mouth of Scoresby Sund, East Greenland.

Mangerud, J., Funder, S., *Boreas*, Dec. 1994, 23(4), p.349-358, 25 refs.

Pleistocene, Marine geology, Glacial geology, Quaternary deposits, Glaciation, Glacier oscillation, Radioactive age determination, Stratigraphy, Greenland—Scoresby Sund

49-4360

Eemian-Weichselian stratigraphy of the Flakkerhuk ridge, southern Jameson Land, East Greenland.

Tveranger, J., Houmark-Nielsen, M., Løvberg, K., Mangerud, J., *Boreas*, Dec. 1994, 23(4), p.359-384, 36 refs.

Pleistocene, Marine geology, Quaternary deposits, Glacial geology, Glacier oscillation, Geochronology, Stratigraphy, Sea level, Greenland—Jameson Land

49-4361

Late Pleistocene stratigraphy and depositional environments of the Fynselv area, Jameson Land, East Greenland.

Hansen, L.A., Jørgensen, M.E., Houmark-Nielsen, M., Kronborg, C., *Boreas*, Dec. 1994, 23(4), p.385-397, 37 refs.

Pleistocene, Sediments, Glacial deposits, Stratigraphy, Quaternary deposits, Marine geology, Glacial geology, Paleoclimatology, Greenland—Jameson Land

49-4362

Eemian and Weichselian stratigraphy of the Langelandselv area, Jameson Land, East Greenland.

Landvik, J.Y., Lyså, A., Funder, S., Kelly, M., *Boreas*, Dec. 1994, 23(3), p.412-423, 50 refs.

Pleistocene, Glacial geology, Glacier oscillation, Marine geology, Marine deposits, Sedimentation, Stratigraphy, Greenland—Jameson Land

49-4363

Aucellaelv stade at Aucellaelv, the first Weichselian glacier advance in Scoresby Sund, East Greenland.

Israelson, C., Funder, S., Kelly, M., *Boreas*, Dec. 1994, 23(4), p.424-431, 23 refs.

Pleistocene, Quaternary deposits, Marine deposits, Glacial deposits, Age determination, Correlation, Glacier oscillation, Greenland—Aucellaelv

49-4364

Lower Jyllandselv succession: evidence for three Weichselian glacier advances over coastal Jameson Land, East Greenland.

Lyså, A., Landvik, J.Y., *Boreas*, Dec. 1994, 23(4), p.432-446, 50 refs.

Pleistocene, Glaciation, Glacier oscillation, Glacial deposits, Glacial geology, Stratigraphy, Paleoecology, Sea level, Greenland—Jameson Land

49-4365

Late Quaternary glacial history of the central west coast of Jameson Land, East Greenland.

Ingólfsson, O., Lyså, A., Funder, S., Möller, P., Björck, S., *Boreas*, Dec. 1994, 23(4), p.447-458, 33 refs.

Pleistocene, Quaternary deposits, Glaciation, Glacial deposits, Glacial geology, Stratigraphy, Correlation, Greenland—Jameson Land

49-4366

Weathering of surface clasts as an indicator of the relative age of glacial deposits on Jameson Land, East Greenland.

Lillieskold, M., Sundqvist, B., *Boreas*, Dec. 1994, 23(4), p.473-478, 23 refs.

Pleistocene, Glacial deposits, Glacial geology, Quaternary deposits, Age determination, Weathering, Glaciation, Correlation, Greenland—Jameson Land

49-4367

Land biotas of the last interglacial/glacial cycle on Jameson Land, East Greenland.

Bennike, O., Böcher, J., *Boreas*, Dec. 1994, 23(4), p.479-487, 33 refs.

Pleistocene, Marine deposits, Paleobotany, Fossils, Age determination, Greenland—Jameson Land

49-4368

Bryophytes from the last interglacial/glacial cycle, Jameson Land, East Greenland.

Hedenäs, L., *Boreas*, Dec. 1994, 23(4), p.488-494, 34 refs.

Paleobotany, Paleoecology, Pleistocene, Quaternary deposits, Sampling, Greenland

49-4369

Stratigraphy of a Late Pleistocene ice-cored moraine at Kap Herschell, northeast Greenland.

Houmark-Nielsen, M., Hansen, L., Jørgensen, M.E., Kronborg, C., *Boreas*, Dec. 1994, 23(4), p.505-512, 18 refs.

Pleistocene, Quaternary deposits, Glacial deposits, Marine deposits, Moraines, Stratigraphy, Glacier ice, Age determination, Greenland

49-4370

Revision of the early Holocene lake sediment based chronology and event stratigraphy on Hochstetter Forland, NE Greenland.

Björck, S., Wohlfarth, B., Bennike, O., Hjort, C., Persson, T., *Boreas,* Dec. 1994, 23(4), p.513-523, 15 refs.

Pleistocene, Quaternary deposits, Lacustrine deposits, Stratigraphy, Palynology, Paleobotany, Geochronology, Greenland—Hochstetter Forland

49-4371

Luminescence dating of Late Quaternary sediments from East Greenland.

Mejdahl, V., Funder, S., *Boreas,* Dec. 1994, 23(4), p.525-535, 31 refs.

Pleistocene, Quaternary deposits, Age determination, Luminescence, Stratigraphy, Correlation, Greenland

49-4372

Ice shove!

Moran, J.M., *Weatherwise,* Apr.-May 1995, 48(2), p.12-15.

Lake ice, Ice breakup, Ice push, Shoreline modification, Wind factors

49-4373

First results from POAM II: the dissipation of the 1993 antarctic ozone hole.

Bevilacqua, R.M., et al, *Geophysical research letters,* Apr. 15, 1995, 22(8), p.909-912, 8 refs.

Polar atmospheres, Ozone, Remote sensing, Photometry, Atmospheric density, Seasonal variations, Stratosphere, Aerosols

POAM II is a space-borne instrument which uses the solar occultation technique to measure the vertical distribution of ozone, aerosols and polar stratospheric clouds, and other properties of the stratosphere and mesosphere. POAM II was launched aboard the SPOT 3 satellite in time to observe the dissipation of the 1993 antarctic ozone hole. POAM data indicate that the antarctic ozone hole dissipates from the top downward. It also supports the hypothesis that the antarctic vortex is an effective containment vessel. However, the strength of the containment appears to decrease markedly at altitudes below 18 km. (Auth.)

49-4374

Do stratospheric aerosol droplets freeze above the ice frost point?

Koop, T., Biermann, U.M., Raber, W., Luo, B.P., Crutzen, P.J., Peter, T., *Geophysical research letters,* Apr. 15, 1995, 22(8), p.917-920, 12 refs.

Polar atmospheres, Stratosphere, Aerosols, Ice formation, Cloud droplets, Freezing points, Freezing rate, Heterogeneous nucleation, Hydrates, Simulation

49-4375

Nitric acid adsorption on ice: a preliminary study.

Laird, S.K., Sommerfeld, R.A., *Geophysical research letters,* Apr. 15, 1995, 22(8), p.921-923, 21 refs.

Cloud physics, Air pollution, Snow impurities, Chemical properties, Ice vapor interface, Adsorption, Simulation

49-4376

Numerical modeling of tracer transport within and out of the lower tropospheric arctic region.

Kao, C.Y.J., Barr, S., Quintanar, A., Langley, D., Glatzmaier, G.A., Malone, R.C., *Geophysical research letters,* Apr. 15, 1995, 22(8), p.941-944, 14 refs.

Polar atmospheres, Air flow, Turbulent diffusion, Aerosols, Haze, Mathematical models

49-4377

Microwave dielectric properties of snow: modeling and measurements.

Surdyk, S., Fujita, S., *Geophysical research letters,* Apr. 15, 1995, 22(8), p.965-968, 11 refs.

Snow physics, Dielectric properties, Snow electrical properties, Electrical measurement, Microwaves, Snow optics

49-4378

Raman spectroscopic study on the nitrogen/oxygen ratio in natural ice clathrates in the GRIP ice core.

Pauer, F., Kipfstuhl, J., Kuhs, W.F., *Geophysical research letters,* Apr. 15, 1995, 22(8), p.969-971, 15 refs.

Ice sheets, Ice cores, Clathrates, Ice spectroscopy, Gases, Atmospheric composition

49-4379

Present-day antarctic ice mass changes and crustal motion.

James, T.S., Ivins, E.R., *Geophysical research letters,* Apr. 15, 1995, 22(8), p.973-976, 18 refs.

Ice sheets, Tectonics, Glacial geology, Glacier mass balance

The peak vertical velocities predicted by three realistic, but contrasting, present-day scenarios of antarctic ice sheet mass balance are found to be of the order of several mm/a. One scenario predicts local uplift rates in excess of 5 mm/a. These rates are small compared to the peak antarctic vertical velocities of the ICE-3G glacial rebound model, which are in excess of 20 mm/a. If the Holocene antarctic deglaciation history portrayed in ICE-3G is realistic, and if regional upper mantle viscosity is not an order of magnitude below 10^{21} Pa·s, then a vast geographical region in West Antarctica is uplifting at a rate that could be detected by a future Global Positioning System (GPS) campaign. While present-day scenarios predict small vertical crustal velocities, their overall continent-ocean mass exchange is large enough to account for a substantial portion of the observed secular polar motion and time-varying zonal gravity field. (Auth.)

49-4380

Predictions of vertical uplift caused by changing polar ice volumes on a viscoelastic earth.

Wahr, J., DaZhong, H., Trupin, A., *Geophysical research letters,* Apr. 15, 1995, 22(8), p.977-980, 12 refs.

Ice sheets, Ice loads, Tectonics, Viscoelasticity, Glacier thickness

Present-day changes in ice could cause vertical displacement rates of several mm/yr around Antarctica and up to 10-15 mm/yr around Greenland. Horizontal displacement rates are likely to be about $\frac{1}{3}$ the vertical rates. The viscoelastic response of the earth to past changes in ice could cause uplift rates that are several times larger. By measuring both gravity and vertical displacements, it is possible to remove the viscoelastic effects, so that the observations can be used to constrain present-day thickness changes. (Auth.)

49-4381

SHRP innovations: snow and ice control.

U.S. Strategic Highway Research Program, H-200 series contracts, No.20, Washington, D.C., Mar. 1993, n.p., 12-minute video cassette.

Road icing, Ice prevention, Snow removal, Road maintenance

49-4382

ICESTRIKE large scale ice-structure interaction database. User's manual. Version 2.0.

ICL Isometrics Consulting Limited, Calgary, Alberta, Ottawa, National Research Council Canada, Program of Energy Research and Development (PERD), Dec. 1993, Var. p., Refs. passim. Includes vols. 1 and 2 for Version 1.0 previously published in Sep. 1988.

Ice solid interface, Ice loads, Ice pressure, Ice cover strength, Ice forecasting, Offshore structures, Artificial islands, Computer programs, Computerized simulation, Data processing, Manuals

49-4383

Impact tests on freshwater ice.

Timco, G.W., Frederking, R.M.W., *National Research Council Canada. Institute for Mechanical Engineering. Cold Regions Engineering. Technical report,* Aug. 1991, IME-CRE-TR-001, 80p. + appends., NRC No.32121, With French summary. 38 refs.

Ice solid interface, Ice cover strength, Ice breaking, Ice deformation, Impact tests, Environmental tests

49-4384

Model tests of pressured broken ice on a segmented inclined plane.

Timco, G.W., *National Research Council Canada. Institute for Mechanical Engineering. Low Temperature Laboratory. Technical report,* Jan. 1991, TR-LT-021, 495p., NRC No.32106, With French summary. 7 refs.

Ice solid interface, Ice loads, Ice pressure, Ice cover strength, Ice pileup, Ice navigation, Metal ice friction, Offshore structures, Artificial islands, Ships, Environmental tests

49-4385

Processing of pack ice stress data—final report.

Sandwell Inc., Calgary, Alberta, Canatec Consultants Ltd., Calgary, Alberta, Ottawa, National Research Council Canada, Program of Energy Research and Development (PERD), Apr. 1994, Var. p., 29 refs.

Pack ice, Ice floes, Ice solid interface, Ice loads, Ice pressure, Pressure ridges, Ice cover strength, Ice cover thickness, Offshore structures, Computerized simulation, Data processing, Beaufort Sea

49-4386

Automated extraction of ice ridge forms in the Beaufort Sea using aerial photography.

Lewis, J.E., Budkewitsch, P., *National Research Council Canada. Institute for Engineering in the Canadian Environment. Coastal Engineering Program. Technical report,* Mar. 1994, IECE-CEP-TR-002, 84p., NRC No.38398, 23 refs.

Ice surveys, Pressure ridges, Ice cover thickness, Ice surface, Aerial surveys, Image processing, Statistical analysis, Beaufort Sea

49-4387

Ice loading on a multifaceted conical structure.

Irani, M.B., Timco, G.W., Muggeridge, D.B., *National Research Council Canada. Institute for Mechanical Engineering. Cold Regions Engineering. Technical report,* May 1992, IME-CRE-TR-005, 78p. + append., NRC No.33569, With French summary. 7 refs.

Ice solid interface, Ice loads, Ice pressure, Pressure ridges, Ice friction, Ice cover strength, Ice deformation, Offshore structures, Environmental tests

49-4388

Glaciotectonics and mapping glacial deposits.

Aber, J.S., ed, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, 309p. + fold. map, schematic, 27 col. plates, Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Refs. passim. For individual papers see 49-4389 through 49-4409.

Glacial geology, Tectonics, Stratigraphy, Sediments, Deformation, Landforms, Geomorphology

49-4389

Glacially deformed sediments of Lavrentiya Bay, Chukotka Peninsula, Far Eastern Russia, and the north shore of St. Lawrence Island, Alaska.

Benson, S.L., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.1-8 + 4 col. plates, 3 refs.

Glacial geology, Glacial erosion, Sediments, Glacier ice, Tectonics, Landforms, United States—Alaska—St. Lawrence Island, Russia—Chukotskiy Peninsula, Russia—Lavrentiya Bay

49-4390

Geomorphic and structural genesis of the Dirt Hills and Cactus Hills, Southern Saskatchewan.

Aber, J.S., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.9-35, 38 refs.

Landforms, Geomorphology, Tectonics, Pressure ridges, Glacier tongues, Bedrock, Stratigraphy, Glacial geology, Glacier surges, Canada—Saskatchewan—Dirt Hills, Canada—Saskatchewan—Cactus Hills

49-4391

Preliminary study of subglacial diamicton microstructures as reflected in drumlin sediments at Chimney Bluffs, New York.

Menzies, J., Woodward, J., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.36-45 + 8 col. plates, 34 refs.

Sediments, Subglacial observations, Microstructure, Deformation, Landforms, Glacial geology, United States—New York—Chimney Bluffs

49-4392

Origin of Quaternary sediment deformation in southwestern Poland: glaciotectonic versus neotectonic.

Krzyszkowski, D., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.46-50, 15 refs.

Glacial geology, Tectonics, Quaternary deposits, Sediments, Deformation, Landforms, Poland

49-4393

Relationship of large-scale glaciotectonic features to substratum and bedrock conditions in central and eastern Poland.

Ruszczyñska-Szenajch, H., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.51-66, 25 refs.

Glacial geology, Tectonics, Bedrock, Landforms, Deformation, Substrates, Lithology, Glacier ice, Poland

49-4394

Glaciodynamic event and glaciodynamic sequence.

Pedersen, S.A.S., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.67-85, 19 refs.

Glacial geology, Tectonics, Stratigraphy, Denmark

49-4395

Salt diapirs, pore-water traps and permafrost as key controls for glaciotectonism in the Kiel area, northwestern Germany.

Piotrowski, J.A., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.86-98 + 2 col. plates, 26 refs.

Glacial geology, Tectonics, Deformation, Permafrost, Landforms, Glacial erosion, Germany—Kiel

49-4396

Expanded bibliography of glaciotectonic references.

Aber, J.S., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.99-137, Refs. p.100-133.

Bibliographies, Glacial geology, Tectonics, Glacial deposits, Glacial erosion

49-4397

Pleistocene mapping at the Wisconsin Geological and Natural History Survey.

Clayton, L., Attig, J.W., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.138-154, 25 refs.

Pleistocene, Mapping, Geochronology, Lithology, Stratigraphy, United States—Wisconsin

49-4398

Mapping glacial terrain, southwestern Minnesota, U.S.A.

Patterson, C.J., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.155-176, 37 refs.

Mapping, Stratigraphy, Pleistocene, Quaternary deposits, Glacier tongues, Geomorphology, Topography, Glacial geology, Landforms, Moraines, United States—Minnesota

49-4399

Glaciotectonic data base and mapping of North America.

Aber, J.S., Bluemle, J.P., Brigham-Grette, J., Dredge, L.A., Sauchyn, D.J., Ackerman, D.L., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.177-200, Refs. p.192-200.

Glacial geology, Tectonics, Mapping, Data processing, Computer applications, Geography, Landscape types, Canada, United States

49-4400

Postglacial evolution of the semiarid interior plains of Canada: a review, relevant concepts and a spatial framework.

Sauchyn, D.J., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.201-214 + 2 col. plates, Refs. p.211-214.

Geochronology, Geomorphology, Glacial geology, Landscape types, Canada

49-4401

Landsat remote sensing of glacial terrain.

Aber, J.S., Spellman, E.E., Webster, M.P., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.215-225, 31 refs.

LANDSAT, Remote sensing, Mapping, Ice cover, Ice conditions, Geomorphology, Glacial geology, Landscape types

49-4402

Mapping glacial terrain in Sweden.

Daniel, E., Rodhe, L., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.226-231 + 4 col. plates, 4 refs.

Mapping, Glacial geology, Landforms, Geological maps, Sweden

49-4403

Modelling of the dynamics of the Scandinavian Ice Sheet using remote sensing and GIS methods.

Punkari, M., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.232-250 + 2 col. plates, 36 refs.

LANDSAT, Remote sensing, Mapping, Glacial geology, Geomorphology, Glacier flow, Ice cover, Landforms, Photointerpretation, Glacial erosion, Moraines, Ice models, Subglacial observations, Finland, Norway, Russia, Sweden

49-4404

European glaciotectonic data base project.

Croot, D.G., Michalak, W., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.251-258, 3 refs.

Glacial geology, Tectonics, Data processing, Computer programs, Computer applications

49-4405

Hydrodynamic blowouts in North Dakota.

Bluemle, J.P., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.259-266, 5 refs.

Hydrodynamics, Ground water, Landforms, Landscape development, Ice cover effect, Glacial lakes, Glacial deposits, Glacial geology, Tectonics, United States—North Dakota

49-4406

Thoughts on the origin of uniform sediment in hummocky glacial topography in parts of north-central Wisconsin.

Ham, N.R., Attig, J.W., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.267-273, 11 refs.

Sediments, Glacial geology, Topography, Hummocks, United States—Wisconsin

49-4407

Glacial lake development and ice-lake types in the Koilliskaira area, northeastern Finland.

Johansson, P., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.274-285, 20 refs.

Glacial lakes, Nunataks, Ice cover, Finland

49-4408

Subaquatic sediments folded by an iceberg: an example from Kabusa in southern Sweden.

Sorby, L., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.286-302, 31 refs.

Ice scoring, Icebergs, Ice rafting, Glacial geology, Stratigraphy, Sediments, Lithology, Deformation, Grounded ice, Sweden—Skåne

49-4409

Sequence stratigraphy: a selected bibliography.

Banham, P.H., Glaciotectonics and mapping glacial deposits. Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, University of Regina, 1993. Edited by J.S. Aber, Regina, Saskatchewan, Canadian Plains Research Center, University of Regina, 1993, p.303-307, Refs. p.304-307.

Stratigraphy, Bibliographies, Quaternary deposits

49-4410

Polarization by frost formed at very low temperatures, as relevant to ice planetary surfaces.

Dougherty, L.M., Geake, J.E., *Royal Astronomical Society. Monthly notices,* Nov. 15, 1994, 271(2), p.343-354, 9 refs.

Extraterrestrial ice, Satellites (natural), Frost, Albedo, Ice crystal optics, Light scattering, Polarization (waves), Simulation

49-4411

Anisotropic properties of ice/water interface: a molecular dynamics study.

Nada, H., Furukawa, Y., *Japanese journal of applied physics I,* Feb. 1995, 34(2A), p.583-588, 16 refs.

Ice water interface, Molecular structure, Molecular energy levels, Anisotropy, Simulation, Interfacial tension

49-4412

Land cover-based snow cover representation for distributed hydrologic models.

Donald, J.R., Soulis, E.D., Kouwen, N., Pietroniro, A., *Water resources research,* Apr. 1995, 31(4), p.995-1009, 26 refs.

Snow cover distribution, Snow hydrology, Snowmelt, Snow depth, Runoff forecasting, Watersheds, Mathematical models, Landscape types

49-4413

Two-component mixing model for predicting regional episodic acidification of surface waters during spring snowmelt periods.

Eshleman, K.N., Davies, T.D., Tranter, M., Wigington, P.J., Jr., *Water resources research,* Apr. 1995, 31(4), p.1011-1021, 35 refs.

Snow hydrology, Snowmelt, Runoff, Chemical properties, Surface waters, Geochemistry, Snow impurities, Mathematical models, Environmental impact

49-4414

Partitioning of benthic community respiration in the Arctic (northwestern Barents Sea).

Piepenburg, D., et al, *Marine ecology progress series,* Mar. 9, 1995, 118(1-3), p.199-213, 53 refs.

Marine biology, Ocean bottom, Biomass, Bottom sediment, Ecosystems, Sampling, Oxygen, Barents Sea

49-4415

Spectrophotometry and organic matter on Iapetus. 1. Composition models.

Wilson, P.D., Sagan, C., *Journal of geophysical research,* Apr. 25, 1995, 100(E4), p.7531-7537, 35 refs.

Extraterrestrial ice, Satellites (natural), Ground ice, Geochemistry, Surface properties, Optical properties, Albedo, Photometry, Ice detection, Models

49-4416

Direct observations of growing cracks in ice.

Arakawa, M., Maeno, N., Higa, M., *Journal of geophysical research,* Apr. 25, 1995, 100(E4), p.7539-7547, 24 refs.

Extraterrestrial ice, Simulation, Ice mechanics, Ice breaking, Crack propagation, Cracking (fracturing), Impact tests, Imaging, Ice solid interface

49-4417

Use of a coupled ice-ocean model to investigate the sensitivity of the arctic ice cover to doubling atmospheric CO_2.

Ramsden, D., Fleming, G., *Journal of geophysical research,* Apr. 15, 1995, 100(C4), p.6817-6828, 24 refs.

Sea ice, Climatology, Ice volume, Ice cover thickness, Atmospheric composition, Carbon dioxide, Global warming, Air ice water interaction, Mathematical models

49-4418

On meltwater under ice shelves.

Lane-Serff, G.F., *Journal of geophysical research,* Apr. 15, 1995, 100(C4), p.6961-6965, 7 refs.

Sea ice, Ice shelves, Ice bottom surface, Ice melting, Ice water interface, Freezing points, Water flow, Mathematical models

The basic features of the flow of meltwater under ice shelves can be described by a set of simple relations and length scales. The flow may be divided into two regions, with different basic processes dominating in each. In the first region, melting of the underside of the ice shelf is important and the temperature and salinity of the current tend toward "equilibrium" values, such that the changes due to melting of the ice shelf are balanced by changes due to entrainment of ambient seawater. The equilibrium values change with depth owing to the effect of the change in pressure on the freezing point. As the current increases in thickness, it is no longer able to adjust sufficiently rapidly to the changing equilibrium values, and the flow moves into the second region. The extent of the first region is governed by the location of the "ambient freezing point." In the second region, melting is less important and the current behaves as an entraining drag-limited gravity current in a stratified ambient fluid, leaving the shelf once the current has the same density as the ambient seawater. (Auth. mod.)

49-4419

Modeling the effects of frazil ice crystals on the dynamics and thermodynamics of Ice Shelf Water plumes.

Jenkins, A., Bombosch, A., *Journal of geophysical research,* Apr. 15, 1995, 100(C4), p.6967-6981, 46 refs.

Sea ice, Ice shelves, Frazil ice, Ice crystals, Ice water interface, Water flow, Buoyancy, Thermodynamics, Mathematical models

Seawater that comes into contact with the base of a floating ice shelf is modified as a result of the phase changes that occur. Melting is prevalent in the deepest parts of the subice cavity, and this drives a buoyant flow of Ice Shelf Water (ISW) along the sloping ice shelf base. The ascent of the ISW toward the surface of the ocean causes supercooling, because the freezing point rises with the falling pressure, and this induces a change from melting to freezing. Assuming that seed crystals exist, the ISW now fulfills the condition for the rapid growth of disc-shaped frazil ice crystals, which may subsequently settle (upward) out of suspension under the action of gravity. A simple numerical model of these processes has been developed, based on the theory of inclined plumes. The ISW is treated as a turbulent, particle-laden gravity current ascending a reactive boundary and containing a suspended crystal load which evolves in response to the supercooling of the water and the inverted sedimentation of the crystals. (Auth. mod.)

49-4420

Modeling the formation and deposition of frazil ice beneath Filchner-Ronne Ice Shelf.

Bombosch, A., Jenkins, A., *Journal of geophysical research,* Apr. 15, 1995, 100(C4), p.6983-6992, 29 refs.

Sea ice, Ice shelves, Ice physics, Frazil ice, Ice bottom surface, Ice formation, Ice water interface, Convection, Supercooling, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Large areas of the Filchner-Ronne Ice Shelf are underlain by layers of marine ice, which form when supercooled seawater circulating beneath the ice shelf freezes. The freezing process initially produces a suspension of disc-shaped frazil ice crystals, and these are subsequently deposited onto the ice shelf base in areas where the flow of water is slack enough. This has been modeled assuming that the freezing takes place within buoyant plumes of Ice Shelf Water ascending the ice shelf base from source regions near the grounding lines of the major inlet glaciers. The deposition of the majority of the suspended frazil ice is found to occur in spatially discrete bursts, where peak rates of accumulation at the ice shelf base exceed 1 m/yr of solid ice. There is a good correlation between the location of the zones of crystal deposition and the position of the upstream limits of the marine ice layers. (Auth. mod.)

49-4421

Quantitative analysis of sea ice draft. 1. Methods for stochastic modeling.

Goff, J.A., *Journal of geophysical research,* Apr. 15, 1995, 100(C4), p.6993-7004, 30 refs.

Sea ice, Topographic features, Ice bottom surface, Profiles, Mathematical models, Statistical analysis, Acoustic measurement

49-4422

Quantitative analysis of sea ice draft. 2. Application of stochastic modeling to intersecting topographic profiles.

Goff, J.A., Stewart, W.K., Singh, H., Tang, X.O., *Journal of geophysical research,* Apr. 15, 1995, 100(C4), p.7005-7017, 21 refs.

Sea ice, Ice bottom surface, Profiles, Surface roughness, Topographic features, Statistical analysis, Physical properties, Fractals, Acoustic measurement

49-4423

Investigating processes of marine ice formation in a floating ice tongue by a high-resolution isotopic study.

Souchez, R., et al, *Journal of geophysical research,* Apr. 15, 1995, 100(C4), p.7019-7025, 31 refs.

Sea ice, Ice shelves, Glacier ice, Frazil ice, Glacier tongues, Floating ice, Ice formation, Ice cores, Isotope analysis, Antarctica—Terra Nova Bay

An insight into the problem of determining the conditions necessary for freezing at the ice shelf-ocean interface can be gained by studying the isotopic properties of the marine ice, both in δD and $\delta^{18}O$. With this last perspective in mind a field program was conducted in Terra Nova Bay area within the 1989-90 Italian Antarctic Program in order to study outcropping sites of marine ice which has been accreted at the base of ice shelves or ice tongues. Two such sites have been sampled, one at Hells Gate Ice Shelf in the south of Terra Nova Bay [Souchez et al., 1991] and the other at the Campbell Glacier Tongue in the north. The ice cores collected at these sites were kept frozen at -25°C and studied for their crystallographic and isotopic properties. The isotopic analyses were done with an accuracy of 0.5 per mill for δD and of 0.1 per mill for $\delta^{18}O$ on 2-mL samples. (Auth. mod.)

49-4424

Laboratory study of frost flower growth on the surface of young sea ice.

Martin, S., Drucker, R., Fort, M., *Journal of geophysical research,* Apr. 15, 1995, 100(C4), p.7027-7036, 7 refs.

Sea ice, Young ice, Ice surface, Surface properties, Surface roughness, Ice crystal growth, Frost, Slush, Simulation

49-4425

Note on infragravity waves in the Arctic Ocean.

Menemenlis, D., Farmer, D.M., Czipott, P.V., *Journal of geophysical research,* Apr. 15, 1995, 100(C4), p.7089-7093, 20 refs.

Oceanography, Gravity waves, Spectra, Ice deformation, Elastic waves, Ice cover thickness, Ocean currents, Velocity measurement, Acoustic measurement, Subglacial observations, Ice water interface, Arctic Ocean

49-4426

Summary of water-use data in Alaska, 1993.

Ireland, R., Maurer, M.A., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file,* Oct. 1994, No.94-53, 45p., 5 refs.

Water reserves, Water supply, Regional planning, United States—Alaska

49-4427

Hydrological investigation of coastal waters and streams for the proposed Shepard Point road, Orca Inlet, near Cordova, Alaska.

Maurer, M.A., Carrick, S., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file,* Sep. 1994, No.94-48, 34p., 11 refs.

Water reserves, Streams, Stream flow, Hydrogeochemistry, Water chemistry, Water pollution, United States—Alaska—Cordova

49-4428

Glaciological research in Norway, 1992 and 1993. [Glasiologiske undersøkelser i Norge 1992 og 1993]

Haakensen, N., ed, *Norges vassdrags- og energiverk (NVE). Publikasjon,* 1995, No.8, 139p., In Norwegian with English summary and captions. 10 refs.

Glacier surveys, Mountain glaciers, Glacier mass balance, Glacier thickness, Glacier oscillation, Glacial hydrology, Norway

49-4429

Interim Phase IIA submarine parametric sonar ice thickness measurement system report.

Wallerstedt, R.L., ed, Crane, IN, U.S. Naval Weapons Support Center, Nov. 1986, Var. p., OSI 5885, Refs. p.A/1-A/6.

Ice surveys, Ice cover thickness, Ice acoustics, Underwater acoustics, Ice water interface, Subglacial observations, Echo sounding, Acoustic measurement

49-4430

Final report: conceptual design of an integrated submarine ice thickness measurement and profiling system.

Wallerstedt, R.L., Crane, IN, U.S. Naval Weapons Support Center, Sep. 1986, Var. p., OSI 5717, 53 refs.

Ice surveys, Ice cover thickness, Ice acoustics, Underwater acoustics, Ice water interface, Subglacial observations, Echo sounding, Acoustic measurement

49-4431

Crude oil spreading in brash ice—data report.

Sayed, M., Ng, S., Ottawa, National Research Council Canada, Program of Energy Research and Development (PERD), Dec. 1993, 13p. + appends., 6 refs.

Oil spills, Ice cover effect, Ice water interface, Environmental tests

49-4432

Overview of load transmission through grounded ice rubble.

Croasdale, K.R., Marcellus, R.W., Metge, M., Wright, B.D., Ottawa, National Research Council Canada, Program of Energy Research and Development (PERD), Mar. 1994, 96p. + append., Refs. in appendix.

Ice solid interface, Ice loads, Ice pressure, Ice pileup, Ice cover strength, Ice (construction material), Ice control, Artificial islands, Offshore structures, Beaufort Sea

49-4433

Collection and review of Imperial Oil/Esso's ice mechanics and ice load data.

Croasdale, K.R., Ottawa, National Research Council Canada, Program of Energy Research and Development (PERD), Mar. 1994, 22p. + appends., 4 refs. + listings of data collections in appendices.

Ice solid interface, Ice loads, Ice pressure, Ice pileup, Ice cover strength, Ice surveys, Offshore structures, Data processing, Bibliographies, Beaufort Sea

49-4434

Laboratory-scale measurement of scattering from modelled arctic ice ridges.

Williams, H.E.F., Yang, T.C., Kille, R.M., *Ultrasonics,* Nov. 1994, 32(6), p.441-446, 19 refs.

Sea ice, Ice acoustics, Underwater acoustics, Sound transmission, Specular reflection, Scattering, Surface roughness, Pressure ridges, Artificial ice, Simulation

49-4435

Species-specific plant responses to exclusion of grazers in three Fennoscandian tundra habitats.

Oksanen, L., Moen, J., *Ecoscience,* 1994, 1(1), p.31-39, With French summary. 34 refs.

Tundra, Ecosystems, Growth, Vegetation patterns, Revegetation, Biomass

49-4436

Soil nitrogen availability in some arctic ecosystems in northwest Alaska: responses to temperature and moisture.

Binkley, D., Stottlemyer, R., Suarez, F., Cortina, J., *Ecoscience,* 1994, 1(1), p.64-70, With French summary. 14 refs.

Ecosystems, Nutrient cycle, Soil chemistry, Arctic landscapes, Soil microbiology, Climatic changes, Soil tests, Temperature effects, United States—Alaska

49-4437

Paleoecology of postglacial tree line fluctuations on the Queen Charlotte Islands, Canada.

Pellatt, M.G., Mathewes, R.W., *Ecoscience,* 1994, 1(1), p.71-81, With French summary. 38 refs.

Paleoecology, Paleobotany, Forest lines, Paleoclimatology, Palynology, Vegetation patterns, Climatic changes, Canada—British Columbia—Queen Charlotte Islands

49-4438

Late-glacial vegetational, tephra, and climatic history of southwestern Kodiak Island, Alaska.

Peteet, D.M., Mann, D.H., *Ecoscience,* 1994, 1(3), p.255-267, With French summary. 46 refs.

Paleobotany, Palynology, Radioactive age determination, Paleoclimatology, Stratigraphy, Vegetation patterns, United States—Alaska—Kodiak Island

49-4439

Fabricated metal buildings and high snow loads.

Hossack, D.D., *Building standards,* July-Aug. 1994, 63(4), p.7-9.

Building codes, Steel structures, Snow loads, Specifications, Safety, Design criteria

49-4440

Meeting the challenge, research vessel support in the Arctic.

Elsner, R., Alexander, V., Royer, T.C., *Marine technology society journal,* 1994-95, 28(4), p.28-33, 5 refs.

Ships, Oceanography, Exploration, Icebreakers, Cold weather performance, Research projects, Design

49-4441

Terrestrial and marine biomarkers in a seasonally ice-covered arctic estuary—integration of multivariate and biomarker approaches.

Yunker, M.B., Macdonald, R.W., Veltkamp, D.J., Cretney, W.J., *Marine chemistry,* Mar. 1995, 49(1), p.1-50, Refs. p.46-50.

Estuaries, Geochemistry, Sediment transport, Hydrocarbons, Environmental tests, Suspended sediments, Sampling, Ice cover effect, Plankton, Models, Canada—Northwest Territories—Mackenzie River

49-4442

Lead, cadmium, arsenic and zinc in the ecosystem surrounding a lead smelter.

Pilgrim, W., Hughes, R.N., *Environmental monitoring and assessment,* Aug. 1994, 32(1), p.1-20, 35 refs.

Ecosystems, Mining, Environmental tests, Air pollution, Aerosols, Metals, Snow impurities, Sampling

49-4443

Mining in northern Canada: expanding the industry while protecting arctic fishes—a review.

Lemly, A.D., *Ecotoxicology and environmental safety,* Nov. 1994, 29(2), p.229-242, Refs. p.238-242.

Mining, Water pollution, Ecosystems, Environmental impact, Environmental protection, Economic development, Canada

49-4444

Reliability of dynamic mechanical thermal analyses (DMTA) for the study of frozen aqueous systems.

Blond, G., Ivanova, K., Simatos, D., *Journal of rheology,* Nov.-Dec. 1994, 38(6), p.1693-1703, 16 refs.

Rheology, Solutions, Frozen liquids, Viscoelasticity, Thermal analysis, Phase transformations, Temperature effects, Spectroscopy

49-4445

Water structure from computational chemistry.

Corongiu, G., Clementi, E., NATO Advanced Research Workshop on Computation Approaches in Supramolecular Chemistry, Strasbourg, France, Sep. 1-5, 1993. Proceedings. Edited by G. Wipff and NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.426, Dordrecht, Kluwer Academic Publishers, 1994, p.1-29, 47 refs.

Water structure, Ice structure, Molecular structure, Molecular energy levels, Simulation, Ice spectroscopy, Spectra, Temperature effects

49-4446

Langmuir films of amphiphilic alcohols and surfaces of polar crystals as templates for ice nucleation.

Popovitz-Biro, R., et al, NATO Advanced Research Workshop on Computation Approaches in Supramolecular Chemistry, Strasbourg, France, Sep. 1-5, 1993. Proceedings. Edited by G. Wipff and NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.426, Dordrecht, Kluwer Academic Publishers, 1994, p.411-418, 17 refs.

DLC QD380.C625

Ice formation, Heterogeneous nucleation, Monomolecular films, Ice crystal structure, Molecular structure, Orientation, Electric fields, Freezing points

49-4447

Evidence against a late Wisconsinan ice shelf in the Gulf of Maine.

Oldale, R.N., Williams, R.S., Jr., Colman, S.M., *Quaternary science reviews,* 1990, 90(1), p.1-13, 76 refs.

Marine geology, Glacial geology, Glacier melting, Ice shelves, Sedimentation, Calving, Pleistocene, Quaternary deposits, Marine deposits, United States—Maine, Gulf

49-4448

Sediment and solute yields in British Columbia and Yukon: their geomorphic significance reexamined.

Slaymaker, O., International Conference on Geomorphology, 1st, University of Manchester, UK, Sep. 15-21, 1985. International Geomorphology 1986. Vol.1, Chichester, UK, John Wiley & Sons Ltd., 1987, p.925-945, Refs. p.941-945. For other papers from same conference see 46-2096 through 46-2119.

River basins, Water erosion, Suspended sediments, Sediment transport, Alluvium, Canada—British Columbia, Canada—Yukon Territory

49-4449

Panel wall heaters.

Haynes, F.D., MP 3610, *United States Committee on Large Dams. USCOLD newsletter,* July 1994, 1p.

Locks (waterways), Dams, Ice control, Ice prevention, Radiant heating

49-4450

Small scale melt processes governing the flushing of nutrients from a first-year sea ice, Hudson Bay, Canada.

Hudier, E., Ingram, G., *Oceanologica acta,* 1994, 17(4), p.397-403, With French summary. 40 refs.

Ice water interface, Ice cover effect, Ice bottom surface, Ice melting, Ice composition, Meltwater, Sea water, Water chemistry, Brines, Nutrient cycle, Canada—Hudson Bay

49-4451

Criteria to distinguish between subglacial glaciotectonic and glaciomarine sedimentation. I. Deformation styles and sedimentology.

Hart, J.K., Roberts, D.H., *Sedimentary geology,* 1994, Vol.91, p.191-213, 49 refs.

Glaciation, Glacial geology, Glacial erosion, Glacial deposits, Moraines, Ice rafting, Marine geology, Marine deposits, Bottom sediment, Tectonics

49-4452

WinterNet. International Winter Cities Information Exchange Program. An overview of WinterNet. Edmonton, Alberta, Planning and Development Department, 1994, 20p.

Cold weather operation, Regional planning, Urban planning, International cooperation, Snow removal, Road maintenance, Data processing, Data transmission, Computer applications

49-4453

On ice rubble interaction modelling.

B. Wright & Associates, Calgary, Alberta, C.M.E.L. Enterprises Ltd. (Canadian Marine Engineering Ltd.), Spencerville, Ontario, Ottawa, National Research Council Canada, Mar. 1993, Var. p., C.M.E.L. report, No.1076, 7 refs.

Ice solid interface, Ice loads, Ice pressure, Ice pileup, Ice cover strength, Artificial islands, Offshore structures, Computerized simulation

49-4454

Calculation of load transmission through ice rubble using the distinct element code UDEC.

Evgin, E., Zhan, C.Z., Ottawa, National Research Council Canada, Institute for Mechanical Engineering, Mar. 1993, 55p., 6 refs.

Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice pileup, Ice cover strength, Offshore structures, Computerized simulation

49-4455

Ship interaction with actual ice conditions. Final report.

Frederking, R.M.W., Riska, K., Ottawa, National Research Council Canada, Oct. 1992, 8p., 23 refs. Finnish-Canadian Joint Research Project Arrangement 5.

Ships, Ice navigation, Ice solid interface, Ice loads, Metal ice friction, Research projects

49-4456

Application of different ice class rules to MV Arctic and a SA 15 type ship.

Helsinki University of Technology. Arctic Offshore Research Centre, Espoo, Finland, Mar. 1992, 18p. + append., 8 refs.

Ships, Ice navigation, Ice loads, Metal ice friction, Standards, Design criteria

49-4457

Laboratory tests of ice interaction with the booms in Lac St. Pierre.

Timco, G.W., Cornett, A.M., *National Research Council Canada. Institute for Engineering in the Canadian Environment. Coastal Engineering Program. Technical report,* June 1994, IECE-CEP-TR-003, 84p., With French summary. 7 refs.

River ice, Lake ice, Ice booms, Ice control, Ice solid interface, Ice loads, Environmental tests, Canada—Quebec—St. Lawrence River

49-4458

Model tests of load apportioning through ice rubble on the Gulf Molikpaq.

Timco, G.W., *National Research Council Canada. Institute for Mechanical Engineering. Cold Regions Engineering. Technical report,* May 1992, IME-CRE-TR-004, 110p., NRC No.33566, With French summary. 29 refs.

Offshore structures, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice pileup, Ice cover strength, Ice control, Environmental tests

49-4459

Numerical simulations of ice jams in Lake St. Peter.

Sayed, M., Serrer, M., Arden, D.A., *National Research Council Canada. Institute for Engineering in the Canadian Environment. Cold Regions and Thermal Engineering. Controlled technical report,* Mar. 1993, IECE-CRT-CTR-004, 29p., With French summary. 7 refs.

River ice, Lake ice, Channels (waterways), Ice jams, Ice forecasting, Ice control, Ice navigation, Mathematical models, Canada—Quebec—St. Lawrence River

49-4460

Gulf Canada's ice/structure interaction information: a summary and transfer plan.

Wright, B.D., Ottawa, National Research Council Canada, Program of Energy Research and Development (PERD), Mar. 1994, 29p. + appends., Information listings in Appendix 3.

Ice solid interface, Ice loads, Ice pressure, Ice cover strength, Ice surveys, Artificial islands, Offshore structures, Offshore drilling, Data processing, Beaufort Sea

49-4461

Numerical modelling of load transmission through grounded EG/AD/S ice rubble.

Marshall, A.R., Ottawa, National Research Council Canada, Institute for Mechanical Engineering, Mar. 1993, 23p. + appends., 5 refs.

Ice solid interface, Ice loads, Ice pressure, Ice pileup, Ice cover strength, Artificial ice, Ice models, Offshore structures, Artificial islands

49-4462

NRC centre for ice loads on Beaufort Sea structures.

Timco, G.W., *National Research Council Canada. Institute for Marine Dynamics. Technical report,* Mar. 1995, TR-1995-18, 18p. + appends., Refs. passim + listing of current holdings in Appendix E.

Ice solid interface, Ice loads, Ice pressure, Ice cover strength, Ice surveys, Artificial islands, Offshore structures, Offshore drilling, Bibliographies, Data processing, Beaufort Sea

49-4463

Submarine parametric sonar ice measurement system calibration report.

Wallerstedt, R.L., Ching, G., Harwell, P., Harrison, M.R., Crane, IN, U.S. Naval Weapons Support Center, Sep. 1987, 43p. + appends., SAIC R88-13.

Ice surveys, Ice cover thickness, Ice acoustics, Underwater acoustics, Ice water interface, Subglacial observations, Echo sounding, Acoustic measurement

49-4464

Synopsis sea-ice test Resolute Bay, Canada report.

Wallerstedt, R.L., Harrison, M.R., Harwell, P., Ching, G., Crane, IN, U.S. Naval Weapons Support Center, Oct. 1987, 73p. + appends., SAIC R88-21, 9 refs.

Ice surveys, Ice cover thickness, Ice acoustics, Underwater acoustics, Ice water interface, Subglacial observations, Echo sounding, Acoustic measurement, Canada—Northwest Territories—Resolute Bay

49-4465

United States Coast Pilot 9. Pacific and arctic coasts Alaska: Cape Spencer to Beaufort Sea. Washington, D.C., U.S. National Oceanic and Atmospheric Administration, National Ocean Service, 1994, 319p. + tables.

Route surveys, Topographic surveys, Oceanographic surveys, Coastal topographic features, Bottom topography, Marine meteorology, Ocean currents, Tidal currents, Ice breakup, Freezeup, United States—Alaska

49-4466

Presentation of ground water and soil information collected in previous site investigations, railroad industrial area, Fairbanks, Alaska.

Maurer, M.A., Ireland, R., Vohden, J., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file,* Sep. 1994, No.94-49, 434p., 3 refs. + listing of 79 reports for a database.

Ground water, Water pollution, Soil pollution, Hydrogeochemistry, Urban planning, Economic development, United States—Alaska—Fairbanks

49-4467

Collaborative study of soils spiked with volatile organic compounds.

Hewitt, A.D., Grant, C.L., SR 95-03, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Jan. 1995, 11p., ADA-292 695, 21 refs.

Soil pollution, Soil tests, Wastes, Laboratory techniques, Accuracy

Vapor fortification is a method of spiking soils with volatile organic compounds (VOCs) that was recently developed for producing materials suitable for performance evaluation and quality assurance/quality control (QA/QC). Using this treatment method, soil subsamples enclosed in heat-sealed glass ampoules were distributed to 16 laboratories for a collaborative round-robin study. The sample sets consisted of duplicates of three different soils. Each soil subsample had been vapor-fortified with the following VOCs: trans-1,2-dichloroethylene (TDCE), trichloroethylene (TCE), benzene (Ben) and toluene (Tol). The laboratories were requested to report analyte concentration estimates for these four analytes and any other detected organic compounds after performing a methanol extraction, purge-and-trap gas chromatography, mass spectrometry analysis. The results from the 12 laboratories that met all of the design criteria produced a range of relative standard deviations from 8.5 to 28.2%, with a pooled standard deviation of less than 13%. The smallest range of consensus values was for Ben (pooled RSD=9.0%), while the determination of TDCE showed the greatest overall uncertainty (pooled RSD=20.3%). This round-robin effort confirmed that the use of vapor-fortified soils sealed in glass ampoules is a precise way of preparing and storing VOC-spiked soil subsamples.

49-4468

Hazards from snow avalanches. Geological hazards. Edited by B.A. Bolt et al, New York, Springer-Verlag, 1977, p.221-231, 7 refs.

DLC QE501.3.G46

Avalanche mechanics, Safety, Classifications, Avalanche forecasting, Countermeasures, Snow cover stability

49-4469

Snow cover, snow lines and glaciers in central Europe since the 16th century.

Pfister, C., Climatic scene. Edited by M.J. Tooley and G.M. Sheail, London, George Allen & Unwin, 1985, p.154-174, 38 refs.

DLC QC981.4.C57

Snow cover distribution, Seasonal variations, Snow line, Glacier oscillation, Snowmelt, Climatic changes, Correlation

49-4470

RACER: Nitrogen remineralization within antarctic sea ice during the 1992 austral winter.

Dore, J.E., Houlihan, T., Karl, D.M., *Antarctic journal of the United States,* 1993, 28(5), p.167-169, 13 refs.

Ice composition, Sea ice, Snow composition, Sea water, Chemical composition, Microbiology, Cryobiology, Antarctica—Antarctic Peninsula

Studies show that the winter pack-ice ecosystem of the western Antarctic Peninsula contains an active heterotrophic component and an active nitrifying component, which serve to regenerate nitrogen within the ice. It appears, however, that diffusion of this recycled nitrogen into the underlying water column is limited. Also, the properties of pack-ice microbial communities in this region appear to be as heterogeneous as the ice itself.

49-4471

Palmer LTER: Hydrogen peroxide in the Palmer LTER region. III. Local sources and sinks.

Tien, G., Karl, D.M., *Antarctic journal of the United States,* 1993, 28(5), p.229-230, 7 refs.

Sea water, Chemical composition, Snowmelt, Glacier ice, Marine biology

During the austral spring and autumn LTER cruises aboard the R/V *Polar Duke,* in Nov. 1992 and R/V *Nathaniel B. Palmer* in Mar. through May 1993, the authors investigated selected sources and sinks of hydrogen peroxide in a variety of antarctic coastal habitats. These measurements constituted one component of the comprehensive study of H_2O_2 dynamics. The potential source terms evaluated were wet deposition (snow), glacial ice meltwater and land runoff, and *in situ* biological processes. It is concluded that both biological and photochemical sources and microbiological sinks of H_2O_2 must be considered in studies of southern ocean H_2O_2 dynamics.

49-4472

Geochemical features of organic matter in sediment cores from Lützow-Holm Bay, Antarctica.
Matsumoto, G.I., Matsumoto, E., Sasaki, K., Watanuki, K., Symposium on organic matter: productivity, accumulation, and preservation in recent and ancient sediments, Nov. 1988, edited by J.K. Whalen and J.W. Farrington, New York, Columbia University Press, 1992, p.142-175, 91 refs.
DLC QE516.5.O7237 1992
Drill core analysis, Sediments, Geochemistry, Algae, Plankton, Antarctica—Lützow-Holm Bay
Organic geochemical and geochronological studies of two marine sediment core samples near Langhovde Glacier (Core B,) and about 40 km to the east of the Core B sample, Core A in Lützow-Holm Bay, have been conducted to understand sedimentary sequences and the distribution, sources, preservation, and destruction of organic matter in an antarctic setting. The sediments are composed mainly of poorly sorted glacial clay; sedimentation rates for Core A varied from about 1.5 mm to about 4.5 mm in tiered depths from 0-50 cm. Vertical distributions of radioisotopic data and organic compounds suggest considerable reworking by iceberg movements. The abundance of iso- and anteiso-alkanoic acids in the Core A sample suggest that bacterial contributions to this sample are considerably greater than those to the Core B sample. The sources of organic matter are mainly phytoplankton and zooplankton, including ice algae, and microorganisms, with small amounts of eroded recycled sediments and the waxes of vascular plants.

49-4473

Natural hydrous pyrolysis: petroleum generation in submarine hydrothermal systems.
Simoneit, B.R.T., Symposium on organic matter: productivity, accumulation, and preservation in recent and ancient sediments, Nov. 1988, edited by J.K. Whalen and J.W. Farrington, New York, Columbia University Press, 1992, p.368-402 (pertinent p.380-381 and p.398-402), Refs. p.398-402.
DLC QE516.5.O7237 1992
Marine geology, Sediments, Geochemistry, Hydrothermal processes, Antarctica—Bransfield Strait
The conversion of organic matter to petroleum products by hydrothermal activity is a geologically rapid process, occurring in nature in many types of submarine environments. Geologically immature organic matter of marine sediments is being altered to petroleum by this process, which is analogous to laboratory hydrous pyrolysis. This activity has been studied in Guaymas Basin (Gulf of California), Escanaba Trough and Middle Valley (NE Pacific), Bransfield Strait (Antarctica), and Atlantis II Deep (Red Sea). Petroleum-like products are formed by the same process from contemporary organic detritus and/or viable microorganisms when they become entrained by turbulent mixing into the discharging vent waters, resulting in an instantaneous hydrous pyrolysis. Preliminary data from laboratory hydrous pyrolysis studies indicate that some of the organic matter interconversions observed in nature can be duplicated and thereby studied in greater detail. Hydrous pyrolysis is a natural process in hydrothermal vent systems generating petroleum, and the associated fluids are efficient solvents for primary and secondary migration of that petroleum.

49-4474

Sustaining health and performance in the cold: a pocket guide to environmental medicine aspects of cold-weather operations.
Young, A.J., Roberts, D.E., Scott, D.P., Cook, J.E., Mays, M.Z., Askew, E.W., *U.S. Army Research Institute of Environmental Medicine. USARIEM technical note,* Dec. 1992, No.93-2, 68p., 9 refs.
Cold weather survival, Cold weather operation, Military operation, Cold exposure, Physiological effects, Health

49-4475

Absence of anomalous dispersion features in the inelastic neutron scattering spectra of water at both sides of the melting transition.
Bermejo, F.J., Alvarez, M., Bennington, S.M., Vallauri, R., *Physical review E,* Mar. 1995, 51(3), p.2250-2262, 26 refs.
Water structure, Melting points, Ice physics, Neutron scattering, Sound waves, Spectra, Molecular energy levels, Thermodynamic properties, Density (mass/volume)

49-4476

Artificial ground freezing.
Xanthakos, P.P., Artificial ground control and improvement. Edited by P.P. Xanthakos et al, New York, John Wiley & Sons, Inc., 1994, p.827-903, Refs. p.896-903.
DLC TN288.X36
Soil freezing, Artificial freezing, Soil stabilization, Frozen ground mechanics, Rheology, Excavation

49-4477

Rockfalls and debris avalanches in the Smugglers Notch area, Vermont.
Lee, F.T., Odum, J.K., Lee, J.D., U.S. Geological Survey. Bulletin 2075, Washington, DC, United States Government Printing Office, 1994, 33p., 45 refs.
DLC QE75.B9
Geocryology, Periglacial processes, Rock streams, Avalanche mechanics, Rock mechanics, Frost action, Freeze thaw cycles, Sediment transport, Slope processes, United States—Vermont

49-4478

Comment on "A long term decrease in arctic haze at Barrow, Alaska" by B.A. Bodhaine and E.G. Dutton.
Jaffe, D., Iversen, T., Shaw, G., Bodhaine, B.A., Dutton, E.G., *Geophysical research letters,* Mar. 15, 1995, 22(6), p.739-742, Includes reply. 21 refs. For paper under discussion see 48-949.
Atmospheric composition, Haze, Aerosols, Air pollution, Atmospheric circulation, United States—Alaska—Barrow

49-4479

On the meltwater genesis of drumlins.
Shoemaker, E.M., *Boreas,* Mar. 1995, 24(1), p.3-10, 29 refs.
Glacial geology, Quaternary deposits, Glacial deposits, Glacial hydrology, Meltwater, Subglacial drainage, Flooding, Water erosion, Sediment transport

49-4480

Debris structures in basal ice exposed at the margin of the Greenland ice sheet.
Knight, P.G., *Boreas,* Mar. 1995, 24(1), p.11-12, 3 refs.
Ice sheets, Glacier ice, Ice bottom surface, Ice composition, Sedimentation, Glacial geology, Greenland

49-4481

Scanning electron microscopy of Pleistocene tills in Estonia.
Mahaney, W.C., Kalm, V., *Boreas,* Mar. 1995, 24(1), p.13-29, 53 refs.
Pleistocene, Glacial deposits, Quaternary deposits, Microstructure, Particle size distribution, Glacial geology, Scanning electron microscopy, Glacial erosion, Estonia

49-4482

Influence of Southern Upland ice on glacio-isostatic rebound in Scotland: the Main Rock Platform in the Firth of Clyde.
Gray, J.M., *Boreas,* Mar. 1995, 24(1), p.30-36, 27 refs.
Pleistocene, Ice sheets, Glaciation, Shoreline modification, Glacial geology, Isostasy, Geomorphology, United Kingdom—Scotland

49-4483

Glacial geological implications of preconsolidation values in sub-till sediments at Skorgenes, western Norway.
Larsen, E., Sandven, R., Heyerdahl, H., Hernes, S., *Boreas,* Mar. 1995, 24(1), p.37-46, 40 refs.
Pleistocene, Glacial deposits, Glacial geology, Marine geology, Ice sheets, Glacier thickness, Stratigraphy, Ice solid interface, Norway

49-4484

Alpine valley heads on the Antarctic Peninsula.
Haynes, V.M., *Boreas,* Mar. 1995, 24(1), p.81-94, 85 refs.
Pleistocene, Mountain glaciers, Alpine glaciation, Glacial geology, Glacial erosion, Geomorphology, Landforms, Antarctica—West Antarctica
Numerous nunataks in the Antarctic Peninsula are highly dissected by alpine valley heads (corries, cirque-headed valleys, etc.). It is believed that these were cut by wet-based mountain glaciation before and during the buildup of the ice-sheet, though the smallest ones may have formed later when the ice-sheet was insufficiently thick to submerge them. Dimensions of the features suggest that the main alpine glaciation was in the Miocene. Morphometric analysis of 1663 alpine valley heads has been based on satellite imagery, concentrating on regional variations in frequency, size and orientation. Length of alpine glaciation is believed to be an important control of size. Orientation is believed to have been influenced by palaeoclimate as well as topography. During early and more marginal glaciations, poleward and lee-side sites were occupied by corrie glaciers, with more windward sites being added as glaciation intensified, followed by northerly orientations under more recent polar conditions. (Auth. mod.)

49-4485

Greenland ice sheet over the next 5000 years.
Loutre, M.F., *Geophysical research letters,* Apr. 1, 1995, 22(7), p.783-786, 11 refs.
Ice sheets, Glacier oscillation, Climatic changes, Climatology, Greenhouse effect, Atmospheric composition, Carbon dioxide, Long range forecasting, Simulation, Greenland

49-4486

Passive microwave-derived snow melt regions on the Greenland ice sheet.
Abdalati, W., Steffen, K., *Geophysical research letters,* Apr. 1, 1995, 22(7), p.787-790, 17 refs.
Ice sheets, Remote sensing, Radiometry, Snow surveys, Snow melting, Detection, Classifications, Seasonal variations, Climatic changes, Greenland

49-4487

Atlantic arctic cyclones and the mild Siberian winters of the 1980s.
Rogers, J.C., Mosley-Thompson, E., *Geophysical research letters,* Apr. 1, 1995, 22(7), p.799-802, 11 refs.
Polar atmospheres, Synoptic meteorology, Air masses, Atmospheric circulation, Seasonal variations, Air temperature, Temperature variations, Turbulent boundary layer, Russia—Siberia

49-4488

UARS MLS observations of lower stratospheric ClO in 1992-93 and 1993-94 arctic winter vortices.
Waters, J.W., Manney, G.L., Read, W.G., Froidevaux, L., Flower, D.A., Jarnot, R.F., *Geophysical research letters,* Apr. 1, 1995, 22(7), p.823-826, 16 refs.
Polar atmospheres, Atmospheric composition, Air pollution, Stratosphere, Chemical properties, Sounding, Ozone, Seasonal variations

49-4489

In situ measurements of BrO during AASE II.
Avallone, L.M., et al, *Geophysical research letters,* Apr. 1, 1995, 22(7), p.831-834, 20 refs.
Polar atmospheres, Atmospheric composition, Chemical properties, Sampling, Aerial surveys, Periodic variations, Air pollution

49-4490

Role of abscisic acid in drought-induced freezing tolerance, cold acclimation, and accumulation of LT178 and RAB 18 proteins in *Arabidopsis thaliana.*
Mäntylä, E., Lång, V., Palva, E.T., *Plant physiology,* Jan. 1995, 107(1), p.141-148, 56 refs.
Plant physiology, Cold tolerance, Acclimatization, Cold stress, Frost resistance, Plant tissues, Temperature effects

49-4491

Effects of freezing and thawing on the tension properties of high-strength concrete.
Marzouk, H., Jiang, D.J., *ACI materials journal,* Nov.-Dec. 1994, 91(6), p.577-586, 14 refs.
Concrete strength, Concrete durability, Concrete structures, Freeze thaw cycles, Freeze thaw tests, Resonance, Elastic properties, Flexural strength

49-4492

Effect of external loads on the frost-resistant properties of mortar with and without silica fume.
Zhou, Y.X., Cohen, M.D., Dolch, W.L., *ACI materials journal,* Nov.-Dec. 1994, 91(6), p.595-601, 13 refs.
Mortars, Concrete aggregates, Frost resistance, Loading, Concrete durability, Freeze thaw tests, Flexural strength, Air entrainment

49-4493

Influence of organic admixtures and testing method on freeze-thaw resistance of concrete.
Aavik, J., Chandra, S., *ACI materials journal,* Jan.-Feb. 1995, 92(1), p.10-14, 10 refs.
Concrete durability, Frost resistance, Freeze thaw cycles, Freeze thaw tests, Accuracy, Concrete admixtures, Mechanical properties, Polymers, Correlation

49-4494
ALTA: an automated lag-time apparatus for studying the nucleation of supercooled liquids.
Barlow, T.W., Haymet, A.D.J., *Review of scientific instruments*, Apr. 1995, 66(4), p.2996-3007, 49 refs.
Supercooling, Temperature variations, Liquid cooling, Heterogeneous nucleation, Freeze thaw cycles, Measuring instruments

49-4495
Cosmic ray simulator: a versatile apparatus for quantitative studies on the interaction of cosmic rays with frozen solids by on line and *in situ* quadrupole mass spectrometry and Fourier transform infrared spectroscopy.
Kaiser, R.I., Gabrysch, A., Roessler, K., *Review of scientific instruments*, Apr. 1995, 66(4), p.3058-3066, 54 refs.
Extraterrestrial ice, Gamma irradiation, Simulation, Frost, Hydrocarbons, Ice spectroscopy, Photochemical reactions, Radiation absorption, Cold chambers

49-4496
Draft recommendation for test method for the freeze-thaw resistance of concrete—tests with water (CF) or with sodium chloride solution (CDF). *Materials and structures*, Apr. 1995, 28(177), p.175-182, 5 refs.
Concrete durability, Frost resistance, Mechanical tests, Freeze thaw tests, Cold weather performance, Standards

49-4497
Mechanical interactions between ice crystals and red blood cells during directional solidification.
Ishiguro, H., Rubinsky, B., *Cryobiology*, Oct. 1994, 31(5), p.483-500, 34 refs.
Cryobiology, Solutions, Ice crystal growth, Ice crystal structure, Ice solid interface, Solidification, Deformation, Preserving, Viability, Freeze thaw cycles

49-4498
Changes in winter air temperatures near Lake Michigan, 1851-1993, as determined from regional lake-ice records.
Assel, R.A., Robertson, D.M., *Limnology and oceanography*, Jan. 1995, 40(1), p.165-176, 34 refs.
Air temperature, Temperature variations, Climatology, Climatic changes, Lake ice, Freezeup, Ice breakup, Correlation, Ice air interface, United States—Michigan, Lake

49-4499
Proceedings of the NIPR Symposium on Polar Meteorology and Glaciology, No.8.
Watanabe, O., ed, NIPR Symposium on Polar Meteorology and Glaciology, 16th, Tokyo, Aug. 4-5, 1993, Tokyo, National Institute of Polar Research, Nov. 1994, 215p., Refs. passim. For selected papers see 49-4500 through 49-4508 or F-52761 through F-52766, I-52754 through I-52760.
Glaciology, Meteorological data, Aerosols, Sea ice, Air ice water interaction, Antarctica—Showa Station
This is a collection of papers presented at the 16th Symposium on Polar Meteorology and Glaciology held on Aug. 4-5, 1993, in Tokyo. It consists of 13 full-length papers pertinent to Antarctica and 31 abstracts; the former were refereed and are arranged in the order of scientific areas of meteorology, glaciology, physical oceanography and observational techniques.

49-4500
Qualitative assessment of height dependent interannual variability of polar stratospheric ozone. Part I: Long-term variability and stratospheric ozone depletion.
Gernandt, H., Dethloff, K., Kanzawa, H., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.8, Tokyo, National Institute of Polar Research, Nov. 1994, p.1-13, 12 refs.
Ozone, Stratosphere, Atmospheric composition, Air temperature, Aerosols, Antarctica—Showa Station, Antarctica—Georg von Neumayer Station, Antarctica—Georg Forster Station
Regular observations have been made for the months of Sep. and Oct. since the beginning of ozone soundings at Showa Station in 1966. An attempt is presented to assess long-term ozone variations by using monthly mean ozone data obtained at Showa and additional data from Georg Forster and Neumayer Stations. These ozone data, together with monthly means of potential temperature and their standard deviations as observed at Showa, as well as the monthly means of the QBO phase as observed at 10 hPa altitude in tropical latitudes, are used to discuss the long-term control of polar stratospheric ozone by atmospheric dynamics. It is suggested that inside the polar vortex, chemically caused ozone reductions at 70 hPa are also controlled by dynamic processes. Significant impacts of volcanic aerosols on stratospheric ozone dominate at 150 hPa pressure level, showing additional severe ozone depletion. (Auth. mod.)

49-4501

Relationship between the thermal belt on the slope of the ice sheet on the Sôya Coast and the surface inversion layer over Syowa Station.

Nagakawa, K., Shimodoori, H., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.8, Tokyo, National Institute of Polar Research, Nov. 1994, p.53-65, 5 refs.

Meteorological data, Meteorological charts, Air temperature, Ice air interface, Infrared photography, Radiometry, Ice sheets, Surface temperature, Wind factors, Antarctica—Showa Station, Antarctica—Lützow-Holm Bay

All the NOAA/AVHRR thermal infrared images received at Showa Station from Feb. 1990 to Jan. 1991 were analyzed to make temperature distribution maps. From this analysis the warmer area in midslope, i.e. the so-called thermal belt, appeared on the ice sheet slope along the coast around Lützow-Holm Bay, especially on the Sôya Coast, frequently in winter. The relationship between the thermal belt on the Sôya Coast and the surface inversion layer over Showa was investigated. When the surface inversion layer thickness increased, the thermal belt was displaced toward the interior or higher part of the ice sheet slope. However, even if the surface inversion layer appeared over Showa, the thermal belt did not necessarily appear. The appearance or absence of the thermal belt on the ice sheet slope is considered to correspond to how the surface inversion layer over the ice sheet, a katabatic wind, connects with the surface inversion layer over the foot of the slope. (Auth.)

49-4502

Micrometeorological observation over the fast ice at Ongul Strait near Syowa Station.

Nakagawa, K., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.8, Tokyo, National Institute of Polar Research, Nov. 1994, p.66-80, 7 refs.

Meteorological data, Climatic factors, Snow ice interface, Heat flux, Snow air interface, Meteorological instruments, Antarctica—Ongul Sound

Micrometeorological conditions were observed over fast ice with overlying thick snow cover, and underlying deep sea, approximately in the center of Ongul Sound from the end of Mar. to the beginning of Dec., 1990. In response to the annual change of solar radiation, the radiation balance showed an annual change: the balance was negative for a period including the polar night, and changed to positive after Oct. Corresponding to the radiation balance, both the sensible heat flux from air to snow and the conductive heat flux from fast ice to snow changed. As the prevailing wind velocity increased, the temperature and humidity increased, and the radiative heat loss, sensible heat flux from the air to the snow, and conductive heat flow from the fast ice to snow decreased. (Auth.)

49-4503

Interaction between antarctic sea ice and ENSO events.

Xie, S.M., Bao, C.L., Xue, Z.H., Zhang, L., Hao, C.J., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.8, Tokyo, National Institute of Polar Research, Nov. 1994, p.95-110, 13 refs.

Sea ice distribution, Air ice water interaction, Ocean currents, Climatic factors, Antarctica—Ross Sea, Antarctica—Weddell Sea

The theory of the cross-coupled correlation-resonance of two wave spectra is used to study the interaction between antarctic sea ice and ENSO events. It is found that the principal period of the correlation time series oscillation is usually coincident with the principal period of sea ice itself; the sea ice of the Ross Sea area, with its principal period of quasi-11 years, has a strong cross correlation oscillation with SSTA of Niño 4. The same is true for the Weddell Sea ice and SSTA of the central-eastern equatorial Pacific but with a common period of quasi-5 years. ENSO events have a good correlation with sea ice in the eastern Antarctic, in their later stage. SST of the central equatorial Pacific has a quasi-contemporary oscillation relationship with Ross Sea ice, and a 1.5 year lag oscillation relationship with Weddell Sea ice. The authors call this oscillation relationship between antarctic sea ice and ENSO events the Southern Oceanic Oscillation (SOO). (Auth. mod.)

49-4504
Study on the oscillation relationship between sea ice of the Arctic and Antarctic.
Xie, S.M., Bao, C.L., Hao, C.J., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.8, Tokyo, National Institute of Polar Research, Nov. 1994, p.111-128, 16 refs. For another version, see F-51750 or 49-1572.
Sea ice distribution, Polar regions, Variations, Ice models, Air ice water interaction, Ice formation
Antarctic sea ice is divided into four regions: SPI1, the eastern antarctic region; SPI2, centered at the Ross Sea; SPI3, centered at the Weddell Sea; and SPI4, the whole antarctic sea region. Arctic sea ice is divided into three regions: NPI1 on the Pacific side; NPI2 on the Atlantic side; and NPI3, the whole arctic sea region. In this paper, the SIGRID polar sea ice data provided by WDC-A are used to analyze the interrelations between the arctic and antarctic sea ice. It is found that complicated interactions exist, with the most outstanding characteristics as follows: NPI2 plays a leading role in the interactions between the two poles' sea ice. SPI3 is a positive feedback center affecting the antarctic sea ice. SPI2 is a negative feedback center affecting the two poles' sea ice. The strongest interactions among NPI2, SPI3 and SPI2 involve a quasi-periodic intensity variation between sea ice of the Antarctic and Arctic with cycle period of 5-6 years. This cycle period coincides with the principal period of NPI2 and SPI3 variations themselves. (Auth. mod.)

49-4505
Growth process of air-hydrates and diffusion of air molecules in deep ice sheet.
Uchida, T., Mae, S., Hondoh, T., Lipenkov, V.IA., Duval, P., Kawabata, J., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.8, Tokyo, National Institute of Polar Research, Nov. 1994, p.140-148, 10 refs.
Ice crystal growth, Ice formation, Ice cores, Ice models, Molecular structure, Antarctica—Vostok Station
Geometrical parameters of air-hydrate crystals in Vostok ice cores revealed that air-hydrate crystals were growing in the deep ice sheet. Air-hydrate crystals with radius of 65 to 100 μm grew while smaller crystals disappeared. The smaller the crystal was, the quicker its number concentration decreased. A growth model of air-hydrate crystals in ice sheets was developed by assuming a spherical diffusion field of gas molecules and their steady-state diffusions. A model with the given geometrical parameters gave an estimate that the product of the diffusion coefficient and equilibrium concentration of gas molecules in ice is on the order of 10^{-19} m^2/s under the conditions of a deep ice sheet. This estimate is reasonable if the concentration of gas molecules in ice is assumed to be the same as that of self-interstitial of ice. The results indicate that gas molecules could diffuse several tens of centimeters during 100 kyr. (Auth.)

49-4506
Using a mobile radio echo sounder to measure bedrock topography in east Queen Maud Land, Antarctica.
Maeno, H., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.8, Tokyo, National Institute of Polar Research, Nov. 1994, p.149-160, 5 refs.
Radio echo soundings, Topographic surveys, Bedrock, Ice cover thickness, Ice sheets, Recording instruments, Antarctica—Queen Maud Land
As part of the Dome Fuji Project, the topography of the bedrock over a wide area around Dome F and along routes from Dome F to S16 (about 1000 km) was surveyed by radio echo sounder with a continuous recording system. The bedrock topography was successfully measured under ice sheets thicker than 3500 m, and the performance of the radio echo sounder was confirmed. The highest point of Dome F was located in the basin-like topography of the bedrock, surrounded by more elevated areas. The strength of the bedrock echo was found to differ substantially between inside and outside of the Dome F area. It is suggested that this is due to the difference of ice sheet temperatures between these areas, since the attenuation coefficients depend on ice temperature. The stronger echo at high altitude will enable one to measure ice thicknesses of more than 3500 m. (Auth.)

49-4507
Technique of continuous analysis of sea ice distribution using video images taken from a ship.
Muramoto, K., Matsuura, K., Endoh, T., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.8, Tokyo, National Institute of Polar Research, Nov. 1994, p.161-168, 13 refs.
Imaging, Image processing, Sea ice distribution, Photographic equipment, Photographic reconnaissance, Photographic techniques, Antarctica—Showa Station
A technique is described for patching video images of ice covered water. The sea ice was photographed by video camera from the ship *Shirase* between Fremantle and Showa Station. Continuous video images are obtained using geometric transformation and template matching. Both shape of the ice and compactness along the ship's route can be obtained continuously. (Auth.)

49-4508

Method to analyze the meteorological radar echo observed at Syowa Station, Antarctica.

Takeya, H., Hatanaka, M., Sakaguchi, T., Nishitsuji, A., Hoshiyama, M., Wada, M., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.8, Tokyo, National Institute of Polar Research, Nov. 1994, p.169-177, 12 refs.

Meteorological instruments, Data processing, Radar echoes, Meteorological data, Snowfall, Particle size distribution, Antarctica—Showa Station

The authors propose an approach to evaluate precipitation rates from meteorological radar echoes and snow particle size distribution data. They applied this approach to the analysis of two sets of radar echo data obtained at Showa Station on Apr. 6 and Oct. 1, 1988. The estimated precipitation rates agree with the results obtained from the Z factor-precipitation rate relations, which were measured at Showa Station. On the basis of these results, the authors feel confident that their approach can be applied to the analysis of meteorological radar echoes in Antarctica. (Auth. mod.)

49-4509

Flow law for anisotropic ice and its application to ice sheets.

Azuma, N., *Earth and planetary science letters,* Dec. 1994, 128(3-4), p.601-614, 32 refs.

Anisotropy, Ice sheets, Ice creep, Rheology, Ice mechanics, Mathematical models

49-4510

Generation of electric fields by ice and snow friction.

Petrenko, V.F., Colbeck, S.C., MP 3611, *Journal of applied physics,* May 1, 1995, 77(9), p.4518-4521, 17 refs.

Ice solid interface, Ice physics, Skis, Sliding, Metal ice friction, Metal snow friction, Charge transfer, Electric fields, Ice electrical properties

Strong electric fields up to $2x10^6$ V/m having potential up to 1.6 kV were generated in the gap between ice (or snow) and metallic and dielectric sliders, including alpine skis. Experimental data on the ice frictional electrification over wide ranges of sliding velocity and temperature are presented both for metal and dielectric sliders. Several possible physical mechanisms are discussed. The observed high magnitude of the potential difference V generated by friction between ice and sliders and the dependencies of V upon the slider velocity, ice conductivity, and temperature can be best explained in terms of high density electric charges picked up by a slider from the ice surface. The observed surface charge density corresponds to strong polarization of water molecules in the surface layer of ice. The phenomenon can play a significant role in forming a frictional force.

49-4511

Modelling the mean and turbulent structure of the summertime arctic cloudy boundary layer.

McInnes, K.L., Curry, J.A., *Boundary-layer meteorology,* Feb. 1995, 73(1-2), p.125-143, 27 refs.

Polar atmospheres, Atmospheric boundary layer, Cloud cover, Stratification, Radiation balance, Climatic factors, Mathematical models, Turbulence, Thermodynamics

49-4512

Turbulence intermittency in the atmospheric surface layer over snow-covered sites.

Lykossov, V.N., Wamser, C., *Boundary-layer meteorology,* Feb. 1995, 72(4), p.393-409, 26 refs.

Atmospheric boundary layer, Turbulent boundary layer, Turbulent flow, Snow air interface, Snow cover effect, Wind velocity, Blowing snow, Antarctica—Weddell Sea

Wind component fluctuations over antarctic pack ice have been decomposed into contributions of large and small-scale eddies to study turbulence structures in the atmospheric surface layer over snow-covered pack ice, for a case with snow drift and another without. It was found that on average, the large eddies contribute little to the covariance, but significantly to the variance of the horizontal wind components. The time variations of the turbulent kinetic energy and the friction velocity, determined by the small eddies, are suppressed when there is drifting snow. It was found that events with strong drag reduction during snow drift correspond to a strong increase of contributions from the first and third quadrant. However, strong drag reduction events in the case without snow drift are caused by a general decrease of contributions from all four quadrants. It was also found that interactions are significantly less correlated with ejections and sweeps in the case with snow drift than in the case without. (Auth. mod.)

49-4513

Summertime atmospheric circulation in the vicinity of a blue ice area in Queen Maud Land, Antarctica.

Van den Broeke, M.R., Bintanja, R., *Boundary-layer meteorology,* Feb. 1995, 72(4), p.411-438, 32 refs.

Glacier mass balance, Glacier ablation, Wind direction, Snow air interface, Blowing snow, Turbulent boundary layer, Atmospheric boundary layer, Atmospheric circulation, Antarctica—Queen Maud Land

The surface wind field is an important factor controlling the surface mass balance of Antarctica. This paper focuses on the observed atmospheric circulation during summer of an antarctic blue ice area in Queen Maud Land. Blue ice areas are characterized by a negative surface mass balance and hence provide an interesting location to study the influence of meteorological processes on large local mass balance gradients. Observations performed at the coastal stations Halley and Georg von Neumayer show the pronounced effects of synoptic forcing. The surface winds in the valley of the blue ice area fall into two distinct flow patterns, occurring with about equal frequency during the experiment. Flow type I is associated with cyclonic activity at the coast, resulting in strong easterly winds, precipitation and drifting snow. Flow characteristics inside and outside of the valley are similar during these conditions. Flow type II occurs when a high pressure system develops in the Weddell Sea, weakening the free atmosphere geostrophic winds. A local circulation is able to develop inside the valley of the blue ice area during these tranquil conditions. The transition from flow type II to flow type I is associated with front-like phenomena inside the valley. (Auth. mod.)

49-4514

Estimation of discharge from braided glacial rivers using ERS 1 synthetic aperture radar: first results.

Smith, L.C., Isacks, B.L., Forster, R.R., Bloom, A.L., Preuss, I., *Water resources research,* May 1995, 31(5), p.1325-1329, 27 refs.

Radar photography, Synthetic aperture radar, Glacial hydrology, Glacier mass balance, River flow, Flow rate, Runoff forecasting, Periodic variations

49-4515

Influence of an AFM tip on interfacial melting on ice.

Eastman, T., Zhu, D.M., *Journal of colloid and interface science,* June 15, 1995, 172(2), p.297-301, 30 refs.

Ice melting, Surface properties, Thermal analysis, Water films, Surface energy, Ice water interface, Lasers, Heating, Capillarity

49-4516

Spectroscopic evidence against nitric acid trihydrate in polar stratospheric clouds.

Toon, O.B., Tolbert, M.A., *Nature,* May 18, 1995, 375(6528), p.218-221, 30 refs.

Clouds (meteorology), Stratosphere, Atmospheric composition, Ozone

Heterogeneous reactions on polar stratospheric clouds (PSCs) play a key role in the photochemical mechanism thought to be responsible for ozone depletion in the Antarctic and the Arctic. Reactions on PSC particles activate chlorine to forms that are capable of photochemical ozone destruction, and sequester nitrogen oxides (NO_x) that would otherwise deactivate the chlorine. Although the heterogeneous chemistry is now well established, the composition of the clouds themselves is uncertain. It is commonly thought that they are composed of nitric acid trihydrate, although observations have left this question unresolved. Reanalyzed here are infrared spectra of type I PSCs obtained in Antarctica in Sep. 1987, using recently measured optical constants of the various compounds that might be present in PSCs. These PSCs were not composed of nitric acid trihydrate but instead had a more complex composition, perhaps that of a ternary solution. Because cloud formation is sensitive to composition, this finding will alter understanding of the locations and conditions in which PSCs form. In addition, the extent of ozone loss depends on the ability of the PSCs to remove NO_x permanently through sedimentation. The sedimentation rates depend on PSC particle size which in turn is controlled by the composition and formation mechanism. (Auth. mod.)

49-4517

Estimating the carrying capacity of flange joints operating at low-cycle loading and low temperatures. [Ob otsenke nesushcheĭ sposobnosti flantsevykh soedineniĭ, rabotaiushchikh pri malotsiklovom nagruzhenii i nizkikh temperaturakh]

Biriulev, V.V., Afanas'ev, S.D., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Apr. 1994, No.4, p.3-6, In Russian. 5 refs.

Joints (junctions), Cold weather operation, Bearing strength, Analysis (mathematics), Loads (forces)

49-4518

Calculating the thermal regime of the enclosures of unique buildings using the fractional step method. [Raschet temperaturnogo rezhima ograzhdaiushchikh konstruktsiĭ unikal'nykh sooruzheniĭ metodom drobnykh shagov]

Kochev, A.G., Makarevich, S.A., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Apr. 1994, No.4, p.61-62, In Russian. 2 refs.

Thermal regime, Analysis (mathematics), Cold weather operation, Walls, Windows, Buildings

49-4519

Moisture transfer mechanism during consolidation of freezing ground. [Mekhanizm vlagoperenosa pri konsolidatsii promerzaiushchikh gruntov]

Aksenov, B.G., Shuvaev, A.N., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Apr. 1994, No.4, p.67-70, In Russian. 3 refs.

Frozen ground compression, Moisture transfer, Soil water, Frozen ground mechanics, Seepage, Mathematical models, Deformation, Embankments, Roads, Frost heave, Permafrost beneath roads

49-4520

Natural situation and ecological direction of city designing and building in the Udokan region. [Prirodnaia situatsiia i ekologicheskaia napravlennost' gradostroitel'nogo formirovaniia Udokanskogo raĭona]

Shundrin, A.D., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo,* Apr. 1994, No.4, p.77-85, In Russian. 11 refs.

Urban planning, Environmental impact, Russia—Udokan Range

49-4521

Eem stable isotope record along the GRIP ice core and its interpretation.

Johnsen, S.J., Clausen, H.B., Dansgaard, W., Gundestrup, N.S., Hammer, C.U., Tauber, H., *Quaternary research,* Mar. 1995, 43(2), p.117-124, 39 refs.

Ice sheets, Ice cores, Isotope analysis, Stratigraphy, Profiles, Paleoclimatology, Climatic changes, Greenland

49-4522

Do Greenland ice cores reflect NW European interglacial climate variations?

Larsen, E., Sejrup, H.P., Johnsen, S.J., Knudsen, K.L., *Quaternary research,* Mar. 1995, 43(2), p.125-132, 45 refs.

Ice sheets, Paleoclimatology, Surface temperature, Climatic changes, Ice cores, Isotope analysis, Oxygen isotopes, Correlation, Greenland

49-4523

High-resolution paleotemperature proxy record for the last interglaciation based on Norwegian speleothems.

Lauritzen, S.I., *Quaternary research,* Mar. 1995, 43(2), p.133-146, 52 refs.

Paleoclimatology, Climatic changes, Subglacial drainage, Caves, Geochemistry, Radioactive age determination, Geochronology, Ice cores, Correlation, Norway

49-4524

Last interglaciation in northeast Siberia.

Lozhkin, A.V., Anderson, P.M., *Quaternary research,* Mar. 1995, 43(2), p.147-158, 16 refs.

Pleistocene, Paleoclimatology, Glaciation, Quaternary deposits, Paleobotany, Vegetation patterns, Russia—Siberia

49-4525

Emergent marine record and paleoclimate of the last interglaciation along the northwest Alaskan coast.

Brigham-Grette, J., Hopkins, D.M., *Quaternary research,* Mar. 1995, 43(2), p.159-173, 58 refs.

Marine deposits, Quaternary deposits, Paleoclimatology, Stratigraphy, Sea ice distribution, Radioactive age determination, Geochronology, Glacier oscillation, United States—Alaska

49-4526

Response of northern hemisphere extratropical climate and vegetation to orbitally induced changes in insolation during the last interglaciation.

Harrison, S.P., Kutzbach, J.E., Prentice, I.C., Behling, P.J., Sykes, M.T., *Quaternary research,* Mar. 1995, 43(2), p.174-184, 25 refs.

Paleoclimatology, Pleistocene, Climatic changes, Insolation, Paleoecology, Biomass, Sea ice distribution, Simulation

49-4527

Reflection of Scandinavian ice sheet fluctuations in Norwegian Sea sediments during the past 150,000 years.

Baumann, K.H., et al, *Quaternary research,* Mar. 1995, 43(2), p.185-197, 73 refs.

Ice sheets, Marine deposits, Glacier oscillation, Pleistocene, Ice rafting, Correlation, Isotope analysis, Radioactive age determination

49-4528

Fraction of ice depolarisation on satellite links in Ka band.

Jakoby, R., Rücker, F., Vanhoenacker, D., Vasseur, H., *Electronics letters,* Nov. 10, 1994, 30(23), p.1917-1918, 4 refs.

Telecommunication, Radio waves, Spacecraft, Polarization (waves), Wave propagation, Attenuation, Precipitation (meteorology), Ice crystal optics, Statistical analysis

49-4529

Influence of the vapor flux on temperature, density, and abundance distributions in a multicomponent, porous, icy body.

Benkhoff, J., Huebner, W.F., *Icarus,* Apr. 1995, 114(2), p.348-354, 18 refs.

Extraterrestrial ice, Porous materials, Ice sublimation, Ice physics, Vapor transfer, Turbulent exchange, Mathematical models, Ice vapor interface

49-4530

Mosaics of vegetation and soil salinity: a consequence of goose foraging in an arctic salt marsh.

Srivastava, D.S., Jefferies, R.L., *Canadian journal of botany,* Jan. 1995, 73(1), p.75-83, With French summary. 51 refs.

Plants (botany), Plant ecology, Biomass, Vegetation patterns, Soil water, Saline soils, Wetlands, Ecosystems, Canada—Manitoba—La Pérouse Bay

49-4531

Frost hardiness and winter photosynthesis of *Thuja plicata* and *Pseudotsuga menziesii* seedlings grown at three rates of nitrogen and phosphorus supply.

Hawkins, B.J., Davradou, M., Pier, D., Shortt, R., *Canadian journal of forest research,* Jan. 1995, 25(1), p.18-28, With French summary. 45 refs.

Forestry, Trees (plants), Frost resistance, Cold tolerance, Nutrient cycle, Plant ecology, Growth, Photosynthesis

49-4532

Patterns of foliar injury to red spruce on Whiteface Mountain, New York, during a high-injury winter.

Boyce, R.L., *Canadian journal of forest research,* Jan. 1995, 25(1), p.166-169, With French summary. 25 refs.

Trees (plants), Forestry, Plant tissues, Damage, Freezing, Frost resistance, Insolation, Temperature effects

49-4533

Development of an empirical model to predict the freezing point of ice cream mix.

Jaskulka, F.J., Smith, D.E., Larntz, K., *Milchwissenschaft,* 1995, 50(1), p.26-30, With German summary. 38 refs.

Frozen liquids, Colloids, Porous materials, Freezing points, Temperature variations, Forecasting, Physical properties, Mathematical models

49-4534

Epicuticular waxes of two arctic species: compositional differences in relation to winter snow cover.

Rieley, G., Welker, J.M., Callaghan, T.V., Eglinton, G., *Phytochemistry,* Jan. 1995, 38(1), p.45-52, 29 refs.

Forest ecosystems, Arctic landscapes, Plant tissues, Surface properties, Snow cover effect, Growth, Microclimatology, Plant physiology, Climatic changes, Norway—Svalbard

49-4535

Experimental and analytical investigation of ice formation from a circular water jet impinging on a horizontal cold surface.

Moallemi, M.K., Naraghi, M.N., *Journal of heat transfer,* Nov. 1994, 116(4), p.1016-1027, 20 refs.

Ice formation, Hydraulic jets, Water films, Heat transfer, Fluid dynamics, Liquid solid interfaces, Surface temperature, Ice forecasting, Mathematical models

49-4536

Prevent damage to gas turbines from ice ingestion.

Calvert, W., *Power,* Oct. 1994, 138(10), p.73-75.

Heating, Air conditioning, Icing, Ice prevention, Damage, Temperature control, Countermeasures

49-4537

DSC measurement of cell suspensions during successive freezing runs: implications for the mechanisms of intracellular ice formation.

Bryant, G., *Cryobiology,* Apr. 1995, 32(2), p.114-128, 45 refs.

Cryobiology, Solutions, Ice crystal growth, Temperature measurement, Temperature effects, Heterogeneous nucleation, Cooling rate

49-4538

Differential effects of growth temperature on ice nuclei active at different temperatures that are produced by cells of *Pseudomonas syringae*.

Gurian-Sherman, D., Lindow, S.E., *Cryobiology,* Apr. 1995, 32(2), p.129-138, 30 refs.

Bacteria, Ice formation, Ice nuclei, Cryobiology, Growth, Temperature effects, Heterogeneous nucleation

49-4539

1993/94 winter ice in German coastal regions between the Ems and the Oder. [Der Eiswinter 1993/94 im deutschen Küstengebiet zwischen Ems und Oder]

Strübing, K., *Deutsche Hydrographische Zeitschrift,* 1994, 46(2), p.177-182, In German. 4 refs.

Sea ice distribution, Seasonal variations, Shores, Ice cover thickness, Ice surveys, Baltic Sea, North Sea

49-4540

Effect of underwing frost on a transport aircraft airfoil at flight Reynolds number.

Bragg, M.B., Heinrich, D.C., Valarezo, W.O., McGhee, R.J., *Journal of aircraft,* Nov.-Dec. 1994, 31(6), p.1372-1379, 21 refs.

Aircraft icing, Ice accretion, Glaze, Wind tunnels, Ice air interface, Surface roughness, Simulation, Performance

49-4541

Ice accretion on aircraft wings with thermodynamic effects.

Tran, P., Brahimi, M.T., Paraschivoiu, I., Pueyo, A., Tezok, F., *Journal of aircraft,* Mar.-Apr. 1995, 32(2), p.444-446, 5 refs.

Aircraft icing, Ice accretion, Profiles, Simulation, Thermodynamics, Ice solid interface, Glaze, Ice forecasting

49-4542

Assessment of frost damage to leafless stem tissues of *Quercus petraea*: a reappraisal of the method of relative conductivity.

Deans, J.D., Billington, H.L., Harvey, F.J., *Forestry,* 1995, 68(1), p.25-34, 22 refs.

Trees (plants), Damage, Frost resistance, Cold weather tests, Electrical measurement, Plant tissues, Accuracy, Plant ecology

49-4543

Computations on frost damage to Scots pine under climatic warming in boreal conditions.

Kellomäki, S., Hänninen, H., Kolström, M., *Ecological applications,* Feb. 1995, 5(1), p.42-52, 38 refs.

Forest ecosystems, Trees (plants), Frost, Damage, Phenology, Climatic changes, Global warming, Simulation

49-4544

Hydroclimatic variability in the Rocky Mountain region.

Changnon, D., McKee, T.B., Doesken, N.J., *Colorado State University. Department of Atmospheric Science. Paper,* Dec. 1990, No.475, Climatology report, No.90-3, 225p., WDCA 93000231, Refs. p.171-177.

Snow surveys, Snowfall, Snow cover distribution, Snow water equivalent, Snow hydrology, Snowmelt, Stream flow, Runoff forecasting, Watersheds, Statistical analysis, United States—Rocky Mountains

49-4545

Goals and priorities to guide United States arctic research. Biennial statement.

U.S. Arctic Research Commission, Arlington, VA, Jan. 1995, 34p., 13 refs.

Research projects, Regional planning, International cooperation, Oceanographic surveys, Polar atmospheres, Environmental protection, Cost analysis

49-4546

Final report.

Polar Research Program Strategies Workshop, Reston, VA, Nov. 12-13, 1991, Williams, R.S., Jr., ed, *U.S. Geological Survey. Open-file report,* May 1995, No.95-247, 72p., Abstracts only. 22 refs.

Research projects, Polar atmospheres, Climatic changes, Paleoclimatology, Glacial geology, Marine geology, Glacier surveys, Ice surveys, Permafrost, Geological surveys, Exploration

49-4547

Biological implications of global change: northern perspectives.

Riewe, R., ed, Oakes, J., ed, Edmonton, University of Alberta, Canadian Circumpolar Institute, 1994, 114p., Refs. passim. Presented at a workshop sponsored by the Royal Society of Canada, Global Change Program, and the Association of Canadian Universities for Northern Studies Oct. 22-23, 1992. For selected papers see 49-4548 through 49-4553.

Global warming, Plant ecology, Vegetation patterns, Phenology, Forest ecosystems, Forest lines, Forest tundra

49-4548

Climatic implications of global warming for the boreal and subarctic regions of western Canada.

Wheaton, E., Wittrock, V., Biological implications of global change: northern perspectives. Edited by R. Riewe and J. Oakes, Edmonton, University of Alberta, Canadian Circumpolar Institute, 1994, p.9-14, 17 refs.

Global warming, Forest lines, Forest ecosystems, Vegetation patterns, Plant ecology, Phenology, Agriculture, Canada

49-4549

Potential impacts of a CO_2-induced climate change on hydro-generation capacity of several river basins in northern Quebec.

Singh, B., Trudel, P.D., Biological implications of global change: northern perspectives. Edited by R. Riewe and J. Oakes, Edmonton, University of Alberta, Canadian Circumpolar Institute, 1994, p.15-24, 45 refs.

Global warming, River basins, River flow, Stream flow, Water reserves, Water balance, Hydrologic cycle, Electric power, Canada—Quebec

49-4550

Post Little Ice Age warming and the western Canadian boreal forest: an analogue for future climate change?

MacDonald, G., Larsen, C., Szeicz, J.M., Dale, K., Biological implications of global change: northern perspectives. Edited by R. Riewe and J. Oakes, Edmonton, University of Alberta, Canadian Circumpolar Institute, 1994, p.25-35, 46 refs.

Paleoclimatology, Paleobotany, Plant ecology, Vegetation patterns, Forest lines, Forest ecosystems, Forest tundra, Phenology, Forest fires, Global warming, Canada

49-4551

Canadian arctic realm and global change.

Svoboda, J., Biological implications of global change: northern perspectives. Edited by R. Riewe and J. Oakes, Edmonton, University of Alberta, Canadian Circumpolar Institute, 1994, p.37-47, 49 refs.

Tundra, Plant ecology, Paleobotany, Phenology, Vegetation patterns, Nutrient cycle, Snow cover effect, Snow line, Permafrost distribution, Global warming, Canada

49-4552

Wildfire as a force in global climate change.

Wein, R., Landhäusser, S., Biological implications of global change: northern perspectives. Edited by R. Riewe and J. Oakes, Edmonton, University of Alberta, Canadian Circumpolar Institute, 1994, p.55-60, 21 refs.

Forest fires, Taiga, Plant ecology, Forest ecosystems, Vegetation patterns, Forest lines, Forest tundra, Nutrient cycle, Global warming

49-4553

Arctic insects and global change.

Ring, R.A., Biological implications of global change: northern perspectives. Edited by R. Riewe and J. Oakes, Edmonton, University of Alberta, Canadian Circumpolar Institute, 1994, p.61-66, 22 refs.

Ecology, Cryobiology, Acclimatization, Phenology, Biogeography, Global warming

49-4554

Improvements to an SST climatology using COADS.

Shea, D.J., Trenberth, K.E., Reynolds, R.W., International COADS (Comprehensive Ocean-Atmosphere Data Set) Workshop, Boulder, CO, Jan. 13-15, 1992. Proceedings, Boulder, CO, National Oceanic and Atmospheric Administration, Environmental Research Laboratories, Climate Monitoring and Diagnostics Laboratory, 1992, p.245-252, WDCA 93000134, 11 refs.

Air ice water interaction, Ice cover effect, Surface temperature, Water temperature, Marine atmospheres, Atmospheric circulation, Data processing

49-4555

Geologic studies in Alaska by the U.S. Geological Survey, 1992.

Dusel-Bacon, C., Till, A.B., *U.S. Geological Survey. Bulletin,* 1993, No.2068, 250p., Refs. passim. For selected papers see 49-4556 through 49-4566.

DLC QE75.B9 No.2068 1992

Exploration, Geological surveys, Geochemistry, Geologic structures, Stratigraphy, Lithology, Minerals, Natural resources, United States—Alaska

49-4556

Late Holocene longitudinal and parabolic dunes in northern Alaska: preliminary interpretations of age and paleoclimatic significance.

Galloway, J.P., Carter, L.D., *U.S. Geological Survey. Bulletin,* 1993, No.2068, Geologic studies in Alaska by the U.S. Geological Survey, 1992. Edited by C. Dusel-Bacon and A.B. Till, p.3-11, 16 refs.

Eolian soils, Sands, Quaternary deposits, Soil dating, Soil erosion, Wind erosion, Paleoclimatology, United States—Alaska—North Slope

49-4557

Depositional sequences in Lower Cretaceous rocks, Atigun syncline and Slope Mountain areas, Alaskan North Slope.

Schenk, C.J., Bird, K.J., *U.S. Geological Survey. Bulletin,* 1993, No.2068, Geologic studies in Alaska by the U.S. Geological Survey, 1992. Edited by C. Dusel-Bacon and A.B. Till, p.48-58, 47 refs.

Exploration, Geological surveys, Geologic structures, Stratigraphy, Hydrocarbons, Natural resources, United States—Alaska—North Slope

49-4558

Favorable areas for metallic mineral resources in and near the Horn Mountains, Sleetmute quadrangle, southwestern Alaska.

Gray, J.E., Theodorakos, P.M., Bradley, L.A., Bullock, J.H., Jr., *U.S. Geological Survey. Bulletin,* 1993, No.2068, Geologic studies in Alaska by the U.S. Geological Survey, 1992. Edited by C. Dusel-Bacon and A.B. Till, p.79-90, 37 refs.

Exploration, Geological surveys, Minerals, Geochemistry, Hydrogeochemistry, Natural resources, United States—Alaska—Horn Mountains

49-4559

Gold and cinnabar in heavy-mineral concentrates from stream-sediment samples collected from the western half of the Lime Hills 1° X 3° quadrangle, Alaska.

Eppinger, R.G., *U.S. Geological Survey. Bulletin,* 1993, No.2068, Geologic studies in Alaska by the U.S. Geological Survey, 1992. Edited by C. Dusel-Bacon and A.B. Till, p.91-100, 37 refs.

Exploration, Geological surveys, Gold, Minerals, Streams, Alluvium, Bottom sediment, Geochemistry, Hydrogeochemistry, Natural resources, United States—Alaska—Alaska Range

49-4560

Early Cenozoic depositional systems, Wishbone Hill district, Matanuska coal field, Alaska.

Flores, R.M., Stricker, G.D., *U.S. Geological Survey. Bulletin,* 1993, No.2068, Geologic studies in Alaska by the U.S. Geological Survey, 1992. Edited by C. Dusel-Bacon and A.B. Till, p.101-117, 30 refs.

Exploration, Geological surveys, Coal, Stratigraphy, Alluvium, Natural resources, United States—Alaska—Matanuska Valley

49-4561

Reservoir framework architecture in the Clamgulchian type section (Pliocene) of the Sterling Formation, Kenai Peninsula, Alaska.

Flores, R.M., Stricker, G.D., *U.S. Geological Survey. Bulletin,* 1993, No.2068, Geologic studies in Alaska by the U.S. Geological Survey, 1992. Edited by C. Dusel-Bacon and A.B. Till, p.118-129, 20 refs.

Exploration, Geological surveys, Geologic structures, Stratigraphy, Lithology, Coal, Natural gas, Natural resources, United States—Alaska—Kenai Peninsula

49-4562

Structural evolution of the Chugach-Prince William terrane at the hinge of the orocline in Prince William Sound, and implications for ore deposits.

Haeussler, P.J., Nelson, S.W., *U.S. Geological Survey. Bulletin,* 1993, No.2068, Geologic studies in Alaska by the U.S. Geological Survey, 1992. Edited by C. Dusel-Bacon and A.B. Till, p.143-162, 43 refs.

Exploration, Geological surveys, Geologic structures, Geomorphology, Geochronology, Lithology, Minerals, Natural resources, United States—Alaska—Prince William Sound

49-4563

Geochemical evaluation of stream-sediment data from the Bering Glacier and Icy Bay quadrangles, south-central Alaska.

Goldfarb, R.J., Borden, J.C., *U.S. Geological Survey. Bulletin,* 1993, No.2068, Geologic studies in Alaska by the U.S. Geological Survey, 1992. Edited by C. Dusel-Bacon and A.B. Till, p.178-186, 32 refs.

Exploration, Geological surveys, Minerals, Streams, Alluvium, Bottom sediment, Geochemistry, Hydrogeochemistry, Natural resources, United States—Alaska—Chugach Mountains

49-4564

Newly discovered molybdenite occurrences at Dora Bay, Prince of Wales Island, southeast Alaska, and preliminary scanning electron microscope studies.

Philpotts, J., Taylor, C., Evans, J., Emsbo, P., *U.S. Geological Survey. Bulletin,* 1993, No.2068, Geologic studies in Alaska by the U.S. Geological Survey, 1992. Edited by C. Dusel-Bacon and A.B. Till, p.187-196, 11 refs.

Exploration, Geological surveys, Minerals, Lithology, Geochemistry, Natural resources, Scanning electron microscopy, United States—Alaska—Prince of Wales Island

49-4565

Ostracode assemblages from modern bottom sediments of Vitus Lake, Bering piedmont glacier, southeast Alaska.

Brouwers, E.M., Forester, R.M., *U.S. Geological Survey. Bulletin,* 1993, No.2068, Geologic studies in Alaska by the U.S. Geological Survey, 1992. Edited by C. Dusel-Bacon and A.B. Till, p.228-235, 10 refs.

Glacier oscillation, Glacial lakes, Meltwater, Outwash, Lacustrine deposits, Bottom sediment, Marine biology, Marine geology, United States—Alaska—Bering Glacier

49-4566

Rubidium-strontium isotopic systematics of vein minerals in the Juneau gold belt, Alaska.

Kistler, R.W., Newberry, R.J., Brew, D.A., *U.S. Geological Survey. Bulletin,* 1993, No.2068, Geologic studies in Alaska by the U.S. Geological Survey, 1992. Edited by C. Dusel-Bacon and A.B. Till, p.236-240, 13 refs.

Exploration, Geological surveys, Geochemistry, Minerals, Gold, Soil dating, Geochronology, Isotope analysis, United States—Alaska—Juneau

49-4567

Frequent outburst floods from South Tahoma Glacier, Mount Rainier, U.S.A.: relation to debris flow, meteorological origin and implications for subglacial hydrology.

Walder, J.S., Driedger, C.L., *Journal of glaciology,* 1995, 41(137), p.1-10, 24 refs.

Glacial hydrology, Sediment transport, Flooding, Glacier beds, Subglacial drainage, Hydrography, Water storage, Meteorological factors, United States—Washington

49-4568

Phase-changing dry snowpack model.

Gray, J.M.N.T., Morland, L.W., Morris, E.M., *Journal of glaciology,* 1995, 41(137), p.11-29, 31 refs.

Snow physics, Snow cover stability, Phase transformations, Surface temperature, Temperature variations, Porosity, Ice air interface, Vapor transfer, Mathematical models

49-4569

Physical environment of drumlin formation.

Patterson, C.J., Hooke, R.L., *Journal of glaciology,* 1995, 41(137), p.30-38, 97 refs.

Glacial geology, Glacial deposits, Geomorphology, Glacier flow, Topographic features, Landforms, Lithology

49-4570

Resolving the Younger Dryas event through borehole thermometry.

Firestone, J., *Journal of glaciology,* 1995, 41(137), p.39-50, 21 refs.

Pleistocene, Paleoclimatology, Ice sheets, Surface temperature, Ice cores, Boreholes, Temperature measurement, Isotope analysis, Heat flux, Greenland

49-4571

Variations in snowpack melt on the Greenland ice sheet based on passive-microwave measurements.

Mote, T.L., Anderson, M.R., *Journal of glaciology,* 1995, 41(137), p.51-60, 31 refs.

Ice sheets, Glacier melting, Snowmelt, Snow cover structure, Brightness, Seasonal variations, Remote sensing, Radiometry, Climatic changes, Simulation, Greenland

49-4572

Monthly balance and water discharge of an intertropical glacier: Zongo Glacier, Cordillera Real, Bolivia, 16°S.

Francou, B., Ribstein, P., Saravia, R., Tiriau, E., *Journal of glaciology,* 1995, 41(137), p.61-67, 18 refs.

Glacier mass balance, Glacier oscillation, Glacier melting, Glacial hydrology, Mountain glaciers, Climatic factors, Seasonal variations, Bolivia

49-4573

Short-pulse radar wavelet recovery and resolution of dielectric contrasts within englacial and basal and ice of Matanuska Glacier, Alaska, U.S.A.

Arcone, S.A., Lawson, D.E., Delaney, A.J., MP 3613, *Journal of glaciology,* 1995, 41(137), p.68-86, 53 refs.

Glacier surveys, Ice structure, Radar echoes, Profiles, Dielectric properties, Wave propagation, Reflectivity, Ice water interface, United States—Alaska

Wavelets transmitted by short-pulse radar are recovered from continuous profiles and used to determine interfacial dielectric contrasts within the englacial and basal ice at the terminus area of Matanuska Glacier, Alaska. The field studies were in the ablation region, where radar horizons could at some point be identified with interfaces between clear ice and air, water or basal ice, and were performed in early spring before drainage fully developed. The profiles used closely spaced antennas with bandwidths centered near 50 and 400 MHz. Transmitted wavelets reflected from interfaces of known dielectric contrasts are used to establish a phase reference for other events from interfaces between unknown contrasts. Migration and Fourier-transform filtering are then applied to the profiles and shown to recover these wavelets from diffractions and reflections. Interfacial dielectric contrasts are determined from the relative phase of the wavelets.

49-4574

"Faint young Sun paradox": further exploration of the role of dynamical heat-flux feed backs in maintaining global climate stability.

Molnar, G.I., Gutowski, W.J., Jr., *Journal of glaciology,* 1995, 41(137), p.87-90, 22 refs.

Paleoclimatology, Pleistocene, Glaciation, Sea ice distribution, Ice air interface, Heat flux, Simulation, Insolation, Climatic changes

49-4575

Fully three-dimensional finite-element model applied to velocities on Storglaciären, Sweden.

Hanson, B., *Journal of glaciology,* 1995, 41(137), p.91-102, 25 refs.

Glacier flow, Ice mechanics, Mathematical models, Simulation, Velocity measurement, Internal friction, Stress concentration, Sweden

49-4576

Characterization and flexural strength of iceberg and glacier ice.

Gagnon, R.E., Gammon, P.H., *Journal of glaciology,* 1995, 41(137), p.103-111, 5 refs.

Icebergs, Glacier ice, Ice mechanics, Ice strength, Flexural strength, Mechanical tests, Strain tests, Temperature effects

49-4577

Hydraulic properties of subglacial sediment determined from the mechanical response of water-filled boreholes.

Waddington, B.S., Clarke, G.K.C., *Journal of glaciology,* 1995, 41(137), p.112-124, 39 refs.

Glacier flow, Ice mechanics, Hydraulics, Glacial hydrology, Boreholes, Freezing, Glacier beds, Ice deformation, Water pressure, Mathematical models

49-4578

Method for determining the average height of a large topographic ice sheet from observations of the echo received by a satellite altimeter.

Wingham, D.J., *Journal of glaciology,* 1995, 41(137), p.125-141, 13 refs.

Ice sheets, Topographic surveys, Topographic features, Height finding, Radar echoes, Scattering, Analysis (mathematics)

49-4579

Positive degree-day factors for ablation on the Greenland ice sheet studied by energy-balance modelling.

Braithwaite, R.J., *Journal of glaciology,* 1995, 41(137), p.153-160, 43 refs.

Ice sheets, Glacier ablation, Glacier melting, Degree days, Heat balance, Mathematical models, Albedo, Correlation, Greenland

49-4580

Response of valley glaciers to climate change and kinematic waves: a study with a numerical ice-flow model.

Van de Wal, R.S.W., Oerlemans, J., *Journal of glaciology,* 1995, 41(137), p.142-152, 20 refs.

Glacier flow, Glacier mass balance, Ice mechanics, Shear stress, Glacier thickness, Wave propagation, Velocity measurement, Climatic changes, Mathematical models

49-4581

Derived bedrock elevations, strain rates and stresses from measured surface elevations and velocities, Jakobshavns Isbræ, Greenland.

Fastook, J.L., Brecher, H.H., Hughes, T.J., *Journal of glaciology,* 1995, 41(137), p.161-173, 17 refs.

Glacier surveys, Glacier flow, Velocity measurement, Photogrammetry, Topographic features, Bedrock, Strains, Mathematical models, Basal sliding, Greenland

49-4582

Variations of ablation, albedo and energy balance at the margin of the Greenland ice sheet, Kronprins Christian Land, eastern north Greenland.

Konzelmann, T., Braithwaite, R.J., *Journal of glaciology,* 1995, 41(137), p.174-182, 31 refs.

Ice sheets, Glacier surveys, Glacier mass balance, Glacier ablation, Albedo, Radiation balance, Heat balance, Ice heat flux, Greenland

49-4583

Spatial variability of snow resistance on potential avalanche slopes.

Birkeland, K.W., Hansen, K.J., Brown, R.L., *Journal of glaciology,* 1995, 41(137), p.183-190, 28 refs.

Avalanche mechanics, Snow cover stability, Snow strength, Snow depth, Slope stability, Topographic effects

49-4584

Recession of Yanamarey Glacier in Cordillera Blanca, Peru, during the 20th century.

Hastenrath, S., Ames, A., *Journal of glaciology,* 1995, 41(137), p.191-196, 20 refs.

Mountain glaciers, Glacier ablation, Glacier oscillation, Periodic variations, Glacier surveys, Mapping, Glacier mass balance, Correlation, Peru

49-4585

Mapping c-axis fabrics to study physical processes in ice.

Alley, R.B., Gow, A.J., Meese, D.A., MP 3612, *Journal of glaciology,* 1995, 41(137), p.197-203, 27 refs.

Glacier ice, Sampling, Grain size, Ice crystal structure, Orientation, Ice deformation, Ice mechanics, Thin sections, Antarctica—Byrd Station

Mapping the spatial distribution of c-axis orientations in ice thin sections is not much more difficult than preparing c-axis scatter plots but can reveal additional information about processes responsible for the observed fabric and texture of the ice. Distributions of angles between c-axes of neighboring grains from the Byrd Station (West Antarctica) ice core suggest that polygonization causes average grain-size to stabilize below 400 m depth. (Auth.)

49-4586

Why calculated basal drags of ice streams can be fallacious.

Lliboutry, L.A., Whillans, I.M., Van der Veen, K., *Journal of glaciology,* 1995, 41(137), p.204-205, 3 refs. Includes reply. For paper under discussion see 48-3569 or 22F-50197.

Glacier ice, Glacier flow, Glacier beds, Ice friction, Shear stress

This letter and reply discuss basal drag mechanics within antarctic ice streams, and focuses on imputed inaccuracies in a previous paper.

49-4587

Analysis of satellite-altimeter height measurements above continental ice sheets.

Bamber, J.L., *Journal of glaciology,* 1995, 41(137), p.206-207, 3 refs. For paper under discussion see 48-3585.

Ice sheets, Remote sensing, Radar echoes, Height finding, Accuracy, Data processing

49-4588

Surging advance of Bering Glacier, Alaska, U.S.A.: a progress report.

Fleisher, P.J., et al, *Journal of glaciology,* 1995, 41(137), p.207-213, 10 refs.

Glacier flow, Glacier oscillation, Glacier surges, Alpine glaciation, Glacier surveys, Seasonal variations, United States—Alaska—Bering Glacier

49-4589

Theoretical model of atmospheric ozone depletion.

Midya, S.K., Jana, P.K., Lahiri, T., *Earth, moon, and planets,* 1995, 66(3), p.279-284, 4 refs.

Atmospheric composition, Ozone, Models, Antarctica—Halley Bay

A critical study on different ozone depletion and formation processes has been made and the following important results are obtained: from analysis it is shown that O_3 concentration will decrease very minutely with time for normal atmosphere when [O], $[O_2]$ and UV-radiation remain constant; an empirical equation is established theoretically between the variation of ozone concentration and time; and special ozone depletion processes are responsible for the dramatic decrease of O_3 concentration over Antarctica. (Auth.)

49-4590

Application of plane waves for accurate measurement of microwave scattering from geophysical surfaces.

Gogineni, S.P., Jezek, K.C., Peters, L., Jr., Young, J.D., Beaven, S.G., Nassar, E.M., *IEEE transactions on geoscience and remote sensing,* May 1995, 33(3), p.627-633, 17 refs.

Sea ice, Remote sensing, Microwaves, Radar echoes, Ice optics, Scattering, Wave propagation, Simulation, Antennas

49-4591

Comparison of retracking algorithms using airborne radar and laser altimeter measurements of the Greenland ice sheet.

Ferraro, E.J., Swift, C.T., *IEEE transactions on geoscience and remote sensing,* May 1995, 33(3), p.700-707, 17 refs.

Ice sheets, Geophysical surveys, Airborne radar, Radar echoes, Lasers, Height finding, Correlation, Data processing, Scattering, Accuracy, Greenland

49-4592

Application of neural networks for sea ice classification in polarimetric SAR images.

Hara, Y., Atkins, R.G., Shin, R.T., Kong, J.A., Yueh, S.H., Kwok, R., *IEEE transactions on geoscience and remote sensing,* May 1995, 33(3), p.740-748, 18 refs.

Sea ice, Ice conditions, Remote sensing, Classifications, Radar photography, Synthetic aperture radar, Image processing, Data processing, Statistical analysis

49-4593

Automated arctic forecasting.

Valenti, M., *Mechanical engineering,* Oct. 1994, 116(10), p.18.

Telemetering equipment, Weather forecasting, Oceanography, Floating structures, Monitors, Meteorological data, Climatology, Arctic Ocean

49-4594

First data on trace metal level and behaviour in two major arctic river-estuarine systems (Ob and Yenisey) and in the adjacent Kara Sea, Russia.

Dai, M.H., Martin, J.M., *Earth and planetary science letters,* Apr. 1995, 131(3-4), p.127-141, 48 refs.

Oceanography, Estuaries, Geochemistry, Sampling, Water chemistry, Metals, Suspended sediments, Colloids, Turbulent diffusion, Environmental tests, Russia—Kara Sea, Russia—Ob' River

49-4595

Crystal size variations in Eemian-age ice from the GRIP ice core, central Greenland.

Thorsteinsson, T., Kipfstuhl, J., Eicken, H., Johnsen, S.J., Fuhrer, K., *Earth and planetary science letters,* Apr. 1995, 131(3-4), p.381-394, 40 refs.

Ice sheets, Ice cores, Impurities, Pleistocene, Ice crystal size, Recrystallization, Isotope analysis, Paleoclimatology, Greenland

49-4596

Acoustic monitoring of the Arctic Ocean: numerical modeling.

Gavrilov, A.N., Kriazhev, F.I., Kudriashov, V.M., *Acoustical physics,* Sep.-Oct. 1994, 40(5), p.761-762, Translated from Akusticheskiĭ zhurnal. 3 refs.

Oceanography, Water temperature, Sea ice distribution, Underwater acoustics, Wave propagation, Attenuation, Ice cover effect, Mathematical models, Arctic Ocean

49-4597

AC flashover performance of insulators covered with artificial ice.

Farzaneh, M., Drapeau, J.F., *IEEE transactions on power delivery,* Apr. 1995, 10(2), p.1038-1046, 25 refs.

Power lines, Transmission lines, Precipitation (meteorology), Ice accretion, Wet snow, Electrical resistivity, Ice cover effect, Charge transfer

49-4598

Enantioselective adsorption of the D- and L-forms of an α-helical antifreeze polypeptide to the {2021} planes of ice.

Laursen, R.A., Wen, D.Y., Knight, C.A., *American Chemical Society. Journal,* Dec. 28, 1994, 116(26), p.12057-12058, 17 refs.

Marine biology, Cryobiology, Antifreezes, Ice physics, Adsorption, Molecular structure, Orientation

49-4599

Data of sea-ice cores obtained in Lützow-Holm Bay from 1990 to 1992 (JARE-31, -32) in the period of Japanese Antarctic Climate Research.

Kawamura, T., Takizawa, T., Ohshima, K.I., Ushio, S., *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1995, No.204, 42p.

Sea ice, Ice cores, Snow depth, Ice cover thickness, Ice composition, Antarctica—Lützow-Holm Bay

As part of the Japanese Antarctic Climate Research (ACR) Program, a two-year study of atmosphere/sea-ice/ocean interaction was conducted off Queen Maud Land and Enderby Land by JARE-31 and JARE-32. Research on the distribution of snow depth and sea-ice thickness and on the growth process of sea ice was done in Lützow-Holm Bay. This report presents data of sea-ice core samples studied.

49-4600

Glaciological data collected by the 34th Japanese Antarctic Research Expedition in 1993.

Motoyama, H., Enomoto, H., Miyahara, M., Koike, J., *Japanese Antarctic Research Expedition. JARE data reports,* Jan. 1995, No.202, 42p., Refs. passim.

Traverses, Snow accumulation, Meteorological data, Meteorological instruments, Antarctica—Showa Station, Antarctica—Mizuho Station

This report presents an outline of field observations carried out by JARE-34 in 1993. Data on net snow accumulation and surface meteorological data, obtained during oversnow traverses from Showa to Dome Fuji Station and at Mizuho Station, are discussed and presented in tables.

49-4601

Glaciological data collected by the 30th, 31st and 32nd Japanese antarctic research expeditions in 1989-1991.

Fujii, Y., Motoyama, H., Azuma, N., *Japanese Antarctic Research Expedition. JARE data reports,* Jan. 1995, No.201, 89p., Refs. passim.

Traverses, Ice cores, Snow accumulation, Glacier flow, Ice surface, Mapping, Meteorological data, Ice sheets, Antarctica—Mizuho Station, Antarctica—Asuka Station, Antarctica—Showa Station

This report presents an outline of the glaciological field work of 1989-1991 by JARE-30, 31 and 32. Data on net snow accumulation at Mizuho and Asuka Stations, surface meteorologica data obtained during oversnow traverses, and aerophotographic courses along the ice sheet margin near Showa are discussed and presented in tables.

49-4602

Territorial waters in the Arctic: the Soviet position.

Olenicoff, S.M., *Rand Corporation. Report,* July 1972, R-907-ARPA, 52p., ARPA Order no.: 189-1, Prepared for the Advanced Research Projects Agency. Refs. p.44-52.

Legislation, International cooperation, History, Russia, Northern Sea Route

49-4603

Basis for basic parameters of a cross section of industrial highways for regions in the Far North and permafrost zones. [Obosnovanie osnovnykh parametrov poperechnogo profilia promyshlennykh avtomobil'nykh dorog dlia raĭonov Kraĭnego Severa i zony vechnoĭ merzloty]

Davydov, V.A., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* Feb. 1995, No.2, p.100-105, In Russian. 15 refs.

Roads, Roadbeds, Permafrost beneath roads, Cold weather construction, Russia—Far North

49-4604

Operating life of a steel lining for strengthening emergency bridge supports. [Ekspluatatsionnyĭ resurs stal'noĭ obdelki dlia usileniia avariĭnykh opor mostov]

Kostelianets, B.A., Kartopol'tsev, V.M., Koneva, N.A., Kozlov, E.V., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* Feb. 1995, No.2, p.105-108, In Russian. 5 refs.

Cold weather performance, Corrosion, Linings, Supports, Metal ice friction, Bridges

49-4605

Ecological problems in the suburbs of Novosibirsk. [Ekologicheskie problemy prigorodnoĭ zony g. Novosibirska]

Biriuleva, I.V., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* Feb. 1995, No.2, p.129-132, In Russian. 3 refs.

Ecology, Environmental impact, Urban planning, Russia—Novosibirsk

49-4606

Volcanic signatures in long-term ozone records.

Roldugin, V.C., Henriksen, K., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.27-35, 15 refs.

DLC QC879.7.A879 1993

Volcanoes, Ozone, Polar atmospheres, Russia

Some major volcanic eruptions have a dramatic influence on the global ozone layer. The effect has to be included when trends are evaluated for limited periods, 10-20 years. In this study the influence of the eruptions of El Chichon is studied, and depleting effects of the eruptions of Mt. Agung and Mt. Pinatubo are identified. Reference to the antarctic ozone hole in this paper is found in the introduction, where some literature linking ozone depletion to the anthropogenic releases of CFC gases is briefly discussed.

49-4607

Variations in the Dobson total ozone data from Reykjavík.

Bjarnason, G.G., Rögnvaldsson, Ö.E., Sigfússon, T.I., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.42-55, 22 refs.

DLC QC879.7.A879 1993

Ozone, Polar atmospheres, Mathematical models, Statistical analysis, Seasonal variations, Iceland—Reykjavík

49-4608

Variations in the stratospheric ozone in the Scandinavian sector of the Arctic during the AASE campaign and 1989.

Henriksen, K., Larsen, S.H.H., Shumilov, O.I., Thorkelsson, B., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.56-61, 17 refs.

DLC QC879.7.A879 1993

Ozone, Polar atmospheres, Stratosphere, Polar stratospheric clouds, Norway—Tromsø, Norway—Oslo, Russia—St. Petersburg, Russia—Murmansk, Finland—Sodankylä, Russia—Heiss Island, Russia—Franz Josef Land

49-4609

Comparison of stratospheric ozone variations in Arctic and Antarctic during solar proton events.

Kasatkina, E.A., Shumilov, O.I., Raspopov, O.M., Henriksen, K., Fisher, S., Slusser, J., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.70-82, 24 refs.

DLC QC879.7.A879 1993

Ozone, Stratosphere, Solar activity, Polar atmospheres

The influence of solar protons of the ground level event (GLE) type on stratospheric ozone was investigated. The asymmetry of ozone's so-called mini-holes, caused by GLEs between the arctic and antarctic polar caps (N/S asymmetry), is discussed in terms of their spatial variations and possible mechanisms. Based on balloon measurements and ground-based ozone data obtained from arctic and antarctic observatories, the GLEs occurring on the following dates were considered: Sep. 29, 1989; Oct. 19, 1989; Oct. 24, 1989; and May 21-28, 1990. In the light of the study's results, the hypothesis is proposed that solar protons trigger aerosol acceleration and the creation of polar stratospheric clouds. (Auth. mod.)

49-4610

Ozone variations in the stratosphere due to gravity waves in stratified shear flows.

Erukhimova, T.L., Trakhtengerts, V.IU., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.83-91, 12 refs.

DLC QC879.7.A879 1993

Ozone, Stratosphere, Polar atmospheres, Shear flow, Analysis (mathematics), Velocity

49-4611

Ice radiance method for BUV instrument monitoring.

Jaross, G., Krueger, A., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.94-101, 5 refs.

DLC QC879.7.A879 1993

Radiance, Ice optics, Backscattering, Mathematical models, Accuracy, Radiation measuring instruments, Ultraviolet radiation, Ice models, Ozone, Polar atmospheres, Greenland, Antarctica

The radiance of large ice-covered land masses has been used to monitor TOMS instrument sensitivities. Greenland and Antarctica provide uniform and stable ice surfaces whose average albedo appears to be constant within the desired accuracy for instrument monitoring. Instrument radiance response will depend upon view and illumination angles, the sun-earth distance, and atmospheric conditions. Restriction to nadir views eliminates view angle dependence, and corrections are made for sun-earth distance. The effect of atmospheric conditions, such as ozone and clouds, is minimized by monitoring at wavelengths above 340 nm and by the high surface radiance. Relative instrument response is determined by the ratio of signals measured at different times using a binning technique to account for differences in solar illumination angles. (Auth. mod.)

49-4612

TOMS profile shape error estimates at high latitude.

Wellemeyer, C.G., Taylor, S.L., Seftor, C.J., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.102-109, 12 refs.

DLC QC879.7.A879 1993

Ozone, Polar atmospheres, Backscattering, Radiance, Accuracy, Radiation measuring instruments

49-4613

Decline in polar stratospheric ozone as observed by NOAA infrared sounders.

Neuendorffer, A., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.110-121.

DLC QC879.7.A879 1993

Ozone, Polar atmospheres, Stratosphere, Infrared mapping, Antarctica—Amundsen-Scott Station, Antarctica—Showa Station, Antarctica—Marambio Station

The impact of chlorofluorocarbon (CFC) release on the earth's ozone shield is becoming more evident with every passing year. It is imperative that the long-term continuous monitoring of this environmental global experiment proceed by every means possible. The National Oceanic and Atmospheric Administration (NOAA) has 14 years of TIROS Operational Vertical Sounder (TOVS) earth radiation data that include ozone-sensitive 9.7 micron information. The 9.7 micron IR channel was selected specifically to permit NOAA's operational polar orbiting weather satellites to monitor total column ozone. Relatively accurate physically derived TOVS infrared global ozone maps are now available in real time. What these IR TOVS synoptic total column ozone maps lack in precision and resolution they make up for in longevity, night capability and full pole-to-pole coverage. The current 14 year sequence of daily TOVS ozone maps from Feb. 1979 to May 1993 covers a period of unprecedented decline in the earth's ozone shield. Recent antarctic ozone holes are developing earlier, growing larger and lasting longer than ever before. (Auth. mod.)

49-4614

Mapping Antarctic ozone from visible-channel data.

Boime, R.D., Warren, S.G., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.122-131, 9 refs.

DLC QC879.7.A879 1993

Ozone, Polar atmospheres, Mapping, Radiometry, Albedo, Light (visible radiation), Mathematical models, Antarctica

Accurate, detailed maps of total ozone were not available until the launch of the Total Ozone Mapping Spectrometer (TOMS) in late 1978. However, the Scanning Radiometer (SR) on NOAA satellites during the 1970s included a visible channel that overlapped closely with the Chappuis absorption band of ozone around 600 nm. The antarctic atmosphere and surface contain no other significant absorbers of radiation at those wavelengths, which makes Antarctica an ideal region to isolate the ozone signal in the visible-channel data. The authors are investigating whether SR data can be used to map antarctic ozone prior to 1978. They use a simple calculation of two-way transmittance to obtain total ozone from data taken by the Advanced Very High Resolution Radiometer (AVHRR). They are modifying the retrieval method to include a comprehensive bidirectional reflectance function for the surface and for uniform clouds, and to choose the appropriate scales for spatial and temporal averaging. If the method appears useful after these improvements have been made, the technique could be applied to SR data from the 1970s. (Auth. mod.)

49-4615

Variations of stratospheric ozone based on the data of laser probing.

El'nikov, A.V., Zuev, V.V., Zuev, V.E., Marichev, V.N., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.134-137, 3 refs.

DLC QC879.7.A879 1993

Ozone, Stratosphere, Lasers, Lidar, Polar atmospheres, Russia—Siberia

49-4616

Investigation of tropospheric ozone based on the data of laser long-pass measurements.

Dolgi, S.I., Zuev, V.V., Zuev, V.E., Petrov, A.I., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.144-150, 5 refs.

DLC QC879.7.A879 1993

Ozone, Lasers, Measurement, Gases, Polar atmospheres, Russia—Tomsk, Russia—Kemerovo

49-4617

Experience of direct impactor measurements of the structure and composition of stratospheric aerosols in polar latitudes.

Kondrat'ev, K.IA., Ivlev, L.S., Ivanov, V.A., Zhukov, V.M., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.151-157, 6 refs.

DLC QC879.7.A879 1993

Aerosols, Stratosphere, Particle size distribution, Profiles, Polar atmospheres, Electron microscopy, Russia—Apatity

49-4618

Ozone and UV-B monitoring program in Canada.

Kerr, J.B., Wardle, D.I., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.160-168, 13 refs.

DLC QC879.7.A879 1993

Ozone, Polar atmospheres, Measurement, Ultraviolet radiation, Canada

49-4619

Measurements of surface ozone in Tromsø, using American and Russian type ozonometers.

Theodorsen, A., Bersås, S., Ørnes, H., Henriksen, K., Vasil'ev, A., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.180-190, 9 refs.

DLC QC879.7.A879 1993

Ozone, Measurement, Measuring instruments, Polar atmospheres, Accuracy, Design, Norway—Tromsø

49-4620

Surface ozone measurements within the industrial city limits during polar winter period.

Larin, V.F., Beloglazov, M.I., Lazutin, L.L., Rumiantsev, S.A., Vasil'ev, A.N., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.207-214, 23 refs.

DLC QC879.7.A879 1993

Ozone, Polar atmospheres, Air pollution, Russia—Apatity

49-4621

Increase of stratospheric aerosols after solar proton event.

Shumilov, O.I., Vasheniuk, E., Kasatkina, E.A., Baĭdalov, S., Henriksen, K., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.223-230, 14 refs.

DLC QC879.7.A879 1993

Aerosols, Lidar, Polar atmospheres, Stratosphere, Solar activity, Ozone, Russia—Murmansk

49-4622

Measurements of surface and boundary layer ozone during various meteorological conditions using various methods.

Beloglazov, M.I., Borovkov, L.P., Larin, V.F., Lazutin, L.L., Schur, L.I., Tumanov, V.A., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.231-236, 7 refs.

DLC QC879.7.A879 1993

Ozone, Measurement, Boundary layer, Profiles, Polar atmospheres, Balloons, Topographic features, Models, Ions, Analysis (mathematics), Russia—Kola Peninsula, Russia—Apatity

49-4623

First analysis of Brewer Umkehr data from a high latitude observatory.

Rummukainen, M., Kyrö, E., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.247-249, 4 refs.

DLC QC879.7.A879 1993

Ozone, Stratosphere, Polar atmospheres, Measurement, Profiles, Accuracy, Computer programs, Finland

49-4624

New detector for LIDAR measurements of ozone exchange processes between stratosphere and troposphere.

Heese, B., von der Gathen, P., Ruhe, W., Schrems, O., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.250-253, 3 refs.

DLC QC879.7.A879 1993

Ozone, Polar atmospheres, Stratosphere, Lidar, Measurement, Measuring instruments, Norway—Spitsbergen

49-4625

Application of Brewer data to obtain information about the Pinatubo aerosol over Greenland.

Wagner, M., Pedersen, T., Larsen, N.W., Eriksen, P., *SPIE—The International Society for Optical Engineering. Proceedings,* June 1993, Vol.2047, Atmospheric ozone, Tromsø, Norway, 28-29 June 1993. Edited by T. Henriksen, p.254-258, 1 ref.

DLC QC879.7.A879 1993

Measuring instruments, Measurement, Ozone, Ultraviolet radiation, Analysis (mathematics), Polar atmospheres, Radiation measurement, Greenland

49-4626

Pressure-tuned Fermi resonance in Ice VII.

Aoki, K., Yamawaki, H., Sakashita, M., *Science,* June 2, 1995, 268(5215), p.1322-1324, 20 refs.

High pressure ice, Hydrogen bonds, Resonance

49-4627

Beryllium-10 dating of the duration and retreat of the last Pinedale glacial sequence.

Gosse, J.C., Klein, J., Evenson, E.B., Lawn, B., Middleton, R., *Science,* June 2, 1995, 268(5215), p.1329-1333, 35 refs.

Age determination, Alpine glaciation, Ice dating, United States—Wyoming—Fremont Lake Basin, United States—Wyoming—Wind River Range

49-4628

Environmental studies from Franz Josef Land, with emphasis on Tikhaia Bay, Hooker Island.

Gjertz, I., ed, Mørkved, B., ed, *Norsk Polarinstitutt. Meddelelser,* July 1992, No.120, 130p., Refs. p.120-130. For selected papers see 49-4629 through 49-4634.

Plankton, Algae, Ecology, Plants (botany), Marine biology, Russia—Franz Josef Land, Russia—Hooker Island, Russia—Tikhaya Bay

49-4629

On structure of water masses in straits of the Franz Josef Land.

Schaban, A., Matishov, D.G., *Norsk Polarinstitutt. Meddelelser,* July 1992, No.120, Environmental studies from Franz Josef Land, with emphasis on Tikhaia Bay, Hooker Island. Edited by I. Gjertz and B. Mørkved, p.5-8.

Hydrography, Salinity, Water temperature, Water structure, Russia—Franz Josef Land

49-4630

Hydrometeorological conditions in Tikhaia Bay, Franz Josef Land, during summer 1991.

Swerpel, S., *Norsk Polarinstitutt. Meddelelser,* July 1992, No.120, Environmental studies from Franz Josef Land, with emphasis on Tikhaia Bay, Hooker Island. Edited by I. Gjertz and B. Mørkved, p.9-13.

Hydrology, Meteorology, Water structure, Sea ice, Ice conditions, Isotherms, Surface temperature, Russia—Franz Josef Land

49-4631

Suspended matter and phytoplankton in Tikhaia Bay, summer 1991.

Wiktor, J., Zajączkowski, M., *Norsk Polarinstitutt. Meddelelser,* July 1992, No.120, Environmental studies from Franz Josef Land, with emphasis on Tikhaia Bay, Hooker Island. Edited by I. Gjertz and B. Mørkved, p.14-18.

Plankton, Marine biology, Biomass, Russia—Franz Josef Land, Russia—Tikhaya Bay

49-4632

Some remarks on the algae in the annual sea ice at Hooker Island, Franz Josef Land.

Okolodkov, IU.B., *Norsk Polarinstitutt. Meddelelser,* July 1992, No.120, Environmental studies from Franz Josef Land, with emphasis on Tikhaia Bay, Hooker Island. Edited by I. Gjertz and B. Mørkved, p.19-21.

Algae, Marine biology, Sea ice, Russia—Franz Josef Land, Russia—Hooker Island

49-4633

Near shore zooplankton of the Tikhaia Bay (Franz Josef Land) in August 1991.

Koszteyn, J., Kwaśniewski, S., *Norsk Polarinstitutt. Meddelelser,* July 1992, No.120, Environmental studies from Franz Josef Land, with emphasis on Tikhaia Bay, Hooker Island. Edited by I. Gjertz and B. Mørkved, p.23-33.

Plankton, Marine biology, Russia—Franz Josef Land, Russia—Tikhaya Bay

49-4634

Vascular plant distribution in Franz Josef Land.

Odasz, A.M., *Norsk Polarinstitutt. Meddelelser,* July 1992, No.120, Environmental studies from Franz Josef Land, with emphasis on Tikhaia Bay, Hooker Island. Edited by I. Gjertz and B. Mørkved, p.83-119.

Plants (botany), Site surveys, Arctic landscapes, Maps, Russia—Franz Josef Land

49-4635

Validation of Nimbus-7 SMMR satellite derived snow depth over the former Soviet Union with ground-based measurements: data collection and preliminary results.

Tait, A., *World Data Center-A for Glaciology. National Snow and Ice Data Center. Report,* Apr. 1993, 76 leaves, incl. col. plates, 10 refs.

Snow depth, Data processing, Radiometry, Spacecraft, Measurement, Remote sensing, Computer programs, Russia

49-4636

Dynamics of supercooled water: mode-coupling theory approach.

Sokolov, A.P., Hurst, J., Quitmann, D., *Physical review B,* May 1, 1995, 51(18), p.12865-12868, 18 refs.

Water structure, Light scattering, Spectroscopy, Spectra, Supercooling, Temperature effects, Viscosity, Thermodynamics, Correlation

49-4637

Relative productivity of zooplankton in the Bering and Okhotsk Seas.

Dulepova, E.P., *Russian journal of marine biology,* Sep. 1995, 20(6), p.325-330, Translated from Biologiya moria. 18 refs.

Marine biology, Oceanographic surveys, Biomass, Sampling, Plankton, Distribution, Ecosystems, Bering Sea, Okhotsk Sea

49-4638

Nitrogen turnover and availability during succession from alder to poplar in Alaskan taiga forests.

Clein, J.S., Schimel, J.P., *Soil biology & biochemistry,* June 1995, 27(6), p.743-752, 45 refs.

Taiga, Plant ecology, Revegetation, Forest ecosystems, Forest soils, Soil microbiology, Nutrient cycle, Floodplains, United States—Alaska

49-4639

Biomass of grazed, burned, and undisturbed páramo grasslands, Colombia. I. Aboveground vegetation.

Hofstede, R.G.M., Mondragón Castillo, M.X., Rocha Osorio, C.M., *Arctic and alpine research,* Feb. 1995, 27(1), p.1-12, 42 refs.

Alpine landscapes, Fires, Environmental impact, Ecosystems, Vegetation patterns, Biomass, Revegetation, Colombia

49-4640

Biomass of grazed, burned, and undisturbed páramo grasslands, Colombia. II. Root mass and aboveground: belowground ratio.

Hofstede, R.G.M., Rossenaar, A.J.G.A., *Arctic and alpine research,* Feb. 1995, 27(1), p.13-18, 38 refs.

Alpine landscapes, Ecosystems, Vegetation patterns, Roots, Biomass, Meadow soils, Subsurface investigations, Correlation, Environmental tests, Colombia

49-4641

Extreme precipitation during 1921 in the area of the Niwot Ridge long-term ecological research site, Front Range, Colorado, U.S.A.

Greenland, D., *Arctic and alpine research,* Feb. 1995, 27(1), p.19-28, 27 refs.

Precipitation (meteorology), Climatology, Snow accumulation, Snow depth, Records (extremes), Alpine tundra, Forest ecosystems, Environmental impact, United States—Colorado

49-4642

Soil carbon and nitrogen mineralization at different elevations in the Chugach Mountains of south-central Alaska, U.S.A.

Sveinbjörnsson, B., Davis, J., Abadie, W., Butler, A., *Arctic and alpine research,* Feb. 1995, 27(1), p.29-37, 45 refs.

Subarctic landscapes, Forest ecosystems, Forest soils, Soil chemistry, Organic soils, Decomposition, Nutrient cycle, Podsol, Altitude, United States—Alaska

49-4643

Scale-dependent correlations of arctic vegetation and snow cover.

Schaefer, J.A., Messier, F., *Arctic and alpine research,* Feb. 1995, 27(1), p.38-43, 34 refs.

Tundra, Arctic landscapes, Vegetation patterns, Classifications, Snow accumulation, Snow cover effect, Plant ecology, Statistical analysis, Correlation, Canada—Northwest Territories—Victoria Island

49-4644

Effect of muskox herbivory on growth and reproduction in arctic legume.

Mulder, C.P.H., Harmsen, R., *Arctic and alpine research,* Feb. 1995, 27(1), p.44-53, 58 refs.

Arctic landscapes, Vegetation patterns, Plant ecology, Plant tissues, Damage, Growth, Environmental impact, Canada—Northwest Territories—Banks Island

49-4645

Factors controlling soil development on a sequence of raised beaches, Truelove Lowland, Devon Island, N.W.T., Canada.

Kelly, P.E., King, R.H., *Arctic and alpine research,* Feb. 1995, 27(1), p.54-71, 39 refs.

Beaches, Arctic landscapes, Soil tests, Soil composition, Lithology, Soil formation, Soil dating, Geomorphology, Statistical analysis, Canada—Northwest Territories—Devon Island

49-4646

Active layer thaw rate at a boreal forest site in central Alaska, U.S.A.

Hinkel, K.M., Nicholas, J.R.J., *Arctic and alpine research,* Feb. 1995, 27(1), p.72-80, 34 refs.

Subarctic landscapes, Forest soils, Discontinuous permafrost, Active layer, Temperature measurement, Ground thawing, Thawing rate, Thaw depth, Mathematical models, Degree days, United States—Alaska

49-4647

Surging history and potential for renewed retreat: Bering Glacier, Alaska, U.S.A.

Muller, E.H., Fleisher, P.J., *Arctic and alpine research,* Feb. 1995, 27(1), p.81-88, 45 refs.

Glacier oscillation, Glacier surges, Glacier surveys, Periodic variations, Pleistocene, Glacial geology, Calving, United States—Alaska—Bering Glacier

49-4648

Soil evidence for a glaciation intermediate between the Bull Lake and Pinedale glaciations at Fremont Lake, Wind River Range, Wyoming, U.S.A.

Hall, R.D., Shroba, R.R., *Arctic and alpine research,* Feb. 1995, 27(1), p.89-98, 35 refs.

Glacial deposits, Pleistocene, Glacial geology, Moraines, Glaciation, Soil chemistry, Soil tests, Soil formation, Correlation, United States—Wyoming

49-4649

Numerical analysis of ice crystal growth on cold surfaces.

Şahin, A.Z., International Conference on Advanced Computational Methods in Heat Transfer, 3rd, Southampton, UK, Aug. 22-24, 1994. Proceedings, Southampton, Computational Mechanics Publications, 1994, p.245-252, 6 refs.

DLC QC319.8.I55

Ice physics, Ice crystal growth, Ice crystal structure, Mathematical models, Heat transfer, Phase transformations, Ice temperature, Ice vapor interface, Condensation

49-4650

Direct-contact heat-transfer characteristics from a liquid ice layer.

Yamada, M., Fukusako, S., Horibe, A., World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics, 3rd, Honolulu, HI, Oct. 31-Nov. 5, 1993. Proceedings. Edited by M.D. Kelleher et al, Amsterdam, Elsevier Science Publishers, 1993, p.1682-1687, 6 refs.

DLC QC138.W67

Air conditioning, Slush, Ice physics, Ice melting, Ice thermal properties, Ice air interface, Heat transfer, Enthalpy, Air temperature

49-4651

Numerical simulation of seasonal convection in an inclined talus.

Song, T.H., International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.2. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.455-460, 15 refs.

DLC QC319.8.I58A

Rock glaciers, Talus, Ground ice, Ice formation, Rock properties, Temperature variations, Air flow, Cooling, Convection, Periglacial processes, Mathematical models

49-4652

Experimental and numerical study of three-dimensional natural convection and freezing in water.

Abegg, C., et al, International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.4. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.1-6, 10 refs.

DLC QC319.8.I58A

Water temperature, Solutions, Convection, Freezing, Ice growth, Ice solid interface, Ice cover effect, Heat flux, Buoyancy

49-4653

Melting of pure ice in an aqueous solution: structure of the thermohaline convective flow.

Bénard, C., Bennacer, R., Gobin, D., Sun, L.Y., International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.4. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.7-12, 15 refs.

DLC QC319.8.I58A

Ice physics, Ice melting, Solutions, Convection, Buoyancy, Phase transformations, Liquid phases, Salinity, Heat flux, Ice water interface

49-4654

Natural convection melting around a horizontal cylinder buried in frozen water-saturated porous media.

Christopher, D.M., Wang, B.X., International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.4. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.19-24, 7 refs.

DLC QC319.8.I58A

Underground pipelines, Porous materials, Convection, Frozen ground temperature, Ground thawing, Phase transformations, Mathematical models, Thermal conductivity

49-4655

Effect of free convection on plug formation during cryogenic pipe-freezing: a numerical study.

Keary, A.C., Bowen, R.J., International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.4. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.55-60, 9 refs.

DLC QC319.8.I58A

Cryogenics, Pipes (tubes), Pipeline freezing, Artificial freezing, Convection, Solidification, Fluid dynamics, Mathematical models

49-4656

Freezing of supercooled water on an oscillating surface.

Kuorsaki, Y., Satoh, I., International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.4. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.61-66, 3 refs.

DLC QC319.8.I58A

Water films, Liquid solid interfaces, Oscillations, Supercooling, Freezing, Phase transformations, Temperature effects, Fluid dynamics

49-4657

Solidification around horizontal cylinder in porous medium saturated with aqueous solution.

Okada, M., Matsumoto, K., Yabushita, Y., International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.4. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.109-114, 6 refs.

DLC QC319.8.I58A

Soil freezing, Soil physics, Artificial freezing, Porous materials, Solidification, Freezing front, Ice water interface, Grain size, Liquid phases, Analysis (mathematics)

49-4658

Fundamental research on initiation of freezing of supercooled water on heat transfer surface.

Saito, A., Okawa, S., International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.4. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.121-126, 6 refs.

DLC QC319.8.I58A

Cold storage, Ice (water storage), Liquid solid interfaces, Surface temperature, Ice formation, Supercooling, Heat transfer, Statistical analysis

49-4659

Effect of maximum fluid density on the melting of ice around a finned surface.

Sasaguchi, K., Sumikawa, T., International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.4. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.139-144, 10 refs.

DLC QC319.8.I58A

Pipes (tubes), Ice melting, Ice solid interface, Density (mass/volume), Thermal conductivity, Mathematical models, Temperature effects

49-4660

Heat-mass transfer and their coupling effects in sublimation process.

Shi, M.H., Feng, M., Yu, W.P., International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.4. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.145-150, 11 refs.

DLC QC319.8.I58A

Freeze drying, Ice sublimation, Porous materials, Heat transfer, Mass transfer, Mathematical models, Thermodynamics, Convection

49-4661

Simultaneous heat transfer and flow in melting snowcover and underlying soil.

Tao, Y.X., International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.4. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.157-162, 10 refs.

DLC QC319.8.I58A

Snow cover stability, Snowmelt, Seepage, Ice water interface, Snow hydrology, Frozen ground physics, Snow cover effect, Ice lenses, Heat transfer, Mathematical models

49-4662

Experimental and analytical investigation of freezing in liquid-saturated porous media with the third kind of boundary condition.

Wang, B.X., Ma, J., International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.4. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.163-168, 17 refs.

Porous materials, Phase transformations, Freezing front, Ice water interface, Freezing rate, Heat transfer, Analysis (mathematics)

49-4663

Experimental study of ice formation around a horizontal cylinder in a square enclosure.

Xu, Z., Oosthuizen, P.H., International Heat Transfer Conference, 10th, Brighton, UK, Aug. 14-18, 1994. Proceedings, Vol.4. Edited by G.F. Hewitt, Rugby, Institution of Chemical Engineers, 1994, p.175-180, 21 refs.

DLC QC319.8.I58A

Ice formation, Ice water interface, Solidification, Heat transfer, Surface temperature, Temperature variations, Density (mass/volume)

49-4664

REILS and ... penguins.

Hauck, R., *Journal of air traffic control*, Dec. 1994, 36(4), p.44-45.

Batteries, Electric power, Runways, Illuminating, Solar radiation

This note details the development of a solar-powered battery system designed to power airfield runway illumination in antarctic environments.

49-4665

Extinction efficiency in the infrared (2-18 μm) of laboratory ice clouds: observations of scattering minima in the Christiansen bands of ice.

Arnott, W.P., Dong, Y.Y., Hallett, J., *Applied optics*, Jan. 20, 1995, 34(3), p.541-551, 31 refs.

Cloud physics, Light scattering, Radiation balance, Ice crystal optics, Attenuation, Infrared spectroscopy, Temperature effects, Simulation, Radiation absorption

49-4666

Glacial environments.

Hambrey, M.J., London, UCL (University College London) Press, 1994, 296p., Refs. p.281-292.

DLC GB2403.2.H35 1994

Glaciation, Glacial geology, Glacial deposits, Glacial erosion, Glacier flow, Subglacial drainage, Outwash, Glacial lakes, Lacustrine deposits, Marine geology, Marine deposits

49-4667

Estimation of ozone concentrations based on measurements of solar ultraviolet radiation in the Antarctic using the BSI PUV-510 instrument.

Bruce, E.J., Handley, P.L., Wan, Z.M., Smith, R.C., *SPIE—The International Society for Optical Engineering. Proceedings,* 1994, Vol.2258, Ocean Optics XII, Bergen, Norway, June 13-15, 1994. Edited by J.S. Jaffe, p.12-20, 24 refs.

DLC GC177.6.O27 No.12 1994

Polar atmospheres, Atmospheric composition, Ozone, Ultraviolet radiation, Solar radiation, Meteorological instruments, Ocean environments, Marine biology, Physiological effects, Antarctica

The greatly reduced stratospheric ozone concentrations over the antarctic continent, the consequent increase in short wavelength ultraviolet radiation (UVB) and the influence of this increased UVB on the antarctic ecosystem has led to the development of new instruments for the measurement of these effects. One objective of research in this area is to estimate column ozone concentrations based upon surface UV measurements. Current commercial instruments vary from full spectral narrow-band to single broad-band, so the usefulness of data from these instruments for linking surface UV measurements to column ozone concentrations also varies. One instrument, arguably a compromise between a more complex and expensive full spectral narrow-band instrument and a simpler broad-band instrument, is manufactured by Biospherical Instruments (BSI) for the measurements of surface and in-water UV radiation. The authors present preliminary results of direct observations of springtime UVB, using the BSI PUV-510, under the antarctic ozone hole and provide an algorithm for the accurate estimation of column ozone based upon these measurements. It is shown that data from the PUV-510 can be used to estimate column ozone, given a rough estimate of surface albedo, to within an accuracy of ±10 DU and that this algorithm is robust, working well for both clear and cloudy skies.

49-4668

Maintaining a phytoplankton bloom in low mixed layer illumination in the Bellingshausen Sea in the austral spring, 1992.

Weeks, A.R., Robinson, I.S., Aiken, J., Moore, G.F., *SPIE—The International Society for Optical Engineering. Proceedings,* 1994, Vol.2258, Ocean Optics XII, Bergen, Norway, June 13-15, 1994. Edited by J.S. Jaffe, p.90-104, 23 refs.

DLC GC177.6.O27 No.12 1994

Plankton, Algae, Chlorophylls, Photosynthesis, Biomass, Marine biology, Light effects, Physiological effects, Ice cover effect, Ice water interface, Antarctica—Bellingshausen Sea

A phytoplankton bloom was observed between 67.2°S and 68.5°S which extended over at least 4° of longitude from 84° to 88°W in the Bellingshausen Sea. The northern boundary of the bloom was associated with a strong eastward flowing surface jet of low salinity water. The controlling factors for phytoplankton growth were explored by examining north to south transects of surface stability, inorganic nutrients, mean mixed layer irradiance and surface currents. The only parameter found to change along with the phytoplankton biomass was the mean mixed layer irradiance, which approached the light limitation thresholds for antarctic phytoplankton. A hypothesis to explain the high concentrations of phytoplankton suggests a positive feedback mechanism in which the phytoplankton grow well in the low light conditions of the mixed layer.

49-4669

Variations in bio-optical properties in the Greenland/Iceland/Norwegian seas.

Dalløkken, R., Sandvik, R., Sakshaug, E., *SPIE—The International Society for Optical Engineering. Proceedings,* 1994, Vol.2258, Ocean Optics XII, Bergen, Norway, June 13-15, 1994. Edited by J.S. Jaffe, p.266-276, 24 refs.

DLC GC177.6.O27 No.12 1994

Plankton, Algae, Chlorophylls, Photosynthesis, Biomass, Marine biology, Ice edge, Ice cover effect, Greenland Sea, Norwegian Sea

49-4670

Polarization dependent measurements of light scattering in sea ice.

Miller, D., Quinby-Hunt, M.S., Hunt, A.J., *SPIE—The International Society for Optical Engineering. Proceedings,* 1994, Vol.2258, Ocean Optics XII, Bergen, Norway, June 13-15, 1994. Edited by J.S. Jaffe, p.908-919, 13 refs.

DLC GC177.6.O27 No.12 1994

Sea ice, Ice optics, Ice crystal optics, Ice structure, Ice crystal structure, Ice cover effect, Light scattering

49-4671

Fluorometric characterization of dissolved and particulate matter in arctic sea ice.

Iturriaga, R., Roesler, C.S., *SPIE—The International Society for Optical Engineering. Proceedings,* 1994, Vol.2258, Ocean Optics XII, Bergen, Norway, June 13-15, 1994. Edited by J.S. Jaffe, p.920-932, 30 refs.

DLC GC177.6.O27 No.12 1994

Sea ice, Ice optics, Ice spectroscopy, Ice composition, Impurities, Plankton, Algae, Suspended sediments

49-4672

Absorption properties of marine-derived material in arctic sea ice.

Roesler, C.S., Iturriaga, R., *SPIE—The International Society for Optical Engineering. Proceedings,* 1994, Vol.2258, Ocean Optics XII, Bergen, Norway, June 13-15, 1994. Edited by J.S. Jaffe, p.933-943, 27 refs.

DLC GC177.6.O27 No.12 1994

Sea ice, Ice optics, Ice spectroscopy, Ice composition, Impurities, Radiation absorption, Algae, Chlorophylls, Biomass

49-4673

In-situ measurements of optical scattering from the water-ice interface of sea ice.

Longacre, J.R., Landry, M.A., *SPIE—The International Society for Optical Engineering. Proceedings,* 1994, Vol.2258, Ocean Optics XII, Bergen, Norway, June 13-15, 1994. Edited by J.S. Jaffe, p.944-953, 7 refs.

DLC GC177.6.O27 No.12 1994

Ice water interface, Ice bottom surface, Ice optics, Ice cover effect, Subglacial observations, Lasers, Light scattering

49-4674

Transport of photosynthetically active radiation in sea ice and ocean.

Jin, Z.H., Stamnes, K.H., Weeks, W.F., *SPIE—The International Society for Optical Engineering. Proceedings,* 1994, Vol.2258, Ocean Optics XII, Bergen, Norway, June 13-15, 1994. Edited by J.S. Jaffe, p.954-964, 19 refs.

DLC GC177.6.O27 No.12 1994

Ice water interface, Ice optics, Ice cover effect, Photosynthesis, Radiation absorption, Algae, Biomass

49-4675

Use of beam spreading measurements to estimate volume scattering properties in sea ice.

Tanis, F.J., *SPIE—The International Society for Optical Engineering. Proceedings,* 1994, Vol.2258, Ocean Optics XII, Bergen, Norway, June 13-15, 1994. Edited by J.S. Jaffe, p.965-973, 6 refs.

DLC GC177.6.O27 No.12 1994

Sea ice, Ice water interface, Ice optics, Ice cover effect, Light scattering, Radiation absorption

49-4676

Role of sea ice in 2 X CO_2 climate model sensitivity. Part I. The total influence of sea ice thickness and extent.

Rind, D., Healy, R., Parkinson, C., Martinson, D., *Journal of climate,* Mar. 1995, 8(3), p.449-463, 33 refs.

Sea ice distribution, Polar atmospheres, Climatic changes, Ice cover thickness, Ice cover effect, Atmospheric composition, Carbon dioxide, Sea level, Mathematical models

As a first step in investigating the effects of sea ice changes on the climate sensitivity to doubled atmospheric CO_2, the authors use a standard simple sea ice model while varying the sea ice distributions and thicknesses in the control run. Thinner ice amplifies the atmospheric temperature sensitivity in these experiments by about 15% because it is easier for the thinner ice to be removed as the climate warms. Thus, its impact on sensitivity is similar to that of greater sea ice extent in the control run, which provides more opportunity for sea ice reduction. An experiment with sea ice not allowed to change between the control and doubled CO_2 simulations illustrates that the total effect of sea ice on surface air temperature changes, including cloud cover and water vapor feedbacks that arise in response to sea ice variations, amounts to 37% of the temperature sensitivity to the CO_2 doubling. These results highlight the importance of properly constraining the sea ice response to climate perturbations, necessitating the use of more realistic sea ice and ocean models. (Auth. mod.)

49-4677

Large-scale atmospheric forcing of recent trends toward early snowmelt runoff in California.

Dettinger, M.D., Cayan, D.R., *Journal of climate,* Mar. 1995, 8(3), p.606-623, 41 refs.

Climatology, Climatic changes, Snowmelt, Runoff, Periodic variations, Stream flow, Atmospheric circulation, Air temperature, United States—California

49-4678

Relationships between the interannual variability of antarctic sea ice and the Southern Oscillation.

Simmonds, I., Jacka, T.H., *Journal of climate,* Mar. 1995, 8(3), p.637-647, 45 refs.

Sea ice distribution, Ice edge, Seasonal variations, Atmospheric circulation, Ice air interface, Ice cover effect, Climatic changes, Climatic factors, Correlation

A climatology of antarctic sea ice extent based on 20 years of data (1973-1992) is presented, including measures of interannual variability and extrema. In the first half of the year the greatest variability is found in the Western Hemisphere, particularly in the Weddell and Ross Sea regions, while in the second semester the variability displays a considerable degree of zonal symmetry. This dataset is used to explore the possible links between antarctic sea ice extent and the Southern Oscillation Index (SOI). To do this the authors have calculated their correlation for all pairings of calendar months, as well as with the SOI taken from the year before and subsequent to that of the time of the sea ice data. Most of the correlations assume their largest magnitude when the SOI leads the anomalies in the sea ice, but these differ considerably among the three ocean basins. The possibility is examined of links between the SOI and sea ice in four key sectors around the antarctic coast, namely, the southwest Indian Ocean, the southwest and southeast Pacific Ocean, and a sector to the west of the Ross Sea. In general, the correlations for these domains are stronger that those found over the entire ocean basins, supporting suggestions that there are important key regions over which the antarctic sea ice influences, and is influenced by, the Southern Oscillation. (Auth. mod.)

49-4679

Development and validation of a simple snow model for GISS GCM.

Lynch-Stieglitz, M., *Journal of climate,* Dec. 1994, 7(12), p.1842-1855, 24 refs.

Climatology, Climatic factors, Snow depth, Snow cover effect, Watersheds, Mathematical models, Snow heat flux, Surface temperature, Soil temperature, Snow air interface

49-4680

Arctic sea ice variability on a timescale of weeks and its relation to atmospheric forcing.

Fang, Z.F., Wallace, J.M., *Journal of climate,* Dec. 1994, 7(12), p.1897-1914, 24 refs.

Sea ice distribution, Climatology, Ice cover thickness, Seasonal variations, Atmospheric circulation, Atmospheric pressure, Ice air interface, Ice edge, Ice cover effect, Correlation

49-4681

Factors affecting the water clarity of ponds on the McMurdo Ice Shelf, Antarctica.

Pridmore, R.D., Vant, W.N., Cummings, V.J., *Antarctic science,* June 1995, 7(2), p.145-148, 24 refs.

Limnology, Meltwater, Ice shelves, Attenuation, Turbidity, Optical properties, Suspended sediments, Light (visible radiation), Antarctica—McMurdo Ice Shelf

The clarity of 39 meltwater ponds on the McMurdo Ice Shelf was determined as the horizontal viewing range of a black disc. Visual ranges varied widely from pond to pond from 0.14-5 m; so did the concentrations of optically-active constituents, including the suspended particles, phytoplankton (10-fold variation) and inorganic suspensoids (>100-fold), and dissolved yellow substance (10-fold). In six of the ponds the ratio of beam attenuation coefficient to total suspended solids concentration was low (<0.6 m^2/g) compared to that in the others (0.7-2.0 m^2/g), suggesting that generally larger particles were present suspended in the water in these ponds. In both groups, relationships between beam attenuation and constituent concentrations indicated that much of the attenuation was due to inorganic suspensoids. Even though the clarity of many of the ponds was poor, their relative shallowness meant levels of underwater light were probably generally adequate for benthic plant growth. (Auth.)

49-4682

Late Holocene advance of the Müller Ice Shelf, Antarctic Peninsula: sedimentological, geochemical and palaeontological evidence.

Domack, E.W., Ishman, S.E., Stein, A.B., McClennen, C.E., Jull, A.J.T., *Antarctic science,* June 1995, 7(2), p.159-170, Refs. p.169-170.

Glacial geology, Marine geology, Sedimentation, Paleoclimatology, Ice shelves, Ice cores, Glacier mass balance, Climatic factors, Antarctica—Müller Ice Shelf

Marine sediment cores were obtained from in front of the Müller Ice Shelf in the summer of 1990-91. Sedimentological and geochemical data from these cores document a warm period that preceded the advance of the Müller Ice Shelf into Lallemand Fjord. Advance of the ice shelf is indicated by a shift from assemblages dominated by calcareous benthic and planktonic forms to those dominated by agglutinated forms. A ^{14}C chronology for the cores indicates that the advance of the Müller Ice Shelf took place c. 400 years ago, coincident with glacier advances in other high southern latitude sites during the onset of the Little Ice Age. Ice core evidence, however, documents this period as one of warmer temperatures for the Antarctic Peninsula. It is suggested that the ice shelf advance was linked to the exclusion of circumpolar deep water from the fjord. (Auth. mod.)

49-4683

Form, structure and stability of the margin of the antarctic ice sheet, Vestfold Hills and Bunger Hills, East Antarctica.

Fitzsimons, S.J., Colhoun, E.A., *Antarctic science,* June 1995, 7(2), p.171-179, 33 refs.

Ice sheets, Ice structure, Moraines, Geomorphology, Glacier mass balance, Antarctica—Vestfold Hills, Antarctica—Bunger Hills

Studies of glacier margins have suggested that form and structure can be used to infer mass balance condition and stability. This paper examines this idea by investigating the form and structure of the antarctic ice sheet at two coastal oases in East Antarctica. Two principal forms of the margin of the ice sheet in the Vestfold and Bunger hills that are discussed are ice cliffs and gently-sloping ice margins with an inner moraine. The form of the ice margins in both areas is primarily related to the accumulation of drift snow and superimposed ice and not to mass balance condition. It is concluded that the form and structure of ice margins are ambiguous indicators of mass balance condition and stability and that a change in mass budget is probably neither a sufficient nor a necessary condition for a change in the morphology of ice margins. Although the authors argue that the form and structure of the ice margins tells us little about stability, interpretation of the Holocene history and geomorphology of the oases suggests that the ice margins have been stable at least throughout the Holocene and that this condition of overall stability continues today. (Auth.)

49-4684

Mapping ice front changes of Müller Ice Shelf, Antarctic Peninsula.

Ward, C.G., *Antarctic science,* June 1995, 7(2), p.197-198, 6 refs.

Ice shelves, Photogrammetry, Mapping, Variations, Antarctica—Müller Ice Shelf

Müller Ice Shelf is a small ice shelf (≈80 km^2) fed by Brückner and Antevs glaciers, which both flow northward off the central peaks of Arrowsmith Peninsula; the ice shelf contains Humphreys Ice Rise. Data sources have indicated that not only has the ice front retreated since 1947 but also that there have been two advances. This paper describes how these changes were recorded using simple photogrammetric techniques.

49-4685

Polar regions: nature, economics, priorities. [Zapoliar'e: priroda, ekonomika, prioritety]

Kotliakov, V.M., Agranat, G.A., *Rossiĭskaia akademiia nauk. Vestnik,* Mar. 1995, 65(3), p.214-220, In Russian. 21 refs.

Ecology, Economic development

49-4686

Demonstration of realtime ice monitoring using ERS-1 SAR data: project report.

Sandven, S., Johannessen, O.M., Kloster, K., *Nansen Environmental and Remote Sensing Center. Special report,* Oct. 15, 1992, No.23, 21p. + appends., Project report to the Norwegian Ministry of Environment's Program for Ocean Monitoring and Forecasting (HOV) and the Norwegian Space Centre. 8 refs.

Synthetic aperture radar, Remote sensing, Spacecraft, Data processing, Sea ice, Ice conditions, Ice navigation, Safety, Maps, Denmark Strait, Greenland Sea, Iceland Sea, Norway—Spitsbergen, Russia—Novaya Zemlya, Norway—Svalbard

49-4687
ERS-1 SAR ice analysis in NE-Barents Sea in March 1992.
Kloster, K., *Nansen Environmental and Remote Sensing Center. Technical report,* July 31, 1992, No.59, 14p., Project for Norsk A.S. 4 refs.
Synthetic aperture radar, Remote sensing, Sea ice, Ice conditions, Ice floes, Pressure ridges, Spacecraft, Barents Sea

49-4688
ERS-1 SAR ice routing of L'Astrolabe through the Northeast Passage.
Johannessen, O.M., et al, *Nansen Environmental and Remote Sensing Center. Technical report,* Feb. 24, 1992, No.56, 31p., Joint project between Nansen Environmental and Remote Sensing Center, Mers Magnetique, European Space Agency, Norwegian Space Centre, and Alaska SAR Facility. 3 refs.
Ice routing, Synthetic aperture radar, Remote sensing, Ice conditions, Sea ice, Data processing, Russia—Kara Sea, Russia—East Siberian Sea, Russia—Franz Josef Land, Russia—Dikson Island, Russia—Chelyuskin Cape, Northern Sea Route

49-4689
Ice sedimentation in the world ocean. [Ledovaia sedimentatsiia v Mirovom okeane]
Lisitsyn, A.P., Moscow, Nauka, 1994, 447p. + 1 fold. map, In Russian. Refs. p.415-445.
Sedimentation, Bottom sediment, Marine geology, Glacial deposits, Marine deposits, Glacier beds, Lithology, Geochemistry, Frozen rocks, Tectonics, Geocryology, Ice shelves, Bering Sea, Okhotsk Sea, Antarctica—Ross Sea, Antarctica—Weddell Sea, Russia—Anadyr' Bay, Russia—Kamchatka Peninsula, Russia—Olyutorskiy Bay
This extensive work includes a study of recent iceberg and biogenic cryophilous deposits, the geology of ice-catchment provinces, and the petrography and mineralogy of sediments in Antarctica. Sedimentary rock basins in East and West Antarctica (including the Weddell Sea) and cryogenic facies (in the subglacial parts of the Weddell and Ross seas) are also discussed.

49-4690
Observational evidence for chemical ozone depletion over the Arctic in winter 1991-92.
von der Gathen, P., et al, *Nature,* May 11, 1995, 375(6527), p.131-134, 32 refs.
Ozone, Atmospheric composition, Stratosphere, Measuring instruments

49-4691
Ice in the 1994 Rabaul eruption cloud: implications for volcano hazard and atmospheric effects.
Rose, W.I., et al, *Nature,* June 8, 1995, 375(6531), p.477-479, 28 refs.
Volcanic ash, Sea water, Volcanic ice, New Guinea—Rabaul

49-4692
Photoreactivity of chlorine dioxide.
Vaida, V., Simon, J.D., *Science,* June 9, 1995, 268(5216), p.1443-1448, 53 refs.
Atmospheric composition, Ozone, Stratosphere, Photochemical reactions
Laboratory experiments and quantum calculations have been used to develop a comprehensive understanding of the photoreactivity of chlorine dioxide (OClO). The photoreactivity is strongly dependent on the medium (gas phase, liquid solution, or cryogenic matrix). These data reveal details of the complex chemistry of OClO. The potential role of this radical in stratospheric ozone depletion is discussed in accord with the laboratory measurements. Several applications of these processes to Antarctica are noted including a prediction that, if the quantum yield for Cl over the entire absorption spectra were 10%, the total antarctic ozone loss would be 3%. (Auth. mod.)

49-4693
FTIR studies of low temperature sulfuric acid aerosols.
Anthony, S.E., Tisdale, R.T., Disselkamp, R.S., Tolbert, M.A., Wilson, J.C., *Geophysical research letters,* May 1, 1995, 22(9), p.1105-1108, 18 refs.
Cloud physics, Polar stratospheric clouds, Aerosols, Chemical properties, Freezing, Heterogeneous nucleation, Infrared spectroscopy, Simulation
Fourier transform infrared (FTIR) spectroscopy was used to study low-temperature sulfuric acid aerosols representative of global stratospheric sulfate aerosols (SSAs). Sub-micron sized H_2SO_4 particles were generated using a constant output atomizer source. The particles were then exposed to water vapor before being injected into a low temperature cell. Multipass transmission FTIR spectroscopy was used to determine the phase and composition of the aerosols vs. time for periods of up to 5 hours. Binary H_2SO_4/H_2O aerosols with compositions from 35 to 95 wt% H_2SO_4 remained liquid for over 3 hours at temperatures ranging from 189-240 K. These results suggest that it is very difficult to freeze SSAs via homogeneous nucleation. Attempts to form aerosols more dilute than 35 wt% H_2SO_4 resulted in ice formation. (Auth.)

49-4694
Ice/dust mixtures in simulated space environment: a study of sublimation and of related phenomena.
Lämmerzahl, P., *Advances in space research,* 1995, 15(10), B2 Symposium of COSPAR Scientific Commission B, Hamburg, Germany, July 11-21, 1994. Proceedings, p.(10)19-(10)28, 32 refs.
Extraterrestrial ice, Simulation, Ice sublimation, Geochemistry, Dust, Ice solid interface, Porous materials, Ice physics, Insolation, Vapor transfer

49-4695
Cometary ice texture and the thermal evolution of comets.
Seiferlin, K., Spohn, T., Benkhoff, J., *Advances in space research,* 1995, 15(10), B2 Symposium of COSPAR Scientific Commission B, Hamburg, Germany, July 11-21, 1994. Proceedings, p.(10)35-(10)38, 8 refs.
Extraterrestrial ice, Simulation, Ice physics, Porosity, Insolation, Ice structure, Thermal conductivity, Temperature variations, Mathematical models

49-4696
Equations of state of icy/mineral media related to planetary physics.
Leliwa-Kopystyński, J., *Advances in space research,* 1995, 15(10), B2 Symposium of COSPAR Scientific Commission B, Hamburg, Germany, July 11-21, 1994. Proceedings, p.(10)69-(10)78, 18 refs.
Extraterrestrial ice, Simulation, Ice physics, Porous materials, Rheology, Thermal conductivity, Mechanical properties, Phase transformations, Analysis (mathematics)

49-4697
Atmospheric water vapor characteristics at 70°N.
Serreze, M.C., Barry, R.G., Walsh, J.E., *Journal of climate,* Apr. 1995, 8(4), p.719-731, 34 refs.
Polar atmospheres, Atmospheric physics, Atmospheric composition, Water vapor, Seasonal variations, Vapor diffusion, Moisture transfer, Sounding, Meteorological data, Statistical analysis

49-4698
Cauchy relation in dense H_2O ice VII.
Shimizu, H., Ohnishi, M., Sasaki, S., Ishibashi, Y., *Physical review letters,* Apr. 3, 1995, 74(14), p.2820-2823, 18 refs.
Ice physics, Ice spectroscopy, Cubic ice, High pressure tests, Molecular structure, Orientation, Ice elasticity, Molecular energy levels

49-4699
Dependence of surface albedo on snow cover duration and other snow parameters in Estonia.
Tooming, H., *Meteorologische Zeitschrift,* Apr. 1995, 4(2), p.62-66, With German summary. 14 refs.
Snow cover distribution, Snow surveys, Snow depth, Seasonal variations, Radiation balance, Albedo, Climatic factors, Snow hydrology, Correlation, Estonia

49-4700
Changes in snow cover and surface albedo in Estonia during the last 100 years.
Tooming, H., Kadaja, J., *Meteorologische Zeitschrift,* Apr. 1995, 4(2), p.67-71, With German summary. 10 refs.
Snow surveys, Snow cover distribution, Seasonal variations, Statistical analysis, Albedo, Correlation, Radiation balance, Climatic changes, Estonia

49-4701
No difference in frost hardiness between high and low altitude *Pinus sylvestris* (L.) offspring.
Sundblad, L.G., Andersson, B., *Scandinavian journal of forest research,* 1995, 10(1), p.22-26, 21 refs.
Trees (plants), Plant ecology, Frost resistance, Altitude, Cold weather tests, Cold weather survival, Cold tolerance, Growth, Phenology

49-4702
Frost hardiness gradients in shoots and roots of *Picea mariana* seedlings.
Colombo, S.J., Zhao, S.Y., Blumwald, E., *Scandinavian journal of forest research,* 1995, 10(1), p.32-36, 20 refs.
Forestry, Trees (plants), Cold weather survival, Acclimatization, Frost resistance, Roots, Plant tissues, Freezing, Damage, Temperature effects

49-4703
TOVS retrievals obtained with the 3I-algorithm. A study of a meso-scale cyclone over the Barents Sea.
Heinemann, G., *Tellus,* May 1995, 47A(3), p.324-330, 20 refs.
Polar atmospheres, Atmospheric circulation, Atmospheric physics, Sounding, Air masses, Marine meteorology, Atmospheric pressure, Synoptic meteorology, Barents Sea

49-4704
Creep relaxation around a crack tip in an ice crystal.
Wei, Y.C., Dempsey, J.P., *Scripta metallurgica et materialia,* Apr. 1, 1995, 32(7), p.949-953, 13 refs.
Ice mechanics, Ice crystal structure, Ice relaxation, Rheology, Ice cracks, Orientation, Ice deformation, Plastic deformation, Mechanical tests

49-4705
Nucleation and growth of ice crystals in concentrated solutions of ethylene glycol.
Bronshteyn, V.L., Steponkus, P.L., *Cryobiology,* Feb. 1995, 32(1), p.1-22, 58 refs.
Cryobiology, Solutions, Antifreezes, Supercooling, Ice crystal growth, Nucleation rate, Temperature effects, Temperature measurement, Thermodynamics

49-4706
Nonequilibrium antifreeze peptides and the recrystallization of ice.
Knight, C.A., Wen, D.Y., Laursen, R.A., *Cryobiology,* Feb. 1995, 32(1), p.23-34, 19 refs.
Cryobiology, Antifreezes, Adsorption, Molecular structure, Ice crystal growth, Recrystallization, Marine biology, Ice water interface, Liquid phases

49-4707
Influence of frozen soil on rangeland erosion.
Seyfried, M.S., Flerchinger, G.N., Symposium on Variability in Rangeland Water Erosion Processes, Minneapolis, MN, Nov. 1-6, 1992. Proceedings. Edited by W.H. Blackburn et al and Soil Science Society of America. Special Publication No.38, Madison, Soil Science Society of America, 1994, p.67-82, 52 refs.
DLC S622.2.V37
Soil erosion, Soil freezing, Plains, Frozen ground mechanics, Soil water migration, Runoff, Seepage, Ice solid interface

49-4708
Frost susceptibility of recycled aggregate.
O'Mahony, M.M., Studies in Environmental Science. Vol.60 and International Conference on Environmental Implications of Construction Materials and Technology Developments, Maastricht, The Netherlands, June 1-3, 1994. Proceedings. Environmental aspects of construction with waste materials. Edited by J.J.J.M. Goumans et al, Amsterdam, Elsevier Science, 1994, p.889-896, 7 refs.
DLC TD196.B85 I57
Roads, Construction materials, Waste disposal, Concrete aggregates, Frost heave, Frost resistance, Subgrade preparation, Water content, Cold weather tests

49-4709
Ice forces.
Määttänen, M., Offshore structures. Vol.1. Edited by D.V. Reddy and M. Arockiasamy, Malabar, Krieger Publishing Co., 1991, p.149-159, 23 refs.
DLC TC1665.O315
Sea ice, Ice mechanics, Ice loads, Loads (forces), Dynamic loads, Stress concentration, Offshore structures, Ice solid interface, Analysis (mathematics)

49-4710
Artificial islands.
Croasdale, K.R., Sangster, R.H.B., Offshore structures. Vol.2. Edited by D.V. Reddy and M. Arockiasamy, Malabar, Krieger Publishing Co., 1991, p.125-139, 23 refs.
DLC TC1665.O315
Artificial islands, Cold weather construction, Stability, Design, Ice loads, Ice solid interface, Protection

49-4711
Development of a design methodology for pipelines in ice scoured seabeds.
Clark, J.I., Paulin, M.J., Lach, P.R., Yang, Q.S., Poorooshasb, H., International Conference on Offshore Mechanics and Arctic Engineering, 13th, Houston, TX, Feb. 27-Mar. 3, 1994. Proceedings, Vol.5, New York, American Society of Mechanical Engineers, 1994, p.107-125, 22 refs.
DLC TC1505.I585a
Underground pipelines, Offshore structures, Ocean bottom, Icebergs, Ice scoring, Ice solid interface, Soil mechanics, Deformation, Design criteria, Countermeasures, Simulation

49-4712
Special aspects of corrosion control in the Arctic and subarctic.
Talkington, J.P., Perrigo, L.D., International Conference on Offshore Mechanics and Arctic Engineering, 13th, Houston, TX, Feb. 27-Mar. 3, 1994. Proceedings, Vol.3, New York, American Society of Mechanical Engineers, 1994, p.337-344, 14 refs.
DLC TC1505.I585a
Ocean environments, Offshore structures, Steel structures, Corrosion, Countermeasures

49-4713
Simple theoretical model for computing omega navigation errors near Antarctica.
Barr, R., *Journal of atmospheric and terrestrial physics,* July 1995, 57(8), p.961-966, 13 refs.
Very low frequencies, Ice models, Radio communication, Ice sheets, Atmospheric physics, Antarctica—Scott Base

The propagation of VLF signals around a model icecap has been computed using Kirchhoff diffraction theory. The antarctic continent has been modelled as a spherical cap, whose pole is coincident with that of the South Pole, which totally absorbs VLF radio waves propagating over it. Using this simple model, the range errors expected whilst travelling between Antarctica and New Zealand, on signals from Omega La Reunion and Argentina, have been calculated and compared with recently derived measurements. In order to model the measured range errors accurately it has been necessary to modify the simple spherical cap model to that of a semi-circular spherical cap, producing what is effectively knife edge diffraction. To 'best fit' the data, the northernmost limit of the spherical cap has been found to be 66.1°S for propagation from La Reunion and 75°S for propagation from Argentina. These model icecaps agree well with the northernmost boundary of the antarctic continent where signals from Omega La Reunion and Argentina graze it tangentially. (Auth.)

49-4714
Planning and scientific program of the GEISHA Expedition.
Roland, N.W., *Polarforschung,* 1993 (Publ. 1994), 63(1), p.1-3, With German summary. 3 refs.
Logistics, Expeditions, Research projects, Antarctica—Shackleton Range

The first German geological expedition to the Shackleton Range (GEISHA) in 1987-88 had a planning and preparatory phase of four years, during which the logistics concept for the expedition had to be changed twice. The expedition was logistically complicated and required the support of an icebreaker (RV *Polarstern*), two fixed-wing aircraft (*Polar 2* and *Polar 4*), and two helicopters, as well as the standard field equipment, including motor toboggans and sledges. The scientific program brought together earth scientists who had worked before in various other structural units of the Antarctic. It was based on the knowledge of the previous British and Soviet expeditions and tried to solve some of the remaining problems, especially with respect to stratigraphy, but also included structural, geological, and plate tectonic aspects. (Auth.)

49-4715
Logistics of the GEISHA Expedition.
Kothe, J., Roland, N.W., Bässler, K.H., *Polarforschung,* 1993 (Publ. 1994), 63(1), p.5-8, With German summary. 3 refs.
Logistics, Transportation, Shelters, Radio communication, Expeditions, Antarctica—Shackleton Range

The geological expedition to the Shackleton Range (GEISHA 1987-88) was not only the southernmost German Antarctic expedition, but also a logistically complex operation. Additionally, the initial logistic concept had to be modified during the planning and preparation phases. Instead of transport to the Shackleton Range by land, two ski-equipped aircraft were necessary. Additionally, the RV *Polarstern* had to be used to reach the Brunt Ice Shelf near Halley Station, where the geological expedition to the Shackleton Range started. To make optimum use of the short time available, the field work was supported by two helicopters in addition to skidoos and sledges, which were available at each camp, making it possible to continue the scientific programs even on white-out days. (Auth.)

49-4716
Thermal field of the Barents Sea region. [Teplovoe pole Barentsevomorskogo regiona]
Tsybulia, L., Levashkevich, V., Apatity, Kol'skiĭ nauchnyĭ tsentr Rossiĭskoĭ akademii nauk, 1992, 112p., In Russian with English title page, summary and table of contents. English title page reads: Terrestrial heat flow in the Barents Sea region. 82 refs.
Geothermy, Thermal conductivity, Thermal properties, Bottom sediment, Rock properties, Heat flux, Barents Sea, Russia—Kola Peninsula, Russia—Arkhangel'sk, Russia—Kolguyev Island

49-4717
Laboratory of soil cryology. [Laboratoriia kriologii pochv], Pushchino, Institute of Soil Science and Photosynthesis, Russian Academy of Sciences, 1992, n.p., In Russian and English. 13 refs.
Cryogenic soils, Laboratories, Freeze thaw cycles, International cooperation

49-4718
Geological action of drift ice. [L'action géologique des glaces flottantes]
Dionne, J.C., *Geoscience Canada,* Sep. 1974, 1(3), p.70-72, In French. 2 refs. Review of the 1st International Symposium on the Geological Action of Drift Ice, Quebec, Apr. 20-24, 1974, for which see 32-4506.
Glacial geology, Marine geology, Ice rafting

49-4719
Marine geological investigations in the Beaufort Sea in 1981 and preliminary interpretations for regions from the Canning River to the Canadian border.
Reimnitz, E., Barnes, P.W., Rearic, D.M., Minkler, P.W., Kempema, E.W., Reiss, T.E., *U.S. Geological Survey. Open-file report,* 1982, No.82-974, 46p. + append., 22 refs.
Oceanographic surveys, Topographic surveys, Echo sounding, Ocean bottom, Bottom topography, Bottom sediment, Ice scoring, Ice erosion, Beaufort Sea

49-4720
Bottom features and processes related to drifting ice on the arctic shelf, Alaska.
Reimnitz, E., Barnes, P.W., Alpha, T.R., *U.S. Geological Survey. Miscellaneous field studies,* 1973, MAP MF-532, n.p., 11 refs.
Grounded ice, Ice scoring, Ice erosion, Ocean bottom, Bottom topography, Bottom sediment, United States—Alaska

49-4721
Binding of an antifreeze polypeptide to an ice/water interface via computer simulation.
McDonald, S.M., White, A., Clancy, P., Brady, J.W., *American Institute of Chemical Engineers. AIChE journal,* Apr. 1995, 41(4), p.959-973, 38 refs.
Antifreezes, Chemical ice prevention, Ice water interface, Cryobiology, Molecular structure, Computerized simulation

49-4722
Location of the shear zone in the eastern Beaufort Sea.
Stringer, W.J., Groves, J.E., Henzler, R.D., Schreurs, L.K., Zender-Romick, J., Fairbanks, University of Alaska, Geophysical Institute, Sep. 1982, 25p., 7 refs.
Ice surveys, Sea ice distribution, Pack ice, Fast ice, Ice deformation, Ice pressure, Ice friction, Drift, Beaufort Sea

49-4723
Occurrence of second-year and multiyear ice in the eastern Beaufort Sea.
Stringer, W.J., Groves, J.E., Henzler, R.D., Schreurs, L.K., Zender-Romick, J., Fairbanks, University of Alaska, Geophysical Institute, July 1982, 52p., 3 refs.
Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice cover strength, Ice salinity, Beaufort Sea

49-4724
Evaluation of the utility of Landsat imagery for determination of sediment concentration: Prudhoe Bay, Alaska.
Groves, J.E., Stringer, W.J., Fairbanks, University of Alaska, Geophysical Institute, Dec. 1982, 20p., 4 refs.
Oceanographic surveys, LANDSAT, Sea water, Suspended sediments, Turbidity, Spaceborne photography, Image processing, United States—Alaska—Prudhoe Bay

49-4725
Distribution of floe sizes in the eastern Beaufort Sea shear zone.
Stringer, W.J., Groves, J.E., Henzler, R.D., Olmsted, C., Fairbanks, University of Alaska, Geophysical Institute, Oct. 1982, 36p., 3 refs.
Ice surveys, Sea ice distribution, Ice floes, Ice conditions, Ice deformation, Ice pressure, Ice friction, Drift, Statistical analysis, Beaufort Sea

49-4726
Width and persistence of the Chukchi polynya.
Stringer, W.J., Zender-Romick, J., Groves, J.E., Fairbanks, University of Alaska, Geophysical Institute, Oct. 1982, n.p., 5 refs.
Ice surveys, Sea ice distribution, Polynyas, Ice openings, Drift, Chukchi Sea

49-4727
Distribution of massive ridges in the eastern Beaufort Sea.
Stringer, W.J., Groves, J.E., Henzler, R.D., Schreurs, L.K., Fairbanks, University of Alaska, Geophysical Institute, Sep. 1982, 12p., 2 refs.
Ice surveys, Sea ice distribution, Pressure ridges, Ice pressure, Ice friction, Ice deformation, Beaufort Sea

49-4728
Low temperature lubricant rheology measurement and relevance to engine operation.
Rhodes, R.B., ed, ASTM special technical paper, STP 1143, Philadelphia, American Society for Testing and Materials, 1992, 181p., Refs. passim. Presented at a symposium in Austin, TX, Dec. 10, 1991. For individual papers see 49-4729 through 49-4737.
Motor vehicles, Engines, Lubricants, Viscosity, Cold weather performance, Cold weather tests

49-4729
History of ASTM accomplishments in low temperature engine oil rheology: 1966-1991.
Shaub, H., Low temperature lubricant rheology measurement and relevance to engine operation. Edited by R.B. Rhodes, Philadelphia, American Society for Testing and Materials, 1992, p.1-19, 50 refs.
Motor vehicles, Engine starters, Lubricants, Viscosity, Cold weather performance, Cold weather tests

49-4730
Pumping viscosity by mini-rotary viscometer: critical aspects.
Henderson, K.O., Low temperature lubricant rheology measurement and relevance to engine operation. Edited by R.B. Rhodes, Philadelphia, American Society for Testing and Materials, 1992, p.20-32, 11 refs.
Motor vehicles, Engines, Lubricants, Viscosity, Cooling rate, Cold weather performance, Cold weather tests

49-4731

Scanning Brookfield Technique of low-temperature, low-shear rheology—its inception, development, and applications.

Selby, T.W., Low temperature lubricant rheology measurement and relevance to engine operation. Edited by R.B. Rhodes, Philadelphia, American Society for Testing and Materials, 1992, p.33-64, 53 refs.

Motor vehicles, Engines, Lubricants, Viscosity, Cold weather performance, Cold weather tests

49-4732

Lube manufacturing technology and engine oil pumpability.

Rossi, A., Low temperature lubricant rheology measurement and relevance to engine operation. Edited by R.B. Rhodes, Philadelphia, American Society for Testing and Materials, 1992, p.65-80, 12 refs.

Motor vehicles, Engines, Lubricants, Manufacturing, Viscosity, Cold weather performance, Cold weather tests

49-4733

Development of European test methods for the measurement of engine oil viscosities at low temperatures.

Vickars, M.A., Huby, F.J., Jordan, C.E., Bates, T.W., Müller, H.D., Low temperature lubricant rheology measurement and relevance to engine operation. Edited by R.B. Rhodes, Philadelphia, American Society for Testing and Materials, 1992, p.81-95, 7 refs.

Motor vehicles, Engines, Lubricants, Viscosity, Cold weather performance, Cold weather tests

49-4734

Shear stresses imposed on oils during low-temperature starting.

Alexander, D.L., Low temperature lubricant rheology measurement and relevance to engine operation. Edited by R.B. Rhodes, Philadelphia, American Society for Testing and Materials, 1992, p.96-114, 4 refs.

Motor vehicles, Engine starters, Lubricants, Viscosity, Cold weather performance, Cold weather tests

49-4735

Low temperature pumpability in gasoline engines: establishing performance at critical locations.

Machleder, W.H., O'Mara, J.H., Kopko, R.J., Stambaugh, R.L., Low temperature lubricant rheology measurement and relevance to engine operation. Edited by R.B. Rhodes, Philadelphia, American Society for Testing and Materials, 1992, p.115-136, 12 refs.

Motor vehicles, Engines, Lubricants, Viscosity, Cold weather performance, Cold weather tests

49-4736

Passenger car and heavy truck cold cranking studies—effects of oil viscosity and vehicle type.

Alexander, A.G., MacAlpine, G.A., May, C.J., Smith, C.R., Low temperature lubricant rheology measurement and relevance to engine operation. Edited by R.B. Rhodes, Philadelphia, American Society for Testing and Materials, 1992, p.137-160, 13 refs.

Motor vehicles, Diesel engines, Engine starters, Lubricants, Viscosity, Cold weather performance, Cold weather tests

49-4737

Engine oil viscosity classification low-temperature requirements—current status and future needs.

Spearot, J.A., Low temperature lubricant rheology measurement and relevance to engine operation. Edited by R.B. Rhodes, Philadelphia, American Society for Testing and Materials, 1992, p.161-181, 17 refs.

Motor vehicles, Engine starters, Lubricants, Viscosity, Cold weather performance, Cold weather tests

49-4738

Results of ice testing of slope protection designs of Beaufort Sea islands—status report.

Cox, J.C., Kotras, T.V., *ARCTEC, Incorporated, Columbia, MD. Report,* May 20, 1981, No.590C-1, Var. p.

Artificial islands, Slope protection, Ice pileup, Ice loads, Ice control, Beaufort Sea

49-4739

Review of ice gouging along the Alaskan coast.

Morrel, M.P., Conner, C.S., *U.S. Naval Civil Engineering Laboratory. NCEL technical memorandum,* Aug. 1991, TM-42-91-11, 23p., 13 refs. and 24 annotated bibliographic citations.

Ice scoring, Ice erosion, Ocean bottom, Bottom topography, Bottom sediment, United States—Alaska

49-4740

Phase I report: investigations to develop an ice thickness measurement device.

Alexander Systems Company, San Diego, CA, Dec. 1986, 25p. + appends., Submitted to Sandia National Laboratories, Albuquerque, NM, under Contract No.01-5363.

Ice surveys, Ice cover thickness, Ice acoustics, Echo sounding, Thickness gages, Portable equipment

49-4741

Alaska OCS socioeconomic studies program, Barrow Arch planning area (Chukchi Sea), Petroleum Technology Assessment OCS Lease Sale No.85.

Wilson, J.C., Wade, W.W., Feldman, M.L., Younger, D.R., *U.S. Bureau of Land Management. Minerals Management Service. Alaska Outer Continental Shelf Office. Technical report,* Dec. 1982, No.79, Var. p., PB85-17293, Refs. p.8/1-8/17.

Offshore drilling, Exploration, Petroleum industry, Economic development, Environmental impact, Cost analysis, United States—Alaska, Chukchi Sea

49-4742

Slope protection design development for Beaufort Sea islands.

Tetra Tech, Inc., Pasadena, CA, ARCTEC, Inc., Columbia, MD, Mar. 1980, 60p. + appends., Refs. passim. Joint industry proposal P-21917 submitted to the Alaska Oil and Gas Association.

Artificial islands, Slope protection, Ice pileup, Ice loads, Ice control, Beaufort Sea

49-4743

Design guidelines for the development of a trencher for cutting rock, coral, and frozen sand in the nearshore environment.

Tausig, W.R., *U.S. Naval Civil Engineering Laboratory. Technical report,* Dec. 1981, TR-890, 103p., 39 refs.

Ocean bottom, Trenching, Rock excavation, Hydraulic jets, Cavitation, Pipe laying

49-4744

Role of spermidine in the ice-nucleating activity of the EIM from *Erwinia uredovora* KUIN-3.

Kawahara, H., Mano, Y., Hamada, R., Obata, H., *Bioscience, biotechnology, and biochemistry,* Dec. 1994, 58(12), p.2201-2206, 36 refs.

Microbiology, Bacteria, Ice nuclei, Nucleating agents, Ice formation, Heterogeneous nucleation, Chemical analysis, Ice water interface

49-4745

Characteristics of ice-nucleation activity in *Fusarium avenaceum* IFO 7158.

Hasegawa, Y., Ishihara, Y., Tokuyama, T., *Bioscience, biotechnology, and biochemistry,* Dec. 1994, 58(12), p.2273-2274, 14 refs.

Microbiology, Fungi, Ice nuclei, Heterogeneous nucleation, Ice formation, Chemical analysis, Nucleating agents, Temperature effects

49-4746

Prediction of decomposition time of permafrost grounds in the course of displacement along the surface of freezing.

Volokhov, S.S., *Moscow University. Geology bulletin,* 1994, 49(4), p.53-55, Translated from Vestnik Moskovskogo Universiteta. Geologiia. 3 refs.

Permafrost transformation, Frozen ground mechanics, Rheology, Permafrost physics, Soil creep, Decomposition, Deformation

49-4747

Snowed under.

Wilkinson, T., *National parks,* Jan.-Feb. 1995, 69(1-2), p.32-37.

Snow vehicles, Ecosystems, Air pollution, Environmental impact, Noise (sound), Countermeasures

49-4748

Comments on "Further evidence for the existence of two kinds of H-bonds in ice IH" by Li et al.

Tse, J.S., Klug, D.D., *Physics letters A,* Mar. 13, 1995, 198(5-6), p.464-466, 16 refs. For article under discussion see 49-679.

Ice physics, Ice structure, Molecular structure, Hydrogen bonds, Defects, Vibration, Spectra

49-4749

Effects of a 2 x CO_2 climate on two large lake systems: Pyramid Lake, Nevada, and Yellowstone Lake, Wyoming.

Hostetler, S.W., Giorgi, F., *Global and planetary change,* Apr. 1995, 10(1-4), p.43-54, 32 refs.

Limnology, Water temperature, Surface temperature, Evaporation, Climatic changes, Global warming, Carbon dioxide, Atmospheric composition, Lake ice, Ice melting, Mathematical models, United States—Nevada—Pyramid Lake, United States—Wyoming—Yellowstone Lake

49-4750

Pattern formation in growth of snow crystals: hexagonal and dendritic patterns.

Yokoyama, E., Kuroda, T., Springer Proceedings in Physics. No.52 and Nishinomiya-Yukawa Memorial Symposium, 4th, Nishinomiya City, Japan, Oct. 26-27, 1989. Proceedings. Dynamics and patterns in complex fluids. Edited by A. Onuki et al, Berlin, Springer-Verlag, 1990, p.194-195, 4 refs.

DLC QD506.A1 N57

Snow physics, Snow crystal growth, Ice vapor interface, Dendritic ice, Phase transformations

49-4751

Probing the structure of cometary ice.

Wilson, M.A., Pohorille, A., Jenniskens, P., Blake, D.F., *Origins of life and evolution of the biosphere,* June 1995, 25(1-3), p.3-19, 32 refs.

Extraterrestrial ice, Computerized simulation, Amorphous ice, Ice physics, Ice vapor interface, Porosity, Ice structure, Adsorption

49-4752

Chemical composition of bulk atmospheric deposition to snow at Col de la Brenva (Mt. Blanc area).

Ronseaux, F., Delmas, R.J., NATO Advanced Research Workshop on Acid Deposition Processes at High Elevation Sites, Edinburgh, Scotland, Sep. 8-13, 1986. Proceedings. Edited by M.H. Unsworth et al and NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.252, Dordrecht, Kluwer Academic Publishers, 1988, p.491-510, 24 refs.

DLC TD196.A25 N38

Snowfall, Alpine landscapes, Atmospheric composition, Aerosols, Snow composition, Air pollution, Firn, Sampling, Correlation, Chemical analysis, France—Mont Blanc

49-4753
Chemical composition of the seasonal snowcover at a southern French Alps site; some preliminary results.
Delmas, V.M., Ronseaux, F., Delmas, R.J., NATO Advanced Research Workshop on Acid Deposition Processes at High Elevation Sites, Edinburgh, Scotland, Sep. 8-13, 1986. Proceedings. Edited by M.H. Unsworth et al and NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.252, Dordrecht, Kluwer Academic Publishers, 1988, p.511-516, 8 refs.
Precipitation (meteorology), Alpine landscapes, Snow composition, Meltwater, Chemical analysis, Sampling, Ion density (concentration), Seasonal variations, France—Alps

49-4754
Chemical composition of snow in the remote Scottish highlands.
Davies, T.D., Brimblecombe, P., Blackwood, I.L., Tranter, M., Abrahams, P.W., NATO Advanced Research Workshop on Acid Deposition Processes at High Elevation Sites, Edinburgh, Scotland, Sep. 8-13, 1986. Proceedings. Edited by M.H. Unsworth et al and NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.252, Dordrecht, Kluwer Academic Publishers, 1988, p.517-539, 30 refs.
DLC TD196.A25 N38
Snowfall, Snow composition, Ion density (concentration), Sampling, Altitude, Aerosols, Air pollution, Correlation, United Kingdom—Scotland

49-4755
Trafficability in the Arctic Ocean in summer: experience gained from a North Pole voyage.
Tunik, A.L., Topics in Engineering. Vol.17 and Marine engineering: design and operation of ships and offshore structures. Edited by T.K.S. Murthy and C.A. Brebbia, Southampton, Computational Mechanics Publications, 1994, p.185-197, 10 refs.
DLC VM156.M295
Icebreakers, Ice navigation, Performance, Trafficability, Nuclear power, Ice cover thickness, Ice cover effect, Ice crossings, Statistical analysis, Arctic Ocean

49-4756
Studies on the effect of the sink-&-float-type ice boom (SFIB) in ice flow control and measurements which prevent SFIB from burying in sand.
Imaizumi, A., Hara, F., Saeki, H., Enoki, K., Topics in Engineering. Vol.17 and Marine engineering: design and operation of ships and offshore structures. Edited by T.K.S. Murthy and C.A. Brebbia, Southampton, Computational Mechanics Publications, 1994, p.199-207, 3 refs.
DLC VM156.M295
Ports, Ice floes, Ice control, Ice booms, Performance, Design

49-4757
Development of multipurpose icebreaker and offshore construction vessel.
Tellefsen, T.P., Topics in Engineering. Vol.17 and Marine engineering: design and operation of ships and offshore structures. Edited by T.K.S. Murthy and C.A. Brebbia, Southampton, Computational Mechanics Publications, 1994, p.221-231, 4 refs.
For another version see 48-113.
DLC VM156.M295
Icebreakers, Research projects, Construction equipment, Design criteria, Ice navigation, Performance, Electronic equipment

49-4758
Multipurpose icebreakers for the Finnish National Board of Navigation.
Lohi, P., Topics in Engineering. Vol.17 and Marine engineering: design and operation of ships and offshore structures. Edited by T.K.S. Murthy and C.A. Brebbia, Southampton, Computational Mechanics Publications, 1994, p.233-240, 2 refs.
DLC VM156.M295
Icebreakers, Design, Design criteria, Performance, Specifications

49-4759
Ontario Hydro—General Public Utilities interconnection Lake Erie cable crossing ice scour evaluation.
Grass, J.D., Johnston, O.A., *Ontario Hydro. Report,* 1982, No.82032, 9p. + appends., Refs. passim.
Appendixes include previous reports.
Lake ice, Ice scoring, Ice erosion, Bottom topography, Bottom sediment, Route surveys, Power lines, Underground cables, Erie, Lake

49-4760
Winter tyres: effects of proposals for rules. [Vinterdäck: effekter av olika regelförslag]
Carlsson, A., Öberg, G., *Sweden. Statens väg- och transportforskningsinstitut. VTI meddelande,* 1995, No.757, 36p., In Swedish with English summary. 7 refs.
Road icing, Road maintenance, Tires, Safety, Accidents, Cost analysis, Legislation, Sweden

49-4761
Studded tyres: socio-economic calculations. [Dubbdäck: samhällsekonomiska konsekvenser]
Carlsson, A., Centrell, P., Öberg, G., *Sweden. Statens väg- och transportforskningsinstitut. VTI meddelande,* 1995, No.756, 36p. + appends., In Swedish with English summary. 27 refs.
Road icing, Road maintenance, Tires, Safety, Accidents, Cost analysis, Sweden

49-4762
Morphology of sea ice pressure ridges in the Baltic Sea.
Kankaanpää, P., Helsinki, University, Department of Geography, 1991, 119p., Refs. p.109-113.
Ice surveys, Sea ice distribution, Ice conditions, Ice cover thickness, Pressure ridges, Ice pressure, Ice deformation, Ice forecasting, Statistical analysis, Baltic Sea

49-4763
Measurements of ice forces on bridge piers, 1970 and 1971.
Neill, C.R., Saunders, H.D., Schultz, H., *Alberta. Research Council. Highway and River Engineering Division. Report,* Sep. 1971, 20p. + appends., 11 refs.
River ice, Ice breakup, Ice loads, Ice pressure, Ice cover thickness, Ice solid interface, Bridges, Piers, Canada—Alberta

49-4764
Experimental study on the compressive strength of sea ice and the ice forces on a circular pile.
Saeki, H., Saito, S., Hamanaka, K., Ozaki, A., *Coastal engineering in Japan,* 1976, Vol.19, p.73-87, 10 refs.
Offshore structures, Piles, Ice solid interface, Ice cover strength, Ice loads, Ice pressure

49-4765
Icing hazard detection for aircraft.
Sand, W.R., Kropfli, R.A., *U.S. Patent Office. Patent,* July 2, 1991, 12 col., USP-5,028,929, 4 refs.
Aircraft icing, Ice detection, Ice forecasting, Moisture detection, Supercooled clouds, Cloud droplets, Airborne radar, Warning systems

49-4766
Prediction of driving traction performance on snow.
Nesbitt, T.R., Barron, D.J., SAE technical paper series, No.800836, Warrendale, PA, Society of Automotive Engineers, 1980, 21p., 6 refs. Presented at the Passenger Car Meeting, Dearborn, MI, June 9-13, 1980.
Motor vehicles, Tires, Rubber snow friction, Traction

49-4767
Snow survey bulletin and water supply forecast, May 1, 1995, Yukon Territory.
Canada. Indian and Northern Affairs. Water Resources Division, Whitehorse, 1995, 27p.
Snow surveys, Runoff forecasting, Snow depth, Snow water equivalent, Stream flow, Canada—Yukon Territory

49-4768
Hydrological yearbook 1992. [Hydrologinen vuosikirja 1992]
Leppäjärvi, R., ed, Helsinki, Vesi- ja ympäristöhallitus (National Board of Waters and the Environment, 1995, 168p., In Finnish and English with Swedish summary.
Water reserves, Water level, River flow, Runoff, Stream flow, Precipitation (meteorology), Snow water equivalent, Snow depth, Frost penetration, Freezeup, Ice breakup, Finland

49-4769
Cryogenic alteration of a frost susceptible soil.
White, T.L., Ottawa, Carleton University, 1992, 137p., M.S. thesis. 55 refs.
Soil freezing, Frozen ground strength, Frozen ground thermodynamics, Frost action, Cryogenic soils, Soil structure, Soil texture

49-4770
Phase composition analysis of core samples: Beaufort (1990) and Cross-Delta (1992) transects.
Patterson, D.E., Ottawa, Carleton University, Geotechnical Science Laboratories, 1994, 6p. + append., IR-64, 3 refs.
Permafrost beneath rivers, Permafrost hydrology, Frozen ground chemistry, Frozen ground thermodynamics, Alluvium, Saline soils, Salinity, Unfrozen water content, Core samplers, Canada—Northwest Territories—Mackenzie River Delta

49-4771
Canada-France pipeline-ground freezing experiment: frozen transition experiment. Second freeze period.
Carleton University. Geotechnical Science Laboratories, Ottawa, 1993, 62p. + append., IR-63, 12 refs.
Gas pipelines, Underground pipelines, Pipeline freezing, Permafrost beneath structures, Soil freezing, Frost heave, Freeze thaw tests, Frost penetration, Soil pressure

49-4772
Study of movement of hydrocarbons through freezing and thawing soils (DEW line cleanup): Final report. Appendix to final report. Gas chromatographic traces.
Carleton University. Geotechnical Science Laboratories, Ottawa, 1994, 70p. + appends. (2 vols.), IR-67, Refs. passim. Tables of gas chromatographic traces are bound in a separate volume.
Oil spills, Soil pollution, Soil freezing, Frozen ground chemistry, Permafrost samplers, Soil chemistry, Soil tests

49-4773
Canada-France pipeline-ground freezing project: uplift resistance tests. Final report.
Carleton University. Geotechnical Science Laboratories, Ottawa, 1994, Var. p., IR-65, Refs. passim.
Gas pipelines, Underground pipelines, Pipeline freezing, Permafrost beneath structures, Soil freezing, Frozen ground strength, Frozen ground thermodynamics, Frozen ground compression, Frost heave, Frost resistance, Freeze thaw tests

49-4774
Development of Morris skimmers for arctic use.
Morris, D.E., Arctic Marine Oil Spill Program Technical Seminar, Edmonton, Alberta, Mar. 7-9, 1979. Proceedings, Ottawa, Environment Canada, 1979, p.125-129.
Oil spills, Oil recovery, Cold weather operation, Cold weather performance

49-4775
Arctic skimmer.
Huston, D.A.C., Arctic Marine Oil Spill Program Technical Seminar, Edmonton, Alberta, Mar. 7-9, 1979. Proceedings, Ottawa, Environment Canada, 1979, p.130-142, 2 refs.
Oil spills, Oil recovery, Cold weather operation, Cold weather performance

49-4776

Feasibility of air and water spray barriers for the collection, concentration and in-situ burning of spilled oils.

Comfort, G., Menon, B., Noble, P., Arctic Marine Oil Spill Program Technical Seminar, Edmonton, Alberta, Mar. 7-9, 1979. Proceedings, Ottawa, Environment Canada, 1979, p.143-158, 6 refs.

Oil spills, Water pollution, Countermeasures, Waste disposal, Ice cover effect, Ice water interface, Cold weather operation

49-4777

Evaluation of a portable open-pit incinerator for the disposal of oil-soaked debris.

Twardus, E.M., Arctic Marine Oil Spill Program Technical Seminar, Edmonton, Alberta, Mar. 7-9, 1979. Proceedings, Ottawa, Environment Canada, 1979, p.249-265, 3 refs.

Oil spills, Waste disposal, Cold weather performance, Permafrost preservation

49-4778

Ice management at marine terminal Herschel Island.

Michel, B., Lafleur, P., Ottawa, Canada, Department of Public Works, 1971, 212p., 6 refs.

Ports, Wharves, Tanker ships, Ice navigation, Ice control, Ice growth, Ice cover thickness, Ice forecasting, Sea water freezing, Canada—Yukon Territory—Herschel Island

49-4779

State of Canada's climate: temperature change in Canada 1895-1991.

Gullett, D.W., Skinner, W.R., Environment Canada. State of the Environment Report. No.92-2, Ottawa, Atmospheric Environment Service, 1992, 36p., 6 refs.

DLC QC903.2.C2 G85

Air temperature, Climatology, Temperature measurement, Periodic variations, Climatic changes, Meteorological data, Weather stations, Statistical analysis, Canada

49-4780

Effects of enhanced UV-B radiation on a subarctic heath ecosystem.

Johanson, U., Gehrke, C., Björn, L.O., Callaghan, T.V., Sonesson, M., *Ambio,* Mar. 1995, 24(2), p.106-111, 51 refs.

Ecosystems, Plant ecology, Plant physiology, Subarctic landscapes, Ultraviolet radiation, Solar radiation, Atmospheric attenuation, Ozone, Environmental impact, Environmental tests, Sweden—Abisko

49-4781

Characterization of ice electrodes.

Doe, H., Kobayashi, T., Sawada, H., *Journal of electroanalytical chemistry,* 1995, Vol.383, p.53-59, 32 refs.

Frozen liquids, Ice electrical properties, Liquid phases, Liquid solid interfaces, Ion diffusion, Hydrogen bonds, Water structure, Molecular structure

49-4782

Recent observations of tides and tidal currents from the northeastern Bering Sea shelf.

Mofjeld, H.O., *U.S. National Oceanic and Atmospheric Administration. Environmental Research Laboratories. Pacific Marine Environmental Laboratory. NOAA technical memorandum,* June 1984, ERL PMEL-57, 36p., 15 refs.

Oceanographic surveys, Tides, Tidal currents, Ocean waves, Diurnal variations, Ice cover effect, Bering Sea

49-4783

Winter currents on the eastern Bering Sea shelf.

Salo, S.A., Schumacher, J.D., Coachman, L.K., *U.S. National Oceanic and Atmospheric Administration. Environmental Research Laboratories. Pacific Marine Environmental Laboratory. NOAA technical memorandum,* 1983, ERL PMEL-45, 53p., 17 refs.

Oceanographic surveys, Ocean currents, Tidal currents, Wind (meteorology), Air ice water interaction, Ice cover effect, Bering Sea

49-4784

Finite element analysis of floating ice sheets.

Vaudrey, K.D., Katona, M.G., ASCE National Structural Engineering Meeting, Cincinnati, OH, Apr. 22-26, 1974. Meeting preprint, No.2235, New York, American Society of Civil Engineers, 1974, 28p., 10 refs.

Sea ice, Ice runways, Ice cover strength, Ice elasticity, Ice loads, Ice deformation, Computerized simulation

49-4785

Effects of freeze/thaw cycles on the permeability of three compacted soils.

Bowders, J.J., Jr., McClelland, S., Hydraulic conductivity and waste contaminant transport in soils. Edited by D.E. Daniel and S.J. Trautwein and ASTM Special Technical Publication. No.1142, Philadelphia, American Society for Testing and Materials, 1994, p.461-481, 9 refs.

DLC TD878.H95

Soil tests, Clay soils, Cryogenic soils, Mechanical tests, Freeze thaw tests, Frost action, Soil compaction, Permeability, Stress concentration

49-4786

Biotic and abiotic processes controlling water chemistry during snowmelt at Rabbit Ears Pass, Rocky Mountains, Colorado, U.S.A.

Peters, N.E., Leavesley, G.H., *Water, air, and soil pollution,* Jan. 1995, 79(1-4), p.171-190, 49 refs.

Snow hydrology, Watersheds, Snowmelt, Meltwater, Ground water, Hydrogeochemistry, Chemical analysis, Weathering

United States—Colorado—Rabbit Ears Pass

49-4787

Sulfur isotope dynamics in a high-elevation catchment, West Glacier Lake, Wyoming.

Finley, J.B., Drever, J.I., Turk, J.T., *Water, air, and soil pollution,* Jan. 1995, 79(1-4), p.227-241, 27 refs.

Watersheds, Lake water, Runoff, Hydrogeochemistry, Isotope analysis, Snowmelt, Snow composition, Bedrock, Air pollution, Water pollution, United States—Wyoming—West Glacier Lake

49-4788

Movement mechanisms of subpolar-type glaciers in China.

Huang, M.H., *Science in China B,* Mar. 1995, 38(3), p.352-361, 15 refs.

Glacier flow, Glacier surveys, Subpolar regions, Glacier beds, Ice mechanics, Ice deformation, Sliding, Ice solid interface, Bedrock, China—Urumqi Glacier

49-4789

Monitoring of forest ecosystems in the Russian subarctic: effects of industrial pollution.

Gytarskiĭ, M.L., Karaban, R.T., Nazarov, I.M., Sysygina, T.I., Chemeris, M.V., *Science of the total environment,* Mar. 1, 1995, 164(1), p.57-68, 28 refs.

Air pollution, Atmospheric composition, Sampling, Subpolar regions, Forest ecosystems, Environmental impact, Plant tissues, Damage, Mining, Monitors, Russia—Kola Peninsula

49-4790

Late- and postglacial environments in the northern Barents Sea west of Franz Josef Land.

Poliak, L.V., Solheim, A., *Polar research,* Dec. 1994, 13(2), p.197-207, 54 refs.

Pleistocene, Marine geology, Quaternary deposits, Glacial deposits, Marine deposits, Paleoclimatology, Glacier oscillation, Lithology, Radioactive age determination, Barents Sea

49-4791

Maintenance of the Arctic Ocean large-scale baroclinic structure by the M2 tide.

Poliakov, I.V., *Polar research,* Dec. 1994, 13(2), p.219-232, 31 refs.

Oceanography, Ocean currents, Tidal currents, Sea level, Turbulent exchange, Periodic variations, Fluid dynamics, Mathematical models, Convection, Bottom topography, Topographic effects, Arctic Ocean

49-4792

Diatoms from an ice-wedge furrow, Ungava Peninsula, Quebec, Canada.

Koivo, L., Seppälä, M., *Polar research,* Dec. 1994, 13(2), p.237-241, 25 refs.

Geocryology, Continuous permafrost, Suprapermafrost ground water, Ice wedges, Sampling, Algae, Classifications, Microbiology, Canada—Quebec—Ungava Peninsula

49-4793

Conceptual model of the impact of flaws on the stress state of sea ice.

Lewis, J.K., *Journal of geophysical research,* May 15, 1995, 100(C5), p.8829-8835, 17 refs.

Sea ice, Ice floes, Ice strength, Ice mechanics, Rheology, Tensile properties, Thermal stresses, Defects, Crack propagation, Mathematical models

49-4794

Results of a stratified snow emissivity model based on the wave approach: application to the antarctic ice sheet.

Surdyk, S., Fily, M., *Journal of geophysical research,* May 15, 1995, 100(C5), p.8837-8848, 34 refs.

Ice sheets, Remote sensing, Radiometry, Snow cover structure, Snow optics, Stratification, Brightness, Surface roughness, Mathematical models

The results from a snow emissivity model are used to help with the interpretation of the Scanning Multichannel Microwave Radiometer data (aboard the satellite Nimbus 7, 1978-1986) over Antarctica. The snow is considered isothermal with horizontal stratification, isotropic inside each stratum, and with smooth interfaces. The spatial distribution of the microwave signatures over Antarctica reveals three areas with typical spectral signatures. These areas are identified from the point of view of snow characteristics through a ground data set (Surdyk and Fily, 1993). The model reproduces well the effect of the stratification on the polarization differences as observed. The strong gradient of emissivity versus frequency observed on one of the test sites is not completely understood. Depth hoar layers characterized by faceted and cup-shaped coarse snow grains seem to have a particular scattering behavior compared with that of the usual grains. When these coarse grains are replaced by fine grains, the model results are closer to the measured data. (Auth. mod.)

49-4795

Dynamics of premelted films: frost heave in a capillary.

Wettlaufer, J.S., Worster, M.G., *Physical review E,* May 1995, 51(5-B), p.4679-4689, 32 refs.

Ice physics, Thermodynamics, Frost heave, Ice melting, Water films, Ice water interface, Interfacial tension, Capillary ice, Mathematical models

49-4796

Gamma-ray detector for in-situ measurement of ^{137}Cs radioactivity in snowfields and glaciers.

Dunphy, P.P., Dibb, J.E., Chupp, E.L., *Nuclear instruments and methods in physics research A,* Dec. 30, 1994, 353(1-3), Symposium on Radiation Measurements and Applications, 8th, Ann Arbor, MI, May 16-19, 1994. Proceedings, p.482-485, 15 refs.

Snow accumulation, Snow composition, Glacier mass balance, Fallout, Sampling, Correlation, Gamma irradiation, Portable equipment

Radioactive debris from above-ground tests of nuclear weapons (mainly 1954-1970) and from the Chernobyl accident (1986) have been deposited on glaciers and snowfields, where they can be used as time and depth markers to determine the subsequent accumulation of snow. A technique is presented to locate these markers that has been used just recently: in-situ measurement of γ-rays from ^{137}Cs. These γ-rays, which are associated with radioactive fallout, have a distinctive depth profile and serve as markers of historical nuclear events. The γ-ray measurement involves lowering a scintillation detector down a borehole in the snow or ice and recording the response to the ^{137}Cs γ-rays as a function of depth. The in-situ measurement can be done relatively quickly and can replace sample retrieval, or it can be used to decide which ice or snow samples should be transported for later analysis in the laboratory. Reported here is a portable detector system that is being developed for use in Antarctica. It is based on inexpensive, commercially available detectors and electronics. (Auth. mod.)

49-4797

Regional and temporal variations of rock magnetic parameters in arctic marine sediments. [Regionale und altersabhängige Variation gesteinsmagnetischer Parameter in marinen Sedimenten der Arktis]

Frederichs, T., *Berichte zur Polarforschung,* 1995, No.164, 212p., In German with English summary. The work is based on the author's dissertation submitted to the University of Bremen in 1994. Refs. p.163-174.

Rock magnetism, Sea water, Stratigraphy, Hydrography, Sediments, Arctic Ocean

49-4798

Comparison of an optimized dynamic-thermodynamic sea ice model with observations in the Weddell Sea. [Vergleichende Untersuchungen eines optimierten dynamisch-thermodynamischen Meereismodells mit Beobachtungen im Weddellmeer]

Fischer, H., *Berichte zur Polarforschung,* 1995, No.166, 130p., In German with English summary. The work is based on the author's dissertation submitted to the University of Bremen in 1994. Refs. p.125-130.

Sea ice, Models, Heat transfer, Ice air interface, Boundary value problems, Ocean currents, Antarctica—Weddell Sea

The role of the sea ice in determining the boundary conditions at the sea surface and its influence on the global ocean circulation is presently investigated with several sea ice-ocean models. This investigation is carried out through a comparison between observations and sea ice model results. An optimized dynamic-thermodynamic sea ice model for the Weddell Sea is coupled to a one-dimensional mixed layer model and is forced with atmospheric boundary conditions from global analyses for the years 1986 and 1987. From sensitivity studies the influence of different atmospheric forcings and model parameters is examined to quantify the required accuracy for a realistic simulation of sea ice. Air temperature and wind field have to be known to a high accuracy to produce a good correspondence between model results and sea ice observations. The net freezing rate, which represents the most important boundary condition for the polar ocean, is essentially determined by the strength and structure of the wind field. The optimized sea ice model shows a good agreement with sea ice concentrations which were analyzed using data taken from passive microwave sensors. (Auth. mod.)

49-4799

Ecophysiology of polar algae.

Kirst, G.O., Wiencke, C., *Journal of phycology,* Apr. 1995, 31(2), p.181-199, Refs. p.196-199.

Sea ice, Algae, Plant ecology, Photosynthesis, Marine biology, Water temperature, Polar regions

Polar marine environments are characterized by extreme variations in irradiance and seasonal changes of day length, accompanied by low water temperatures usually in the range of -1.8° to 2°C (in shallow waters, up to 10°C). Benthic macroalgae are abundant in the tidal zones up to the supralittoral, while microalgae inhabit the sea ice, the ice edge zones, and, as phytoplankton, the open water column. The present review summarizes the physiology and ecophysiology of these algae with the aim of revealing their specific physiological and metabolic properties that allow for adaptation and acclimatization to the special conditions of polar environments. Important abiotic and biotic factors as well as environmental conditions comparing the Arctic and Antarctic are summarized. (Auth. mod.)

49-4800

Problems of mountain hazard mapping using spaceborne remote sensing techniques.

Buchroithner, M.F., *Advances in space research,* June 1995, 15(11), A3.2 Meeting of COSPAR Scientific Commission A, Hamburg, Germany, July 11-21, 1994. Proceedings, p.(11)57-(11)66, 5 refs.

Remote sensing, Avalanche forecasting, Mudflows, Spaceborne photography, Sensor mapping, Soil mapping, Synthetic aperture radar, Topographic effects

49-4801

DSC measurement of cell suspensions during successive freezing runs: implications for the mechanisms of intracellular ice formation.

Bryant, G., *Cryobiology,* Apr. 1995, 32(2), p.114-128, 45 refs.

Microbiology, Cryobiology, Solutions, Ice formation, Damage, Temperature measurement, Cooling rate, Heterogeneous nucleation

49-4802

Differential effects of growth temperature on ice nuclei active at different temperatures that are produced by cells of *Pseudomonas syringae*.

Gurian-Sherman, D., Lindow, S.E., *Cryobiology,* Apr. 1995, 32(2), p.129-138, 30 refs.

Bacteria, Microbiology, Cryobiology, Ice nuclei, Ice formation, Heterogeneous nucleation, Growth, Temperature effects

49-4803

Moraine and soil stratigraphy, Mammoth Basin and upper Green River areas, Wind River Mountains, western Wyoming, U.S.A.

Mahaney, W.C., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1993, 29(2), p.103-118, With German summary. 40 refs.

Glacial deposits, Pleistocene, Moraines, Glacial geology, Soil profiles, Stratigraphy, Age determination, Weathering, United States—Wyoming

49-4804

Ozone concentration and photolysis frequencies: results of an experiment at a high alpine station (Pegelstation Vernagtbach/Oetztal Alps.

Reuder, J., Escher-Vetter, H., Kins, L., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1993, 29(2), p.119-132, With German summary. 30 refs.

Atmospheric composition, Atmospheric density, Photometry, Photochemical reactions, Ozone, Periodic variations, Alpine landscapes, Chemical analysis, Turbulent diffusion, Austria—Alps

49-4805

Glaciated area of Goldberggrupe in the Hohe Tauern, Austria, 1850-1992. [Kartometrische Daten der Vergletscherung der Goldberggruppe in der Hohen Tauern 1850-1992]

Böhm, R., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1993, 29(2), p.133-152, In German with English summary. 26 refs.

Mountain glaciers, Glacier surveys, Alpine glaciation, Glacier oscillation, Periodic variations, Photogrammetry, Glacier mass balance, Correlation, Austria—Alps

49-4806

Mieminger Schneeferner, an avalanche-fed cirque glacier. [Der Mieminger Schneeferner, ein Beispiel eines lawinenernährten Kartgletschers]

Kuhn, M., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1993, 29(2), p.153-171, In German with English summary. 25 refs.

Mountain glaciers, Glacier surveys, Alpine glaciation, Cirque glaciers, Glacier oscillation, Avalanche mechanics, Glacier alimentation, Austria—Alps

49-4807

Determination of the geodetic position of ablation stakes by the Global Positioning System. [Bestimmung der geodätischen Position von Gletschersignalen mit Hilfe des Global Positioning Systems (GPS)]

Tremel, H., Hornik, H., Rentsch, H., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1993, 29(2), p.173-178, In German with English summary. 6 refs.

Glacier surveys, Geodetic surveys, Spacecraft, Glacier ablation, Mountain glaciers, Glacier oscillation, Snow stakes, Correlation, Austria—Alps

49-4808

Glaciers of the Austrian Alps. [Die Gletscher der österreichischen Alpen]

Patzelt, G., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1993, 29(2), p.179-193, In German.

Glacier surveys, Mountain glaciers, Alpine glaciation, Glacier oscillation, Periodic variations, Austria—Alps

49-4809

Northern Hemisphere snow cover: recent variations in historic perspective.

Robinson, D.A., Frei, A., Hughes, M.G., Wright, J.J., Annual Climate Diagnostic Workshop, 18th, Boulder, CO, Nov. 1-5, 1993. Proceedings, Washington, D.C., U.S. Department of Commerce, 1993, p.248-251, 4 refs.

DLC QC980.C54a

Snow cover distribution, Climatology, Periodic variations, Snow surveys, Sensor mapping, Spaceborne photography, Meteorological data, Weather observations

49-4810

Relations between 700-millibar height anomalies and April 1 snowpack accumulation in the western United States.

McCabe, G.J., Jr., Legates, D.R., Dettinger, M.D., Annual Climate Diagnostic Workshop, 18th, Boulder, CO, Nov. 1-5, 1993. Proceedings, Washington, D.C., U.S. Department of Commerce, 1993, p.252-255.

Snow accumulation, Climatology, Periodic variations, Atmospheric circulation, Snow air interface, Correlation

49-4811

Physical properties of frozen volatiles—their relevance to the study of comet nuclei.

Klinger, J., Comets in the post-Halley era. Edited by R.L. Newburn, Jr. et al and Astrophysics and Space Science Library. Vol.167, Dordrecht, Kluwer Academic Publishers, 1991, p.227-241, Refs. p.237-242.

DLC QB721.C6494

Extraterrestrial ice, Physical properties, Simulation, Ice physics, Ice sublimation, Amorphous ice, Hydrates, Clathrates, Geochemistry

49-4812

Laboratory simulation of cometary processes: results from first KOSI experiments.

Grün, E., et al, Comets in the post-Halley era. Edited by R.L. Newburn, Jr. et al and Astrophysics and Space Science Library. Vol.167, Dordrecht, Kluwer Academic Publishers, 1991, p.277-297, Refs. p.294-297.

DLC QB721.C6494

Extraterrestrial ice, Laboratory techniques, Simulation, Ice sublimation, Ice physics, Physical properties, Geochemistry, Heat transfer, Advection, Ice water interface, Radiation absorption

49-4813

Laboratory simulation of cometary structures.

Ibadinov, Kh.I., Rahmonov, A.A., Bjasso, A.S., Comets in the post-Halley era. Edited by R.L. Newburn, Jr. et al and Astrophysics and Space Science Library. Vol.167, Dordrecht, Kluwer Academic Publishers, 1991, p.299-311, 35 refs.

DLC QB721.C6494

Extraterrestrial ice, Ice physics, Simulation, Ice sublimation, Physical properties, Geochemistry, Mineralogy, Thermal regime

49-4814

Chemical theories on the origin of comets.

Yamamoto, T., Comets in the post-Halley era. Edited by R.L. Newburn, Jr. et al and Astrophysics and Space Science Library. Vol.167, Dordrecht, Kluwer Academic Publishers, 1991, p.361-376, Refs. p.373-376.

DLC QB721.C6494

Extraterrestrial ice, Ice formation, Ice physics, Ice sublimation, Chemical composition, Theories, Cosmic dust, Geochemistry

49-4815

Installation and monitoring of thermal conductivity suction sensors in a fine-grained subgrade soil subject to seasonal frost.

Khogali, W.E.I., Anderson, K.O., Gan, J.K., Fredlund, D.G., Conference on Road and Airport Pavement Response Monitoring Systems, West Lebanon, NH, Sep. 12-16, 1991. Proceedings, New York, American Society of Civil Engineers, 1992, p.153-167, 10 refs.

DLC TE251.5.R28

Pavements, Bituminous concretes, Pavement bases, Subgrade soils, Soil tests, Seasonal freeze thaw, Frost action, Sensors, Water pressure, Frozen ground temperature, Thermal conductivity

49-4816

Evaluation of soil water sensors in frozen soils.

Nieber, J.L., Baker, J.M., Spaans, E.J.A., Conference on Road and Airport Pavement Response Monitoring Systems, West Lebanon, NH, Sep. 12-16, 1991. Proceedings, New York, American Society of Civil Engineers, 1992, p.168-181, 18 refs.

DLC TE251.5.R28

Frozen ground mechanics, Soil water, Water content, Unfrozen water content, Sensors, Soil tests, Porosity, Neutron activation analysis

49-4817

Freeze-drying of pharmaceutical crystalline and amorphous solutes in vials: dynamic multi-dimensional models of the primary and secondary drying stages and qualitative features of the moving interface.

Liapis, A.I., Bruttini, R., *Drying technology,* 1995, 13(1-2), p.43-72, 23 refs.

Freeze drying, Vacuum freezing, Solutions, Mathematical models, Mass transfer, Ice sublimation, Ice water interface, Water transport, Heat transfer

49-4818

Aerosol absorption measurements at Barrow, Mauna Loa and the South Pole.

Bodhaine, B.A., *Journal of geophysical research,* May 20, 1995, 100(D5), p.8967-8975, 58 refs.

Polar atmospheres, Atmospheric density, Radiation absorption, Haze, Aerosols, Light scattering, Photometry, Seasonal variations, Climatic factors, Antarctica—Amundsen-Scott Station, United States—Alaska—Barrow

Aerosol absorption has been measured continuously using aethalometers at Barrow, AK (1986 to present); Mauna Loa, HI (1990 to present); and South Pole, Antarctica (1987-1990). These three stations are part of a network of baseline monitoring stations operated by the Climate Monitoring and Diagnostics Laboratory (CMDL) of the National Oceanic and Atmospheric Administration (NOAA). Condensation nucleus (CN) concentration and multiwavelength aerosol scattering have also been measured continuously for many years at these stations. Aethalometer measurements are usually reported in terms of atmospheric black carbon aerosol (BC) concentration using the calibration suggested by the manufacturer. The *in situ* aerosol absorption (550 nm) from aethalometer measurements is deduced by assuming that the aerosol absorption on the aethalometer filter is enhanced by a factor of 1.9 over that in the atmosphere. Each station shows a considerable annual cycle in aerosol absorption, aerosol scattering and single-scattering albedo. The maximum in the Barrow annual cycle is caused primarily by the springtime arctic haze phenomenon; the maximum in the Mauna Loa annual cycle is caused by the springtime Asian dust transport; and the maximum in the South Pole annual cycle is caused by late winter transport from southern mid-latitudes. (Auth. mod.)

49-4819

Spatial and temporal variability of $ClONO_2$, HNO_3, and O_3 in the arctic winter of 1992/1993 as obtained by airborne infrared emission spectroscopy.

Blom, C.E., Fischer, H., Glatthor, N., Gulde, T., Höpfner, M., Piesch, C., *Journal of geophysical research,* May 20, 1995, 100(D5), p.9101-9114, 27 refs.

Polar atmospheres, Climatology, Atmospheric attenuation, Aerial surveys, Sounding, Infrared spectroscopy, Atmospheric composition, Photochemical reactions, Seasonal variations, Ozone

49-4820

Variability of $ClONO_2$ and HNO_3 in the arctic polar vortex: comparison of Transall Michelson interferometer for passive atmospheric sounding measurements and three-dimensional model results.

Chipperfield, M.P., et al, *Journal of geophysical research,* May 20, 1995, 100(D5), p.9115-9129, 27 refs.

Polar atmospheres, Polar stratospheric clouds, Ozone, Atmospheric composition, Atmospheric attenuation, Aerial surveys, Sounding, Chemical properties, Seasonal variations, Mathematical models

49-4821

Temperature and accumulation at the Greenland Summit: comparison of high-resolution isotope profiles and satellite passive microwave brightness temperature trends.

Shuman, C.A., Alley, R.B., Anandakrishnan, S., White, J.W.C., Grootes, P.M., Stearns, C.R., *Journal of geophysical research,* May 20, 1995, 100(D5), p.9165-9177, 51 refs.

Paleoclimatology, Air temperature, Ice sheets, Snow accumulation, Periodic variations, Snow composition, Isotope analysis, Profiles, Radiometry, Brightness, Correlation, Greenland

49-4822

Snow and floating ice.

Gray, D.M., Prowse, T.D., Handbook of hydrology. Edited by D.R. Maidment, New York, McGraw-Hill, Inc., 1993, p.7.1-7.58, 171 refs.

DLC GB662.5.M35

Floating ice, Manuals, River ice, Ice formation, Snow hydrology, Snow physics, Snow cover stability, Physical properties, Snow air interface, Ice water interface, Snow cover effect, Ice cover effect

49-4823

Observational and modeling studies of the influence of sea ice anomalies on atmospheric circulation.

Walsh, J.E., NATO Advanced Research Workshop on Prediction of Interannual Climate Variations, Trieste, Italy, July 22-26, 1991. Proceedings. Edited by J. Shukla and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.6, Berlin, Springer-Verlag, 1993, p.71-88, 44 refs.

DLC QC198.8.C5 N373

Air ice water interaction, Climatic factors, Atmospheric boundary layer, Atmospheric circulation, Sea ice distribution, Ice edge, Ice air interface, Ice cover effect, Periodic variations, Weather forecasting

49-4824

Observational and modeling studies of the influence of snow anomalies on the atmospheric circulation.

Walsh, J.E., NATO Advanced Research Workshop on Prediction of Interannual Climate Variations, Trieste, Italy, July 22-26, 1991. Proceedings. Edited by J. Shukla and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.6, Berlin, Springer-Verlag, 1993, p.89-105, 38 refs.

DLC QC198.8.C5 N373

Climatic factors, Atmospheric circulation, Periodic variations, Snow cover distribution, Snow cover effect, Snow air interface, Atmospheric boundary layer, Simulation

49-4825

Spectral variability of light scattering by atmospheric ice crystals.

Macke, A., NATO Advanced Research Workshop on High Spectral Resolution Infrared Remote Sensing for Earth's Weather and Climate Studies, Paris, France, Mar. 23-26, 1992. Proceedings. Edited by A. Chedin et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.9, Berlin, Springer-Verlag, 1993, p.191-204, 16 refs.

DLC QC980.H5918

Cloud physics, Light scattering, Spectra, Ice crystal optics, Classifications, Ice crystal structure, Refractivity, Radiation absorption, Backscattering, Fractals, Analysis (mathematics)

49-4826

Detection of polar stratospheric clouds with next generation IR sounders.

Meerkoetter, R., NATO Advanced Research Workshop on High Spectral Resolution Infrared Remote Sensing for Earth's Weather and Climate Studies, Paris, France, Mar. 23-26, 1992. Proceedings. Edited by A. Chedin et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.9, Berlin, Springer-Verlag, 1993, p.205-213, 6 refs.

DLC QC980.H5918

Polar stratospheric clouds, Optical properties, Detection, Cloud physics, Temperature measurement, Infrared reconnaissance, Remote sensing, Sounding

49-4827

Combined effects of irradiance and first autumn frost on CO_2 assimilation and selected parameters of chlorophyll *a* fluorescence in Norway spruce shoots.

Kalina, J., Marek, M.V., Špunda, V., *Photosynthetica,* 1994, 30(2), p.233-242, 26 refs.

Trees (plants), Plant ecology, Plant physiology, Photosynthesis, Frost, Carbon dioxide, Chlorophylls, Temperature effects, Photochemical reactions

49-4828

Radionuclides on the Kola Peninsula, Novaya Zemlya, Franz Josef Land and in the Barents Sea. [Radionuklidy na Kol'skom poluostrove, Novoĭ Zemle, Zemle Frantsa-Iosifa i v Barentsevom more]

Matishov, G.G., Matishov, D.G., Podobedov, V.V., Szczypa, J., Solecki, J., Janusz, W., Apatity, Kol'skiĭ nauchnyĭ tsentr RAN, 1992, 67p., In Russian with English title page, summary and table of contents. 33 refs.

Radioactivity, Radioactive isotopes, Water pollution, Soil pollution, Nuclear power, Radioactive wastes, Environmental impact, Mosses, Algae, Barents Sea, Russia—Kola Peninsula, Russia—Novaya Zemlya, Russia—Franz Josef Land

49-4829

Freeze-drying effects on wet and dry soil aggregate stability.

Staricka, J.A., Benoit, G.R., *Soil Science Society of America. Journal,* Jan.-Feb. 1995, 59(1), p.218-223, 16 refs.

Soil science, Soil tests, Accuracy, Soil aggregates, Freeze drying, Freeze thaw cycles, Stability, Water content, Statistical analysis

49-4830

Investigation of the freezing blowby phenomenon in heat pipes.

Ochterbeck, J.M., Peterson, G.P., *Journal of thermophysics and heat transfer,* Apr.-June 1995, 9(2), p.314-321, 7 refs.

Heat pipes, Pipeline freezing, Solidification, Fluid dynamics, Freeze thaw cycles, Vapor pressure, Heat transfer

49-4831

Wrong snow can fool pilots.

Kiernan, V., *New scientist,* Feb. 4, 1995, 145(1963), p.6.

Aircraft, Navigation, Safety, Snow density, Snowstorms, Visibility, Snowfall, Velocity measurement

49-4832

Scattering phase function of bullet rosette ice crystals.

Iaquinta, J., Isaka, H., Personne, P., *Journal of the atmospheric sciences,* May 1, 1995, 52(9), p.1401-1413, 52 refs.

Cloud physics, Optical properties, Ice crystal optics, Ice crystal structure, Orientation, Light scattering, Wave propagation, Analysis (mathematics)

49-4833

Using radar-measured radial vertical velocities to distinguish precipitation scattering from clear-air scattering.

Ralph, F.M., *Journal of atmospheric and oceanic technology,* Apr. 1995, 12(2), p.257-267, 37 refs.

Precipitation (meteorology), Wind (meteorology), Wind velocity, Profiles, Radar echoes, Scattering, Ice crystal optics, Falling snow, Detection

49-4834

Late Quaternary sediment yield from the High Arctic Svalbard area.

Elverhøi, A., et al, *Journal of geology,* Jan. 1995, 103(1), p.1-17, 44 refs.

Pleistocene, Glacial deposits, Alpine landscapes, Stratigraphy, Quaternary deposits, Marine geology, Glacial geology, Sedimentation, Glacial erosion, Norway—Svalbard

49-4835

Constraints on the Late Weichselian ice sheet over the Barents Sea from observations of raised shorelines.

Lambeck, K., *Quaternary science reviews,* Jan. 1995, 14(1), p.1-16, 60 refs.

Pleistocene, Marine geology, Glacial geology, Isostasy, Ice sheets, Sea level, Glacier oscillation, Geomorphology, Shoreline modification, Ice models, Barents Sea

49-4836

Extended abstracts.

Tikkanen, E., ed, Varmola, M., ed, Katermaa, T., ed, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland, *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, 369p., Refs. passim. For selected papers see 49-4837 through 49-4907.

DLC GE160.F5S95 1992A

Environmental impact, Environmental protection, Air pollution, Forest ecosystems, Trees (plants), Plant physiology, Finland, Sweden, Russia—Kola Peninsula, Norway

49-4837

Arctic Monitoring and Assessment Programme (AMAP)—a presentation of the process, organization and the programme.

Reiersen, L.-O., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.13-22, 4 refs.

Monitors, Research projects, International cooperation, Environmental protection

49-4838

Evaluation and prediction of atmospheric pollution in the industrial and near-border districts of Kola North.

Baklanov, A.A., Kliuchnikova, E.M., Rodiushkina, I.A., Cherepanov, C.D., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.25-27, 2 refs.

Air pollution, Environmental impact, Polar atmospheres, Russia—Kola Peninsula

49-4839

Meteorological conditions prevailing during 1991 sulphur pollution episodes in northern Fennoscandia.

Hongisto, M., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.28-30, 1 ref.

Air pollution, Polar atmospheres, Meteorology, Environmental impact, Models, Finland, Sweden, Norway, Denmark

49-4840

Deposition of trace metals in northern Finland.

Juntto, S., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.31-33, 3 refs.

Precipitation (meteorology), Pollution, Metals, Finland

49-4841

Levels and profiles of PCDDs and PCDFs in environmental samples as determined in snow deposited in northern Sweden.

Rappe, C., Andersson, P., Marklund, S., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.34-36, 5 refs.

Environmental impact, Air pollution, Snow impurities, Sweden

49-4842

Key aspects of sulphur pollution in northernmost Europe.

Tuovinen, J.-P., Laurila, T., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.37-40, 8 refs.

Air pollution, Environmental impact, Polar atmospheres, Russia—Kola Peninsula, Sweden, Finland, Denmark

49-4843

Aerosols in Oulanka: inorganic ions and trace metals in size-segregated particles.

Mäkinen, M., Hillamo, R., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.41-42, 3 refs.

Aerosols, Metals, Ions, Air pollution, Atmospheric composition, Polar atmospheres, Finland

49-4844

Atmospheric concentrations of aerosol and gaseous pollutants in the Finnish Arctic.

Virkkula, A., Mäkinen, M., Hillamo, R., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.43-45, 2 refs.

Aerosols, Air pollution, Atmospheric composition, Polar atmospheres, Finland—Sevettijärvi

49-4845

Annual movement of ozone in the atmosphere over the Kola Peninsula.

Zachinaev, IU.V., Ginak, A.I., Kostin, A.M., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.46-47, 1 ref.

Ozone, Air pollution, Stratosphere, Air flow, Polar atmospheres, Russia—Kola Peninsula

49-4846

Soils in northern Fennoscandia and Kola Peninsula from an environmental point of view—monitoring and present state.

Olsson, M., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.51-64, 45 refs.

Soil chemistry, Soil composition, Soil mapping, Soil surveys, Soil pollution, Geochemistry, Weathering, Models, Monitors, Denmark, Finland, Sweden, Russia—Kola Peninsula

49-4847

Investigation of soil amelioration after intensive industrial pressure.

Evdokimova, G.A., Mozgova, N.P., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.65-68, 2 refs.

Soil composition, Soil pollution, Metals, Russia—Far North

49-4848

Long range transport of airborne solid particles into northern Fennoscandia—the yellow snow episode of March 1991, in the light of the Chernobyl accident of 1986.

Franzén, L.G., Hjelmroos, M., Kållberg, P., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.69-72, 6 refs.

Snow impurities, Dust, Wind erosion, Soil erosion, Sweden, Denmark, Finland

49-4849

Use of mosses in geochemical and environmental studies in Finnish Lapland—comparison of results from 1982 and 1990.

Niskavaara, H., Lehmuspelto, P., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.73-77, 4 refs.

Mosses, Geochemistry, Air pollution, Environmental impact, Metals, Finland—Lapland, Russia—Kola Peninsula

49-4850

Overbank sediments as an indicator of the geochemical state of the environment in the Inari area, northern Finland.

Pulkkinen, E., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.78-81, 5 refs.

Sediments, Geochemistry, Environmental impact, Geological maps, Pollution, Finland—Inari, Russia—Kola Peninsula

49-4851

Weathering of podzolized tills and sensitivity to acidification at Monchegorsk in the Kola Peninsula and in eastern Finnish Lapland.

Räisänen, M.L., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.82-84, 7 refs.

Weathering, Podsol, Clay minerals, Chemical properties, Glacial till, Russia—Kola Peninsula, Russia—Monchegorsk, Finland—Lapland

49-4852

Podzol formation in glacial till and glaciofluvial sand chronosequences in northern Finland: intensity of pedogenic weathering and implications for soil ANC.

Väänänen, T.M., Petäjä-Ronkainen, A., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.85-88, 8 refs.

Glacial till, Podsol, Sands, Weathering, Meltwater, Finland

49-4853

Biological indication of soil contaminated by heavy metals.

Evdokimova, G.A., Mozgova, N.P., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.89-91, 3 refs.

Soil pollution, Metals, Soil microbiology, Podsol

49-4854

Comparison of microwave digestion method and two conventional dissolution methods for metal analysis of sediment samples.

Lehto, O., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.92-93, 4 refs.

Sediments, Metals, Pollution, Microwaves, Finland

49-4855

Finnish geochemical atlas for PC.

Teerilahti, R., Tarvainen, T., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.94-95, 1 ref.

Geochemistry, Maps, Computer programs, Glacial till, Ground water, Data processing, Finland

49-4856

Environmental geochemical mapping based on organic sediments of small headwater streams in Finland.

Väänänen, P., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.96-99.

Geochemistry, Geological maps, Sediments, Streams, Finland

49-4857

Feather moss *(Hylocomium splendens* (Hedw.)) as a bioindicator of heavy metals in the urban areas. Two case histories—Rovaniemi and Sodankylä.

Äyräs, M., Niskavaara, H., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.100-103, 9 refs.

Mosses, Pollution, Environmental tests, Metals, Finland—Rovaniemi, Finland—Sodankylä

49-4858

Marine ecosystem dynamics and the state of the environment in arctic waters.

Falk-Petersen, I.B., Falk-Petersen, S., Savinova, T.N., Wassmann, P., Gabrielsen, G., Matisov, G., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.107-122, 45 refs.

Ecosystems, Plankton, Pollution, Marine biology, Biomass, Water pollution, Environmental impact, Barents Sea, Norwegian Sea, Russia—Kara Sea

49-4859

Acidification of the waters in northern Fennoscandia and the Kola Peninsula.

Kinnunen, K., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.123-132, 13 refs.

Water pollution, Environmental impact, Water chemistry, Lake water, International cooperation, Russia—Kola Peninsula, Finland

49-4860

Till geochemistry and sensitivity to acidification of lakes in northern Finland.

Kähkönen, A.M., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.141-144, 8 refs.

Glacial till, Geochemistry, Lake water, Water chemistry, Finland

49-4861

Acidification and its geological controls of natural waters in North Finland.

Lahermo, P., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.145-147.

Streams, Ground water, Water pollution, Water chemistry, Sediments, Finland

49-4862

Acidification of water systems in northern Kola.

Moĭseenko, T.I., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.148-151, 4 refs.

Lake water, Water chemistry, Water pollution, Russia—Kola Peninsula

49-4863

Impacts of pollution on freshwater communities in the border areas between Russia and Norway.

Nøst, T., et al, *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.152-155, 10 refs.

Ecology, Water pollution, Water chemistry, Environmental impact, Russia—Nikel', Russia—Zapolyarnyy, Russia—Murmansk, Norway—Kuetsyarvi

49-4864

Lake monitoring, critical load of sulphur and modelling of future acidity for several sulphur reduction scenarios in the Norwegian-Russian border areas.

Traaen, T.S., Henriksen, A., Moĭseenko, T.I., Wright, R.F., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.161-164, 3 refs.

Lake water, Water pollution, Water chemistry, Environmental impact, Lakes, Streams, Models, Russia—Kola Peninsula, Norway, Finland

49-4865

Benthic invertebrates, zooplankton and phytoplankton communities in relation to pollution of waters in the Kola Peninsula.

IAkovlev, V., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.165-167, 6 refs.

Plankton, Water pollution, Environmental impact, Lakes, Rivers, Streams, Ecology, Russia—Kola Peninsula

49-4866

Critical loads of sulphur and nitrogen for forest soils and lakes in Finnish Lapland.

Johansson, M., Forsius, M., Posch, M., Kämäri, J., Kinnunen, K., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.177-180, 3 refs.

Forest soils, Soil pollution, Lakes, Lake water, Water pollution, Models, Finland—Lapland

49-4867

Monitoring of acidification in lakes during changing load conditions in Finnish Lapland—development work of the monitoring system.

Mähönen, O., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.181-182, 2 refs.

Lakes, Lake water, Water chemistry, Water pollution, Monitors, Finland—Lapland

49-4868

Acidification in the arctic countries: Man-made acidification in a world of natural extremes.

Nenonen, M., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.183-185, 6 refs.

Ecosystems, Environmental impact, Pollution

49-4869

Proposed forest health monitoring data base for use in boreal forests.

LaBau, V.J., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.191-199, 3 refs.

Trees (plants), Forest ecosystems, Forest land, Data processing

49-4870

Monitoring of forest vegetation in eastern Finnmark, Norway: crown density and crown colour 1988-1991.

Aamlid, D., Venn, K., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.200-203, 4 refs.

Trees (plants), Air pollution, Forest land, Norway

49-4871

Nickel and copper soil contamination caused by emissions from the "Severonickel" smelter complex.

Barkan, V.Sh., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.204-207, 4 refs.

Soil pollution, Environmental impact, Podsol, Soil chemistry, Russia—Kola Peninsula, Russia—Monchegorsk

49-4872

Interaction between deposition and tree canopies in forest ecosystems in Finnish Lapland.

Derome, J., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.208-210, 3 refs.

Forest ecosystems, Nutrient cycle, Finland—Lapland

49-4873

Some ecophysiological approaches to the assessment of plant habitats in the case of the anthropogenic pollution.

Gerasimenko, T.V., Kaĭpiaĭnen, E.L., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.211-212, 8 refs.

Environmental impact, Plants (botany), Plant physiology, Plant ecology, Russia—Kola Peninsula

49-4874

Special monitoring of mining-induced environmental stress in the Nickel-Zapolyarnyi district of western Kola Peninsula.

Karpuz, M.R., Roberts, D., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.213-214.

Environmental impact, Environmental tests, LANDSAT, Remote sensing, Pollution, Russia—Kola Peninsula

49-4875

Atmospheric heavy metal deposition in Finnish Lapland in 1986 and 1990.

Kubin, E., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.219.

Air pollution, Environmental impact, Forest ecosystems, Finland—Lapland

49-4876

Pollution-induced changes in the properties of forest soils in the Kola Peninsula.

Nikonov, V., Goriaĭnova, V., Lukina, N., Motova, A., Petrova, N., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.220-221, 2 refs.

Forest soils, Podsol, Soil pollution, Soil chemistry, Environmental impact, Metals, Russia—Kola Peninsula

49-4877

Foliar chemical composition of Scots pines in Finnish Lapland and on the Kola Peninsula.

Raitio, H., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.226-231, 9 refs.

Trees (plants), Chemical analysis, Plant physiology, Environmental impact, Finland—Lapland, Russia—Kola Peninsula

49-4878

Cell injuries in the needles of Scots pine (*Pinus sylvestris L.*) in Finnish Lapland. A light and electron microscopic approach.

Sutinen, S., Koivisto, L., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.232-234, 5 refs.

Trees (plants), Plant physiology, Plant tissues, Environmental impact, Electron microscopy, Finland—Lapland

49-4879

Needle damage in the Scots pines of Lapland and the Kola Peninsula.

Turunen, M., Huttunen, S., Bäck, J., Koponen, J., Huhtala, P., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.235-239, 9 refs.

Trees (plants), Plant physiology, Plant tissues, Environmental impact, Electron microscopy, Finland—Lapland, Russia—Kola Peninsula

49-4880

Mapping the air pollution impact on the natural environments in the Norwegian-Russian-Finland border areas using Landsat TM data.

Tømmervik, H.A., Johansen, B.E., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.240-241, 1 ref.

Air pollution, Mapping, Environmental impact, LANDSAT, Remote sensing, Finland, Norway, Russia

49-4881

Dynamics of the state of Scots pine ecosystems as influenced by air pollution in the Kola Peninsula.

IArmishko, V.T., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.242-245, 5 refs.

Plant ecology, Forest ecosystems, Trees (plants), Air pollution, Environmental impact, Russia—Kola Peninsula

49-4882

Monitoring of forest vegetation in eastern Finnmark, Norway: lichen vegetation on birch trunks.

Aamlid, D., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.246-248, 6 refs.

Air pollution, Lichens, Forest ecosystems, Vegetation, Trees (plants), Environmental impact, Norway—Finnmark

49-4883

State of the field layer in polluted and non-polluted Scots pine forests in the Kola Peninsula.

Bakkal, I.J., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.249-253, 4 refs.

Forest ecosystems, Trees (plants), Lichens, Mosses, Air pollution, Forest fires, Russia—Kola Peninsula

49-4884

Living forest-limit pines (*Pinus sylvestris* L.) as indicators of past climatic and environmental changes in northern Finnish Lapland.

Eronen, M., Laakkonen, M., Lindholm, M., Meriläinen, J., Zetterberg, P., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.254-255, 7 refs.

Climatic changes, Forest land, Trees (plants), Finland—Lapland

49-4885

Genetic monitoring of Scots pine stands on the Kola Peninsula.

Fedorkov, A., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.256-258, 5 refs.

Trees (plants), Air pollution, Environmental impact, Plant physiology, Russia—Kola Peninsula

49-4886

Trichloroacetic acid, a uniquitous herbicide in Finnish forest trees.

Frank, H., Scholl, H., Sutinen, S., Norokorpi, Y., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.259-261, 10 refs.

Trees (plants), Air pollution, Environmental impact, Plant physiology, Finland

49-4887

Changes in the physiological status of Scots pine as influenced by air pollution.

Gabukova, V.V., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.262-263.

Air pollution, Trees (plants), Environmental impact, Plant physiology, Russia—Kola Peninsula, Russia—Karelia

49-4888

Post-fire recovery of ground vegetation layer in the Scots pine forests of the Kola Peninsula.

Gorshkov, V.V., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.264-268, 7 refs.

Forest ecosystems, Forest fires, Mosses, Lichens, Protective vegetation, Air pollution, Russia—Kola Peninsula

49-4889

Nickel and copper accumulation in the lichen *Cetraria nivalis* (L.) Ach. in Lapland.

Heino, S., Anttonen, S., Wulff, A., Kärenlampi, L., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.269.

Air pollution, Environmental impact, Lichens, Finland—Lapland, Norway—Lapland

49-4890

Variation in the growth rate of *Cladina rangiferina* (L.) Wigg in eastern Fennoscandia.

Helle, T., Kojola, I., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.270-271, 5 refs.

Air pollution, Environmental impact, Lichens, Plant physiology, Finland, Norway, Russia—Monchegorsk, Russia—Nikel'

49-4891

Monitoring pollen dispersal in Finnish Lapland.

Hicks, S., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.272-273.

Pollen, Vegetation patterns, Finland—Lapland

49-4892

Geobotanical map of the Lapland preserve, Kola Peninsula.

Kholod, S.S., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.274-275.

Geobotanical interpretation, Maps, Vegetation patterns, Alpine tundra, Taiga, Russia—Kola Peninsula

49-4893

Indications of air pollutant induced stress on pines and lichens in Lapland.

Huttunen, S., Roitto, M., Tikkinen, S., Lamppu, J., Bäck, J., Turunen, M., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.276-278, 11 refs.

Air pollution, Environmental impact, Trees (plants), Lichens, Plant physiology, Finland—Lapland, Russia—Monchegorsk, Russia—Kola Peninsula

49-4894

Spectral signature studies of vegetation in Korpfjell, Southern Varanger, by use of CASI imaging spectrometer.

Johansen, B., Tømmervik, H.A., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.279-281, 1 ref.

Air pollution, Environmental impact, Vegetation patterns, Imaging, Spectroscopy, Norway—Varanger

49-4895

Luminescence study of conifer needles damage in technogenic barrens of the Kola Peninsula.

Kashulin, P.A., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.282-283, 3 refs.

Luminescence, Trees (plants), Plant physiology, Environmental impact, Russia—Kola Peninsula

49-4896

Precipitation quality and soil properties in spruce ecosystems subjected to industrial air pollution.

Kashulina, G., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.284-287, 4 refs.

Forest ecosystems, Soil chemistry, Forest soils, Air pollution, Environmental impact, Mosses, Lichens, Trees (plants), Rain, Podsol, Russia—Kola Peninsula

49-4897

Peculiarities of the north-taiga ecosystems destruction caused by the impact of aerotechnogenic emissions—following 15 years of monitoring.

Kriuchkov, V.V., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.290-293.

Taiga, Forest ecosystems, Environmental impact, Pollution, Russia—Nikel', Russia—Kola Peninsula

49-4898

Heavy metals in wild berries in Finnish Lapland subjected to atmospheric industrial pollution from the Kola Peninsula.

Laine, K., et al, *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.297-299, 2 refs.

Air pollution, Environmental impact, Vegetation, Plants (botany), Chemical composition, Finland—Lapland, Russia—Kola Peninsula, Russia—Monchegorsk

49-4899

Monitoring short term changes from timber harvesting directly below the timber-line in southern Swedish Lapland.

Lindkvist, L., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.300-303, 6 refs.

Forest lines, Podsol, Forest soils, Soil water, Hydrogen ion concentration, Bedrock, Soil composition, Sweden—Lapland

49-4900

Percolation water quality on the ion-balance monitoring plots of the Lapland Forest Damage Project in the 1990 and 1991 growing seasons.

Lindroos, A.-J., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.304-306, 1 ref.

Environmental impact, Air pollution, Forest soils, Ions, Soil water migration, Ground water, Finland—Lapland, Russia—Kola Peninsula

49-4901

Pollution-induced changes in the foliar composition of Siberian spruce (*Picea abies obovata* subsp. (Ledeb.) Domin) and Scots pine (*Pinus sylvestris* L.) in the Kola Peninsula.

Lukina, N., Nikonov, V., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.307-309, 3 refs.

Air pollution, Environmental impact, Chemical composition, Trees (plants), Plant physiology, Russia—Kola Peninsula, Russia—Monchegorsk

49-4902

Satellite survey of forest damage in the Monchegorsk area, Kola Peninsula.

Mikkola, K., Ritari, A., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.310-313, 5 refs.

Air pollution, Environmental impact, LANDSAT, Remote sensing, Forest ecosystems, Trees (plants), Russia—Kola Peninsula, Russia—Monchegorsk

49-4903

Lichens and plants obtained from permanent study plots in northern Finland as bioindicators for radioactive fallout.

Rissanen, K., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.320-322, 5 refs.

Lichens, Plants (botany), Fallout, Plant physiology, Finland

49-4904

Vitality of Scots pine stands at different distances from emission sources in the Kola Peninsula.

Salemaa, M., Lindgren, M., Jukola-Sulonen, E.-L., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.323-324, 4 refs.

Air pollution, Environmental impact, Trees (plants), Russia—Kola Peninsula, Russia—Monchegorsk, Finland—Lapland

49-4905

Effect of air pollution on the seasonal changes in the frost hardiness of the needles of *Pinus sylvestris* L.

Sutinen, M.-L., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.326-329, 6 refs.

Air pollution, Environmental impact, Trees (plants), Plant physiology, Frost resistance, Seasonal variations, Russia—Kola Peninsula, Russia—Monchegorsk, Finland—Lapland

49-4906

Scots pine roots and soil microbiology in dry pine forests in Lapland.

Väre, H., Ohtonen, R., Ahonen-Jonnarth, U., Markkola, A.M., Tarvainen, O., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.330.

Soil microbiology, Trees (plants), Plant physiology, Air pollution, Environmental impact, Biomass, Finland—Lapland, Norway, Russia—Kola Peninsula

49-4907

State and productivity of forests in North European Russia.

Ziabchenko, S., *University of Lapland, Rovaniemi, Finland. Arctic Centre. Publications,* 1992, No.4, Symposium on the State of the Environment and Environmental Monitoring in Northern Fennoscandia and the Kola Peninsula, Oct. 6-8, 1992, Rovaniemi, Finland. Extended abstracts. Edited by E. Tikkanen, M. Varmola and T. Katermaa, p.331-334, 11 refs.

Forest ecosystems, Trees (plants), Biomass, Environmental impact, Russia

49-4908

Proceedings.

International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993, *Annals of glaciology,* 1994, Vol.20, 458p., Refs. passim. For individual papers see 49-4909 through 49-4977 or F-52889 through F-52957.

Glacier surveys, Ice sheets, Ice shelves, Glacier flow, Glacier oscillation, Glacier mass balance, Glacier thickness, Snow ice interface, Ice water interface, Ice cores, Ice composition, Ice dating, Paleoclimatology, Radio echo soundings, Spaceborne photography, Antarctica

This volume consists of 69 papers presented during the Fifth International Symposium on Antarctic Glaciology, held in Cambridge, U.K., on Sep. 5-11, 1993. The studies cover numerous features of ice and snow, including their interaction with each other, the atmosphere and the ocean. Paleoclimatological implications derived from the study of ice cores are also considered.

49-4909

Spectral bi-directional reflectance of snow and glacier ice measured in Dronning Maud Land, Antarctica.

Winther, J.G., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.1-5, 14 refs.

Snow optics, Ice optics, Snow surface, Glacier surfaces, Snow cover effect, Reflectivity, Albedo, Radiometry, Spaceborne photography, Antarctica—Queen Maud Land

Visible and near-infrared spectral reflectances of snow and superimposed ice were measured in Queen Maud Land during the 1992-93 austral summer. Spectral-reflectance curves of both snow and superimposed ice remain high (>80%) in the visible region. A pronounced decrease in reflectance appears in the near-infrared, especially for superimposed ice. Superimposed ice with a 1 cm thick surface layer of ice-bound snow crystals had a considerably higher reflectance than superimposed ice containing only a few snow crystals. Furthermore, these data prove that snow and superimposed ice reflect solar radiation specularly and suggest that the anisotropy strengthens with increasing wavelengths. Integrated in-situ reflectances corresponding to Landsat TM bands 1-4 show that TM band 1 is least affected, whereas TM band 4 is most affected by anisotropy. (Auth. mod.)

49-4910

Changes and surface features of the Larsen Ice Shelf, Antarctica, derived from Landsat and Kosmos mosaics.

Skvarca, P., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.6-12, 11 refs.

Ice shelves, Glacier surveys, Ice surveys, Glacier oscillation, Glacier flow, Glacier surfaces, Crevasses, Calving, Spaceborne photography, Antarctica—Larsen Ice Shelf

Two uncontrolled mosaics were assembled at a 1:1,000,000 scale, covering for the first time almost the entire Larsen Ice Shelf area, using Landsat TM images of 1986-89 and the Kosmos KATE-200 photographic products of late 1975. By comparing them, it was possible to estimate the change along the 600 km north-south ice-shelf's seaward margin where substantial calving has occurred recently. In overall extent, the ice shelf has decreased by 9300 km^2 since 1975. The interpretation of the available satellite data also allowed estimates of the ice-shelf's inland boundary and detection of new surface ice features. Estimates of surface velocities were derived by photographically co-registering sequential imagery in the chaotic rifted-crevassed area east of Kenyon Peninsula, where conspicuous ice features could be clearly detected even after a 10 year interval. The Landsat TM mosaic, though uncontrolled, provides a basic data set for future studies of global change of the major ice shelf on the Antarctic Peninsula. (Auth. mod.)

49-4911

Steady-state crystal size of deforming ice.

Jacka, T.H., Li, J., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.13-18, 30 refs.

Ice sheets, Glacier flow, Glacier friction, Glacier ice, Ice crystal size, Ice pressure, Ice deformation, Ice creep

Previous studies have established that, together with the development of a preferred crystal-orientation fabric in ice undergoing creep deformation to high strains, there also develops a tertiary equilibrium crystal size, i.e. the crystal size, rather than affecting the creep rate, is a result of the deformation to large strains. Equilibrium crystal size is considered here as a "balance" between crystal growth with time as a function of temperature and crystal change as a result of temperature-dependent deformation. The temperature effects in these two processes (Arrhenius relation) are similar. Consideration of the activation energies for the two processes indicates that it may be appropriate to cancel them, yielding a dependence of equilibrium crystal size on stress alone. (Auth. mod.)

49-4912

Temporal variations of microwave brightness temperatures over Antarctica.

Sherjal, I., Fily, M., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.19-25, 14 refs.

Glacier surveys, Ice surveys, Ice sheets, Ice shelves, Snow ice interface, Snow surface temperature, Snow heat flux, Glacier heat balance, Radiometry, Spaceborne photography, Antarctica—Charlie, Dome, Antarctica—Ross Ice Shelf

Passive microwave brightness temperatures from the Special Sensor Microwave Imager (SSMI) are studied together with surface air temperatures from two Automatic Weather Stations (AWS) for the year 1989. One station is located on the East Antarctic plateau (Dome C) and the other on the Ross Ice Shelf. The satellite data for frequencies 19, 22 and 37 GHz with vertical polarization, centered on the two AWS stations, are studied. A simple thermodynamic model, and a simple radiative-transfer model that takes into account the snow temperature profile and assumes a constant annual emissivity, are proposed. The combination of these two models enables one to compute extinction coefficients, penetration depths and to retrieve the measured brightness temperature variations from the AWS surface temperatures. Afterwards, this model is reversed in order to retrieve the snow-surface temperatures from the satellite data. Results are promising but strong approximations and *a priori* knowledge of the extinction coefficient are still needed at this point. (Auth.)

49-4913

Recent elevation increase on Lambert Glacier, Antarctica, from orbit cross-over analysis of satellite-radar altimetry.

Lingle, C.S., Lee, L.H., Zwally, H.J., Seiss, T.C., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.26-32, 24 refs.

Glacier surveys, Glacier thickness, Glacier mass balance, Glacier oscillation, Glacier surfaces, Height finding, Radio echo soundings, Spaceborne photography, Antarctica—Lambert Glacier

The mean rate-of-change of the surface elevation on lower Lambert Glacier was measured with satellite-radar altimetry from the Geosat Exact Repeat Mission (ERM) (1987-89) and Seasat (1978), using orbit cross-over analysis. The orbit bias between the two satellites is estimated from cross-over differences over sea ice seaward of the calving front of the Amery Ice Shelf. The results show a mean rate of increase of the surface height on lower Lambert Glacier of 31±10 mm/yr over the decade from 1978 to 1987-89. The computation is also carried out independently using data not low-pass filtered but with orbit bias minimized by adjusting the Seasat and Geosat ERM orbits into a common ocean surface. The latter analysis shows a mean rate of increase of the surface height of 83±9 mm/year during the same time period. Cross-over analyses carried out using altimetry not low-pass filtered and with orbits not adjusted into a common ocean surface yield intermediate results. Taken together, the cross-over analyses show that the surface height on lower Lambert Glacier increased at a mean rate within the range 20-90 mm/year during the decade 1978 to 1987-89. (Auth. mod.)

49-4914

Depositional environment of the snow cover on West Antarctic pack-ice floes.

Jeffries, M.O., Veazey, A.L., Morris, K., Krouse, H.R., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.33-38, 17 refs.

Ice surveys, Pack ice, Ice floes, Snow ice interface, Snow depth, Snow density, Snow loads, Snow composition, Isotope analysis, Antarctica—Ross Sea, Antarctica—Amundsen Sea, Antarctica—Bellingshausen Sea

The depth, density, load and isotopic ($\delta^{18}O$) composition of the snow cover on pack-ice floes were measured in late austral summer 1992 in the eastern Ross, Amundsen and western Bellingshausen Seas. Snow-density values commonly exceeded 350 kg/m^3 and some were as high as 500 kg/m^3. The densification of the snow occurs quickly and is attributed to a windy environment. The high density and sometimes considerable depth of the snow on the floes accounts for loads of as much as 700 kg/m^2 and resultant sea-water flooding of the underlying sea ice. Lower mean $\delta^{18}O$ values in the Ross/Amundsen Seas snow cover suggest that the region might have a cooler climate than the Bellingshausen Sea region. (Auth. mod.)

49-4915

Studies of the grounding-line location on Ice Streams D and E, Antarctica.

Jacobel, R.W., Robinson, A.E., Bindschadler, R.A., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.39-42, 8 refs.

Glacier surveys, Ice surveys, Ice sheets, Ice shelves, Glacier thickness, Glacier flow, Glacier mass balance, Glacier oscillation, Glacier beds, Radio echo soundings, Antarctica—West Antarctica

Landsat Thematic Mapper (TM) images were used prior to the 1991-92 field season to infer the position of the grounding line at the mouths of Ice Streams D and E, West Antarctica. The field plan for mass-balance studies was based on this determination, and thus the imagery played a central role in both the scientific and logistics planning. A radar profile along the flow direction was made across the inferred grounding line at one location, and ice-thickness measurements together with surface surveying enabled the authors to compare the hydrostatic surface and the actual topography to determine the point at which the ice becomes grounded. The profile transits from floating to grounded ice at the same location as the grounding line inferred from the imagery. Changes in the radar-echo strength also occur at this location, giving further support to this interpretation. (Auth. mod.)

49-4916

Recent advance of the grounding line of Lambert Glacier, Antarctica, deduced from satellite-radar altimetry.

Herzfeld, U.C., Lingle, C.S., Lee, L.H., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.43-47, 18 refs.

Glacier surveys, Ice shelves, Glacier thickness, Glacier flow, Glacier oscillation, Glacier mass balance, Radio echo soundings, Height finding, Spaceborne photography, Antarctica—Lambert Glacier

Satellite radar-altimeter data from Seasat (1978) and the Geosat Exact Repeat Mission (1987-89) are evaluated to investigate the question of advance or retreat of Lambert Glacier. New maps based on a fine-scale 3 km grid are calculated using ordinary kriging. The break in slope at the 100 m elevation contour, relative to the WGS 1984 ellipsoid, is taken as a proxy for the grounding line. Measurements indicate that the irregular grounding line, which includes shoals, advanced approximately 10 km between 1978 and 1987-89, corresponding to a mean advance rate of about 1 km/year. (Auth.)

49-4917

Digital elevation model of the antarctic ice sheet derived from ERS-1 altimeter data and comparison with terrestrial measurements.

Bamber, J.L., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.48-54, 22 refs.

Glacier surveys, Ice sheets, Ice shelves, Glacier thickness, Glacier surfaces, Glacier oscillation, Radio echo soundings, Height finding, Spaceborne photography, Antarctica

The launch of ERS-1 provides coverage by satellite altimetry of 80% of the antarctic ice sheet, allowing topographic mapping of areas which previously had a dearth of accurate elevation data. Four 35 d repeat cycles of fast-delivery altimeter data were used in this study, comprising a total of approximately 1,000,000 height estimates. The OSU-91A geopotential model was used to convert ellipsoidal elevations to geoidal values. Corrections for surface slope were applied and a Digital Elevation Model (DEM) was produced with a grid spacing of 20 km. The DEM was compared with a digitized version of the Scott Polar Research Institute Antarctic folio map. This map was derived from orthometric measurements of surface elevation, primarily from pressure altimetry. Differences in excess of 300 m were observed between the two data sets. Only 37% of the region covered showed agreement to better than 50 m, and a significant proportion of this was composed of the Ross and Filchner-Ronne Ice Shelves. The largest discrepancies occurred in marginal areas where there is poor coverage by both satellite altimetry and terrestrial data. (Auth. mod.)

49-4918

Morphology and late Cenozoic (<5 Ma) glacial history of the area between David and Mawson glaciers, Victoria Land, Antarctica.

Verbers, A.L.L.M., Damm, V., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.55-60, 21 refs.

Glacier surveys, Ice sheets, Glaciation, Glacial geology, Glacier thickness, Glacier oscillation, Subglacial observations, Glacier beds, Bottom topography, Nunataks, Paleoclimatology, Geochronology, Radio echo soundings, Antarctica—David Glacier, Antarctica—Mawson Glacier

Glacio-geological field work and radar ice-thickness sounding were carried out in the area between David and Mawson Glaciers. A subglacial topographic map has been compiled from radio-echo-sounding data. The northern part of this map shows that the trench of David Glacier reaches a depth of more than 100 m below sea level. The area south of David Glacier comprises a landscape of nunatak clusters dissected by glaciated valleys with ice thicknesses as much as 800 m. Subglacial cirques occur at the outer margins of the nunatak clusters. A model for the regional glacial history is proposed. It starts with a major deglaciation in the Pliocene, which results in marine transgression in basins west of the Transantarctic Mountains. During the late Pliocene, the ice advanced towards the northeast, depositing a thin layer of (Sirius Group) till containing reworked mid-Pliocene marine diatoms. Due to accelerated mountain uplift, the ice cut into the pre-Pliocene peneplain, eroding broad valleys. A period of ice-sheet retreat followed to expose a landscape of large nunataks separated by wide valleys. During this period, local cirque glaciation occurred. When the ice sheet advanced again, another phase of uplift forced the glaciers to cut deeper into the valleys. (Auth.)

49-4919

Small-scale variability of physical properties and structural characteristics of antarctic fast ice.

Veazey, A.L., Jeffries, M.O., Morris, K., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.61-66, 27 refs.

Fast ice, Ice cores, Snow ice interface, Ice cover thickness, Ice structure, Ice salinity, Ice temperature, Ice growth, Ice crystal structure, Antarctica—McMurdo Sound, Antarctica—Pine Island Bay

The small-scale variability of physical properties and structural characteristics of multiple pairs of fast-ice cores, obtained during the austral summer of 1991-92 in McMurdo Sound (MCM) and Pine Island Bay (PIB), are examined and discussed with respect to the growth and decay of the sea ice. The ice at the MCM site was thicker than that at the PIB site and was covered by a somewhat thinner snow-pack. While mean salinity and temperature of the ice at the two sites were similar, small-scale variations in both salinity and temperature were greater at PIB than at MCM. The ice sheet at MCM was a two-layer medium consisting of congelation ice overlying platelet ice. The ice from the PIB site was composed of mainly frazil ice and layers of congelation ice with occasional thin layers of snow-ice at the surface of the cores. Crystal sub-structure measurements, *c*-axis orientation and brine-layer spacing from the MCM cores revealed that the congelation ice had moderately aligned, horizontally oriented *c* axes. (Auth. mod.)

49-4920

Two-dimensional finite-element study of flow in the transition zone between an ice sheet and an ice shelf.

Lestringant, R., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.67-72, 16 refs.

Ice sheets, Ice shelves, Glacier flow, Glacier friction, Ice pressure, Ice deformation

A numerical study has been carried out on the flow of ice in the transition zone between an ice sheet and an ice shelf. The study was motivated by the need for global ice-sheet-ice-shelf modelling to determine the characteristics of the transition zone. The problem is dealt with from an academic viewpoint, and the study especially focuses on two-dimensional vertical sharp transition zones. Stokes equations are solved using a finite-element method. Conclusions include: in ice-sheet-ice shelf modelling, each of the two components can be computed separately, then linked by a jump-boundary condition for the horizontal velocity; and, as shown by studies in Antarctica on the response of an ice shelf to tidal forcing, the surface elevation/thickness ratio passes through the hydrostatic equilibrium value. (Auth.)

49-4921

Studies on microparticles contained in medium-depth ice cores retrieved from east Dronning Maud Land, Antarctica.

Higashi, A., Fujii, Y., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.73-79, 16 refs.

Ice sheets, Ice cores, Ice composition, Ice dating, Impurities, Dust, Volcanic ash, Paleoclimatology, Drill core analysis, Antarctica—Queen Maud Land

SEM observations of microparticles in ice-core samples, retrieved in east Queen Maud Land, have been carried out since 1987. Morphology and elemental composition by EDS of many microparticles taken from various depths of the 700 m Mizuho ice core were compared with each other and with those of stratospheric microparticles in NASA Cosmic Dust Catalogs and microparticles hitherto found in deep ice cores retrieved in Antarctica. Number concentrations of microparticles were measured on all samples throughout the Mizuho core. Marked fluctuations found in the depth profile of the concentration seem to coincide with cold climates indicated by $\delta^{18}O$ of the same core. Compositional analysis of volcanic ash at a depth of 500 m in the Mizuho core, dated at approximately 6000 years bp, indicates that the ash originated from the South Sandwich Is. (Auth.)

49-4922

Causes and nature of ice-sheet radio-echo internal reflections estimated from the dielectric properties of ice.

Fujita, S., Mae, S., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.80-86, 28 refs.

Ice sheets, Glacier surveys, Ice electrical properties, Ice structure, Ice composition, Ice dating, Volcanic ash, Impurities, Dielectric properties, Radio echo soundings, Antarctica—Mizuho Station

The causes and nature of ice-sheet radio-echo internal reflections at deep layers in polar ice sheets are discussed, based on the dielectric properties of ice that have been measured at microwave and radio frequencies at Mizuho Station. The reflection coefficients of electromagnetic waves in ice sheets were derived as a function of the frequency used in radar sounding and the temperature of ice, and both were compared quantitatively. It is shown that at single-plane boundaries the reflection coefficients due to the former cause are independent of frequency and temperature and that they are large enough to produce dominant internal reflections. In contrast, reflection coefficients due to the latter cause strongly depend on frequency and temperature. Since they are inversely proportional to frequency, the latter cause can be dominant only when frequencies below about 60 MHz are used. (Auth. mod.)

49-4923

Empirical relation between overburden pressure and firn density.

Kameda, T., Shoji, H., Kawada, K., Watanabe, O., Clausen, H.B., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.87-94, 25 refs.

Ice sheets, Snow ice interface, Glacier ice, Firn stratification, Ice pressure, Ice density, Ice cores, Antarctica, Greenland

Two empirical equations for firn densification have been obtained, considering firn porosity as a function of overburden pressure. In the first equation, the reduction ratio of porosity in firn is assumed to be proportional to the increasing ratio of overburden pressure and the *m*-th power of the porosity. The porosity exponent *m* should be close to -2, so as to have a best fit with 14 depth-density profiles from Greenland and Antarctica. In the second equation, the reduction ratio of porosity was assumed to increase proportionally to the increment of overburden pressure and the *n*-th power of the porosity. The most satisfactory values of *n* range from -1 to 1. It has been suggested that firn densities, determined primarily by overburden pressure and firn temperature, contribute to a lesser degree. (Auth.)

49-4924

Characteristics of bubble volumes in firn-ice transition layers of ice cores from polar ice sheets.

Kameda, T., Naruse, R., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.95-100, 16 refs.

Ice sheets, Snow ice interface, Glacier ice, Firn stratification, Ice density, Ice cores, Bubbles, Antarctica—Mizuho Station, Greenland

The air-bubble formation process has been studied experimentally by using five ice cores from Greenland and antarctic ice sheets. Bubble volumes in firn-ice samples were measured by a classical method based on Boyle-Mariotte's law for an ideal gas. It was found that the bubble volume varies with depth as a function of bulk density in the firn-ice transition layer, which is represented by an exponential function of firn density. Air bubbles start to form rapidly at a bulk density of 0.763-0.797 Mg/m^3. This density (p_{ib}) seems to be correlated with the ice temperature in the ice sheets; p_{ib} increases with a decrease in the ice temperature. V_b shows the maximum value in the density range 0.819-0.832 Mg/m^3. The corresponding porosity of the density ranges between 0.110 and 0.097. This porosity does not seem to correlate with ice temperature or accumulation rate at the coring site. These characteristics of firn densities probably affect the amount of entrapped air in glacier ice (total air content) in polar ice sheets. (Auth.)

49-4925

Velocities of the Smith Glacier ice tongue and Dotson Ice Shelf, Walgreen Coast, Marie Byrd Land, West Antarctica.

Lucchitta, B.K., Mullins, K.F., Smith, C.E., Ferrigno, J.G., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.101-109, 14 refs.

Glacier surveys, Glacier tongues, Ice shelves, Glacier flow, Glacier oscillation, Calving, Antarctica—Smith Glacier, Antarctica—Dotson Ice Shelf

Velocity measurements were made for 2 time intervals on the Smith Glacier ice tongue (1973-88 and 1988-90) and 3 on the Dotson Ice Shelf (1972-88, 1973-88 and 1988-90). The Smith Glacier ice tongue velocities for the two intervals are similar near the grounding line, but show a progressive increase toward the terminus in the late 1980s. The Dotson Ice Shelf velocities of the Smith Glacier ice tongue may be attributed to a general loss of densely packed icebergs that buttressed the terminus during the 1970s but drifted out to sea during the late 1980s. The Smith Glacier ice tongue receded as much as 10 km between 1973 and 1988, and Dotson Ice Shelf 5-7 km in the same time period. Similar observations of drifting and calving were made for the adjacent Thwaites Glacier ice tongue. The cause of the loss of ice in the region is unknown, but it may have been a change in winds or a warming of the air or water during the late 1980s. (Auth.)

49-4926

First access to the ocean beneath Ekströmisen, Antarctica, by means of hot-water drilling.

Nixdorf, U., Oerter, H., Miller, H., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.110-114, 17 refs.

Ice shelves, Ice bottom surface, Ice water interface, Ice temperature, Ice melting, Glacier ablation, Subglacial observations, Tidal currents, Echo sounding, Ice drills, Thermal drills, Antarctica—Ekström Ice Shelf, Antarctica—Georg von Neumayer Station

A hot-water drill developed during the past 2 years at Alfred Wegener Institute was used to penetrate the Ekström Ice Shelf several times near the Georg von Neumayer Station. The drilling operation was successful, and the initial large diameter (≥35 cm) allowed easy access to the ocean. One hole was used to install an ultrasonic echo-sounder which recorded the ablation at the ice-shelf bottom continuously. Another hole was used for emplacement of a thermistor string throughout the 237 m thick ice shelf for ice-temperature measurements. Several CTD profiles in the 175 m deep water column, and the analysis of water samples, provided valuable data for the understanding of ice-shelf-ocean interactions. (Auth.)

49-4927

Electrical conductivity method (ECM) stratigraphic dating of the Byrd Station ice core, Antarctica.

Hammer, C.U., Clausen, H.B., Langway, C.C., Jr., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.115-120, 36 refs.

Ice sheets, Ice cores, Ice composition, Ice electrical properties, Ice dating, Paleoclimatology, Drill core analysis, Antarctica—Byrd Station

A continuous ECM profile (strong acid concentration) has been measured along the 2191 m of ice core recovered at Byrd Station in 1968. The ECM profile reveals continuous and systematic seasonal changes which are used for dating the ice core back to 50,000 bp. (Auth.)

49-4928

Snow-accumulation rates and isotopic content (^2H, ^3H) of near-surface firn from the Filchner-Ronne Ice Shelf, Antarctica.

Graf, W., et al, *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.121-128, 26 refs.

Ice shelves, Ice cores, Snow ice interface, Glacier alimentation, Firn stratification, Ice composition, Ice dating, Drill core analysis, Isotope analysis, Antarctica—Ronne Ice Shelf

The accumulation and distribution of the ^2H content of near-surface layers in the eastern part of the Ronne Ice Shelf were determined from 16 firn cores drilled to about 10 m depth in 1990 and 1992. The cores were dated stratigraphically by seasonal δ^2H variations in the firn. In addition, ^3H and high-resolution chemical profiles were used to assist in dating. Both the accumulation rate and the stable-isotope content decrease with increasing distance from the ice edge. The δ^2H profiles of the two ice cores B13 and B15 drilled in 1990 and 1992 to 215 and 320 m depth, respectively, reflect the gradual depletion in ^2H in the firn upstream of the drill sites. Comparison with surface data indicates that the ice above 142 m in core B15 and above 137 m in core B13 was deposited on the ice shelf, whereas the deeper ice, down to 152.8 m depth, most probably originated from the margin of the antarctic ice sheet. (Auth. mod.)

49-4929

Electrical resistivity measurements on Ice Stream B, Antarctica.

Shabtaie, S., Bentley, C.R., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.129-136, 46 refs.

Glacier surveys, Ice sheets, Glacier flow, Ice electrical properties, Ice structure, Impurities, Ice temperature, Ice density, Radio echo soundings, Antarctica—Marie Byrd Land

Electrical resistivity sounding using the four-electrode Schlumberger array was carried out at station UpB on Ice Stream B at an electrode spacing of 3 km. Measured apparent resistivities were compared with theoretical models based on known relations between resistivity, density and temperature. Densities were measured in a pit and two coreholes; temperatures were measured in the upper 200 m of the ice stream and have been calculated for greater depth from an ice-stream temperature model. The resistivity increases with depth down to 650-700 m. Below that there is a marked decrease over the next 100 m or so that is correlated with the Holocene-Wisconsin transition zone. Still deeper there is an orders-of-magnitude increase to a value in the basal ice of 30 Mohm or more. This extremely high resistivity is similar to that reported for temperature glaciers and deep in the antarctic ice sheet elsewhere. The authors attribute it to the destruction, by extensive metamorphism, of impurity-conduction paths at two-grain boundaries. (Auth.)

49-4930

Analysis of satellite radar-altimeter return wave forms over the East Antarctic ice sheet.

Yi, D., Bentley, C.R., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.137-142, 18 refs.

Ice sheets, Glacier surveys, Glacier surfaces, Glacier thickness, Height finding, Radio echo soundings, Spaceborne photography, Antarctica—East Antarctica

The precision of satellite-radar altimetry over the antarctic ice sheet can be improved by using a physically based retracking algorithm on the altimeter returns ("wave forms"). Here the authors develop a model that is based on a variable combination of surface- and volume scattering and determine the model parameters through least-square fitting to the observed waveforms. The model parameters include surface roughness, proportion of volume scattering, extinction coefficient and an amplitude coefficient. Geosat data collected over a test sector of the East Antarctic ice sheet have been analyzed to find quantitative estimates of seasonal and geographic variations of the several parameters. Results show that the effect of volume scattering can change the elevation measurement over the inland part of the East Antarctic ice sheet by more than 1 m, and that there are both spatial and temporal variations; temporal variations are less significant than spatial variations. (Auth.)

49-4931

Effects of temperature and pressure on the transformation rate from air bubbles to air-hydrate crystals in ice sheets.

Uchida, T., Hondoh, T., Mae, S., Duval, P., Lipenkov, V.IA., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.143-147, 16 refs.

Ice sheets, Ice cores, Firn stratification, Glacier ice, Ice microstructure, Ice composition, Ice dating, Bubbles, Hydrates

Experimental investigations on the formation and growth processes of air-hydrate crystals were carried out on the Vostok core to determine the transformation process of air bubbles into air-hydrate crystals in deep ice sheets. The microscopic observations revealed that the transformation began at the boundary between a bubble and ice. Faster transformation occurred along the boundary and, subsequently, the transformation progressed towards the center of the bubble at a lower rate. Each transformation rate increased with pressure and also with temperature. The activation energy of the transformation was about 0.52 eV for the primary transformation process and about 0.90 eV for subsequent processes. These results indicate that the rate determining the process of transformation is mainly supplementation of water molecules to the transformation site. (Auth. mod.)

49-4932

Ice thickness, bed topography and basal-reflection strengths from radar sounding, Upstream B, West Antarctica.

Novick, A.N., Bentley, C.R., Lord, N., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.148-152, 14 refs.

Glacier surveys, Ice sheets, Glacier thickness, Glacier flow, Glacier beds, Glacial hydrology, Subglacial drainage, Subglacial observations, Bottom topography, Radio echo soundings, Antarctica—Marie Byrd Land

Radar profiling in the area around Upstream B camp was performed during the austral 1991-92 summer. About 150 km of lines covering 80 km^2 along the Ohio State University strain grid were profiled. The high density of data along the profiling lines allowed the use of median filtering schemes to remove or decrease interference from near-surface diffractors. Bed and surface elevations are poorly correlated. Hydraulic-head gradients suggest ponding of water in some places and drainage from others. Reflection amplitudes vary over a range of about 24 db, partly because of scattering by crevasses and partly because of real differences in bed reflection. (Auth.)

49-4933

High-resolution radar on Ice Stream B2, Antarctica: measurements of electromagnetic wave speed in firn and strain history from buried crevasses.

Clarke, T.S., Bentley, C.R., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.153-159, 16 refs.

Glacier surveys, Ice sheets, Glacier flow, Glacier beds, Subglacial observations, Crevasses, Radio echo soundings, Antarctica—Marie Byrd Land

Two types of experiments were performed near Upstream B Camp using a high-resolution ground-penetrating radar system. In the first type, tracking a metal drill tip through the upper 85 m of the ice column indicated an approximately linear decrease of wave speed with depth down to 50 m, with a constant speed of 170±4 m/μs below. The authors believe the (unexpected) linearity may have been caused by one or more buried crevasses. In the second experiment, a survey of a 250 km^2 grid showed a population of buried crevasses at about 30 m depth that have an estimated burial age of 210±25 years, which is taken to indicate that this ice has been exhibiting streaming behavior for at least that length of time. One 3 km segment along the edge of the survey area nearest the center of the stream showed a virtually flat undisrupted stratigraphy down to the maximum depth of the measurements. The fact that this ice was accelerated from near-zero speed to its present 440 m/a without cracking or folding suggests that it may have been incorporated into the ice stream as a solid block. (Auth.)

49-4934

Local climate, circulation and surface-energy balance of an antarctic blue-ice area.

Bintanja, R., Van den Broeke, M.R., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.160-168, 17 refs.

Ice air interface, Snow air interface, Ice sublimation, Snow evaporation, Ice heat flux, Atmospheric circulation, Wind (meteorology), Antarctica—Heimefront Range

Results of measurements performed on and around an antarctic blue-ice field are presented. The measurements were carried out in a valley of Heimefront Range during a 2 month field season in the summer of 1992-93. A simple model is used to evaluate the surface-energy balance from measured meteorological quantities. The large differences in the surface-energy balance values between snow and blue ice are mainly caused by differences in albedo, surface roughness, thermal conductivity and short-wave radiation extinction coefficient. Taking into account uncertainties in the calculations, it appears that the calculated sublimation rates over ice and snow do not differ much. (Auth. mod.)

49-4935

C axes from radar depolarization experiments at Upstream B Camp, Antarctica, in 1991-1992.

Liu, C., Bentley, C.R., Lord, N.E., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.169-176, 17 refs.

Glacier surveys, Ice sheets, Glacier flow, Ice structure, Ice electrical properties, Ice crystal structure, Radio echo soundings, Radio waves, Polarization (waves), Antarctica—Marie Byrd Land

Thirty-nine 50 MHz radar polarization experiments were performed in 1991-92 near Upstream B Camp along two lines perpendicular to flow, 1.4 and 2 km long and 900 m apart. For each of the experiments, which were at 100 m intervals, the receiving antenna was held fixed, alternately parallel and perpendicular to flow, while the transmitting antenna was rotated in 15° increments through a full circle twice, once for each orientation of the receiving antenna. The data consist of echo-amplitude measurements from the bottom of the ice. Assuming a model of the ice sheet as a crystalline medium with axial symmetry, the azimuths of the symmetry axis and the cosines of the phase shifts between extraordinary and ordinary waves can be estimated from the variations in amplitude with orientation of the transmitting antenna. The results from bottom echoes show an abrupt change in the axis of symmetry over a distance of only 100 m. This suggests that the experimental lines cross the boundary between two blocks of ice with different stress histories. (Auth.)

49-4936

Indication of a dilatant bed near Downstream B Camp, Ice Stream B, Antarctica.

Atre, S.R., Bentley, C.R., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.177-182, 7 refs.

Glacier surveys, Ice sheets, Glacier flow, Glacier beds, Subglacial observations, Subglacial drainage, Ice acoustics, Seismic surveys, Echo sounding, Antarctica—Siple Coast

Phases of seismic P-wave reflections from the bed of Ice Stream B at a site on its ice plain have been examined. The survey comprised a 36 km line at a shallow angle (18°) to ice movement and four 3.6 km cross lines. Reversed-phase and unreversed-phase reflections each characterize about half the bed. The corresponding zones can be correlated in stripes quasi-parallel to ice movement. The authors take this as support for a model previously developed that relates the zones to different types of subglacial sediment dragged along by the ice. There is also evidence for patches of pooled water. (Auth.)

49-4937

Ice Stream C, Antarctica, sticky spots detected by microearthquake monitoring.

Anandakrishnan, S., Alley, R.B., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.183-186, 23 refs.

Glacier surveys, Ice sheets, Glacier flow, Glacier beds, Glacier friction, Subglacial drainage, Subglacial observations, Earthquakes, Antarctica—Siple Coast

Microearthquakes at the base of slow-moving Ice Stream C occur many times more frequently than at the base of fast-moving Ice Stream B. It is suggested that the microearthquake source sites are so-called "sticky spots", defined as limited zones of stronger subglacial material interspersed within a weaker matrix. The fault-plane area of the microearthquakes is therefore a measure of the size of the sticky spots. The spatial density of the microearthquakes is a measure of the distribution of sticky spots. The average stress drop associated with these microearthquakes is consistent with an ice-stream bed model of weak subglacial till interspersed with stronger zones that support much or all of the basal shear stress. The authors infer a weak inter-sticky-spot material by the large distances, relative to fault radius, to which the microearthquake stress change is transmitted. (Auth.)

49-4938

Water-piracy hypothesis for the stagnation of Ice Stream C, Antarctica.

Alley, R.B., Anandakrishnan, S., Bentley, C.R., Lord, N., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.187-194, 53 refs.

Glacier surveys, Ice sheets, Glacier flow, Glacier beds, Glacier friction, Glacial hydrology, Subglacial drainage, Antarctica—Siple Coast

Water piracy by Ice Stream B may have caused neighboring Ice Stream C to stop. The modern hydrologic potentials near the upstream end of the main trunk of Ice Stream C are directing water from the C catchment into Ice Stream B. Interruption of water supply from the catchment would have reduced water lubrication on bedrock regions projecting through lubricating basal till and stopped the ice stream in a few years or decades, short enough to appear almost instantaneous. This hypothesis explains several new data sets from Ice Stream C and makes predictions that might be testable. (Auth.)

49-4939

Seasonal changes of sea-ice characteristics off East Antarctica.

Allison, I., Worby, A., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.195-201, 9 refs.

Ice surveys, Pack ice, Sea ice distribution, Ice cover thickness, Ice conditions, Ice edge, Pressure ridges, Air ice water interaction, Seasonal variations, Antarctica—East Antarctica

Data on antarctic sea-ice characteristics and their spatial and temporal variability are presented from cruises between 1986 and 1993 for the region spanning 60-150°E between Oct. and May. In spring, the sea-ice zone is a variable mixture of different thicknesses of ice plus open water and in some regions only 30-40% of the area is covered with ice >0.3 m thick. The thin-ice and open-water areas are important for air-sea heat exchange. Crystallographic analyses of ice cores, supported by salinity and stable-isotope measurements, show that approximately 50% of the ice mass is composed of small frazil crystals. These are formed by rapid ice growth in leads and polynyas and indicate the presence of open water throughout the growth season. Ice growth by congelation freezing rarely exceeds 0.4 m, with increases in ice thickness beyond this mostly attributable to rafting and ridging. While most of the total area is thin ice or open water, in the central pack much of the total ice mass is contained in ridges. (Auth. mod.)

49-4940

Accumulation variation in eastern Kemp Land, Antarctica.

Goodwin, I.D., Higham, M., Allison, I., Ren, J.W., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.202-206, 14 refs.

Snow accumulation, Snow cover distribution, Snow erosion, Snow ice interface, Firn stratification, Glacier alimentation, Antarctica—Kemp Coast

The spatial pattern of accumulation rate for eastern Kemp Coast in the elevation range 1850-2700 m is presented together with observations of the physical parameters of snow temperature, average microwave emissivity (19 GHz, H polarization), distribution of depth hoar and firn-crystal diameter. The broad accumulation pattern in the region was found to be significantly low when compared to other coastal areas of East Antarctica such as Wilkes Land. The low accumulation regime is attributed to low atmospheric moisture transport and low penetration of synoptic cyclonic systems onto the coastal slopes. In the absence of high coastal precipitation, the accumulation rate is determined predominantly by surface snow-redistribution processes. Attempts to determine accumulation-rate time series using visible layer, $\delta^{18}O$ isotope and electrical conductivity stratigraphies were unsuccessful due to the relatively low coastal accumulation rates (less than 280 $kg/m^2/a$) and the complex modification of precipitation by redistribution processes. (Auth. mod.)

49-4941

Vostok (Antarctica) climate record time-scale deduced from the analysis of a borehole-temperature profile.

Salamatin, A.N., Lipenkov, V.IA., Blinov, K.V., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.207-214, 24 refs.

Ice sheets, Ice cores, Ice temperature, Ice dating, Paleoclimatology, Geochronology, Pleistocene, Boreholes, Drill core analysis, Antarctica—Vostok Station

Several sets of temperature measurements were carried out from 1972-88 in the Vostok borehole. They have provided an ice-sheet temperature profile down to a depth of 2000 m. The accuracy of the profile is sufficient to analyze perturbations induced by the surface-temperature variations over the last climatic cycle. The mathematical model developed for the ice-temperature computation is applied to solve an inverse problem. The amplitudes and phase lags of the main harmonic components in the surface-temperature variations are reconstructed on the basis of fitting the calculated ice-temperature profile to the experimental one with the assumption that Milankovich cycles (100, 41, 23 and 19 ky) are dominant in the climate oscillations. Minimal standard deviation between calculated and measured temperature profiles is found of the same order as the reproducibility of the temperature measurements (0.005-0.01°C). Although the simulated temperature-time curve obtained in this study does not contain short-term variations, all the main climate events predicted from the ice-core isotope analysis can be recognized. (Auth. mod.)

49-4942

Recent survey of brine infiltration in McMurdo Ice Shelf, Antarctica.

Morse, D.L., Waddington, E.D., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.215-218, 13 refs.

Ice shelves, Ice water interface, Ice composition, Ice salinity, Glacier oscillation, Brines, Firn stratification, Radio echo soundings, Antarctica—McMurdo Ice Shelf

The brine infiltration zone of McMurdo Ice Shelf has been extensively studied by other authors. Brine percolates inland laterally from the ice front, opposite to the direction of ice-shelf motion. Inland propagation of brine pulses following ice-shelf break-outs appears to be the primary brine-infiltration mechanism. During the 1992-93 field season, the authors used radio-echo sounding to resurvey the inland limit of the brine-infiltration zone. The boundary had been similarly mapped in 1977. They observed that since the earlier survey, one 7 km section has retreated seaward by approximately 800 m while another 5 km section is unchanged. These displacements are consistent with the earlier hypothesis that brine infiltration occurs by the influx of brine pulses. (Auth.)

49-4943

Spatial variations of local climate at Taylor Dome, Antarctica: implications for paleoclimate from ice cores.

Waddington, E.D., Morse, D.L., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.219-225, 33 refs.

Glacier surveys, Ice sheets, Ice cores, Ice composition, Firn stratification, Ice temperature, Ice dating, Glacial meteorology, Paleoclimatology, Isotope analysis, Antarctica—Taylor Glacier

Ten m firn temperatures measured at Taylor Dome are influenced by a factor other than altitude and latitude that varies systematically across the Dome. Preliminary data discussed here are compatible with spatially variable katabatic winds that could control the winter temperature-inversion strength to provide a large part of the signal. This has implications for paleoclimate studies. Variations of the stable isotopes $\delta^{18}O$ and δD from ice cores are a proxy for paleotemperature. The isotope thermometer is calibrated by comparing local isotope ratios with corresponding measured temperatures. In order to derive a useful isotope-temperature calibration, one must understand the processes that control the modern spatial variability of temperature. In order to quantify past changes in local climate, one must also understand processes that influence local spatial variability. If these processes differed in the past, ice-core climate reconstruction would be affected in two ways: through alteration of the geochemical record and through alteration of deep ice and firn temperatures. (Auth. mod.)

49-4944

Seasonal variations of major ionic concentration levels in drifting-snow samples obtained from east Dronning Maud Land, East Antarctica.

Osada, K., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.226-230, 21 refs.

Snowdrifts, Snow composition, Scavenging, Aerosols, Ion density (concentration), Seasonal variations, Antarctica—Mizuho Station, Antarctica—Queen Maud Land

Drifting-snow samples were collected at Mizuho Station from Feb. to Oct. 1986, and along traverse routes in east Queen Maud Land from Oct. 1986 to Jan. 1987. Measurements for Cl^-, NO_3^-, SO_4^{2-} and Na^+ were made on the snow samples by ion chromatography. Oxygen-isotope ratios were also measured on the samples. Concentrations levels of NO_3^- and SO_4^{2-} show distinctive seasonal variations: high in summer (4.6 neq/g for NO_3^- and 3.3 neq/g for SO_4^{2-}) and low in winter during mid-Mar. to mid-Nov. (1.0 neq/g for NO_3^- and 0.5 neq/g for SO_4^{2-}). Results obtained at Mizuho show that the transition from the summer high values to winter low values takes about 20 d for NO_3^-. The variations in Cl^- and Na^+ concentration levels are small in both autumn and spring; averages are about 1 neq/g with greater variability throughout the rest of the year. The intensive-sampling data set shows that there is considerable variability within a day with NO_3^- and SO_4^{2-} concentration levels up to about a factor of 4 associated with a 10 per mill change in $\delta^{18}O$ ratios. (Auth. mod.)

49-4945

Post-drilling recrystallization of the Byrd Station deep ice core and its relevance to current and future deep-core drilling on polar ice sheets.

Gow, A.J., MP 3614, *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.231-236, 4 refs.

Ice sheets, Ice cores, Recrystallization, Ice microstructure, Ice crystal structure, Ice crystal size, Ice deformation, Antarctica—Byrd Station

Cores of highly strained ice recovered from depths of 1200-1800 m at Byrd Station in 1967-68 have been found to have recrystallized while in storage in the United States. Such recrystallization, inferred to have occurred when temperatures in the storage facility rose above about -14°C, would not have been discovered if thin sections of the cores had not been prepared and photographed at the drill site within hours of pulling the cores to the surface. It was only after new sections of the long-stored cores were compared with the original sections that the full extent of recrystallization was revealed. The recrystallized structure emulates in both texture and fabric those observed in naturally annealed ice in the bottom 350 m at Byrd Station. It is concluded that polar ice cores should be stored at temperatures of -20°C or colder in order to inhibit or minimize post-drilling recrystallization. (Auth.)

49-4946

80 year record of retreat of the Koettlitz Ice Tongue, McMurdo Sound, Antarctica.

Gow, A.J., Govoni, J.W., MP 3615, *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.237-241, 12 refs.

Glacier surveys, Glacier tongues, Glacier oscillation, Glacier ablation, Calving, Ice edge, Antarctica—Koettlitz Glacier

A survey of ice-front changes since 1910-13 shows that the Koettlitz Ice Tongue, located along the western shore of McMurdo Sound, has undergone significant retreat during the past 80 years. The ice front in 1910-13 was located 5 km in front of the Dailey Is. Today, only two of the six Dailey Is. remain connected to the Koettlitz Ice Tongue. The most recent break-out of ice is believed to have occurred in 1979 or 1980, resulting in an estimated loss of 80 km^2 of ice. Based on the current position of the ice front, it is estimated that a minimum of 300 km^2 of ice has calved off the Koettlitz Ice Tongue during the 80 year period that has elapsed since the ice front was first mapped in 1910-13. (Auth.)

49-4947

Surface mass balance in east Dronning Maud Land, Antarctica, observed by Japanese Antarctic Research Expeditions.

Takahashi, S., Ageta, Y., Fujii, Y., Watanabe, O., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.242-248, 17 refs.

Glacier surveys, Ice sheets, Glacier mass balance, Snow ice interface, Snow accumulation, Snow density, Snow water equivalent, Glacier alimentation, Snow erosion, Snow evaporation, Antarctica—Queen Maud Land, Antarctica—Mizuho Station

The surface mass balance in east Queen Maud Land has been observed mainly by means of the snow-stake method. The surface mass balance generally decreased with distance from the coast; from more than 250 mm/a in the coastal region to less than 50 mm/a in the inland region above 3500 m in altitude. At Mizuho Station, the sublimation was about 50 mm/a, precipitation was between 140 and 260 mm/a, and the loss from the surface by the redistribution was estimated to be about 100 mm/a, which agrees with the surface mass balance estimated as 70 mm/a from the grain-growth rate. Around the mountainous area, the balance was small or in some cases negative, where a bare-ice field has developed. In the inland area 3000-3200 m a.s.l. the surface mass balance was less than 50 mm/a. This low mass-balance area can be explained by redistribution from drifting snow. The whole mass input in 5 drainage basins, with a total area of 620 x 10^3 km^2, is 61.2 Gton/a; the mean surface mass balance is 99 mm/a. (Auth.)

49-4948

Decay of surface topography on the Ross Ice Shelf, Antarctica.

Casassa, G., Whillans, I.M., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.249-253, 19 refs.

Glacier surveys, Ice shelves, Glacier surfaces, Glacier flow, Glacier friction, Ice deformation, Antarctica—Byrd Glacier, Antarctica—Ross Ice Shelf

The time decay of surface undulations is modeled analytically. The particular application is the decay of flow stripes on the Ross Ice Shelf that emanate from Byrd Glacier. The model predicts two extreme undulation types. One extreme, which is termed the buckle solution, has a decay time of only 13 years. The other, the pinch-and-swell case, can persist much longer (700 years), because each surface ridge is underlain by deep roots. Flow stripes may originate as a combination of both the buckle and pinch-and-swell extremes, but only the pinch-and-swell aspect is predicted to survive in the ice shelf. The predicted decay time and that measured from satellite imagery are in close agreement. (Auth.)

49-4949

Evaluation of strain rates on Ice Stream B, Antarctica, obtained using GPS phase measurements.

Hulbe, C.L., Whillans, I.M., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.254-262, 30 refs.

Glacier surveys, Ice sheets, Glacier flow, Glacier friction, Glacier surfaces, Ice deformation, Geodetic surveys, Antarctica—Marie Byrd Land

The "stop-and-go" kinematic Global Positioning System (GPS) technique was used to survey 270 stations twice within a 25 km by 10 km strain grid on the surface of Ice Stream B. One or two geodetic quality receivers operated as reference pivots, while two similar receivers traveled to grid stations. Each station was occupied for 25 s. Each survey was completed within 2 weeks. Calculated horizontal strain rates are accurate to 1%, and relative vertical velocities are accurate to 20 mm/km/a. Maps of the four horizontal velocity gradients, relative vertical velocity and surface elevation are presented. The vertical velocity pattern is used to identify the part of the topography that forms stationary waves and that which is migrating. No strong quantitative link is found between the pattern in horizontal strain rate and surface topography. In particular, there is no evidence that the topography is relaxing toward isostasy. (Auth. mod.)

49-4950

Method for determining ice-thickness change at remote locations using GPS.

Hulbe, C.L., Whillans, I.M., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.263-268, 18 refs.

Glacier surveys, Ice sheets, Glacier thickness, Glacier mass balance, Glacier oscillation, Glacier flow, Geodetic surveys, Antarctica—Amundsen-Scott Station, Antarctica—Byrd Station

Ice-thickness changes at remote locations on ice sheets can be determined by means of precise Global Positioning System (GPS) surveys with interferometric solutions. Remote sites are precisely surveyed relative to GPS receivers on rock. Repeat observations of the position of a remote site provide its vertical velocity. The difference between this velocity and accumulation rate is an indicator of change in ice-sheet thickness. Allowance must be made for the movement of survey markers due to firn compaction and down-slope ice motion. To allow for firn compaction, very long poles are placed to a sufficient depth in the firn that the densification rate can be considered steady. This assumption may be tested by measurements with poles set to different depths. (Auth. mod.)

49-4951

Glacier disequilibrium in the Convoy Range, Transantarctic Mountains, Antarctica.

Chinn, T.J., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.269-276, 19 refs.

Glacier surveys, Glacier oscillation, Glacier mass balance, Glacier flow, Moraines, Snow ice interface, Snow accumulation, Glacier alimentation, Paleoclimatology, Antarctica—Convoy Range

Field work on a geological map of the Convoy Range included mapping of glaciers, moraines and surficial deposits. A range of glaciological indicators, including supraglacial and other moraines and margin morphology, has been used to assess the present equilibrium of the glaciers. Fields of rafted supraglacial moraine have accumulated over long periods of time at specific low-gradient, low-velocity locations. As the glacier regime changes, the shape of the moraine field distorts, signalling a change in flow pattern. By reversing the ice-flow vectors directed at the moraine field, the directions from whence the debris came are shown. Examination of the contortions of supraglacial moraine fields reveals the nature of the changes in glacier regime. Moraine-field configurations all suggest that local glaciers are expanding in response to higher local precipitation, estimated to have occurred between 2000 and 8000 year bp, most likely coincident with the world-wide "climate optimum" of about 6000 year bp. (Auth. mod.)

49-4952

Simulations of anisotropy and fabric development in polar ices.

Castelnau, O., Duval, P., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.277-282, 27 refs.

Ice sheets, Ice structure, Ice crystal structure, Ice deformation, Ice plasticity, Glacier flow, Glacier friction, Ice models

The preferred orientation of ice crystals in polar ice sheets develops as a result of intracrystalline slip. Polycrystalline plasticity theory has been successfully used to simulate development of fabrics in rocks. In this study, the authors present a simple theory for plastic deformation and fabric evolution. Each crystal within the aggregate is assumed to deform only by basal glide, and recrystallization processes are not directly taken into account. The authors have adopted the uniform stress bound, that is, stress is supposed to be homogeneous in the polycrystal. Simulated fabrics in uniaxial compression and tension are similar to those observed in ice sheets. It is suggested that effects of vertical compression and/or rotation recrystallization are of great importance for fabric evolution in polar ice sheets. The proposed model can reproduce viscosities of anisotropic ice samples tested in compression or tension but it is not able to reproduce the low viscosity of ices with a single-maximum fabric when tested in simple shear. (Auth. mod.)

49-4953

Spatial and seasonal variations of the snow chemistry at the central Filchner-Ronne Ice Shelf, Antarctica.

Minikin, A., Wagenbach, D., Graf, W., Kipfstuhl, J., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.283-290, 37 refs.

Ice shelves, Snow ice interface, Snow composition, Snow impurities, Snow accumulation, Firn stratification, Antarctica—Ross Ice Shelf, Antarctica—Filchner Ice Shelf

The chemical stratigraphy of the surface firn of the central Filchner-Ronne Ice Shelf was determined in conjunction with stable isotopes from shallow firn cores and snow-pit samples collected at 15 widely distributed sites, and covering a time period of at least 20 years. Throughout the investigated area, wintertime nss sulphate levels are found to be substantially negative, indicating that the sulphate to sodium ratio in airborne sea-salt particles is depleted by a factor of 5, approximately, in relation to the bulk sea-water ratio. While winter firn layers appear to be marked by episodic events of large sea-salt inputs, pronounced annual cycles with maxima in summer firn layers are commonly observed for the ECM signal and for nss sulphate, nitrate and methanesulphonate (MSA) at all sites. It is concluded that the sea-salt and the biogenic sulphur compounds deposited on the Filchner-Ronne Ice Shelf mainly originate from the adjacent Weddell Sea. (Auth. mod.)

49-4954

Modelling the antarctic ice-sheet changes through time.

Budd, W.F., Jenssen, D., Mavrakis, E., Coutts, B., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.291-297, 20 refs.

Ice sheets, Ice shelves, Glacier oscillation, Glacier mass balance, Glacial meteorology, Ice models, Sea level, Global warming, Antarctica

A new assessment is made of the possible range of responses of the antarctic ice sheet to future global warming by performing a series of sensitivity tests to prescribed climatic forcing with an ice-sheet model. To obtain an appropriate initial present state for the ice sheet, it has been necessary to perform a series of simulations through the last glacial cycle with prescribed forcing including accumulation, sea level and, less importantly, climatic temperature. For future climatic forcing, General Circulation Model simulations have been used with particular concern for the changes in the sea-ice cover and ocean warming. Effects of progressive changes have been examined with increases of basal-melt rates up to 10 m/a, surface annual mean temperatures by up to 7°C and surface-accumulation rates to double the present values. Without additional accumulation, the increased basal melt of 10 m/a would greatly reduce the ice shelves and contribute to sea-level rise of 0.3 m in 100 years and over 0.6 m by 500 years. The additional accumulation offsets this to give ca. zero change by 100 years and -1.2 m by 500 years. (Auth. mod.)

49-4955

Temperature structure and characteristics appearing on SSM/I images of the Cosmonaut Sea, Antarctica.

Takizawa, T., Ohshima, K.I., Ushio, S., Kawamura, T., Enomoto, H., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.298-306, 4 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Polynyas, Air ice water interaction, Oceanographic surveys, Ocean currents, Water temperature, Spaceborne photography, Antarctica—Enderby Land, —Indian Ocean

Water-temperature structure shows that cold water with a temperature below -1.5°C was present in the coastal region of Enderby Land. Circumpolar Deep Water with a temperature higher than 1.0°C was found below about 150 m depth from northeast to northwest of the coldwater area. The SSM/I images in 1987-91 indicate that polynya activities were intensive in 1988 and the typical Cosmonaut Polynya was observed. Due to weaker activities, the small and sporadic Cosmonaut Polynya formed in 1987, 1989, 1990 and 1991. A coastal polynya was frequently observed yearly at about 66°S, 50-60°E. A train of polynyas to the east of Cosmonaut Polynya often appeared. It is concluded that the Atmospheric Convergence Line and Antarctic Divergence Region are responsible for polynya activities in the area investigated. (Auth. mod.)

49-4956

Reconnaissance of chemical and isotopic firn properties on top of Berkner Island, Antarctica.

Wagenbach, D., et al, *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.307-312, 14 refs.

Glacier surveys, Ice sheets, Ice shelves, Ice cores, Firn stratification, Ice composition, Ice dating, Isotope analysis, Antarctica—Berkner Island

Shallow firn cores were drilled to 11 m at the two main summits of Berkner I. and analyzed in high depth resolution for electrical d.c. conductivity (ECM), stable isotopes, chloride, sulphate, nitrate and methane-sulphonate (MSA). From the annual layering of δD and non-sea-salt (nss) sulphate, a mean annual snow accumulation of 26.6 cm water at the north dome, and 17.4 cm water at the south dome, are obtained. As a result of ineffective wind scouring indicated by a relatively low near-surface snow density, regular annual cycles are found in the upper 4-5 m. Post-depositional changes are responsible for a substantial decrease of the seasonal δD and nitrate amplitude as well as for considerable migration of the MSA signal operating below a depth of 3-4 m. The mean chemical and isotopic firn properties at the south dome correspond to those on the Filchner-Ronne Ice Shelf at a comparable distance to the coast; the north dome is found to be much more influenced by maritime air masses. Persistent high sea-salt levels in winter snow at Berkner I. heavily obscure the determination of nss sulphate. (Auth. mod.)

49-4957

Development of enhanced ice flow at the southern margin of Ice Stream D, Antarctica.

Scambos, T.A., Echelmeyer, K.A., Fahnestock, M.A., Bindschadler, R.A., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.313-318, 9 refs.

Glacier surveys, Ice sheets, Glacier flow, Glacier friction, Spaceborne photography, Image processing, Antarctica—Siple Coast

A combination of image-based velocity mapping techniques and finite-element modeling has been used to study a part of the southern shear margin of Ice Stream D. The study area is a region over which the margin shows considerable development morphologically, where a new southern margin is forming in response to an abrupt increase in ice-stream width just upstream of the study area. A series of ice-speed profiles perpendicular to the margin was determined by semi-automated displacement measurements of small ice features in sequential Landsat TM images. Finite-element modeling of the upstream and downstream profiles suggests that a considerable change occurs in the stiffness of the ice in the marginal zone between the two profiles, and in the stiffness or amount of sliding in the basal layer underlying the margin. Ice in the downstream profile appears to have marginal zones of softer ice in which shear strain is concentrated and uniformly low resistance to deformation in the bed. (Auth. mod.)

49-4958

Surface-velocity field of the northern Larsen Ice Shelf, Antarctica.

Bindschadler, R.A., Fahnestock, M.A., Skvarca, P., Scambos, T.A., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.319-326, 6 refs.

Glacier surveys, Ice shelves, Glacier flow, Glacier oscillation, Spaceborne photography, Antarctica—Larsen Ice Shelf

Three satellite images of the northern Larsen Ice Shelf are used to derive velocity fields for the periods 1975-86 and 1986-89. Substantial increases in the speed of the ice between these periods were detected to a high degree of confidence. Ice which entered the ice shelf between Fothergill Point and Cape Worsley and ice from Drygalski Glacier have accelerated by approximately 15% over the measurement period. Ice from Bombardier and Dinsmoor Glaciers also exhibit acceleration but by a lesser amount. These accelerations may be the result of either significant retreat experienced by the ice shelf during this period or warming in the Antarctic Peninsula region. Velocities measured by surface survey over a 15 d period in 1991 indicate a slower velocity than the image-derived velocities in the limited region of overlap. These differences appear to be systematic and may be the result of uncontrolled errors in the surface survey. (Auth.)

49-4959

Detailed elevation map of Ice Stream C, Antarctica, using satellite imagery and airborne radar.

Bindschadler, R.A., Vornberger, P.L., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.327-335, 12 refs.

Glacier surveys, Ice sheets, Glacier flow, Glacier thickness, Glacier surfaces, Height finding, Spaceborne photography, Aerial surveys, Topographic surveys, Image processing, Antarctica—Siple Coast

Surface elevations collected by airborne radar are interpolated between flight lines using Landsat TM image data to produce a detailed digital elevation model of part of Ice Stream C. The photoclinometric method developed is general and allows the derivation of surface elevation along any line parallel to the solar illumination from a single known elevation on that line. Accuracies of the derived elevations are improved with additional elevation control that permits an empirical determination of parameters in the photoclinometric equation accounting for albedo and atmospheric scattering. Elevation errors increase approximately linearly with the integration distance. An explicit relationship is derived that shows the image brightness is insensitive to the cross-Sun component of small surface slopes typical of ice sheets. (Auth. mod.)

49-4960

Formation and disintegration of the antarctic ice sheet.

Huybrechts, P., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.336-340, 22 refs.

Ice sheets, Glacier oscillation, Glacial meteorology, Glaciation, Geochronology, Paleoclimatology, Global warming, Antarctica

A model of the antarctic ice sheet has been used to simulate the ice sheet in warmer climates. The results of these experiments reveal the considerable stability of the East Antarctic ice sheet. It would require a temperature rise of between 17 and 20 K above present levels to remove this ice sheet from the subglacial basins in the interior of the continent, and of 25 K to melt down the antarctic ice sheet completely. For a temperature rise less than 5 K the model actually predicts a larger antarctic ice sheet than today as a result of increased snowfall, whereas the West Antarctic ice sheet was found not to survive temperatures more than 8-10 K above present values. Furthermore, basal temperature conditions in these experiments point to the problems involved in raising the base of the ice sheet to the pressure-melting point over the large areas necessary to consider the possibility of sliding instability. In view of these findings, it is difficult to reconcile a highly variable East Antarctic ice sheet until the Pliocene with modest warming recorded in, for instance, the deep-sea records for the late Neogene. (Auth. mod.)

49-4961

Numerical model of blowing snow around an antarctic building.

Moore, I., Mobbs, S.D., Ingham, D.B., King, J.C., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.341-346, 10 refs.

Blowing snow, Snowdrifts, Snow erosion, Snow accumulation, Snow loads, Buildings, Stations, Cold weather construction, Antarctica—Halley Station

This paper studies a building at a station run by the British Antarctic Survey and located on the Brunt Ice Shelf. Four previous stations have been built in the area, the buildings of which were designed to become covered in snow and all have been crushed within a few years. The current station, Halley V, consists of three buildings which are all raised from the ice shelf on legs. They were designed in such a way that wind blowing underneath the buildings would keep them clear of snow. This paper describes a model which predicts the shape and position of drift formation, and then compares the results with those observed at Halley. The model is a first attempt to address the problem and as such the paper can be considered to be a progress report; improvements are currently being made as part of continuing research. (Auth. mod.)

49-4962

Validating and improving elevation data of a satellite-image map of Filchner-Ronne Ice Shelf, Antarctica, with results from ERS-1.

Sievers, J., et al, *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.347-352, 16 refs.

Glacier surveys, Ice shelves, Glacier thickness, Glacier surfaces, Height finding, Topographic surveys, Spaceborne photography, Image processing, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

A satellite-image map with surface-elevation contours of Filchner-Ronne Ice Shelf has been published previously as a topographic map. The image map was constructed from a mosaic of 69 Landsat Multispectral Scanner (MSS) images and NOAA AVHRR data. The standard deviation in position in the central part of the mosaic is ±125 m. Topographic-glaciologic features were taken from Landsat scenes and represent the best coastline of this region. Surface elevations have been calculated from airborne and ground measurements of either ice thickness or barometric pressure. Accuracies vary from ±2 to ±7 m. Oversnow trigonometric levelling in the northeastern part of the ice shelf, tied to sea level at the ice front, has achieved accuracies of ±1 m. Accuracies reduce to about ±20 m in the grounded ice areas. (Auth. mod.)

49-4963

Sea-bed depths at the mouth of Rutford Ice Stream, Antarctica.

Smith, A.M., Doake, C.S.M., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.353-356, 14 refs.

Ice shelves, Ice water interface, Ice acoustics, Underwater acoustics, Echo sounding, Seismic surveys, Subglacial observations, Ocean bottom, Bottom topography, Antarctica—Rutford Ice Stream, Antarctica—Ronne Ice Shelf

Seismic measurements of ice- and water-column thickness have been made on Rutford Ice Stream where it joins the Ronne Ice Shelf. Assuming that the ice is in hydrostatic equilibrium, these values have been used to calculate sea-bed elevations. A sea-bed trough more than 2 km below sea level along the western margin continues downstream from the grounded to the floating ice. (Auth.)

49-4964

Comparison of satellite-altimetry and ice-thickness measurements of the Ross Ice Shelf, Antarctica.

Bamber, J.L., Bentley, C.R., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.357-364, 28 refs.

Glacier surveys, Ice shelves, Glacier thickness, Glacier surfaces, Glacier beds, Ice water interface, Radio echo soundings, Height finding, Topographic surveys, Spaceborne photography, Antarctica—Ross Ice Shelf

The launch of ERS-1 provides coverage by satellite altimetry of a large part of the Ross Ice Shelf including areas of input from Byrd Glacier and Ice Streams D and E. Five 35 d repeats of fast-delivery data comprising approximately 100,000 height estimates have been used to produce a Digital Elevation Model (DEM) of the Ross Ice Shelf north of 81.5°S. Two of the latest geoid models, OSU91-A and JGM1, were compared with the available in situ data and hydrostatic models based on ice and water densities. The altimetry was compared with ice-thickness data from Ross Ice Shelf Geophysical and Glaciological Survey (RIGGS) stations and Scott Polar Research Institute radio-echo-sounding surveys undertaken in the 1970s. Differences between the DEM and heights calculated from ice thicknesses and a standard density-depth equation lie, in general, within the combined measurement errors. There are, however, several areas where this is not the case. Prominent north-south stripes of different ice thickness shown on a RIGGS map apparently do not exist. (Auth. mod.)

49-4965

Central part of the Filchner-Ronne Ice Shelf, Antarctica: internal structures revealed by 40 MHz monopulse RES.

Blindow, N., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.365-371, 13 refs.

Glacier surveys, Ice shelves, Glacier thickness, Ice structure, Ice salinity, Snow ice interface, Ice bottom surface, Ice water interface, Subglacial observations, Radio echo soundings, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

About 1200 km of surface-based radio-echo sounding (RES) profiles were measured during the German Antarctic field season 1989-90 on the Filchner-Ronne Ice Shelf (FRIS). In the area investigated downstream of Doake Ice Rumples and Henry Ice Rise, a basal layer of marine ice up to 400 m thick was found below the meteoric ice, which is less than 100 m thick in some places. The continuous profiling yielded the total ice thickness in the northern part and a variety of internal structures, including layers in the meteoric and the marine ice, remnants of crevasses, and varying reflections of the meteoric-marine interface reflection (MMR). It is shown that the most-disturbed MMR signatures originate at grounding zones at Doake Ice Rumples and at both sides of Henry Ice Rise. The status of the meteoric ice bottom is preserved by the formation of marine ice; structures remain widely unchanged over 400 km of flow. Internal features that can be correlated on parallel profiles perpendicular to the flow provide an independent means for the construction of flowlines. (Auth. mod.)

49-4966

Investigating tidal flexure on an ice shelf using kinematic GPS.

Vaughan, D.G., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.372-376, 17 refs.

Glacier surveys, Ice shelves, Glacier thickness, Glacier beds, Glacier flow, Glacier mass balance, Ice water interface, Tidal currents, Height finding, Topographic surveys, Antarctica—Rutford Ice Stream

The positions of ice-stream grounding zones are uniquely sensitive to changes in the mass balance of the ice sheet. Present methods for locating grounding-zone features are either imprecise or require considerable effort in interpretation. The authors present a new method which uses the kinematic GPS technique to locate the position of the limit of tidal flexure. The method involves the collection of at least two surface-elevation profiles along the same track through the grounding zone at different times during the tidal cycle. The elevation profiles obtained coincide upstream of the limit of flexure but diverge downstream of the limit of flexure. Subtracting the profiles produces a tidal-deflection profile which shows directly the response of the ice shelf to the tidal forcing. Two examples are given of the use of this method, both on Rutford Ice Stream. The first is across the grounding zone and shows that the method is capable of measuring grounding positions to around 200 m precision. The second, taken across an active shear margin, shows a tidal-deflection profile, with an absence of steps that would indicate the presence of fracture planes penetrating from the ice base to sea level. (Auth.)

49-4967

Temperature investigation and modeling on the Filchner-Ronne Ice Shelf, Antarctica.

Grosfeld, K., Thyssen, F., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.377-385, 49 refs.

Glacier surveys, Ice shelves, Glacier mass balance, Glacier heat balance, Ice bottom surface, Ice growth, Ice water interface, Ice temperature, Ice salinity, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

During the German Antarctic Expedition field season 1989-90, hot-water drilling was done on the Filchner-Ronne Ice Shelf (FRIS) to investigate the temperature-depth profile and the bottom-melting rate, which are significant parameters for mass- and energy-balance studies of the ice shelf. Remeasurements of chains installed in 1991-92 yielded reliable results. Taking glaciological, geodetic and geophysical data on a flowline through the central part of FRIS, the authors developed a two-dimensional thermal model to reconstruct the measurements from a steady-state temperature-depth profile ca. 550 km upstream on Möllereisstrom. A basal layer of 350 m of marine ice was calculated with thermal properties depending on salinity and temperature. In areas with strong basal freezing, nearly isothermal depth profiles in the marine ice layer are derived. Further downstream in areas of basal melting a nearly cubic temperature-depth profile is observed. (Auth.)

49-4968

Oceanic environment beneath the northwest Ronne Ice Shelf, Antarctica.

Robinson, A., Makinson, K., Nicholls, K., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.386-390, 19 refs.

Ice shelves, Ice bottom surface, Ice water interface, Frazil ice, Subglacial observations, Oceanographic surveys, Water temperature, Salinity, Antarctica—Ronne Ice Shelf

Oceanographic data have been obtained from beneath the Ronne Ice Shelf at a site on the southeastern side of a sea-floor trough, the Ronne Depression. The data consist of 5 d of CTD profiling and a long-term temperature record from a thermistor cable. The water column was found to be composed of two layers: a cold buoyant layer of Ice Shelf Water (ISW) overlying a layer of unmodified Western Shelf Water (WSW). A change in the water column was observed on the last day of profiling, with the WSW layer thinning, a cold intrusion appearing directly above the WSW and the ISW becoming colder. In addition, on three profiles the ISW cooled further and increased in salinity, becoming apparently statically unstable. The temperature record from the thermistor cable confirms that the ISW layer occasionally becomes colder, with greater variation in temperature than seen on the CTD profiles. These low temperatures and high salinities are interpreted as indicating that water containing ice crystals in suspension has been advected beneath the site. (Auth.)

49-4969

Numerical flow simulation at local parts of Filchner-Ronne Ice Shelf, Antarctica.

Jonas, M., Grosfeld, K., Thyssen, F., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.391-396, 24 refs.

Glacier surveys, Ice shelves, Glacier flow, Glacier heat balance, Ice deformation, Ice structure, Ice temperature, Ice bottom surface, Ice water interface, Radio echo soundings, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The Münster radio echo sounding (RES) work in the central Filchner-Ronne Ice Shelf has revealed new information. Different signatures are discernible in the airborne RES data. Local model calculations in the area between Henry Ice Rise and Berkner I. are used to interpret these signatures in terms of thermal and dynamic parameters. From airborne measurements, the shapes of the meteoric and marine-ice layers were prepared as input data for dynamic-model calculations. A general increase in the temperature-dependent flow parameter is compared with a spatially variable flow parameter that is derived from model calculations concerning freezing and melting processes. Velocity and strain fields were calculated by a finite-difference method on a local data base between Henry Ice Rise and Berkner I. (Auth.)

49-4970

20th century behaviour of Drygalski Ice Tongue, Ross Sea, Antarctica.

Frezzotti, M., Mabin, M.C.G., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.397-400, 15 refs.

Glacier surveys, Glacier tongues, Glacier oscillation, Glacier flow, Ice water interface, Calving, Polynyas, Antarctica—Drygalski Ice Tongue

Drygalski Ice Tongue is a floating seaward extension of David Glacier. In Dec. 1956, the ice tongue was about 110 km long. By Dec. 1957, a major calving event had occurred and the outer 40 km of the ice tongue had broken away. This is the only major 20th century calving event identified, and it may have occurred during a violent storm that struck the Ross Sea area in mid-June 1957. By 1960 further minor ice loss had occurred, but since that time Drygalski Ice Tongue has maintained the same shape. In Jan. 1993, the ice tongue was 95.8 km long and at its terminus was flowing at 880-900 m/a. Drygalski Ice Tongue is an important regulator of the size of the Terra Nova Bay polynya. The average size of the polynya varied from nearly 2000 km^2 in 1956 to 650 km^2 in 1957. This has a significant impact on sea-ice production in the Ross Sea. In 1956, about 115 km^3 of sea ice would have been produced, sufficient to cover 30% of the Ross Sea area with a 1 m thickness of sea ice. (Auth. mod.)

49-4971

Flow regime of the Lambert Glacier-Amery Ice Shelf system, Antarctica: structural evidence from Landsat imagery.

Hambrey, M.J., Dowdeswell, J.A., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.401-406, 34 refs.

Glacier surveys, Ice shelves, Glacier flow, Glacier surfaces, Glacier surges, Topographic surveys, Spaceborne photography, Antarctica—Lambert Glacier, Antarctica—Amery Ice Shelf

High-resolution visible and near-infrared satellite imagery provides a means of investigating the structural glaciology, and hence the dynamics, of large ice masses. The Lambert Glacier-Amery Ice Shelf system is one of the largest ice drainage basins in Antarctica and has previously yielded conflicting evidence concerning its dynamic behavior: either that the system has a propensity for surging or that it has a constant flow regime. Digital manipulation of Landsat imagery allows analysis of the structure of the glacier system, showing longitudinal foliation, medial moraines and crevasse patterns. These provide no evidence of surging behavior during the residence time of ice in the glacier system. (Auth.)

49-4972

Landsat TM image maps of the Shirase and Siple Coast ice streams, West Antarctica.

Ferrigno, J.G., et al, *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.407-412, 17 refs.

Glacier surveys, Ice sheets, Glacier flow, Glacier surfaces, Topographic surveys, Topographic maps, Spaceborne photography, Image processing, Antarctica—Shirase Coast, Antarctica—Siple Coast

Fifteen 1:250,000 and one 1:1,000,000 scale Landsat Thematic Mapper (TM) image mosaic maps are currently being produced of the West Antarctic ice streams on the Shirase and Siple coasts. Landsat TM images were acquired between 1984 and 1990 in an area bounded approximately by 78°-82.5°S and 120°-160°W. Landsat TM bands 2, 3 and 4 were combined to produce a single band, thereby maximizing data content and improving the signal-to-noise ratio. The summed single band was processed with a combination of high- and low-pass filters to remove longitudinal striping and normalize solar elevation-angle effects. The images were mosaicked and transformed to a Lambert conformal conic projection using a cubic-convolution algorithm. The projection transformation was controlled with ten weighted geodetic ground-control points and internal image-to-image pass points with annotation of major glaciological features. The image maps are being published in two formats: conventional printed map sheets and on a CD-ROM. (Auth.)

49-4973

Melting and freezing beneath ice shelves: implications from a three-dimensional ocean-circulation model.

Determann, J., Gerdes, R., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.413-419, 32 refs.

Ice shelves, Ice water interface, Ice bottom surface, Glacier melting, Ice growth, Sea water freezing, Glacier oscillation, Glacier mass balance, Ocean currents, Antarctica—Ronne Ice Shelf

The thermohaline circulation below a regularly shaped ice shelf comparable in dimensions to the Ronne Ice Shelf is investigated by means of a three-dimensional primitive equation model. To handle the strongly inclined ocean surface as well as the bottom topography, the authors use scaled coordinates in the vertical direction. Preliminary results of two model versions containing both open and closed open-ocean boundaries prove the internal circulation is almost independent of the hydrography outside the ice shelf. Driven only by the pressure dependence of the sea-water freezing point, a stationary circulation pattern evolves, forced by buoyancy flux due to melting and freezing. The redistribution of ice from deep to shallow ice-shelf drafts resembles the ice-pump mechanism. Its strength depends on the ice-thickness gradients, namely, the differences of the freezing point at the ice-shelf base. Since simulated melting and accumulation rates convincingly reproduce the interactions observed at the base of Ronne Ice Shelf, the present model can act as a tool for coupling ice-ocean dynamics. (Auth.)

49-4974
Climate since AD 1510 on Dyer Plateau, Antarctic Peninsula: evidence for recent climate change.
Thompson, L.G., et al, *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.420-426, 20 refs.
Ice sheets, Ice cores, Ice composition, Ice dating, Paleoclimatology, Climatic changes, Global warming, Dust, Isotope analysis, Antarctica—Dyer Plateau
A 480 year record of the oxygen-isotope ratios, dust content, chemical species and net accumulation from ice cores drilled in 1989-90 on Dyer Plateau in the Antarctic Peninsula is presented. Unlike in East Antarctica, on Dyer Plateau conditions appear to have been fairly normal from AD 1500 to 1850, with cooler conditions from 1850 to 1930 and a warming trend dominating since 1930. Reconstructed annual layer thicknesses suggest an increase in net accumulation beginning early in the 19th century and continuing to the present. This intuitive conflict between increasing net accumulation and depleted $\delta^{18}O$ (cooler climate) in the 19th century appears widespread in the peninsula region and challenges one's understanding of the physical relationships among moisture sources, air temperatures and snow accumulation. The complex meteorological regime in the Antarctic Peninsula region complicates a meaningful interpretation of proxy indicators and results in a strong imprint of local high-frequency processes upon the larger-scale climate picture. (Auth. mod.)

49-4975
Holocene temperature variations inferred from six antarctic ice cores.
Ciais, P., Jouzel, J., Petit, J.R., Lipenkov, V.IA., White, J.W.C., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.427-436, 43 refs.
Ice sheets, Ice cores, Ice composition, Ice dating, Air temperature, Paleoclimatology, Isotope analysis, Antarctica—Vostok Station, Antarctica—Charlie, Dome
The authors have reconstructed temperature changes over the past 15,000 years from ice-core data in Antarctica, using measurements of the D/H isotope ratio in ice as a proxy of temperature for central sites (Vostok, Dome C and Komsomolskaya) as well as coastal sites. They examined the dating of each core and built up a common temporal framework for the ensemble of the data; they addressed the problem of inferring small-amplitude temperature fluctuations from the isotope data, in the light of noise-generating mechanisms involved in snow deposition. Temperature was reconstructed so as to minimize distortion created by the sampling of ice cores in the field. The 7 ice cores studied yield an average temperature curve which can be put in perspective with nearby paleoclimatic records. (Auth.)

49-4976
Ice sheets and continental drift.
Paltridge, G.W., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.437-439, 19 refs.
Ice sheets, Ice age theory, Glaciation, Isostasy, Paleoclimatology, Continental drift, Earth crust
Cycles of ice-sheet loading during glacial periods of the Earth's history induce horizontal velocities in the uppermost mantle which may be of the same order as those of continental drift. Given some nonlinear mechanism which ensures preferential movement in the one direction, a climatically induced component of continental drift is therefore possible during glacial periods such as the Quaternary. If so, one might expect that component of drift to be intermittent on time-scales between 20 and 100 ka, i.e. on time-scales of observed ice-volume variations which, at least over the last 700 ka, have been related to the Earth's orbital variations. (Auth.)

49-4977
Spatial variability of the major chemistry of the antarctic ice sheet.
Mulvaney, R., Wolff, E.W., *Annals of glaciology,* 1994, Vol.20, International Symposium on Antarctic Glaciology, 5th, Cambridge, England, Sep. 5-11, 1993. Proceedings, p.440-447, 48 refs.
Ice sheets, Snow ice interface, Ice composition, Snow composition, Impurities, Polar atmospheres, Marine atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Scavenging, Antarctica
A compilation of reliable data for sodium, nitrate, chloride and sulphate has been made. NO_3^- concentrations are remarkably consistent across Antarctica, though there appears to be some correlation with altitude and accumulation rate. Post-depositional loss of NO_3^- is important at low-accumulation sites. Cl^- concentration (either measured directly or calculated from Na^+ via the sea-salt ratio) decreases with distance from the coast, though the decline is less rapid if the coastal topography is not steep or mountainous. Excess sulphate (xs SO_4^{2-}) concentration (here calculated from normal sea-salt ratios with Na^+ or Cl^-) also declines with distance from the coast, though less quickly than Cl^-. Fractionation of sea-salt ions makes the calculation of xs SO_4^{2-} uncertain. (Auth.)

49-4978
Preprints.
International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988, *Annalen der Meteorologie,* 1988, No.25, 724p. (2 vols.), Refs. passim. For selected papers see 49-4979 through 49-5068.
DLC QC851.A67 N.F. Nr.25
Cloud physics, Precipitation (meteorology), Ice nuclei, Ice crystal growth, Ice crystal adhesion, Ice crystal size, Snowfall, Hail clouds, Hailstone growth, Cloud cover, Supercooled clouds, Cloud droplets, Coalescence, Scavenging

49-4979
Temporal variations of snow crystal growth parameters.
Takahashi, T., Fukuta, N., Endoh, T., Wakahama, G., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.9-11, 9 refs.
Snow crystal growth, Snowfall, Snow pellets, Ice crystal adhesion, Coalescence, Precipitation (meteorology)

49-4980
Empirical equations of ice crystal growth microphysics for modeling and analysis.
Redder, C.R., Fukuta, N., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.12-14, 9 refs.
Ice crystal growth, Ice crystal adhesion, Supercooled clouds, Cloud physics

49-4981
Contrast study of new model on ice crystal growth.
Wang, A.S., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.15-17, 10 refs.
Ice crystal growth, Cloud physics

49-4982
Wind tunnel study on the melting of snow flakes.
Mitra, S.K., Vohl, O., Pruppacher, H.R., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.18-21, 6 refs.
Snowflakes, Snow melting, Coalescence, Precipitation (meteorology), Raindrops

49-4983
Evaporation and melting of ice crystals: a laboratory study.
Oraltay, R.G., Hallett, J., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.22-24, 6 refs.
Ice crystal growth, Ice sublimation, Ice melting, Cloud physics

49-4984
New mechanism for ice initiation in warm-based midwestern cumuli.
Czys, R.R., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.25-27, 7 refs.
Supercooled clouds, Cloud droplets, Coalescence, Ice nuclei, Freezing nuclei

49-4985
Spreading of supercooled water droplets on an ice surface.
Dong, Y.Y., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.28-30, 7 refs.
Supercooled clouds, Cloud droplets, Ice water interface, Ice accretion, Glaze

49-4986
Test of ice crystal production by aircraft.
Vali, G., Kelly, R.D., Serrano, F., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.52-54, 5 refs.
Supercooled clouds, Cloud physics, Condensation trails, Aircraft, Artificial nucleation, Ice crystal growth

49-4987
Airborne studies of the ice phase in maritime clouds around the British Isles.
Brown, P.R.A., Choularton, T.W., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.55-57, 8 refs.
Supercooled clouds, Cloud physics, Marine meteorology, Ice crystal growth, Ice crystal size, Ice detection, United Kingdom

49-4988
Evidence of preferential zones of ice multiplication by splintering in convective cells.
Gayet, J.F., Duroure, C., Soulage, R.G., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.61-63, 5 refs.
Cloud physics, Ice crystal growth, Ice crystal size, Ice crystal collision

49-4989
Microphysical characteristics of warm-based cumuli: observations at -10°C.
Czys, R.R., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.64-66, 2 refs.
Supercooled clouds, Cloud droplets, Cloud physics, Cloud seeding, Artificial precipitation

49-4990
Effect of ice physical processes on the numerical simulation of West African squall lines.
Hall, W.D., Lafore, J.P., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.100-102, 5 refs.
Cloud physics, Fronts (meteorology), Precipitation (meteorology), Freezing nuclei, Ice crystal growth

49-4991
Numerical simulation of microphysical processes in cumulonimbus.
Hu, Z.J., He, G.F., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.103-105, 2 refs.
Cloud physics, Cloud droplets, Coalescence, Precipitation (meteorology), Ice crystal growth

49-4992
Some outstanding problems on the influence of clouds on radiation.
Stephens, G.L., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.115-117, 5 refs.
Cloud physics, Cloud cover, Radiation balance, Ice crystal size, Ice crystal optics, Light scattering

49-4993
Comparison of holographic and 2-D probe measurements of ice crystals.
Brown, P.R.A., Darlison, A.G., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.141-143, 7 refs.
Cloud physics, Ice crystal size, Ice crystal optics, Holography

49-4994

Development of hydrometeor video sonde.

Murakami, M., Matsuo, T., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.144-147, 3 refs.

Cloud physics, Precipitation (meteorology), Snow crystal growth, Snow crystal structure, Ice crystal size, Ice crystal optics, Meteorological instruments

49-4995

Microphysical and electrical phenomena during freezing of water drops.

Adzhiev, A.Kh., Tomazov, S.T., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.161-163, 2 refs.

Cloud physics, Cloud electrification, Cloud droplets, Ice crystal growth, Ice electrical properties, Hailstone growth

49-4996

Liquid water content, median volume diameter, and temperature in dependence on the height above the cloud base for different types of clouds.

Hoffmann, H.E., Roth, R., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.175-177, 4 refs.

Aircraft icing, Cloud physics, Supercooled clouds, Cloud droplets, Unfrozen water content

49-4997

Crystallization of supercooled solutions.

Harrison, K., Hallett, J., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.180-182, 6 refs.

Ice crystal growth, Freezing nuclei, Solutions, Supercooling, Liquid phases, Ice water interface, Liquid solid interfaces

49-4998

Kinetics of ice crystal formation on aerosol particles in supercooled fog.

Gorbunov, B.Z., Pashchenko, A.E., Kakutkina, N.A., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.183-184, 3 refs.

Supercooled fog, Ice crystal growth, Aerosols, Ice nuclei, Nucleation rate

49-4999

About secondary ice crystal production.

Gzirishvili, T.G., Khorguani, V.G., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.185-187, 3 refs.

Ice crystal growth, Aerosols, Freezing nuclei, Ice nuclei, Supercooled clouds, Cloud droplets

49-5000

Experimental studies on secondary ice particle production.

Yamashita, A., Konishi, H., Shimada, W., Miyatake, M., Tani, K., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.188-189.

Cloud physics, Ice needles, Ice crystal growth, Ice sublimation

49-5001

Proportion of riming growth process in snowfall phenomena.

Harimaya, T., Sato, M., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.190-192, 4 refs.

Snow crystal growth, Snowflakes, Snowfall, Falling snow, Ice crystal adhesion, Coalescence, Precipitation (meteorology), Cloud physics

49-5002

Three-dimensional structures of snow crystals shown by stereo-photomicrographs.

Iwai, K., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.193-195, 6 refs.

Snow crystal structure, Ice crystal replicas, Stereophotography

49-5003

On the variation of falling velocity of early snowflakes.

Kajikawa, M., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.196-198, 5 refs.

Snow crystal growth, Snowflakes, Falling snow, Coalescence, Precipitation (meteorology)

49-5004

On the dynamics of the falling ice crystal zone.

Podzimek, J., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.202-204, 3 refs.

Cloud physics, Ice crystal collision, Ice crystal growth, Turbulent exchange, Scavenging, Precipitation (meteorology)

49-5005

New database of ice particle size spectra for altitudes up to 10 km (30,000 ft).

Jeck, R.K., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.205-207, 11 refs.

Cloud physics, Ice crystal size, Precipitation (meteorology)

49-5006

Vertical wind tunnel for the study of snowflakes and effects of accumulated snow on materials.

Isono, K., Kobayashi, J., Gonda, T., Sasyo, Y., Mori, T., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.208-210, 2 refs.

Wind tunnels, Snowflakes, Snow crystal growth, Snowfall, Snow accumulation

49-5007

Pattern of air bubble inclusions in atmospheric ice formed during accretion growth.

Gribelin, P., Personne, P., Isaka, H., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.214-216, 4 refs.

Ice accretion, Ice air interface, Bubbles

49-5008

Analysis of hailstones from a severe storm and their simulated evolution.

Levi, L., Lubart, L., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.217-219, 7 refs.

Hailstone growth, Hailstone structure, Hail clouds, Cloud physics, Coalescence

49-5009

Collection efficiencies of soft-hailstones for supercooled water droplets and ice crystals.

Keith, W.D., Saunders, C.P.R., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.220-222, 4 refs.

Hailstone growth, Ice crystal growth, Ice crystal collision, Ice crystal adhesion, Supercooled clouds, Cloud droplets, Coalescence

49-5010

Simulation of conical graupel by using a ballistic model.

Personne, P., Duroure, C., Isaka, H., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.223-225, 10 refs.

Snow pellets, Ice crystal growth, Ice crystal adhesion, Ice accretion

49-5011

Comparison of model results for models of differing microphysical detail.

Farley, R.D., Orville, H.D., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.226-228, 9 refs.

Hailstone growth, Hail clouds, Cloud physics

49-5012

Studies of cloud micro-chemical physics.

Pitter, R.L., Finnegan, W.G., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.243-245, 7 refs.

Cloud physics, Atmospheric composition, Ice crystal growth, Ice composition, Impurities

49-5013

Effect of aerosols on pH of snowfalls.

Kumai, M., MP 3616, *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.249-250, 1 ref.

Aerosols, Atmospheric composition, Snow air interface, Snowfall, Snow composition, Snow impurities, Scavenging

49-5014

Ionic concentrations of rime ice and snow and Bergeron process.

Huang, S.H., Castillo, R.A., Monhen, V.K., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.251-253, 3 refs.

Cloud physics, Atmospheric composition, Snow crystal growth, Snowfall, Snow composition, Snow impurities, Scavenging, Ion density (concentration)

49-5015

Effect of freezing on the composition of cloud droplets.

Iribarne, J.V., Pyshnov, T., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol 1, p.258-260, 3 refs.

Supercooled clouds, Cloud droplets, Atmospheric composition, Ice crystal growth, Ice composition, Impurities, Scavenging

49-5016

Some effects of cloud microphysics on cloud chemistry.

Hegg, D.A., Hobbs, P.V., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.261-263, 12 refs.

Cloud physics, Cloud droplets, Atmospheric composition, Ice nuclei, Ice crystal growth, Scavenging

49-5017

Microphysical, dynamical and chemical aspects of scavenging processes during winter precipitation.

Waldvogel, A., Schumann, T., Zinder, B., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.270-272, 4 refs.

Cloud physics, Cloud droplets, Aerosols, Ice nuclei, Snowfall, Scavenging

49-5018

Vertical profiles of pollutants inside and outside of cloud.

Isaac, G.A., Leaitch, W.R., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.273-275, 4 refs.

Air pollution, Cloud physics, Cloud droplets, Ice nuclei, Scavenging

49-5019

Influences of cloud microphysics on continental and marine precipitation chemistry.

Parungo, F.P., Nagamoto, C., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.285-287, 6 refs.

Atmospheric composition, Cloud physics, Cloud droplets, Snowfall, Snow composition, Snow impurities, Scavenging

49-5020

Radar observations of precipitation microstructure: the morphology of linear depolarization measurements in cloud.

Herzegh, P.H., Jameson, A.R., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.328-329, 3 refs.

Hail clouds, Hailstone structure, Ice detection, Radar echoes

49-5021

Intercomparisons of aircraft measurements with lidar returns for aerosol, ice crystals, and water droplets.

Leaitch, W.R., Hoff, R.M., Carswell, A.I., Pal, S.R., Cunningham, A.G., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.338-340, 3 refs.

Cloud physics, Cloud droplets, Aerosols, Ice nuclei, Ice crystal size, Ice detection, Backscattering, Lidar

49-5022

On the small scale topographical influences on precipitation.

Grabowski, W.W., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.344-346, 7 refs.

Cloud physics, Precipitation (meteorology), Snowfall, Topographic effects

49-5023

Numerical investigation of an orographic precipitation event.

Meyers, M.P., Cotton, W.R., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.347-349, 7 refs.

Cloud physics, Precipitation (meteorology), Ice nuclei, Ice crystal collision, Topographic effects

49-5024

Complex microphysical interactions within a central Sierra Nevada orographic cloud system.

Rauber, R.M., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.350-352, 5 refs.

Cloud physics, Precipitation (meteorology), Ice nuclei, Ice crystal collision, Topographic effects

49-5025

Microphysical observations over the Atlas Mountains in Morocco.

Baddour, O., Rasmussen, R.M., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.356-358, 3 refs.

Cloud physics, Supercooled clouds, Cloud droplets, Precipitation (meteorology), Snowfall, Ice crystal collision, Coalescence, Topographic effects

49-5026

Microphysical and dynamical interactions in Colorado Front Range upslope storms.

Wesley, D.A., Weissbluth, M.J., Pielke, R.A., Cotton, W.R., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.359-361, 8 refs.

Cloud physics, Precipitation (meteorology), Snowfall, Snowstorms, Topographic effects

49-5027

Characteristics of radar echo of snow band formed in the lee side of a mountain.

Fujiyoshi, Y., Endoh, T., Wakahama, G., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.1, p.362-363, 3 refs.

Cloud cover, Snowfall, Snowstorms, Topographic effects, Weather forecasting, Radar echoes

49-5028

Identification of precipitation particles using dual polarization radar.

Illingworth, A.J., Caylor, I.J., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.372-374, 9 refs.

Cloud physics, Cloud droplets, Precipitation (meteorology), Ice crystal size, Ice detection, Radar echoes

49-5029

EHF attenuation through the melting layer.

Barnes, A.A., Jr., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.380-382, 15 refs.

Cloud physics, Precipitation (meteorology), Snowflakes, Falling snow, Snow melting, Radar echoes

49-5030

Size distribution of precipitation particles in midlatitude mesoscale convective complexes.

Yeh, J.D., Fan, B.F., Cotton, W.R., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.383-385, 5 refs.

Cloud physics, Precipitation (meteorology), Ice crystal size, Ice crystal collision, Coalescence

49-5031

Basic characteristics of the winter northern Xinjiang stratiform cloud system.

Gao, Z.Y., Zhang, J.X., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.389-392, 1 ref.

Cloud physics, Cloud seeding, Ice nuclei, Artificial precipitation, Artificial snow, Snow manufacturing, China—Xinjiang Province

49-5032

Doppler radar observation of convergence band cloud formed on the west coast of Hokkaido Island, Japan.

Fujiyoshi, Y., Tsuboki, K., Wakahama, G., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.407-409, 3 refs.

Cloud cover, Snowstorms, Snowfall, Weather forecasting, Radar echoes, Japan—Hokkaido

49-5033

Use of oxygen isotopes in studies of ice phase precipitation from winter storms.

Demoz, B., Warburton, J.A., Stone, R.L., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.410-412, 10 refs.

Cloud physics, Precipitation (meteorology), Snowstorms, Snowfall, Snow composition, Isotope analysis

49-5034

Numerical sensitivity study of the morphology of lake-effect snow storms over Lake Michigan.

Hjelmfelt, M., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.413-415, 16 refs.

Lake effects, Snowstorms, Snowfall, Cloud cover, Weather forecasting, United States—Michigan, Lake

49-5035

Doppler radar observations of snow particles in winter convective clouds.

Konishi, H., Endoh, T., Wakahama, G., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.416-418, 2 refs.

Cloud physics, Snowstorms, Snowfall, Snow pellets, Snowflakes, Falling snow, Ice crystal size, Radar echoes

49-5036

Origin of air masses leading to severe hailstorms in southwestern France.

Dessens, J., Fournier d'Albe, E.M., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.452-454, 4 refs.

Air masses, Hail clouds, Hailstone growth, Weather forecasting, France

49-5037

Radar remote sensing of melting hail.

Bringi, V.N., Meischner, P.F., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.455-457, 9 refs.

Cloud physics, Hail clouds, Hailstones, Ice melting, Precipitation (meteorology), Radar echoes

49-5038

Structural and textural characteristics of cirrus clouds.

Kuo, K.S., Welch, R.M., Sengupta, S.K., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.468-470, 10 refs.

Clouds (meteorology), Cloud cover, Cloud physics, Ice crystal optics, Spaceborne photography, Image processing

49-5039

Cirrus clouds and mesoscale atmospheric processes.

Borisenkov, E.P., Bazlova, T.A., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.471-472, 7 refs.

Cloud physics, Cloud cover, Ice nuclei, Ice crystal growth, Precipitation (meteorology)

49-5040

Mesoscale and microscale structure of cirrus clouds: three case studies.

Sassen, K., Griffin, M.K., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.473-475, 5 refs.

Cloud physics, Cloud cover, Ice nuclei, Ice crystal growth, Unfrozen water content

49-5041

Vertical velocities within a cirrus cloud from Doppler lidar and aircraft measurements during FIRE: implications for particle growth.

Gultepe, I., Heymsfield, A.J., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.476-478, 8 refs.

Cloud physics, Cloud cover, Ice nuclei, Ice crystal collision, Ice crystal size, Ice crystal growth

49-5042

Hydrometeor development in cold clouds in FIRE.

Heymsfield, A.J., Knight, N.C., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.479-481.

Cloud physics, Cloud cover, Ice crystal growth, Ice crystal size, Ice crystal adhesion, Unfrozen water content

49-5043

Empirical model of the structure of cirrus clouds in middle latitudes.

Kosarev, A.L., Mazin, I.P., Nevzorov, A.N., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.482-484, 9 refs.

Cloud physics, Cloud cover, Ice crystal size, Ice nuclei, Unfrozen water content

49-5044

Modelling the initial ice crystal spectrum in cirrus cloud.

Darlison, A.G., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.485-487, 8 refs.

Cloud physics, Ice nuclei, Ice crystal growth, Ice crystal size, Nucleation rate, Unfrozen water content

49-5045

Effects of cirrus composition on atmospheric radiation budgets.

Kinne, S., Liou, K.N., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.488-489, 2 refs.

Cloud physics, Cloud cover, Ice crystal size, Ice crystal optics, Radiation balance, Albedo

49-5046

Precipitation mechanism of precipitus stratiformis over Jilin Province in spring.

Wang, X.L., Jin, D.Z., Li, Y.Z., Zheng, C.R., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.507-508, 7 refs.

Cloud seeding, Artificial nucleation, Ice nuclei, Artificial precipitation, China—Jilin Province

49-5047

Aircraft observations and simulations of arctic stratus clouds.

Finger, J.E., Wendling, P., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.509-510, 4 refs.

Polar atmospheres, Cloud cover, Cloud physics, Atmospheric boundary layer, Turbulent exchange

49-5048

Water content of winter clouds over ETS.

Azarov, A.S., Bezrukova, N.A., Buranbaev, N.F., Koldaev, A.V., Chernikov, A.A., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.518-520, 4 refs.

Cloud physics, Supercooled clouds, Unfrozen water content, Cloud seeding, Russia—Moscow

49-5049

Occurrence of ice in clouds associated with extratropical cyclones.

Bruintjes, R.T., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.547-550, 8 refs.

Cloud physics, Supercooled clouds, Atmospheric disturbances, Fronts (meteorology), Ice crystal growth, Ice nuclei, Coalescence, Precipitation (meteorology)

49-5050

Supercooling of surface water skins of spherical and spheroidal hailstones.

List, R., García-García, F., Kuhn, R., Greenan, B., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.551-553, 7 refs.

Hailstone growth, Hailstone structure, Ice crystal adhesion, Ice water interface, Water films, Coalescence, Supercooling

49-5051

Microphysical concept of hail formation.

Tlisov, M.I., Khorguani, V.G., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.554-556, 3 refs.

Hail clouds, Cloud physics, Hailstone growth

49-5052

Studies of artificial hailstones under different experimental conditions.

Prodi, F., Wang, A.S., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.557-559, 8 refs.

Artificial hailstones, Hailstone growth, Hailstone structure, Hail prevention, Environmental tests

49-5053

Wind tunnel hailstone growth using Doppler radar derived trajectories.

Lesins, G.B., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.560-562, 10 refs.

Artificial hailstones, Hailstone growth, Hailstone structure, Wind tunnels

49-5054

Effect of supercooled droplet electrical charge on the hail growth coagulative process.

Bliadze, T.G., Kartsivadze, A.I., Okudzhava, A.M., Saliashvili, T.N., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.563-565, 7 refs.

Artificial hailstones, Hailstone growth, Hailstone electrification, Ice crystal adhesion, Coalescence

49-5055

Growth of hailstones in convective clouds: results of measurements and numerical experiments.

Stoianov, S., Tlisov, M.I., Geresdi, I., Zoltán, C., Székely, C., Molnár, K., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.566-568, 4 refs.

Cloud physics, Hail clouds, Hailstone growth, Hailstone structure

49-5056

Hail impacts, hail nets and damage.

Roos, D., Durrant, S., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.569-571, 5 refs.

Hail, Hail prevention, Damage, Cost analysis

49-5057

Comparison of the shape and size distributions of raindrops and hailstones.

Wang, P.K., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.572-573, 5 refs.

Hailstones, Raindrops, Particle size distribution, Ice crystal size

49-5058

Two stage hailstone growth in the August 1, 1981 CCOPE storm.

Pflaum, J.C., Rasmussen, R.M., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.574-575, 13 refs.

Cloud physics, Hail clouds, Hailstone growth, Ice crystal adhesion, Coalescence

49-5059

On some characteristics determining the development of hail processes in Bulgaria.

Simeonov, P., Sirakov, D., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.576-578, 3 refs.

Cloud physics, Hail clouds, Hailstone growth, Weather forecasting, Bulgaria

49-5060

Microphysical characteristics of convective clouds over the south-central United States.

Poellot, M.R., Pflaum, J.C., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.582-584, 3 refs.

Cloud physics, Ice nuclei, Ice crystal growth, Precipitation (meteorology), Coalescence

49-5061

Investigating mixing and the activation of ice with gaseous tracer techniques.

Stith, J.L., Politovich, M.K., Reinking, R.F., Detwiler, A.G., Smith, P.L., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.588-590, 3 refs.

Cloud physics, Ice nuclei, Ice crystal growth, Aerosols, Scavenging

49-5062

First formation of precipitation in an isolated convective cloud.

Knight, C.A., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.591-593, 3 refs.

Cloud physics, Thunderstorms, Precipitation (meteorology), Ice nuclei, Ice crystal growth

49-5063

Comparisons of satellite data with surface-based remote sensing measurements in Utah winter orographic storms.

Rogers, D.C., Sassen, K., Dodd, G.C., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.659-661, 5 refs.

Cloud physics, Snowstorms, Snowfall, Radar echoes, United States—Utah

49-5064

Observation of microbursts from snow clouds in winter monsoon season.

Uyeda, H., Shirooka, R., Kikuchi, K., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.678-680, 4 refs.

Cloud physics, Snowstorms, Wind (meteorology), Atmospheric disturbances, Japan—Hokkaido

49-5065

Structure of the convective cells and the dynamics of hailstorm development in Alazani Valley.

Kartsivadze, A.I., Salukvadze, T.G., Doreuli, R.I., Khelaia, E.I., Balavadze, A.Sh., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.684-686, 5 refs.

Cloud physics, Hail clouds, Hailstone growth, Thunderstorms, Air masses, Georgia

49-5066

3-D numerical modelling and radar observations of deep convective clouds.

Höller, H., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.693-695, 9 refs.

Cloud physics, Hail clouds, Hailstone growth, Snow pellets, Storms

49-5067

Mesoscale patterns of ice particle characteristics in Hurricane Norbert.

Houze, R.A., Jr., Marks, F.D., Jr., Black, R.A., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.708-710, 5 refs.

Cloud physics, Ice nuclei, Ice crystal growth, Precipitation (meteorology), Atmospheric disturbances, Storms

49-5068

Microphysics in a deep convective cloud system associated with a mesoscale convective complex—numerical simulation.

Fan, B.F., Yeh, J.D., Cotton, W.R., Tripoli, G., *Annalen der Meteorologie,* 1988, No.25, International Cloud Physics Conference, 10th, Bad Homburg, Germany, Aug. 15-20, 1988. Preprints. Vol.2, p.714-716, 8 refs.

Cloud physics, Ice nuclei, Ice crystal adhesion, Snow pellets, Precipitation (meteorology), Coalescence

49-5069

Synopsis of glacier researches in Patagonia, 1993.

Naruse, R., Aniya, M., *Bulletin of glacier research,* Mar. 1995, No.13, p.1-10, 34 refs.

Glacier surveys, Research projects, Glacier oscillation, Calving, Glacier thickness, Glacier mass balance, Periodic variations, Climatic factors, Chile—Patagonia

49-5070

Recent thinning, retreat and flow of Upsala Glacier, Patagonia.

Skvarca, P., Satow, K., Naruse, R., Leiva, J.C., *Bulletin of glacier research,* Mar. 1995, No.13, p.11-20, 15 refs.

Glacier surveys, Glacier flow, Glacier oscillation, Velocity measurement, Glacier thickness, Periodic variations, Argentina—Patagonia

49-5071

Thickness change and short-term flow variation of Moreno Glacier, Patagonia.

Naruse, R., Skvarca, P., Satow, K., Takeuchi, Y., Nishida, K., *Bulletin of glacier research,* Mar. 1995, No.13, p.21-28, 34 refs.

Glacier surveys, Glacier thickness, Glacier oscillation, Glacier ablation, Periodic variations, Glacier flow, Basal sliding, Velocity measurement, Argentina—Patagonia

49-5072

Thickness change and flow of Tyndall Glacier, Patagonia.

Nishida, K., Satow, K., Aniya, M., Casassa, G., Kadota, T., *Bulletin of glacier research,* Mar. 1995, No.13, p.29-34, 8 refs.

Glacier surveys, Glacier flow, Glacier thickness, Periodic variations, Glacier ablation, Velocity measurement

49-5073

Meteorological features at Moreno and Tyndall glaciers, Patagonia, in the summer 1993/94.

Takeuchi, Y., Satow, K., Naruse, R., Ibarzabal, T., Nishida, K., Matsuoka, K., *Bulletin of glacier research,* Mar. 1995, No.13, p.35-44, 13 refs.

Glacier surveys, Glacial meteorology, Meteorological factors, Air temperature, Temperature variations, Snow air interface, Ice cover effect, Wind factors, Argentina—Patagonia

49-5074

Characteristics of heat balance and ablation on Moreno and Tyndall glaciers, Patagonia, in the summer 1993/94.

Takeuchi, Y., Naruse, R., Satow, K., *Bulletin of glacier research,* Mar. 1995, No.13, p.45-56, 13 refs.

Glacier surveys, Glacier oscillation, Glacier ablation, Glacier heat balance, Seasonal variations, Ice heat flux, Meteorological factors, Argentina—Patagonia

49-5075

Chemical features of the precipitation in summer at Tyndall Glacier, Patagonia.

Satow, K., *Bulletin of glacier research,* Mar. 1995, No.13, p.57-61, 10 refs.

Glacier surveys, Glacial meteorology, Precipitation (meteorology), Snow composition, Chemical analysis, Solubility, Ion density (concentration), Argentina—Patagonia

49-5076

Sinking of stones on glacier surface during the melting season.

Matsuoka, K., Nishida, K., Takeuchi, Y., *Bulletin of glacier research,* Mar. 1995, No.13, p.63-68, 12 refs.

Glacier surveys, Glacial hydrology, Surface structure, Glacier melting, Rocks, Sediment transport, Ice solid interface, Ice heat flux

49-5077

Morphology of Ameghino Glacier and landforms of Ameghino valley, southern Patagonia.

Aniya, M., Sato, H., *Bulletin of glacier research,* Mar. 1995, No.13, p.69-82, 21 refs.

Glacial geology, Pleistocene, Geomorphology, Landforms, Glacier oscillation, Moraines, Argentina—Patagonia

49-5078

Holocene glacial chronology of Upsala Glacier at Peninsula Herminita, Southern Patagonia Icefield.

Aniya, M., Sato, H., *Bulletin of glacier research,* Mar. 1995, No.13, p.83-96, 15 refs.

Pleistocene, Glaciation, Glacier oscillation, Glacial geology, Glacial deposits, Geochronology, Argentina—Patagonia

49-5079

Holocene glacier variations at Tyndall Glacier area, southern Patagonia.

Aniya, M., Sato, H., *Bulletin of glacier research,* Mar. 1995, No.13, p.97-109, 20 refs.

Pleistocene, Glacial geology, Glacier oscillation, Landforms, Glacial deposits, Geochronology, Geomorphology, Argentina—Patagonia

49-5080

Glacier variations in the Northern Patagonia Icefield between 1990/91 and 1993/94.

Wada, Y., Aniya, M., *Bulletin of glacier research,* Mar. 1995, No.13, p.111-119, 3 refs.

Glacier surveys, Glacier oscillation, Seasonal variations, Oblique photography, Glacier tongues, Glacier ablation, Argentina—Patagonia

49-5081

Preliminary study of sediment cores from Lago Argentino and fluctuations of Moreno Glacier, Patagonia.

del Valle, R.A., Skvarca, P., Mancini, M.V., Lusky, J., *Bulletin of glacier research,* Mar. 1995, No.13, p.121-126, 9 refs.

Glacial geology, Glacier surveys, Glacier oscillation, Sediments, Stratigraphy, Drill core analysis, Glacier tongues, Palynology, Argentina—Patagonia

49-5082

Vertical distribution of ^{210}Pb in the arctic glacier, Snøfjellafonna, in northwestern Spitsbergen.

Suzuki, T., Ohta, K., Watanabe, O., *Bulletin of glacier research,* Mar. 1995, No.13, p.133-136, 15 refs.

Glacier ice, Aerosols, Ice composition, Ice cores, Sampling, Radioactive isotopes, Isotope analysis, Profiles, Periodic variations, Norway—Spitsbergen

49-5083

Counting condensation nuclei in the antarctic ozone mission.

Wilson, J.C., *U.S. National Aeronautics and Space Administration. Technical report,* Nov. 1994, NASA-CR-197113, 62p., N95-15847, Refs. passim.

Ozone, Aerosols, Atmospheric composition, Condensation, Meteorological instruments, Stratosphere

This report primarily concerns the measurement of aerosol in the stratosphere from NASA ER-2 aircraft in studies of stratospheric ozone depletion in the northern and southern hemispheres. The ER-2 Condensation Nucleus Counter (CNC) measures the number concentration of particles in the diameter range of approximately 0.01 to 1 micron. The Passive Cavity Aerosol Spectrometer measures size distributions in the 0.17 to 3 micron diameter range. This instrument was upgraded during the study to a Focused Cavity Aerosol Spectrometer (FCAS). This upgrade permitted the instrument to measure particles as small as 0.05 micron in diameter. The inlet for the PCAS and FCAS was modified and characterized so that the modifications to the aerosol due to anisokinetic sampling and heating upon sampling and in transport to the measurement location were accounted for in the data analysis. (Auth. mod.)

49-5084

Quaternary geology at Lions Rump (SSSI No.34), King George Island, South Shetland Islands (West Antarctica).

Birkenmajer, K., *Polish Academy of Sciences. Bulletin. Earth Sciences,* 1994, 42(3), p.207-221, 20 refs.

Glacial geology, Moraines, Geochronology, Ice cover thickness, Glacier surges, Antarctica—King George Island

Three generations of Late Holocene moraines and related glaciofluvial deposits, postdating high raised beaches, are described from the area of Lions Rump, King George Bay, designated as a Site of Special Scientific Interest (SSSI No.34). Lichenometric dating using circular thalii of *Rhizocarpon geographicum* indicates that the first generation moraines were formed as a result of glacier advance in the second half of the 18th century. The second (prior to 1960) and the third (between 1988 and 1991) glacier advances produced the second and the third generations of the moraines, respectively. The Holocene history of the area is outlined. Comparison of dated Late Holocene glacier advances of King George Bay and Admiralty Bay on King George I. with those of Hope Bay, northern Antarctic Peninsula, gives a picture of instability of ice cover in maritime West Antarctica. The timing of glacier advances/surges depends principally on local conditions and is not correlatable among the three areas considered. (Auth.)

49-5085

Radiocarbon vs. calendar ages of major lateglacial hydrological events in North America.

Lowell, T.V., Teller, J.T., *Quaternary science reviews,* Nov.-Dec. 1994, 13(9-10), p.801-803, 23 refs.

Pleistocene, Glacier oscillation, Glacier melting, Glacial hydrology, Quaternary deposits, Radioactive age determination, Correlation, Accuracy, Ice age theory

49-5086

Late glacial drainage systems along the northwestern margin of the Laurentide ice sheet.

Lemmen, D.S., Duk-Rodkin, A., Bednarski, J.M., *Quaternary science reviews,* Nov.-Dec. 1994, 13(9-10), p.805-828, 97 refs.

Pleistocene, Ice sheets, Geomorphology, Glacial hydrology, Glacier melting, Glacial lakes, Surface drainage, Isostasy

49-5087

Glacial Lake McConnell: paleogeography, age, duration, and associated river deltas, Mackenzie River basin, western Canada.

Smith, D.G., *Quaternary science reviews,* Nov.-Dec. 1994, 13(9-10), p.829-843, 36 refs.

Pleistocene, Glacial lakes, Glacial hydrology, Flooding, River basins, Deltas, Geomorphology, Canada—Northwest Territories

49-5088

Glacial Lake Agassiz: its northwest maximum extent and outlet in Saskatchewan (Emerson Phase).

Fisher, T.G., Smith, D.G., *Quaternary science reviews,* Nov.-Dec. 1994, 13(9-10), p.845-858, 37 refs.

Pleistocene, Glacial hydrology, Glacial lakes, Geomorphology, Flooding, Water erosion, Lacustrine deposits, Glacial deposits, Radioactive age determination, Canada—Saskatchewan

49-5089

History of late glacial runoff along the southwestern margin of the Laurentide ice sheet.

Kehew, A.E., Teller, J.T., *Quaternary science reviews,* Nov.-Dec. 1994, 13(9-10), p.859-877, 46 refs.

Pleistocene, Ice sheets, Glacial geology, Glacial lakes, Glacial hydrology, Meltwater, Runoff, Geomorphology, Canada—Saskatchewan

49-5090

Deglaciation, lake levels, and meltwater discharge in the Lake Michigan basin.

Colman, S.M., Clark, J.A., Clayton, L., Hansel, A.K., Larsen, C.E., *Quaternary science reviews,* Nov.-Dec. 1994, 13(9-10), p.879-890, 48 refs.

Pleistocene, Ice sheets, Lakes, Water level, Glacial geology, Glacier oscillation, Glacier melting, Shoreline modification, Meltwater, Isostasy, Geomorphology, United States—Michigan, Lake

49-5091

Lakes of the Huron basin: their record of runoff from the Laurentide ice sheet.

Lewis, C.F.M., Moore, T.C., Jr., Rea, D.K., Dettman, D.L., Smith, A.M., Mayer, L.A., *Quaternary science reviews,* Nov.-Dec. 1994, 13(9-10), p.891-922, Refs. 918-922.

Pleistocene, Ice sheets, Watersheds, Glacial lakes, Glacier melting, Runoff, Precipitation (meteorology), Lacustrine deposits, Geochronology, Huron, Lake

49-5092

Impact of glacial lake runoff on the Goldthwait and Champlain Seas: the relationship between glacial Lake Agassiz runoff and the Younger Dryas.

Rodrigues, C.G., Vilks, G., *Quaternary science reviews,* Nov.-Dec. 1994, 13(9-10), p.923-944, Refs. p.941-944.

Pleistocene, Ice sheets, Glacial lakes, Meltwater, Runoff, Oceanography, Bottom sediment, Radioactive age determination, Geochronology, Canada—Quebec

49-5093

Evolution and paleohydrology of glacial Lakes Barlow and Ojibway.

Veillette, J.J., *Quaternary science reviews,* Nov.-Dec. 1994, 13(9-10), p.945-971, 64 refs.

Pleistocene, Glacial hydrology, Glacial lakes, Glacial geology, Glacier melting, Water level, Surface drainage, Lacustrine deposits, Geomorphology, Geochronology, Canada—Ontario

49-5094

Early development of the glacial theory: Louis Agassiz and the Scottish connection.

Gordon, J.E., *Geology today,* Mar.-Apr. 1995, 11(2), p.64-68, 9 refs.

Pleistocene, Ice age theory, Glacial geology, Geomorphology, United Kingdom—England

49-5095

Recent historical fluctuations of the Glacier du Taillon, Pyrénées.

Gellatly, A.F., Grove, J.M., Bücher, A., Latham, R., Whalley, W.B., *Physical geography,* Sep.-Oct. 1994, 15(2), p.399-413, 23 refs.

Mountain glaciers, Glacier oscillation, Periodic variations, Glacier surveys, Glacier mass balance, France—Pyrénées Mountains

49-5096

Glacier trends in the Caucasus, 1960s to 1980s.

Bedford, D.P., Barry, R.G., *Physical geography,* Sep.-Oct. 1994, 15(2), p.414-424, 21 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Periodic variations, Correlation, Caucasus

49-5097

Glaciological studies at Rae Glacier, Canadian Rocky Mountains.

Lawby, C.P., Smith, D.J., Laroque, C.P., Brugman, M.M., *Physical geography,* Sep.-Oct. 1994, 15(2), p.425-441, 36 refs.

Glaciology, Glacier surveys, Mountain glaciers, Cirque glaciers, Glacier oscillation, Glacier flow, Periodic variations, Glacier mass balance, Climatic factors, Canada—Alberta

49-5098

Hydrological characteristics of the Dokriani Glacier in the Garhwal Himalayas.

Singh, P., Ramasastri, K.S., Singh, U.K., Gergan, J.T., Dobhal, D.P., *Hydrological sciences journal,* Apr. 1995, 40(2), p.243-257, With French summary. 7 refs.

Mountain glaciers, Glacier surveys, Glacial hydrology, Sediment transport, Glacier melting, Snowmelt, Meltwater, Runoff, Temperature effects, India—Himalaya Mountains

49-5099

Rhythms in the geomorphological evolution and time-space related scale levels in the high latitudes.

Godard, A., *Zeitschrift für Geomorphologie,* July 1993, Suppl.93, p.61-67, With German and French summaries. 9 refs.

Geomorphology, Arctic landscapes, Slope processes, Soil erosion, Glacial erosion, Glacial geology, Sediment transport, Weathering

49-5100

Phases of periglacial-geomorphological processes during the Weichselian in northern German lowlands. [Phasen periglaziär-geomorphologischer Prägung während der Weichseleiszeit im norddeutschen Tiefland]

Liedtke, H., *Zeitschrift für Geomorphologie,* July 1993, Suppl.93, p.69-94, In German with English and French summaries. Refs. p.91-94.

Geomorphology, Periglacial processes, Pleistocene, Permafrost indicators, Geocryology, Paleoecology, Solifluction, Germany

49-5101

Young fluvial valleys in Scandinavia and in the Arctic compared as to form and possible rate of formation.

Rudberg, S., *Zeitschrift für Geomorphologie,* July 1993, Suppl.93, p.111-126, With German and French summaries. 24 refs.

Geomorphology, Valleys, Topographic features, Glaciation, Glacial erosion, Water erosion, Periglacial processes, Sweden

49-5102

SST estimation within Syowa's station mask using MOS-1's visible and thermal infrared radiometers.

Schneider, W., Nishio, F., Yamanouchi, T., Watanabe, O., Masuko, H., *International journal of remote sensing,* Mar. 10, 1995, 16(4), p.613-624, 8 refs.

Oceanography, Water temperature, Surface temperature, Temperature measurement, Spaceborne photography, Radiometry, Data processing, Antarctica—Showa Station

Since Feb. 1989, measurements from Marine Observatory Satellite 1 (MOS-1) have been received at Showa Station. The first set of MOS-1 visible and thermal infrared recordings from Showa is analyzed in this study. A method developed by Schüssel and Grassl is applied for ice and cloud filtering. For clear ocean pixels the sea surface temperatures are estimated by applying Muneyama's split window algorithm. A sea surface temperature composite of ten VTIR passes is presented. (Auth. mod.)

49-5103

Prospects for use of "PDP" additive to improve the low-temperature properties of gas-condensate diesel fuel.

Bashkatova, S.T., Vasil'eva, E.N., Deineko, P.S., Zelinskaia, M.I., Pashichev, E.B., *Chemistry and technology of fuels and oils,* Mar. 1995, 30(7-8), p.298-301, Translated from Khimiia i tekhnologiia topliv i masel. 9 refs.

Fuels, Diesel engines, Cold weather performance, Fuel additives, Viscosity, Chemical composition

49-5104

Sea-ice impact on thermal regime and circulation of the atmosphere in the northern hemisphere in winter.

Kattsov, V.M., Meleshko, V.P., Sokolov, A.P., Liubanskaia, V.A., *Russian meteorology and hydrology,* 1993, No.12, p.1-18, Translated from Meteorologiia i gidrologiia. 27 refs.

Climatic factors, Air temperature, Atmospheric circulation, Sea ice distribution, Ice cover effect, Ice air interface, Seasonal variations, Thermal regime, Mathematical models

49-5105

Numerical study of hail formation and growth under natural development of a cloud and cloud modification.

Ashabokov, B.A., Fedchenko, L.N., Shapovalov, A.V., Shoranov, R.A., *Russian meteorology and hydrology,* 1994, No.1, p.30-36, Translated from Meteorologiia i gidrologiia. 17 refs.

Hail clouds, Hailstone growth, Cloud physics, Cloud seeding, Meteorological factors, Heterogeneous nucleation, Microstructure, Thermodynamics, Ice air interface, Mathematical models

49-5106

M_2 tide in the Arctic Ocean. 1. The structure of barotropic tide.

Poliakov, I.V., Dmitriev, N.E., *Russian meteorology and hydrology,* 1994, No.1, p.43-52, Translated from Meteorologiia i gidrologiia. 23 refs.

Oceanography, Ocean currents, Tidal currents, Hydrodynamics, Turbulent exchange, Bottom topography, Topographic effects, Models, Arctic Ocean

49-5107

M_2 tide in the Arctic Ocean. 2. The structure of the tide in a stratified ocean.

Poliakov, I.V., Dmitriev, N.E., Golovin, P.N., *Russian meteorology and hydrology,* 1994, No.2, p.38-47, Translated from Meteorologiia i gidrologiia. 9 refs.

Oceanography, Ocean currents, Tidal currents, Water structure, Stratification, Salinity, Hydrodynamics, Simulation, Arctic Ocean

49-5108

Role of cryogenic barrage in the formation of river discharge in permafrost areas.

Markov, M.L., *Russian meteorology and hydrology,* 1994, No.2, p.76-81, Translated from Meteorologiia i gidrologiia. 7 refs.

Permafrost hydrology, Hydrogeology, River flow, Seepage, Suprapermafrost ground water, Geocryology, Naleds, Subsurface drainage, Seasonal variations

49-5109

Specifying concrete for adverse weather.

Kay, T., Slater, D., *Concrete,* May-June 1995, 29(3), p.21-23.

Concrete durability, Winter concreting, Temperature control, Specifications

49-5110

How hot and cold weather affect plastic concrete.

Turton, C.D., *Concrete,* May-June 1995, 29(3), p.24-25.

Winter concreting, Temperature control, Freezing, Countermeasures

49-5111

Concreting in the cold of Canada.

Schell, H., *Concrete,* May-June 1995, 29(3), p.26-27.

Winter concreting, Cold weather construction, Temperature control, Temperature measurement, Canada

49-5112

Predicting and evaluating the performance of ice harvesting thermal energy storage systems.

Knebel, D.E., *ASHRAE journal,* May 1995, 37(5), p.22-30, 3 refs.

Refrigeration, Ice makers, Ice formation, Ice solid interface, Mathematical models, Defrosting, Heat transfer, Heat loss, Performance

49-5113

Control of ice storage systems.

Carey, C.W., Mitchell, J.W., Beckman, W.A., *ASHRAE journal,* May 1995, 37(5), p.32-39, 5 refs.

Air conditioning, Refrigeration, Ice makers, Ice (water storage), Tanks (containers), Performance, Design, Heat transfer

49-5114

Keeping cool in the Snow Crystals Museum.

Sagae, A., *ASHRAE journal,* Jan. 1995, 37(1), p.41-44.

Buildings, Indoor climates, Humidity, Air conditioning, Refrigeration, Temperature control, Ice air interface, Design

49-5115

Evaluation of heat and moisture transfer properties in a frozen-unfrozen water-soil system.

Singh, A.K., Chaudhary, D.R., *International journal of heat and mass transfer,* Aug. 1995, 38(12), p.2297-2303, 13 refs.

Soil physics, Soil freezing, Soil tests, Sands, Thermal conductivity, Mass transfer, Moisture transfer, Soil water migration, Analysis (mathematics)

49-5116

New view on the driving mechanism of Milankovitch glaciation cycles.

Liu, H.S., *Earth and planetary science letters,* Mar. 1995, 131(1-2), p.17-26, 36 refs.

Glaciation, Pleistocene, Ice sheets, Glacier oscillation, Ice volume, Ice age theory, Insolation, Climatic changes, Periodic variations

49-5117

Cosmogenic nuclide exposure ages and glacial history of late Quaternary Ross Sea drift in McMurdo Sound, Antarctica.

Brook, E.J., Kurz, M.D., Ackert, R.P., Raisbeck, G., Yiou, F., *Earth and planetary science letters,* Mar. 1995, 131(1-2), p.41-56, 51 refs.

Ice sheets, Grounded ice, Pleistocene, Glacier oscillation, Glacial deposits, Isotope analysis, Geochronology, Marine geology, Sea level, Antarctica—McMurdo Sound

^{3}He, ^{10}Be and ^{26}Al surface exposure ages were determined for rock samples from late Quaternary drift sheets deposited on the coast of McMurdo Sound by the Ross Sea ice sheet. The youngest drift, previously believed to be Late Wisconsin in age, has exposure ages of 8-106 kyr (19 samples). These results suggest that the apparent 'Late Wisconsin' ice margin may represent a number of ice sheet advances during the last glacial period. ^{3}He exposure ages from analogous but stratigraphically older drift range from 104 to 567 kyr (seven samples), and clearly distinguish the youngest drift from older deposits. Comparison of ^{10}Be and ^{3}He concentrations in Ross Sea Drift quartz samples indicates significant ^{3}He loss in only one sample, suggesting that cosmogenic ^{3}He is generally retained in young antarctic quartz samples (exposure age <100 kyr) of appropriate grain size. In two of the five quartz samples analyzed, significant excesses of ^{26}Al relative to ^{10}Be preclude meaningful ^{26}Al exposure age calculations. These excesses may be due to nucleogenic ^{26}Al produced as a byproduct of uranium and thorium decay. (Auth. mod.)

49-5118

Satellite remote sensing of polar snow and ice: present status and future directions.

Massom, R.A., *Polar record,* Apr. 1995, 31(177), p.99-114, 68 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Ice surveys, Glacier surveys, Snow surveys, Ice cover effect, Snow cover effect, Global change, Radiation balance, Radiometry, Radio echo soundings, Remote sensing, Spaceborne photography

Polar snow and ice masses exert a profound influence on global climate and ocean circulation, and are in turn influenced by climate. Satellite remote sensing constitutes the only practical and systematic means of gaining long-term overviews of any change or variability that may be occurring in key snow and ice parameters. Current relevant satellite sensors are reviewed and future developments evaluated to determine how these may lead to improved retrievals of the key parameters. Sensors to be launched on satellite platforms planned for the end of the century and beyond include both improved versions of existing sensors such as MODIS (Moderate Resolution Imaging Spectrometer), and new classes of sensors (such as imaging spectrometers and laser rangers/altimeters) applied to polar remote sensing for the first time. (Auth.)

49-5119

Ice processes and growth history on arctic and sub-arctic lakes using ERS-1 SAR data.

Morris, K., Jeffries, M.O., Weeks, W.F., *Polar record,* Apr. 1995, 31(177), p.115-128, 26 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Frozen lakes, Lake ice, Ice surveys, Ice growth, Freezeup, Ice breakup, Ice cover effect, Synthetic aperture radar, Backscattering, Radio echo soundings, Spaceborne photography, Global warming, United States—Alaska—North Slope

49-5120

Assessing trends in arctic sea-ice distribution in the Barents and Kara seas using the Kosmos-Okean satellite series.

Bel'chanskiĭ, G.I., Mordvintsev, I.N., Ovchinnikov, G.K., Douglas, D.C., *Polar record,* Apr. 1995, 31(177), p.129-134, 10 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Spaceborne photography, Statistical analysis, Barents Sea, Russia—Kara Sea

49-5121

Sea-ice type classification from ERS-1 SAR data based on grey level and texture information.

Smith, D.M., Barrett, E.C., Scott, J.C., *Polar record,* Apr. 1995, 31(177), p.135-146, 32 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Synthetic aperture radar, Spaceborne photography, Image processing

49-5122

Biomass and leaf-area index maps derived from SPOT images for Toolik Lake and Imnavait Creek areas, Alaska.

Shippert, M.M., Walker, D.A., Auerbach, N.A., Lewis, B.E., *Polar record,* Apr. 1995, 31(177), p.147-154, 30 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Tundra, Plant ecology, Vegetation patterns, Forest canopy, Biomass, Photosynthesis, Spaceborne photography, Geobotanical interpretation, United States—Alaska—Toolik Lake

49-5123

Development of a sea-ice workstation for the automated monitoring of sea ice.

Boardman, D., Darwin, D., Martin, J., McIntyre, N., Sullivan, K., *Polar record,* Apr. 1995, 31(177), p.155-160, 11 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Ice surveys, Ice reporting, Sea ice distribution, Ice conditions, Ice edge, Drift, Spaceborne photography, Synthetic aperture radar, Image processing, Data transmission

49-5124

Comparative evaluation of ALMAZ, ERS-1, JERS-1, and Landsat-TM for discriminating wet tundra habitats.

Bel'chanskiĭ, G.I., Ovchinnikov, G.K., Douglas, D.C., *Polar record,* Apr. 1995, 31(177), p.161-168, 11 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Tundra, Wetlands, Plant ecology, Vegetation patterns, Geobotanical interpretation, Terrain identification, Spaceborne photography, Synthetic aperture radar, Image processing, United States—Alaska—North Slope

49-5125

NDVI, biomass, and landscape evolution of glaciated terrain in northern Alaska.

Walker, D.A., Auerbach, N.A., Shippert, M.M., *Polar record,* Apr. 1995, 31(177), p.169-178, 48 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Glacial geology, Glaciation, Tundra, Plant ecology, Vegetation patterns, Biomass, Paleoclimatology, Spaceborne photography, Geobotanical interpretation, United States—Alaska—Toolik Lake

49-5126

Characteristics of vegetation phenology over the Alaskan landscape using AVHRR time-series data.

Markon, C.J., Fleming, M.D., Binnian, E.F., *Polar record,* Apr. 1995, 31(177), p.179-190, 58 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Plant ecology, Vegetation patterns, Phenology, Terrain identification, Radiometry, Spaceborne photography, Geobotanical interpretation, Image processing, United States—Alaska

49-5127

Determination of actual snow-covered area using Landsat TM and digital elevation model data in Glacier National Park, Montana.

Hall, D.K., Foster, J.L., Chien, J.Y.L., Riggs, G.A., *Polar record,* Apr. 1995, 31(177), p.191-198, 15 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Snow surveys, Snow cover distribution, Runoff forecasting, Topographic surveys, Terrain identification, Mapping, Spaceborne photography, Image processing, United States—Montana—Glacier National Park

49-5128

Atmospheric temperature variability in the Arctic as revealed in a TOVS data record.

Khalsa, S.J.S., Key, J.R., *Polar record,* Apr. 1995, 31(177), p.199-210, 14 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Polar atmospheres, Air temperature, Climatic changes, Global warming, Meteorological data, Spaceborne photography

49-5129

Detection of polar stratospheric clouds over Antarctica using AVHRR images obtained at Palmer Station during August 1992.

Garcia, O., Pagan, K.L., Foschi, P.G., Gaines, S.E., Hipskind, R.S., *Polar record,* Apr. 1995, 31(177), p.211-226, 30 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Polar atmospheres, Polar stratospheric clouds, Cloud cover, Cloud physics, Clouds (meteorology), Stratosphere, Air temperature, Radiometry, Spaceborne photography, Antarctica—Palmer Station

Four case studies are presented that focus on a joint analysis of AVHRR images with other independently obtained data sets to identify examples of both optically thick and thin polar stratospheric clouds (PSCs) over Antarctica. Optically thick PSCs are shown to be readily identifiable by the temperature signatures in AVHRR channel 5 images over the Antarctic Peninsula-Weddell Sea area. A time series of optically thick PSCs as seen in satellite images obtained at Palmer Station is produced and discussed. Four events are identified and discussed where the areal coverage by cold temperatures indicative of PSCs expands to cover a significant portion of the area sampled. Plans for further research are outlined. (Auth.)

49-5130

Monitoring, classification, and characterization of interior Alaska forests using AIRSAR and ERS-1 SAR.

Williams, C.L., McDonald, K., Rignot, E.J.M., Viereck, L.A., Way, J.B., Zimmermann, R., *Polar record,* Apr. 1995, 31(177), p.227-234, 18 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Plant ecology, Vegetation patterns, Revegetation, Forest land, Forest canopy, Phenology, Floodplains, Terrain identification, Aerial surveys, Spaceborne photography, Synthetic aperture radar, Geobotanical interpretation, United States—Alaska—Fairbanks

49-5131

Remote sensing, a tool for reindeer range land management.

Colpaert, A., Kumpula, J., Nieminen, M., *Polar record,* Apr. 1995, 31(177), p.235-244, 26 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Taiga, Forest tundra, Animals, Grazing, Lichens, Vegetation patterns, Spaceborne photography, Aerial surveys, Terrain identification, Geobotanical interpretation, Finland

49-5132

Relating CO_2 fluxes to spectral vegetation indices in tundra landscapes: importance of footprint definition.

Hope, A.S., Fleming, J.B., Vourlitis, G.L., Stow, D.A., Oechel, W.C., Hack, T., *Polar record,* Apr. 1995, 31(177), p.245-250, 11 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Tundra, Soil air interface, Vegetation patterns, Vegetation factors, Nutrient cycle, Atmospheric composition, Radiometry, Spaceborne photography, Geobotanical interpretation, United States—Alaska—North Slope

49-5133

On the possibility of remotely sensing global dimethyl sulfide sea-to-air flux.

Jodwalis, C.M., Benner, R.L., *Polar record,* Apr. 1995, 31(177), p.251-256, 38 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Marine atmospheres, Air water interactions, Nutrient cycle, Sea water, Water chemistry, Atmospheric composition, Aerosols, Spaceborne photography

49-5134

Satellite-based map compared to a traditional vegetation map of arctic vegetation in the Ny-Ålesund area, Svalbard.

Spjelkavik, S., *Polar record,* Apr. 1995, 31(177), p.257-269, 40 refs. Presented at the 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments, Fairbanks, AK, May 16-20, 1994.

Tundra, Plant ecology, Vegetation patterns, Biomass, Terrain identification, Mapping, Spaceborne photography, Geobotanical interpretation, Norway—Svalbard

49-5135

Federal On Scene Coordinator's report: T/V Exxon Valdez oil spill. Final report March 24, 1989 to June 10, 1992.

U.S. Coast Guard, Leschine, T.M., ed, Arlington, MA, Cutter Information Corp., 1993, 2 vols., PB94-121845 (Vol.1), Vol.1: main report, 570p. Vol.2: appends., 992p. + maps. Numerous footnotes passim in both vols.

Oil spills, Oil recovery, Tanker ships, Accidents, Water pollution, Environmental impact, Cost analysis, United States—Alaska—Prince William Sound

49-5136

Scour assessment at bridges from Flag Point to Million Dollar Bridge, Copper River Highway, Alaska.

Brabets, T.P., *U.S. Geological Survey. Water-resources investigations report,* 1994, No.94-4073, 57p., 35 refs.

Bridges, River flow, Water erosion, Sediment transport, Suspended sediments, Bottom sediment, Alluvium, United States—Alaska—Copper River

49-5137

Cold water oil spills.

Etkin, D.S., Oil spill intelligence report, Arlington, MA, Cutter Information Corp., 1990, 63p., Refs. p.53-61.

Oil spills, Oil recovery, Water pollution, Ice cover effect, Ice water interface, Cold weather operation

49-5138

Proceedings. [Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne. Actes]

International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994, Griselin, M., ed, Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, 138p., In French and English. Refs. passim. For selected papers see 49-5139 through 49-5152.

Glacier surveys, Glacial hydrology, Subglacial drainage, Subglacial caves, Meltwater

49-5139

Argentière Glacier: hydroelectricity and glaciology. [Glacier d'Argentière: hydro-électricité et glaciologie]

Moreau, L., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.17-22, In French with English summary. 5 refs.

Glacial hydrology, Subglacial drainage, Glacier surveys, Site surveys, Dams, Electric power, France

49-5140

Prediction of the subglacial drainage in the marginal system of the Loven East glacier, Ny Ålesund, Svalbard: results of the "Svalbard 92" Spanish expedition. [Prédiction du drainage sous-glaciaire dans le système marginal du glacier Loven Est, Ny Ålesund, Svalbard: résultats de l'expédition glaciologique espagnole "Svalbard 92"]

Eraso, A., Gavilan, C.J., Perez, D., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.23-30, Parallel French and English texts. 6 refs.

Glacier surveys, Glacial hydrology, Subglacial drainage, Glacial rivers, Subglacial caves, Subglacial observations, Statistical analysis, Norway—Svalbard

49-5141

Hans Glacier moulins observed from 1988 to 1992. [Les moulins du glacier Hans de 1988 à 1992]

Schroeder, J., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.31-39, In French with English summary. 5 refs.

Glacier surveys, Glacial hydrology, Subglacial drainage, Glacier surfaces, Subglacial caves, Meltwater, Norway—Svalbard

49-5142

Present Franz Josef Land glaciation and the possibilities of cryokarst in glaciers under one of the most severe conditions in the eastern Arctic.

Moskalevskiĭ, M.IU., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.41-46, 3 refs.

Glacier surveys, Glacial hydrology, Subglacial drainage, Subglacial caves, Glacier thickness, Glacier formation, Glacier alimentation, Firn stratification, Radio echo soundings, Spaceborne photography, Russia—Franz Josef Land

49-5143

Phenomenology and first numerical simulations of the phreatic drainage network inside glaciers.

Badino, G., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.47-54, 9 refs.

Glacial hydrology, Subglacial drainage, Subglacial caves, Glacier flow, Computerized simulation, Mathematical models

49-5144

Attempt to model outflow from the Werenskiold Glacier basin (SW Spitsbergen).

Krawczyk, W.E., Leszkiewicz, J., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.55-60, 7 refs.

Glacier surveys, Glacial hydrology, Subglacial drainage, Glacial rivers, Meltwater, Runoff, Norway—Spitsbergen

49-5145

Hydrology and geochemistry of the Loven East Glacier, Spitsbergen. [Hydrologie et géochimie du glacier Loven Est, Spitsberg]

Griselin, M., Marlin, C., Dever, L., Moreau, L., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.61-76, Parallel French and English texts. 23 refs.

Glacier surveys, Glacial hydrology, Glacier alimentation, Subglacial drainage, Glacial rivers, Meltwater, Runoff, Water chemistry, Hydrogeochemistry, Isotope analysis, Norway—Spitsbergen

49-5146

Problems of en- and subglacial drainage origin.

Mavliudov, B.R., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.77-82, 14 refs.

Glacial hydrology, Subglacial drainage, Glacier flow, Glacier friction, Crevasses, Meltwater

49-5147

Cryokarst and glacial outbursts at the Chauvet Glacier (Haute-Ubaye, French southern Alps). [Cryokarst et vidanges glaciaires au glacier de Chauvet (Haute-Ubaye, Alpes françaises du Sud)]

Assier, A., Evin, M., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.83-87, Parallel French and English texts. 4 refs.

Glacier surveys, Glacial hydrology, Subglacial drainage, Glacial lakes, Meltwater, Lake bursts, Flood forecasting, Electromagnetic prospecting, France

49-5148

Study of ice from the end of the Hypsithermal in a cave in the northern Yukon, Canada. [Étude d'une glace de la fin de l'Hypsithermal dans une caverne du Nord du Yukon, Canada]

Lauriol, B., Clark, I.D., Prévost, C., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.89-92, In French with English summary. 23 refs.

Ice caves, Fossil ice, Ice dating, Paleoclimatology, Marine deposits, Cryogenic soils, Soil dating, Isotope analysis, Fossils, Canada—Yukon Territory

49-5149

New information on the interior drainage of subpolar glaciers of southwest Spitsbergen.

Rehák, J., Sr., Rehák, J., Jr., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.93-100, 18 refs.

Glacier surveys, Subglacial caves, Subglacial drainage, Glacial hydrology, Norway—Spitsbergen

49-5150

Cave investigations at South Iniltchek Glacier, central Tian-Shan.

Mavliudov, B.R., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.101-104, 1 ref.

Glacier surveys, Glacial lakes, Subglacial drainage, Subglacial caves, Glacial hydrology, Icebound lakes, Ice dams, Lake bursts, Kyrgyzstan—Tian Shan

49-5151

Explorations in the glacial moulins of the Mer de Glace (Chamonix, France) and the Gornergletscher (Zermatt, Switzerland). [Explorations dans les moulins glaciaires de la Mer de Glace (Chamonix, France) et du Gornergletscher (Zermatt, Suisse)]

Wenger, R., Symposium international:Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.105-108, In French with English summary. 4 refs.

Glacier surveys, Glacial hydrology, Subglacial drainage, Subglacial caves, Meltwater, France, Switzerland

49-5152

Glacial moulins of temperate and cold glaciers from 1986 to 1994 (Mer de Glace and Greenland): morphology and measuring techniques of ice deformation. [Moulins glaciaires des glaciers tempérés et froids de 1986 à 1994 (Mer de Glace et Groenland): morphologie et techniques de mesures de la déformation de la glace]

Reynaud, L., Moreau, L., Symposium international: Cavités glaciaires et cryokarst en régions polaires et de haute montagne (International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, 3rd, Chamonix, France, Nov. 1-6, 1994). Université de Besançon. Annales littéraires, No.561, Série Géographie, No.34, Besançon, France, Université de Franche-Comté, 1995, p.109-113, In French with English summary. 3 refs.

Glacier surveys, Glacial hydrology, Subglacial drainage, Subglacial caves, Glacier flow, Ice deformation, Meltwater, France, Greenland

49-5153

New recovery technique for gas production from Alaskan gas hydrates.

Islam, M.R., *Journal of petroleum science and engineering,* Sep. 1994, 11(4), p.267-281, 8 refs.

Mining, Natural gas, Hydrates, Gas wells, Thermal expansion, Thermoelectric effects, Electric heating, Mathematical models

49-5154

Effects of different cementing materials and curing on concrete scaling.

Afrani, I., Rogers, C., *Cement, concrete, and aggregates,* Dec. 1994, 16(2), p.132-139, 11 refs.

Concrete admixtures, Concrete curing, Freeze thaw cycles, Canada—Ontario—Kingston

49-5155

Strength evaluation of *in-situ* concrete by rebound hammer and core testing.

Ward, M.A., Langan, B.W., *Cement, concrete, and aggregates,* Dec. 1994, 16(2), p.181-185, 6 refs.

Concrete strength, Compressive properties, Impact tests, Hardness tests, Ultrasonic tests, Frost resistance, Freeze thaw tests

49-5156

Study on the pneumatic conveying system of snow lumps—comparison between shapes of snow lumps in positive pressure type.

Kobayashi, T., Kumagai, M., *Japan. National Research Institute for Earth Science and Disaster Prevention. Report,* Mar. 1995, No.55, p.1-8, In Japanese with English summary. 3 refs.

Snow compaction, Snow removal, Ducts, Air flow

49-5157

Extraction of characteristic mesoscale wind fields by VAD analysis.

Nakai, S., *Japan. National Research Institute for Earth Science and Disaster Prevention. Report,* Mar. 1995, No.55, p.9-23, In Japanese with English summary. 11 refs.

Cloud physics, Precipitation (meteorology), Wind (meteorology), Fronts (meteorology), Radar echoes, Snowstorms, Snowfall, Weather forecasting

49-5158

Few considerations concerning acid snow and acid rain.

Taguchi, Y., Aoyama, K., Katoh, K., Endo, J., Yamamoto, M., *Niigata University. Research Institute for Hazards in Snowy Areas. Annual report,* 1994, No.16, p.37-48, In Japanese with English summary. 21 refs.

Snow composition, Snow impurities, Snowfall, Scavenging, Air pollution, Soil pollution, Japan

49-5159

Experimental study on impact force of slushflow.

Kamiishi, I., Kobayashi, S., Izumi, K., *Niigata University. Research Institute for Hazards in Snowy Areas. Annual report,* 1994, No.16, p.49-53, In Japanese. 7 refs.

Wet snow, Slush, Snow loads, Avalanche modeling, Avalanche mechanics

49-5160

Investigations of sun crust formation II.

Ozeki, T., Akitaya, E., *Low temperature science (Teion kagaku). Series A Physical sciences,* 1994, No.53, p.1-10, In Japanese with English summary. 7 refs.

Snow crust, Snow surface, Snow air interface, Snow heat flux, Depth hoar, Snow melting

49-5161

Process of snowmelt in Spitsbergen.

Nakabayashi, H., Kodama, Y., Takeuchi, Y., *Low temperature science (Teion kagaku). Series A Physical sciences,* 1994, No.53, p.11-22, In Japanese with English summary. 7 refs.

Snow surveys, Snow melting, Snowmelt, Snow air interface, Snow heat flux, Snow hydrology, Norway—Spitsbergen

49-5162

Movement of subsurface water on a forested hillslope in the Moshiri experimental basin. I. Observation of the pressure head using a tensiometer nest.

Ishii, Y., Kobayashi, D., *Low temperature science (Teion kagaku). Series A Physical sciences,* 1994, No.53, p.23-34, In Japanese with English summary. 19 refs.

Snow hydrology, Snowmelt, Seepage, Ground water, Runoff, Soil water migration, Forest land, Slope processes, Japan—Hokkaido

49-5163

Snow disasters on road in Heilongjiang Province, China.

Akitaya, E., et al, *Low temperature science (Teion kagaku). Series A Physical sciences,* 1994, No.53, p.35-50, In Japanese with English summary. 6 refs.

Road icing, Snowstorms, Snowdrifts, Road maintenance, China—Heilongjiang Province

49-5164

Microlandform classification of lakeshore wetlands as methane sources in west Yakutsk, Siberia.

Sone, T., *Low temperature science (Teion kagaku). Series A Physical sciences,* 1994, No.53, p.51-57, In Japanese with English summary. 7 refs.

Tundra, Wetlands, Peat, Nutrient cycle, Soil air interface, Atmospheric composition, Global warming, Russia—Yakutsk

49-5165

Laboratory and field analytical methods for explosives residues in soil.

Walsh, M.E., Jenkins, T.F., Thorne, P.G., MP 3617, Symposium on Alternatives to Incineration for Disposal of Chemical Munitions and Energetics. Proceedings, Vol.2. Energetics, Hoboken, Stevens Institute of Technology, June 1995, 29p., 90 refs.

Explosives, Sediments, Soil chemistry, Soil pollution, Soil tests, Chemical analysis, Laboratory techniques, Sampling, Environmental tests, Waste disposal

Standard analytical methods have been developed to characterize explosives residues in soil at U.S. Department of Defense installations. The laboratory analysis is conducted using reversed phase high performance liquid chromatography (RP-HPLC) and the most commonly found analytes are TNT and RDX. Other analytes commonly detected are the environmental transformation products of TNT including TNB, dinitroaniline, and the isomers of amino-DNT, and the manufacturing by-products DNB and the isomers of DNT. Field methods designed to detect TNT and RDX have enhanced site characterization by providing rapid on-site results for a greater number of samples than would be economically feasible by depending solely on off-site laboratory analyses for all samples. Attempts may be made to use both laboratory and field methods to analyze treatment matrices, such as incinerator ash and compost, but further analytical method development is needed to enhance extraction and minimize interferences.

49-5166

Interpretation of AEM data in terms of ice keel geometry.

Liu, G.M., Becker, A., University of California. Department of Materials Science and Mineral Engineering. Final report, Berkeley, University of California, Aug. 1989, 15p. + append., U.S. Navy Contract No.N00014-89-6004, 6 refs.

Sea ice, Remote sensing, Aerial surveys, Ice cover thickness, Ice water interface, Pressure ridges, Electrical measurement, Electromagnetic properties, Electric fields, Topographic features, Data processing

49-5167

Theoretical and experimental results of measurements with horizontal magnetic dipoles over sea water to measure ice thickness and water salinity.

Hoekstra, P., Geo-Physi-Con. Co. Ltd. Calgary, Canada. Report No.79-16A, Calgary, Geo-Physi-Con. Ltd., June 1980, 10p. + append., 3 refs.

Sea ice, Ice cover thickness, Remote sensing, Ice water interface, Salinity, Electrical resistivity, Electric fields, Analysis (mathematics), Electrical measurement, Polarization (charge separation)

49-5168

Fertilizing and mulching influence on the performance of four native woody species suitable for revegetation in subarctic Quebec.

Houle, G., Babeux, P., *Canadian journal of forest research,* Dec. 1994, 42(12), p.2342-2349, With French summary. 36 refs.

Subarctic landscapes, Forest ecosystems, Plant ecology, Revegetation, Land reclamation, Nutrient cycle, Growth, Canada—Quebec

49-5169

Root freezing tolerance and vitality of Norway spruce and Scots pine seedlings; influence of storage duration, storage temperature, and prestorage root freezing.

Lindström, A., Stattin, E., *Canadian journal of forest research,* Dec. 1994, 42(12), p.2477-2484, With French summrary. 28 refs.

Plant ecology, Forestry, Trees (plants), Roots, Plant tissues, Frost resistance, Cold tolerance, Seasonal variations, Cold storage, Viability, Temperature effects

49-5170

Stand structure and carbon metabolism of coppice forests at a heavy snowfall climate region of central Japan. I. Dynamics of stand structure during 14 years.

Yoneda, T., Hamabata, E., Ogawa, H., *Ecological research,* Apr. 1995, 10(1), p.41-52, 25 refs.

Forest ecosystems, Plant physiology, Meteorological factors, Snow loads, Snow cover effect, Damage, Vegetation patterns, Growth, Biomass, Statistical analysis, Japan

49-5171

Electromagnetic induction sensing of sea ice thickness and conductivity. Phase II final report.

Echert, D.C., White, G.B., Becker, A., *Flow Research Co., Kent, WA. Technical report,* Nov. 1989, FLOW-TR-388, 41p. + append., 18 refs.

Sea ice, Geophysical surveys, Ice cover thickness, Electric fields, Electromagnetic properties, Remote sensing, Sensor mapping, Portable equipment, Ice electrical properties, Electrical resistivity

49-5172

Relationship of vegetation to methane emission and hydrochemical gradients in northern peatlands.

Bubier, J.L., *Journal of ecology,* June 1995, 83(3), p.403-420, 80 refs.

Peat, Wetlands, Vegetation patterns, Mosses, Plant ecology, Hydrogeochemistry, Geochemical cycles, Natural gas, Subarctic landscapes, Soil air interface, Vapor transfer

49-5173

Effect of salinity on the leaf and shoot demography of two arctic forage species.

Srivastava, D.S., Jefferies, R.L., *Journal of ecology,* June 1995, 83(3), p.421-430, 55 refs.

Arctic landscapes, Grasses, Wetlands, Vegetation patterns, Growth, Soil chemistry, Salinity, Plant ecology, Canada—Manitoba—Hudson Bay

49-5174

Continental glaciation and nuclear fuel waste disposal: Canada's approach and assessment of the impact on nuclide transport through the biosphere.

Sheppard, M.I., Amiro, B.D., Davis, P.A., Zach, R., *Ecological modelling,* Apr. 1995, 78(3), p.249-265, 48 refs.

Nuclear power, Waste disposal, Radioactive wastes, Ecology, Environmental impact, Glaciation, Glacier melting, Runoff, Water pollution, Simulation, Long range forecasting, Canada

49-5175

***In situ* tests for ice strength measurements.**

Kivisild, H.R., Iyer, S.H., *Ocean engineering,* 1976, Vol.3, p.329-342, 1 ref.

Ice strength, Sea ice, Ice mechanics, Mechanical tests, Mechanical properties, Ice solid interface, Boreholes, Cracking (fracturing)

49-5176

Large patches of Flaxman boulders in Stefansson Sound; Beaufort Sea, Alaska.

Reimnitz, E., Ross, R., U.S. Geological Survey. Open file report, Washington, D.C., U.S. Department of the Interior, [1979], 26p., 10 refs.

Oceanographic surveys, Ocean bottom, Bottom sediment, Sedimentation, Ecosystems, Marine biology, Sounding, Ice scoring, Ice rafting, Rocks, United States—Alaska—Stefansson Sound

49-5177

Studies of the behavior of oil in ice, conducted by the Outer Continental Shelf Environmental Assessment Program.

Stringer, W.J., Weller, G., University of Alaska. Geophysical Institute. Report, Fairbanks, University of Alaska, 1980, 17p., 31 refs.

Sea ice, Oil spills, Liquid solid interfaces, Simulation, Environmental impact, Oceanography, Fluid dynamics

49-5178

Airborne electromagnetic sensing of sea-ice thickness—final report.

Liu, G.M., Becker, A., *University of California. Engineering Geoscience. Final report,* [1987], 12p. + figs., 11 refs. For another version see 46-273.

Sea ice, Ice cover thickness, Remote sensing, Topographic effects, Ice cover effect, Electrical measurement, Electric fields, Electromagnetic properties, Wave propagation, Ice electrical properties, Analysis (mathematics)

49-5179

Physical hazards and pollutant transport mechanisms in the Bering Sea nearshore area.

Stringer, W.J., University of Alaska. Geophysical Institute. Arctic Research Unit 267. Special Report to the Outer Continental Shelf Environmental Assessment Program, Fairbanks, University of Alaska, 1980, 23p., 18 refs.

Sea ice, Ice conditions, Ice cover effect, Shores, Water pollution, Fast ice, Offshore drilling, Oil spills, Environmental impact, Bering Sea

49-5180

Ice displacement vectors measured in Norton Sound and the adjacent Bering Sea 1973-1979.

Stringer, W.J., Henzler, R.D., University of Alaska. Geophysical Institute. Arctic Research Unit 267. Report, Fairbanks, University of Alaska, 1981, 37p., 2 refs.

Sea ice distribution, Ice surveys, Ice floes, Drift, Velocity measurement, Ice conditions, Periodic variations, Maps, Photointerpretation, Spaceborne photography, Bering Sea

49-5181

Nearshore ice characteristics in the eastern Bering Sea.

Stringer, W.J., University of Alaska. Geophysical Institute. Report No.278, Fairbanks, University of Alaska, 1980, 32p., 24 refs. For another version see 35-4139.

Sea ice distribution, Ice conditions, Shores, Spaceborne photography, Ice edge, Sensor mapping, Seasonal variations, Meteorological factors, Marine atmospheres, Bering Sea

49-5182

Report of pit-wall observations of snow cover in Sapporo 1993-94.

Akitaya, E., Fukuzawa, T., Ozeki, T., Kawashima, Y., Sakai, A., *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1994, No.53, p.1-10, In Japanese with English summary. 3 refs.

Snow surveys, Snow depth, Snow stratigraphy, Snow hardness, Snow density, Snow temperature, Snow water equivalent, Japan—Hokkaido

49-5183

Observation of soil temperature on a forested hillslope in the Moshiri experimental basin, 1.

Ishii, Y., Kobayashi, D., *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1994, No.53, p.11-20, In Japanese with English summary. 3 refs.

Snowmelt, Seepage, Snow cover effect, Soil temperature, Soil water migration, Slope processes, Forest land, Japan—Hokkaido

49-5184

Meteorological manual observations at Moshiri in snowmelt seasons, 1991-1994.

Nakabayashi, H., Niimi, K., Taniguchi, K., *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1994, No.53, p.21-32, In Japanese with English summary. 8 refs.

Snow surveys, Snowfall, Snow depth, Snow density, Snow water content, Snowmelt, Snow air interface, Cloud cover, Air temperature, Japan—Hokkaido

49-5185

Air temperature data at Hakuun hut in the Daisetsu Mountains, central Hokkaido in 1990-1993.

Sone, T., *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1994, No.53, p.33-50, In Japanese with English summary. 9 refs.

Permafrost distribution, Periglacial processes, Mountain soils, Soil air interface, Air temperature, Surface temperature, Freezing indexes, Japan—Hokkaido

49-5186

Meteorological observation data in Jiayin and Lopei of Heilongjiang Province, northeastern China, 2.

Ishii, Y., et al, *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1994, No.53, p.51-65, In Japanese with English summary. 2 refs.

Meteorological data, Air temperature, Surface temperature, Wind velocity, Humidity, China—Heilongjiang Province

49-5187

Biological data report for the Saroma-ko site of the SARES (Saroma-Resolute Studies) Project, February-March, 1992.

Taguchi, S., et al, *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1994, No.53, p.67-163, With Japanese summary. 9 refs.

Cryobiology, Ice cover effect, Snow ice interface, Ice optics, Marine biology, Algae, Chlorophylls, Photosynthesis, Nutrient cycle, Biomass, Japan—Saroma, Lake

49-5188
Meteorological data report for the sea ice studies off the Okhotsk Sea Coast of Sakhalin, 1992-1994.
Shirasawa, K., et al, *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1994, No.53, p.165-256, With Japanese summary.
Ice surveys, Fast ice, Ice cover thickness, Ice cover effect, Snow ice interface, Snow air interface, Ice air interface, Ice water interface, Air temperature, Snow temperature, Ice temperature, Water temperature, Russia—Sakhalin Island

49-5189
Distributions of pack ice in the Okhotsk Sea off Hokkaido observed using a sea-ice radar network, January-May, 1994.
Ishikawa, M., Takatsuka, T., Ikeda, M., Shirasawa, K., Aota, M., *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1994, No.53, p.257-282, In Japanese with English summary.
Ice surveys, Sea ice distribution, Ice reporting, Ice conditions, Radar photography, Okhotsk Sea, Japan—Hokkaido

49-5190
Correction to "Atmospheric and oceanographic data report for Saroma-ko Lagoon of the SARES (Saroma-Resolute Studies) Project, 1992".
Shirasawa, K., et al, *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1994, No.53, p.283-296, For original paper see 49-3072.
Air temperature, Wind velocity, Wind direction, Japan—Saroma, Lake

49-5191
Sea-level rise: a review of recent past and near-future trends.
Gornitz, V., *Earth surface processes and landforms,* Feb. 1995, 20(1), p.7-20, Refs. p.18-20.
Sea level, Climatic changes, Tides, Ice sheets, Glacier melting
Recently reduced sea level rise (SLR) estimates are based on climate models that predict a zero to negative contribution to SLR from Antarctica. Most global climate models (GCMs) indicate an ice accumulation over Antarctica, because in a warmer world, precipitation will exceed ablation/snow-melt. However, the impacts of attritional processes, such as thinning of the ice shelves, have been downplayed according to some experts. Furthermore, not all climate models are in agreement. Opposite conclusions may be drawn from the results of other GCMs. In addition, the West Antarctic Ice Sheet is potentially subject to dynamic and volcanic instabilities that are difficult to predict. Because of the great uncertainty in SLR projections, careful monitoring of future sea-level trends by upgraded tide-gauge networks and satellite geodesy will become essential. (Auth. mod.)

49-5192
Incorporation of crude and fuel oil into salt- and freshwater ice.
Taylor, S., Perron, N., SR 95-06, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Feb. 1995, 11p., ADA-293 719, 15 refs.
Salt ice, Oil spills, Thermal conductivity, Ice water interface, Ice growth, Thin sections, Ice melting
North Slope Crude, no.2 fuel oil, and vegetable oil were each released under columnar freshwater and saltwater ice grown in a laboratory coldroom. Because the thermal conductivity of all the oils is lower than that of water or ice, thinner ice grew under the soil and resulted in a concave ice/water interface. Both the fresh and saline ice encapsulated the oils, but the saline ice did so more slowly. Thin sections of the ice blocks containing the crude and fuel oils show how the columnar ice crystals bend around and under the oil patches. The movement of the vegetable oil during melting was photographed, and spectral reflectance measurements of the ice surface were made to determine if the oil could be detected remotely. Although the presence of oil under 10 cm of ice was detectible, under field conditions the optical detectability of oil will depend upon the depth of the oil within the ice, the type of ice, and the contrast between the under-ice oil and the background against which it is being viewed.

49-5193
Chemical preservation of volatile organic compounds in soil subsamples.
Hewitt, A.D., SR 95-05, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Feb. 1995, 8p., ADA-292 875, 23 refs.
Waste treatment, Hydrocarbons, Preserving, Soil tests, Laboratory techniques
This study evaluates chemical preservation as a means of inhibiting the biological degradation of volatile organic compounds (VOCs) in soil subsamples held for 14 days or longer. Experiments were performed using a soil in which benzene and toluene were found to rapidly biodegrade under aerobic conditions while following protocols consistent with high-level and low-level purge-and-trap gas chromatography mass spectrometry and static headspace gas chromatography analysis. Chemical preservation consisted of immersing soil subsamples fortified with trans-1,2-dichloroethylene (TDCE), trichloroethylene (TCE), benzene and toluene in methanol or water acidified to a pH of less than 2 with $NaHSO_4$. These two methods of chemical preservation resulted in stable concentrations of these two aromatic hydrocarbons even when held at room temperature. The two chlorinated hydrocarbons showed stable concentrations with or without chemical preservation. This result, in conjunction with earlier findings, suggests that chemical preservation is more effective at suppressing biodegradation than the current practice of refrigeration (4°C).

49-5194
Assessing cryogenic testing of aggregates for concrete pavements.
Korhonen, C.J., Charest, B., SR 95-04, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Feb. 1995, 12p., ADA-293 301, 7 refs.
Concrete pavements, Cold weather construction, Concrete durability, Concrete aggregates, Freeze thaw tests
Damage to concrete pavements caused by freeze-thaw deterioration of concrete aggregate remains a serious problem. Current tests for determining an aggregate's freeze-thaw durability can take up to 70 days to perform and results from these tests don't always correlate well with field performance. A rapid test for freeze-thaw durability that would accurately predict field service would be a valuable tool for providing durable concrete. Cycling aggregate 10 times between liquid nitrogen and hot water proved useful as a tool to rule out frost-susceptible aggregate. Pore size distribution measurements reveal pore sizes that are critical to freeze-thaw durability. Aggregates with more than 75% of their measurable pore volume between pore diameters of 0.01 and 5 μm or with more than 95% of their measurable pore volume smaller than 5 μm were susceptible to frost damage. Thus a new freeze-thaw test for aggregates might employ the cryogenic test to screen out all frost-susceptible aggregate and pore size measurement to classify the rest. This new test procedure offers results much quicker than current standard test procedures. Further study is needed to refine the method for general use.

49-5195
Modeling-based evaluation of the effect of wastewater application practices on groundwater quality.
Reynolds, C.M., Iskandar, I.K., CR 95-02, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Feb. 1995, 38p., ADA-293 491, 33 refs.
Ground water, Soil water, Computerized simulation, Waste disposal, Waste treatment, Models
The model WASTEN was used to compare several nitrogen input scenarios and to predict the levels of nitrate in groundwater for a proposed wastewater treatment facility at Fort Dix, NJ. The primary variables tested were input concentration of NO_3-N (nitrate nitrogen) and NH_4-N (ammonium nitrogen) and long-term application of wastewater. Two NO_3-N loading rates, 4 and 10 mg NO_3-N/L, were tested for 168-day simulations. The system's response was estimated from the NO_3-N concentration in water draining below 150 cm. For both input NO_3-N concentrations, the predicted NO_3-N concentrations in the leachate below 150 cm were less than 2 mg NO_3-N/L. The initial NO_3-N in the soil profile represented typical background levels for this site. The final NO_3-N in the soil profile was affected by both denitrification and leaching. The initial NH_4-N in the simulated soil profile was equal to the extractable NH_4-N from soil samples taken at the Fort Dix site. Because a portion of the extractable NH_4-N exists as exchangeable rather than solution NH_4-N, the soil profile values for the solution NH_4-N used in the simulation were greater than actual soil solution values would be. Moreover, by adjusting model coefficients, all the initial NH_4-N was forced to leach in the model simulations rather than be subjected to nitrification, denitrification, immobilization or plant uptake. Due to the retardation effects on NH_4-N mobility caused by soil-ion sorption, the NH_4-N leaching was distributed over an extended time rather than moving rapidly below the unsaturated zone.

49-5196
Transport of tracer Br^- in frozen Morin clay in response to temperature gradients.
Nakano, Y., CR 95-03, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Feb. 1995, 10p., ADA-293 466, 15 refs.
Clays, Frost heave, Ions, Temperature gradients
The movement of water and Br^- was measured in unsaturated and partially frozen soil columns subjected to linear temperature fields. Both water and Br^- moved from the warmer to cooler parts in the columns. The data were analyzed under the assumption that Br^- is confined to unfrozen water. It was found that the negative adsorption of Br^- by clay surfaces plays a significant role in the transport of Br^- in frozen Morin clay and that Br^- tends to move faster than unfrozen water.

49-5197
Cold regions mobility models.
Richmond, P.W., Shoop, S.A., Blaisdell, G.L., CR 95-01, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Feb. 1995, 72p., ADA-293 728, 25 refs.
Tracked vehicles, Vehicle wheels, Traction, Computer programs, Mathematical models
This report annotates the cold regions mobility prediction routines included in the CAMMS/ALBE mobility models. It further explains the development of algorithms that are used in these models to describe the interaction of a vehicle with terrain that has been affected by cold weather. The following terrain conditions are discussed: undisturbed snow (shallow and deep); disturbed snow (moderately trafficked and hard packed); ice; and thawing soils. Several combinations of substrates are also considered. A stand-alone computer model is included.

49-5198
High strength lightweight aggregate concrete for arctic applications—part 1.
Hoff, G.C., Structural lightweight aggregate concrete performance. Edited by T.A. Holm and A.M. Vaysburd, Detroit, American Concrete Institute, 1992, p.1-65, ACI SP-136, 12 refs.
Concrete structures, Offshore structures, Mechanical tests, Concrete strength, Physical properties, Chemical composition, Concrete aggregates, Design criteria, Lightweight concretes

49-5199
High strength lightweight aggregate concrete for arctic applications—part 2.
Hoff, G.C., Structural lightweight aggregate concrete performance. Edited by T.A. Holm and A.M. Vaysburd, Detroit, American Concrete Institute, 1992, p.67-173, ACI SP-136, 23 refs.
Concrete structures, Offshore structures, Lightweight concretes, Concrete aggregates, Marine atmospheres, Cold weather performance, Mechanical tests, Freeze thaw tests, Frost resistance, Concrete durability, Temperature effects

49-5200
High strength lightweight aggregate concrete for arctic applications—part 3.
Hoff, G.C., Structural lightweight aggregate concrete performance. Edited by T.A. Holm and A.M. Vaysburd, Detroit, American Concrete Institute, 1992, p.175-245, ACI SP-136, 15 refs.
Concrete structures, Offshore structures, Concrete durability, Concrete strength, Concrete aggregates, Lightweight concretes, Mechanical tests, Mechanical properties, Cold weather performance, Design criteria

49-5201
Geomorphological evidences of high mountain permafrost in central Apennines.
Dramis, F., Kotarba, A., *Comitato Glaciologico Italiano. Bollettino. Ser. 3: Geografia fisica e dinamica quaternaria,* 1994, 17(1), p.29-36, With Italian summary. 20 refs.
Geomorphology, Pleistocene, Alpine landscapes, Geocryology, Permafrost indicators, Permafrost distribution, Periglacial processes, Mountain soils, Rock glaciers, Italy—Apennines

49-5202
Permafrost mapping with BTS methodology in the Upper Valtellina (Sondrio Province, Italy). [Rilevamento del permafrost con il metodo BTS nell'Alta Valtellina, (Sondrio, Italia)]
Guglielmin, M., Tellini, C., *Comitato Glaciologico Italiano. Bollettino. Ser. 3: Geografia fisica e dinamica quaternaria,* 1994, 17(1), p.47-54, In Italian with English summary. 17 refs.
Alpine landscapes, Permafrost distribution, Permafrost indicators, Mapping, Rock glaciers, Snow cover effect, Snow temperature, Soil temperature, Correlation, Italy—Alps

49-5203
Rock glaciers of the Manzina (Valfurva, Stelvio National Park, Italy). Geoelectrical soundings. [Les glaciers rocheux de la Manzina (Valfurva, Parc National du Stelvio, Italie). Prospection electrique]
Smiraglia, C., Fabre, D., Evin, M., Assier, A., *Comitato Glaciologico Italiano. Bollettino. Ser. 3: Geografia fisica e dinamica quaternaria,* 1994, 17(1), p.79-85, In French with English and Italian summaries. 15 refs.
Alpine landscapes, Geophysical surveys, Rock glaciers, Geomorphology, Electrical measurement, Sounding, Geocryology, Ground ice, Ice detection, Periglacial processes, Italy—Valtellina

49-5204
New hypothesis about the maximum advance of the Ventina Glacier (Valtellina, Alpi Retiche). [Nuove ipotesi sulla massima espansione olocenica del Ghiacciaio dell Ventina (Valtellina, Alpi Retiche)]
Pelfini, M., Smiraglia, C., *Comitato Glaciologico Italiano. Bollettino. Ser. 3: Geografia fisica e dinamica quaternaria,* 1994, 17(1), p.103-105, In Italian with English summary. 9 refs.
Glacier oscillation, Pleistocene, Glacial deposits, Moraines, Geochronology, Radioactive age determination, Geomorphology, Alpine landscapes, Italy—Alps

49-5205
Evaluation of an ice detection/prediction system at the Grand River Bridge, Hwy. 401.
Masliwec, T., Leung, T., Jewer, F., Canada. Ministry of Transportation. Research and Development Branch. Report MAT-94-04, Ontario, Ministry of Transportation, 1995, 23p., 14 refs.
Road icing, Bridges, Ice detection, Winter maintenance, Safety, Sensors, Computer applications, Photographic reconnaissance, Performance

49-5206
Evaluation of a video system for remote monitoring of winter road surface conditions.
Perchanok, M.S., Raven, R., Canada. Ministry of Transportation. Research and Development Branch. Report MAT-94-11, Ontario, Ministry of Transportation, 1994, 14p., 16 refs.
Road icing, Ice control, Winter maintenance, Safety, Monitors, Remote sensing, Imaging, Photographic reconnaissance, Cost analysis

49-5207
Geochemical study on the Strandline Glacier, Terra Nova Bay, Antarctica.
Ghermandi, G., Meneghel, M., Sighinolfi, G.P., *Comitato Glaciologico Italiano. Bollettino. Ser. 3: Geografia fisica e dinamica quaternaria,* 1993, 16(2), p.121-128, With Italian summary. 39 refs.
Geochemistry, Glacier surveys, Glacier ice, Ice sampling, Impurities, Glacial geology, Chemical composition, Bedrock, Antarctica—Terra Nova Bay
A chemical study was carried out on ice samples collected from the Strandline Glacier during the Italian Antarctic Expedition to Terra Nova Bay in 1989-90, in order to investigate sources and mode and type of transport of elements and compounds present. Analysis was performed on the whole sample without filtration of the particulate matter. Element abundances for both main and trace lithophile and heavy metals are much higher than literature data for polar ice and snow. Element overabundances derive from the presence of solid particles of different origin (continental terrestrial and cosmic) and of seasalt by local strong aerosol. Calculation of crustal enrichment factors suggests that the chemistry of samples from the frontal zone is essentially controlled by the amount of rock particles from the substratum enveloped in the glacier during its movement. In contrast, the chemistry of the surface ice samples derives from atmospheric or tropospheric introduction of dissolved constituents and solid particles of different origin (primary marine aerosol, continental and cosmic dust, etc.). (Auth. mod.)

49-5208
Reports on the Glaciological Survey of 1992. [Relazioni della Campagna Glaciologica 1992]
Armando, E., Smiraglia, C., Zanon, G., *Comitato Glaciologico Italiano. Bollettino. Ser. 3: Geografia fisica e dinamica quaternaria,* 1993, 16(2), p.197-246, In Italian.
Glaciology, Glacier surveys, Mountain glaciers, Glacier oscillation, Seasonal variations, Italy—Alps

49-5209
Studies on the delay mechanism of runoff to snowmelt.
Nomura, M., *Institute of Low Temperature Science. Contributions A,* 1994, No.39, 49p., 28 refs.
Snow hydrology, Snowmelt, Meltwater, Subsurface drainage, Runoff, Watersheds, Seepage, Hydrography, Simulation, Ice water interface

49-5210
Studies of the alpine flora along an east-west gradient in central western Norway.
Moe, B., *Nordic journal of botany,* 1995, 15(1), p.77-89, 60 refs.
Plant ecology, Phenology, Alpine landscapes, Cold tolerance, Distribution, Climatic factors, Bedrock, Seasonal variations, Norway

49-5211
Winter weather forecasting throughout the eastern United States. Part IV: lake effect snow.
Niziol, T.A., Snyder, W.R., Waldstreicher, J.S., *Weather and forecasting,* Mar. 1995, 10(1), p.61-77, 58 refs.
Climatology, Atmospheric physics, Precipitation (meteorology), Snowstorms, Lake effects, Weather forecasting, Synoptic meteorology, Accuracy, Wind factors

49-5212
Identification and classification of frost susceptible soils.
Chamberlain, E.J., Gaskin, P.N., Esch, D., Berg, R.L., MP 3618, ASCE Spring Convention, Las Vegas, NV, Apr. 26-30, 1982. Preprint, New York, American Society of Chemical Engineers, 1982, 38p., 36 refs.
Soil classification, Soil tests, Soil freezing, Mechanical properties, Frost action, Cold weather construction, Specifications, Standards
Methods for determining the frost susceptibility of soil and granular materials used in road and airfield construction are reviewed. The methods employed by transportation departments in the United States, Canada and Europe are included. Three levels of classification are identified; Type I, based on a specified particle size; Type II, generally based on soil type; and Type III, which requires a laboratory freezing test. Two critical particle sizes appear frequently, 0.074 and 0.020 mm. The most common basis is the Casagrande criteria; however, few transportation agencies use the same method, as modifications have been made to address specific problems. The reliability of most criteria is uncertain because few have been rigorously validated. Transportation agencies should have all three types available, and possibly a fourth and even more discriminating method, to select criteria appropriate to the task.

49-5213
Application of the modified image method to electromagnetic studies of sea ice.
Trinh, L.B., New Orleans, University of New Orleans, Dec. 1990, 86p., Master's thesis. 12 refs.
Sea ice, Ice conditions, Remote sensing, Data processing, Ice surveys, Aerial surveys, Electromagnetic properties, Electric fields, Analysis (mathematics)

49-5214
Observation of two longitudinal and two transverse waves in a frozen porous medium.
Leclaire, P., Cohen-Ténoudji, F., Aguirre-Puente, J., *Acoustical Society of America. Journal,* Apr. 1995, 97(4), p.2052-2055, 10 refs.
Porous materials, Frozen liquids, Elastic waves, Sound waves, Wave propagation, Acoustic measurement, Velocity measurement, Ice water interface, Temperature effects, Ice acoustics

49-5215
Sound generation by ice floe rubbing.
Ye, Z., *Acoustical Society of America. Journal,* Apr. 1995, 97(4), p.2191-2198, 14 refs.
Sea ice, Ice floes, Underwater acoustics, Ice acoustics, Ice breaking, Shear stress, Ice solid interface, Ice water interface, Sound waves, Wave propagation, Mathematical models

49-5216
Spectral representations of rough interface reverberation in stratified ocean waveguides.
Schmidt, H., Kuperman, W.A., *Acoustical Society of America. Journal,* Apr. 1995, 97(4), p.2199-2209, 17 refs.
Oceanography, Sound waves, Wave propagation, Scattering, Ice cover effect, Fluid dynamics, Stratification, Ice water interface, Mathematical models, Spectra, Surface roughness

49-5217
Non-contact sensors for road conditions.
Holzwarth, F., Eichhorn, U., *Sensors and actuators A,* June-Aug. 1993, Vol.A37-A38, Eurosensors VI, San Sebastián, Spain, Oct. 5-7, 1992. Proceedings, p.121-127, 12 refs.
Road icing, Ice detection, Sensors, Design, Infrared radiation, Spectra, Light scattering, Cold weather performance

49-5218
Deicer salt scaling deterioration of concrete—an overview.
Marchand, J., Sellevold, E.J., Pigeon, M., International Conference on Durability of Concrete, 3rd, Nice, France, May 22-28, 1994. Proceedings. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.1-46, SP 145-1, 155 refs.
DLC TA440.D8194
Concrete durability, Concrete admixtures, Degradation, Ice removal, Chemical ice prevention, Frost resistance, Frost action, Freeze thaw cycles, Cold weather tests

49-5219
Investigation of alternate concrete deicers.
Hudec, P.P., MacInnis, C., McCann, S.P., International Conference on Durability of Concrete, 3rd, Nice, France, May 22-28, 1994. Proceedings. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.65-84, SP 145-3, 10 refs.
DLC TA440.D8194
Concrete durability, Mortars, Ice removal, Ice melting, Salting, Corrosion, Concrete admixtures, Frost resistance, Chemical composition

49-5220
W/CM code requirements inappropriate for resistance to deicer salt scaling.
Johnston, C.D., International Conference on Durability of Concrete, 3rd, Nice, France, May 22-28, 1994. Proceedings. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.85-105, SP 145-4, 14 refs.
DLC TA440.D8194
Concrete durability, Salting, Ice removal, Corrosion, Countermeasures, Standards, Concrete aggregates, Cold weather performance, Mechanical properties

49-5221
Durability of concrete structure exposed to $CaCl_2$ based deicing salts.
Collepardi, M., Coppola, L., Pistolesi, C., International Conference on Durability of Concrete, 3rd, Nice, France, May 22-28, 1994. Proceedings. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.107-120, SP 145-5, 14 refs.
DLC TA440.D8194
Concrete structures, Concrete durability, Cement admixtures, Frost resistance, Chemical composition, Salting, Degradation, Corrosion, Mechanical tests

49-5222
Long-term durability of special high strength concretes.
Nepper-Christensen, P., Kristensen, B.W., Rasmussen, T.H., International Conference on Durability of Concrete, 3rd, Nice, France, May 22-28, 1994. Proceedings. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.173-190, SP 145-9.
DLC TA440.D8194
Concrete durability, Concrete strength, Reinforced concretes, Freeze thaw tests, Frost resistance, Mechanical tests

49-5223
Durability properties of high strength concrete containing silica fume and lignite fly ash.
Nasser, K.W., Ghosh, S., International Conference on Durability of Concrete, 3rd, Nice, France, May 22-28, 1994. Proceedings. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.191-214, SP 145-10, 23 refs.
DLC TA440.D8194
Concrete durability, Concrete strength, Concrete admixtures, Aggregates, Frost resistance, Freeze thaw tests, Microstructure, Scanning electron microscopy, Mechanical properties

49-5224
Freezing and thawing durability of concrete block pavers.
Ghafoori, N., Mathis, R.P., International Conference on Durability of Concrete, 3rd, Nice, France, May 22-28, 1994. Proceedings. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.609-622, SP 145-32, 11 refs.
DLC TA440.D8194
Concrete pavements, Concrete durability, Cement admixtures, Bricks, Construction materials, Frost resistance, Freeze thaw cycles, Mechanical properties, Cold weather performance

49-5225
Freezing and thawing durability of air-entrained wet- and dry-mix shotcrete incorporating silica fume.
Durand, B., Mirza, J., Nguyen, P., International Conference on Durability of Concrete, 3rd, Nice, France, May 22-28, 1994. Proceedings. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.623-641, SP 145-33, 17 refs.
DLC TA440.D8194
Concrete durability, Concrete strength, Concrete admixtures, Concrete placing, Frost resistance, Freeze thaw tests, Aggregates, Mechanical properties

49-5226
Study of frost resistance of concrete using an organic shrinkage-reducing agent.
Fujiwara, H., Tomita, R., Shimoyama, Y., International Conference on Durability of Concrete, 3rd, Nice, France, May 22-28, 1994. Proceedings. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.643-655, SP 145-34, 4 refs.
DLC TA440.D8194
Concrete durability, Concrete admixtures, Chemical properties, Air entrainment, Freeze thaw tests, Cold weather performance, Viscosity

49-5227
Durability of concrete for early opening of repaired highways—field evaluation.
Nagi, M., Janssen, D., Whiting, D., International Conference on Durability of Concrete, 3rd, Nice, France, May 22-28, 1994. Proceedings. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.811-833, SP 145-43, 22 refs.
DLC TA400.D8194
Concrete pavements, Concrete durability, Frost resistance, Freeze thaw tests, Winter maintenance, Mechanical properties, Concrete admixtures, Air entrainment

49-5228
Liquid capillary condensates below the freezing point.
Christenson, H.K., *Physical review letters,* June 5, 1995, 74(23), p.4675-4678, 21 refs.
Hydrocarbons, Liquid phases, Porosity, Phase transformations, Freezing points, Capillarity, Liquid solid interfaces, Interfacial tension, Temperature effects

49-5229
Frost heave dynamics at a single crystal interface.
Wilen, L.A., Dash, J.G., *Physical review letters,* June 19, 1995, 74(25), p.5076-5079, 30 refs.
Ice physics, Frost heave, Ice water interface, Ice crystal growth, Water films, Temperature gradients, Thermodynamic properties, Fluid flow, Ice melting, Surface properties

49-5230
Freeze plug proves safe, economical in riser repair.
Nelson, M.J., *Oil & gas journal,* May 1, 1995, 93(18), p.106-110, 1 ref.
Offshore structures, Subsurface structures, Pipeline freezing, Pipe flow, Solidification, Maintenance, Cryogenics

49-5231
Alaska's North Slope/Beaufort region sees E&D resurgence. *Oil & gas journal,* May 31, 1995, 91(22), p.15-19.
Petroleum industry, Exploration, Economic analysis, Economic development, Offshore drilling, United States—Alaska

49-5232
Overview of explosives contamination at DoD facilities: an analytical perspective.
Jenkins, T.F., Walsh, M.E., MP 3619, Annual Meeting of Air & Waste Management Association, 88th, San Antonio, TX, June 18-23, 1995, Air & Waste Management Association, 1995, 18p., 98 refs.
Military facilities, Explosives, Waste disposal, Soil pollution, Soil analysis, Environmental impact, Environmental tests, Chemical analysis, Laboratory techniques
The purpose of this paper is to provide an overview of the explosives contamination problem at DoD facilities from an analytical chemistry perspective, with emphasis on the compounds found in explosives-contaminated soils and laboratory and field methods that have been used for site characterization.

49-5233
Comments on "Critical evaluation of predicted and measured gas-liquid partition coefficients in v-hexadecane".
Leggett, D.C., MP 3620, *Journal of physical chemistry,* June 8, 1995, p.9638, 1 ref.
Gases, Hydrocarbons, Fuels, Thermodynamics, Chemical analysis, Phase transformations, Solubility

49-5234
Catalogue of sea ice ridges.
Burden, R.P., Timco, G.W., *National Research Council, Canada. Institute for Marine Dynamics. Technical report,* Apr. 1995, TR-1995-27, 72p. + appends., 28 refs.
Sea ice, Pressure ridges, Structural analysis, Ice surveys, Classifications, Ice cover thickness, Topographic features, Profiles

49-5235
Historical references to ice conditions along the Beaufort Sea coast of Alaska.
Shapiro, L.H., Metzner, R.C., *University of Alaska. Geophysical Institute. Scientific report,* Sep. 1979, UAG R-268, Var. p.
Sea ice distribution, Ice conditions, Shores, History, Periodic variations, Beaufort Sea

49-5236
Role of sea ice as a physical hazard and a pollutant transport mechanism in the Bering Sea.
Stringer, W.J., *University of Alaska. Geophysical Institute. Special report,* July 1980, 26p., 21 refs.
Oceanography, Oil spills, Water pollution, Environmental impact, Sea ice, Ice conditions, Fast ice, Classifications, Bering Sea

49-5237
Abbreviated test report for the preproduction qualification test (PPQT) of the Mounted Crewman Cold-wet Glove (MCG) Soldier Enhancement Program (SEP).
Litavec, D.J., Watson, R.A., U.S. Army Test And Evaluation Command TECOM Project No.8-EI-495-MCG-002, Fort Greely, AK, U.S. Army Cold Regions Test Activity, June 1995, 16p. + append.
Clothing, Cold weather performance, Cold weather tests, Thermal insulation, Thermal properties, Human factors

49-5238
Analysis of the tensor dielectric constant of sea ice at microwave frequencies.
Stogryn, A., *Aerojet Electrosystems Company. Report,* Oct. 1985, No.7975, 36p., Contract No.N00014-83-C-0726, 18 refs. For another version see 41-3315.
Sea ice, Remote sensing, Radiometry, Microwaves, Dielectric properties, Electromagnetic properties, Ice physics, Anisotropy, Scattering, Analysis (mathematics)

49-5239
Snow and avalanches in the Davos region. [Schnee und Lawinen in der Region Davos]
Meister, R., Frutiger, S., Beck, E., *Schnee- und Lawinenforschung. Winterberichte,* 1995, No.58, p.34-53, In German.
Snow surveys, Avalanches, Snow accumulation, Avalanche forecasting, Seasonal variations, Statistical analysis, Switzerland—Davos

49-5240
Snow and avalanche correlation in the Swiss alpine regions. [Schnee- und Lawinenverhältnisse im schweizerischen Alpengebiet]
Gliott, S., Meister, R., *Schnee- und Lawinenforschung. Winterberichte,* 1995, No.58, p.54-156, In German.
Avalanche forecasting, Snow surveys, Alpine landscapes, Snow accumulation, Seasonal variations, Snow cover distribution, Statistical analysis, Switzerland—Alps

49-5241
Concerning accidents and damage caused by snow in Swiss alpine regions. [Durch Lawinen verursachte Unfälle und Schäden im Gebiet der Schweizer Alpen]
Etter, H.J., *Schnee- und Lawinenforschung. Winterberichte,* 1995, No.58, p.157-200, In German.
Avalanches, Alpine landscapes, Avalanche forecasting, Accidents, Safety, Snow surveys, Statistical analysis, Switzerland—Alps

49-5242
Freeze-thaw flow management: a novel concept for high-performance liquid chromatography, capillary electrophoresis, electrochromatography and associated techniques.
Bevan, C.D., Mutton, I.M., *Journal of chromatography A,* Apr. 21, 1995, 697(1-2), International Symposium on Chromatography, 20th, Bournemouth, UK, June 19-24, 1995, p.541-548, 16 refs.
Chemical analysis, Laboratory techniques, Fluid dynamics, Fluid flow, Flow control, Pipe flow, Solidification, Freeze thaw cycles, Pipes (tubes)

49-5243
Frost resistance, a critical look.
Pigeon, M., V. Mohan Malhotra Symposium, Detroit, MI, 1993. Proceedings, Detroit, American Concrete Institute, 1994, p.141-158, 30 refs.
DLC TA439.C575
Concrete durability, Frost resistance, Freeze thaw cycles, Microstructure, Surface properties, Air entrainment, Physical properties, Degradation, Cracking (fracturing)

49-5244
Freezing and thawing.
Newlon, H., Jr., Mitchell, T.M., Significance of tests and properties of concrete and concrete-making material. Edited by P. Klieger and J.F. Lamond, Fredericksburg, American Society for Testing and Materials, Aug. 1994, p.153-163, ST 169C, 55 refs.
DLC TA440.S556
Concrete durability, Weathering, Cold weather tests, Frost resistance, Freeze thaw tests, Mechanical properties, Standards, Laboratory techniques

49-5245
Additional studies on the softening of rigid PVC by aqueous solutions of organic solvents.
Parker, L.V., Ranney, T.A., SR 95-08, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Mar. 1995, 17p., ADA-294 451, 12 refs.
Polymers, Pipes (tubes), Solutions

This study examined whether an aqueous solution that contained 18 organic chemicals that are either solvents or good swelling agents of PVC are able to cause softening when combined in a solution, with each solute at an activity of 0.05. This activity was selected because there is no evidence that an individual organic solute with an activity of 0.05 can soften PVC. However, the authors found that this combined test solution rapidly softened PVC. They also examined whether organic chemicals that are either solvents or good softening agents of PVC and are also totally miscible in water are able to soften PVC when mixed with water. Four chemicals (tetrahydrofuran, acetone, dimethylformamide and pyridine) were tested in a study that ran for 20 weeks. Tetrahydrofuran, a PVC solvent, caused a significant change in the hardness readings of samples exposed to concentrations as low as 0.01% (w/v). Acetone, a good swelling agent of PVC, caused a significant change in the hardness readings of samples exposed to a 10% concentration but not a 5% concentration. Dimethylformamide, a poorer swelling agent of PVC, did not cause any measurable signs of softening at concentrations below 60%. The lowest concentration of pyridine tested (20%) was found to have a significant effect on the hardness readings. A preliminary short-term study (7 days) showed that n-butylamine was intermediate between pyridine and dimethylformamide in its ability to soften PVC.

49-5246

Preliminary study of height and pointing calibration scenarios for satellite laser altimetry of continental ice sheet topography.

Lisano, M.E., II, Schutz, B.E., *Astrodynamics 1993: Advances in the astronautical sciences,* 1994, 85(3), p.2677-2687, 16 refs.

DLC TL787.A6A2

Height finding, Lasers, Ice sheets, Data processing, Ice volume, Topography

It is planned to use height measurements made with a satellite laser altimeter, such as the Geoscience Laser Altimeter System (GLAS) of the Earth Observing System (EOS) to infer changes in the volume of the Greenland and antarctic ice sheets. Two methods for calibrating satellite laser altimeter pointing knowledge and height measurements of the continental ice sheets are examined in this preliminary study. One calibration method is based on locating the altimeter satellite position with the Global Positioning System (GPS); the second method is based on tracking the satellite using ground-based satellite laser ranging (SLR). This investigation suggests that a feasible calibration strategy using Altimeter Footprint Detector Arrays (AFDA's) will be to deploy small, mobile arrays at the highest latitudes flown over by the satellite, and that the size of these arrays will depend strongly on the predicted satellite position cross-track error as a function of time. Future work is proposed, based on the AFDA concept and calibration algorithms. (Auth. mod.)

49-5247

Lake-effect snowfall over Lake Michigan.

Braham, R.R., Jr., Dungey, M.J., *Journal of applied meteorology,* May 1995, 34(5), p.1009-1019, 35 refs.

Precipitation (meteorology), Cloud physics, Atmospheric boundary layer, Snowfall, Snow accumulation, Aerial surveys, Probes, Particle size distribution, Spectra, Lake effects, United States—Michigan, Lake

49-5248

New look at the Israeli cloud seeding experiments.

Rangno, A.L., Hobbs, P.V., *Journal of applied meteorology,* May 1995, 34(5), p.1169-1193, 97 refs.

Cloud physics, Cloud seeding, Weather modification, Precipitation (meteorology), Rain, Statistical analysis, Accuracy, Israel

49-5249

Response of warm-based, midwestern cumulus congestus to dynamic seeding trials.

Czys, R.R., Changnon, S.A., Jr., Westcott, N.E., Scott, R.W., Petersen, M.S., *Journal of applied meteorology,* May 1995, 34(5), p.1194-1214, 44 refs.

Cloud seeding, Weather modification, Cloud physics, Artificial nucleation, Silver iodide, Performance, Statistical analysis, Radar echoes

49-5250

Exploratory analysis of seeding effects on rainfall: Illinois 1989.

Changnon, S.A., Jr., Gabriel, K.R., Westcott, N.E., Czys, R.R., *Journal of applied meteorology,* May 1995, 34(5), p.1215-1224, 10 refs.

Cloud physics, Cloud seeding, Weather modification, Precipitation (meteorology), Rain, Silver iodide, Statistical analysis, Radar echoes, United States—Illinois

49-5251

Climax again?

Gabriel, K.R., *Journal of applied meteorology,* May 1995, 34(5), p.1225-1227, 1 ref.

Cloud physics, Cloud seeding, Experimentation, Statistical analysis, Accuracy

49-5252

Stability of the viscous-plastic sea ice rheology.

Gray, J.M.N.T., Killworth, P.D., *Journal of physical oceanography,* May 1995, 25(5), p.971-978, 40 refs.

Sea ice, Pack ice, Ice strength, Ice mechanics, Ice models, Rheology, Mathematical models, Stress concentration, Ice plasticity, Viscosity

49-5253

Numerical study of mechanisms of accretion for rotating snow sleeves evolving on conductor rods.

Poots, G., Skelton, P.L.I., *International journal for numerical methods in engineering,* Mar. 15, 1995, 38(5), p.861-879, 16 refs.

Transmission lines, Power line icing, Mechanical properties, Snow accumulation, Ice accretion, Air flow, Snow loads, Snow air interface, Wind factors, Mathematical models, Snow cover effect

49-5254

Definition and description of the zones of potential earthquake sources in the Barents Sea.

Assinovskaia, B.A., Solov'ev, S.L., *Physics of the solid earth,* Mar. 1994, 29(8), p.664-675, Translated from Fizika zemli. 28 refs.

Marine geology, Ocean bottom, Earthquakes, Forecasting, Periodic variations, Seismic surveys, Statistical analysis, Tectonics, Barents Sea

49-5255

Seasonal snow cover classification system for local to global applications.

Sturm, M., Holmgren, J., Liston, G.E., MP 3621, *Journal of climate,* May 1995, 8(5)pt.2, p.1261-1283, 72 refs.

Snow cover distribution, Snow cover structure, Snow surveys, Classifications, Terminology, Mapping, Correlation, Climatic factors, Meteorological factors, Stratigraphy

A new classification system for seasonal snow covers is proposed. It has six classes (tundra, taiga, alpine, maritime, prairie, and ephemeral), each class defined by a unique ensemble of textural and stratigraphic characteristics within each layer. The classes can also be derived using a binary system of three climate variables: wind, precipitation, and air temperature. Using this classification system, the Northern Hemisphere distribution of the snow cover classes is mapped on a 0.5° lat x 0.5° long grid. These maps are compared to maps prepared from snow cover data collected in the former Soviet Union and Alaska. Factor analysis indicates that the snow classes can be readily discriminated using four or more winter average thermal or physical parameters. Further, analysis of hourly time series indicates that 84% of the time, spot measurements of the parameters are sufficient to correctly differentiate the snow cover class.

49-5256

Penetration fracture of sea ice plate.

Bažant, Z.P., Li, Y.N., *International journal of solids and structures,* Feb. 1995, 32(2-4), p.303-313, 13 refs.

Sea ice, Ice strength, Loads (forces), Plates, Ice mechanics, Cracking (fracturing), Ice solid interface, Penetration, Stress concentration, Crack propagation, Analysis (mathematics)

49-5257

Theoretical analysis of crack nucleation due to grain boundary dislocation pile-ups in a random ice microstructure.

Wu, M.S., Niu, J., *Philosophical magazine A,* Apr. 1995, 71(4), p.831-854, 23 refs.

Ice physics, Ice mechanics, Ice microstructure, Ice cracks, Crack propagation, Nucleation, Orientation, Stress concentration, Analysis (mathematics), Computerized simulation

49-5258

Air-entrainment is key to halting deicer scaling.

Mack, J., *Roads & bridges,* July 1994, 32(7), p.63.

Concrete pavements, Chemical ice prevention, Corrosion, Countermeasures, Freeze thaw cycles, Concrete durability, Concrete admixtures, Air entrainment, Physical properties

49-5259

CMA has role to play in critical applications.

Strawn, R., *Roads & bridges,* Mar. 1993, 31(3), p.50-51.

Road icing, Bridges, Ice melting, Ice prevention, Environmental protection, Chemical ice prevention, Geochemistry, Cost analysis

49-5260

Contaminant migration in engineered clay barriers due to heat and moisture redistribution under freezing conditions.

Mohamed, A.M.O., Yong, R.N., Mazus, M.T., *Canadian geotechnical journal,* Feb. 1995, 31(1), p.40-59, With French summary. 26 refs.

Clay soils, Linings, Soil tests, Soil freezing, Soil pollution, Ion diffusion, Temperature gradients, Frozen ground mechanics, Soil water migration, Fluid dynamics

49-5261

Infrared spectra of ice surfaces and assignment of surface-localized modes from simulated spectra of cubic ice.

Rowland, B., Kadagathur, N.S., Devlin, J.P., Buch, V., Feldman, T., Wojcik, M.J., *Journal of chemical physics,* June 1, 1995, 102(21), p.8328-8341, 41 refs.

Ice physics, Ice surface, Ice spectroscopy, Infrared radiation, Spectra, Ice crystal optics, Surface properties, Molecular structure, Adsorption, Vibration

49-5262

Empirical technique for estimating near-surface air temperature trends in central Greenland from SSM/I brightness temperatures.

Shuman, C.A., Alley, R.B., Anandakrishnan, S., Stearns, C.R., *Remote sensing of environment,* Feb. 1995, 51(2), p.245-252, 30 refs.

Remote sensing, Radiometry, Ice sheets, Firn, Brightness, Air temperature, Surface temperature, Periodic variations, Radiation balance, Correlation, Greenland

49-5263

SAR image study of a snow-covered area in the French Alps.

Fily, M., Dedieu, J.P., Surdyk, S., *Remote sensing of environment,* Feb. 1995, 51(2), p.253-262, 31 refs.

Snow cover structure, Snow surveys, Alpine landscapes, Spaceborne photography, Synthetic aperture radar, Radiometry, Correlation, Image processing, Topographic effects, France—Alps

49-5264

Field trials of pre-wetted sand for winter maintenance.

Perchanok, M.S., Raven, R., Stephenson, D., Foreman, S., Canada. Ministry of Transportation. Research and Development Branch. Report MAT-94-10, Ontario, Ministry of Transportation, Mar. 1995, 37p., 10 refs.

Road icing, Ice control, Winter maintenance, Countermeasures, Traction, Sands, Soil tests, Coatings, Wettability

49-5265

Project engineering and project management of offshore petroleum development in the Ross Sea, Antarctica: an engineering-economic evaluation.

Beike, D.K., Austin, University of Texas, 1993, 272p., University Microfilms order No. 94-13440, Ph.D. thesis. Refs. p.253-272.

Sea ice, Economic development, Crude oil, Engineering, Marine geology, Equipment, Logistics, Environmental protection, Antarctica—Ross Sea

This study speculates about the viability of antarctic petroleum development and estimates when antarctic oil production will become economically feasible. The analysis is based on a hypothetical exploration and development model which could require a $7.6 billion investment in 1992 US constant dollars. Following a 20 year development period, a 30 year project producing an initial 144,000,000 bbl per year with a 5% decline rate is assumed. Exploration is based on a floating conical drilling unit. Production is based on a concrete Tension Leg Platform concept, with subsea completion. Storage will be in a seafloor facility and transportation will be by ice-breaking tankers. The Ross Sea was chosen as the most promising petroleum-producing area in the Antarctic, because it has the most promising sedimentary basins, has had the most scientific exposure, and is environmentally the most favorable area. The risk of this venture, with its large up front investment, spread over 20 years, makes it unlikely that such an operation will be economically feasible. (Auth. mod.)

49-5266

Feasibility tests and design of AMANDA (Antarctic muon and neutrino detector array).

Miller, T.C., Berkeley, University of California, 1993, 246p., University Microfilms order No. 94-30611, Ph.D. thesis. Refs. p.239-244.

Radiation measuring instruments, Data processing, Ice physics, Transparence, Attenuation, Antarctica—Amundsen-Scott Station

The AMANDA (Antarctic Muon and Neutrino Detector Array) is a large area, high-energy neutrino detector whose primary purpose is the identification of astrophysical sources of very high energy neutrinos. AMANDA will consist of 10 vertical strings of downward-facing 20 cm photomultiplier tubes (PMTs), located in clear antarctic ice at 1 km depth. Neutrinos will be detected indirectly via Cerenkov light emitted in ice by muons produced in neutrino interactions below the array. The incident neutrino direction will be determined from the timing and pulse height information in many PMTs. The author first reviews potential astrophysical high energy neutrino point sources. Second, he describes the planned AMANDA array, including detailed descriptions of hardware, electronics, and data acquisition, and then describes experimental results on AMANDA to date. The feasibility of the AMANDA project depends critically upon the optical clarity of antarctic ice. Measurements of ice transparency at 200 m depth in Greenland during 1990 and at 800 m depth at the South Pole during the 1991-92 and 1992-93 austral summers were consistent with the peak optical attenuation length of 25 m that has been measured in laboratory ice. (Auth. mod.)

49-5267

Maps showing directions of longshore sediment transport along the Alaskan Bering Sea coast.

Hunter, R.E., Sallenger, A.H., Dupre, W.R., *U.S. Geological Survey. Miscellaneous field studies,* 1979, No.1049, 7p. + maps, 40 refs.

Marine geology, Shores, Beaches, Ocean currents, Sediment transport, Landforms, Shoreline modification, Geological maps, Bering Sea

49-5268

Distributions of free amino acids in sea and lake ice cores from Antarctica with special reference to ice biota.

Yang, H.F., NIPR Symposium on Polar Biology, Proceedings. No.8, Tokyo, National Institute of Polar Research, Jan. 1995, p.114-125, 27 refs.

Ice cores, Limnology, Microbiology, Ecology, Sea water, Chemical composition, Antarctica—Davis Station

Dissolved free amino acids (DFAA) of sea ice cores and lake ice cores collected from the vicinity of Davis Station were determined by HPLC. DFAA analysis showed that concentrations of total DFAA in ice cores were higher than those in water and they varied from 8.0 to 30.9 μM and 14.0 to 45.0 μM in the sea and lake ice cores, respectively. The highest concentration of total DFAA in the sea ice core appeared at 150 cm depth, while that in the lake ice core was found at 60-70 cm depth. The relative compositions of individual amino acids, such as serine, histidine and ornithine, were similar in both types of ice cores. These DFAA were probably derived from metabolism of the dominant organisms in the algal assemblage ice community. (Auth.)

49-5269

Cold-weather concreting—tips for protecting concrete in cold weather. *Concrete construction,* Dec. 1994, 39(12), p.945.

Winter concreting, Concrete durability, Cold weather operation, Temperature control

49-5270

Vulnerable ecosystems: Victoria's alpine regions.

New, T.R., Yen, A.L., *Victorian naturalist,* Feb. 1995, 112(1), p.54-55, 6 refs.

Alpine landscapes, Ecosystems, Global change, Environmental impact, Environmental protection, Australia

49-5271

Wood fiber reinforced cement composites under wetting-drying and freezing-thawing cycles.

Soroushian, P., Marikunte, S., Won, J.P., *Journal of materials in civil engineering,* Nov. 1994, 6(4), p.595-611, 17 refs.

Composite materials, Construction materials, Concrete durability, Cement admixtures, Wood, Freeze thaw tests, Elastic properties, Flexural strength

49-5272

Chemodynamics of trace pollutants during snowmelt on roof and street surfaces.

Daub, J., Förster, J., Herrmann, R., Robien, A., Striebel, T., *Water science & technology,* July 1994, 30(1), Biennial Conference of the International Association of Water Quality, 17th, Budapest, Hungary, July 24-30, 1994. Selected proceedings, p.73-85, 20 refs.

Snowmelt, Snow hydrology, Snow impurities, Runoff, Meltwater, Sampling, Suspended sediments, Water pollution, Environmental tests, Metals

49-5273

Sediment thicknesses and Holocene glacial marine sedimentation rates in three East Greenland fjords (ca. 68° N).

Andrews, J.T., Milliman, J.D., Jennings, A.E., Rynes, N., Dwyer, J., *Journal of geology,* Nov. 1994, 102(6), p.669-683, 74 refs.

Marine geology, Sedimentation, Glacial geology, Glacial deposits, Radioactive age determination, Ocean bottom, Sampling, Ice rafting, Calving, Stratigraphy, Greenland

49-5274

Method for drawing locus of a sliding ski as observed from direction perpendicular to snow surface.

Sahashi, T., Ichino, S., *Japanese journal of applied physics,* Feb. 1995, 34(2A), p.674-679, 4 refs.

Skis, Sliding, Mechanical tests, Photographic techniques, Ice solid interface, Mechanical properties, Analysis (mathematics)

49-5275

Surface textural properties of icy satellites: a comparison between Europa and Rhea.

Domingue, D.L., Lockwood, G.W., Thompson, D.T., *Icarus,* June 1995, 115(2), p.228-249, 53 refs.

Extraterrestrial ice, Satellites (natural), Remote sensing, Photometry, Regolith, Frost, Porosity, Light scattering, Ice optics, Albedo

49-5276

Magnesium sulfate-water to 400 MPa using a novel piezometer: densities, phase equilibria, and planetological implications.

Hogenboom, D.L., Kargel, J.S., Ganasan, J.P., Lee, L., *Icarus,* June 1995, 115(2), p.258-277, 53 refs.

Extraterrestrial ice, Satellites (natural), Regolith, Geochemistry, Geocryology, Hydrates, Solutions, Phase transformations, High pressure tests, Simulation, Ice formation, Temperature effects

49-5277

Phase associations and lipid distributions in the seasonally ice-covered arctic estuary of the Mackenzie Shelf.

Yunker, M.B., Macdonald, R.W., Whitehouse, B.G., *Advances in organic geochemistry,* Dec. 1994, 22(3-5), International Meeting on Organic Geochemistry, 16th, Stavanger, Norway, Sep. 20-24, 1993. Proceedings, p.651-669, Refs. p.667-669.

Estuaries, Deltas, Hydrocarbons, Suspended sediments, Solubility, Geochemistry, Water chemistry, Sampling, Subglacial observations, Ice cover effect, Seasonal variations, Canada—Northwest Territories—Mackenzie Delta

49-5278

Paleocryogenesis and structure of the soil mantle of the Russian plain.

Alifanov, V.M., Gugalinskaia, L.A., *Eurasian soil science,* July 1994, 26(7), p.23-37, Translated from Pochvovedenie. 31 refs.

Soil structure, Soil mapping, Geocryology, Pleistocene, Microrelief, Polygonal topography, Permafrost indicators

49-5279

Penetration rate of solid-liquid phase-change heat transfer interface with different kinds of boundary conditions.

Ma, J., Wang, B.X., *International journal of heat and mass transfer,* July 1995, 38(11), p.2135-2138, 12 refs.

Phase transformations, Solutions, Ice water interface, Heat transfer, Freezing front, Boundary value problems, Analysis (mathematics)

49-5280

Snow control lets city breathe easy.

Head, J., *American city & county,* Apr. 1995, 110(5), p.54-61.

Road maintenance, Winter maintenance, Ice control, Snow removal, Air pollution, Environmental impact, Countermeasures, Materials

49-5281

Rocks keep Latrobe rolling. *American city & county,* Apr. 1995, 110(5), p.56.

Winter maintenance, Road maintenance, Ice control, Salting, Liquids, Rocks, Traction

49-5282

Reading the road with RWIS. *American city & county,* Apr. 1995, 110(5), p.58.

Winter maintenance, Road maintenance, Road icing, Sensors, Remote sensing, Meteorological data, Monitors

49-5283

Iowa studies winter road maintenance.

Nixon, A., *American city & county,* Apr. 1995, 110(5), p.60.

Road maintenance, Winter maintenance, Urban planning, Snow removal, Ice removal

49-5284

Ice concentration in the eastern Beaufort Sea.

Stringer, W.J., *University of Alaska. Geophysical Institute. Report,* May 1982, 51p., Contract No.81-RAC00147, 1 ref.

Sea ice distribution, Ice surveys, Ice edge, Ice openings, Ice conditions, Spaceborne photography, Statistical analysis, Seasonal variations, Beaufort Sea

49-5285

Marine barge terminal at Nome, Alaska. Engineering feasibility study, Juneau, Gute & Nottingham, Structural Engineers, 1974, n.p., 43 refs.

Docks, Construction, Design criteria, Marine transportation, Cold weather operation, Cost analysis, Meteorological factors, Ice conditions

49-5286

Experiments on granular flows to predict avalanche runup.

Chu, T., Hill, G., McClung, D.M., Ngun, R., Sherkat, R., *Canadian geotechnical journal,* Apr. 1995, 32(2), p.285-295, With French summary. 15 refs.

Avalanche mechanics, Avalanche modeling, Avalanche tracks, Simulation, Mechanical tests, Rheology, Topographic effects, Analysis (mathematics)

49-5287

Hivon, E.G., Sego, D.C., *Canadian geotechnical journal,* Apr. 1995, 32(2), p.336-354, With French summary. 51 refs.

Frozen ground strength, Frozen ground mechanics, Soil tests, Saline soils, Strain tests, Temperature effects, Unfrozen water content

49-5288

Electrical conductivity and carbon in metamorphic rocks of the Yukon-Tanana Terrane, Alaska.

Mathez, E.A., Duba, A.G., Peach, C.L., Léger, A., Shankland, T.J., Plafker, G., *Journal of geophysical research,* June 10, 1995, 100(B7), p.10,187-10,196, 42 refs.

Geologic processes, Lithology, Tectonics, Rock properties, Magnetic anomalies, Electrical resistivity, Geochemistry, United States—Alaska

49-5289

Intrusion of ice into porous media by regelation: a mechanism of sediment entrainment by glacier.
Iverson, N.R., Semmens, D.J., *Journal of geophysical research,* June 10, 1995, 100(B7), p.10,219-10,230, 70 refs.
Glacial geology, Glacial erosion, Glacier flow, Ice pressure, Glacier beds, Sediment transport, Regelation, Ice solid interface, Mechanical tests

49-5290

Black-box modeling of the subglacial water system.
Murray, T., Clarke, G.K.C., *Journal of geophysical research,* June 10, 1995, 100(B7), p.10,231-10,245, 30 refs.
Glacial hydrology, Subglacial observations, Glacier beds, Water pressure, Ice water interface, Hydraulics, Mathematical models

49-5291

Investigations of the Marine Arctic Integrated Expedition (MAKE) in 1992. [Issledovaniia Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii (MAKE) v 1992 g.]
Boiarskiĭ, P.V., *Novaia Zemlia,* 1993, Vol.1, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.2, p.14-36 + fold. col. map, In Russian. 17 refs.
DLC DK11.N68N68
Expeditions, History, Russia—Novaya Zemlya

49-5292

Exploration and development of Novaya Zemlya: primary expeditions and other events. [Izuchenie i osvoenie Novoĭ Zemli: osnovnye ekspeditsii i drugie sobytiia]
Koriakin, V.S., *Novaia Zemlia,* 1993, Vol.1, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.2, p.40-46, In Russian.
DLC DK511.N68N68
Expeditions, History, Russia—Novaya Zemlya

49-5293

On the history of the exploration of Novaya Zemlya: a review of literary and archival sources. [K istorii izucheniia Novoĭ Zemli: obzor literaturnykh i arkhivnykh istochnikov]
Boiarskiĭ, P.V., Volkov, V.A., Kulikova, M.V., *Novaia Zemlia,* 1993, Vol.1, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.2, p.47-66, In Russian. Refs. passim.
DLC DK511.N68N68
Expeditions, History, Bibliographies, Russia—Novaya Zemlya

49-5294

Historical evolution of maps of Novaya Zemlya. [Istoricheskaia evoliutsiia kart Novoĭ Zemli]
Koriakin, V.S., *Novaia Zemlia,* 1993, Vol.1, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.2, p.67-78, In Russian. 12 refs.
DLC DK511.N68N68
Maps, History, Russia—Novaya Zemlya

49-5295

Secret records of the nuclear archipelago. [Sekretnye rekordy iadernogo arkhipelaga]
Emel'ianenkov, A.F., *Novaia Zemlia,* 1993, Vol.1, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.2, p.96-107, In Russian. 18 refs.
DLC DK511.N68N68
Environmental impact, Pollution, Radioactive wastes, Waste disposal, Russia—Novaya Zemlya

49-5296

Radioecological status of the central polygon of the Russian Federation. [Radioekologicheskoe sostoianie tsentral'nogo poligona Rossiĭskoĭ Federatsii]
Andrianov, K.N., Safronov, V.G., *Novaia Zemlia,* 1994, Vol.3, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.4, p.68-75, In Russian. 10 refs.
DLC DK511.N68N68
Radioactivity, Nuclear explosions, Pollution, Fallout, Mosses, Grasses, Soil pollution, Russia—Novaya Zemlya

49-5297

Accumulation of artificial radionuclides by marine algae along the Novaya Zemlya coast (Barents Sea). [Akkumuliatsiia iskusstvennykh radionuklidov morskimi vodorosliami u beregov Novoĭ Zemli (Barentsevo more)]
Vozzhinskaia, V.B., Kuzin, V.S., Pestrikov, V.V., Efimov, B.V., Ivanov, P.V., Shmelev, I.P., *Novaia Zemlia,* 1994, Vol.3, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.4, p.76-78, In Russian. 12 refs.
DLC DK511.N68N68
Algae, Radioactivity, Fallout, Pollution, Barents Sea, Russia—Novaya Zemlya, Russia—Murmansk, Russia—Vaygach Island

49-5298

Comprehensive investigations of the historical-cultural and environmental area of Novaya Zemlya and coastal territories (Marine Arctic Integrated Expedition, 1993). [Kompleksnye issledovaniia istoriko-kul'turnoĭ i prirodnoĭ sredy Novoĭ Zemli i pribrezhnykh territoriĭ (MAKE, 1993 g.)]
Boiarskiĭ, P.V., et al, *Novaia Zemlia,* 1994, Vol.3, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.4, p.80-136, In Russian. Refs. passim.
DLC DK511.N68N68
Environmental protection, History, Geography, Tundra, Ecosystems, Expeditions, Russia—Novaya Zemlya

49-5299

Marine flora of Novaya Zemlya (Barents Sea). [Morskaia rastitel'nost' Novoĭ Zemli (Barentsevo more)]
Vozzhinskaia, V.B., *Novaia Zemlia,* 1994, Vol.3, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.4, p.137-141, In Russian. 7 refs.
DLC DK511.N68N68
Plants (botany), Vegetation patterns, Biomass, Site surveys, Russia—Novaya Zemlya

49-5300

Water and aqueous solutions near freezing—integral equation theory and computer simulations.
Haymet, A.D.J., Wallqvist, A., *New York Academy of Sciences. Annals,* Apr. 29, 1994, Vol.715, International Conference on Natural Gas Hydrates. New Paltz, NY, June 20-24, 1993, p.146-160, 22 refs.
DLC Q11.N5
Water structure, Models, Solutions, Ice formation, Solubility, Phase transformations, Statistical analysis, Ice water interface, Computerized simulation

49-5301

Computer simulation of the crystal growth and dissolution of natural gas hydrates.
Báez, L.A., Clancy, P., *New York Academy of Sciences. Annals,* Apr. 29, 1994, Vol.715, International Conference on Natural Gas Hydrates. New Paltz, NY, June 20-24, 1993, p.177-186, 15 refs.
DLC Q11.N5
Natural gas, Hydrates, Clathrates, Phase transformations, Crystal growth, Molecular energy levels, Thermodynamics, Computerized simulation

49-5302

Dynamical properties and stability of clathrate hydrates.
Tse, J., *New York Academy of Sciences. Annals,* Apr. 29, 1994, Vol.715, International Conference on Natural Gas Hydrates. New Paltz, NY, June 20-24, 1993, p.187-206, 85 refs.
DLC Q11.N5
Clathrates, Hydrates, Thermodynamic properties, Stability, Theories, Phase transformations

49-5303

Permafrost-associated gas hydrate accumulations.
Collett, T.S., *New York Academy of Sciences. Annals,* Apr. 29, 1994, Vol.715, International Conference on Natural Gas Hydrates. New Paltz, NY, June 20-24, 1993, p.247-269, 25 refs.
DLC Q11.N5
Natural gas, Hydrates, Distribution, Permafrost transformation, Geochemistry, Geologic processes, Frozen ground chemistry

49-5304

Freezing rain and sleet climatology of the southeastern U.S.A.
Davis, R.E., Gay, D.A., *South Carolina Water Resources Commission. Southeast Regional Climate Center. Research paper,* May 1993, No.052593, 30p. + appends., 22 refs.
DLC QC984.S83 D38
Climatology, Precipitation (meteorology), Rain, Ice storms, Atmospheric physics, Ice water interface, Air water interactions, Glaze, Seasonal variations, Temperature effects

49-5305

Limit-force ice loads and their significance to offshore structures in the Beaufort Sea.
Comfort, G., Dinnovitzer, A., Gong, Y., *National Research Council, Canada. Program of Energy Research and Development. Final report,* Mar. 1994, No.4346-C, var.p., 57 refs.
Offshore structures, Sea ice, Ice strength, Ice loads, Impact, Dynamic loads, Ice solid interface, Pack ice, Ice mechanics, Mathematical models, Design criteria, Standards

49-5306

Chemical effects on cement mortar of calcium magnesium acetate as a deicing salt.
Peterson, O., *Cement and concrete research,* Apr. 1995, 25(3), p.617-626, 5 refs.
Cement admixtures, Mortars, Salting, Ice removal, Chemical composition, Corrosion, Compressive properties, Mechanical tests

49-5307

Examination of two techniques to determine the origin of soil-sized particles on alpine slopes in the Duke Valley, southwest Yukon.
Howes, J.E., Ottawa, Carleton University, 1989, 89p., M.A. thesis. Refs. p.64-68.
Alpine landscapes, Slope processes, Geomorphology, Bedrock, Sediment transport, Sediments, Origin, Soil analysis, Sampling, Weathering, Particle size distribution, X ray diffraction, Canada—Yukon Territory

49-5308

Studies of the behavior of oil in ice, conducted by the Outer Continental Shelf Environmental Assessment Program.
Stringer, W.J., Weller, G., University of Alaska. Arctic Project Office. Outer Continental Shelf Environmental Assessment Program. Report, Fairbanks, University of Alaska, [1980], 17p., 31 refs.
Oceanography, Research projects, Oil spills, Dispersions, Ice water interface, Simulation, Liquid solid interfaces, Fluid dynamics, Ice cover effect, Environmental impact

49-5309

Aeromagnetic surveys over the Transantarctic Mountains and the Ross Sea area.
Damaske, D., *Terra Antartica. Special issue,* 1994, 1(3), Lithospheric Investigations in the Ross Sea Area (LIRA) Workshop, Gradisca d'Isonzo, June 3-5, 1993. Antarctic Offshore Acoustic Stratigraphy (ANTOSTRAT) Meeting, Gradisca d'Isonzo, May 31-June 2, 1993. Antarctic Crustal Profile (ACRUP). Data report. Crustal structure of the Transantarctic Mountains and adjacent Ross Sea depression. Ross Sea Regional Working Group. Geotraverse ACRUP-1 Experiment (1993-94). Edited by C.A. Ricci, p.503-506, 13 refs.
Geomagnetism, Aerial surveys, Magnetic anomalies, Ice shelves, Antarctica—Transantarctic Mountains, Antarctica—Ross Sea

Airborne investigations of the magnetic field in the Ross Sea region have been carried out since about 1960. During the last ten years about 90,000 km of data have been gathered at line spacings of 4.4 km (in most cases) with a tie-line interval of 22 km. Major structures in the Ross Embayment, such as the Victoria Land Basin and its central graben structure, have been magnetically identified and their extent determined. New features, e.g. the Polar 3 anomaly, have been discovered and are discussed in the context of the tectonic evolution in the Ross Sea area. Units of distinct magnetic signature and magnetic lineaments contributed to the understanding of the crustal structure of parts of the Ross Embayment. However, open questions remain regarding the boundary of the West Antarctic Rift System with the East Antarctic shield. (Auth. mod.)

49-5310

Marine magnetic and aeromagnetic surveys in the West Antarctic rift system.

Behrendt, J.C., The GANOVEX and CASERTZ Groups, *Terra Antartica. Special issue,* 1994, 1(3), Lithospheric Investigations in the Ross Sea Area (LIRA) Workshop, Gradisca d'Isonzo, June 3-5, 1993. Antarctic Offshore Acoustic Stratigraphy (ANTOSTRAT) Meeting, Gradisca d'Isonzo, May 31-June 2, 1993. Antarctic Crustal Profile (ACRUP). Data report. Crustal structure of the Transantarctic Mountains and adjacent Ross Sea depression. Ross Sea Regional Working Group. Geotraverse ACRUP-1 Experiment (1993-94). Edited by C.A. Ricci, p.509-511, 19 refs.

Ice sheets, Geomagnetism, Aerial surveys, Ice shelves, Volcanoes, Antarctica—West Antarctica

Geophysical surveys over and adjacent to the Ross Sea continental shelf have revealed much information about the structure of the extended crust in this area of the volcanically active West Antarctic rift system (WR). The areas of the rift underlying the Byrd Subglacial basin are much less well known. Late Cenozoic rift activity, characterized by exposures of alkaline bimodal volcanic rocks along the flanks of the WR, has been dated from about 30 Ma to the present. A large mantle-plume-head origin has been proposed for the late Cenozoic rift activity in the WR on the basis of geophysical data and of ocean island basalt chemistry of the volcanic rocks.

49-5311

Seismic reflection experiments on the Ross Ice shelf: 1985-1991.

Stern, T.A., Ten Brink, U.S., Beaudoin, B.C., Bannister, S.C., *Terra Antartica. Special issue,* 1994, 1(3), Lithospheric Investigations in the Ross Sea Area (LIRA) Workshop, Gradisca d'Isonzo, June 3-5, 1993. Antarctic Offshore Acoustic Stratigraphy (ANTOSTRAT) Meeting, Gradisca d'Isonzo, May 31-June 2, 1993. Antarctic Crustal Profile (ACRUP). Data report. Crustal structure of the Transantarctic Mountains and adjacent Ross Sea depression. Ross Sea Regional Working Group. Geotraverse ACRUP-1 Experiment (1993-94). Edited by C.A. Ricci, p.513-516, 11 refs.

Seismic reflection, Ice shelves, Seismic surveys, Bottom topography, Antarctica—Ross Ice Shelf

Three seismic reflection experiments on the Ross Ice Shelf are briefly described. Seismic reflection exploration on a thick floating ice shelf presents a unique challenge in terms of both data acquisition and processing. Conventional acquisition methods were used in the 1985 survey including drilled shot holes and moving cables and geophones by skidoo. In the latest experiment, the SERIS project of 1990-91, thermal drilling of shot holes and a towed ice streamer were used. Results are varied and appear to depend on the intensity and character of intra-ice and seafloor multiples that are created by the dynamite shots. Some of the features observed in the geology beneath the ice shelf include unconformities, basement faulting, bottom simulating reflector and a possible base of the crust (Moho) reflector. (Auth.)

49-5312

Measurement of terrestrial heat flow in glaciated terrain (preliminary data from Victoria Land, Antarctica).

Delisle, G., *Terra Antartica. Special issue,* 1994, 1(3), Lithospheric Investigations in the Ross Sea Area (LIRA) Workshop, Gradisca d'Isonzo, June 3-5, 1993. Antarctic Offshore Acoustic Stratigraphy (ANTOSTRAT) Meeting, Gradisca d'Isonzo, May 31-June 2, 1993. Antarctic Crustal Profile (ACRUP). Data report. Crustal structure of the Transantarctic Mountains and adjacent Ross Sea depression. Ross Sea Regional Working Group. Geotraverse ACRUP-1 Experiment (1993-94). Edited by C.A. Ricci, p.527-528, 13 refs.

Geothermometry, Ice sheets, Boreholes, Drilling, Antarctica—Ricker Hills, Antarctica—Billing, Mount, Antarctica—Howard, Mount

Heat flow measurements in the Ross Sea have shown consistently high values. The East Antarctic craton, on the other hand, is generally believed to be characterized by low heat flow values. The determination of the increase of terrestrial heat flow in the transitional zone between this craton and the Ross Sea could potentially help answer the two closely connected questions of the effect of the evolution of high crustal temperatures of the Western Ross Sea on the adjacent continental crust and of the cause of the ongoing uplift of the Transantarctic Mountains. An attempt to measure terrestrial heat flow in the onshore transitional zone was carried out during GANOVEX VII and is discussed in this paper.

49-5313

Natural history of Novaya Zemlya. [Estestvennaia istoriia Novoĭ Zemli]

Maliasova, E.S., Serebriannyĭ, L.R., *Novaia Zemlia,* 1993, Vol.2, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.3, p.10-22, In Russian. 12 refs.

DLC DK511.N68N68

Marine deposits, Pleistocene, Tundra, Alluvium, Pollen, Russia—Novaya Zemlya

49-5314

Review of vegetation cover on the west coast of Novaya Zemlya. [Obzor rastitel'nogo pokrova zapadnogo poberezh'ia Novoĭ Zemli]

Shakhin, D.A., *Novaia Zemlia,* 1993, Vol.2, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.3, p.98-124, In Russian. 21 refs.

DLC DK511.N68N68

Vegetation patterns, Deserts, Geobotanical interpretation, Tundra, Site surveys, Plants (botany), Swamps, Russia—Novaya Zemlya, Russia—Mys Zhelaniya, Russia—Zaliv Russkaya Gavan', Russia—Guba Severnaya Sul'meneva, Russia—Guba Melkaya, Russia—Zaliv Malye Karmakuly, Russia—Zaliv Rusanova, Russia—Guba Kamenka

49-5315

Soil microfauna in ecological control on Novaya Zemlya. [Mikrofauna pochv v ekologicheskom kontrole na Novoĭ Zemle]

Krivolutskiĭ, D.A., Kaliakin, V.N., *Novaia Zemlia,* 1993, Vol.2, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.3, p.125-131, In Russian. 17 refs.

DLC DK511.N68N68

Soil microbiology, Animals, Ecology, Russia—Novaya Zemlya

49-5316

Ecological express-monitoring of sea water transparency in coastal waters of the archipelago of Novaya Zemlya, the Barents and White seas. [Ekologicheskiĭ ekspress-monitoring prozrachnosti morskoĭ vody pribrezhnykh akvatoriĭ arkhipelaga Novaia Zemlia, Barentseva i Belogo moreĭ]

Matiushenko, V.A., Ushakov, I.E., *Novaia Zemlia,* 1993, Vol.2, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.3, p.132-149, In Russian. 31 refs.

DLC DK511.N68N68

Transparence, Sea water, Ecology, Monitors, Russia—Novaya Zemlya, Russia—White Sea, Barents Sea

49-5317

Extracts from field diaries of members of the Marine Arctic Integrated Expedition, concerning the environmental characteristics at the points of disembarkation from the ship *Ivan Kireev* in 1992. [Vypiski iz polevykh dnevnikov uchatnikov MAKE, otnosiashchiesia k kharakteristike okruzhaiushcheĭ sredy v mestakh vysadok s sudna "Ivan Kireev" v 1992 g.]

Koriakin, V.S., Serebriannyĭ, L.R., Shakhin, D.A., Kaliakin, V.N., Kuznetsov, M.P., *Novaia Zemlia,* 1993, Vol.2, Trudy Morskoĭ arkticheskoĭ kompleksnoĭ ekspeditsii, Vol.3, p.185-195, In Russian.

DLC DK511.N68N68

Expeditions, Vegetation patterns, Hydrography, Geography, Russia—Novaya Zemlya

49-5318

Comparative analysis of three local floras on the northeastern Chukotskiy Peninsula. [Sravnitel'nyĭ analiz trekh lokal'nykh flor na severo-vostoke Chukotskogo poluostrova]

IUrtsev, B.A., Katenin, A.E., Rezvanova, G.S., *Botanicheskii zhurnal,* Apr. 1994, 79(4), p.1-12, In Russian with English summary. 19 refs.

DLC QK1.V713

Plants (botany), Site surveys, Arctic landscapes, Russia—Chukotskiy Peninsula

49-5319

Current and Holocene vegetation in the Paanajärvi National Park (northwestern Karelia). [Sovremennaia i golotsenovaia rastitel'nost' natsional'nogo parka Paanaiarvi (severo-zapadnaia Kareliia)]

Elina, G.A., Kuznetsov, O.L., Deviatova, E.I., Lebedeva, R.M., Maksimov, A.I., Stoĭkina, N.V., *Botanicheskiĭ zhurnal,* Apr. 1994, 79(4), p.13-31, In Russian with English summary. 36 refs.

DLC QK1.V713

Plants (botany), Swamps, Peat, Stratigraphy, Geobotanical interpretation, Tundra, Taiga, Forest land, Vegetation patterns, Site surveys, Russia—Karelia

49-5320

Structure of seed surface and the systematics of the Siberian *Gypsophila* species (*Caryophyllaceae*). [Struktura poverkhnosti semian sibirskikh *Gypsophila (Caryophyllaceae)* v sviazi s sistematikoĭ]

Kovtoniuk, N.K., *Botanicheskii zhurnal,* Apr. 1994, 79(4), p.48-51, In Russian with English summary. 15 refs.

DLC QK1.V713

Plants (botany), Plant physiology

49-5321

Rhythm of initiation and growth of annual shoots of *Pyrolaceae* in the taiga zone. [Ritm zalozheniia i rost godichnykh pobegov grushankovykh (*Pyrolaceae*) v taezhnoĭ zone]

Katomina, A.P., *Botanicheskiĭ zhurnal,* Apr. 1994, 79(4), p.71-80, In Russian with English summary. 9 refs.

DLC QK1.V713

Plants (botany), Plant physiology, Taiga, Russia—Murmansk, Russia—St. Petersburg

49-5322

Open pine woodlands in northern Western Siberia. [Sosnovye redkoles'ia severa Zapadnoĭ Sibiri]

Vasil'ev, S.V., *Botanicheskiĭ zhurnal,* Apr. 1994, 79(4), p.87-99, In Russian with English summary. 6 refs.

DLC QK1.V713

Forest land, Taiga, Lichens, Valleys, Trees (plants), Russia—Siberia

49-5323

Vegetation cover of the axial part of the Yam-Alin Mountain range (Far East, Amur-Uda interfluve). Types of phytocoenoses. [Rastitel'nyĭ pokrov osevoĭ chasti khrebta IAm-Alin' (Dal'niĭ Vostok, Amuro-Udskoe mezhdurech'e). Tipy fitotsenozov]

Osipov, S.V., *Botanicheskiĭ zhurnal,* Apr. 1994, 79(4), p.99-110, In Russian with English summary. 38 refs. For part 2 see 49-5336.

DLC QK1.V713

Plants (botany), Vegetation, Vegetation patterns, Tundra, Forest land, Site surveys, Russia—Yam-Alin Mountains, Russia—Far East, Russia—Amur River, Russia—Uda River

49-5324

Critical notes on the species of the genus *Eriophorum* (Cyperaceae) related to *Eriophorum scheuchzeri*. [Kriticheskie zametki o vidakh roda *Eriophorum* (Cyperaceae) rodstva *Eriophorum scheuchzeri*]

Novoselova, M.S., *Botanicheskiĭ zhurnal,* Apr. 1994, 79(4), p.111-119, In Russian and Latin. 7 refs.

DLC QK1.V713

Plants (botany), Vegetation patterns, Tundra, Swamps

49-5325

***Picea* and *Larix* (Pinaceae) in Pliocene and Pleistocene floras of the Berelekh River region (Kolyma River basin). [*Picea* i *Larix* (Pinaceae) v pliotsenovykh i pleĭstotsenovykh florakh raĭona reki Berelekh (basseĭn reki Kolymy)]**

Arbuzova, O.N., *Botanicheskiĭ zhurnal,* May 1994, 79(5), p.1-10, In Russian with English summary. 20 refs.

DLC QK1.V713

Paleobotany, Pleistocene, Fossils, Alluvium, Russia—Kolyma River, Russia—Berelekh River

49-5326
Flora of the Machvavaam River basin (Anyui highland, western Chukotka). [Flora basseĭna reki Machvavaam (Aniuĭskoe nagor'e, Zapadnaia Chukotka)]
Koroleva-Zaslavskaia, T.M., *Botanicheskiĭ zhurnal,* May 1994, 79(5), p.33-47, In Russian with English summary. 13 refs.
DLC QK1.V713
Plants (botany), River basins, Site surveys, Alpine tundra, Forest tundra, Russia—Chukotskiy Peninsula, Russia—Machvavaam River

49-5327
Morphological structure and development of shoots in *Pinus sibirica* (Pinaceae). [O morfologicheskoĭ strukture i razvitii pobegov *Pinus sibirica* (Pinaceae)]
Goroshkevich, S.N., *Botanicheskiĭ zhurnal,* May 1994, 79(5), p.63-71, In Russian with English summary. 37 refs.
DLC QK1.V713
Plants (botany), Plant physiology, Trees (plants)

49-5328
Expansion of the ranges of water vascular plants as related to anthropogenic factors in the taiga zone of the Arkhangel'sk region (Russia). [Rasshirenie arealov vodnykh sosudistykh rasteniĭ v sviazi s antropegennym vosdeĭstviem v taezhnoĭ zone Arkhangel'skoĭ oblasti (Rossiia)]
Vekhov, N.V., *Botanicheskiĭ zhurnal,* May 1994, 79(5), p.72-81, In Russian with English summary. 9 refs.
DLC QK1.V713
Plants (botany), Environmental impact, Water pollution, Site surveys, Russia—Arkhangel'sk, Russia—Kena River, Russia—Onega River

49-5329
Structure and dynamics of the vegetation cover of the Shamar meadow station (Mongolia). [Struktura i dinamika rastitel'nogo pokrova lugovogo statisonara Shamar (Mongoliia)]
Kalibernova, N.M., *Botanicheskiĭ zhurnal,* May 1994, 79(5), p.81-91, In Russian with English summary. 8 refs.
DLC QK1.V713
Plants (botany), Plant physiology, Vegetation patterns, Site surveys, Meadow soils, Frozen ground, Mongolia—Orhon River

49-5330
Species of dinoflagellates new to the Avachinskaya Inlet (Kamchatka). [Vidy dinofitovykh vodorosleĭ, novye dlia Avachinskoĭ guby (Kamchatka)]
Konovalova, G.V., *Botanicheskiĭ zhurnal,* May 1994, 79(5), p.129-133, In Russian with English summary. 15 refs.
DLC QK1.V713
Plankton, Microbiology, Marine biology, Algae, Site surveys, Russia—Kamchatka Peninsula, Russia—Avachinskaya Inlet

49-5331
Development of the ideas and scientific initiatives of A.I. Tolmachev in modern botany. [Razvitie ideĭ i nauchnykh nachinaniĭ A.I. Tolmacheva v sovremennoĭ botanike]
IUrtsev, B.A., *Botanicheskiĭ zhurnal,* June 1994, 79(6), p.1-18, In Russian with English summary. Refs. p.14-18.
DLC QK1.V713
Plants (botany), History, Taiga, Arctic landscapes

49-5332
Vegetation type and vegetation cover type in tundras and polar deserts. [O tipe rastitel'nosti i tipe rastitel'nogo pokrova v tundrakh i poliarnykh pustyniakh]
Norin, B.N., *Botanicheskiĭ zhurnal,* June 1994, 79(6), p.35-45, In Russian with English summary. Refs. p.42-45.
DLC QK1.V713
Vegetation, Vegetation patterns, Forest tundra, Deserts, Russia—Far North

49-5333
Flora of the Vatamkayvaam River basin (Chukotskiy Peninsula). [O flore basseĭna reki Vatamkaĭvaam (Chukotskiĭ poluostrov)]
Petrovskiĭ, V.V., Plieva, T.V., *Botanicheskiĭ zhurnal,* June 1994, 79(6), p.46-59, In Russian with English summary. 8 refs.
DLC QK1.V713
Plants (botany), Site surveys, River basins, Russia—Chukotskiy Peninsula, Russia—Vatamkayvaam River

49-5334
Population-morphological variation and intraspecific structure of *Caragana pygmaea* (Fabaceae) in Siberia. [Populiatsionno-morfologicheskaia izmenchivost' i vnutrividovaia struktura *Caragana pygmaea* (Fabaceae) v Sibiri]
Bondareva, N.A., *Botanicheskiĭ zhurnal,* June 1994, 79(6), p.74-87, In Russian with English summary. 14 refs.
DLC QK1.V713
Plants (botany), Plant physiology, Site surveys, Arctic landscapes, Russia—Siberia

49-5335
Mosses of willow shrub and tundra communities in the upper reaches of the Neizvestnaya River (Wrangel Island). [Mkhi ivovykh kustarnikovykh i tundrovykh soobshchestv verkhnego techeniia reki Neizvestnoĭ (ostrov Vrangelia)]
Afonina, O.M., Sekretareva, N.A., *Botanicheskiĭ zhurnal,* July 1994, 79(7), p.43-52, In Russian with English summary. 6 refs.
DLC QK1.V713
Plants (botany), Mosses, Tundra, Peat, Russia—Wrangel Island, Russia—Neizvestnaya River

49-5336
Vegetation cover of the axial part of the Yam-Alin mountain range (Far East, the Amur-Uda interfluve). Spatial unit types. [Rastitel'nyĭ pokrov osevoĭ chasti khrebta IAm-Alin' (Dal'niĭ Vostok, Amuro-Udskoe mezhdurech'e). Tipy territorial'nykh edinits]
Osipov, S.V., *Botanicheskiĭ zhurnal,* July 1994, 79(7), p.66-74, In Russian with English summary. 15 refs. For part 1 see 49-5323.
DLC QK1.V713
Plants (botany), Vegetation, Vegetation patterns, Tundra, Forest land, Site surveys, Russia—Amur River, Russia—Uda River, Russia—Yam-Alin Mountains, Russia—Far East

49-5337
Characteristics of the mineral composition of plants and soils on the ultrabasic rocks in the Ust'-Bel'skiy mountain massif (middle reaches of the Anadyr' River). I. Soils. [Osobennosti mineral'nogo sostava rasteniĭ i pochv na ul'traosnovnykh porodakh Ust'-Bel'skogo gornogo massiva (srednee techenie reki Anadyr'). I. Pochvy]
Alekseeva-Popova, N.V., Drozdova, I.V., *Botanicheskiĭ zhurnal,* July 1994, 79(7), p.75-85, In Russian with English summary. 31 refs.
DLC QK1.V713
Soil composition, Minerals, Rocks, Microelement content, Vegetation patterns, Plants (botany), Russia—Anadyr' River

49-5338
Lichen species from the coast of the Kara Sea new to the Polar Urals. [Novye dlia poliarnogo Urala vidy lishaĭnikov s poberezh'ia Karskogo Moria]
Kotlov, IU.V., *Botanicheskiĭ zhurnal,* July 1994, 79(7), p.122-124, In Russian. 8 refs.
DLC QK1.V713
Plants (botany), Lichens, Vegetation patterns, Mosses, Russia—Kara Sea, Russia—Ural Mountains

49-5339
Chromosome numbers in flowering plants of the Tomsk region. Monocotyledones. [Chisla khromosom tsvetkovykh rasteniĭ Tomskoĭ oblasti. Odnodol'nye]
Malakhova, L.A., Markova, G.A., *Botanicheskiĭ zhurnal,* July 1994, 79(7), p.134-135, In Russian.
DLC QK1.V713
Plants (botany), Plant physiology, Russia—Tomsk

49-5340
Effect of phytoplankton composition on the turnover of phosphorus in the Lake Ladoga ecosystem. [Vliianie vidovogo sostava fitoplanktona na krugovorot fosfora v ekosisteme Ladozhskogo ozera]
Petrova, N.A., Raspletina, G.F., *Botanicheskiĭ zhurnal,* Aug. 1994, 79(8), p.9-16, In Russian with English summary. 22 refs.
DLC QK1.V713
Plankton, Biomass, Algae, Lakes, Ecosystems, Russia—Ladoga Lake

49-5341
Geographical variation of chromosome numbers in thin-rhizomatous species of *Aegopodium* (Umbelliferae). [Geograficheskaia izmenchivost' khromosomnykh chisel u tonkornevishchnykh vidov *Aegopodium* (Umbelliferae)]
Vasil'eva, M.G., Alekseeva, T.V., Pimenov, M.G., *Botanicheskiĭ zhurnal,* Aug. 1994, 79(8), p.27-31, In Russian with English summary. 13 refs.
DLC QK1.V713
Plants (botany), Plant physiology, Vegetation patterns, Kazakhstan, Kyrgyzstan, Russia

49-5342
Lichen flora of the lower reaches of the Chugor'yakha River (southwestern Gydan Peninsula, West Siberian Arctic). [Flora lishaĭnikov nizov'ev reki Chugor'iakha (iugo-zapadnaia chast' Gydanskogo poluostrova, Zapadnosibirskaia Arktika)]
Andreev, M.P., *Botanicheskiĭ zhurnal,* Aug. 1994, 79(8), p.39-50, In Russian with English summary. 8 refs.
DLC QK1.V713
Plants (botany), Lichens, Vegetation patterns, Tundra, Fungi, Russia—Gydan Peninsula, Russia—Chugor'yakha River, Russia—Siberia

49-5343
Liverworts of the lower reaches of the Chugor'yakha River (southwestern Gydan Peninsula, West Siberian Arctic). [Pechenochnye mkhi nizov'ev reki Chugor'iakha (iugo-zapadnaia chast' Gydanskogo poluostrova, Zapadnosibirskaia Arktika)]
Potemkin, A.D., *Botanicheskiĭ zhurnal,* Aug. 1994, 79(8), p.51-57, In Russian with English summary. 7 refs.
DLC QK1.V713
Plants (botany), Vegetation patterns, Tundra, Mosses, Russia—Gydan Peninsula, Russia—Chugor'yakha River, Russia—Siberia

49-5344
Mosses of the lower reaches of the Chugor'yakha River (southwestern Gydan Peninsula, West Siberian Arctic). [Listostebel'nye mkhi nizov'ev reki Chugor'iakha (iugo-zapadnaia chast' Gydanskogo poluostrova, Zapadnosibirskaia Arktika)]
Cherniad'eva, I.V., *Botanicheskiĭ zhurnal,* Aug. 1994, 79(8), p.57-67, In Russian with English summary. 10 refs.
DLC QK1.V713
Mosses, Plants (botany), Tundra, Vegetation patterns, Russia—Chugor'yakha River, Russia—Gydan Peninsula, Russia—Siberia

49-5345
Flora of the vascular plants in the lower reaches of the Chugor'yakha River (southwestern Gydan Peninsula, West Siberian Arctic). [Flora sosudistykh rasteniĭ nizov'ev reki Chugor'iakha (iugo-zapadnaia chast' Gydanskogo poluostrova, Zapadnosibirskaia Arktika)]
Rebristaia, O.V., Khitun, O.V., *Botanicheskiĭ zhurnal,* Aug. 1994, 79(8), p.68-77, In Russian with English summary. 10 refs.
DLC QK1.V713
Plants (botany), Vegetation patterns, Tundra, Mosses, Russia—Gydan Peninsula, Russia—Chugor'yakha River, Russia—Siberia

49-5346

Synanthropic flora of the middle taiga subzone of the European Northeast. [Sinantropnaia flora podzony sredneĭ taĭgi evropeĭskogo severo-vostoka]

Martynenko, V.A., *Botanicheskiĭ zhurnal*, Aug. 1994, 79(8), p.77-81, In Russian with English summary. 6 refs.

DLC QK1.V713

Plants (botany), Vegetation patterns, Taiga, Grasses, Russia—Komi

49-5347

***Saxifraga lactea* (Saxifragaceae) in Yakutia. [*Saxifraga lactea* (Saxifragaceae) v IAkutii]**

Doron'kin, V.M., Zuev, V.V., *Botanicheskiĭ zhurnal*, Aug. 1994, 79(8), p.81-86, In Russian with English summary. 21 refs.

DLC QK1.V713

Plants (botany), Vegetation patterns, Russia—Yakutia

49-5348

Coenobiomorphs of the herbaceous layer in southern taiga cedar forests of West Siberia. [Tsenobiomorfy travianogo iarusa iuzhnotaezhnykh kedrovykh lesov Zapadnoĭ Sibiri]

Kirpotin, S.N., *Botanicheskiĭ zhurnal*, Aug. 1994, 79(8), p.86-92, In Russian with English summary. 7 refs.

DLC QK1.V713

Plants (botany), Taiga, Forest ecosystems, Forest land, Vegetation patterns, Grasses, Plant physiology, Russia—Siberia

49-5349

New species of the genus *Hieracium* (Asteraceae) from Siberia. [Novye vidy roda *Hieracium* (Asteraceae) iz Sibiri]

Tupitsyna, N.N., *Botanicheskiĭ zhurnal*, Aug. 1994, 79(8), p.94-102, In Russian and Latin. 1 ref.

DLC QK1.V713

Plants (botany), Plant physiology, Vegetation patterns, Russia—Siberia

49-5350

New species of the genus *Dendranthema* (Asteraceae) from southern Yakutia. [Novyĭ vid roda *Dendranthema* (Asteraceae) iz IUzhnoĭ IAkutii]

Volotovskiĭ, K.A., *Botanicheskiĭ zhurnal*, Aug. 1994, 79(8), p.102-105, In Russian and Latin. 5 refs.

DLC QK1.V713

Plants (botany), Vegetation patterns, Plant physiology, Tundra, Steppes, Russia—Yakutia

49-5351

Changes in the diversity of species of lichens in the post-fire process of revegetation in non-polluted pine forests on the Kola Peninsula. [Izmenenie vidovogo raznoobraziia napochvennykh lishaĭnikov v protsesse poslepozharnogo vosstanovleniia nezagriaznennykh sosnovykh lesov Kol'skogo poluostrova]

Gorshkov, V.V., *Rossiĭskaia akademiia nauk. Doklady*, Mar. 1995, 341(1), p.118-121, In Russian. 15 refs.

Lichens, Revegetation, Forest fires, Pollution, Russia—Kola Peninsula

49-5352

Duration and intensity of the formation of oil and gas pools. [Prodolzhitel'nost' i intensivnost' formirovaniia zalezheĭ nefti i gaza]

Larin, V.I., *Rossiĭskaia akademiia nauk. Doklady*, Feb. 1995, 340(6), p.797-798, In Russian. 3 refs.

Natural gas, Natural resources, Crude oil, Russia—Siberia

49-5353

Gold ore formations in the Russian Northeast. [Zolotorudnye formatsii Severo-Vostoka Rossii]

Sidorov, A.A., *Rossiĭskaia akademiia nauk. Doklady*, Jan. 1995, 340(1), p.85-88, In Russian. 2 refs.

Gold, Natural resources, Geological maps, Russia

49-5354

Impact of anthropogenic aerosols on the climate. [O vozdeĭstvii antropogennogo aerozolia na klimat]

Kondrat'ev, K.IA., Ivlev, L.S., *Rossiĭskaia akademiia nauk. Doklady*, Jan. 1995, 340(1), p.98-99, In Russian. 12 refs.

Aerosols, Climatic changes, Environmental impact, Air pollution, Albedo, Fractals

49-5355

Limit states design of antenna towers.

Wahba, Y.M.F., Madugula, M.K.S., Monforton, G.R., *Canadian journal of civil engineering*, Dec. 1994, 21(6), p.913-923, With French summary. 17 refs.

Antennas, Towers, Stability, Design criteria, Loads (forces), Static loads, Snow loads, Ice loads, Wind factors, Standards, Structural analysis

49-5356

Two-step shape and timing of the last deglaciation in Antarctica.

Jouzel, J., et al, *Climate dynamics*, Apr. 1995, 11(3), p.151-161, Refs. p.159-161.

Paleoclimatology, Geochronology, Ice sheets, Ice cores, Isotope analysis, Climatic changes, Glacier oscillation, Antarctica—East Antarctica

The authors present a detailed isotopic record analyzed in a new ice core drilled at Dome B in East Antarctica that fully demonstrates the existence of an antarctic cold reversal (ACR). These results suggest that the two-step shape of the last deglaciation has a worldwide character but they also point to noticeable interhemispheric differences. Thus, the coldest part of the ACR, which shows a temperature drop about three times weaker than that recorded during the Younger Dryas (YD) in Greenland, may have preceded the YD. Antarctica did not experience abrupt changes and the two warming periods started there before they started in Greenland. The links between Southern and Northern Hemisphere climates throughout this period are discussed in the light of additional information derived from the antarctic dust record. (Auth. mod.)

49-5357

Hierarchical structure of glacial climatic oscillations: interactions between ice-sheet dynamics and climate.

Paillard, D., *Climate dynamics*, Apr. 1995, 11(3), p.162-177, 33 refs.

Paleoclimatology, Glacier oscillation, Ice sheets, Marine deposits, Ice melting, Icebergs, Ocean currents, Climatic changes, Ice models, Ice age theory, Mathematical models

49-5358

Seasonal circulation under the eastern Ross Ice Shelf, Antarctica.

Hellmer, H.H., Jacobs, S.S., *Journal of geophysical research*, June 15, 1995, 100(C6), p.10,873-10,885, 42 refs.

Sea ice, Ice shelves, Ocean currents, Salinity, Water transport, Ice cover effect, Ice water interface, Hydrography, Simulation, Antarctica—Ross Ice Shelf

An annual cycle of shelf water temperatures and salinities measured at depth near the eastern Ross Ice Shelf front is used to force a two-dimensional thermohaline circulation model adapted to different sub-ice paths in the vicinity of Roosevelt I. These paths were assumed to have constant water column thicknesses of 160, 200, and 240 m and lengths of 460-800 km. Model results were compared with other long-term measurements that showed outflow from beneath the ice shelf. The ice shelf base loses mass at a rate of 18-27 cm/yr, with seasonal forcing increasing the spatial and temporal variability of circulation and property distributions in the larger cavities. Shallow cavities reduce the influence of shelf water variability with increasing length. Introducing a transient shelf water temperature rise of 0.01°C/yr for 100 years increases the melt rate by 4-5 times. (Auth. mod.)

49-5359

Observational and numerical study of wind stress variations within marginal ice zones.

Guest, P.S., Glendening, J.W., Davidson, K.L., *Journal of geophysical research*, June 15, 1995, 100(C6), p.10,887-10,904, 49 refs.

Sea ice, Oceanography, Ice edge, Air ice water interaction, Wind direction, Stresses, Turbulent boundary layer, Ice air interface, Mathematical models, Barents Sea

49-5360

Evidence for platelet ice accretion in arctic sea ice development.

Jeffries, M.O., Schwartz, K., Morris, K., Veazey, A.D., Krouse, H.R., Cushing, S., *Journal of geophysical research*, June 15, 1995, 100(C6), p.10,905-10,914, 23 refs.

Oceanography, Sea ice, Mass balance, Ice growth, Ice water interface, Ice crystal structure, Ice composition, Salinity, Structural analysis, Isotope analysis, Thin sections, Beaufort Sea

49-5361

Statistical analysis of arctic pressure ridge morphology.

Davis, N.R., Wadhams, P., *Journal of geophysical research*, June 15, 1995, 100(C6), p.10,915-10,925, 41 refs.

Sea ice, Oceanography, Ice cover thickness, Surface structure, Orientation, Pressure ridges, Distribution, Ice acoustics, Acoustic measurement, Statistical analysis

49-5362

Freeze decontamination process: modeling in a simplified case of completely mixed aqueous phase and observations with ultrasonic agitation in the liquid during freezing.

Ul-Haq, E., White, D.A., *Separation science and technology*, 1995, 30(5), p.719-730, 8 refs.

Solutions, Ice physics, Phase transformations, Frozen liquids, Ultrasonic tests, Vibration, Solidification, Solid phases, Impurities, Water treatment, Ice water interface, Mathematical models

49-5363

Decadal oscillation due to the coupling between an ocean circulation model and a thermodynamic sea-ice model.

Zhang, S., Lin, C.A., Greatbatch, R.J., *Journal of marine research*, Jan. 1995, 53(1), p.79-106, 43 refs.

Oceanography, Climatology, Sea ice, Ice water interface, Ocean currents, Thermodynamics, Ice models, Ice cover effect, Air ice water interaction, Mathematical models

49-5364

Refractory organic compounds in polar waters: relationship between humic substances and amino acids in the Arctic and Antarctic.

Hubberten, U., Lara, R.J., Kattner, G., *Journal of marine research*, Jan. 1995, 53(1), p.137-149, 26 refs.

Sea water, Oceanography, Water chemistry, Ecology, Solubility, Marine biology, Nutrient cycle, Sampling, Geochemistry, Suspended sediments

A synopsis of data on the amino acid compositions of arctic and antarctic seawater, CAD-fractions of dissolved organic matter (DOM) and suspended particulate organic material (POM) is presented. Total dissolved amino acids (TDAA) correlated highly significantly with dissolved organic nitrogen (DON), representing about 11% of DON in unfractionated filtered seawater. Average DON values were similar with ca. 3-4 μM N in the Arctic and Antarctic. Differences in amino acid distribution and composition patterns in particulate and dissolved material suggest the selective preservation or utilization of certain amino acids. In both regions, at the surface ca. 60%, and at depths >500 m almost 100% of TDAA is found in the "humic" fractions. A background value of TDAA of around 200 nM, mostly contained in the hydrophobic neutral (HbN) fraction, is present throughout the water column, probably forming part of recalcitrant molecules. The relation of these findings to different humification mechanisms is discussed. (Auth. mod.)

49-5365

Energy expenditure and clearing snow: a comparison of shovel and snow pusher.

Smolander, J., Louhevaara, V., Ahonen, E., Polari, J., Klen, T., *Ergonomics*, Apr. 1995, 38(4), p.749-753, 5 refs.

Snow removal, Physiological effects, Tests, Human factors

49-5366

Momentum and scalar transfer coefficients over aerodynamically smooth antarctic surfaces.

Bintanja, R., Van den Broeke, M.R., *Boundary-layer meteorology,* Apr. 1995, 74(1-2), p.89-111, 29 refs.

Polar atmospheres, Turbulent boundary layer, Air flow, Wind velocity, Atmospheric physics, Moisture transfer, Heat transfer, Snow cover effect, Ice cover effect, Surface roughness, Ice air interface, Analysis (mathematics), Antarctica—Queen Maud Land

Vertical profiles of wind speed, temperature and humidity were used to estimate the roughness lengths for momentum (z_0), heat (z_H) and moisture (z_Q) over smooth ice and snow surfaces. The profile measurements were performed in the vicinity of a blue ice field in Queen Maud Land. The values of z_0 over ice ($3 \cdot 10^{-6}$ m) seem to be the smallest ever obtained over permanent natural surfaces. The settling of snow on the ice and the loss of momentum at saltating snow particles serve as momentum-dissipating processes during snow-drift events. The scalar roughness lengths and surface temperature can be evaluated from the temperature and humidity profile measurements if the ratio z_H/z_Q is specified. This new method circumvents the difficult measurement of surface temperature. The scalar roughness lengths seem to be approximately equal to z_0 for a large range of low roughness Reynolds numbers, despite the frequent occurrence of drifting snow. Possible reasons for this agreement with theory of non-saltating flow are discussed. (Auth.)

49-5367

Evaluation of turbulent fluxes over Maitri, Antarctica.

Naithani, J., Dutta, H.N., Pasricha, P.K., Reddy, B.M., Aggarwal, K.M., *Boundary-layer meteorology,* Apr. 1995, 74(1-2), p.195-208, 20 refs.

Polar atmospheres, Turbulent boundary layer, Air flow, Wind direction, Heat transfer, Insolation, Turbulent diffusion, Stratification, Antarctica—Maitri Station

Turbulent fluxes have been evaluated for clear sunny days over Maitri Station using the basic meteorological data recorded at four levels of a 28 m tower. The data are supplemented with radiation data. The surface layer over Maitri remains thermally stratified during the hours of minimum solar insolation, the so-called nighttime period. The surface winds during this period are generally very strong, resulting in high momentum fluxes. In particular, for high winds (>12 m/s), the temperature gradient is found to be less positive than for moderate winds (4 to 7 m/s). Solar insolation provides the daytime heating necessary for the diurnal variation of atmospheric stability and hence for the turbulent fluxes. Thus on clear days, daytime conditions are marked by upward transport of heat with reduced momentum flux, while stable nighttime conditions are marked by a downward heat flux with increased momentum fluxes. (Auth.)

49-5368

Saturation of laser beam scintillations in snowfalls.

Borovoĭ, A.G., Zhukov, A.F., Vostretsov, N.A., *Optical Society of America. Journal A,* May 1995, 12(5), p.964-969, 19 refs.

Falling snow, Precipitation (meteorology), Snowflakes, Snow optics, Lasers, Light transmission, Wave propagation, Scintillation, Turbulent boundary layer

49-5369

Novel device for the recovery of frozen crystals.

Mancia, F., Oubridge, C., Hellon, C., Woollard, T., Groves, G., Nagai, K., *Journal of applied crystallography,* Apr. 1, 1995, 28(pt.2), p.224-225, 7 refs.

Cryogenics, Microbiology, Crystals, Laboratory techniques, X ray diffraction, Instruments

49-5370

Gas turbine icing: how to keep it under control.

Reneau, C., *Control engineering,* Mar. 1995, 42(3), p.85-86.

Gas production, Icing, Air temperature, Temperature control, Heating, Dehumidification, Ice prevention, Compressors

49-5371

Freezing in an ultrasonic bath as a method for the decontamination of aqueous effluents.

Ul-Haq, E., White, D.A., Adeleye, S.A., *Chemical engineering journal,* Mar. 1995, 57(1), p.53-60, 17 refs.

Water treatment, Ultrasonic tests, Solutions, Ice water interface, Ice solid interface, Freezing, Desalting, Mass transfer

49-5372

Impact of airport de-icing on a river: the case of the Ouseburn, Newcastle upon Tyne.

Turnbull, D.A., Bevan, J.R., *Environmental pollution,* 1995, 88(3), p.321-332, 28 refs.

Airports, Ice removal, Salting, Urea, Runoff, Streams, Water pollution, Environmental impact, Limnology, Microbiology, Ecology, Sampling, Chemical analysis, United Kingdom

49-5373

Life in the deep freeze.

Stevens, J.E., *Technology review,* May-June 1995, 98(4), p.18-20.

Marine biology, Sea ice, Ecology, Ice growth, Ice structure, Microbiology

This paper conveys efforts of marine biologists to understand the ecology of microorganisms which inhabit sea ice in the antarctic seas, especially as correlated to ice structural phenomena compatible with biomass aggregation.

49-5374

Double-moment multiple-phase four-class bulk ice scheme. Part II: Simulations of convective storms in different large-scale environments and comparisons with other bulk parameterizations.

Ferrier, B.S., Tao, W.K., Simpson, J., *Journal of the atmospheric sciences,* Apr. 15, 1995, 52(8), p.1001-1033, 91 refs.

Cloud physics, Storms, Precipitation (meteorology), Radar echoes, Profiles, Ice crystal growth, Snow pellets, Classifications, Reflectivity, Mathematical models, Simulation

49-5375

Some aircraft observations of the scattering properties of ice crystals.

Francis, P.N., *Journal of the atmospheric sciences,* Apr. 15, 1995, 52(8), p.1142-1154, 31 refs.

Cloud physics, Climatology, Aerial surveys, Remote sensing, Light scattering, Ice crystal optics, Radiometry, Radiance, Ice crystal size

49-5376

Comments on "Laboratory simulation of atmospheric motions in the vicinity of Antarctica".

King, J.C., Turner, J., Chen, R., Boyer, D.L., Tao, L., *Journal of the atmospheric sciences,* Apr. 15, 1995, 52(8), p.1260-1261, Includes reply. 8 refs. For paper under discussion see 48-2146 or 22I-49651.

Atmospheric circulation, Spaceborne photography, Simulation, Correlation, Wind direction, Accuracy

This note includes comment and reply on the accuracy of the original authors' interpretation of antarctic atmospheric circulation derived from correlation of simulated results with photointerpretation of spaceborne cloud imagery.

49-5377

Occurrence of permafrost and frozen sub-seabottom materials in the southern Beaufort Sea.

Hunter, J.A.M., Judge, A.S., MacAulay, H.A., Good, R.L., Gagne, R.M., Burns, R.A., *Geological Survey of Canada. Beaufort Sea Project. Technical report,* Apr. 1976, No.22, 174p., Refs. p.81-88.

Subsea permafrost, Permafrost surveys, Oceanography, Ocean bottom, Bottom sediment, Permafrost distribution, Permafrost structure, Permafrost thermal properties, Seismic surveys, Seismic refraction, Profiles, Beaufort Sea

49-5378

Molecular dynamics of icing on cables and structures.

Sonwalkar, N., Shyam Sunder, S., Yip, S., *Massachusetts Institute of Technology. Department of Civil and Environmental Engineering. Final report,* Nov. 1992, 241p., 144 refs.

Cables (ropes), Structures, Icing, Ice accretion, Countermeasures, Protective coatings, Ice removal, Ice solid interface, Adsorption, Molecular energy levels, Ice spectroscopy, Ice physics

49-5379

Method for determining ice undercut temperature of deicing chemical.

Mauritis, M., McGraw, J., Jang, J.W., *Journal of materials in civil engineering,* Feb. 1995, 7(1), p.84-86, 4 refs.

Road icing, Ice removal, Solutions, Ice melting, Freezing points, Temperature effects, Temperature measurement

49-5380

Ice crushing type snow making system "Snow Kaiser". *NKK technical review,* Dec. 1994, No.71, p.55-56.

Ice makers, Snow manufacturing, Artificial snow, Snow mechanics, Ice breaking, Design

49-5381

Modern icebreaking ships.

Brigham, L.W., Shipping revolution—the modern merchant ship. Edited by R. Gardiner, London, Conway Maritime Press Ltd., 1992, p.154-158, 165-166.

Ships, Marine transportation, Icebreakers, Design, Performance

49-5382

Variation of radio brightness of freshwater ice cover during winter.

Bordonskiĭ, G.S., Krylov, S.D., *Izvestiya. Atmospheric and oceanic physics,* June 1994, 29(6), p.807-811, Translated from Izvestiia. Fizika atmosfery i okeana. 12 refs.

Lake ice, Ice cover thickness, Reservoirs, Radiometry, Brightness, Microwaves, Dielectric properties, Snow cover effect

49-5383

Efficiency of formation of CH_3O in the reaction of CH_3O_2 with ClO.

Biggs, P., Canosa-Mas, C.E., Fracheboud, J.M., Shallcross, D.E., Wayne, R.P., *Geophysical research letters,* May 15, 1995, 22(10), p.1221-1224, 17 refs.

Polar atmospheres, Atmospheric attenuation, Ozone, Heterogeneous nucleation, Polar stratospheric clouds, Simulation, Chemical analysis

In an experiment to simulate heterogeneous chemical reactions in the antarctic stratosphere, a discharge-flow apparatus was used to determine the branching ratio α for the channel of the reaction of ClO with CH_3O_2 that leads to the formation of CH_3O. The experiments were performed at 2 Torr pressure and at room temperature. ClO was the excess reactant and was measured by mass spectrometer; CH_3O was detected by laser-induced fluorescence. The value of α was shown to depend on the fraction β of the reaction of CH_3O with Cl atoms that leads to the formation of CH_3O. Comparison with other published results suggests the possibility of three significant product channels for the reaction of CH_3O_2 with ClO. (Auth. mod.)

49-5384

Deliquescence and freezing of stratospheric aerosol observed by balloonborne backscattersondes.

Larsen, N., Rosen, J.M., Kjome, N.T., Knudsen, B., *Geophysical research letters,* May 15, 1995, 22(10), p.1233-1236, 13 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Freezing points, Aerial surveys, Backscattering, Volcanic ash, Spectra

49-5385

Isentropic mixing in the arctic stratosphere during the 1992-1993 and 1993-1994 winters.

Dahlberg, S.P., Bowman, K.P., *Geophysical research letters,* May 15, 1995, 22(10), p.1237-1240, 14 refs.

Polar atmospheres, Climatology, Wind (meteorology), Stratosphere, Air masses, Atmospheric circulation, Seasonal variations, Turbulent diffusion

49-5386

Production of dicarboxylic acids in the arctic atmosphere at polar sunrise.

Kawamura, K., Kasukabe, H., Yasui, O., Barrie, L.A., *Geophysical research letters,* May 15, 1995, 22(10), p.1253-1256, 22 refs.

Polar atmospheres, Atmospheric composition, Aerosols, Haze, Sampling, Air pollution, Photochemical reactions

49-5387

H_2O_2 in snow, air and open pore space in firn at Summit, Greenland.

Bales, R.C., Losleben, M.V., McConnell, J.R., Fuhrer, K., Neftel, A., *Geophysical research letters,* May 15, 1995, 22(10), p.1261-1264, 5 refs.

Ice sheets, Climatology, Firn, Chemical composition, Ice cores, Sampling, Snow air interface, Vapor transfer, Greenland—Summit

49-5388

Long-term radar observations of the melting layer of precipitation and their interpretation.

Fabry, F., Zawadzki, I., *Journal of the atmospheric sciences,* Apr. 1, 1995, 52(7), p.838-851, 43 refs.

Precipitation (meteorology), Remote sensing, Classifications, Reflectivity, Radar echoes, Brightness, Profiles, Snowflakes, Snow melting, Statistical analysis

49-5389

Temperature of evaporating sea spray droplets.

Andreas, E.L., MP 3622, *Journal of the atmospheric sciences,* Apr. 1, 1995, 52(7), p.852-862, 22 refs.

Marine meteorology, Atmospheric physics, Turbulent boundary layer, Turbulent diffusion, Sea spray, Drops (liquids), Evaporation, Temperature measurement, Forecasting, Mathematical models, Heat transfer

This paper uses a full microphysical model to accurately predict the evaporating temperature, T_{ev} of pure and saline droplets to investigate how close wet-bulb thermometer temperature (T_{wet}) is to this temperature. In general, T_{wet} is within 0.2-0.3°C of T_{ev} for droplets with salinities from 0 to 40 psu when the droplet radius is 10 μm or greater. When the droplet radius is less than 10 μm, however, T_{wet} can underestimate T_{ev} badly, especially for higher air temperatures. To provide accurate estimates of T_{ev} quickly, the paper describes an algorithm that predicts T_{ev} to within 0.3°C of the temperature predicted by the full model for droplets with radii from 0.5 to 500 μm when air temperatures are from -10 to 30°C, relative humidities are from 80 to 97.5% and droplet salinities are from 0 to 40 psu.

49-5390

Microbial food web associated with the ice algal assemblage: biomass and bacterivory of nanoflagellate protozoans in Resolute Passage (High Canadian Arctic).

Laurion, I., Demers, S., Vézina, A.F., *Marine ecology progress series,* Apr. 20, 1995, 120(1-3), p.77-87, Refs. p.85-87.

Marine biology, Ecosystems, Algae, Microbiology, Nutrient cycle, Biomass, Sea ice, Ice composition, Sampling, Snow cover effect, Canada—Northwest Territories—Resolute Passage

49-5391

Effect of deposition rate and sample thickness on the luminescence emitted by electron irradiated polycrystalline H_2O ice.

Litjens, R.A.J., Quickenden, T.I., Freeman, C.G., Sangster, D.F., *Radiation physics and chemistry,* May 1995, 45(5), p.817-823, 16 refs.

Ice physics, Luminescence, Radiation absorption, Spectra, Ice cover thickness, Ice accretion, Ice solid interface

49-5392

Theoretical and numerical investigations of the polarization properties of a lidar signal scattered by a set of oriented ice plates.

Popov, A.A., Shefer, O.V., *Applied optics,* Mar. 20, 1995, 34(9), p.1488-1492, 13 refs.

Ice crystal optics, Refractivity, Lidar, Sounding, Backscattering, Orientation, Polarization (waves), Mathematical models

49-5393

Observation: botanical and other characteristics in arctic salt-affected coastal areas.

Bruce, L.B., Panciera, M.T., Gavlak, R.G., Tilman, B.A., Cadle, J.M., *Journal of range management,* May 1995, 48(3), p.206-210, 9 refs.

Tundra, Shores, Arctic landscapes, Ecosystems, Plants (botany), Plant ecology, Vegetation patterns, Vegetation factors, United States—Alaska—North Slope

49-5394

Effect of freeze-drying and storage on phenol degradation.

Gaiek, R.L., Lange, C.R., Weber, A.S., *Water environment research,* July-Aug. 1994, 66(5), p.698-706, 35 refs.

Waste treatment, Water treatment, Hydrocarbons, Microbiology, Degradation, Freeze drying, Biomass, Viability

49-5395

Arctic ice shows speed of climate 'flips'.

Holmes, B., *New scientist,* Mar. 4, 1995, 145(1967), p.13.

Climatology, Climatic changes, Ice sheets, Ice cores, Ice composition

49-5396

Port of Nome Alaska.

Tippetts-Abbett-McCarthy-Stratton Inc., Design memorandum, Anchorage, Tippetts-Abbett-McCarthy-Stratton Inc., Aug. 1982, 29 refs.

Ports, Construction, Design, Design criteria, Engineering, Ice conditions, Ice loads, Ice override, Countermeasures, Protection, Cost analysis, United States—Alaska—Nome

49-5397

Microbial communities in the permanent ice cap of Lake Bonney, Antarctica: relationships among chlorophyll-*a*, gravel, and nutrients.

Wing, K.T., Priscu, J.C., *Antarctic journal of the United States,* 1993, 28(5), p.247-249, 3 refs.

Limnology, Microbiology, Lake ice, Algae, Biomass, Antarctica—Bonney, Lake

During previous studies on planktonic microorganisms in Lake Bonney, the authors observed a discolored layer of ice occurring at approximately mid-depth within the ice cap. This study presents results from an investigation of the components in that discolored ice layer, including chlorophyll-*a*, gravel weight, nutrient concentration, primary productivity, and bacterial activity. Microscopic examination of preserved samples from the ice cores revealed a preponderance of filamentous cyanobacteria morphologically similar to the genera *Oscillatoria* and *Phormidium*. Studies within the liquid water column of Lake Bonney have shown *Oscillatoria* to be a minor component of the photosynthetic planktonic community. The lake ice microalgae may be derived from the plankton within the lake or may originate from surrounding terrestrial communities which are dominated by filamentous cyanobacteria of the genus *Phormidium*.

49-5398

Blue ice and green ice.

Warren, S.G., Brandt, R.E., Boime, R.D., *Antarctic journal of the United States,* 1993, 28(5), p.255-256, 8 refs.

Colored ice, Albedo, Ablation, Icebergs, Snow, Antarctica—Howe, Mount

The authors' particular reason for measuring the spectrum of blue ice was for comparison with their previous measurements of a green iceberg. Green ice apparently forms by the freezing of seawater to the base of ice shelves. It differs from sea ice at the ocean surface in that it contains almost no salt and no bubbles. A figure shows the measured albedo as a function of wavelength for the blue ice, as well as that of snow and of a green iceberg. The albedo of the blue ice is surprisingly high due to the large number of bubbles. The reflectance spectrum of the green iceberg differs from that of the blue glacier ice in two respects: its peak wavelength is slightly longer (500-520 nm vs. 470-500 nm), and the reflectance is lower at all wavelengths.

49-5399

Spectral bidirectional reflectance and energy absorption rates of antarctic snow.

Carlson, R.W., Arakelian, T., *Antarctic journal of the United States,* 1993, 28(5), p.256-258, 5 refs.

Snow, Albedo, Radiation absorption, Solar radiation, Grain size, Antarctica—Amundsen-Scott Station, Antarctica—Vostok Station

During the past four austral summers, the authors have investigated the visible and NIR spectral and angular scattering properties of snow at Amundsen-Scott Station, Byrd Surface Camp and Vostok Station. In this paper they highlight some of the results and discuss the spectral dependence of the solar energy absorption rate and the angular scattering profiles at visible and NIR wavelengths. The general spectral properties of antarctic snow are illustrated in a figure, which shows a typical reflectance spectrum at the South Pole with the sun at approximately 23° elevation angle and nadir viewing. Also shown are theoretical bidirectional reflectance curves for various snow grain radii.

49-5400

Infrared atmospheric absorption and emission studies.

Van Allen, R., Murcray, F., *Antarctic journal of the United States,* 1993, 28(5), p.259-260, 3 refs.

Atmospheric attenuation, Atmospheric composition, Ozone, Infrared radiation, Antarctica—McMurdo Station, Antarctica—Amundsen-Scott Station

The authors are measuring the infrared absorption spectrum of the atmosphere using the sun as a source from McMurdo Station. They are also measuring the infrared emission spectrum of the atmosphere from Amundsen-Scott Station. The main purpose of this experiment is to collect atmospheric emission data during the austral winter to measure column abundances of water vapor, ozone, fluorocarbon-11, fluorocarbon-12 and nitric acid as well as absolute total radiance in the region of 7-20 microns (500-1,500 wavenumbers). The spectra for 1992 have been calibrated and show a clear improvement in signal-to-noise ratio compared with the first year of the experiment. Even in July, the signal was clear enough to observe the seasonal disappearance of HNO_3.

49-5401

Balloonborne measurements of ozone and aerosol profiles at McMurdo Station, Antarctica, during the austral spring of 1992.

Johnson, B.J., Deshler, T., *Antarctic journal of the United States,* 1993, 28(5), p.260-262, 4 refs.

Ozone, Aerosols, Atmospheric composition, Antarctica—McMurdo Station

Balloonborne instruments were launched from McMurdo Station to measure vertical profiles of ozone and aerosol. Thirty-four profiles of ozone, 3 condensation nuclei profiles and 8 profiles of aerosol between 0.15 and 10.0 μm in radius, in 8 size classes, were measured from Aug. 23 through Oct. 31, 1992. Polar stratospheric clouds (PSCs) were observed from the initial sounding in late Aug. until the middle of Sep. The 1992 measurements provide evidence that volcanic aerosol does play a major role in ozone depletion, presumably through the heterogeneous chlorine chemistry that occurs on the additional surface area from the volcanic aerosol or by acting as a nucleation site for additional growth of PSCs. The decay of the volcanic aerosol in the stratosphere will reduce the number of concentrations for the 1993 season but may continue to have an impact on ozone depletion.

49-5402

Field observations of stratospheric trace gases in support of the upper atmospheric research satellite mission during the antarctic spring of 1992.

De Zafra, R.L., Emmons, L.K., Reeves, M., Shindell, D.T., Trimble, C., *Antarctic journal of the United States,* 1993, 28(5), p.262-263, 5 refs.

Atmospheric composition, Air pollution, Ozone, Stratosphere, Antarctica—McMurdo Station

This research is intended to provide correlative data in support of instruments on the National Aeronautic and Space Administration's upper atmospheric research satellite (UARS), as well as to gather independent data pertaining to ozone loss during the antarctic spring season. Due to the early seasonal nature of ozone loss over Antarctica, this research must be carried out during the winter fly-in period at McMurdo Station. Following an initial period of setting up and debugging of equipment, the authors carried out observations almost continuously from Sep. 9 until Oct. 10.

49-5403

Observation of trace gases in the stratosphere over a 1-year cycle at the South Pole.

Trimble, C., De Zafra, R.L., *Antarctic journal of the United States,* 1993, 28(5), p.264-265, 4 refs.

Stratosphere, Atmospheric composition, Ozone, Air pollution, Antarctica—Amundsen-Scott Station

During Sep. 1993 the authors monitored the large increase in low-altitude ClO in the antarctic spring, signifying the chemical attack on ozone by chlorine that leads to formation of the ozone hole, and followed the dynamical breakup of the vortex in Nov. by continued monitoring of N_2O and O_3. They made an unsuccessful search for hydrogen peroxide (H_2O_2), resulting at least in a useful upper limit being placed for the first time on how much may be present in the polar night stratosphere. They also obtained a large volume of unique data on several species (O_3, N_2O, HNO_3, NO_2, ClO, and H_2O_2) and made some unanticipated observations that should prove to be of considerable significance in characterizing dynamical and chemical effects occurring in the heart of the antarctic winter vortex.

49-5404

Carbon monoxide in the antarctic atmosphere: observations of decreasing concentrations.

Khalil, M.A.K., Rasmussen, R.A., *Antarctic journal of the United States,* 1993, 28(5), p.265-267, 7 refs.

Atmospheric composition, Air pollution, Ozone, Antarctica—Amundsen-Scott Station, Antarctica—Palmer Station, Antarctica—Mawson Station

Data from Antarctica that suggest recent decreases in the concentration of CO are reported. Data are available between 1980 and 1992 from three experiments. CO concentrations increased during the first half of the period (1980-86) and decreased in the second half

(1986-92). Overall, the decrease in recent years has more than compensated for the increases in earlier years, so that CO concentrations now (1991-92) are lower by about 10±3 ppbv compared with concentrations a decade ago (1980-81).

49-5405

Atmospheric measurements of HCFC-22 at the South Pole.

Montzka, S.A., Myers, R.C., Butler, J.H., Elkins, J.W., Cummings, S.O., *Antarctic journal of the United States,* 1993, 28(5), p.267-269, 13 refs.

Ozone, Atmospheric composition, Air pollution, Antarctica—Amundsen-Scott Station

The authors report HCFC-22 measurements made at Amundsen-Scott Station through the end of 1992 and discuss them in light of results obtained at the next nearest station, Cape Grim. The growth rate of atmospheric HCFC-22 during 1992 at Amundsen-Scott Station was identical to the rate observed at Cape Grim, at 5.3 ppt per year. This rate is also consistent with a previous estimate for the Southern Hemisphere during 1992. A mean atmospheric mixing ratio of 95 ppt was determined for HCFC-22 during 1992 at the Amundsen-Scott Station. Similar mixing ratios were observed at Cape Grim, suggesting that the mixing ratio of HCFC-22 is fairly constant in the Southern Hemisphere below 40°S. Comparisons between results from the two stations suggest that HCFC-22 is stable in both dry and wet flask samples for extended periods.

49-5406

Atmospheric longwave radiation spectrum and near-surface atmospheric temperature profiles at South Pole Station.

Walden, V.P., Warren, S.G., *Antarctic journal of the United States,* 1993, 28(5), p.269-271, 3 refs.

Radiation, Air temperature, Atmospheric composition, Antarctica—Amundsen-Scott Station

From a data set spanning the year from Jan. 14, 1992 through Jan. 14, 1993, the authors attempt to determine the controls of the longwave radiation budget on the antarctic plateau and to offer spectral measurements for use in testing atmospheric radiation models and radiation codes in climate models. Temperature profiles from a radiosonde on a tethered kite and on a routine balloon launch from Aug. 28, 1992 at Amundsen-Scott Station are shown in a figure. Radiation model simulations using various spectral and vertical resolutions are compared to the downward spectral radiance measurements.

49-5407

Relative elevations of meteorological facilities at South Pole Station.

Warren, S.G., Starbuck, M., Groeneveld, C., *Antarctic journal of the United States,* 1993, 28(5), p.271-273, 1 ref.

Meteorological instruments, Air temperature, Weather stations, Snow accumulation, Antarctica—Amundsen-Scott Station

Detailed information about the temperature profile near the surface is needed to interpret the measured infrared radiation spectra and to evaluate the turbulent heat fluxes. At Amundsen-Scott Station this profile can be obtained from radiosonde launches, together with temperature measurements at the snow surface, at the standard reporting height of 2 m above the surface, and near the top of the 23 m meteorological tower. The height of the radiosonde-launching deck has changed since its installation in the summer of 1974-75 relative to the 2 m thermometers, which are raised every year as the surface snow accumulates and rises against the meteorological towers. A table is presented showing elevations of benchmarks and meteorological facilities at Amundsen-Scott Station in Oct. and Nov. 1992.

49-5408

Katabatic-wind-forced mesoscale cyclone development over the Ross Ice Shelf near Byrd Glacier during summer.

Carrasco, J.F., Bromwich, D.H., *Antarctic journal of the United States,* 1993, 28(5), p.285-288, 13 refs.

Atmospheric disturbances, Wind (meteorology), Wind factors, Ice shelves, Antarctica—Ross Ice Shelf, Antarctica—Franklin Island

A mesoscale cyclone formed near Byrd Glacier in association with katabatic drainage from that glacier. The second synoptic cyclone seemed to contribute to the southward extension of the semipermanent subsynoptic surface trough located around Franklin I., whereas the midtropospheric southerly and southwesterly winds could support the intensification of the katabatic winds. The temporary retrogression of the midtropospheric trough toward the Ross Sea/Ross Ice Shelf area could provide upper-level support for cyclogenesis but not for its subsequent development. This study provides another example of katabatic-wind-forced mesoscale cyclogenesis near Byrd Glacier and its association with a similar area farther north around Franklin I.

49-5409

Snow temperature, wind speed, and wind direction around the Pegasus Runway during 1992.

Stearns, C.R., Weidner, G.A., *Antarctic journal of the United States,* 1993, 28(5), p.291-294, 3 refs.

Ice runways, Ice shelves, Snow temperature, Wind direction, Wind factors, Weather stations, Antarctica—Ross Ice Shelf, Antarctica—Minna Bluff

Automatic weather station (AWS) units are installed at the north and south ends of the Pegasus blue-ice runway on the Ross Ice Shelf near Ross I. and at the Minna Bluff, Williams Field and Linda AWS sites in support of the meteorology of the blue-ice runway. Determining the differences between the wind speed and direction observations at the Minna Bluff site minus the Pegasus North AWS site is the start of an attempt to determine the potential for wind shear in the vertical at Pegasus Runway. The southerly wind passing Minna Bluff is assumed to continue over Pegasus Runway at the elevation of the Minna Bluff AWS site. Based on the above assumption, the wind-speed difference from the surface to 900 m could be as much as 10 m/s. This difference is not a problem when aircraft are taking off to the south but could be a problem for takeoff to the north. The opposite problem occurs when aircraft are landing.

49-5410

Augustana Glacier and Augustana Creek, Alaska, and Lake Fryxell, Antarctica.

Péwé, T.L., *Augustana College Library Publications,* 1992, No.36, Earth interpreters: F.M. Fryxell, geology, and Augustana. Edited by D.A. Schroeder and R.C. Anderson, p.49-59, Refs. p.57-58.

DLC QE38.E27

Limnology, Glaciers, Lake ice, Antarctica—Fryxell, Lake

The general setting and description of Lake Fryxell, a permanently ice covered lake in the lower part of Taylor Dry Valley, its scientific significance and the origin of its name, are presented.

49-5411

On the statistics of ice loads on ship hull in the Baltic.

Kujala, P., *Acta Polytechnica Scandinavica. Mechanical engineering series,* 1994, No.116, 98p., Refs. p.89-95.

Ships, Design criteria, Ice mechanics, Ice loads, Dynamic loads, Ice solid interface, Structural analysis, Impact, Ice breaking, Flexural strength, Statistical analysis

49-5412

Preliminary results of a binational research cruise in the western Arctic Ocean.

Grantz, A., et al, *Polar geography and geology,* July-Sep. 1994, 18(3), p.187-210, 5 refs.

Oceanographic surveys, Research projects, Marine geology, Ocean currents, Water pollution, Radioactive wastes, Sampling, Sea ice, Ice cores, Paleoclimatology, Arctic Ocean

49-5413

Functional and spatial differentiation of the mountain terrain of northwestern Sørkapp Land, Svalbard.

Ziaja, W., *Polar geography and geology,* July-Sep. 1994, 18(3), p.211-230, 36 refs.

Arctic landscapes, Geomorphology, Geologic structures, Landscape types, Terrain identification, Bedrock, Periglacial processes, Norway—Svalbard

49-5414

Changes in the chemical composition of water in the Lake Dyupkun-Kureyka reservoir hydrosystem.

Sorokovikova, L.M., Domysheva, V.N., *Polar geography and geology,* July-Sep. 1994, 18(3), p.245-254, Translated from Geografiia i prirodnye resursy, 1994, No.3. 17 refs.

Subpolar regions, Limnology, Lake water, River flow, Water chemistry, Sampling, Reservoirs, Construction, Environmental impact, Russia—Dyupkun, Lake

49-5415

Sea-ice and weather monitoring: guidelines for a proposed new remote sensing system.

Volkov, A.M., Grishchenko, V.D., Selivanov, A.S., Trifonov, IU.V., Kurevleva, T.G., Pichugin, A.P., *Polar geography and geology,* July-Sep. 1994, 18(3), p.255-266, 10 refs.

Marine meteorology, Sea ice distribution, Ice surveys, Ice conditions, Spaceborne photography, Radiometry, Synthetic aperture radar, Design, Arctic Ocean

49-5416

CMHC research project: Testing of air barriers—construction details II.

Canada Mortgage and Housing Corporation, *Canada Mortgage and Housing Corporation. Project Implementation Division. Report,* Mar. 31, 1993, No.32173.03/1, 24p.+ appends.

Construction materials, Buildings, Walls, Panels, Air leakage, Permeability, Countermeasures, Sealing, Design, Performance, Wind factors

49-5417

CMHC research project testing of air barriers—construction details.

Canada Mortgage and Housing Corporation, *Canada Mortgage and Housing Corporation. Project Implementation Division. Report,* Aug. 26,1991, No.30132.OR/2, 44p. + appns.

Construction materials, Buildings, Walls, Air leakage, Permeability, Sealing, Countermeasures, Design, Performance, Wind factors

49-5418

Exact solution to the one-dimensional inverse-Stefan problem in nonideal biological tissues.

Rabin, Y., Shitzer, A., *Journal of heat transfer,* May 1995, 117(2), p.425-431, 23 refs.

Cryobiology, Phase transformations, Stefan problem, Enthalpy, Freezing front, Cooling rate, Analysis (mathematics)

49-5419

Biological events during ice breakup in the Great Whale River (Hudson Bay).

Hudon, C., *Canadian journal of fisheries and aquatic sciences,* Nov. 1994, 54(11), p.2467-2481, With French summary. 45 refs.

Marine biology, Estuaries, River ice, Ice breakup, Ecology, River flow, Sampling, Sediment transport, Biomass, Ice cover effect, Statistical analysis, Canada—Quebec—Hudson Bay

49-5420

Comparison of seeded and nonseeded orographic cloud simulations with an explicit cloud model.

Meyers, M.P., DeMott, P.J., Cotton, W.R., *Journal of applied meteorology,* Apr. 1995, 34(4), p.834-846, 31 refs.

Cloud seeding, Cloud physics, Ice nuclei, Artificial nucleation, Simulation, Heterogeneous nucleation, Weather modification, Correlation, Mathematical models

49-5421

Spreading of crude petroleum in brash ice: effects of oil's physical properties and water current.

Sayed, M., Kotlyar, L.S., Sparks, B.D., *International journal of offshore and polar engineering,* June 1995, 5(2), p.127-133, 8 refs.

Oil spills, Slush, Liquid solid interfaces, Simulation, Crude oil, Dispersions, Viscosity, Interfacial tension, Physical properties, Ice cover effect, Environmental tests

49-5422

Deglacial land emergence and lateral upper-mantle heterogeneity in the Svalbard Archipelago. I. First results for simple load models.

Breuer, D., Wolf, D., *Geophysical journal international,* June 1995, 121(3), p.775-788, 48 refs.

Glacial geology, Pleistocene, Loads (forces), Isostasy, Tectonics, Viscosity, Geologic structures, Geomorphology, Mathematical models, Barents Sea

49-5423
Updated satellite technique to forecast heavy snow.
Johnston, E.C., *Weather and forecasting,* June 1995, 10(2), p.219-228, 20 refs.
Weather forecasting, Climatology, Fronts (meteorology), Snowfall, Snow accumulation, Cloud cover, Spaceborne photography, Infrared photography, Photointerpretation, Turbulent boundary layer

49-5424
Contrasting meteorological conditions associated with winter storms at Denver and Colorado Springs.
Mahoney, J.L., Brown, J.M., Tollerud, E.I., *Weather and forecasting,* June 1995, 10(2), p.245-260, 25 refs.
Climatology, Snowstorms, Snowfall, Weather forecasting, Synoptic meteorology, Fronts (meteorology), Advection, Atmospheric circulation, Topographic effects, United States—Colorado

49-5425
Diagnosing a Colorado heavy snow event with a nonhydrostatic mesoscale numerical model structured for operational use.
Snook, J.S., Pielke, R.A., *Weather and forecasting,* June 1995, 10(2), p.261-285, 56 refs.
Precipitation (meteorology), Snowstorms, Weather forecasting, Synoptic meteorology, Atmospheric pressure, Accuracy, Mathematical models, Meteorological data, United States—Colorado

49-5426
Backscatter model for the unusual radar properties of the Greenland ice sheet.
Rignot, E.J.M., *Journal of geophysical research,* May 25, 1995, 100(E5), p.9389-9400, 49 refs.
Ice sheets, Extraterrestrial ice, Surface structure, Remote sensing, Ice optics, Backscattering, Radar echoes, Airborne radar, Mathematical models, Correlation, Greenland

49-5427
Molecular surface structure of a low-temperature ice Ih(0001) crystal.
Materer, N., et al, *Journal of physical chemistry,* Apr. 27, 1995, 99(17), p.6267-6269, 14 refs.
Ice physics, Ice structure, Electron microscopy, Molecular structure, Hydrogen bonds, Orientation, Surface structure, Molecular energy levels, Simulation

49-5428
Frequency-dependent optical constants of water ice obtained directly from aerosol extinction spectra.
Clapp, M.L., Miller, R.E., Worsnop, D.R., *Journal of physical chemistry,* Apr. 27, 1995, 99(17), p.6317-6326, 97 refs.
Ice optics, Cloud physics, Optical properties, Refractivity, Light scattering, Aerosols, Infrared radiation, Radiation absorption, Spectra, Temperature effects, Polar stratospheric clouds, Simulation

49-5429
Light-scattering studies of simple molecular supercooled liquids: structural considerations.
Zhao, X.L., Kivelson, D., *Journal of physical chemistry,* Apr. 27, 1995, 99(17), p.6721-6732, 33 refs.
Liquid cooling, Supercooling, Solutions, Light scattering, Spectra, Thermodynamic properties, Temperature effects, Molecular energy levels, Viscosity

49-5430
Development of anti-icing technology.
Blackburn, R.R., McGrane, E.J., Chappelow, C.C., Harwood, D.W., Fleege, E.J., *National Research Council. Strategic Highway Research Program. Report,* 1994, SHRP-H-385, 479p., 30 refs. For another version see 47-932.
Road icing, Winter maintenance, Salting, Standards, Chemical ice prevention, Cold weather tests, Cold weather performance, Meteorological factors, Antifreezes, Forecasting

49-5431
Prudhoe Bay and beyond.
Sohio (Standard Oil Company of Ohio), Anchorage, AK, Sohio Alaska Petroleum Co., [1984], 24p., 4th edition.
Petroleum industry, Offshore drilling, Oil wells, Oil recovery, Economic development, United States—Alaska—Prudhoe Bay

49-5432
Analysis of laser profilometer data: AEM flights in the Baltic, winter 1994.
Lensu, M., *Helsinki University of Technology. Ship Laboratory. Arctic Offshore Research Centre. Report,* 1995, M-195, 98p., 15 refs.
Ice surveys, Ice cover thickness, Ice surface, Pressure ridges, Aerial surveys, Radio echo soundings, Lidar, Height finding, Statistical analysis, Baltic Sea

49-5433
Geochemical survey of the Valdez 1°×3° quadrangle, south-central Alaska.
Goldfarb, R.J., Borden, J.C., Winkler, G.R., *U.S. Geological Survey. Bulletin,* 1995, No.2084, 77p. + foldout map, 69 refs.
Exploration, Geological surveys, Geochemistry, Hydrogeochemistry, Suspended sediments, Alluvium, Minerals, Natural resources, United States—Alaska—Chugach Mountains

49-5434
Classification properties of Holocene sediment in Shelikof Strait, Alaska.
Hampton, M.A., *Marine georesources and geotechnology,* 1994, Vol.12, p.237-257, 38 refs.
Ocean bottom, Bottom sediment, Marine deposits, Quaternary deposits, Soil classification, Soil texture, Soil strength, Grain size, Particle size distribution, United States—Alaska—Shelikof Strait

49-5435
Manipulating the temperature of an arctic tundra plot: considerations for the ITEX study.
Albert, M.R., MP 3624, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, [1991], 12p. + figs., Unpublished manuscript. 6 refs.
Tundra, Plant ecology, Vegetation patterns, Revegetation, Snow cover effect, Permafrost heat transfer, Radiation balance, Global warming, Environmental tests

One of the goals of the planned International Tundra experiment is to study the effects of an in-situ warming on the flora of selected tundra sites. Initial ideas delineated at the ITEX workshop included the use of subsurface heating equipment, artificial lighting, greenhouses, and open-topped chambers. The purpose of this paper is to put forth the idea of local heating in a simple, inexpensive, and minimally intrusive manner, by capitalizing on the radiation absorption characteristics of various ground covers. Several simple numerical experiments are performed to demonstrate that the nature of the ground surface cover can have a profound effect on the local thermal regime. General guidance is given for the placement of introduced ground covers.

49-5436
Ice trials of the MSV Fennica.
Nyman, T., *Maritime research news,* 1993, 7(1), p.2-3.
Icebreakers, Ice navigation, Baltic Sea

49-5437
Model tests of a twin screw multipurpose icebreaker.
Jalonen, R., Karppinen, T., *Maritime research news,* 1993, 7(1), p.4-5.
Icebreakers, Ice navigation, Environmental tests, Baltic Sea

49-5438
Ice model tests for Bohai oil production project.
Mäkelä, K., *Maritime research news,* 1993, 7(1), p.6-7, 5 refs.
Offshore structures, Ice solid interface, Ice loads, Ice deformation, Ice cover strength, Ice pileup, Environmental tests, China—Bohai Sea

49-5439
Ship interaction with actual ice conditions JRPA 5.
Riska, K., *Maritime research news,* 1993, 7(1), p.8-9, 24 refs.
Ships, Ice navigation, Ice solid interface, Ice loads, Ice pressure, Metal ice friction, Environmental tests

49-5440
Ionic defects in ice: a dynamical square lattice model.
Zolotariuk, A.V., Savin, A.V., Economou, E.N., *Solid state ionics,* 1995, Vol.77, p.28-33, 15 refs.
Ice crystal structure, Hydrogen bonds, Crystal defects, Lattice models, Molecular structure, Molecular energy levels

49-5441
Preventing ice formation in tunnels.
Mudholkar, V.V., *Railway track structures,* Jan. 1991, p.26-27.
Railroad tunnels, Ice prevention, Thermal insulation

49-5442
Programme and abstracts.
International Nordic Symposium on Chemicals in the Arctic-Boreal Environment, Helsinki, Finland, May 12-14, 1993, Luotola, M., ed, Nurmi, E., ed, Helsinki, National Board of Waters and the Environment, 1993, 100p., Abstracts only. Refs. passim.
DLC TD196.C45I585 1993
Polar atmospheres, Atmospheric composition, Air pollution, Water pollution, Soil pollution, Environmental impact, Ecology, Ecosystems, Nutrient cycle

49-5443
Verglimit pavements in Ontario—an interim report.
Gruspier, J.E., *Ontario Ministry of Transportation and Communications. Report,* Aug. 1986, ME-86-02, 6p. + tables.
Road icing, Chemical ice prevention, Safety, Accidents, Pavements, Road maintenance, Canada—Ontario

49-5444
Financial implications of salt vs. CMA as a deicing agent: costs benefits estimated by an MTO expert group.
Bacchus, A., *Ontario Ministry of Transportation. Report,* Dec. 1987, ME-87-20, 33p., 4 refs.
Road icing, Chemical ice prevention, Salting, Road maintenance, Cost analysis, Canada—Ontario

49-5445
Issues relating to the use of de-icing chemicals.
Manning, D.G., *Ontario Ministry of Transportation. Report,* Mar. 1990, MAT-90-04, 13p.
Road icing, Chemical ice prevention, Salting, Road maintenance, Cost analysis, Canada—Ontario

49-5446
Laboratory tests of the performance of highway de-icing chemicals and winter sand on compacted snow and ice.
Comfort, G., *Ontario Ministry of Transportation. Report,* Sep. 1994, MAT-94-05, 64p., 24 refs.
Road icing, Chemical ice prevention, Salting, Sanding, Road maintenance, Rubber snow friction, Rubber ice friction, Skid resistance, Environmental tests, Canada—Ontario

49-5447
Research programs.
U.S. National Oceanic and Atmospheric Administration. National Environmental Satellite, Data, and Information Service (NESDIS). Office of Research and Applications, Dec. 1994, 163p., N95-18721.
Organizations, Research projects, Remote sensing, Spaceborne photography, Weather forecasting, Marine meteorology, Meteorological data, Weather observations

49-5448

Ice jam detection and flood monitoring using airborne synthetic aperture radar: Saint John River, New Brunswick, 1987.

Farris-Manning, P.J., Ottawa, Carleton University, 1991, 79p., M.A. thesis. 35 refs.

River ice, Ice breakup, Ice jams, Ice detection, Flood forecasting, Aerial surveys, Synthetic aperture radar, Image processing, Canada—New Brunswick—Saint John River

49-5449

Coupled thermo-mechanical analysis of pipelines buried in freezing ground.

Wang, D.Y., Ottawa, Carleton University, 1994, 210p., M.E. thesis. 75 refs.

Underground pipelines, Pipeline freezing, Soil freezing, Frost heave, Freezing front, Frozen ground strength, Frozen ground thermodynamics, Soil pressure, Soil creep, Computer programs, Mathematical models

49-5450

Ice surface temperature retrieval from AVHRR, ATSR, and passive microwave satellite data: Algorithm development and application.

Key, J., Maslanik, J.A., Steffen, K., *U.S. National Aeronautics and Space Administration. Contract report,* Mar. 23, 1994, NASA-CR-195276, 18p., N94-27849, 7 refs.

Surface temperature, Ice temperature, Sea ice, Radiometry, Land ice, Spaceborne photography, Data processing, Mathematical models, Instruments, Snow temperature, Snow ice interface

One essential parameter used in the estimation of radiative and turbulent heat fluxes from satellite data is surface temperature. Over the ice, the surface within a single satellite pixel is likely to be highly heterogeneous, a mixture of the ice of various thicknesses, open water, and snow cover in the case of sea ice. Additionally, the Arctic is cloudy, with typical cloud cover amounts ranging from 60-90%. There are few observations of cloud cover amounts over Antarctica. The goal of this research is to increase the knowledge of surface temperature patterns and magnitudes in both polar regions, by examining existing data and improving the ability to use satellite data as a monitoring tool. Four instruments are of interest in this study: the AVHRR, ATSR, SMMR, and SSM/I. The authors refine the existing AVHRR retrieval algorithm, defined in Key and Haefliger (1992) and applied elsewhere; they develop a method for IST retrieval from ATSR data similar to the one used for SST, and investigate the possibility of estimating surface temperature from passive microwave data (in conjunction with AVHRR clear sky samples) through the use of 'effective emissivities' and physical relationships between skin temperature and subsurface temperature.

49-5451

Estimating snowmelt runoff erosion indices for Canada.

Hayhoe, H.N., Pelletier, R.G., Coote, D.R., *Journal of soil and water conservation,* Mar.-Apr. 1995, 50(2), p.174-179, 20 refs.

Soil erosion, Water erosion, Precipitation (meteorology), Meteorological factors, Snow hydrology, Snowmelt, Runoff forecasting, Snow cover effect, Statistical analysis, Analysis (mathematics), Canada

49-5452

Statistics of surface-layer turbulence and evaluations of eddy-accumulation coefficients.

Andreas, E.L., MP 3625, Symposium on Boundary Layers and Turbulence, 11th, Charlotte, NC, Mar. 27-31, 1995. Preprint volume, Boston, American Meteorological Association, 1995, p.106-109, 16 refs.

Atmospheric boundary layer, Turbulent boundary layer, Turbulent diffusion, Wind velocity, Statistical analysis, Fluid dynamics

Monin-Obukhov Similarity Theory (MOST) has been the most important development in boundary-layer meteorology in the last 50 years. Yet despite its success in unifying theory and observations, disturbing uncertainties persist in some of the universal functions that MOST predicts should exist. In light of this uncertainty, it is still important to report high-quality turbulence data that can help narrow the error bars on the Monin-Obukhov similarity functions. Here are reported new data on the nondimensional standard deviations of vertical velocity, temperature, and humidity and on the temperature skewness and present functions of stability that fit these data.

49-5453

Wedging action during vertical penetration of floating ice sheets.

Sodhi, D.S., MP 3626, Ice mechanics. Edited by J.P. Dempsey and Y.D.S. Rajapakse, American Society of Mechanical Engineers, 1995, AMD-Vol.207, 24 refs.

Floating ice, Ice sheets, Ice mechanics, Loads (forces), Ice deformation, Crack propagation, Penetration tests, Ice solid interface, Mechanical tests, Stress concentration, Ultimate strength

Small-scale experiments were conducted with freshwater ice in a basin to understand wedging action during the vertical loading of floating ice sheets. Results of the following series of experiments are presented: (a) beams with fixed ends, (b) paired cantilever beams arranged free-end to free-end and loaded together, (c) beams with an apparatus inserted between the free ends of paired cantilever beams to measure the in-plane force during vertical loading, and (d) vertical downward loading of floating ice sheets with fixed and free boundaries. Analysis of the data from the beam tests reveals that the wedging action results in the development of wedging pressure in the top or bottom third of the ice thickness, and that this results in a resisting moment that counters the deformation of a cracked ice sheet. An ice sheet attached to the basin walls inhibits the propagation of radial cracks because of the wedging action, whereas an ice sheet free at the edges from the surrounding ice sheet fails by the propagation of radial cracks all the way to the ice sheet's free boundary. The difference between the two breakthrough loads of the free and the fixed ice sheets can be attributed to wedging action. The results of the beams tests are used to predict the breakthrough loads of floating ice sheets, which are in agreement with loads measured during full-scale and small-scale experiments.

49-5454

Accuracy of airborne laser altimetry over the Greenland ice sheet.

Krabill, W.B., Thomas, R.H., Martin, C.F., Swift, R.N., Frederick, E.B., *International journal of remote sensing,* May 10, 1995, 16(7), p.1211-1222, 8 refs.

Ice sheets, Geophysical surveys, Remote sensing, Aerial surveys, Photogrammetric surveys, Height finding, Lidar, Accuracy, Greenland

49-5455

Comparison of brightness temperatures from SSMI instruments on the DMSP F8 and F11 satellites for Antarctica and the Greenland ice sheet.

Abdalati, W., Steffen, K., Otto, C., Jezek, K.C., *International journal of remote sensing,* May 10, 1995, 16(7), p.1223-1229, 5 refs.

Ice sheets, Radiometry, Remote sensing, Microwaves, Spacecraft, Brightness, Radiance, Correlation, Performance, Greenland, Antarctica

Passive microwave satellite data provide extremely important information about the climate and surface conditions in the often cloudy high latitude regions of the Earth. Multichannel passive microwave data have great potential for long-term climate monitoring. In order to ensure consistent data sets for such long-term monitoring, the relations between the microwave brightness temperatures from similar sensors on successive satellite platforms must be understood. In this study the 19, 22 and 37 GHz channels of the Defense Meteorological Satellite Program F8 and F11 Special Sensor Microwave Imager instruments are compared, employing data derived from both Antarctica and Greenland. While the analysis shows that the two data sets are highly correlated with correlation coefficients greater than 0.98, the consistency between the two data sets can be improved by applying small corrections on the order of 1° K. (Auth. mod.)

49-5456

Frost resistance of cement mortars with different lime contents.

Müller, A., Fuhr, C., Knöfel, D., *Cement and concrete research,* May 1995, 25(4), p.809-818, 5 refs.

Cement admixtures, Mortars, Frost resistance, Chemical composition, Mechanical properties, Freeze thaw cycles, Concrete strength, Compressive properties, Microstructure

49-5457

Temperature distribution in Collins Ice Cap, King George Island, Antarctica.

Han, J.K., Wen, J.H., Shang, X.C., Jin, H.J., *Antarctic Research (Chinese edition),* Mar. 1995, 7(1), p.59-66, In Chinese with English summary. 6 refs.

Ice temperature, Boreholes, Snow cover effect, Ice water interface, Seepage, Ice air interface, Antarctica—King George Island

Borehole temperature measurements show that Collins Ice Cap has characteristics of a temperate glacier in most parts of the accumulation area, but it is characterized as cold glacier in the ablation area. The ice temperature of the active layer is noticeably affected by seasonal variations of air temperature. The water infiltrating and warming is very significant at a depth of 30 m; the snow cover also has an effect on temperature distribution. The data reveal that the ice temperature in deep layers is at the freezing point: the temperature varies greatly in the vicinity (10-20 m) of the Little Dome. (Auth. mod.)

49-5458

Proceedings.

Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: international conference, Anchorage, AK, Mar. 23-25, 1994, University of Alaska Sea Grant College Program. Report, No.95-02, Fairbanks, University of Alaska, 1995, 392p., Refs. passim. For selected papers see 49-5459 through 49-5474.

Oil spills, Accidents, Tanker ships, Oil recovery, Environmental protection, Regional planning, Safety, Legislation, United States—Alaska—Prince William Sound

49-5459

Oil spill prevention measures undertaken in the wake of the *Exxon Valdez* oil spill.

Stock, G., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.89-92.

Oil spills, Accidents, Tanker ships, Petroleum transportation, Safety, Environmental protection, Regional planning, Legislation, United States—Alaska—Prince William Sound

49-5460

Grounding resistance of alternative structural systems for tankers.

Sikora, J.P., Roseman, D.P., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.111-137, 9 refs.

Tanker ships, Petroleum transportation, Accidents, Oil spills, Safety, Design criteria

49-5461

Prevention of accidents and oil spills on the outer continental shelf.

Regg, J.B., Breitmeier, J., Smith, R., Walker, J., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.139-148, 8 refs.

Exploration, Offshore drilling, Oil spills, Accidents, Safety, Regional planning, Environmental protection, United States—Alaska

49-5462

Development of an oil spill contingency planning evaluation model.

Abordaif, F.H., Harrald, J.R., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.149-170, 14 refs.

Oil spills, Oil recovery, Accidents, Water pollution, Regional planning, Environmental protection

49-5463

Oil spill response in the wake of the *Exxon Valdez* oil spill.

Bodron, D., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.171-174.

Oil spills, Tanker ships, Accidents, Oil recovery, United States—Alaska—Prince William Sound

49-5464

***Braer* and the *Exxon Valdez*—cleanup comparisons.**

Wills, J.W.G., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.175-180.

Oil spills, Tanker ships, Accidents, Oil recovery, United Kingdom—Scotland, United States—Alaska—Prince William Sound

49-5465
Prince William Sound Community College and fishing vessel oil spill response training.
Ulvestad, D.A., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.193-201, 2 refs.
Oil spills, Accidents, Oil recovery, Education, United States—Alaska—Prince William Sound

49-5466
Spill planning, preparedness, and response capabilities for public land managers.
Kurtz, R.S., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.269-277, 16 refs.
Oil spills, Accidents, Oil recovery, Environmental protection, Regional planning, United States—Alaska—Prince William Sound

49-5467
Protecting ecotourism and recreation resources in the event of an oil spill.
Lethcoe, N.R., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.279-299, 12 refs.
Oil spills, Accidents, Oil recovery, Environmental impact, Environmental protection, Regional planning, Cost analysis, Economic development, United States—Alaska—Prince William Sound

49-5468
Then & now: changes since the *Exxon Valdez* oil spill.
Stephens, S., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.301-309.
Oil spills, Accidents, Petroleum transportation, Tanker ships, Safety, Environmental protection, Regional planning, United States—Alaska—Prince William Sound

49-5469
Citizen oversight under OPA 90: report card from Prince William Sound.
Stanley, H.E., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.311-321.
Oil spills, Accidents, Tanker ships, Petroleum transportation, Safety, Environmental protection, Regional planning, Legislation, United States—Alaska—Prince William Sound

49-5470
Oversight of the marine industry in western Alaska.
Miller, M., Haynes, D., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.323-327.
Oil spills, Accidents, Marine transportation, Safety, Environmental protection, Regional planning, Legislation, United States—Alaska—Prince William Sound

49-5471
Development of a unified federal/state, coastal/inland oil and hazardous substance contingency plan for the state of Alaska.
Lautenberger, C., Pearson, L.A., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.329-337.
Oil spills, Accidents, Environmental protection, Safety, Regional planning, Legislation, United States—Alaska

49-5472
States/British Columbia Oil Spill Task Force: going beyond response.
Cameron, J.R., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.339-345.
Oil spills, Accidents, Environmental protection, Regional planning, International cooperation

49-5473
Development of technology protocols for oil and hazardous substance spill response appropriate for the state of Alaska.
Pearson, L.A., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.347-353, 3 refs.
Oil spills, Accidents, Environmental protection, Regional planning, Legislation, United States—Alaska

49-5474
Research program to ensure that best available technology is used in preventing and responding to oil spills in Alaska and the North Pacific.
Parker, W.B., Prevention, response, and oversight five years after the *Exxon Valdez* oil spill: proceedings of an international conference, Anchorage, AK, Mar. 23-25, 1994, Fairbanks, University of Alaska, 1995, p.355-360.
Oil spills, Accidents, Environmental protection, Regional planning, Legislation, Research projects, Cost analysis, United States—Alaska

49-5475
High frequency (140 GHz) dynamic nuclear polarization: polarization transfer to a solute in a frozen aqueous solution.
Gerfen, G.J., Becerra, L.R., Hall, D.A., Griffin, R.G., Temkin, R.J., Singel, D.J., *Journal of physical chemistry,* June 22, 1995, 102(24), p.9494-9497, 18 refs.
Solutions, Frozen liquids, Nuclear magnetic resonance, Polarization (charge separation), Cryogenics, Spectra, Electron paramagnetic resonance, Laboratory techniques

49-5476
Interactions of the D- and L-forms of winter flounder antifreeze peptide with {201} planes of ice.
Madura, J.D., Wierzbicki, A., Harrington, J.P., Maughon, R.H., Raymond, J.A., Sikes, C.S., *American Chemical Society. Journal,* Jan. 12, 1994, 116(1), p.417-418, 20 refs.
Marine biology, Ice physics, Antifreezes, Adsorption, Molecular structure, Orientation, Simulation, Ice water interface, Latticed structures

49-5477
Research on low and high speed hovercraft icebreaking.
Hinchey, M., Colbourne, B., *Canadian journal of civil engineering,* Feb. 1995, 22(1), p.32-42, With French summary. 15 refs.
Icebreakers, Floating ice, Ice breaking, Air cushion vehicles, Performance, Design, Simulation, Mechanical tests, Ice air interface, Interfacial tension, Fluid dynamics

49-5478
Effects of ice on the hydraulics of Mackenzie River at the outlet of Great Slave Lake, N.W.T.: a case study.
Hicks, F.E., Chen, X.B., Andres, D., *Canadian journal of civil engineering,* Feb. 1995, 22(1), p.43-54, With French summary. 6 refs.
River ice, Hydraulics, Ice water interface, Ice cover effect, Surface roughness, Channels (waterways), Water flow, Hydrography, Models, Canada—Northwest Territories—Mackenzie River

49-5479
Combined wind and ice loading on antenna towers: discussion.
Marshall, D.G., Makkonen, L., Macfarlane, D., Wahba, Y.M.F., Madugula, M.K.S., Monforton, G.R., *Canadian journal of civil engineering,* Feb. 1995, 22(1), p.204-209, Includes reply. 18 refs.
Antennas, Towers, Precipitation (meteorology), Ice loads, Ice forecasting, Ice cover thickness, Ice solid interface, Stability, Wind factors, Design criteria, Standards

49-5480
Similarity of desublimation processes.
Podol'skiĭ, A.G., Kukharenko, V.N., Kolgatin, A.G., *Journal of engineering physics and thermophysics,* Nov. 1994, 66(5), p.503-507, Translated from Inzhenerno-fizicheskiĭ zhurnal. 6 refs.
Cryogenics, Gases, Condensation, Density (mass/volume), Mathematical models, Correlation

49-5481
On the rate of frazil ice formation in polar regions in the presence of turbulence.
Voropayev, S.I., Fernando, H.J.S., Mitchell, L.A., *Journal of physical oceanography,* June 1995, 25(6)pt.II, p.1441-1450, 18 refs.
Sea ice, Oceanography, Freezing rate, Ice crystal growth, Frazil ice, Ice water interface, Simulation, Turbulent exchange, Fluid dynamics

49-5482
Compaction of polar snow packs.
Gray, J.M.N.T., Morland, L.W., *Cold regions science and technology,* Feb. 1995, 23(2), p.109-119, 16 refs.
Snow cover structure, Snow compaction, Snow mechanics, Snow density, Profiles, Analysis (mathematics), Viscosity

49-5483
FEM simulation of interface problem for laterally loaded piles in permafrost.
Foriero, A., Ladanyi, B., *Cold regions science and technology,* Feb. 1995, 23(2), p.121-136, 33 refs.
Permafrost beneath structures, Pile structures, Soil creep, Pile load tests, Mathematical models, Computerized simulation, Frozen ground mechanics, Dislocations (materials), Ice solid interface

49-5484
Flow law for anisotropic polycrystalline ice under uniaxial compressive deformation.
Azuma, N., *Cold regions science and technology,* Feb. 1995, 23(2), p.137-147, 17 refs.
Ice mechanics, Strain tests, Ice deformation, Ice creep, Ice crystal structure, Orientation, Anisotropy, Thin sections, Analysis (mathematics)

49-5485
Compliant model tests with the Great Belt West Bridge piers in ice—Part 1: test methods and key results.
Timco, G.W., Nwogu, O.G., Christensen, F.T., *Cold regions science and technology,* Feb. 1995, 23(2), p.149-164, 25 refs.
Bridges, Piers, Stability, Mechanical tests, Simulation, Ice floes, Ice loads, Dynamic loads, Ice solid interface, Design criteria, Forecasting

49-5486
Compliant model tests with the Great Belt West Bridge piers in ice—Part 2: analyses of results.
Christensen, F.T., Timco, G.W., Nwogu, O.G., *Cold regions science and technology,* Feb. 1995, 23(2), p.165-182, 29 refs.
Bridges, Piers, Stability, Ice loads, Dynamic loads, Ice floes, Ice solid interface, Ice breaking, Mechanical tests, Structural analysis, Simulation

49-5487
On the minimum depth of bridge and culvert foundations in seasonal frost regions.
Dai, H.M., Wang, X.L., *Cold regions science and technology,* Feb. 1995, 23(2), p.183-190, 8 refs.
Bridges, Culverts, Foundations, Frozen ground mechanics, Seasonal freeze thaw, Frost heave, Frost penetration, Design criteria

49-5488
Triaxial tests on dry, naturally occurring snow.
Lang, R.M., Harrison, W.L., MP 3627, *Cold regions science and technology,* Feb. 1995, 23(2), p.191-199, 14 refs.
Snow mechanics, Mechanical tests, Strain tests, Ice solid interface, Loads (forces), Snow plasticity, Plastic deformation, Ultimate strength
This study presents and discusses the results of triaxial tests conducted on dry, naturally occurring snow. The applied strain rate for the fresh snow was 1.01 x 10^{-5}/s and the confining pressure was varied from 0 to 41.37 kPa. Stress-deformation curves are presented and snow behavior is represented within the context of a critical state model (Roscoe et al., 1963). Under these specific loading conditions the stress-deformation curves demonstrate that snow exhibits an instantaneous response which can be characterized for computational purposes as an isotropic, nonlinear, elastic-plastic strain hardening material. The loading conditions did not promote viscous behavior of the snow and viscous effects are not considered. When the results are corrected to true stress, the snow continues to deform without an increase in load beyond the limit load. Also, the effect of increased ultimate strength with increased confining pressure was, in general, apparent for snow.

49-5489
Automatic tracking of crevasses on satellite images.
Whillans, I.M., Tseng, Y.H., *Cold regions science and technology,* Feb. 1995, 23(2), p.201-214, 23 refs.
Spaceborne photography, Snow surveys, Photogrammetric surveys, Crevasse detection, Image processing, Ice mechanics, Glacier flow, Ice deformation, Velocity measurement, Correlation, Antarctica—Marie Byrd Land
Measurements of glacier motion and deformation are obtained by automatically matching features, such as crevasses, on repeat images. A computer-based method identifies and tracks groups of features on successive images and calculates their displacement and the rotation and distortion of the ice. Ice deformation within each matched area is permitted and calculated using a least-squares method within each area. The method is applied to SPOT satellite images of Ice Stream B. A quality-checking scheme rejects inappropriate matches. The results compare satisfactorily with velocities obtained by manual methods from repeat photography of the same region. (Auth. mod.)

49-5490
Scales of variation of suspended sediment concentration and turbidity in a glacial meltwater stream.
Clifford, N.J., Richards, K.S., Brown, R.A., Lane, S.N., *Geografiska annaler,* 1995, 77A(2), p.45-65, 29 refs.
Glacial hydrology, Limnology, Glacial rivers, Stream flow, Meltwater, Suspended sediments, Sampling, Turbidity, Periodic variations, Fractals, Switzerland—Haut Glacier d'Arolla

49-5491
Modelling the effect of topography on ice sheet erosion, Scotland.
Glasser, N.F., *Geografiska annaler,* 1995, 77A(2), p.67-82, 73 refs.
Ice sheets, Pleistocene, Glacial erosion, Glacier flow, Glacial geology, Ice models, Thermal regime, Geomorphology, Glacier beds, Ice solid interface, Topographic effects, Mathematical models, United Kingdom—Scotland

49-5492
Subrecent moraine ridge formation on Cuff Cape, Victoria Land, Antarctica.
Möller, P., *Geografiska annaler,* 1995, 77A(2), p.83-94, 11 refs.
Glacial geology, Glacial deposits, Moraines, Sedimentation, Stratification, Geomorphology, Antarctica—Cuff Cape
A small bedrock ridge called Cuff Cape, protruding from an ice field in the inner part of Granite Harbour, carries a system of moraine ridges. Based on studies of contemporary processes along the present ice margin, sediment facies states of logged trenches and the morphology of the moraines, it can be concluded that moraines at low altitudes are composed of sediments deposited in fluvial troughs and meltwater ponds along a frontal glacier apron. The sediments were primarily deposited as debris flow diamictons, generated from melted-out sediments from basal debris bands and sorted sediments deposited as traction load and suspended load sediments in the marginal ponds. These sediments were in a frozen state, later glaciotectonically thrust and stacked into moraine ridges during minor readvance stages. The largest moraine, covering a narrow retreat zone, was formed along the terrestrial ice margin by means of push and stacking of frontal apron diamictons. This moraine also carries superimposed minor ridges along its proximal slope, suggesting frequent readvance stages. (Auth. mod.)

49-5493
Cryoplanation terraces—a brief review and some remarks.
Czudek, T., *Geografiska annaler,* 1995, 77A(2), p.95-105, 40 refs.
Periglacial processes, Cryogenic soils, Slope processes, Weathering, Geomorphology, Terraces, Geocryology, Frost action

49-5494
Sorption of strontium on unconsolidated glaciofluvial deposits and clay minerals: mutual interference of cesium, strontium and barium.
Grütter, A., Rössler, E., von Gunten, H.R., Keil, R., *Radiochimica acta,* 1994, 64(3-4), p.247-252, 9 refs.
Quaternary deposits, Glacial deposits, Clay minerals, Radioactive isotopes, Geochemistry, Radioactive wastes, Mineralogy, Absorption, Ground water, Environmental tests, Simulation

49-5495
Structure for falling snow—optical model.
Yousefian, V., Martinez-Sanchez, M., Dvore, D., *Aerodyne Research, Inc. Quarterly report,* May 1982, No.97, 14p., 11 refs.
Snowstorms, Cloud physics, Precipitation (meteorology), Remote sensing, Falling snow, Light transmission, Snow optics, Particle size distribution, Mathematical models

49-5496
Differentiating various sources of chlorides in domestic well waters.
Hunter and Associates, *Ontario. Ministry of Transportation and Communications. Research and Development Branch. Report,* Oct. 1987, RR 240, 38p., 43 refs.
Ground water, Wells, Water pollution, Salting, Origin, Distribution, Hydrogeochemistry, Sampling, Leaching, Ion density (concentration), Environmental tests

49-5497
Observations and numerical simulation of a shallow ice-covered midlatitude lake.
Rogers, C.K., Lawrence, G.A., Hamblin, P.F., *Limnology and oceanography,* Mar. 1995, 40(2), p.374-385, 25 refs.
Limnology, Water temperature, Temperature variations, Lake ice, Ice cover effect, Ice water interface, Ice air interface, Heat transfer, Snow cover effect, Insolation, Simulation, Mathematical models

49-5498
Parameterizing polarizable intermolecular potentials for water with the ice 1h phase.
Brodholt, J., Sampoli, M., Vallauri, R., *Molecular physics,* May 1995, 85(1), p.81-90, 21 refs.
Ice physics, Water structure, Ice crystal structure, Molecular structure, Latticed structures, Dielectric properties, Thermodynamic properties, Polarization (charge separation), Charge transfer

49-5499
Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas.
Holten, J.I., ed, Paulsen, G., ed, Oechel, W.C., ed, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, 185p., Refs. passim. Invited papers from an international conference, Trondheim, Norway, Nov 27-29, 1990. For individual papers see 49-5500 through 49-5517.
DLC QH543.I485 1990
Global warming, Climatic changes, Environmental impact, Ecosystems, Plant ecology, Revegetation, Vegetation patterns, Nutrient cycle, Phenology, Biogeography

49-5500
Understanding the impacts of climatic change on northern ecosystems.
Oechel, W.C., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.5-8, 12 refs.
Global warming, Climatic changes, Ecosystems, Environmental impact, Plant ecology, Nutrient cycle

49-5501
Climatic models and feedback mechanisms. Climatic scenarios.
Pedersen, K., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.9-11, 6 refs.
Global warming, Climatic changes, Radiation balance, Atmospheric circulation

49-5502
Application of the Intergovernmental Panel on Climate Change's scientific assessment to northern ecosystems.
Callaghan, T.V., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.12-23, 32 refs.
Global warming, Climatic changes, Environmental impact, Ecosystems, Plant ecology, Revegetation, Vegetation patterns, Nutrient cycle, Atmospheric composition, Carbon dioxide

49-5503
Biospheric feedback mechanisms to a changing climate in the north.
Callaghan, T.V., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.24-38, 75 refs.
Global warming, Climatic changes, Environmental impact, Ecosystems, Plant ecology, Revegetation, Vegetation patterns, Nutrient cycle, Tundra, Photosynthesis, Biomass

49-5504
Modelling the biological effects of climatic change.
Fry, G., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.39-41.
Global warming, Climatic changes, Environmental impact, Ecosystems, Plant ecology, Revegetation, Forestry, Computerized simulation

49-5505
Empirical and theoretical foundations for modelling the response of ecosystems to climatic change.
Gil'manov, T.G., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.42-74, Refs. p.68-74.
Global warming, Climatic changes, Environmental impact, Ecosystems, Plant ecology, Vegetation patterns, Phenology, Biomass, Nutrient cycle, Mathematical models

49-5506
Modelling the response of Nordic forests to climatic change.
Sykes, M.T., Prentice, I.C., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.75-80, 30 refs.
Global warming, Climatic changes, Environmental impact, Forest ecosystems, Plant ecology, Vegetation patterns, Revegetation, Forest land, Computerized simulation

49-5507
Impact of climatic change on terrestrial ecosystems.
Dahl, E., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.81-83, 2 refs.
Global warming, Climatic changes, Environmental impact, Ecosystems, Plant ecology, Vegetation patterns

49-5508

Potential effects of climatic change on distribution of plant species, with emphasis on Norway.

Holten, J.I., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.84-104, 60 refs.

Global warming, Climatic changes, Environmental impact, Ecosystems, Plant ecology, Vegetation patterns, Revegetation, Biogeography, Norway

49-5509

Climatic change and disturbance by fire in boreal and sub-alpine forests.

Suffling, R., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.105-121, 76 refs.

Global warming, Climatic changes, Environmental impact, Forest ecosystems, Plant ecology, Vegetation patterns, Revegetation, Forest fires

49-5510

Effect of elevated CO_2 on natural vegetation.

Skre, O., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.122-124, 4 refs.

Global warming, Climatic changes, Environmental impact, Ecosystems, Plant ecology, Plant physiology, Carbon dioxide

49-5511

Consequences of possible climatic temperature changes for plant production and growth in alpine and sub-alpine areas in Fennoscandia.

Skre, O., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.125-135, 47 refs.

Global warming, Climatic changes, Environmental impact, Ecosystems, Plant ecology, Plant physiology, Forest lines, Phenology

49-5512

Forecasting the impact of climatic change on natural vegetation with particular reference to the boreal and sub-arctic floras.

Hendry, G.A.F., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.136-150, 37 refs.

Global warming, Climatic changes, Environmental impact, Ecosystems, Plant ecology, Vegetation patterns, Revegetation, Plant physiology, Phenology

49-5513

Climatic changes; effects on aquatic ecosystems.

Hessen, D.O., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.151-153.

Global warming, Climatic changes, Environmental impact, Ecosystems, Wetlands, Lakes, Nutrient cycle

49-5514

Climatic effects on fresh water: nutrient loading, eutrophication and acidification.

Hessen, D.O., Wright, R.F., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.154-167, 21 refs.

Global warming, Climatic changes, Environmental impact, Ecosystems, Streams, Lakes, Water pollution, Water chemistry, Nutrient cycle

49-5515

Effects of climatic change on freshwater fish and biological communities in Norway.

Langeland, A., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.168-171, 15 refs.

Global warming, Climatic changes, Environmental impact, Ecosystems, Ecology, Lakes, Physiological effects, Animals, Biogeography, Nutrient cycle, Norway

49-5516

Effects on boreal and arctic/alpine fauna.

Sømme, L., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.172-175, 8 refs.

Global warming, Climatic changes, Environmental impact, Ecosystems, Ecology, Animals, Biogeography, Nutrient cycle

49-5517

Predicting insect faunal dynamics in a changing climate—a northern European perspective.

Solbreck, C., Impacts of climatic change on natural ecosystems with emphasis on boreal and arctic/alpine areas. Edited by J.I. Holten, G. Paulsen, and W.C. Oechel, Trondheim, Norwegian Institute for Nature Research (NINA), 1993, p.176-185, 50 refs.

Global warming, Climatic changes, Environmental impact, Ecosystems, Ecology, Animals, Phenology, Acclimatization, Biogeography

49-5518

Climatic characteristics of height and temperature of the tropopause over the arctic basin.

Timerev, A.A., Nagurnyĭ, A.P., Egorov, S.A., Medvedchenko, E.IU., *Russian meteorology and hydrology,* 1994, No.6, p.16-21, Translated from Meteorologiia i gidrologiia. 18 refs.

Polar atmospheres, Marine meteorology, Climatology, Air temperature, Radio echo soundings, Temperature variations, Seasonal variations, Arctic Ocean

49-5519

Mean fields of temperature and salinity of the Arctic Ocean.

Poliakov, I.V., Timokhov, L.A., *Russian meteorology and hydrology,* 1994, No.7, p.33-38, Translated from Meteorologiia i gidrologiia. 8 refs.

Oceanography, Climatology, Water temperature, Surface temperature, Hydrography, Salinity, Hydrodynamics, Seasonal variations, Arctic Ocean

49-5520

Grains of truth.

Addison, D., *Weatherwise,* June-July 1995, 48(3), p.12.

Snow physics, Snow crystal structure, Grain size, Runoff forecasting, Scanning electron microscopy, Laboratory techniques, Snow water equivalent

49-5521

Superstorm success.

Addison, D., *Weatherwise,* June-July 1995, 48(3), p.18-24.

Snowstorms, Weather observations, Accuracy, Records (extremes)

49-5522

Assessment of CMA as an alternative de-icer.

Pianca, F., *Ontario. Ministry of Transportation and Communications. Research and Development Branch. Technical publication,* Nov. 1984, ME-84-02, 29p., 13 refs.

Winter maintenance, Road maintenance, Road icing, Chemical ice prevention, Ice removal, Salting, Corrosion, Environmental tests, Water pollution, Countermeasures

49-5523

Membrane fluidity as a factor in production and stability of bacterial ice nuclei active at high subfreezing temperatures.

Lindow, S.E., *Cryobiology,* June 1995, 32(3), p.247-258, 44 refs.

Cryobiology, Bacteria, Microbiology, Dispersions, Ice nuclei, Heterogeneous nucleation, Temperature effects, Saturation

49-5524

Fracture phenomena in an isotonic salt solution during freezing and their elimination using glycerol.

Gao, D.Y., Lin, S., Watson, P.F., Critser, J.K., *Cryobiology,* June 1995, 32(3), p.270-284, 37 refs.

Cryobiology, Solutions, Frozen liquids, Salt water, Ice mechanics, Freezing, Cracking (fracturing), Polymers, Thermal stresses, Microstructure

49-5525

Laboratory evaluation of ice formation around a 3-mm accuprobe.

Saliken, J.C., Cohen, J., Miller, R., Rothert, M., *Cryobiology,* June 1995, 32(3), p.285-295, 10 refs.

Cryobiology, Cryogenics, Probes, Freezing, Ice formation, Ice physics, Ice temperature, Temperature measurement

49-5526

Glaciological monitoring. [Gliatsiologicheskiĭ monitoring]

Kotliakov, V.M., Rototaeva, O.V., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii,* Oct. 1991, Vol.73, p.3-10, In Russian with English summary. 21 refs.

DLC GB2401.M37

Glaciology, Monitors

49-5527

Latest climatic cycle of the Earth: data from comprehensive studies of Antarctic ice cores. [Posledniĭ klimaticheskiĭ tsikl zemli: dannye kompleksnykh issledovaniĭ antarkticheskikh kernov]

Kotliakov, V.M., et al, *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii,* Oct. 1991, Vol.73, p.11-18, In Russian with English summary. 22 refs.

DLC GB2401.M37

Paleoclimatology, Ice cores, Aerosols, Climatic changes, Carbon dioxide, Isotope analysis, Antarctica—Vostok Station

The ice core obtained at Vostok Station from a depth of 2546 m is constituted of ice formed during 200 thousand years. Isotope temperature data have indicated two interglacials, which started 140 and 15 ka with abrupt warmings, by 11° and 9°C, respectively, and the long Ice Age, 110-15 ka, including two interstadials. During the cooling periods the snow accumulation decreased twice, the concentration of aerosols grew 10-20 times, and concentration of CO_2 in the atmosphere decreased by 25-30%. The coolings were accompanied by an increase of atmospheric circulation, especially of meridional transfer. (Auth. mod.)

49-5528

Vegetation belt at growth and degradation stages of mountain glaciations. [Rastitel'naia poiasnost' na etapakh rosta i degradatsii gornykh oledeneniĭ]

Agakhaniants, O.E., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii,* Oct. 1991, Vol.73, p.18-23, In Russian with English summary. 22 refs.

DLC GB2401.M37

Alpine glaciation, Forest lines, Plant ecology, Ice cover effect, Glacier oscillation, Russia

49-5529

Würmian glaciation of the Tien Shan and the "Paleogeographic enigma of Issyk-Kul' Lake". [Viurmskoe oledenenie Tian'-Shania i "Paleografichesia zagadka ozera Issyk-Kul'"]

Grosval'd, M.G., Glebova, L.N., Steklenkov, A.P., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii,* Oct. 1991, Vol.73, p.23-36, In Russian with English summary. 34 refs.

DLC GB2401.M37

Alpine glaciation, Paleoclimatology, Pleistocene, Glacial lakes, Tien Shan, Russia—Issyk-Kul' Lake

49-5530
Age, morphology and history of the development of the last glaciation in Eastern Altay. [O vozraste, morfologii i istorii razvitiia poslednego oledeneniia Vostochnogo Altaia]
Butvilovskiĭ, V.V., Panychev, V.A., Lammert, A.K., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.36-43, In Russian with English summary. 28 refs.
DLC GB2401.M37
Alpine glaciation, Pleistocene, Quaternary deposits, Glacial lakes, Ice dams, Radioactive age determination, Glacier ablation, Degradation, Russia—Altay, Russia—Bashkaus River

49-5531
Role of climatic characteristics in the fluctuations of the annual mass balance and displacement of the Hintereisferner Glacier terminus. [Rol' klimaticheskikh kharakteristik v kolebaniiakh godovogo balansa massy i peremeshchenie kontsa lednika Khinterĭsferner]
Tiulina, T.IU., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.43-50, In Russian with English summary. 14 refs.
DLC GB2401.M37
Glacier mass balance, Glacier tongues, Glacier alimentation, Glacier ablation, Climatic factors, Austria—Alps, Austria—Hintereisferner Glacier

49-5532
Interannual variability in air temperature in the Western and Central Caucasus in summer. [Mezhgodovaia izmenchivost' temperatury vozdukha na Zapadnom i Tsentral'nom Kavkaze v letniĭ sezon]
Davidovich, N.V., Tarasova, L.N., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.50-59, In Russian with English summary. 6 refs.
DLC GB2401.M37
Air temperature, Temperature variations, Climatic factors, Atmospheric disturbances, Seasonal variations, Russia—Caucasus

49-5533
Mechanism of formation and development of snow layer texture. [Mekhanizm formirovaniia i razvitiia tekstury snezhnoĭ tolshchi]
Samoĭliuk, V.I., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.59-65, In Russian with English summary. 11 refs.
DLC GB2401.M37
Snow cover structure, Snow crystal growth, Snow mechanics, Snow density, Mathematical models, Porosity

49-5534
Strength properties of loosening layers in a snow cover. [Prochnostnye svoĭstva gorizontov razrykhleniia v snezhnoĭ tolshche]
Zhidkov, V.A., Oleĭnikov, A.D., Samoĭlov, R.S., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.65-73, In Russian with English summary. 19 refs.
DLC GB2401.M37
Snow depth, Snow cover structure, Snow strength, Snow crystal structure, Depth hoar, Ice crystals, Statistical analysis, Mathematical models

49-5535
Using a two-layer model to calculate the movement of powder avalanches. [Opyt primeneniia dvukhsloĭnoĭ modeli dlia rascheta dvizheniia pylevykh lavin]
Nazarov, A.N., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.73-79, In Russian with English summary. 4 refs.
DLC GB2401.M37
Mathematical models, Avalanche mechanics, Avalanche modeling, Russia—Khibiny Mountains, Tajikistan—Pamirs

49-5536
Effect of vegetation on the development of naled phenomena. [Vliianie rastitel'nosti na razvitie nalednykh iavleniĭ]
Alekseev, V.R., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.79-87, In Russian with English summary. 3 refs.
DLC GB2401.M37
Vegetation factors, Naleds, Meltwater, Analysis (mathematics), Ice melting, Heat transfer, Mass transfer, Ice deterioration

49-5537
Calculating flood water waves formed from outbursts of snow and ice dams. [Raschet pavodochnykh voln, formiruiushchikhsia pri proryve snezhnykh i ledianykh plotin]
Samoĭlov, R.S., Manets, A.F., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.89-93, In Russian with English summary. 4 refs.
DLC GB2401.M37
Analysis (mathematics), Ice dams, Dams, Lake bursts, Floods, Ice jams

49-5538
Mechanism of blue ice band formation under simple shear. [O mekhanizme obrazovaniia golubykh lent l'da pri chistom sdvige]
Ivanov, A.I., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.94-98, In Russian with English summary. 6 refs.
DLC GB2401.M37
Glacier ice, Shear stress, Mathematical models, Ice elasticity, Viscosity, Ice deformation, Ice models

49-5539
Space-time characteristics of interdependence in regional glacier systems. [Prostranstvenno-vremennye osobennosti vzaimosviazeĭ v regional'nykh lednikovykh sistemakh]
Glebova, L.N., Zverkova, N.M., Narozhnyĭ, IU.K., Khromova, T.E., Chernova, L.P., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.98-103, In Russian with English summary. 8 refs.
DLC GB2401.M37
Mountain glaciers, Glacier oscillation, Glacier alimentation, Glacier surveys, Topographic maps, Alps, Russia—Altay Mountains

49-5540
Internal structure and thermo-hydrodynamic state of glaciers in Severnaya Zemlya. [Vnutrennee stroenie i termogidrodinamicheskoe sostoianie lednikov Severnoĭ Zemli]
Klement'ev, O.L., Nikolaev, V.I., Potapenko, V.IU., Savatiugin, L.M., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.103-109, In Russian with English summary. 19 refs.
DLC GB2401.M37
Ice cores, Thermal regime, Ice thermal properties, Ice formation, Glacier ice, Boreholes, Hydrodynamics, Glacier alimentation, Glacier melting, Russia—Severnaya Zemlya, Russia—Vavilov Ice Dome

49-5541
Structure, composition and hydrothermal regime of the Garabashi Glacier on Elbrus. [Stroenie, sostav i gidrotermicheskiĭ rezhim lednika Garabashi na El'bruse]
Zagorodnov, V.S., et al, *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.109-117, In Russian with English summary. 8 refs.
DLC GB2401.M37
Ice cores, Boreholes, Glacier ice, Ice formation, Active layer, Recrystallization, Ice crystal growth, Firn stratification, Georgia—Elbrus, Georgia—Garabashi Glacier

49-5542
Spatial changes in the Bolshoy Azau Glacier in the Elbrus area. [Prostranstvennye izmeneniia lednika Bol'shoĭ Azau v Priel'brus'e]
Zolotarev, E.A., Ushakova, L.A., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.117-122, In Russian with English summary. 10 refs.
DLC GB2401.M37
Glacier oscillation, Glacier surfaces, Glacier tongues, Glacier ablation, Models, Data processing, Photogrammetric surveys, Image processing, Georgia—Elbrus, Georgia—Bolshoy Azau Glacier

49-5543
Displacement of the Tuyuksu Glacier terminus and its annual mass balance. [Peremeshchenie kontsa lednika Tuiuksu i godovoĭ balans ego massy]
Makarevich, K.G., Tiulina, T.IU., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.122-125, In Russian with English summary. 4 refs.
DLC GB2401.M37
Glacier mass balance, Glacier tongues, Glacier oscillation, Glacier ablation, Glacier melting, Kazakhstan—Zailiyskiy Alatau, Kazakhstan—Tuyuksu Glacier

49-5544
Distribution of snow resources on the glaciers of Central Altay. [Raspredelenie snegozapasov na lednikakh Tsentral'nogo Altaia]
Narozhnyĭ, IU.K., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.125-131, In Russian with English summary. 14 refs.
DLC GB2401.M37
Snow accumulation, Snow cover distribution, Water reserves, Snow ice interface, Russia—Altay Mountains

49-5545
Avalanches in the Baykal region. [Snezhnye laviny Pribaĭkal'ia]
Gulevich, V.P., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.131-135, In Russian with English summary. 11 refs.
DLC GB2401.M37
Avalanches, Avalanche formation, Recrystallization, Avalanche forecasting, Avalanche mechanics, Russia—Baykalskiy Range

49-5546
Impact of air streams on the formation of caves in glaciers. [Vliianie vozdushnykh potokov na formirovanie peshcher v lednikakh]
Mavliudov, B.R., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.135-139, In Russian with English summary. 4 refs.
DLC GB2401.M37
Ice caves, Glacier melting, Temperature effects, Tectonics, Air temperature, Air flow, Meltwater, Russia—Pamirs, Russia—Medvezhiy Glacier

49-5547
North American regional conference on standards in glacier mass balance studies. [Severoamerikanskoe regional'noe soveshchanie po standartam v izuchenii balansa massy lednikov], *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.143-148, In Russian.
DLC GB2401.M37
Meetings, Glacier mass balance

49-5548
Data on glaciers of the USSR in the Mass Balance Bulletin. [Materialy po lednikam SSSR v Mass-balansovom biulletene], *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Oct. 1991, Vol.73, p.148-156, In Russian.
DLC GB2401.M37
Glacier ablation, Glacier mass balance, Glacier surveys, CIS

49-5549

First attempt at preparing data for the Mass Balance Bulletin (MBB). [Pervyĭ opyt podgotovki materialov dlia Mass-balansovogo biulletenia (MBB)]

Popovnin, V.V., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ,* Oct. 1991, Vol.73, p.156-161, In Russian.

DLC GB2401.M37

Glacier mass balance, Glacier surveys, CIS

49-5550

Some proposals for optimizing the presentation of mass balance data in publications of the World Glacier Monitoring Service. [Nekotorye predlozheniia po optimizatsii predstavleniia mass-balansovykh dannykh v izdaniiakh Vsemirnoĭ sluzhby monitoringa lednikov]

Kotliakov, V.M., Popovnin, V.V., Tsvetkov, D.G., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ,* Oct. 1991, Vol.73, p.161-167, In Russian.

DLC GB2401.M37

Glacier mass balance, Glacier oscillation, International cooperation, Organizations

49-5551

Report by V.M. Kotliakov delivered at the meeting of the Scientific Council of the Institute of Geography. [Doklad V.M. Kotliakova na Uchenom sovete Instituta geografii]

Dreĭer, N.N., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ,* Oct. 1991, Vol.73, p.167-168, In Russian.

DLC GB2401.M37

Meetings, Global change, Geography, Environmental protection

49-5552

Dendroindication as one method of monitoring glacio-nival phenomena and processes. [Dendroindikatsiia kak odin iz metodov monitoringa nival'no-gliatsial'nykh iavleniĭ i protsessov]

Solomina, O.N., Ol'shanskiĭ, G.I., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ,* Oct. 1991, Vol.73, p.169-175, In Russian with English summary. 23 refs.

DLC GB2401.M37

Age determination, Glacier oscillation, Snow depth, Trees (plants), Climatic changes

49-5553

Methods of processing and mapping the data from radar surveys of glaciers. [Metodika obrabotki i kartografirovaniia dannykh radiolokatsionnoĭ s"emki lednikov]

Konstantinova, T.N., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ,* Oct. 1991, Vol.73, p.176-180, In Russian with English summary. 6 refs.

DLC GB2401.M37

Computer applications, Mapping, Data processing, Radio echo soundings, Radar echoes, Remote sensing, Glacier surfaces, Subglacial observations, Glacier thickness, Glacier beds, Ice models, Norway—Spitsbergen, Norway—Fridtjof Glacier, Norway—Hans Glacier

49-5554

Glaciology at the 20th General Assembly of the International Geodetic and Geophysical Union in Vienna. [Gliatsiologiia na XX General'noĭ assamblee Mezhdunarodnogo geodezicheskogo i geofizicheskogo soiuza v Vene]

Glazovskiĭ, A.F., Kotliakov, V.M., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ,* Oct. 1991, Vol.73, p.181-189, In Russian.

DLC GB2401.M37

Glaciology, Meetings, International cooperation, Organizations

49-5555

Contribution of dissertation research to the development of glaciological theory and practice. [Vklad dissertatsionnykh issledovaniĭ v razvitie teorii i praktiki gliatsiologii]

Nikolaeva, G.M., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ,* Oct. 1991, Vol.73, p.189-193, In Russian.

DLC GB2401.M37

Glaciology, Research projects

49-5556

Annotated list of Soviet literature on glaciology for 1989. [Annotirovannyĭ spisok sovetskoĭ literatury po gliatsiologii za 1989 god]

Kotliakov, V.M., Chernovoĭ, L.P., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ,* Oct. 1991, Vol.73, p.195-233, In Russian with English summary. 787 refs.

DLC GB2401.M37

Glaciology, Bibliographies

49-5557

Program and methodological bases of the compilation of the World Atlas of Snow and Ice Resources. [Programma i metodologicheskie osnovy sostavleniia Atlasa snezhno-ledovykh resursov mira]

Kotliakov, V.M., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ,* Mar. 1992, Vol.74, 240p., In Russian with English summary. Refs. p.183-190, 228-235.

DLC GB2401.M37

Maps, Mapping, Snow cover distribution, Ice cover, Ice conditions, Snowmelt, Runoff, Glaciation, Glacier surveys, Snow water equivalent, Glaciology, Precipitation (meteorology), Glaciers

49-5558

Artificial ice formation in natural conditions. [Iskusstvennoe l'doobrazovanie v prirodnykh usloviiakh]

Khodakov, V.G., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.,* July 1992, Vol.75, p.3-13, In Russian with English summary. 38 refs.

DLC GB2401.M37

Artificial freezing, Firn

49-5559

International glaciological symposium in Spitsbergen. [Mezhdunarodnyĭ gliatsiologicheskiĭ simpozium na Shpitsbergene]

Glazovskiĭ, A.F., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.,* July 1992, Vol.75, p.13-14, In Russian.

DLC GB2401.M37

Meetings, Glaciology, International cooperation, Research projects

49-5560

Pollution of glaciers in the Central Caucasus. [Zagriaznenie lednikov Tsentral'nogo Kavkaza]

Zalikhanov, M.Ch., Kerimov, A.M., Stepanov, G.V., Cherniak, M.M., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.,* July 1992, Vol.75, p.15-22, In Russian with English summary. 5 refs.

DLC GB2401.M37

Glacier ice, Impurities, Pollution, Ice microstructure, Electron microscopy, Ice drills, Caucasus

49-5561

Geochemistry of unmelted snow cover of the Kongsvegen Glacier and the Amundsen Ice Plateau in Spitsbergen. [Geokhimiia neprotaiavshego snezhnogo pokrova lednika Konsvegen i lednikovogo plato Amundsena na Shpitsbergena]

Arkhipov, S.M., Moskalevskiĭ, M.IU., Glazovskiĭ, A.F., Maevskiĭ, P., Witlow, S., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.,* July 1992, Vol.75, p.22-35, In Russian with English summary. 10 refs.

DLC GB2401.M37

Ions, Snow cover, Snow composition, Snowfall, Glacier surfaces, Norway—Spitsbergen, Norway—Kongsvegen Glacier, Norway—Amundsen Ice Plateau

49-5562

New data on the structure and development of the Vavilov Ice Dome, Severnaya Zemlya. [Novye dannye o stroenii i razvitii lednika Vavilova na Severnoĭ Zemle]

Barkov, N.I., et al, *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.,* July 1992, Vol.75, p.35-41, In Russian with English summary. 14 refs.

DLC GB2401.M37

Glacier mass balance, Glacier ablation, Boreholes, Glacier alimentation, Glacier surfaces, Glacier oscillation, Precipitation (meteorology), Paleoclimatology, Russia—Severnaya Zemlya, Russia—Vavilov Ice Dome

49-5563

Glacigenic deposits of the Central Depression—key to the late Quaternary history of the development of the eastern Barents Sea. [Gliatsigennye otlozheniia tsentral'noĭ vpadiny—kliuch k pozdnechetvertichnoĭ istorii razvitiia vostochnoĭ chasti Barentseva moria]

Gataullin, V.N., Poliak, L.V., Epshteĭn, O.G., Romaniuk, B.F., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.,* July 1992, Vol.75, p.42-50, In Russian with English summary. 28 refs.

DLC GB2401.M37

Quaternary deposits, Glacial erosion, Ice cover, Ice conditions, Glacial till, Bedrock, Glacial geology, Marine deposits, Barents Sea

49-5564

Layered ice on the western coast of the Yamal Peninsula: structure, composition and origin. [Plastovye l'dy zapadnogo poberezh'ia poluostrova IAmal: stroenie, sostav i proiskhozhdenie]

Gataullin, V.N., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.,* July 1992, Vol.75, p.50-57, In Russian with English summary. 13 refs.

DLC GB2401.M37

Glacier ice, Land ice, Ice composition, Ice structure, Glacial deposits, Ice formation, Russia—Yamal Peninsula

49-5565

Models of dielectric permittivity of wet snow considering the spatial distribution of its moisture. [Modeli dielektricheskoĭ pronitsaemosti vlazhnogo snega s uchetom prostranstvennogo raspredeleniia v nem vlagi]

Boiarskiĭ, D.A., Kliorin, N.I., Mirovskiĭ, V.G., Tikhonov, V.V., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.,* July 1992, Vol.75, p.57-62, In Russian with English summary. 25 refs.

DLC GB2401.M37

Wet snow, Dielectric properties, Mathematical models, Remote sensing, Snow cover, Scattering

49-5566

Ice thickness and subglacial topography of the Abramov Glacier based on data from low frequency radio echo sounding. [Tolshchina l'da i podlednyĭ rel'ef lednika Abramova po dannym nizkochastotnogo radiozondirovaniia]

Kuz'michenok, V.A., Vasilenko, E.V., Macheret, IU.IA., Moskalevskiĭ, M.IU., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.,* July 1992, Vol.75, p.63-68 + 3 col. fold. maps, In Russian with English summary. 12 refs.

DLC GB2401.M37

Maps, Glacier surfaces, Subglacial observations, Remote sensing, Radio echo soundings, Glacier thickness, Glacier tongues, Topographic maps, CIS—Abramov Glacier, CIS—Tien Shan, CIS—Alay Range

49-5567

Mathematical model for reconstructing the shape of inland ice sheets. [Matematicheskaia model' rekonstruktsii formy nazemnykh lednikovykh shchitov]

Balaeva, V.A., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.68-70, In Russian with English summary. 4 refs.

DLC GB2401.M37

Ice cover, Pleistocene, Mathematical models

49-5568

Identifying boundary conditions on a glacier bed with the aid of measurements made on its surface. [Opredelenie granichnykh uslovii na dne lednika pri pomoshchi izmerenii na ego poverkhnosti]

Larina, T.B., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.71-74, In Russian with English summary. 8 refs.

DLC GB2401.M37

Analysis (mathematics), Glacier beds, Glacier surfaces, Velocity, Viscosity, Glacier oscillation, Subglacial observations, Brittleness, Fracturing, Glacier surges

49-5569

Entropy monitoring of an ice cover regime. [Entropiinyi monitoring rezhima lednikovogo pokrova]

Efimov, V.A., Govorukha, L.S., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.74-77, In Russian with English summary. 11 refs.

DLC GB2401.M37

Ice cover thickness, Thermodynamics, Air water interactions, Moisture transfer, Glacier alimentation, Glacier ablation, Air ice water interaction, Climatic changes, Russia—Vavilov Ice Dome

49-5570

Inactive glaciers of Severnaya Zemlya. [Passivnye ledniki na Severnoi Zemle]

Bol'shiianov, D.IU., Nikolaev, V.I., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.78-81, In Russian with English summary. 17 refs.

DLC GB2401.M37

Land ice, Glaciers, Glacier ice, Ice formation, Isotopes, Geochemistry, Russia—Severnaya Zemlya

49-5571

Research on Antarctic sea ice. [Ob issledovaniiakh morskikh antarkticheskikh l'dov]

Romanov, A.A., Korotkov, A.I., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.82-85, In Russian with English summary. 8 refs.

DLC GB2401.M37

Ice forecasting, Sea ice distribution, Ice conditions, Ice navigation, Long range forecasting, Antarctica—Weddell Sea

Development of reliable methods of long-term predictions of ice conditions for navigation in antarctic waters is discussed as an important objective of the studies of ice regime in the southern ocean. The comprehensive interrelated and interacting ice surveys are discussed. Regional problems of ice studies in the Weddell Sea are specified with regard to the draft of the "Ice" section in the national part of the International Programme of "Antarctic zone" studies. (Auth.)

49-5572

Structural characteristics and chemical composition of layered ice in the Shpindler area on the Yugorskiy Peninsula. [Strukturnye osobennosti i khimicheskii sostav plastovykh l'dov urochishcha Shpindler na IUgorskom poluostrove]

Ivanov, A.V., Gol'dfarb, IU.I., Ezhova, A.B., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.86-89, In Russian with English summary. 17 refs.

DLC GB2401.M37

Ice composition, Ion exchange, Leaching, Migration, Salinity, Ice structure, Frozen rocks, Ground ice, Russia—Yugorskiy Peninsula, Russia—Kara Sea

49-5573

Mass transfer in the surface snow layer in central Antarctica. [Massoperenos v pripoverkhnostnoi snezhnoi tolshche Tsentral'noi Antarktidy]

Nikolenko, A.V., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.89-93, In Russian with English summary. 8 refs.

DLC GB2401.M37

Snow cover, Snow surface, Snow surface temperature, Snow density, Water vapor, Metamorphism (snow), Vapor diffusion, Mass balance, Mass transfer, Antarctica—Vostok Station

Results of experimental measurements of mass transfer by water vapor diffusion through snow cover in the vicinity of Vostok Station are presented. Changes in the annual mass balance and snow density with depth have been evaluated. The data testify to the possible deformation of snow density profile versus depth under the effects of water vapor diffusion. The possible agents determining this phenomenon are analyzed. The possibility of deformation of temperature and density profiles in the near-surface snow sequence due to snow metamorphism is shown.

49-5574

Effect of temperature on snow strength properties. [Vliianie temperatury na prochnostnye svoistva snega]

Zhidkov, V.A., Samoilov, R.S., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.94-98, In Russian with English summary. 16 refs.

DLC GB2401.M37

Snow strength, Snow density, Snow compression, Snow deformation, Snow temperature, Temperature effects, Tensile properties, Shear strength, Air temperature, Penetration tests, Analysis (mathematics)

49-5575

Calculating the minimum winter discharge from glacially nourished rivers in the Caucasus. [O raschete minimal'nogo zimnego stoka rek Kavkaza s lednikovym pitaniem]

Imanov, F.A., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.98-101, In Russian with English summary. 10 refs.

DLC GB2401.M37

Rivers, River basins, Glacier melting, Hydraulics, Accuracy, Analysis (mathematics), Caucasus

49-5576

Glaciers on Chantalskiy Range. [Ledniki Chantal'skogo khrebta]

Sedov, R.V., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.102-107, In Russian with English summary. 3 refs.

DLC GB2401.M37

Mountain glaciers, Glacier surveys, Russia—Chukotskiy Peninsula, Russia—Chantal'skiy Range

49-5577

Stability of an ice core. [Ustoichivost' ledianogo kerna]

Zagorodnov, V.S., Nagornov, O.V., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.107-112, In Russian with English summary. 5 refs.

DLC GB2401.M37

Ice cores, Thermal stresses, Thermal drills, Temperature distribution, Ice cracks, Analysis (mathematics), Ice coring drills

49-5578

Oriented lakes of edoma plains: the result of thawing through glacial grooves? [Orientirovannye ozera edomnykh ravnin: rezul'tat protaivaniia po lednikovym borozdam?]

Grosval'd, M.G., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.112, In Russian.

DLC GB2401.M37

Glacial lakes, Origin, Meltwater, Theories

49-5579

Meteorological conditions for the formation of the winter mass balance of the Tuyuksu Glacier. [Meteorologicheskie usloviia formirovaniia zimnego balansa massy lednika Tuiuksu]

Voloshina, A.P., Golovkova, R.G., Sudakov, P.A., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.113-122, In Russian with English summary. 12 refs.

DLC GB2401.M37

Glacier mass balance, Snow accumulation, Precipitation (meteorology), Snowfall, Air temperature, Kazakhstan—Zailiyskiy Alatau, Kazakhstan—Tuyuksu Glacier

49-5580

Summer mass balance of the Tuyuksu Glacier and its relationship to meteorological indices. [Letnii balans massy lednika Tuiuksu i ego sviaz' s meteorologicheskimi pokazateliami]

Voloshina, A.P., Golovkova, R.G., Makarevich, K.G., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.122-134, In Russian with English summary. 4 refs.

DLC GB2401.M37

Glacier mass balance, Glacier ablation, Air temperature, Radiation balance, Precipitation (meteorology), Kazakhstan—Zailiyskiy Alatau, Kazakhstan—Tuyuksu Glacier

49-5581

External mass exchange of the Tuyuksu Glacier: spatial and temporal analysis during the period of instrumental measurements. [Vneshnii massoobmen lednika Tuyuksu: prostranstvenno-vremennoi analiz za period instrumental'nykh izmerenii]

Makarevich, K.G., Voloshina, A.P., Uvarov, V.N., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.135-140, In Russian with English summary. 9 refs.

DLC GB2401.M37

Glacier mass balance, Glacier ablation, Glacier alimentation, Air temperature, Kazakhstan—Zailiyskiy Alatau, Kazakhstan—Tuyuksu Glacier

49-5582

Current fluctuations of Tien Shan glaciers. [O sovremennykh kolebaniiakh lednikov Tian'-Shania]

Tiulina, T.IU., Uvarov, V.N., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.140-148, In Russian with English summary. 13 refs.

DLC GB2401.M37

Glacier oscillation, Glacier mass balance, Glacier ablation, Air temperature, Glacier surveys, CIS—Tien Shan, Kazakhstan—Tuyuksu Glacier

49-5583

Fields of current glacier fluctuations in the Alps. [Polia kolebanii sovremennykh lednikov Al'p]

Konovalova, G.I., Konstantinova, T.N., Timofeeva, N.A., Chernova, L.P., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.148-154, In Russian with English summary. 8 refs.

DLC GB2401.M37

Glacier oscillation, Glacier surveys, Air temperature, Precipitation (meteorology), Glacier tongues, Alps

49-5584

Spatial-temporal variability in the characteristics of the regime of glaciers on the southern slope of Elbrus. [Prostranstvenno-vremennaia izmenchivost' kharakteristik rezhima lednikov iuzhnogo sklona El'brusa]

Bazhev, A.B., Rototaeva, O.V., Khmelevskoi, I.F., *Rossiiskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovanii.*, July 1992, Vol.75, p.154-163, In Russian with English summary. 12 refs.

DLC GB2401.M37

Glacier alimentation, Glacier tongues, Glacier melting, Glacier mass balance, Glacier ablation, Georgia—Elbrus, Georgia—Garabashi Glacier

49-5585

Interaction of nival-glacial systems with human activity. [Vzaimodeĭstvie nival'no-gliatsial'nykh sistem i deiatel'nosti cheloveka]

Khromova, T.E., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ.*, July 1992, Vol.75, p.165-176, In Russian with English summary. 11 refs.

DLC GB2401.M37

Environmental impact, Avalanche protection, Snow cover, Nivation, Caucasus

49-5586

Snow conditions for winter recreation in Tien Shan and Pamir-Alay. [Snezhnye usloviia zimneĭ rekreatsii Tian'-Shania i Pamiro-Alaia]

Kravchenko, G.N., Getker, M.I., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ.*, July 1992, Vol.75, p.176-185, In Russian with English summary. 11 refs.

DLC GB2401.M37

Snow cover distribution, Snow depth, Snow cover stability, Snow melting, CIS—Tien Shan, Pamir-Alay

49-5587

Impact of winter recreation on natural complexes and recommendations for their efficient use. [Vliianie zimneĭ rekreatsii na prirodnye kompleksy i rekomendatsii po ikh effektivnomu ispol'zovaniiu]

Kravchenko, G.N., Mavliudov, B.R., Suprunenko, IU.P., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ.*, July 1992, Vol.75, p.185-194, In Russian with English summary. 22 refs.

DLC GB2401.M37

Environmental impact, Environmental protection, Snow cover, Snow depth, Snow compaction, Snow density, CIS—Tien Shan, Caucasus

49-5588

Methods of estimating and controlling aufeis hazards along routes of linear engineering structures. [Metody otsenki i kontrol' nalednoĭ opasnosti vdol' trass lineĭnykh inzhenernykh sooruzheniĭ]

Alekseev, V.R., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ.*, July 1992, Vol.75, p.194-199, In Russian with English summary. 14 refs.

DLC GB2401.M37

Naleds, Countermeasures, Data processing

49-5589

Current state of avalanche protection for the Baykal-Amur railroad line. [Sovremennoe sostoianie protivolavinnoĭ zashchity Baĭkalo-Amurskoĭ zheleznoĭ dorogi]

Matvienko, V.S., Kozlov, IU.V., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ.*, July 1992, Vol.75, p.199-203, In Russian with English summary. 2 refs.

DLC GB2401.M37

Avalanche protection, Countermeasures, Railroads, Baykal Amur railroad

49-5590

Experimental studies of the functioning of avalanche retarding structures. [Eksperimental'nye issledovaniia raboty lavinotormoziashchikh sooruzheniĭ]

IAdroshnikov, V.I., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ.*, July 1992, Vol.75, p.203-208, In Russian with English summary. 7 refs.

DLC GB2401.M37

Avalanche protection, Countermeasures, Avalanche modeling, Avalanche mechanics, Mathematical models

49-5591

Splitting of an ice floe from impact against end piers of bridges with a vertical cutting edge. [Raskalyvanie l'diny pri udare o mostovuiu oporu s vertikal'noĭ rezhushcheĭ gran'iu]

Gevorkian, S.G., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ.*, July 1992, Vol.75, p.208-212, In Russian with English summary. 14 refs.

DLC GB2401.M37

Ice floes, Ice cover strength, Ice mechanics, Floating ice, River ice, Ice solid interface, Bridges, Piers, Analysis (mathematics)

49-5592

Working session and seminar of the glaciology section, autumn 1991. [Rabochee soveshchanie i shkola-seminar sektsii gliatsiologii osen'iu 1991 g.]

Ushakov, A.I., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ.*, July 1992, Vol.75, p.213-218, In Russian.

DLC GB2401.M37

Meetings, Glaciology, Global change, Research projects

49-5593

Early days of glaciology in Kazakhstan. [U istokov gliatsiologicheskoĭ nauki Kazakhstana]

Cherkasov, P.A., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ.*, July 1992, Vol.75, p.219-222, In Russian.

DLC GB2401.M37

Glaciology, History, Kazakhstan

49-5594

Paradox of Terskye Keĭvy—late moraines in the southeast of the Kola Peninsula. [Paradoks terskikh keĭv—molodykh moren iugo-vostoka Kol'skogo poluostrova]

Grosval'd, M.G., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ.*, July 1992, Vol.75, p.231, In Russian.

DLC GB2401.M37

Moraines, Glacial deposits, Russia—Kola Peninsula

49-5595

Workshop on glaciology at the Institute of Geography, Russian Academy of Sciences (June 1991-July 1992). [Nauchnyĭ seminar po gliatsiologii v Institute geografii RAN (iiun' 1991-iiul' 1992)]

Mikhalenko, V.N., *Rossiĭskaia akademiia nauk. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ.*, July 1992, Vol.75, p.232, In Russian.

DLC GB2401.M37

Meetings, Glaciology, Research projects

49-5596

Low-level atmospheric jets and inversions on Ice Station Weddell 1.

Andreas, E.L., Claffey, K.J., Makshtas, A.P., MP 3623, *Antarctic journal of the United States,* 1993, 28(5), p.274-276, 9 refs.

Meteorological data, Weather observations, Meteorological instruments, Wind (meteorology), Antarctica—Weddell Sea

During deployment on Ice Station Weddell 1 (ISW-1) in 1992 the authors launched radiosondes, typically at 00 and 12 Greenwich mean time (GMT) to investigate the structure of the lower atmosphere. Near the end of the drift in late May and early June, they launched simultaneous radiosondes from ISW-1 and from the *Akademik Fedorov* at 00, 06, 12, and 18 GMT as the *Fedorov* approached from the northeast to help disassemble the station. Here the authors report some preliminary results from this radiosounding program.

49-5597

Dynamic interaction between titanium and snow.

Abe, M., Ito, H., Ueda, K., Aoyagi, H., Nishimura, T., World Titanium Conference, 3rd, San Diego, CA, June 29-July 2, 1992. Proceedings, Vol.3. Edited by F.H. Froes et al, Warrendale, PA, Minerals, Metals & Materials Society, 1992, p.2,713-2,720, 5 refs.

DLC TA480.T54 W67

Metals, Ice solid interface, Snow mechanics, Metal snow friction, Sliding, Design criteria, Construction materials

49-5598

Laboratory study of the uptake of HNO_3 and HCl vapor by snow crystals and ice spheres at temperatures between 0 and -40°C.

Diehl, K., Mitra, S.K., Pruppacher, H.R., *Atmospheric environment,* May 1995, 29(9), p.975-981, 22 refs.

Snow crystals, Snow physics, Atmospheric composition, Ice vapor interface, Dendritic ice, Aerosols, Air pollution, Scavenging, Chemical properties, Adsorption, Temperature effects, Cloud physics, Simulation

49-5599

Scavenging of SO_2 and HCl during growth of ice crystals by vapour diffusion.

Santachiara, G., Prodi, F., Vivarelli, F., *Atmospheric environment,* May 1995, 29(9), p.983-987, 27 refs.

Cloud physics, Falling snow, Scavenging, Aerosols, Cloud droplets, Ice vapor interface, Ice crystal growth, Vapor diffusion, Absorption, Simulation, Chemical properties

49-5600

Oxygen isotope study of water masses in the Princess Elizabeth Trough, Antarctica.

Frew, R.D., Heywood, K.J., Dennis, P.F., *Marine chemistry,* Apr. 1995, 49(2-3), p.141-153, 25 refs.

Oceanography, Hydrography, Sea water, Sampling, Isotope analysis, Ice water interface, Ice melting, Ice cover effect, Antarctica—Weddell Sea

Data from a hydrographic survey located in the Princess Elizabeth Trough near the antarctic continent are presented and discussed. This region is covered by sea-ice for most of the year with the ice-edge retreating to the southern edge of the Trough during summer. Water samples were collected during the austral summer, Feb. 1993, to determine the ratio of the oxygen-18 to oxygen-16 isotope, $\delta^{18}O$. Four water bodies are characterized by their temperature, salinity and $\delta^{18}O$ properties, Surface Water, Winter Water, Warm Deep Water and Bottom Water. The Bottom Water is warmer, saltier and heavier isotopically than Weddell Sea Bottom Water, and has T-S properties close to that of classical Antarctic Bottom Water. This Bottom Water is isotopically distinct from the Weddell Sea-derived Bottom Water that ventilates the Indian Ocean through the Kerguelen-Crozet gap. A mechanism for local formation of the Bottom Water involving freezing of Surface Water and entrainment of Warm Deep Water is described. (Auth. mod.)

49-5601

Dynamics and marginal positions of the eastern Scandinavian ice sheet during the Younger Dryas. [Skandinavian mannerjäätikön itäosan dynamiikka ja reuna-asemat Nuoremman Dryaksen aikana]

Punkari, M., Boulton, G.S., *Terra,* 1995, 107(1), p.3-14, In Finnish with English summary. 58 refs.

Pleistocene, Paleoclimatology, Ice sheets, Glacier oscillation, Marine geology, Glacial geology, Ice edge, Finland

49-5602

Role of snow sublimation in frontogenesis.

Parker, D.J., Thorpe, A.J., *Royal Meteorological Society. Quarterly journal,* Apr. 1995, 121(524)pt.B, p.763-782, 22 refs.

Precipitation (meteorology), Fronts (meteorology), Synoptic meteorology, Wind direction, Snow physics, Falling snow, Sublimation, Air temperature, Cooling, Snow air interface, Snow evaporation, Analysis (mathematics)

49-5603

Ecological-economic stability in traditional branches during the industrial development of the North. [Ekologo-khoziaĭstvennaia ustoĭchivost' traditsionnykh otrasleĭ pri promyshlennom osvoenii Severa]

Khrushchev, S.A., Geografiia i khoziaĭstvo. Vyp.4: Raĭony prozhivaniia malochislennykh narodov Severa (Geography and economics. Vol.4: Sparsely-populated regions in the North). Edited by A.I. Chistobaev, Leningrad, GO SSSR, 1991, p.32-49, In Russian. 18 refs.

Economic development, Ecology, Environmental impact, Russia—Far North

49-5604
Development of a regional climate model of the western Arctic.
Lynch, A.H., Chapman, W.L., Walsh, J.E., Weller, G., *Journal of climate,* June 1995, 8(6), p.1555-1570, 49 refs.
Climatology, Atmospheric physics, Models, Simulation, Sea ice, Ice air interface, Ice cover effect, Climatic factors, Weather forecasting, Moisture transfer

49-5605
Evidence of the Eldgjá (Iceland) eruption in the GISP2 Greenland ice core: relationship to eruption processes and climatic conditions in the tenth century.
Zielinski, G.A., et al, *Holocene,* 1995, 5(2), p.129-140, 69 refs.
Ice sheets, Ice cores, Volcanoes, Aerosols, Volcanic ash, Geochemistry, Sediments, Sampling, Climatic factors, Age determination, Iceland—Eldgjá, Greenland—Summit

49-5606
Calendar-dated, early 'Little Ice Age' glacier advance at Robson Glacier, British Columbia, Canada.
Luckman, B.H., *Holocene,* 1995, 5(2), p.149-159, 35 refs.
Glacier oscillation, Sediments, Moraines, Radioactive age determination, Accuracy, Correlation, Canada—British Columbia—Robson Glacier

49-5607
Trace gas emissions from Canadian peatlands and the effect of climatic change.
Moore, T.R., *Wetlands,* Sep. 1994, 14(3), p.223-228, 41 refs.
Wetlands, Peat, Soil air interface, Vapor transfer, Natural gas, Carbon dioxide, Climatic changes, Atmospheric composition, Geochemical cycles, Canada

49-5608
Kinetics of crystallizing D_2O water near 150 K by Fourier transform infrared spectroscopy and a comparison with the corresponding calorimetric studies on H_2O water.
Hage, W., Hallbrucker, A., Mayer, E., Johari, G.P., *Journal of chemical physics,* July 8, 1995, 103(2), p.545-550, 21 refs.
Ice physics, Deuterium oxide ice, Cubic ice, Freezing rate, Cryogenics, Infrared spectroscopy, Phase transformations, Spectra, Temperature effects, Temperature measurement, Diffusion

49-5609
Calcium magnesium acetate (CMA) production: an assessment of process technology.
Sheridan Technical Associates Inc., *Ontario. Ministry of Transportation. Research and Development Branch. Technical report,* Mar. 1990, MAT-90-09, 110p., 62 refs.
Road maintenance, Winter maintenance, Salting, Road icing, Ice removal, Materials, Manufacturing, Chemical analysis, Cost analysis

49-5610
Managing roadway snow and ice control operations.
Kuemmel, D.E., National Cooperative Highway Research Program. NCHRP synthesis of highway practice, No.207, Washington, D.C., U.S. National Research Council, Transportation Research Board, 56p., PB95-176624, 129 refs.
DLC TE220.5.K84 1994
Road icing, Road maintenance, Highway planning, Snow removal, Chemical ice prevention, Salting, Sanding, Weather forecasting, Cost analysis

49-5611
Contribution of icing ablation to streamflow in a discontinuous permafrost area.
Reedyk, S., Woo, M.K., Prowse, T.D., *Canadian journal of earth sciences,* Jan. 1995, 32(1), p.13-20, With French summary. 26 refs.
Stream flow, Icing, Ablation, Ice melting, Flow measurement, Ice water interface, Flood forecasting, Periodic variations, Discontinuous permafrost

49-5612
Anatomy of an Upper Silurian transgressive-regressive cycle, Prince of Wales Island, arctic Canada.
Mortensen, P.S., Jones, B., *Canadian journal of earth sciences,* Jan. 1995, 32(1), p.24-36, With French summary. 57 refs.
Paleoecology, Arctic landscapes, Sediments, Fossils, Lithology, Geologic processes, Algae, Canada—Northwest Territories—Prince of Wales Island

49-5613
Glacial advances and stratigraphy in Otto Fiord and adjacent areas, Ellesmere Island, Northwest Territories.
Bednarski, J.M., *Canadian journal of earth sciences,* Jan. 1995, 32(1), p.52-64, With French summary. 37 refs.
Arctic landscapes, Pleistocene, Glaciation, Marine geology, Glacial geology, Sea level, Quaternary deposits, Radioactive age determination, Stratigraphy, Canada—Northwest Territories—Ellesmere Island

49-5614
Sedimentary record of Moose Lake: implications for glacier activity in the Mount Robson area, British Columbia.
Desloges, J.R., Gilbert, R., *Canadian journal of earth sciences,* Jan. 1995, 32(1), p.65-78, With French summary. 37 refs.
Lacustrine deposits, Bottom sediment, Radio echo soundings, Sedimentation, Age determination, Glacial deposits, Glacier melting, Glacial hydrology, Canada—British Columbia—Moose Lake

49-5615
Highly active microbial communities in the ice and snow cover of high mountain lakes.
Felip, M., Sattler, B., Psenner, R., Catalan, J., *Applied and environmental microbiology,* June 1995, 61(6), p.2394-2401, 43 refs.
Limnology, Microbiology, Lake ice, Snow cover, Slush, Biomass, Growth, Ecosystems, Sampling, Plankton

49-5616
Calorimetric study of crystal growth of ice in hydrated methemoglobin and of redistribution of the water clusters formed on melting the ice.
Sartor, G., Mayer, E., *Biophysical journal,* Oct. 1994, 67(4), p.1724-1732, 26 refs.
Hydrates, Ice physics, Ice melting, Ice crystal growth, Phase transformations, Temperature measurement, Melting points, Cooling rate, Ice water interface, Recrystallization, Temperature effects, Thermodynamics

49-5617
Effectiveness of high-performance thin surfacings in a wet-freeze environment.
Kazmierowski, T.J., Bradbury, A., Hajek, J., Jones, G., *Transportation research record,* Aug. 1993, No.1392, p.3-12, 6 refs.
Pavements, Road maintenance, Surface properties, Covering, Protective coatings, Polymers, Frost resistance, Specifications, Skid resistance

49-5618
Chloride penetration and the effect on porosity in a pavement.
Miller, R.A., Krouskop, B., Minkarah, I.A., Bodocsi, A., *Transportation research record,* Aug. 1993, No.1392, p.134-141, 8 refs.
Concrete pavements, Concrete durability, Ice removal, Salting, Antifreezes, Road maintenance, Corrosion, Seepage, Porosity, Penetration tests, Ion diffusion, Cold weather tests

49-5619
Instrumentation of a landfill cover to measure depth of frost penetration.
Zimmie, T.F., Moo-Young, H.K., Harris, W.A., Myers, T.J., *Transportation research record,* Oct. 1994, No.1432, p.44-49, 11 refs.
Waste disposal, Municipal engineering, Linings, Sludges, Permeability, Freeze thaw cycles, Frost penetration, Thermistors, Electrical resistivity, Snow cover effect

49-5620
Low-temperature fracture toughness of polyethylene-modified asphalt binders.
Lee, N.K., Hesp, S.A.M., *Transportation research record,* Oct. 1994, No.1436, p.54-59, 29 refs.
Pavements, Brittleness, Mechanical tests, Bitumens, Thermal stresses, Cracking (fracturing), Low temperature tests, Admixtures, Polymers, Countermeasures

49-5621
Effect of moisture on low-temperature asphalt mixture properties and thermal-cracking performance of pavements.
Kim, N.H., Roque, R., Hiltunen, D., *Transportation research record,* Dec. 1994, No.1454, p.82-88, 10 refs.
Bituminous concretes, Concrete pavements, Admixtures, Brittleness, Thermal stresses, Cracking (fracturing), Low temperature tests, Cold weather performance, Moisture

49-5622
Horizontal distribution of air pollution in Sapporo based on the measurements of electric conductivity and hydrogen exponent of snowfall.
Kikuchi, K., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Nov. 1975, Vol.34, p.67-77, In Japanese with English summary. 4 refs.
Snowfall, Snow impurities, Snow composition, Snow electrical properties, Scavenging, Air pollution, Japan—Hokkaido

49-5623
Measurements of the aerosol concentration and the electric conductivity of melted snowfall during winter season at Sapporo.
Kikuchi, K., Endoh, T., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Aug. 1975, Vol.33, p.1-8, In Japanese with English summary. 9 refs.
Snowfall, Snowmelt, Snow impurities, Snow composition, Snow electrical properties, Scavenging, Aerosols, Air pollution, Japan—Hokkaido

49-5624
Observations of ice-rampart and icequake activity in Lake Kussharo.
Sugimoto, Y., Fujii, S., Moriya, T., Sasatani, T., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Nov. 1981, Vol.40, p.79-91, In Japanese with English summary. 15 refs.
Lake ice, Ice deformation, Ice cracks, Icequakes, Pressure ridges, Ice pileup, Ice override, Ice push, Japan—Hokkaido

49-5625
Observations of planetary boundary layer by means of sonic radar in the cold season, Hokkaido Island, Japan.
Taniguchi, T., Kikuchi, K., Harimaya, T., Maki, M., Hiramatsu, C., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Oct. 1983, Vol.42, p.27-35, In Japanese with English summary. 7 refs.
Atmospheric boundary layer, Air temperature, Surface temperature, Falling snow, Snow acoustics, Snow cover effect, Sodar, Japan—Hokkaido

49-5626
Artificial making of snow crystals of cold temperature types—preliminary reports.
Sato, N., Kikuchi, K., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Oct. 1983, Vol.42, p.37-50, In Japanese with English summary. 20 refs.
Snow crystal growth, Snow crystal structure, Artificial snow, Ice crystal replicas, Cloud chambers

49-5627

Spatial variations of nocturnal cooling on Hokkaido Island.

Maki, M., Harimaya, T., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Mar. 1984, Vol.43, p.1-15., In Japanese with English summary. 13 refs.

Air temperature, Surface temperature, Diurnal variations, Wind factors, Topographic effects, Japan—Hokkaido

49-5628

Process of nocturnal cooling in a land basin.

Maki, M., Harimaya, T., Kikuchi, K., Taniguchi, T., Horie, N., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Mar. 1984, Vol.43, p.17-29, In Japanese with English summary. 12 refs.

Air temperature, Surface temperature, Diurnal variations, Wind factors, Topographic effects, Japan—Hokkaido

49-5629

Winter precipitation characteristics in the recent decade in Sapporo, Hokkaido, Japan (supplement: records of the snow depth of the recent 3 years as recorded by 50 primary and junior high schools in Sapporo).

Kikuchi, K., Kon, H., Taniguchi, T., Asuma, Y., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Oct. 1984, Vol.44, p.1-21, In Japanese with English summary. 10 refs.

Snowfall, Snow depth, Snowstorms, Clouds (meteorology), Cloud cover, Precipitation (meteorology), Weather forecasting, Meteorological data, Japan—Hokkaido

49-5630

Method for estimating the advection velocity of radar echoes using a simple weather radar system.

Asuma, Y., Kikuchi, K., Kon, H., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Oct. 1984, Vol.44, p.23-34, In Japanese with English summary. 12 refs.

Snowfall, Snowstorms, Weather forecasting, Radar echoes, Radar tracking, Japan—Hokkaido

49-5631

Experiments for a very-short-range prediction of snowfall using a simple weather radar system. Part 1—outline and possibility.

Asuma, Y., Kikuchi, K., Kon, H., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Oct. 1984, Vol.44, p.35-51, In Japanese with English summary. 11 refs.

Snowfall, Snowstorms, Weather forecasting, Radar echoes, Radar tracking, Japan—Hokkaido

49-5632

Experiments for a very-short-range prediction of snowfall using a simple weather radar system. Part 2—examples of actual prediction.

Asuma, Y., Kikuchi, K., Kon, H., Taniguchi, T., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Oct. 1984, Vol.44, p.53-65, In Japanese with English summary. 10 refs.

Snowfall, Snowstorms, Weather forecasting, Radar echoes, Radar tracking, Japan—Hokkaido

49-5633

Feasibility of co-operative snow control initiatives.

Brubacher, P.H., Murray, J.G., Lobb, D., Rosevear, E.L., *Ontario. Ministry of Transportation. Research and Development Branch. Technical report,* Mar. 1992, Mat-92-05, 40p. + appends., 34 refs.

Road maintenance, Winter maintenance, Snow fences, Snow hedges, Blowing snow, Snowdrifts, Countermeasures, Cost analysis

49-5634

Ground temperature and related permafrost characteristics in West Greenland.

Van Tatenhove, F.G.M., Olesen, O.B., *Permafrost and periglacial processes,* Oct.-Dec. 1994, 5(4), p.199-215, With French summary. 35 refs.

Soil temperature, Permafrost surveys, Surface temperature, Permafrost thermal properties, Permafrost thickness, Temperature measurement, Sounding, Temperature variations, Snow cover effect, Greenland

49-5635

Identification of heat-transfer processes during soil cooling, freezing, and thaw in central Alaska.

Hinkel, K.M., Outcalt, S.I., *Permafrost and periglacial processes,* Oct.-Dec. 1994, 5(4), p.217-235, With French summary. 40 refs.

Soil physics, Discontinuous permafrost, Active layer, Heat transfer, Freeze thaw cycles, Soil temperature, Temperature variations, Soil water migration, Thermal regime, Ion density (concentration), Snowmelt, United States—Alaska

49-5636

Sublimation as a geomorphic process: a review.

Law, J., van Dijk, D., *Permafrost and periglacial processes,* Oct.-Dec. 1994, 5(4), p.237-249, With French summary. 50 refs.

Ice sublimation, Beaches, Periglacial processes, Frozen ground physics, Eolian soils, Geomorphology, Blowing snow, Sediment transport, Snow air interface, Porosity, Meteorological factors

49-5637

Ice-wedge rejuvenation, Fosheim Peninsula, Ellesmere Island, Canada.

Lewkowicz, A.G., *Permafrost and periglacial processes,* Oct.-Dec. 1994, 5(4), p.251-268, With French summary. 50 refs.

Ground ice, Geocryology, Ice wedges, Ice growth, Periodic variations, Frozen ground mechanics, Permafrost structure, Permafrost mass transfer, Stratigraphy, Climatic changes, Canada—Northwest Territories—Ellesmere Island

49-5638

Ice-wedge casts and relict polygonal patterned ground in north-east Iowa, USA.

Walters, J.C., *Permafrost and periglacial processes,* Oct.-Dec. 1994, 5(4), p.269-282, With French summary. 52 refs.

Geocryology, Patterned ground, Pleistocene, Paleoclimatology, Sediments, Soil structure, Ice wedges, Permafrost transformation, Permafrost indicators, Periglacial processes, United States—Iowa

49-5639

Snow depth controls palsa growth.

Seppälä, M., *Permafrost and periglacial processes,* Oct.-Dec. 1994, 5(4), p.283-288, With French summary. 12 refs.

Geocryology, Periglacial processes, Frost mounds, Frozen ground expansion, Snow cover effect, Snow depth, Frozen ground thermodynamics, Surface temperature, Temperature variations

49-5640

Burial mound permafrost in the Altai.

Gorbunov, A., Gorbunova, I., *Permafrost and periglacial processes,* Oct.-Dec. 1994, 5(4), p.289-292, With French summary. 9 refs.

Periglacial processes, Geocryology, Mountain soils, Permafrost origin, Permafrost indicators, Permafrost distribution, Discontinuous permafrost, Subsurface investigations, Kazakhstan—Altai Mountains

49-5641

On an explicit method for checking the freeze-thaw behavior of pavements. [Vers une méthode explicite de vérification de la tenue des chaussées au gel/dégel]

Aussedat, G., Lerolle, Y., Michaut, J.P., *Revue générales des routes et des aerodromes,* Apr. 1995, No.728, p.38-47, In French with English summary. 26 refs.

Pavements, Seasonal freeze thaw, Frost resistance, Freeze thaw cycles, Bitumens, Freezing indexes, Classifications, Design criteria

49-5642

Evidence of warming of Atlantic water in the southern Canadian Basin of the Arctic Ocean: results from the Larsen-93 expedition.

Carmack, E.C., Macdonald, R.W., Perkin, R.G., McLaughlin, F.A., Pearson, R.J., *Geophysical research letters,* May 1, 1995, 22(9), p.1061-1064, 29 refs.

Oceanographic surveys, Hydrography, Ocean currents, Water temperature, Temperature variations, Salinity, Profiles, Barents Sea

49-5643

Abbreviated test report of the Corrective Action Verification Test (CAVT) of the Family of Medium Tactical Vehicles (FMTV).

Walker, O., Swain, N.A., *U.S. Army Cold Regions Test Activity. TECOM project,* July 1995, No.1-VG-120-MTV-016, 40p. + appends., 14 refs.

Cold weather performance, Cold weather tests, Military equipment, Vehicles, Engine starters, Design criteria, Countermeasures, Temperature effects

49-5644

Method for detection of chemical reactions between concrete and deicing chemicals.

Gillis, H.J., Jang, J.W., Weiblen, P.W., Iwasaki, I., *Transportation research record,* Oct. 1994, No.1442, p.143-147, 9 refs.

Concrete durability, Concrete slabs, Pavements, Degradation, Cracking (fracturing), Salting, Solutions, Liquid solid interfaces, Ice removal, Chemical analysis

49-5645

Economic impact of winter road maintenance on road users.

Hanbali, R.M., *Transportation research record,* Oct. 1994, No.1442, p.151-161, 15 refs. For another version see 49-4041.

Road maintenance, Winter maintenance, Snow removal, Ice removal, Economic analysis, Cost analysis, Cold weather operation

49-5646

Comparison of liquid and solid chemicals for anti-icing applications on pavements.

Alger, R.G., Beckwith, J.P., Adams, E.E., *Transportation research record,* Oct. 1994, No.1442, p.163-169, 3 refs.

Road icing, Bitumens, Winter maintenance, Chemical ice prevention, Chemical analysis, Rubber snow friction, Ice friction, Cold weather tests, Statistical analysis

49-5647

Low-temperature high strain rate behavior of GR/EP laminate under transverse impact.

Dutta, P.K., Hui, D., MP 3628, Advanced structural fiber composites. Edited by P. Vincenzini, Techna, 1995, p.455-468, 19 refs.

Composite materials, Strain tests, Impact tests, Dynamic loads, Stress concentration, Low temperature tests, Temperature effects, Elastic properties

The influence of high strain rate and low temperatures on the transverse (through-the-thickness) behavior of a graphite/epoxy composite system was studied using the CRREL split Hopkinson pressure bar apparatus. The compressive data generated include strength to failure, strain to failure, pre- and post-failure stress-strain behavior, and the strain energy to failure. The test temperature ranged from 24°C to -60°C and strain rate from 100 to 300 strains per second. The study provides relationships between the transverse elastic modulus and the strain rates at different temperatures. Data obtained from such tests would be useful in prediction of the transverse impact behavior, especially the failure mechanisms, for a wide range of low-temperature conditions.

49-5648

Severe hailstorm at Grahamstown in relation to convective weather hazards in South Africa.

Perry, A., *Weather,* June 1995, 50(6), p.211-214, 12 refs.

Meteorological data, Ice storms, Hail, Distribution, Periodic variations, Damage, Statistical analysis, South Africa

49-5649

1990 Valentine's Day arctic outbreak. Part 1: mesoscale and microscale structure and evolution of a Colorado Front Range shallow upslope cloud.
Rasmussen, R.M., Bernstein, B.C., Murakami, M., Stossmeister, G., Reisner, J., Stankov, B., *Journal of applied meteorology,* July 1995, 34(7), p.1481-1511, 54 refs.
Precipitation (meteorology), Fronts (meteorology), Cloud physics, Radar echoes, Snowfall, Ice crystal growth, Turbulent boundary layer, Supercooling, Topographic effects, United States—Colorado

49-5650

Local advection of momentum, heat, and moisture during the melt of patchy snow covers.
Liston, G.E., *Journal of applied meteorology,* July 1995, 34(7), p.1705-1715, 30 refs.
Atmospheric boundary layer, Snow air interface, Snowmelt, Snow hydrology, Advection, Mathematical models, Snow cover effect, Surface energy, Radiance

49-5651

On the Upper Quaternary paleoecology of eastern Tibet.
Frenzel, B., Li, J., Liu, S.J., *Science in China B,* Apr. 1995, 38(4), p.484-494, 22 refs.
Paleoecology, Glacier oscillation, Quaternary deposits, Sampling, Moraines, Glaciation, Geochronology, Geomorphology, Tibet

49-5652

Successive oceanic and solar forcing indicated by Younger Dryas and early Holocene climatic oscillations in the Jura.
Magny, M., *Quaternary research,* May 1995, 43(3), p.279-285, 43 refs.
Paleoclimatology, Climatic changes, Quaternary deposits, Radioactive age determination, Correlation, Insolation, Lacustrine deposits, Water level, Forest lines

49-5653

Glacial meltwater in Lake Huron during early postglacial time as inferred from single-valve analysis of oxygen isotopes in ostracodes.
Dettman, D.L., Smith, A.J., Rea, D.K., Moore, T.C., Jr., Lohmann, K.C., *Quaternary research,* May 1995, 43(3), p.297-310, 31 refs.
Lacustrine deposits, Quaternary deposits, Sampling, Sediments, Isotope analysis, Pleistocene, Glacial lakes, Water level, Glacier melting, Meltwater, United States—Huron, Lake

49-5654

Postglacial vegetation and climate of the Cascade Range, central Oregon.
Sea, D.S., Whitlock, C., *Quaternary research,* May 1995, 43(3), p.370-381, 32 refs.
Paleoecology, Palynology, Paleoclimatology, Climatic changes, Quaternary deposits, Vegetation patterns, Radioactive age determination, United States—Oregon

49-5655

Postglacial vegetation and climate change in the northern Bristol Bay region, southwestern Alaska.
Hu, F.S., Brubaker, L.B., Anderson, P.M., *Quaternary research,* May 1995, 43(3), p.382-392, 58 refs.
Paleoecology, Paleoclimatology, Climatic changes, Vegetation patterns, Forest tundra, Quaternary deposits, Lacustrine deposits, Palynology, Radioactive age determination, Geochronology, United States—Alaska—Bristol Bay

49-5656

Late Quaternary vegetation and climate of the Wind River Range, Wyoming.
Fall, P.L., Davis, P.T., Zielinski, G.A., *Quaternary research,* May 1995, 43(3), p.393-404, 47 refs.
Paleoclimatology, Lacustrine deposits, Glacial deposits, Glacier oscillation, Quaternary deposits, Paleoecology, Vegetation patterns, Forest lines, Radioactive age determination, Climatic changes, United States—Wyoming—Wind River Range

49-5657

Organic remains in Finnish subglacial sediments.
Punkari, M., Forsström, L., *Quaternary research,* May 1995, 43(3), p.414-425, 48 refs.
Quaternary deposits, Pleistocene, Paleoecology, Glacial deposits, Sediment transport, Organic soils, Soil analysis, Stratigraphy, Peat, Subglacial observations, Finland

49-5658

Model for the indentation-induced splitting ice floe experiments.
Gupta, V., Picu, R.C., *Acta metallurgica et materialia,* Apr. 1995, 43(4), p.1355-1362, 32 refs.
Ice solid interface, Ice floes, Ice models, Cracking (fracturing), Ice mechanics, Mechanical tests, Crack propagation, Ice microstructure, Ice pressure, Mechanical properties, Mathematical models

49-5659

Podzolisation mechanisms and the synthesis of imogolite in northern Scandinavia.
Gustafsson, J.P., Bhattacharya, P., Bain, D.C., Fraser, A.R., McHardy, W.J., *Geoderma,* May 1995, 66(3-4), p.167-184, 39 refs.
Organic soils, Forest soils, Soil analysis, Soil formation, Subarctic landscapes, Podsol, Mineralogy, Soil profiles, Geochemical cycles, Finland

49-5660

Morphology of glacially fluted terrain: examples from the Northwest Highlands of Scotland.
Bennett, M.R., *Geologists' Association. Proceedings,* Jan. 1995, 106(pt.1), p.27-38, 46 refs.
Glacial geology, Geomorphology, Landforms, Classifications, Glacial erosion, Topographic features, Pleistocene, United Kingdom—Scotland

49-5661

Cyclic loading of saline ice.
Cole, D.M., Durell, G.D., MP 3629, *Philosophical magazine A,* July 1995, 72(1), p.209-229, 49 refs.
Ice mechanics, Salt ice, Mechanical tests, Stress concentration, Strain tests, Dynamic loads, Mechanical properties, Ice microstructure, Ice relaxation, Temperature effects

This paper details the results of an experimental program to investigate the constitutive behavior of saline ice under reversed direct-stress conditions. The test material was laboratory-grown saline (NaCl) ice. The work explored the effects of temperature (from -5 to -50°C), cyclic stress amplitude (0.1-0.8 MPa) and loading frequency (10^{-3}-1 Hz) on the response of the ice. Variations in the ice growth conditions allowed the effects of microstructural variations to be investigated as well, with total porosity in the range 30-104 ppt. The experiments were generally performed by applying a sinusoidally varying uniaxial load, oscillating about zero, to the cylindrical specimens. Several experiments employed cyclic strain control. The material response was typically composed of elastic and anelastic strain, with various degrees of permanent or viscous strain occurring at higher temperatures and lower frequencies, and proved to be very sensitive to variations in loading conditions and to microstructural variations. An increase in total porosity caused a decrease in the effective modulus and an increase in the anelastic strain. The ice exhibited a very complex temperature dependence, a stress dependence that was approximately linear at low temperatures but nonlinear at high temperatures, and a significant frequency effect.

49-5662

Size distribution of snowflakes and their growth processes.
Harimaya, T., Kanemura, N., Ishida, H., Okazaki, K., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Sep. 1992, No.56, p.21-32, In Japanese with English summary. 15 refs.
Snow crystal growth, Ice crystal size, Snowflakes, Snowfall, Particle size distribution, Cloud physics, Clouds (meteorology), Precipitation (meteorology)

49-5663

Relationship between the size distribution of solid precipitation particles and the development stage of snow clouds.
Kanemura, N., Harimaya, T., Sato, M., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Mar. 1991, No.55, p.1-12, In Japanese with English summary. 12 refs.
Snow crystal growth, Ice crystal size, Snowflakes, Snowfall, Particle size distribution, Cloud physics, Clouds (meteorology), Precipitation (meteorology)

49-5664

Microphotographs of snow crystals using a special-effect filter.

Kikuchi, K., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Mar. 1990, No.53, p.61-67, In Japanese with English summary. 3 refs.

Snow crystal structure, Ice crystal replicas, Photographic techniques

49-5665

Method for estimation of fresh snow cover using a simple weather radar system.

Asuma, Y., Kikuchi, K., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Aug. 1989, No.52, p.55-64, In Japanese with English summary. 12 refs.

Snowfall, Snowstorms, Cloud cover, Clouds (meteorology), Weather forecasting, Radar echoes, Radar tracking, Japan—Hokkaido

49-5666

Confluent phenomena of band-shaped radar echoes in winter.

Harimaya, T., Kato, S., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Sep. 1988, No.51, p.35-45, In Japanese with English summary. 5 refs.

Snowfall, Snowstorms, Weather forecasting, Cloud cover, Clouds (meteorology), Radar echoes, Radar tracking, Japan—Hokkaido

49-5667

Characteristics of radar echoes by the precipitating snow clouds over the Ishikari Bay, Hokkaido, Japan—comparison with aerological data.

Asuma, Y., Kikuchi, K., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Feb. 1988, No.50, p.1-13, In Japanese with English summary. 10 refs.

Snowfall, Snowstorms, Cloud cover, Clouds (meteorology), Weather forecasting, Radar echoes, Radar tracking, Japan—Hokkaido

49-5668

Characteristics of velocity distribution in Patagonian glaciers.

Naruse, R., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Mar. 1987, No.49, p.211-219, In Japanese with English summary. 14 refs.

Glacier surveys, Mountain glaciers, Glacier flow, Glacier oscillation, Chile—Patagonia

49-5669

Snowfall properties in the Sapporo City area and the occurrence frequency of radar echoes over the Ishikari Bay, Hokkaido, Japan.

Asuma, Y., Kikuchi, K., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Mar. 1987, No.49, p.317-330, In Japanese with English summary. 25 refs.

Snowfall, Snowstorms, Weather forecasting, Cloud cover, Clouds (meteorology), Radar echoes, Radar tracking, Japan—Hokkaido

49-5670

Studies on the convergence band clouds formed in the mid-winter seasons on the west coast of Hokkaido Island, Japan (I).

Kobayashi, F., Kikuchi, K., Motoki, T., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Mar. 1987, No.49, p.341-357, In Japanese with English summary. 16 refs.

Snowstorms, Snowfall, Cloud cover, Clouds (meteorology), Weather forecasting, Spaceborne photography, Japan—Hokkaido

49-5671

Reduction of nocturnal cooling value by smudging.

Harimaya, T., Maki, M., Kikuchi, K., Taniguchi, T., Hiramatsu, C., Azumane, S., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Oct. 1985, No.46, p.1-11, In Japanese with English summary. 5 refs.

Air temperature, Surface temperature, Diurnal variations, Smoke generators, Frost protection, Japan—Hokkaido

49-5672

Urban heat island during the snow cover period (I)—observations.

Harimaya, T., Taniguchi, T., Ohira, T., Hiramatsu, C., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Mar. 1985, Vol.45, p.1-14, In Japanese with English summary. 10 refs.

Snow cover effect, Snow thermal properties, Snow heat flux, Snow surface temperature, Air temperature, Humidity, Urban planning, Japan—Hokkaido

49-5673

Urban heat island during the snow cover period (II)—numerical calculation.

Ohira, T., Harimaya, T., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Mar. 1985, Vol.45, p.15-27, In Japanese with English summary. 6 refs.

Snow cover effect, Snow thermal properties, Snow heat flux, Snow surface temperature, Air temperature, Humidity, Urban planning, Japan—Hokkaido

49-5674

Observation of nocturnal cooling in Akaigawa basin, Hokkaido.

Harimaya, T., Maki, M., Kikuchi, K., Taniguchi, T., Ohira, T., Yoshihiro, M., *Hokkaido University. Geophysical bulletin (Hokkaido daigaku chikyu butsuri kenkyu hokoku),* Mar. 1985, Vol.45, p.29-41, In Japanese with English summary. 10 refs.

Air temperature, Surface temperature, Diurnal variations, Wind factors, Topographic effects, Japan—Hokkaido

49-5675

Northern Sea Route reconnaissance report.

U.S. Army Corps of Engineers. Alaska District, Anchorage, AK, U.S. Army Corps of Engineers, Alaska District, June 1995, 3 vols. (var. p.), Refs. passim. For individual papers see 49-5676 through 49-5682.

Marine transportation, Ships, Icebreakers, Ice navigation, History, Tanker ships, Models, International cooperation, Climatology, Ports, Northern Sea Route, Russia

49-5676

Northern Sea Route reconnaissance report: history and present status of operations.

Mulherin, N.D., MP 3630, Northern Sea Route reconnaissance report, Vol.1, Appendix A, Anchorage, AK, U.S. Army Corps of Engineers, Alaska District., June 1995, 85p., Refs. p.68-71.

History, Marine transportation, Ice navigation, Ports, Ships, Cost analysis, Legislation, International cooperation, Ice conditions, Sea ice, Icebreakers, Northern Sea Route

49-5677

Northern Sea Route reconnaissance report: climatology of environmental conditions affecting commercial navigation along the Northern Sea Route.

Proshutinskiĭ, A.IU., Proshutinskaia, T.O., Weingartner, T.J., Northern Sea Route reconnaissance report, Vol.2, Appendix B, Anchorage, AK, U.S. Army Corps of Engineers, Alaska District., June 1995, 196p., Refs. p.192-196.

Marine transportation, Meteorology, Ice conditions, Sea ice, Ocean currents, Sea level, Water waves, Rivers, River ice, Ice jams, Ice navigation, Surface waters, Northern Sea Route, Russia—Siberia

49-5678

Northern Sea Route reconnaissance report: a summary of icebreaking technology.

Sodhi, D.S., MP 3632, Northern Sea Route reconnaissance report, Vol.2, Appendix C, Anchorage, AK, U.S. Army Corps of Engineers, Alaska District., June 1995, 233p., Refs. p.47-49.

Icebreakers, Ships, Design, Design criteria, Propellers, Ice navigation, Ports, Northern Sea Route, Russia

49-5679

Northern Sea Route reconnaissance report: Russian institutions, monitoring and forecasting capabilities, and sources of data for the Northern Sea Route.

Proshutinskiĭ, A.IU., Proshutinskaia, T.O., Northern Sea Route reconnaissance report, Vol.2, Appendix D, Anchorage, AK, U.S. Army Corps of Engineers, Alaska District., June 1995, 148p., Refs. p.86-111.

Organizations, History, Hydrology, Meteorology, Marine transportation, Ice forecasting, Icebreakers, Oceanographic ships, Ice navigation, Ice models, Ice conditions, Drift stations, Northern Sea Route, Russia

49-5680

Northern Sea Route reconnaissance report: summary of findings from the International Northern Sea Route Program (INSROP) and other international initiatives related to the Northern Sea Route.

Sackinger, W.M., Northern Sea Route reconnaissance report, Vol.3, Appendix E, Anchorage, AK, U.S. Army Corps of Engineers, Alaska District., June 1995, 16p.

Organizations, Marine transportation, Research projects, Ice navigation, Northern Sea Route

49-5681

Northern Sea Route reconnaissance study: forecast of commodity flows.

Gulf Engineers and Consultants, Inc., Northern Sea Route reconnaissance report, Vol.3, Appendix F, Anchorage, AK, U.S. Army Corps of Engineers, Alaska District., June 1995, 41p. + append., 14 refs.

Marine transportation, Cost analysis, Navigation, Northern Sea Route

49-5682

Northern Sea Route reconnaissance report: transit model development and results. Draft.

Mulherin, N.D., Eppler, D.T., Farmer, L.D., Proshutinskaia, T.O., Proshutinskiĭ, A.IU., Smith, O.P., MP 3631, Northern Sea Route reconnaissance report, Vol.3, Appendix G, Anchorage, AK, U.S. Army Corps of Engineers, Alaska District., June 1995, 289p., Refs. p.45-46.

Marine transportation, Cost analysis, Models, Navigation, Simulation, Ice navigation, Ice cover thickness, Northern Sea Route, Russia

49-5683

Role of H-bond in the formation of ices.

Li, J.C., Ross, D.K., NATO Advance Research Workshop on Hydrogen Bond Networks, Cargèse, France, Aug. 16-22, 1993. Proceedings. Edited by M.-C. Bellissent-Funel et al and NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.435, Dordrecht, Kluwer Academic Publishers, 1994, p.61-67, 24 refs.

DLC QD471.B35

Ice physics, Ice formation, Hydrogen bonds, Ice structure, Water structure, Molecular structure, Stress concentration, Models, Molecular energy levels

49-5684

MD simulations of stretched TIP4P-water in the supercooled regime.

Ruocco, G., Sampoli, M., Torcini, A., Vallauri, R., NATO Advance Research Workshop on Hydrogen Bond Networks, Cargèse, France, Aug. 16-22, 1993. Proceedings. Edited by M.-C. Bellissent-Funel et al and NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.435, Dordrecht, Kluwer Academic Publishers, 1994, p.77-80, 9 refs.

DLC QD471.B35

Liquid cooling, Water structure, Molecular structure, Supercooling, Thermodynamics, Density (mass/volume), Molecular energy levels, Simulation

49-5685

Hydrogen bond solids in space.

Klinger, J., NATO Advance Research Workshop on Hydrogen Bond Networks, Cargèse, France, Aug. 16-22, 1993. Proceedings. Edited by M.-C. Bellissent-Funel et al and NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.435, Dordrecht, Kluwer Academic Publishers, 1994, p.339-354, 31 refs.

DLC QD471.B35

Extraterrestrial ice, Ice composition, Hydrogen bonds, Cosmic dust, Solids, Distribution

49-5686

Hyperquenched glassy bulk water: a comparison with other amorphous forms of water, and with vitreous but freezable water in a hydrogel and on hydrated methemoglobin.

Mayer, E., NATO Advance Research Workshop on Hydrogen Bond Networks, Cargèse, France, Aug. 16-22, 1993. Proceedings. Edited by M.-C. Bellissent-Funel et al and NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.435, Dordrecht, Kluwer Academic Publishers, 1994, p.355-372, 61 refs.

DLC QD471.B35

Ice physics, Water structure, Phase transformations, Amorphous ice, Hydrates, Polymers, Temperature measurement, Thermodynamic properties, Cryogenics

49-5687

Spectroscopic and simulation study of ice surfaces: bare and with adsorbates.

Devlin, J.P., Silva, S.C., Rowland, B., Buch, V., NATO Advance Research Workshop on Hydrogen Bond Networks, Cargèse, France, Aug. 16-22, 1993. Proceedings. Edited by M.-C. Bellissent-Funel et al and NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.435, Dordrecht, Kluwer Academic Publishers, 1994, p.373-380, 14 refs.

DLC QD471.B35

Ice physics, Ice spectroscopy, Infrared spectroscopy, Amorphous ice, Surface structure, Defects, Hydrogen bonds, Adsorption, Spectra, Simulation

49-5688

Structural study of vapour deposited amorphous ice by neutron diffraction.

Blakey, D.M., NATO Advance Research Workshop on Hydrogen Bond Networks, Cargèse, France, Aug. 16-22, 1993. Proceedings. Edited by M.-C. Bellissent-Funel et al and NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.435, Dordrecht, Kluwer Academic Publishers, 1994, p.381-388, 18 refs.

DLC QD471.B35

Ice physics, Amorphous ice, Neutron diffraction, Molecular structure, Hydrogen bonds, Cryogenics

49-5689

Hydrogen bonds reorganisation during clathrate hydrate growth in hexagonal ice.

Ocampo, J., NATO Advance Research Workshop on Hydrogen Bond Networks, Cargèse, France, Aug. 16-22, 1993. Proceedings. Edited by M.-C. Bellissent-Funel et al and NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.435, Dordrecht, Kluwer Academic Publishers, 1994, p.389-393, 8 refs.

DLC QD471.B35

Ice physics, Hydrogen bonds, Clathrates, Hydrates, Adsorption, Molecular structure, Surface structure, Fractals

49-5690

Structural studies of ice nucleation in confined geometries.

Motl, P., Dore, J.C., Bellissent-Funel, M.C., NATO Advance Research Workshop on Hydrogen Bond Networks, Cargèse, France, Aug. 16-22, 1993. Proceedings. Edited by M.-C. Bellissent-Funel et al and NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.435, Dordrecht, Kluwer Academic Publishers, 1994, p.403-409, 8 refs.

DLC QD471.B35

Ice physics, Ice formation, Heterogeneous nucleation, Proton transport, Hydrogen bonds, Ice crystal structure, Porosity, Neutron diffraction, Deuterium oxide ice

49-5691

Crystal *ab initio* investigations of ice II, VIII and IX.

Ojamäe, L., Hermansson, K., NATO Advance Research Workshop on Hydrogen Bond Networks, Cargèse, France, Aug. 16-22, 1993. Proceedings. Edited by M.-C. Bellissent-Funel et al and NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.435, Dordrecht, Kluwer Academic Publishers, 1994, p.411-418, 28 refs.

DLC QD471.B35

Ice physics, Ice crystal structure, Hydrogen bonds, Molecular energy levels, Thermodynamics, Simulation, Models

49-5692

T_g regulation effects in polymer-water systems.

Rault, J., NATO Advance Research Workshop on Hydrogen Bond Networks, Cargèse, France, Aug. 16-22, 1993. Proceedings. Edited by M.-C. Bellissent-Funel et al and NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.435, Dordrecht, Kluwer Academic Publishers, 1994, p.441-445, 21 refs.

DLC QD471.B35

Polymers, Ice formation, Phase transformations, Absorption, Temperature variations, Solubility

49-5693

Soviet data on the Arctic heat budget and its climatic influence.

Fletcher, J.O., ed, Keller, B., ed, Olenicoff, S.M., ed, *Rand Corporation. Research memorandum,* May 1966, RM-5003-PR, 205p., Refs. passim. For individual papers see 49-5694 through 49-5700.

DLC Q180.A1R36 RM-5003 Pr May 1966

Atmospheric circulation, Pack ice, Sea ice, Radiation balance, Solar radiation, Albedo, Heat balance, Heat transfer, Cloud physics

49-5694

Polar ice and climate.

Budyko, M.I., *Rand Corporation. Research memorandum,* May 1966, RM-5003-PR, p.9-23, Translated from Izvestiia Akademii nauk SSSR, Seriia geograficheskaia, 1962, No.6, p.3-10. 6 refs. For another version see 25-3103.

DLC Q180.A1R36 RM-5003 Pr May 1966

Heat balance, Solar radiation, Sea ice, Ice cover, Ice conditions, Climatic factors, Air temperature, Analysis (mathematics)

49-5695

Influence of the arctic pack ice on climate.

Fletcher, J.O., *Rand Corporation. Research memorandum,* May 1966, RM-5003-PR, p.25-50, 10 refs. For another source see 21-24540.

DLC Q180.A1R36 RM-5003 Pr May 1966

Polar atmospheres, Heat balance, Heat loss, Pack ice, Sea ice, Atmospheric circulation, Climatic factors, Solar radiation, Radiation balance, Ice cover effect, Isotherms, Ice thermal properties

49-5696

Principal characteristics of the radiation balance of the underlying surface and of the atmosphere in the Arctic.

Marshunova, M.S., *Rand Corporation. Research memorandum,* May 1966, RM-5003-PR, p.51-131, 52 refs.

DLC Q180.A1R36 RM-5003 Pr May 1966

Polar atmospheres, Solar radiation, Radiation balance, Analysis (mathematics), Cloud cover

49-5697

Variability of solar radiation in the Arctic.

Marshunova, M.S., *Rand Corporation. Research memorandum,* May 1966, RM-5003-PR, p.133-150, Translated from Trudy Arkticheskogo i antarkticheskogo nauchno-issledovatel'skogo instituta, Vol.273 (1965), p.147-156. 5 refs.

DLC Q180.A1R36 RM-5003 Pr May 1966

Polar atmospheres, Solar radiation, Cloud cover, Statistical analysis

49-5698

Radiational properties of the central arctic ice coat.

Chernigovskiĭ, N.T., *Rand Corporation. Research memorandum,* May 1966, RM-5003-PR, p.151-173, Translated from Trudy Arkticheskogo i antarkticheskogo nauchno-issledovatel'skogo instituta, Vol.253 (1963), p.249-260. 8 refs.

DLC Q180.A1R36 RM-5003 Pr May 1966

Sea ice, Pack ice, Albedo, Ice floes, Ice cover, Snow ice interface, Ice melting, Snow melting, Solar radiation

49-5699

On the radiation properties of clouds.

Koptev, A.P., Voskresenskiĭ, A.I., *Rand Corporation. Research memorandum,* May 1966, RM-5003-PR, p.175-191, Translated from Trudy Arkticheskogo i antarkticheskogo nauchno-issledovatel'skogo instituta, Vol.239 (1962), p.39-47. 8 refs.

DLC Q180.A1R36 RM-5003 Pr May 1966

Solar radiation, Cloud cover, Albedo, Cloud physics, Analysis (mathematics), Radiation balance

49-5700

On the heat balance of the central Arctic.

Doronin, IU.P., *Rand Corporation. Research memorandum,* May 1966, RM-5003-PR, p.193-205, Translated from Trudy Arkticheskogo i antarkticheskogo nauchno-issledovatel'skogo instituta, Vol.253 (1963), p.178-184. 12 refs.

DLC Q180.A1R36 RM-5003 Pr May 1966

Heat balance, Sea ice, Ice cover, Ice thermal properties, Heat transfer, Air water interactions, Analysis (mathematics), Ice air interface

49-5701

BrO + ClO reaction and the polar stratospheric ozone.

Poulet, G., Lancar, I.T., Laverdet, G., Le Bras, G., European Symposium on Physico-chemical Behaviour of Atmospheric Pollutants, 5th, Varese, Italy, Sep. 25-28, 1989. Edited by G. Restelli et al and Commission of the European Communities. Environmental Research Programme. Air Pollution Report No.23, Dordrecht, Kluwer Academic Publishers, 1990, p.190-195, 9 refs.

DLC TD881.P485

Polar atmospheres, Cloud physics, Atmospheric density, Polar stratospheric clouds, Ozone, Photochemical reactions, Air pollution, Simulation

In a simulation of photochemical reactions implicated in antarctic ozone depletion, the rate constant of chemical reactions has been measured at 298 K using the discharge flow-mass spectrometry method: $k_1=(1.13\pm0.15) \times 10^{-11}$ cm^3 $molecule^{-1}s^{-1}$. The measurement of the products has led to the determination of the branching ratios: (0.43±0.10) for the OClO channel and (0.12±0.05) for the BrCl one at 298 K. (Auth. mod.)

49-5702

Kinetics of the reaction ClO + ClO=Cl_2O_2 and its implications for polar ozone depletions.

Hayman, G.D., Cox, R.A., European Symposium on Physico-chemical Behaviour of Atmospheric Pollutants, 5th, Varese, Italy, Sep. 25-28, 1989. Edited by G. Restelli et al and Commission of the European Communities. Environmental Research Programme. Air Pollution Report No.23, Dordrecht, Kluwer Academic Publishers, 1990, p.196-203, 20 refs.

DLC TD881.P485

Polar atmospheres, Cloud physics, Photochemical reactions, Polar stratospheric clouds, Atmospheric attenuation, Simulation

In a simulation of chemical reactions in the antarctic stratosphere, the Molecular Modulation technique has been applied to study the kinetics of the association reaction of ClO radicals to form a dimer, Cl_2O_2: ClO + ClO + M=Cl_2O_2 + M. The ClO radical was generated by the low intensity photolysis at 350 nm of mixtures of Cl_2/Cl_2O or Cl_2/O_3. The kinetics of the ClO radical were followed by UV absorption spectroscopy. Modulation waveforms were recorded as functions of temperature and pressure. The observed rate constants showed a strong pressure dependence at each temperature and were analyzed in terms of the Troe parameterization. (Auth. mod.)

49-5703

Possible heterogeneous reaction processes inducing depletion of the ozone layer in the stratospheric Antarctica.

Müller, J., European Symposium on Physico-chemical Behaviour of Atmospheric Pollutants, 5th, Varese, Italy, Sep. 25-28, 1989. Edited by G. Restelli et al and Commission of the European Communities. Environmental Research Programme. Air Pollution Report No.23, Dordrecht, Kluwer Academic Publishers, 1990, p.210-214, 8 refs.

DLC TD881.P485

Polar atmospheres, Polar stratospheric clouds, Atmospheric attenuation, Ozone, Heterogeneous nucleation, Models, Photochemical reactions

Increasing methane increases the stratospheric water vapor which during the antarctic winter is frozen in stratospheric particles. The particles are built up according to the specific vapor pressure of the constituting substances: sulfuric acid in the core of the particles and other less volatile substances like HNO_3 and HCl in surrounding shell, together with H_2O-ligands. Induced by the low temperatures in the antarctic winter (-80°C), in addition to HNO_3 and HCl, NO_2 is also frozen on the surface of the ice particles. Due to reactions with HCl located on the surface, CL_2 and other ozone-attacking species are set free. It is postulated that during the antarctic sunrise in spring by charge transfer processes in the particles hydrated electrons are induced which react at the surface with H^+-ions, N_2O and chlorinated halocarbons. By these processes the ozone-attacking radicals H, OH and Cl are generated. (Auth. mod.)

49-5704

H_2O_2 in solid precipitation.

Neftel, A., Sigg, A., Jacob, P., European Symposium on the Physico-chemical Behaviour of Atmospheric Pollutants, 4th, Stresa, Italy, Sep. 23-25, 1986. Proceedings. Edited by G. Angeletti et al, Dordrecht, D. Reidel Publishing Co., 1987, p.45-57, 18 refs.

DLC TD881.P485

Snow impurities, Precipitation (meteorology), Chemical properties, Sampling, Profiles, Atmospheric composition, Aerosols, Cloud physics, Scavenging, Snow air interface

49-5705

Acid deposition in a snow field at 2500 m.a.s.l. in Switzerland.

Neftel, A., Sigg, A., Zürcher, F., European Symposium on the Physico-chemical Behaviour of Atmospheric Pollutants, 4th, Stresa, Italy, Sep. 23-25, 1986. Proceedings. Edited by G. Angeletti et al, Dordrecht, D. Reidel Publishing Co., 1987, p.500-510, 11 refs.

DLC TD881.P485

Snowfall, Snow surveys, Profiles, Air pollution, Snow impurities, Snow hydrology, Sampling, Chemical properties, Switzerland

49-5706

Acidity measurements of snowfalls collected over the Vosges in relation to air mass trajectories.
Colin, J.L., Jaffrezo, J.L., Lescoat, V., Renard, D., Pinart, J., European Symposium on the Physico-chemical Behaviour of Atmospheric Pollutants, 4th, Stresa, Italy, Sep. 23-25, 1986. Proceedings. Edited by G. Angeletti et al, Dordrecht, D. Reidel Publishing Co., 1987, p.511-519, 8 refs.
DLC TD881.P485
Snowfall, Sampling, Chemical properties, Ion density (concentration), Air pollution, Scavenging, Atmospheric circulation, France—Vosges Mountains

49-5707

***Mallomonas nuussuaqensis* nov. sp., a new species of silica-scaled chrysophytes from West Greenland.**
Wilken, L.R., Kristiansen, J., Jürgensen, T., *Nordic journal of botany,* 1994, 14(6), p.711-714, 6 refs.
Limnology, Algae, Structural analysis, Classifications, Limnology, Sampling, Ecology, Greenland

49-5708

Ice flood disaster and its reduction measures in the Inner Mongolia section of the Yellow River.
Xu, J.F., *Journal of glaciology and geocryology,* Mar. 1995, 17(1), p.1-7, In Chinese with English summary.
River ice, Ice jams, Ice breakup, Ice forecasting, Ice control, Flood forecasting, Flood control, Reservoirs, China—Yellow River, China—Inner Mongolia

49-5709

Grey relational analysis of the leading climatic factor influencing the changes of the equilibrium line.
Wang, N.L., *Journal of glaciology and geocryology,* Mar. 1995, 17(1), p.8-15, In Chinese with English summary. 12 refs.
Mountain glaciers, Glacier mass balance, Glacier oscillation, Glacial meteorology, Climatic factors, Mathematical models, China—Tian Shan

49-5710

Experimental study of influence of soil type on ice formation and cryogenic structure of freezing soils.
Wang, J.C., Xu, X.Z., Zhang, L.X., Deng, Y.S., *Journal of glaciology and geocryology,* Mar. 1995, 17(1), p.16-22, In Chinese with English summary. 7 refs.
Soil freezing, Freezing front, Frozen ground thermodynamics, Cryogenic soils, Soil structure, Soil texture

49-5711

Study on the geomorphological characteristics and glaciations in paleo-Daocheng Ice Cap, western Sichuan.
Zheng, B.X., Ma, Q.H., *Journal of glaciology and geocryology,* Mar. 1995, 17(1), p.23-32, In Chinese with English summary. 11 refs.
Alpine glaciation, Glacial geology, Glacial erosion, Glacial deposits, Quaternary deposits, Pleistocene, Tectonics, Geomorphology, Paleoclimatology, China—Sichuan Province

49-5712

Preliminary research on axial splitting method for determining tensile strength of frozen soil.
Shen, Z.Y., Peng, W.W., Liu, Y.Z., Chang, X.X., *Journal of glaciology and geocryology,* Mar. 1995, 17(1), p.33-39, In Chinese with English summary. 2 refs.
Frozen ground strength, Soil tests, Strain tests, Tensile properties

49-5713

Strain rate sensitivity analysis of compression strength of frozen soil.
Li, H.S., Yang, H.T., Chang, C., Sun, X.T., *Journal of glaciology and geocryology,* Mar. 1995, 17(1), p.40-48, In Chinese with English summary. 7 refs.
Frozen ground strength, Frozen ground compression, Soil tests, Strain tests

49-5714

Study on the general thermal parameters of the frozen NaCl soil.
Zhang, L.X., Tao, Z.X., Gu, T.X., *Journal of glaciology and geocryology,* Mar. 1995, 17(1), p.49-53, In Chinese with English summary. 3 refs.
Frozen ground thermodynamics, Frozen ground chemistry, Saline soils, Loess, Sands, Thermal conductivity, Thermal diffusion

49-5715

Selection and evaluation of water supply sources in the permafrost area.
Bai, Y.X., *Journal of glaciology and geocryology,* Mar. 1995, 17(1), p.55-64, In Chinese with English summary.
Permafrost hydrology, Subpermafrost ground water, Frozen ground temperature, Soil temperature, Seepage, Water supply, Water reserves, China—Greater Khingan Range

49-5716

Factors influencing δ^{18} in precipitation and their relative importance.
Zhang, X.P., Yao, T.D., *Journal of glaciology and geocryology,* Mar. 1995, 17(1), p.65-72, In Chinese with English summary. 16 refs.
Atmospheric circulation, Atmospheric composition, Cloud physics, Unfrozen water content, Water vapor, Precipitation (meteorology), Oxygen isotopes, Isotope analysis

49-5717

Characteristics of glacier hydrology in the area of the Gongga Mountains.
Cao, Z.T., *Journal of glaciology and geocryology,* Mar. 1995, 17(1), p.73-83, In Chinese with English summary. 6 refs.
Mountain glaciers, Glacier surveys, Glacial hydrology, Glacial meteorology, Meltwater, Runoff, China—Gongga, Mount

49-5718

Study of calculation method of soil frost depth in the forest zone.
Ai, J., Liu, B.Z., Zhang, H.T., Gong, L., *Journal of glaciology and geocryology,* Mar. 1995, 17(1), p.84-92, In Chinese with English summary. 1 ref.
Mountain soils, Forest soils, Soil freezing, Frost penetration, Thermal conductivity, Snow cover effect, China—Heilongjiang Province

49-5719

Another verification on the fluctuation prediction of the Batura Glacier, Karakoram.
Wang, W.Y., *Journal of glaciology and geocryology,* Mar. 1995, 17(1), p.93-96, In Chinese with English summary.
Glacier surveys, Mountain glaciers, Glacier oscillation, Highway planning, Pakistan—Karakoram Mountains

49-5720

Deep Pleistocene iceberg plowmarks on the Yermak Plateau: Sidescan and 3.5 kHz evidence for thick calving ice fronts and a possible marine ice sheet in the Arctic Ocean. [Comment and Reply].
Dowdeswell, J.A., Vogt, P.R., Crane, K., Sundvor, E., *Geology,* May 1995, 23(5), p.476-478, 12 refs.
Ocean bottom, Icebergs, Ice scoring, Grounded ice, Calving, Arctic Ocean

49-5721

Winter maintenance study for reduced salt usage.
Fromm, H.J., *Ontario. Ministry of Transportation and Communication. Research and Development Branch. Report,* Oct. 1982, MSP-82-02, 63p., 18 refs.
Road maintenance, Winter maintenance, Ice control, Ice removal, Salting, Cold weather operation, Cold weather tests, Standards

49-5722

1995 IASC meeting—report.
International Arctic Science Committee, Oslo, 1995.
Meetings, Organizations, Research projects, Economic development, Environmental impact

49-5723

Comparative field study of calcium magnesium acetate and rock salt during the winters of 1986-87 and 1987-88.
Manning, D.G., Crowder, L.W., *Ontario. Ministry of Transportation. Research and Development Branch. Technical report,* Sep. 1988, MAT-88-06, 50p., 10 refs.
Road icing, Winter maintenance, Ice removal, Materials, Salting, Cold weather performance, Corrosion

49-5724

Preliminary study on freshwater diatom flora from King George Island, Antarctica.
Yang, J.R., Shen, Y.B., Nanji Qiaozhi Wang Dao Feierdesi Bandao diceng ji gushengwu yanjiu (Stratigraphy and palaeontology of Fildes Peninsula, King George Island, Antarctica). Edited by Y.B. Shen, Beijing, Science Press (Kexue chubanshe), 1994, p.263-287, In Chinese with English summary. 34 refs.
Frozen lakes, Limnology, Lacustrine deposits, Algae, Cryobiology, Ecology, Fossils, Paleobotany, Paleoecology, Antarctica—King George Island
Sediment samples were collected from shallow freshwater areas, such as pond, stream and other waterlogged places on King George I. during the austral summer from Dec. 1987 to Feb. 1988. The dominant species in diatom composition of King George I. were comprised of *Fragilaria construens* var. *binodis* Grunow, *F. capicina* Desm., *Navicula mutica* Kützing, *N. mutica* var. *cohnii* Grunow, *N. muticopsis* Van Heurck, *Pinnularia antarctica* sp. nov., *P. microstauron* Cleve, *Nitzschia frustulum* var. *subsalina* Hustedt and *Gomphonema lanceolatum* var. *insignis* Cleve. The most common species (5% of total) in sample composition were *Achnanthes marginulata* Grunow, *A. brevips* Agardh, *A. brevips* var. *intermedia* Cleve, and *Pinnularia borealis* Ehrenberg. Three new diatom species, *Pseudoeunotia antarctica* Yang sp. nov., *Stauroneis antarctica* Yang sp. nov. and *Pinnularia antarctica* Yang sp. nov., were discovered. The freshwater diatom assemblage from King George I. has the characteristic features of low species richness, low species diversity and a high population. Benthic pennate species are dominant. These features are also common in recent diatom assemblages in arctic lakes and in fossil diatom assemblages formed in the late-glacial period. (Auth. mod.)

49-5725

Latitude variations of stratospheric trace gases.
Toon, G.C., Blavier, J.F., Szeto, J.T., *Geophysical research letters,* Nov. 15, 1994, 21(23), p.2599-2602, 7 refs.
Atmospheric composition, Stratosphere, Ozone, Aerial surveys
The authors present vertical column abundances of H_2O, N_2O, HNO_3, NO_2, O_3, HF, HCl, and $ClNO_3$ determined from solar absorption spectra measured by the JPL MkIV interferometer from the NASA DC-8 aircraft. These observations, taken in 1987 and 1992, covered latitudes ranging from 85°S to 85°N. Although most gases display latitude symmetry, large asymmetries in H_2O, HNO_3, and O_3 are apparent, which can be ascribed to processes enhanced by the colder antarctic winter temperatures. (Auth.)

49-5726

Technical maintenance and servicing of ships according to their condition: handbook. [Tekhnicheskie obsluzhivanie i remont sudov po sostoianiiu; spravochnik]
Blinov, E.K., Rozenberg, G.Sh., St. Petersburg, Sudostroenie, 1992, 188p., In Russian. 60 refs.
Ships, Maintenance, Construction, Cold weather construction, Temperature measurement, Manuals

49-5727

Screening of new application methods for winter abrasives on Ontario highways.
Perchanok, M.S., Comfort, G., SWIFT Workshop, Edmonton, Alberta, Canada, Aug. 22-25, 1994, 1994, 16p., 4 refs.
Road maintenance, Winter maintenance, Skid resistance, Sands, Grain size, Ice friction, Ice solid interface, Cold weather tests, Cost analysis

49-5728

Calcium treated sand: a report on the use of calcium chloride treated sand and salt on a Ministry highway during the winter of 1982-83.
Cohen, S., *Ontario. Ministry of Transportation and Communications. Report,* June 1983, No.MM-83-001.
Road maintenance, Winter maintenance, Ice control, Skid resistance, Salting, Aggregates, Physical properties, Cold weather performance, Cold weather tests, Cost analysis

49-5729
Effects of the length of the snow-free period on leaf longevity in alpine shrubs: a cost-benefit model.
Kikuzawa, K., Kudo, G., *Oikos,* June 1995, 73(2), p.214-220, 33 refs.
Plants (botany), Plant ecology, Phenology, Microclimatology, Alpine landscapes, Snow cover effect, Photosynthesis, Viability

49-5730
Risk-equivalent seasonal discharge programs for ice-covered rivers.
Wotton, C.L., Lence, B.J., *Journal of water resources planning and management,* May-June 1995, 121(3), p.275-282, 26 refs.
Waste disposal, Water treatment, Sewage disposal, Seasonal variations, Rivers, Water pollution, Environmental impact, Water chemistry, Oxygen, River ice, Ice cover effect, Standards

49-5731
Mathematical analysis of the effective thermal conductivity of food materials in the frozen state.
Miyawaki, O., Pongsawatmanit, R., *Bioscience, biotechnology, and biochemistry,* July 1994, 58(7), p.1222-1225, 12 refs.
Polymers, Solutions, Frozen liquids, Thermal conductivity, Temperature measurement, Analysis (mathematics), Temperature effects, Ice water interface, Correlation

49-5732
Composition and genesis of glacial hummocks, western Wisconsin, USA.
Johnson, M.D., Mickelson, D.M., Clayton, L., Attig, J.W., *Boreas,* June 1995, 24(2), p.97-116, 53 refs.
Glacial geology, Glacier beds, Pleistocene, Quaternary deposits, Glacier melting, Hummocks, Geomorphology, Sediments, Soil formation, Soil analysis, United States—Wisconsin

49-5733
Subglacial to proglacial sediment transition in a shallow ice-contact lake.
Rovey, C.W., Borucki, M.K., *Boreas,* June 1995, 24(2), p.117-127, 35 refs.
Glacial geology, Pleistocene, Moraines, Quaternary deposits, Sedimentation, Lakes, Bottom sediment, Stratigraphy, Soil texture, Glacier melting, Subglacial drainage

49-5734
Contemporary terminal-moraine ridge formation at a temperate glacier: Styggedalsbreen, Jotunheimen, southern Norway.
Matthews, J.A., McCarroll, D., Shakesby, R.A., *Boreas,* June 1995, 24(2), p.129-139, 55 refs.
Glacial geology, Glacier tongues, Geomorphology, Moraines, Grain size, Soil formation, Sedimentation, Models, Ice solid interface, Norway

49-5735
High-resolution paleomagnetic correlation of Middle Weichselian ice-dammed lake sediments in two coastal caves, western Norway.
Valen, V., Larsen, E., Mangerud, J., *Boreas,* June 1995, 24(2), p.141-153, 30 refs.
Pleistocene, Glacial geology, Glaciation, Caves, Geomagnetism, Sedimentation, Stratigraphy, Correlation, Norway

49-5736
Cold climate concerns. Part 1—water supply facilities.
Ryan, W.L., *Public works,* July 1995, 126(8), p.34-36, 1 ref.
Water supply, Municipal engineering, Cold weather operation, Water treatment, Water pipelines, Frost protection, Design criteria

49-5737
Snow and ice control on the New York State Thruway.
Dyment, R., *Public works,* July 1995, 126(8), p.37-39.
Road maintenance, Winter maintenance, Snow removal, Ice control, Chemical ice prevention, Salting, Standards, Cold weather operation

49-5738
Electron microscopy studies of amphiphilic self-assemblies on vitreous ice.
Majewski, J., et al, *Advanced materials,* Jan. 1995, 7(1), p.26-35, 55 refs.
Ice physics, Electron microscopy, Vitreous ice, Two dimensional nucleation, Heterogeneous nucleation, Freezing points, Layers, Hydrocarbons, Polymers, Molecular structure, Ice water interface, Latticed structures

49-5739
Rock salt.
Ontario. Ministry of Transportation. Research and Development Branch, *De-icer fact sheet,* Oct. 1992, No.1, 1p.
Winter maintenance, Road maintenance, Ice removal, Salting, Cold weather performance, Specifications, Environmental impact

49-5740
Calcium chloride.
Ontario. Ministry of Transportation. Research and Development Branch, *De-icer fact sheet,* Oct. 1992, No.2, 1p.
Winter maintenance, Road maintenance, Ice removal, Salting, Cold weather performance, Specifications

49-5741
PM-20.
Ontario. Ministry of Transportation. Research and Development Branch, *De-icer fact sheet,* Oct. 1992, No.3, 1p.
Winter maintenance, Road maintenance, Ice removal, Salting, Cold weather performance, Specifications

49-5742
Calcium magnesium acetate (CMA).
Ontario. Ministry of Transportation. Research and Development Branch, *De-icer fact sheet,* Nov. 1993, No.4, 1p.
Road maintenance, Winter maintenance, Salting, Ice removal, Specifications, Cold weather performance

49-5743
Sodium formate.
Ontario. Ministry of Transportation. Research and Development Branch, *De-icer fact sheet,* Jan. 1993, No.5, 1p.
Winter maintenance, Road maintenance, Salting, Ice removal, Specifications, Cold weather performance

49-5744
Urea.
Ontario. Ministry of Transportation. Research and Development Branch, *De-icer fact sheet,* Oct. 1992, No.6, 1p.
Road maintenance, Winter maintenance, Cold weather performance, Salting, Urea, Specifications

49-5745
Corrosion inhibitors (general).
Ontario. Ministry of Transportation. Research and Development Branch, *De-icer fact sheet,* Oct. 1992, No.7, 1p.
Winter maintenance, Road maintenance, Ice removal, Corrosion, Salting, Admixtures, Countermeasures

49-5746
Freezegard + PCl.
Ontario. Ministry of Transportation. Research and Development Branch, *De-icer fact sheet,* Sep. 1993, No.8, 1p.
Winter maintenance, Road maintenance, Ice removal, Liquids, Cold weather performance

49-5747
Qwiksalt + PCl.
Ontario. Ministry of Transportation. Research and Development Branch, *De-icer fact sheet,* Sep. 1993, No.9, 1p.
Winter maintenance, Road maintenance, Salting, Cold weather performance, Specifications

49-5748
Rocksalt + TCl.
Ontario. Ministry of Transportation. Research and Development Branch, *De-icer fact sheet,* Oct 1992, No.10, 1p.
Winter maintenance, Road maintenance, Salting, Specifications, Cold weather performance

49-5749
Sprinkle lightly—salt and alternatives for highway de-icing.
Fromm, H.J., *Ontario. Ministry of Transportation and Communications. Research and Development Branch. Report,* July 1984, No.MSP-84-01, 11p., 15 refs.
Winter maintenance, Road maintenance, Ice control, Ice removal, Salting, Aggregates, Environmental impact, Countermeasures

49-5750
Detection of crevasses near McMurdo Station, Antarctica with airborne short-pulse radar.
Delaney, A.J., Arcone, S.A., SR 95-7, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Mar. 1995, 20p., ADA-295 072, 13 refs.
Crevasse detection, Aerial surveys, Profiles, Radio echo soundings, Stratigraphy, Antarctica—McMurdo Station
Airborne short-pulse radar is evaluated experimentally as a rapid reconnaissance tool for locating snow-bridged crevasses. An immediate need for a crevasse detector is present within the U.S. Antarctic Program, which is planning a major surface traverse from McMurdo to deliver construction materials to Amundsen-Scott Station. This feasibility study of a crevasse detection system was performed near McMurdo Station in Jan. 1994. The radar utilized pulses centered near 200 and 500 MHz and was operated from a low flying helicopter with altitude and speed as variables. A global positioning system (GPS) was used for survey control. Results are presented over glacial ice on Ross I. and at various locations on the Ross Ice Shelf near White and Black Is. and near the Aurora Glacier terminus. Strong evidence of crevassing was recorded at flight speeds near 45 mph, at altitudes near 15 m, and at a data acquisition rate of 51 scans/second. Crevasses are detected by the reflections and diffractions from distorted layering in snow bridges, and by the strong diffractions from within the crevasses. The strongest diffractions apparently emanated from within the crevasse and not from the base of the snow bridge. Along the control line, a crevasse with no surface expression was detected by radar and verified by probing and digging. Transects devoid of crevasses show layering without the small scale distortion seen over snow bridges. (Auth. mod.)

49-5751
Development and application of a spatial database for emergency management operations—1993 midwest flood.
Nagle, J.A., Ochs, E.S., Bruzewicz, A.J., McKim, H.L., CR 95-4, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Mar. 1995, 57p., ADA-294 613, 8 refs.
River basins, Flooding, Geography, Mapping, Geophysical surveys, Remote sensing, Data processing, Computer applications
During natural and man-made emergencies, there is a need for the rapid development of spatial databases to support recovery efforts. A spatial database was developed to support the U.S. Army Corps of Engineers Disaster Field Offices during the flooding in the midwest in the summer of 1993. The spatial database contains roads, railroads, hydrography, county boundaries and inundation data for 7 rivers located in the Mississippi River basin. The spatial data came from a variety of sources, including U.S. Census Bureau TIGER/Line files, U.S. Geological Survey Digital Line Graphs and satellite imagery. An application of the spatial database is also described. Maps were produced showing roads, railways, hydrography, county boundaries and, when available, inundation data. These maps were then distributed to assist in the recovery efforts and future planning.

49-5752
Motion resistance of wheeled vehicles in snow.
Richmond, P.W., CR 95-7, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Mar. 1995, 47p., ADA-294 675, 12 refs.
Vehicle wheels, Tires, Traction, Snow mechanics, Snow loads, Snow deformation, Ice solid interface, Cold weather performance, Mechanical tests, Forecasting
Before vehicle mobility in snow can be reliably predicted, a complete understanding of motion resistance in snow is required. This report examines several aspects of wheeled vehicle motion resistance using results obtained with the CRREL instrumented vehicle. Resistances of leading and trailing tires are examined. Limited data are presented for undercarriage drag, and third and fourth wheel passes in the same rut are initially analyzed, as is the way snow deforms around a wheel. For the CRREL instrumented vehicle, a

trailing tire has a resistance coefficient of about 0.017 for snow depths less than about 22 cm. For deeper snow, the disruption of the snowpack caused by a preceding wheel causes snow to fall into the rut, resulting in higher trailing tire coefficients. For larger vehicles, which in some cases have trailing tires carrying larger loads than preceding tires, the trailing tire coefficients are on the order of 0.048 and 0.025 for second and third trailing wheels respectively. The results and observations of this study are applied in a reanalysis of the towed resistance data obtained during the U.S. Army's Wheels vs. Tracks study. An improved algorithm is presented for predicting wheeled vehicle motion resistance caused by snow.

49-5753

Detection and analysis of cirrus clouds using passive infrared satellite data.

d'Entremont, R.P., *SPIE—The International Society for Optical Engineering. Proceedings,* Apr. 1993, Vol.1934, Passive infrared remote sensing of clouds and the atmosphere. Edited by D.K. Lynch, p.164-179, 36 refs.

DLC QC974.5.P37

Clouds (meteorology), Climatology, Remote sensing, Infrared spectroscopy, Radiometry, Spacecraft, Cloud physics, Ice crystal optics, Detection

49-5754

Retrieval of cirrus radiative and spatial properties using coincident AVHRR and HIRS satellite data.

d'Entremont, R.P., Wylie, D.P., Peduzzi, D.C., Doherty, J., *SPIE—The International Society for Optical Engineering. Proceedings,* Apr. 1993, Vol.1934, Passive infrared remote sensing of clouds and the atmosphere. Edited by D.K. Lynch, p.180-196, 15 refs.

DLC QC974.5.P37

Clouds (meteorology), Cloud physics, Remote sensing, Spaceborne photography, Radiometry, Infrared photography, Radiation balance, Optical properties, Detection, Correlation

49-5755

Remote sensing of cirrus cloud parameters using AVHRR data.

Ou, S.C., Liou, K.N., Rao, N., Gooch, W., Takano, Y., *SPIE—The International Society for Optical Engineering. Proceedings,* Apr. 1993, Vol.1934, Passive infrared remote sensing of clouds and the atmosphere. Edited by D.K. Lynch, p.217-229, 15 refs.

DLC QD974.5.P37

Clouds (meteorology), Cloud physics, Remote sensing, Radiometry, Detection, Ice crystal optics, Ice crystal size, Optical properties, Radiance, Models

49-5756

Review of subvisual cirrus morphology.

Schmidt, E.O., Alvarez, J.M., Vaughan, M.A., Wylie, D.P., *SPIE—The International Society for Optical Engineering. Proceedings,* Apr. 1993, Vol.1934, Passive infrared remote sensing of clouds and the atmosphere. Edited by D.K. Lynch, p.230-239, 25 refs.

DLC QD974.5.P37

Cloud physics, Cloud cover, Detection, Classifications, Optical properties, Remote sensing

49-5757

Impact of cirrus clouds on remote sensing of surface temperatures.

Cornette, W.M., Shanks, J.G., *SPIE—The International Society for Optical Engineering. Proceedings,* Apr. 1993, Vol.1934, Passive infrared remote sensing of clouds and the atmosphere. Edited by D.K. Lynch, p.252-262, 5 refs.

DLC QD974.5.P37

Geophysical surveys, Remote sensing, Surface temperature, Temperature measurement, Accuracy, Cloud cover, Cloud physics, Ice crystal optics, Scattering, Radiance

49-5758

Subvisual cirrus: what it is and where you find it.

Lynch, D.K., *SPIE—The International Society for Optical Engineering. Proceedings,* Apr. 1993, Vol.1934, Passive infrared remote sensing of clouds and the atmosphere. Edited by D.K. Lynch, p.264-274, 48 refs.

DLC QD974.5.P37

Cloud physics, Cloud cover, Ice crystal optics, Remote sensing, Detection, Optical properties, Classifications

49-5759

Detection of polar stratospheric clouds from NOAA-HIRS data: a case study.

Wendling, P., Meerkoetter, R., Buell, R., *SPIE—The International Society for Optical Engineering. Proceedings,* Apr. 1993, Vol.1934, Passive infrared remote sensing of clouds and the atmosphere. Edited by D.K. Lynch, p.346-353, 9 refs.

DLC QD974.5.P37

Cloud cover, Cloud physics, Polar stratospheric clouds, Detection, Remote sensing, Radiometry, Temperature measurement, Radiance, Optical properties, Spectra

49-5760

Glaciological studies in tunnel 2 of Glacier No.1 at the headwaters of the Urumqi River.

Huang, M.H., Zhou, T., Jing, X.P., Wang, W.T., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.289-300, In Chinese with English summary. 14 refs.

Glacier surveys, Mountain glaciers, Ice tunnels, Glacier flow, Glacier ice, Ice temperature, Ice structure, Ice deformation, China—Tian Shan

49-5761

Essential types of heave development for soil freezing.

Xu, X.Z., Zhang, L.X., Wang, J.C., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.301-307, In Chinese with English summary. 3 refs.

Soil freezing, Frost heave, Freezing front, Soil water migration

49-5762

Primary study on model for coupled heat-moisture-salt transfer in soil during freezing-thawing processes.

Yue, H.S., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.308-313, In Chinese with English summary. 4 refs.

Soil freezing, Ground thawing, Frozen ground thermodynamics, Frozen ground chemistry

49-5763

Fractal structure features of granulometric composition in frozen soil and its significance.

Yi, S.M., Tang, H.M., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.314-319, In Chinese with English summary. 5 refs.

Frozen ground strength, Cryogenic soils, Soil structure, Soil texture, Grain size, Particle size distribution, Fractals

49-5764

Study on freezing point of wet sand under loads.

Cui, G.X, Li, Y., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.320-326, In Chinese with English summary. 2 refs.

Soil freezing, Artificial freezing, Sands, Soil stabilization, Frozen ground strength, Frozen ground compression, Unfrozen water content, Freezing points

49-5765

Effect of length of specimen on the results in radial splitting test.

Shen, Z.Y., Peng, W.W., Liu, Y.Z., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.327-332, In Chinese with English summary. 3 refs.

Frozen ground strength, Tensile properties, Strain tests

49-5766

Climatic features of Tianshan Urumqi River Valley.

Zhang, Y.S., Kang, E.S., Liu, C.H., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.333-341, In Chinese with English summary. 3 refs.

Mountains, River basins, Air temperature, Precipitation (meteorology), Humidity, Atmospheric pressure, Water vapor, Vapor pressure, Seasonal variations, Climatic factors, China—Tian Shan

49-5767

Circulation features of China corresponding to abnormal snow cover in Northern Hemisphere.

Wang, G.Y., Zeng, Q.Z., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.342-345, In Chinese with English summary. 4 refs.

Snowfall, Snow line, Snow cover distribution, Snow cover effect, Atmospheric circulation, Atmospheric pressure, Precipitation (meteorology), China

49-5768

Determination of major cations in snow and ice samples by atomic absorption spectrophotometer.

Huang, C.L., Li, Z.Q., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.346-350, In Chinese with English summary. 2 refs.

Snow samplers, Snow composition, Ice sampling, Ice composition, Ice spectroscopy, Impurities, Atmospheric composition, Air pollution, Ion density (concentration)

49-5769

Constant stress creep experiments on ice containing debris of Glacier No.1 at the headwaters of the Urumqi River.

Li, G., Wang, M.H., Huang, M.H., Wang, W.T., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.351-356, In Chinese with English summary. 8 refs.

Glacier surveys, Mountain glaciers, Glacier flow, Glacier ice, Ice deformation, Ice creep, Talus, China—Tian Shan

49-5770

Application of PD-1/2 special automatic control pipette in grain-size analysis of glacial deposits.

Sun, W.Z., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.357-362, In Chinese with English summary. 3 refs.

Glacial deposits, Moraines, Glacial till, Soil structure, Soil texture, Grain size, Particle size distribution

49-5771

Milankovitch theory is upset or verified.

Li, P.J., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.363-370, In Chinese with English summary. 15 refs.

Ice age theory, Glaciation, Geochronology, Marine deposits, Marine geology, Sea level, Paleoclimatology

49-5772

Research history and present situation of Younger Dryas event in the last deglaciation.

Wang, J.M., Zhong, W., *Journal of glaciology and geocryology,* Dec. 1994, 16(4), p.371-379, In Chinese with English summary. 42 refs.

Glaciation, Geochronology, Ocean currents, Atmospheric circulation, Global change, Paleoclimatology

49-5773

Proceedings.

International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995, Collins, N.H., ed, SR 95-9, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, 305p., ADA-294 630, Refs. passim. For selected papers see 49-5774 through 49-5786.

Military operation, Cold weather operation, Cold weather performance, Cold weather tests, Military equipment, Clothing, Design, Design criteria, Cold exposure, Temperature effects

49-5774
Materiel challenges in arctic and subarctic climates.
Barger, J.G., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.3-9.
Military operation, Cold weather operation, Equipment, Clothing, Cold weather tests, Standards

49-5775
Environmental Issues Guide for Heuristic Testing (EIGHT).
Williamson, R.L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.11-17, 3 refs.
Military equipment, Cold weather operation, Cold weather tests, Computer programs, Computer applications, Data processing, Design criteria, Computerized simulation

49-5776
Layering principle for cold weather clothing: are we there yet?
Frim, J., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.21-45, 5 refs.
Military equipment, Clothing, Cold weather performance, Cold weather tests, Temperature effects, Design, Layers, Thermal insulation, Physiological effects, Wind factors

49-5777
Torso auxiliary heating can maintain extremities' temperatures during cold exposure.
Ducharme, M.B., Brajkovic, D., Frim, J., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.49-52, 6 refs.
Military operation, Military equipment, Clothing, Cold weather tests, Cold exposure, Physiological effects, Electric heating, Heat transfer

49-5778
Towed snow plow for the Small Unit Support Vehicle (SUSV).
Walsh, M.R., MP 3634, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.135-144, 4 refs.
Military equipment, Cold weather operation, Tracked vehicles, Snow removal, Cold weather tests, Performance, Design

49-5779
Medical research for cold weather military operations.
Young, A.J., Sawka, M.N., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.147-152, 15 refs.
Military operation, Cold weather operation, Cold weather performance, Cold exposure, Physiological effects, Acclimatization, Countermeasures, Research projects

49-5780
Basic research and cold weather operations.
Ashton, G.D., Harmon, R.S., MP 3635, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.155-161.
Military operation, Materials, Cold weather operation, Research projects, Cold weather tests, Design

49-5781
Positive temperature coefficient handwear and footwear heating systems.
Clarke, M.R.H., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.163-176, 7 refs.
Military equipment, Clothing, Cold weather performance, Cold exposure, Batteries, Electric heating, Design, Materials

49-5782
Enhanced mobility for cold regions.
Shoop, S.A., MP 3636, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.179-186, 17 refs.
Vehicles, Cold weather performance, Snow cover effect, Traction, Ice solid interface, Temperature effects, Research projects

49-5783
Organisation of protection against avalanches in the Republic of Slovenia—Tasks of the Slovenian Army.
Kavar, J., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.187-199, 4 refs.
Military operation, Accidents, Avalanches, Safety, Rescue operations, Slovenia

49-5784
Trial by adventure.
Osczevski, R.J., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.215-240, 15 refs.
Military operation, Equipment, Cold weather performance, Cold weather tests, Cold exposure, Expeditions, Simulation, Clothing, Temperature effects

49-5785
State-of-the-art advances in U.S. military cold weather heating equipment.
Mackoul, J., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.265-282.
Military operation, Cold weather operation, Cold weather performance, Military equipment, Portable shelters, Portable equipment, Heating, Design criteria

49-5786
Snow drifting problems and abatement.
Lever, J., Haehnel, R., Wilkinson, J., MP 3637, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* 1995, SR 95-9, International Conference on Cold Weather Military Operations, Burlington, VT, Feb. 28-Mar. 2, 1995. Proceedings. Edited by N.H. Collins, p.301-305.
Snowdrifts, Countermeasures, Snow physics, Blowing snow, Snow air interface, Wind factors, Wind tunnels, Simulation

49-5787
Quaternary geology of the Frances Lake map area, Yukon and Northwest Territories.
Dyke, A.S., *Canada. Geological Survey. Memoir,* 1990, No.426, 39p. + maps, With French summary. 32 refs.
DLC QE185.A2
Geological maps, Pleistocene, Quaternary deposits, Geological surveys, Bedrock, Surface structure, Geomorphology, Landforms, Glacial geology, Glacial deposits, Canada—Yukon Territory, Canada—Northwest Territories

49-5788
Spatial distribution of bacterioplankton biomass and production in the marginal ice-edge zone of the Weddell-Scotia Sea during austral winter.
Mordy, C.W., Penny, D.M., Sullivan, C.W., *Marine ecology progress series,* June 1995, 122(1-3), p.9-19, 58 refs.
Oceanography, Sampling, Plankton, Pack ice, Ice edge, Ice cover effect, Biomass, Distribution, Ecosystems, Antarctica—Weddell Sea, —Scotia Sea
To help elucidate the ecological and biogeochemical significance of bacterial production in winter, the distributions of bacterial biomass and production in the MIZ of the Weddell-Scotia Sea in austral winter 1988 were examined as part of the Antarctic Marine Ecosystem Research at the Ice-edge Zone (AMERIEZ) program. Measurements were made along 3 rapid transects providing a synoptic view of the MIZ. Transects were oriented normal to the ice edge with stations extending up to 100 km into the pack and several hundred km seaward of the ice edge. Winter distributions of bacterial biomass and production were more closely related to local hydrography than to microalgal distributions or the proximity of the ice edge. Bacterial characteristics were highest within or in the proximity of warm-core eddies, enrichments which may have resulted from prior ice melt or from advection of more productive waters. (Auth. mod.)

49-5789
Growth and reproduction of dwarf shrubs in a subarctic plant community: annual variation and above-ground interactions with neighbours.
Shevtsova, A., Ojala, A., Neuvonen, S., Vieno, M., Haukioja, E., *Journal of ecology,* Apr. 1995, 83(2), p.263-275, 37 refs.
Plant ecology, Subarctic landscapes, Ecosystems, Growth, Seasonal variations, Temperature effects, Statistical analysis, Finland

49-5790
Development of a *Populus balsamifera* clone in subarctic Québec reconstructed from spatial analyses.
Brodie, C., Houle, G., Fortin, M.J., *Journal of ecology,* Apr. 1995, 83(2), p.309-320, 43 refs.
Trees (plants), Subarctic landscapes, Plant ecology, Growth, Distribution, Plant tissues, Vegetation patterns, Statistical analysis, Correlation, Canada—Quebec

49-5791
"Last word" on ice spikes.
Perry, H.F., *Physics teacher,* Mar. 1995, 33(3), p.148-149, 6 refs.
Dendritic ice, Icicles, Ice growth, Ice water interface, Ice physics

49-5792
Spectrum of elastic-gravity waves in the sea under the ice cover.
Marchenko, A.V., *Bulletin of the Russian Academy of Sciences. Supplement. Physics of vibrations,* 1994, Vol.58(suppl.4), p.220-235, Translated from Izvestiia Rossiĭskoi Akademiĭ nauk. Seriia fizicheskaia. 14 refs.
Sea ice, Ice mechanics, Ice edge, Ice water interface, Ice cover effect, Elastic waves, Gravity waves, Wave propagation, Spectra, Mathematical models, Fluid dynamics

49-5793
Traditional agriculture of the populations in the North and protected territories (the problem of the creation of a Central Siberian biosphere reserve). [Traditsionnoe khoziaĭstvo narodov Severa i okhraniaemye territorii (k probleme sozdaniia Tsentral'nosibirskogo biosfernogo rezervata)]
Klokov, K.B., Geografiia i khoziaĭstvo. Vyp.4: Raĭony prozhivaniia malochislennykh narodov Severa (Geography and economics. Vol.4: Sparsely-populated regions in the North). Edited by A.I. Chistobaev, Leningrad, GO SSSR, 1991, p.50-74, In Russian. 7 refs.
Ecology, Environmental protection, Environmental impact, Cold weather operation, Russia—Siberia

49-5794
Mired in political and legal struggles, Russian offshore E&D remains at impasse.
George, D., *Offshore,* Mar. 1995, 55(3), p.38.
Gas production, Petroleum industry, International cooperation, Legislation, Russia

49-5795

Joint industry field expedition to study ice conditions in Pechora Sea, 1993.

Wilkman, G., et al, *Hydrotechnical construction,* Feb. 1995, 28(8), p.454-459, Translated from Gidrotekhnicheskoe stroitel'stvo. For another version see 49-3345.

Sea ice distribution, Ice surveys, Ice conditions, Petroleum industry, Exploration, International cooperation, Pechora Sea

49-5796

Technological challenges for hydrocarbon production in the Barents Sea.

Gudmestad, O.T., Strass, P., *Hydrotechnical construction,* Feb. 1995, 28(8), p.460-471, Translated from Gidrotekhnicheskoe stroitel'stvo. 7 refs. For other versions see 48-125 and 49-3351.

Petroleum industry, Hydrocarbons, Offshore drilling, Ice conditions, Sea ice distribution, Icebergs, Barents Sea

49-5797

Hydrocarbon production concepts for dynamic annual sea ice regions.

Wang, A.T., Poplin, J.P., Heuer, C.E., *Hydrotechnical construction,* Feb. 1995, 28(8), p.472-492, Translated from Gidrotekhnicheskoe stroitel'stvo. 41 refs. For another version see 49-3314.

Petroleum industry, Hydrocarbons, Economic development, Offshore drilling, Sea ice distribution, Ice cover thickness, Ice rafting, Ice loads, Offshore structures, Design criteria, Bering Sea

49-5798

Review of the background state of the environment for 1991. [Obzor fonovogo sostoianiia okruzhaiushcheĭ prirodnoĭ sredy za 1991 g.]

Izrael', IU.A., ed, Rovinskiĭ, F.IA., ed, Moscow, Gidrometeoizdat, 1992, 61p., In Russian.

Environmental protection, Environmental impact, Water pollution, Ecology, Hydrography, Air pollution, Rivers, Barents Sea, Russia—Kara Sea, Russia—Laptev Sea, Russia—White Sea, Russia—Siberia, Baltic Sea, Sea of Azov, Russia—Black Sea

49-5799

21st century project: considering the construction of a tunnel beneath the Bering Strait and a transcontinental railroad. [Proekt XXI veka: razmyshleniia o stroitel'stve tonnelia pod Beringovym prolivom i transkontinental'noĭ zheleznoĭ dorogi]

Ostroumov, G., *Nauka i zhizn',* Apr. 1995, No.4, p.2-11, In Russian.

Railroads, Tunnels, Railroad tunnels, Cold weather construction, Environmental impact, International cooperation, Design, Route surveys, Bering Strait

49-5800

Arctic and climate. [Arktika i klimat]

Kondrat'ev, K.IA., Johannessen, O.M., St. Petersburg, PROPO, 1993, 140p., In Russian with extended English summary and table of contents. Refs. p.101-111.

Polar atmospheres, Aerosols, Global change, Sea ice, Climatic changes, Ice water interface, Cloud cover, Solar radiation, Mathematical models, Remote sensing, Ice cover, Snow cover, Infrared radiation, Microwaves

49-5801

Practical recommendations for landscaping northern cities (for example Kostomukshi). [Prakticheskie rekomendatsii po ozeleneniiu severnykh gorodov (na primere Kostomukshi)]

Andreev, K.A., Berezovskiĭ, V.A., Sazonov, S.V., Krutov, V.I., Petrozavodsk, Karel'skiĭ nauchnyĭ tsentr RAN, 1992, 18p., In Russian. 4 refs.

Landscape development, Revegetation, Trees (plants), Forestry, Russia—Karelia

49-5802

Expedition of the Murmansk Marine Biological Institute to Baydaratskaya Bay and the southwestern Kara Sea (September 1991, September-October 1992, the R/V *Dalnye Zelentsy*). [Ekspeditsii Murmanskogo morskogo biologicheskogo instituta v Baĭdaratsuiu gubu i iugo-zapadnuiu chast' Karskogo moria (sentiabr' 1991 g., sentiabr'-oktiabr' 1992 g., NIS "Dal'nye Zelentsy")]

Matishov, G.G., Apatity, Kol'skiĭ nauchnyĭ tsentr RAN, 1992, 21p., In Russian with English table of contents. 15 refs.

Expeditions, Plankton, Marine biology, Biomass, Microbiology, Ecology, Environmental protection, Russia—Baydaratskaya Bay, Russia—Kara Sea

49-5803

Changes in the rate of migration of water-soluble substances in tundra soils and taiga terrain in relation to global climatic changes. [Izmenenie intensivnosti migratsii vodorastvorimykh veshchestv v pochvakh tundrovykh i taezhnykh landshaftov v sviazi s global'nymi izmeneniami klimata]

Vasil'evskaia, V.D., Pervova, N.E., *Moscow. Universitet. Vestnik. Seriia 17: Pochvovedenie,* Jan.-Mar. 1995, No.1, p.3-12, In Russian with English summary. 25 refs.

Tundra, Taiga, Vegetation factors, Frozen ground chemistry, Frozen ground mechanics, Active layer, Ground thawing, Migration, Temperature effects, Global change, Climatic changes

49-5804

Phosphorus in humic acids of mountain-forest and mountain-meadow soils in the northwestern Caucasus. [Fosfor v guminovykh kislotakh gornolesnykh i gorno-lugovykh pochv Severo-zapadnogo Kavkaza]

Makarov, M.I., *Moscow. Universitet. Vestnik. Seriia 17: Pochvovedenie,* Jan.-Mar. 1995, No.1, p.38-48, In Russian with English summary. 20 refs.

Forest soils, Meadow soils, Mountain soils, Frozen ground chemistry, Soil composition, Caucasus

49-5805

Ecological problems of regulating river runoff and reconstructing water reservoirs. [Ekologicheskie problemy regulirovaniia rechnogo stoka i rekonstruktsii vodokhranilishch]

Edel'shteĭn, K.K., *Moscow. Universitet. Vestnik. Seriia 5: Geografiia,* Sep.-Oct. 1994, No.5, p.52-58, In Russian with English summary. 17 refs.

Runoff, Water pollution, Environmental impact, Reservoirs, River basins, Russia

49-5806

Geographical characteristics of low winter runoff from Buryatya. [Geograficheskie zakonomernosti nizkogo zimnego stoka rek Buriatii]

Evstigneev, V.M., Shaĭbonov, B.B., *Moscow. Universitet. Vestnik. Seriia 5: Geografiia,* Sep.-Oct. 1994, No.5, p.74-79, In Russian with English summary. 7 refs.

Rivers, Runoff, Runoff forecasting, Accuracy, Russia—Buryatya

49-5807

Distribution of cloudiness and evaluation of its impact on the accumulation of total insolation in Yakutia. [Raspredelenie oblachnosti i otsenka ee vliianiie na prikhod summarnoĭ radiatsii v IAkutii]

Sokolikhina, N.N., *Moscow. Universitet. Vestnik. Seriia 5: Geografiia,* Sep.-Oct. 1994, No.5, p.96-101, In Russian with Engliah summary. 7 refs.

Cloud cover, Solar radiation, Insolation, Seasonal variations, Forecasting, Analysis (mathematics), Russia—Yakutia

49-5808

Conifer stomate analysis as a paleoecological tool: an example from the Hudson Bay Lowlands.

Hansen, B.C.S., *Canadian journal of botany,* Feb. 1995, 73(2), p.244-252, With French summary. 26 refs.

Paleoecology, Trees (plants), Palynology, Peat, Plant tissues, Classifications, Vegetation patterns, Correlation, Canada—Ontario—Hudson Bay Lowlands

49-5809

Snow management with windbreaks: potential user conflicts.

Perchanok, M.S., Cain, N.P., International Windbreaks & Agroforestry Symposium, 3rd., Ridgetown College, Canada, June 1991, p.97-99, 5 refs.

Windbreaks, Snow fences, Snow hedges, Road maintenance, Blowing snow, Snowdrifts, Protection, Countermeasures, Agriculture

49-5810

Discharge peaks caused by ice channel melt in Black Hills streams.

Rahn, P.H., *South Dakota Academy of Sciences. Proceedings,* 1991, Vol.70, p.157-165, 8 refs.

River ice, Ice pileup, Stream flow, Ice melting, Hydrography, Runoff, Seasonal variations, United States—South Dakota—Black Hills

49-5811

Recent variations in mean temperature and the diurnal temperature range in the Antarctic.

Jones, P.D., *Geophysical research letters,* June 1, 1995, 22(11), p.1345-1348, 17 refs.

Polar atmospheres, Air temperature, Periodic variations, Diurnal variations, Statistical analysis, Climatic changes

Monthly mean surface temperature data are available from nearly twenty stations in Antarctica for the period since the International Geophysical Year 1957. All but three stations show an increase in mean temperatures over this time, amounting in the average to 0.57°C from 1957 to 1994, warming which occurred before the early 1970s. Since then, there has been no change. The warming has been greatest in the Antarctic Peninsula. Analyses of the less-widely available diurnal temperature range (DTR) data show regions of increase and decrease over Antarctica. An average continental DTR series shows no trend from 1957 to 1992. Analyses for six mid-to-high latitude southern ocean islands show increases in mean temperature from 1961-90. Given the low year-to-year variability in these data, these trends are more significant than for any of the stations on the antarctic continent. The marked decrease in mean temperatures over Antarctica during 1993 and 1994 seems unrelated to sea-ice variations which show little change since the early 1980s. (Auth. mod.)

49-5812

Observations of ultraviolet light reflection and transmission by first-year sea ice.

Perovich, D.K., MP 3633, *Geophysical research letters,* June 1, 1995, 22(11), p.1349-1352, 19 refs.

Sea ice, Young ice, Electromagnetic properties, Ultraviolet radiation, Transmissivity, Ice optics, Radiation absorption, Albedo, Snow cover effect, Attenuation

As part of a comprehensive program investigating the electromagnetic properties of sea ice, measurements were made of the optical properties of young ice and first-year sea ice at ultraviolet wavelengths. Young sea ice observations were made in a specially designed sea ice pond at the Cold Regions Research and Engineering Laboratory, while first-year sea ice was examined in the Chukchi Sea and Beaufort Sea near Barrow, AK. The results indicated that, in general, albedo increased with increasing wavelength from 305 to 380 nm, with values for first-year ice in the 0.4 to 0.6 range. Transmittance through bare first-year ice was roughly 0.5 to 2%. Extinction coefficients for bare sea ice were between 2 and 4/m and decreased with increasing wavelength. The presence of a snow cover had a profound impact on ultraviolet light levels under sea ice, with even a thin (0.1-m thick) snow cover reducing transmitted ultraviolet light by more than an order of magnitude. Observed transmittances indicated that the attenuation of ultraviolet light by sea ice and snow was greater than that of the photosynthetically active radiation.

49-5813

Multifractal analysis of the Greenland ice-core project climate data.

Schmitt, F., Lovejoy, S., Schertzer, D., *Geophysical research letters,* July 1, 1995, 22(13), p.1689-1692, 37 refs.

Paleoclimatology, Climatic changes, Air temperature, Temperature variations, Ice sheets, Ice cores, Sampling, Isotope analysis, Statistical analysis, Fractals, Greenland

49-5814

Freezing behavior of stratospheric sulfate aerosols inferred from trajectory studies.

Tabazadeh, A., Toon, O.B., Hamill, P., *Geophysical research letters,* July 1, 1995, 22(13), p.1725-1728, 23 refs.

Polar atmospheres, Aerosols, Condensation nuclei, Freezing, Cloud physics, Polar stratospheric clouds, Heterogeneous nucleation, Aerial surveys, Chemical properties

Temperature histories for both polar atmospheres based on 10-day back trajectories for six ER-2 flights during 1989 and 1987 are presented. These trajectories along with the properties of the observed PSC (polar stratospheric cloud) particles are used here to infer the physical state of the preexisting sulfuric acid aerosols. Of the ER-2 flights described here, only PSCs observed on the flights of Jan. 24 and 25, 1989 are consistent with the thermodynamics of liquid ternary solutions. The observed PSCs were probably composed of amorphous solid solutions of HNO_3 and H_2O. The temperature histories, recent laboratory measurements and the properties of glassy solids suggest that stratospheric H_2SO_4 aerosols may undergo a phase transition to SAT (sulfuric acid tetrahydrate) upon warming at ≈198 K after going through a cooling cycle to about 194 K or lower. (Auth. mod.)

49-5815

Topographic steering of the Antarctic Circumpolar Current.

Marshall, D., *Journal of physical oceanography,* July 1995, 25(7), p.1636-1650, 34 refs.

Oceanography, Hydrography, Ocean currents, Fluid dynamics, Bottom topography, Topographic effects, Mathematical models

An analytic model of the Antarctic Circumpolar Current (ACC) is presented in which information contained in a hydrographic section is propagated along characteristics. The characteristics are obtained by assuming that potential vorticity is uniform on density surfaces, lying between the *f*/H contours found in a homogeneous ocean and the *f* contours found in a strongly stratified ocean. A family of solutions are obtained for a realistic spherical geometry including coastlines and major topographic features. In the limit of weak bottom currents, the ACC transports 160 Sv of fluid around Antarctica, with circumpolar flow in the upper 3 km and abyssal gyres bounded by the bottom topography. In the limit of large bottom currents, the ACC exhibits increased sensitivity to the topography; streamlines resemble *f*/H contours and do not pass through the Drake Passage. (Auth. mod.)

49-5816

Rain, snow, and spring runoff revisited.

Bohren, C.F., *Physics teacher,* Feb. 1995, 33(2), p.79-81, 8 refs.

Precipitation (meteorology), Snowmelt, Runoff, Snow hydrology, Water vapor, Condensation, Ice vapor interface, Vapor pressure, Snow physics

49-5817

Particle emission induced by ionization tracks in water ice.

Shi, M., Grosjean, D.E., Schou, J., Baragiola, R.A., *Nuclear instruments and methods in physics research B,* May 1995, 96(3-4), p.524-529, 39 refs.

Ice physics, Amorphous ice, Radiation absorption, Ionization, Ion diffusion, Molecular energy levels

49-5818

Origin mechanisms of nitrate (NO_3^-) ions in antarctic surface snow.

Cao, C., Qin, D.H., Liu, F.J., *Chinese science bulletin,* May 1995, 40(9), p.790-792, 3 refs.

Ice sheets, Snow surface, Sampling, Snow composition, Ionization, Atmospheric electricity, Solar radiation

This paper demonstrates that the origin mechanisms of nitrate ions in antarctic surface snow are the ionization processes in polar middle and upper atmosphere driven by energetic particles and emission from space. The NO_3^- unique space distribution in antarctic snow and ice is a combined result of many factors involving polar particle precipitation, ionization effects, vertical transport in the middle and upper atmosphere, polar vortex and polar stratospheric clouds. (Auth. mod.)

49-5819

Concentration and environmental significance of lead in surface snow of antarctic ice sheet (III).

Qin, D.H., Ren, J.W., Sun, J.Y., Chen, D.Y., Wen, K.L., Li, L.Q., *Science in China B,* May 1995, 38(5), p.632-640, 14 refs.

Ice sheets, Snow impurities, Snow surface, Sampling, Precipitation (meteorology), Air pollution, Periodic variations, Aerosols, Metals, Snow air interface

The lead concentration in surface snow of the antarctic ice sheet (corresponding to modern precipitation) has systematically been studied applying LEAF technique. The distribution principle of lead concentration of surface snow of the antarctic ice sheet is "low in the west and high in the east" along the route of the 1990 International Trans-Antarctic Expedition. The concentration of lead in East Antarctica is 2-3 times higher than that in Larsen Ice Shelf and the Antarctic Peninsula, which results primarily from the activity of pre-Soviet Antarctic Expedition. The concentration of lead in Larsen Ice Shelf and the Antarctic Peninsula can be regarded as the background value of modern precipitation of the antarctic ice sheet at the end of 1980s. (Auth. mod.)

49-5820

Ice formation in a river.

Nyberg, L., International PHOENICS Users Conference, 1st, Dartford, UK, Sep. 1985. Numerical simulation of fluid flow and heat/mass transfer processes. Edited by N.C. Markatos et al and Lecture Notes in Engineering. Vol.18, Berlin, Springer-Verlag, 1986, p.108-121, 6 refs.

DLC TA357.N878

River ice, Ice formation, Frazil ice, Computerized simulation, Mathematical models, Ice water interface, Ice heat flux, Supercooling, Computer programs

49-5821

Prediction of fuel freezing in airplane fuel tanks of arbitrary geometry.

McConnell, P.M., Owens, S.F., Kamin, R.A., International PHOENICS Users Conference, 1st, Dartford, UK, Sep. 1985. Numerical simulation of fluid flow and heat/mass transfer processes. Edited by N.C. Markatos et al and Lecture Notes in Engineering. Vol.18, Berlin, Springer-Verlag, 1986, p.239-259, 22 refs.

DLC TA357.N878

Aircraft, Fuels, Tanks (containers), Freezing, Viscosity, Phase transformations, Heat transfer, Forecasting, Computerized simulation, Computer programs, Thermodynamics

49-5822

Comparison of general-purpose finite-element methods for the Stefan problem.

Pham, Q.T., *Numerical heat transfer B,* June 1995, 27(4), p.417-435, 27 refs.

Stefan problem, Thermal conductivity, Phase transformations, Enthalpy, Temperature gradients, Analysis (mathematics), Correlation, Heat balance

49-5823

Comparison of ClO measurements by airborne and spaceborne microwave radiometers in the arctic winter stratosphere 1993.

Crewell, S., et al, *Geophysical research letters,* June 15, 1995, 22(12), p.1489-1492, 11 refs.

Stratosphere, Atmospheric composition, Profiles, Aerosols, Radiometry, Chemical properties, Correlation

49-5824

Contrail formation: homogeneous nucleation of H_2SO_4/H_2O droplets.

Kärcher, B., Peter, T., Ottmann, R., *Geophysical research letters,* June 15, 1995, 22(12), p.1501-1504, 19 refs.

Cloud physics, Aerosols, Condensation trails, Homogeneous nucleation, Ice formation, Condensation nuclei, Weather modification, Environmental impact

49-5825

Decadal trends in the North Atlantic oscillation: regional temperatures and precipitation.

Hurrell. J.W., *Science,* Aug. 4, 1995, 269(5224), p.676-679, 46 refs.

Atmospheric circulation, Air temperature, Precipitation (meteorology), Ice cores, Greenland, North Atlantic Ocean

49-5826

Arctic's shrinking sea ice.

Johannessen, O.M., Miles, M., Bjørgo, E., *Nature,* July 13, 1995, 376(6536), p.126-127, 10 refs.

Sea ice distribution, Atmospheric circulation, Remote sensing, Models, Polar regions

49-5827

Latitudinal gradient of atmospheric CO_2 due to seasonal exchange with land biota.

Denning, A.S., Fung, I.Y., Randall, D., *Nature,* July 20, 1995, 376(6537), p.240-243, 31 refs.

Atmospheric circulation, Carbon dioxide, Atmospheric composition

Measurements of CO_2 concentrations at remote marine sites have been used with numerical models of atmospheric transport to deduce the location, nature and magnitude of carbon sinks. One of the most important constraints on such estimates is the observed interhemispheric gradient in atmospheric CO_2 concentration. Published models that simulate the transport of trace gases suggest that the gradient is primarily due to interhemispheric differences in fossil-fuel emissions, with small contributions arising from natural exchange of CO_2 with the various carbon reservoirs. Used here is a full atmospheric general circulation model with a more realistic representation of turbulent mixing near the ground to investigate CO_2 transport. The latitudinal (meridional) gradient imposed by the seasonal terrestrial biota is nearly half as strong as that imposed by fossil-fuel emissions. Such a contribution implies that the sinks of atmospheric CO_2 in the Northern Hemisphere must be stronger than previously suggested. The coverage in this study is global, including data for both polar regions, with CO_2 values at the South Pole being deduced at every grid point. (Auth. mod.)

49-5828

Late glacial stage and Holocene tropical ice core records from Huascarán, Peru.

Thompson, L.G., et al, *Science,* July 7, 1995, 269(5220), p.46-50, 45 refs.

Ice cores, Ice composition, Chemical composition, Snow accumulation, Paleoclimatology, Peru—Huascarán

49-5829

Continued decline of total ozone over Halley, Antarctica, since 1985.

Jones, A.E., Shanklin, J.D., *Nature,* Aug. 3, 1995, 376(6539), p.409-411, 31 refs.

Ozone, Atmospheric composition, Air temperature, Antarctica—Halley Station

The authors review the status of the ozone hole based on the continued total-ozone measurements at Halley. The springtime ozone hole continues to deepen, with both the October mean and minimum total ozone persistently decreasing. The ozone loss extends into Jan. and Feb., so that significant increases in ultraviolet-B radiation can be expected at the surface over Antarctica during the summer. A signal of ozone loss is now apparent in the spring and summer temperature records, with recent temperatures at the 100-mbar level consistently close to, or colder than, the historical (1957-72) minima for the period Oct. to Jan. These low temperatures may well enable the maintenance of springtime ozone-loss mechanisms until later in the year. (Auth. mod.)

49-5830

New data on conditions for the formation of gold ore veins in the Kommunar deposits (Kuznetskiy Alatau). [Novye dannye ob usloviiakh obrazovaniia zolotorudnykh zhil mestorozhdeniia Kommunar (Kuznetskiĭ Alatau)]

Grebenshchikova, V.I., Prokof'ev, V.IU., Troshin, IU.P., *Rossiĭskaia akademiia nauk. Doklady,* Jan. 1995, 340(2), p.239-242, In Russian. 10 refs.

Gold, Mining, Temperature measurement, Geochemistry, Carbon dioxide, Ice melting, Hydrates, Russia—Kuznetskiy Alatau, Russia—Siberia

49-5831

Map of the stability of terrain in the cryolithozone of Western Siberia. [Karta ustoĭchivosti landshaftov kriolitozony Zapadnoĭ Sibiri]

Shpolianskaia, N.A., Zotova, L.I., *Moscow. Universitet. Vestnik. Seriia 5: Geografiia,* Jan.-Feb. 1994, No.1, p.56-66, In Russian with English summary. 11 refs.

Maps, Landscape types, Geocryology, Tundra, Stability, Russia—Siberia

49-5832

Climatic changes in the steppe zone of Kazakhstan during the Holocene (based on data from spore-pollen analysis). [Kolebaniia klimata stepnoĭ zony Kazakhstana v golotsene (po dannym sporovo-pyl'tsevogo analiza)]

Klimanov, V.A., Tarasov, P.E., Tarasova, I.V., *Moscow. Universitet. Vestnik. Seriia 5: Geografiia,* Jan.-Feb. 1994, No.1, p.99-104, In Russian with English summary. 12 refs.

Steppes, Climatic changes, Pollen, Palynology, Paleoclimatology, Temperature gradients, Kazakhstan

49-5833

Current state of and prospects for mathematical modeling of avalanches. [Sovremennoe sostoianie i perspektivy matematicheskogo modelirovaniia snezhnykh lavin]

Nazarov, A.N., *Moscow. Universitet. Vestnik. Seriia 5: Geografiia,* Jan.-Feb. 1994, No.1, p.105-111, In Russian with English summary. 24 refs.

Avalanche modeling, Mathematical models, Avalanche mechanics

49-5834

Frozen ground. *International Permafrost Association. News bulletin,* June 1995, No.17, 24p.

Research projects, Organizations, Meetings, Permafrost

49-5835

Nonlinear steady-state model of the North Water Polynya, Baffin Bay.

Darby, M.S., Willmott, A.J., Mysak, L.A., *Journal of physical oceanography,* May 1994, 24(5), p.1011-1020, 14 refs.

Sea ice distribution, Oceanography, Ice edge, Drift, Polynyas, Heat flux, Air ice water interaction, Wind direction, Mathematical models, Baffin Bay

49-5836

Frost hardiness of Norway spruce treated with acid mist. Evaluation of the electrolyte leakage rate technique.

Sheppard, L.J., Franssen, I., Cape, J.N., *Environmental and experimental botany,* Apr. 1995, 35(2), p.139-149, 28 refs.

Plant physiology, Plant tissues, Trees (plants), Frost resistance, Ion diffusion, Forest ecosystems, Air pollution, Aerosols, Simulation, Accuracy

49-5837

Orientation effects on the fracture of pond (S1) ice.

Stehn, L.M., DeFranco, S.J., Dempsey, J.P., *Engineering fracture mechanics,* June 1995, 51(3), p.431-445, 25 refs.

Ponds, Ice cover, Ice strength, Ice mechanics, Ice deformation, Cracking (fracturing), Crack propagation, Orientation, Stress concentration, Mechanical tests, Ice solid interface, Anisotropy

49-5838

Ski vibrations and damping.

Glenne, B., Jorgensen, J.E., Chalupnik, J.D., *Experimental techniques,* Nov.-Dec. 1994, 18(6), p.19-22, 9 refs.

Skis, Mechanical properties, Mechanical tests, Vibration, Damping, Structural analysis, Design, Ice solid interface, Simulation

49-5839

Subglacial observations from Øksfjordjøkelen, north Norway.

Rea, B.R., Whalley, W.B., *Earth surface processes and landforms,* Nov. 1994, 19(7), p.659-673, 44 refs.

Glacier flow, Ice mechanics, Glacial erosion, Velocity measurement, Subglacial observations, Basal sliding, Glacier beds, Bottom topography, Ice solid interface, Ice deformation, Norway

49-5840

Total column densities of tropospheric and stratospheric trace gases in the undisturbed arctic summer atmosphere.

Notholt, J., Meier, A., Peil, S., *Journal of atmospheric chemistry,* Mar. 1995, 20(3), p.311-332, 53 refs.

Polar atmospheres, Atmospheric attenuation, Atmospheric density, Stratosphere, Aerosols, Ozone, Seasonal variations, Photometry, Spectra, Air pollution, Climatic changes

49-5841

Application of radar and laser systems to ocean and ice remote sensing.

Vandemark, D.C., Krabill, W.B., Walsh, E.J., Hoge, F.E., Clem, T.D., International Airborne Remote Sensing Conference and Exhibition, 1st, Strasbourg, France, Sep 12-15, 1994. Proceedings, Vol.1. Applications, technology and science, Ann Arbor, Environmental Research Institute of Michigan, 1994, p.I-173-I-183, 22 refs.

DLC G70.39.I55a

Remote sensing, Spacecraft, Geophysical surveys, Oceanography, Ice sheets, Topographic surveys, Radar echoes, Lasers, Height finding

49-5842

Hierarchical approach to monitoring alpine forest ecosystems with satellite and airborne remote sensing data.

Banninger, C., International Airborne Remote Sensing Conference and Exhibition, 1st, Strasbourg, France, Sep 12-15, 1994. Proceedings, Vol.3. Applications, technology and science, Ann Arbor, Environmental Research Institute of Michigan, 1994, p.III-425-III-434.

DLC G70.39.I55a

Alpine landscapes, Forest ecosystems, Damage, Remote sensing, Spaceborne photography, Image processing, Vegetation patterns, Classifications, Environmental protection

49-5843

95 GHz airborne radar for high resolution polarimetric cloud measurements.

Pazmany, A.L., Galloway, J., McIntosh, R.E., International Airborne Remote Sensing Conference and Exhibition, 1st, Strasbourg, France, Sep 12-15, 1994. Proceedings, Vol.3. Applications, technology and science, Ann Arbor, Environmental Research Institute of Michigan, 1994, p.III-663-III-668, 3 refs.

DLC G70.39.I55a

Cloud physics, Remote sensing, Airborne radar, Radar echoes, Backscattering, Falling snow, Snow optics, Polarization (waves)

49-5844

On links between microwave and shortwave signatures of multiyear sea ice during the onset of melt.

Winebrenner, D.P., et al, Topical Symposium on Combined Optical-Microwave Earth and Atmosphere Sensing, Albuquerque, NM, Mar. 22-25, 1993. Proceedings, Piscataway, New Jersey, Institute of Electrical and Electronics Engineers, Inc., 1993, p.74-77, 15 refs.

DLC G70.39.T67

Sea ice, Remote sensing, Synthetic aperture radar, Radiometry, Ice melting, Backscattering, Snow cover effect, Albedo, Surface temperature, Correlation, Beaufort Sea

49-5845

Investigation of polar stratospheric clouds using remote sensors, *in situ* instruments, and the Perseus remotely piloted aircraft.

Toohey, D.W., Gary, B.L., Langford, J.S., Topical Symposium on Combined Optical-Microwave Earth and Atmosphere Sensing, Albuquerque, NM, Mar. 22-25, 1993. Proceedings, Piscataway, New Jersey, Institute of Electrical and Electronics Engineers, Inc., 1993, p.123-125, 3 refs.

DLC G70.39.T67

Polar atmospheres, Polar stratospheric clouds, Remote sensing, Sensors, Aerial surveys, Aircraft, Design

This paper discusses plans to equip the Perseus aircraft with *in situ* and remote sensors to examine the microphysical and thermodynamic properties of polar stratospheric clouds and the chemical transformations they induce for research in both polar atmospheres. (Auth. mod.)

49-5846

Snow properties derived from TM and SAR measurements.

Shi, J.C., Dozier, J., Rosenthal, W., Topical Symposium on Combined Optical-Microwave Earth and Atmosphere Sensing, Albuquerque, NM, Mar. 22-25, 1993. Proceedings, Piscataway, New Jersey, Institute of Electrical and Electronics Engineers, Inc., 1993, p.240-243, 14 refs.

DLC G70.39.T67

Snow cover structure, Remote sensing, Radiometry, Synthetic aperture radar, Snow physics, Scattering, Wet snow, Particle size distribution, Grain size, Snow optics

49-5847

Huge CO_2 storage in antarctic ice sheet.

Honjou, T., Sano, H., *Energy conversion and management,* June-Sep. 1995, 36(6-9), International Conference on Carbon Dioxide Removal, 2nd, Kyoto, Japan, Oct 24-27, 1994. Proceedings, p.501-504.

Ice sheets, Excavation, Carbon dioxide, Cold storage, Environmental protection

This paper describes a CO_2-storage system using artificial ice-caving within the antarctic ice sheet. It indicates the feasibility for the storage of dry-ice CO_2 in Antarctica. (Auth. mod.)

49-5848

Insulation facilitates winter concreting.

Wallace, G.B., *U.S. Department of the Interior. Bureau of Reclamation. Engineering monograph,* Oct. 1955, No.22, 42p.

Winter concreting, Concrete curing, Concrete placing, Thermal insulation, Frost resistance, Covering, Specifications, Temperature effects, Temperature control

49-5849

Geomorphology and landscape evolution of the Lahul Himalaya, northern India.

Owen, L.A., et al, *Zeitschrift für Geomorphologie,* June 1995, 39(2), p.145-174, With German and French summaries. 27 refs.

Mountains, Geomorphology, Landscape development, Glacial geology, Glacial erosion, Geocryology, Periglacial processes, Mass movements (geology), Geological maps, India—Himalaya Mountains

49-5850

Form of glacial cirques in the English Lake District, Cumbria.

Evans, I.S., Cox, N.J., *Zeitschrift für Geomorphologie,* June 1995, 39(2), p.175-202, With German and French summaries. 38 refs.

Geomorphology, Glacial geology, Cirques, Detection, Classifications, Geological maps, Correlation, Statistical analysis, United Kingdom—England

49-5851

Comparison of three methods of calculating air temperature from electronic measurements.

Harris, S.A., Pedersen, J.H., *Zeitschrift für Geomorphologie,* June 1995, 39(2), p.203-210, 10 refs.

Air temperature, Temperature measurement, Temperature variations, Thermistors, Permafrost thermal properties, Permafrost distribution, Correlation, Heat flux, Soil air interface, Canada—Alberta—Calgary

49-5852

Temperature conditions in permafrost areas of the mountains of southwestern Alberta and the European Alps.

Harris, S.A., *Zeitschrift für Geomorphologie,* June 1995, 39(2), p.211-235, 31 refs.

Climatology, Climatic changes, Permafrost distribution, Permafrost transformation, Alpine landscapes, Air temperature, Surface temperature, Temperature measurement, Periodic variations, Freezing indexes, Seasonal freeze thaw, Canada—Alberta

49-5853

Present day soil frost activity at the Hexriver Mountains, Western Cape, South Africa.

Boelhouwers, J.C., *Zeitschrift für Geomorphologie,* June 1995, 39(2), p.237-248, With German and French summaries. 22 refs.

Soil freezing, Geocryology, Frost action, Geomorphology, Periglacial processes, Soil creep, Microclimatology, Seasonal variations, Cryogenic textures, South Africa

49-5854

On the ^{14}C and ^{39}Ar distribution in the central Arctic Ocean: implications for deep water formation.

Schlosser, P., et al, *Radiocarbon,* 1994, 36(3), p.327-343, 27 refs.

Oceanography, Ocean currents, Radioactive isotopes, Isotope analysis, Sampling, Hydrography, Radioactive age determination, Correlation, Periodic variations, Arctic Ocean

49-5855

^{210}Pb and stable lead through the redox transition zone of an antarctic lake.

Canfield, D.E., Green, W.J., Nixon, P., *Geochimica et cosmochimica acta,* June 1995, 59(12), p.2459-2468, 59 refs.

Limnology, Lake water, Sampling, Geochemistry, Mineralogy, Aerosols, Sediments, Environmental tests, Antarctica—Vanda, Lake

In Lake Vanda, relatively low Eh values combined with a lowering of pH lead to the dissolution of manganese oxides, and the accumulation of dissolved Mn. This paper presents the depth distributions of dissolved and particulate stable lead, ^{210}Pb, and ^{226}Ra, to understand the dynamics of lead cycling through the redox transition zone. Results indicate that stable lead is released from dissolving manganese oxides in the region between 51 to 61 m, resulting in a dissolved lead maximum at 59 m. Concentration profiles show that dissolved lead diffuses to the top of the zone of aerobic Mn reduction (AMR) and is sequestered onto newly formed manganese oxides. These oxides settle and dissolve, releasing lead back to solution. Lead also diffuses downward into the anoxic-sulfidic waters for permanent removal as insoluble PbS phases. Model calculations demonstrate that scavenging onto particles is the most important removal pathway for stable lead from the AMR zone. Finally, similar timescales of removal are found for ^{210}Pb and stable lead, showing that in this environment, the ^{210}Pb "clock" may be applied to understanding rates of stable lead cycling. (Auth. mod.)

49-5856

Aurora, June 1995, Vol.14, No.4.

ANARE Club, Melbourne, 1995, 32p., For selected papers see F-53246 and G-53245 or 49-5857 and 49-5858.

Research projects, Cold weather operation, Traverses, Antarctica—Lambert Glacier

The better part of this issue covers the Lambert Glacier Basin Traverse, including logistics and operational aspects and extracts from the official report on ice radar digital recording, data processing and results from the traverse project. A section titled ANARE happenings includes highlights of the major scientific achievements for 1994-1995 and outlines for the 1995-1996 ANARE season program. An article by M. Kirton, ANARE's Editor, recalling events related to his visits to Antarctica, and an article on a new dictionary of antarctic English, conclude this issue.

49-5857

Logistical and operational aspects of the Lambert Glacier Basin Traverse.

Higham, M., *Aurora,* June 1995, 14(4), p.8-15.

Traverses, Transportation, Logistics, Snow vehicles, Cold weather operation, Research projects, Ice sheets, Antarctica—Lambert Glacier

This paper describes some of the logistical and operational features of the oversnow traverse program that the Australian Antarctic Division (AAD) has run in recent years. The Lambert Glacier Basin traverse, part of LARGE (Lambert Amery Regional Glaciology Experiment), is a glaciological exploration and research program conducted from Mawson Station and forming part of a longer-term effort to investigate the glaciological characteristics of the ice sheet of East Antarctica. During the 1980s Australian traverse activity was based out of Casey in Wilkes Land. A figure shows traverse routes covered by the AAD since 1974, mostly for glaciological purposes.

49-5858

Extracts from the official report "Ice radar digital recording, data processing and results from the Lambert Glacier Basin traverses".

Higham, M., Reynolds, M., Brocklesby, A., Allison, I., *Aurora,* June 1995, 14(4), p.15-17.

Radar, Cold weather operation, Ice cover thickness, Bedrock, Bottom topography, Data processing, Computer applications, Antarctica—Lambert Glacier

A digital recording system is described for the ANARE 100 MHz ice radar, which has been used successfully over four field seasons during a glaciological traverse around the hinterland of the Lambert Glacier Basin. The resultant data have been analyzed to provide information on both basal and internal layer reflections from the ice sheet. The major sub-glacial topographic feature along the route is a 350 km wide graben-like trough south of the Prince Charles Mountains. The two major ice streams in the basin, the Lambert and Mellor Glaciers, lie within this trough which at its deepest is 1150 m below sea level. With the exception of this, the bedrock around the route is generally above sea level. Sub-glacial upland areas are located west of the North Prince Charles Mountains, apparently linking these with the Hansen Mountains to the northwest, and to the east of the Grove Mountains. (Auth. mod.)

49-5859

Is the Greenland Ice Sheet bistable.

Crowley, T.J., Baum, S.K., *Paleoceanography,* June 1995, 10(3), p.357-363, 48 refs.

Ice sheets, Ice cores, Climatic changes, Models, Carbon dioxide, Greenland

49-5860

Has climate changed the Earth's tilt.

Rubincam, D.P., *Paleoceanography,* June 1995, 10(3), p.365-372, 42 refs.

Ice sheets, Climatic changes, Viscous flow, Climate friction, Obliquity, Earth mantle

49-5861

Depositional fluxes, palaeoproductivity, and ice rafting in the NE Atlantic over the past 30 ka.

Manighetti, B., McCave, I.N., *Paleoceanography,* June 1995, 10(3), p.579-592, 35 refs.

Sediments, Sea water, Chemical composition, Ice rafting, North Atlantic Ocean

49-5862

Studies of Greenland using the Seasat scatterometer.

Long, D.G., Hardin, P.J., *SPIE-The International Society for Optical Engineering. Proceedings,* Apr. 1993, Vol.1941, Ground sensing. Edited by H.N. Nasr, p.247-253, 5 refs.

DLC G70.39.G76

Ice sheets, Ice conditions, Surface structure, Seasonal variations, Spaceborne photography, Radar echoes, Scattering, Image processing, Greenland

49-5863

Seasonal comparison of carbon, nitrogen, and pigment content in *Laminaria solidungula* and *L. Saccharina* (Phaeophyta) in the Alaskan Arctic.

Henley, W.J., Dunton, K.H., *Journal of phycology,* June 1995, 31(3), p.325-331, 39 refs.

Marine biology, Plants (botany), Ecology, Photosynthesis, Plant physiology, Growth, Subglacial observations, Ice cover effect, Light effects, Beaufort Sea

49-5864

Total reflection XRF analysis of impurities in ice.

Arena, L.E., Sánchez, H.J., Nasello, O., *Nuclear instruments and methods in physics research B,* May 1995, 100(1), p.196-198, 15 refs.

Ice physics, Impurities, Microanalysis, Detection, X ray analysis, Scattering, Spectra

49-5865

Snow avalanche incidents in north-western Anatolia, Turkey during December 1992.

Gürer, I., Tunçel, H., Yavaş, Ø.M., Erenbilge, T., Sayin, A., *Natural hazards,* Jan. 1995, 11(1), p.1-16, 8 refs.

Avalanche formation, Meteorological factors, Accidents, Avalanche forecasting, Safety, Turkey

49-5866

Glacial Lake Saskatchewan and Lake Agassiz deltas in east-central Saskatchewan with special emphasis on the Nipawin delta.

Christiansen, E.A., Sauer, E.K., Schreiner, B.T., *Canadian journal of earth sciences,* Mar. 1995, 32(3), p.334-348, With French summary. 24 refs.

Pleistocene, Glacial lakes, Geological surveys, Boreholes, Deltas, Sedimentation, Lacustrine deposits, Quaternary deposits, Stratigraphy, Canada—Saskatchewan

49-5867

Distribution of stable isotopes in antarctic surface snow.

Yao, T.D., Qin, D.H., *Chinese science bulletin,* June 1995, 40(11), p.921-925, 5 refs.

Snow surveys, Sampling, Surface temperature, Profiles, Correlation, Isotope analysis, Periodic variations, Paleoclimatology

Used as climatic indicators, stable isotopes provide a very powerful tool for reconstructing paleoclimate. The established model with regard to the relationship between stable isotopes and temperature based on data obtained from Dumont d'Urville Station to Dome C in Antarctica has been widely used in ice core research. Does a modeling based on one point or one profile in Antarctica fit other parts of the continent? To answer this question, it is necessary to collect a number of samples covering a large part of the Antarctic. The 1990 International Trans-Antarctica Expedition provided a substantial opportunity for such a solution. (Auth. mod.)

49-5868

Iron-containing weathering products of basalt in a cold, dry climate.

Koch, C.B., Mørup, S., Madsen, M.B., Vistisen, L., *Chemical geology,* May 30, 1995, 122(1-4), p.109-119, 22 refs.

Geologic structures, Geochemistry, Arctic landscapes, Mineralogy, Weathering, Nunataks, Rock properties, Magnetic properties, Spectroscopy, Spectra, Greenland

49-5869

Response of the seabed to storm-generated combined flows on a sandy arctic shoreface, Canadian Beaufort Sea.

Héquette, A., Hill, P.R., *Journal of sedimentary research,* July 1995, A65(3), p.461-471, 66 refs.

Shoreline modification, Oceanography, Ocean bottom, Ocean currents, Water waves, Sediment transport, Sedimentation, Storms, Turbulent flow, Hydrography, Acoustic measurement, Beaufort Sea

49-5870

Response of methane emission from arctic tundra to climatic change: results from a model simulation.

Christensen, T.R., Cox, P., *Tellus,* July 1995, 47B(3), p.301-309, 33 refs.

Tundra, Ecosystems, Climatic changes, Global warming, Greenhouse effect, Geochemical cycles, Natural gas, Water table, Soil air interface, Vapor transfer, Soil physics, Simulation

49-5871

Freeze/thaw problems from the state perspective.

Marks, V.J., Specialty Conference on Highway Research Program Products. Denver, CO, Apr. 8-10, 1991. Proceedings, New York, American Society of Civil Engineers, 1991, p.28-30, 5 refs.

DLC TE200.S853

Pavements, Degradation, Freeze thaw cycles, Frost action, Cracking (fracturing), Concrete aggregates, Cold weather performance, Standards, Chemical properties

49-5872

Improved guidelines for snow fences.

Tabler, R.D., Specialty Conference on Highway Research Program Products. Denver, CO, Apr. 8-10, 1991. Proceedings, New York, American Society of Civil Engineers, 1991, p.69-71, 5 refs.

DLC TE200.S853

Snow fences, Performance, Blowing snow, Snow air interface, Standards

49-5873

High-efficiency snowplows.

Pell, K.M., Crane, R.L., Specialty Conference on Highway Research Program Products. Denver, CO, Apr. 8-10, 1991. Proceedings, New York, American Society of Civil Engineers, 1991, p.72-74.

DLC TE200.S583

Snow removal, Vehicles, Design

49-5874

Alpine and subalpine landuse and ecosystems mapping.

Itten, K.I., et al, Imaging spectrometry—a tool for environmental observations. Edited by J. Hill et al and EUROCOURSES. Remote sensing. Vol.4, Dordrecht, Kluwer Academic Publishers, 1994, p.285-293, 11 refs.

DLC GE45.R44 I43

Alpine landscapes, Remote sensing, Sensor mapping, Radiometry, Spectra, Forest ecosystems, Classifications, Vegetation patterns, Terrain identification

49-5875

Ecotones and fluvial regimes in arctic lotic environments.

Power, G., Power, M., *Hydrobiologia,* Apr. 28, 1995, 303(1-3), p.111-124, Refs. p.121-124.

Ecosystems, Arctic landscapes, Limnology, Littoral zone, Hydrography, Stream flow, Ice cover effect, Permafrost hydrology, Naleds

49-5876

Having an ice time.

Traynor, J., *Geographical magazine,* July 1995, 67(7), p.42-43.

Cold weather survival, Expeditions, Equipment, Clothing

49-5877

Effectiveness of foam blankets in the thermal management of the permafrost zone.

Zviagin, V.V., Mel'nikov, V.P., Rusakov, N.L., Feklistov, V.N., *Russian Academy of Sciences. Transactions. Earth science sections,* June 1995, 331(5), p.222-227, Translated from Rossiĭskaia akademiia nauk. Doklady. 7 refs. For Russian original see 48-2611.

Permafrost preservation, Active layer, Ground thawing, Countermeasures, Thermal insulation, Covering, Permafrost heat transfer, Temperature control

49-5878

Deposition of dust on glaciers of the Pamir and Tian-Shan ranges (and possible effect on their melting rates).

Ivlev, L.S., Kondrat'ev, K.IA., Golovin, A.V., Kudriashov, V.I., *Russian Academy of Sciences. Transactions. Earth science sections,* Jan. 1995, 329(2), p.15-18, Translated from Rossiĭskaia akademiia nauk. Doklady. 4 refs.

Glacier ice, Glacier melting, Ice cores, Ice structure, Dust, Aerosols, Neutron activation analysis, Geochemistry, Russia—Pamirs

49-5879

Formation and decay of secondary peaks in the vertical ozone distribution in the lower stratosphere over poles.

Osechkin, V.V., Smyshliaev, S.P., *Russian Academy of Sciences. Transactions. Earth science sections,* Jan. 1995, 329(2), p.25-28, Translated from Rossiĭskaia akademiia nauk. Doklady. 7 refs.

Polar atmospheres, Stratosphere, Atmospheric attenuation, Ozone, Distribution, Photochemical reactions, Sounding, Gamma irradiation

49-5880

University research in Antarctica, 1989-92.

Heywood, R.B., ed, British Antarctic Survey Antarctic Special Topic Award Scheme Round 2 Symposium, Sep. 30-Oct. 1, 1992, Cambridge, British Antarctic Survey, 1993, 153p., Refs. passim. For individual papers see B-53266 through B-53268, B-53271 through B-53275, E-53265, E-53270, F-53261 through F-53264, I-53259, I-53260, I-53269 and K-53258 or 49-5881 through 49-5886.

Marine biology, Meteorological data, Ice surveys, Snow surveys, Paleoclimatology

This volume presents 18 contributions to the symposium covering the following areas of interest: the inner magnetosphere; atmospheric processes; ice sheets, ice shelves and blowing snow measurements and models; paleotemperature records and environmental monitoring from high-latitude mollusc skeletal chemical composition; the paleoceanography of the Weddell Sea; adaptation in antarctic organisms; microplankton lipid composition and nutrition of krill; and antarctic fish growth and metabolism.

49-5881

Model studies of dynamics, chemistry and transport in the antarctic and arctic stratospheres.

McIntyre, M.E., Pyle, J.A., British Antarctic Survey Antarctic Special Topic Award Scheme Round 2 Symposium, Sep. 30-Oct. 1, 1992. Proceedings. University research in Antarctica, 1989-92, edited by R.B. Heywood, Cambridge, British Antarctic Survey, 1993, p.17-34, Refs. p.33-34.

Stratosphere, Ozone, Atmospheric composition, Atmospheric circulation, Clouds (meteorology), Polar atmospheres

This work is part of an ongoing effort to improve the understanding of the interacting radiative, chemical and fluid-dynamical processes that control the present behavior and future evolution of the stratospheric ozone layer, motivated by recent observations of polar and mid-latitude ozone depletion. Progress in modelling different aspects of the problem is described, which demand consideration of many nonlinear interactions over a vast range of spatial scales of motion, and over chemical and dynamical time scales from fractions of a second to many years. One fundamental aspect is the comparative study of the antarctic and arctic stratospheres, and the way in which the polar vortex regions fit into the global-scale circulation of the middle atmosphere. A new technique, contour advection, borrowed from recent work on idealized vortex dynamics, is put to use for the first time as a high-powered computational tool for the numerical simulation of tracer advection at unprecedented, and closely controllable, accuracies. (Auth. mod.)

49-5882

Obtaining more accurate measurements of ice sheet topography and mass-balance with satellite radar altimetry.

Wingham, D.J., British Antarctic Survey Antarctic Special Topic Award Scheme Round 2 Symposium, Sep. 30-Oct. 1, 1992. Proceedings. University research in Antarctica, 1989-92, edited by R.B. Heywood, Cambridge, British Antarctic Survey, 1993, p.43-46, 18 refs.

Ice surface, Spaceborne photography, Mass balance, Radar

In this report the author summarizes new approaches to obtaining accurate surface topography and mass-balance observations with satellite pulse-limited altimeters. These approaches replace the current procedure known as "retracking" with new procedures that are different for the two measurements. The status of practical work applying these new methods to the ERS-1 altimeter measurements is described. (Auth.)

49-5883

Satellite microwave observations of antarctic firn surface state.

Ridley, J.K., Rapley, C.G., British Antarctic Survey Antarctic Special Topic Award Scheme Round 2 Symposium, Sep. 30-Oct. 1, 1992. Proceedings. University research in Antarctica, 1989-92, edited by R.B. Heywood, Cambridge, British Antarctic Survey, 1993, p.47-54, 8 refs.

Ice shelves, Remote sensing, Brightness, Surface properties, Ice melting, Backscattering, Antarctica—Filchner Ice Shelf, Antarctica—Weddell Sea

This paper addresses observations made over the ice shelves around the Weddell Sea and the Antarctic Peninsula, where variations in the microwave properties are relatively large. Both passive microwave brightness temperature and active microwave backscatter coefficient variations are studied with a view to extracting long-term climatic variables from the data. Passive microwave observations of ice shelves show a sharp rise in brightness temperature corresponding to the onset of surface melting. Data since 1978 are compared with surface air temperature data from Halley and this is used to validate a general analysis of surface melting on several other ice shelves. This method shows a systematic increase in the number of days of melting over recent years. A K_u band scatterometer was deployed at two test sites, on the Filchner Ice Shelf and the Coats Land plateau, during summer 1991-92. The field measurements show spatial and temporal agreement in backscatter coefficient with that measured by the ERS-1 radar altimeter, and suggest that surface crusts are responsible for the differences observed at the two test sites. (Auth. mod.)

49-5884

Numerical modelling of blowing snow.

Mobbs, S.D., Dover, S.E., British Antarctic Survey Antarctic Special Topic Award Scheme Round 2 Symposium, Sep. 30-Oct. 1, 1992. Proceedings. University research in Antarctica, 1989-92, edited by R.B. Heywood, Cambridge, British Antarctic Survey, 1993, p.55-63, 21 refs.

Snow physics, Particle size distribution, Mathematical models, Sublimation, Wind factors, Boundary layer

A new numerical model which predicts the time evolution of profiles of blowing snow is presented. The model solves the one-dimensional boundary layer equations for wind and potential temperature using a mixing length hypothesis to determine the eddy viscosity. Balance equations are included for water vapor and snow particles. The humidity balance includes the effects of turbulent diffusion and sublimation of snow, whilst the snow particle balance includes turbulent diffusion, sublimation and settling. Close to the surface, the wind, temperature and humidity profiles are matched to classical Monin-Obukhov similarity profiles whilst for snow particles, a saltation layer is parametrized. (Auth. mod.)

49-5885

X-ray microprobe studies of ice and snow.

Potts, W.T.W., Reid, A.P., British Antarctic Survey Antarctic Special Topic Award Scheme Round 2 Symposium, Sep. 30-Oct. 1, 1992. Proceedings. University research in Antarctica, 1989-92, edited by R.B. Heywood, Cambridge, British Antarctic Survey, 1993, p.65-70, 11 refs.

Snow composition, Ice composition, Sea ice, Ice shelves, Microanalysis, Antarctica—Ronne Ice Shelf

Analyses have been made of the elemental composition of the interstitial fluid in meteoric and sea ice. The measurements were made by x-ray emission analysis of planed frozen specimens in a Jeol 840A Scanning Electron Microscope. Although the total concentrations of contaminants in meteoric ice from Dolleman I. was only 1 mg/l, sulphur, presumably in the form of sulphuric acid, was highly concentrated at triple junctions but Na and Cl were not detected. Analyses of sea ice from the Ronne Ice Shelf showed high concentrations of Na, Cl and Mg at both triple junctions and two grain boundaries, but S was not detected. Comparisons of the estimated quantities of Na and Cl concentration at the grain boundaries with the bulk composition of the sea ice suggests that up to 300 μM of NaCl was incorporated in the ice crystals. The authors suggest that only when the concentrations of NaCl exceeds this level would NaCl be segregated to the grain boundaries. This solubility of NaCl in ice would account for its absence at triple junctions in meteoric ice. (Auth. mod.)

49-5886

Decadal timescale links between Antarctic Peninsula ice-core oxygen-18, deuterium and temperature.

Jones, P.D., Wigley, T.M.L., British Antarctic Survey Antarctic Special Topic Award Scheme Round 2 Symposium, Sep. 30-Oct. 1, 1992. Proceedings. University research in Antarctica, 1989-92, edited by R.B. Heywood, Cambridge, British Antarctic Survey, 1993, p.97-98, 5 refs.

Ice cores, Isotope analysis, Air temperature, Climatic changes, Antarctica—Antarctic Peninsula

The Antarctic Peninsula region has experienced a long-term warming trend over the 20th century, with the 1971-90 mean at Faraday Station being 1.9°C warmer than the mean over 1904-41 based on expedition reports. For the period prior to 1900 there is conflicting evidence from different data sources. An initial interpretation of isotopic data from ice cores suggests that the 19th century was warmer than the 20th century. In contrast, snow accumulation rate data for the 19th century from the same ice cores suggest lower temperatures. The authors investigate these facts by studying the links between atmospheric temperature over the Antarctic Peninsula, circulation parameters and isotopic data over the period of instrumental records. (Auth. mod.)

49-5887

Snow removal handbook.

Air Transport Association of America, Washington, D.C., 1994, 39p., Revised edition.

DLC TL725.3.C6 S63

Airports, Aircraft, Specifications, Runways, Cold weather operation, Snow removal, Manuals, Standards, Materials, Safety

49-5888

Use of salt for snow removal.

New York. Legislative Commission on Expenditure Review, Albany, July 1991, 38p., 9 refs.

DLC TE220.5.N48

Road maintenance, Winter maintenance, Snow removal, Ice control, Salting, Standards, Economic analysis, Cost analysis, Legislation, United States—New York

49-5889

Illustrated Ski-Doo snowmobile buyer's guide.

Mickelson, P.J., Osceola, WI, Motorbooks International, 1994, 160p.

DLC TL234.2.M53

Equipment, Tracked vehicles, Snow vehicles, Design, Specifications, Performance

49-5890

Freezing the ground in Pisa. *Geographical magazine,* June 1995, 67(6), p.6.

Towers, Stability, Soil freezing, Soil stabilization, Liquefied gases, Italy—Pisa

49-5891

Mapping arctic ice floes. *Geographical magazine,* June 1995, 67(6), p.7.

Sea ice distribution, Drift, Remote sensing, Image processing, Computer programs

49-5892

Subglacial erosion, deposition and deformation associated with deformable beds.

Hart, J.K., *Progress in physical geography,* June 1995, 19(2), p.173-191, 60 refs.

Glacial geology, Glacial hydrology, Pleistocene, Glacial geology, Subglacial observations, Glacial erosion, Glacier beds, Sediment transport, Sedimentation, Ice solid interface, Plastic deformation

49-5893

Topographic, altitudinal and regional patterns in continental and suboceanic heath vegetation of northern Fennoscandia.

Oksanen, L., Virtanen, R., *Acta botanica fennica,* 1995, Vol.153, p.1-80, Refs. p.55-61.

Plant ecology, Vegetation patterns, Arctic landscapes, Ecosystems, Topographic surveys, Topographic effects, Geobotanical interpretation, Classifications, Statistical analysis, Finland

49-5894

Isolated occurrences of spruce, *Picea abies*, in northernmost Fennoscandia in relation to the enigma of continental mountain birch forests.

Oksanen, L., *Acta botanica fennica*, 1995, Vol.153, p.81-92, 49 refs.

Arctic landscapes, Plant ecology, Forest ecosystems, Forest lines, Vegetation patterns, Distribution, Geobotanical interpretation, Finland

49-5895

Timberline patterns in northernmost Fennoscandia. Relative importance of climate and grazing.

Oksanen, L., Moen, J., Helle, T., *Acta botanica fennica*, 1995, Vol.153, p.93-105, 38 refs.

Arctic landscapes, Trees (plants), Plant ecology, Forest lines, Forest ecosystems, Distribution, Vegetation patterns, Finland

49-5896

Structure and ecology of dry hemiarctic meadow vegetation in northernmost Fennoscandia.

Oksanen, L., *Acta botanica fennica*, 1995, Vol.153, p.107-110, 16 refs.

Arctic landscapes, Ecosystems, Plant ecology, Vegetation patterns, Distribution, Statistical analysis, Finland

49-5897

Change in phytomass and net primary productivity for Siberia from the mid-Holocene to the present.

Monserud, R.A., Denissenko, O.V., Kolchugina, T.P., Tchebakova, N.M., *Global biogeochemical cycles*, June 1995, 9(2), p.213-226, 81 refs.

Geochemical cycles, Plant ecology, Vegetation patterns, Taiga, Biomass, Periodic variations, Paleoecology, Correlation, Classifications, Russia—Siberia

49-5898

Tree ring width and density evidence of climatic and potential forest change in Alaska.

Jacoby, G.C., D'Arrigo, R.D., *Global biogeochemical cycles*, June 1995, 9(2), p.227-234, 42 refs.

Climatology, Climatic changes, Trees (plants), Growth, Age determination, Global warming, Air temperature, Correlation, Periodic variations, United States—Alaska

49-5899

Growler detection in sea clutter with coherent radars.

Nohara, T.J., Haykin, S., *IEEE transactions on aerospace and electronic systems*, July 1994, 30(3), p.836-847, 13 refs.

Sea clutter, Oceanography, Ice navigation, Ice detection, Floating ice, Radar echoes, Wave propagation, Performance, Design, Spectra, Statistical analysis

49-5900

Method for ice concentration estimation by means of inversion techniques.

Arai, K., Ishiyama, E., Terayama, Y., *Advances in space research*, Jan. 1996, 17(1), A3.1 Symposium of COSPAR Scientific Commission A, Hamburg, Germany, July 11-24, 1994. Proceedings, p.(1)115-(1)118, 4 refs.

Sea ice distribution, Remote sensing, Spaceborne photography, Radiometry, Accuracy, Image processing, Data processing, Analysis (mathematics)

49-5901

Leading role of ammonium in the nitrogen uptake regime of southern ocean marginal ice zones.

Goeyens, L., Tréguer, P., Baumann, M.E.M., Baeyens, W., Dehairs, F., *Journal of marine systems*, June 1995, 6(4), p.345-361, 82 refs.

Sea water, Chemical composition, Ice edge, Models, Plankton, Biomass, Antarctica—Weddell Sea, —Scotia Sea

The nitrogen signature of marginal ice zones in the southern ocean often departs from the "classical" antarctic nutrient profiles with high nitrate and low ammonium values in the surface layer. Weddell Sea marginal ice zones show enhanced nitrate depletions amounting to ≈500 mmol N/m^2. Additionally, ammonium stocks in the upper layer can be up to 7% of the inorganic nitrogen pool. The corresponding nitrogen uptake regime suggests elevated nitrate assimilation during the early phase of the productive season and significantly reduced nitrate assimilation at a later stage. Absolute as well as specific nitrate uptake rates decrease by an order of magnitude when ammonium stocks exceed 1.7% of the total inorganic nitrogen. The variability in nitrogen utilization reflects physiological changes in the phytoplankton assemblage. In response to increased ammonium stocks, phytoplankton show a reduced capacity to take up nitrate and following an initial diatom bloom non-siliceous phytoplankton become predominant in a regenerated production regime. (Auth.)

49-5902

Climate records covering the last glaciation.

Sowers, T., Bender, M., *Science*, July 14, 1995, 269(5221), p.210-214, 61 refs.

Climatic changes, Ice composition, Chemical composition, Ice cores, Oxygen isotopes, Antarctica—Vostok Station, Antarctica—Marie Byrd Land

The oxygen-18/oxygen-16 ratio of molecular oxygen trapped in ice cores provides a time-stratigraphic marker for transferring the absolute chronology for the Greenland Ice Sheet Project (GISP) II ice core to the Vostok and Byrd ice cores in Antarctica. Comparison of the climate records from these cores suggests that near the beginning of the last deglaciation, warming in Antarctica began approximately 3000 years before the onset of the warm Bølling period in Greenland. Atmospheric carbon dioxide and methane concentrations began to rise 2000 to 3000 years before the warming began in Greenland and must have contributed to deglaciation and warming of temperate and boreal regions in the Northern Hemisphere. (Auth.)

49-5903

Growth of nitric acid hydrates on thin sulfuric acid films.

Iraci, L.T., Middlebrook, A.M., Wilson, M.A., Tolbert, M.A., *Geophysical research letters*, May 15, 1994, 21(10), p.867-870, 16 refs.

Polar atmospheres, Cloud physics, Hydrates, Heterogeneous nucleation, Polar stratospheric clouds, Simulation, Chemical properties, Infrared spectroscopy

Type I polar stratospheric clouds (PSCs) are thought to nucleate and grow on stratospheric sulfate aerosols (SSAs). To model this system, thin sulfuric acid films were exposed to water and nitric acid vapors and subjected to cooling and heating cycles. FTIR spectroscopy was used to probe the phase of the sulfuric acid and to identify the HNO_3/H_2O films that condensed. Nitric acid trihydrate (NAT) was observed to grow on crystalline sulfuric acid tetrahydrate (SAT) films. NAT also condensed in/on supercooled H_2SO_4 films without causing crystallization of the sulfuric acid. This growth is consistent with NAT nucleation from ternary solutions as the first step in PSC formation. (Auth. mod.)

49-5904

Composition and freezing of aqueous H_2SO_4/HNO_3 solutions under polar stratospheric conditions.

Beyer, K.D., Seago, S.W., Chang, H.Y., Molina, M.J., *Geophysical research letters*, May 15, 1994, 21(10), p.871-874, 13 refs.

Polar atmospheres, Polar stratospheric clouds, Cloud physics, Simulation, Heterogeneous nucleation, Supercooling, Aerosols, Temperature effects

The results of laboratory investigations of the freezing behavior of aqueous acid solutions indicate that in the polar stratosphere, H_2SO_4/H_2O aerosol droplets would not freeze at temperatures above the ice frost point in the absence of HNO_3; however, in the presence of typical levels of HNO_3 liquid sulfuric acid aerosols take up significant amounts of HNO_3 and H_2O vapors and freeze much more readily. This is a consequence of the very rapid change in composition of the liquid droplets as the temperature drops to within two to three degrees of the equilibrium temperature at which HNO_3 and H_2O vapors would co-condense to form a liquid solution. In the high latitude stratosphere this HNO_3/H_2O 'dew point' is typically around 192-194 K at 100 mbar. (Auth. mod.)

49-5905

Present antarctic aerosol composition: a memory of ice age atmospheric dust?

Delmas, R.J., Petit, J.R., *Geophysical research letters*, May 15, 1994, 21(10), p.879-882, 32 refs.

Paleoclimatology, Ice sheets, Ice cores, Dust, Aerosols, Marine atmospheres, Quaternary deposits, Mineralogy, Origin

Data obtained from the chemical analysis (Na, Al, and Ca concentrations) of deep antarctic ice cores has been re-examined. The correlations found between the concentrations of these elements suggest that the Patagonian continental shelf was the dominant aerosol source during the last ice age, the dust being an intimate mixture of marine clay and carbonates. In addition, it is proposed that sea salt deposited on the continental shelf sediments during drop in sea level was emitted and transported jointly with this dust. The present antarctic aerosol composition is very similar to the one deduced from ice core studies for glacial climatic conditions. The authors conclude that present antarctic aerosol originates mainly from ice-age aeolian deposits in South American cold deserts. (Auth. mod.)

49-5906

Glacial morphology and depositional sequences of the antarctic continental shelf.

Ten Brink, U.S., Schneider, C., *Geology*, July 1995, 23(7), p.580-584, 17 refs.

Marine geology, Ocean bottom, Stratigraphy, Sedimentation, Glacial erosion, Grounded ice, Models

A simple model for the unusual depositional sequences and morphology of the antarctic continental shelf is proposed. The model considers the regional stratal geometry and the reversed morphology of the antarctic continental shelf to be principally the results of time-integrated effects of glacial erosion and sedimentation related to the location of the ice grounding line. The model offers several guidelines for stratigraphic interpretation of the antarctic shelf and a Northern Hemisphere shelf, both of which have been subject to many glacial advances and retreats. (Auth. mod.)

49-5907

Study of wind chill effect at Maitri, Antarctica.

Kulandaivelu, E., Singh, S., *Mausam*, Jan. 1995, 46(1), p.31-34, With Hindi summary. 4 refs.

Wind velocity, Wind chill, Air temperature, Temperature measurement, Physiological effects, Antarctica—Maitri Station

The influence of meteorological parameters such as wind and temperature determine the chill effect upon the human body. The rate of heat removal from the body by wind and low temperature was termed as wind chill by Siple and Passel (1945). Using the wind chill chart, wind chill effects at Maitri Station during 1990 have been studied and compared with conventional value of monthly mean dry bulb and minimum temperatures. It was observed that the wind chill temperature was about 15-25°C lower than the dry bulb temperature when the wind speed exceeds 10 kt. (Auth.)

49-5908

Antarctic snow record of southern hemisphere lead pollution.

Wolff, E.W., Suttie, E.D., *Geophysical research letters*, May 1, 1994, 21(9), p.781-784, 19 refs.

Snow cover, Sampling, Snow impurities, Metals, Air pollution, Aerosols, Profiles, Seasonal variations, Antarctica—Coats Land

Lead concentrations from an antarctic snow pit show the pattern of Pb reaching the antarctic atmosphere over the last 70 years. Between 1920 and 1950 the Pb concentration shows significant variations around a mean of about 2.5 ng/kg. Between 1950 and 1980 there was a clear increase to 6 ng/kg, with an apparent reduction after that. A few high concentrations in the late 1970s are probably due to local contamination from aircraft using leaded gasoline (petrol). Excluding these anomalously high values, the chronological pattern in lead concentrations can be reconciled with estimates of emissions from vehicles and metal production processes in the Southern Hemisphere. (Auth.)

49-5909

Measurements of the $J(O^1D)$ actinic flux within and above stratiform clouds and above snow surfaces.

Junkermann, W., *Geophysical research letters*, May 1, 1994, 21(9), p.793-796, 14 refs.

Atmospheric composition, Photochemical reactions, Atmospheric boundary layer, Photometry, Radiation balance, Aerosols, Chemical properties, Snow cover effect, Albedo, Backscattering

49-5910

Proceedings.

Thurston, D.K., ed, Fujita, K., ed, International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992, *U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region. OCS study,* Aug. 1994, MMS 94-0040, 408p., Refs. passim. For selected papers see 49-5911 through 49-5925.

Geological surveys, Hydrocarbons, Exploration, Geologic structures, Geologic processes, Marine geology, Glacial deposits, Pleistocene, Tectonics, Stratigraphy, Geochronology, Arctic Ocean

49-5911

Mesozoic stratigraphy of Franz Josef Land Archipelago, arctic Russia—a literature review.

Embry, A.F., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.15-20, MMS 94-0040, 21 refs.

Arctic landscapes, Pleistocene, Geologic structures, Stratigraphy, Geological surveys, Tectonics, Lithology, Russia—Franz Josef Land

49-5912

Climatic fluctuations and other events in the Mesozoic of the Siberian Arctic.

Zakharov, V.A., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.23-28, MMS 94-0040, 13 refs.

Paleoclimatology, Climatic changes, Temperature variations, Stratigraphy, Paleoecology, Paleobotany, Russia—Siberia

49-5913

Earliest Tertiary paleogeography of the Arctic Ocean.

Marincovich, L., Jr., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.45-48, MMS 94-0040, 28 refs.

Marine geology, Marine deposits, Marine biology, Pleistocene, Paleoecology, Geography, Correlation, Tectonics, Arctic Ocean

49-5914

Geological and geochemical analysis of the Aurora well, offshore of the Arctic National Wildlife Refuge 1002 area.

Banet, A.C., Jr., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.95-100, MMS 94-0040, 15 refs.

Offshore drilling, Oil wells, Geochemistry, Marine geology, Stratigraphy, Hydrocarbons, Exploration, Beaufort Sea

49-5915

Correlation study of selected exploration wells from the North Slope and Beaufort Sea, Alaska.

Banet, S.M., Scherr, J., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.101-104, MMS 94-0040, 14 refs.

Marine geology, Stratigraphy, Geological surveys, Tectonics, Boreholes, Correlation, United States—Alaska—North Slope

49-5916

Uppermost Albian Campanian palynological biostratigraphy of Axel Heiberg and Ellesmere Islands, (Canadian Arctic).

Núñez-Betelu, L.K., MacRae, R.A., Hills, L.V., Muecke, G.K., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.135-140, MMS 94-0040, 30 refs.

Geological surveys, Stratigraphy, Palynology, Paleoecology, Age determination, Correlation, Canada—Northwest Territories—Axel Heiberg Island

49-5917

Development of a glaciated arctic continental margin: exemplified by the western margin of Svalbard.

Andersen, E.S., Solheim, A., Elverhøi, A., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.155-160, MMS 94-0040, 19 refs.

Marine geology, Glacial geology, Geologic processes, Stratigraphy, Sea level, Geochronology, Seismic surveys, Sedimentation, Glacial deposits, Norway—Svalbard

49-5918

Seismicity of the Amerasian arctic shelf and its relationship to tectonic features.

Fujita, K., Koz'min, B.M., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.307-312, MMS 94-0040, 29 refs.

Marine geology, Geologic structures, Tectonics, Seismic surveys, Seismic reflection, Arctic Ocean

49-5919

Quaternary deposits of the Barents Sea and Valdai glaciation of the Eurasian arctic shelf.

Merklin, L.R., Dunaev, N.N., Levchenko, O.V., Pavlidis, IU.A., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.327-332, MMS 94-0040, 30 refs.

Marine geology, Pleistocene, Glaciation, Quaternary deposits, Marine deposits, Seismic surveys, Seismic reflection, Sedimentation, Barents Sea

49-5920

Deep ice scour and mass-wasting features on the northern Svalbard insular shelf and slope.

Cherkis, N.Z., Max, M.D., Midthassel, A., Crane, K., Sundvor, E., Vogt, P.R., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.333-338, MMS 94-0040, 26 refs.

Marine geology, Pleistocene, Bottom sediment, Sediment transport, Mass movements (geology), Icebergs, Ice scoring, Grounded ice, Sounding, Norway—Svalbard

49-5921

Paleogeography of Late Pleistocene glaciation of north-eastern Asia.

Glushkova, O.IU., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.339-344, MMS 94-0040, 32 refs.

Pleistocene, Glaciation, Glacier oscillation, Geomorphology, Snow line, Correlation

49-5922

Neogene paleoclimate of the Gulf of Alaska and regional correlations to the Bering Sea region.

Lagoe, M.B., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.345-350, MMS 94-0040, 15 refs.

Marine deposits, Marine geology, Paleoclimatology, Quaternary deposits, Glaciation, Stratigraphy, Correlation, Age determination, Bering Sea

49-5923

Origin of gravels from the southern coast and continental shelf of the Beaufort Sea, arctic Alaska.

Naidu, A.S., Mowatt, T.C., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.351-356, MMS 94-0040, 29 refs.

Marine geology, Quaternary deposits, Marine deposits, Sediment transport, Gravel, Lithology, Origin, Theories, Beaufort Sea

49-5924

Late Quaternary changes in sediment composition in the central Arctic Ocean: preliminary results of the Arctic '91 expedition.

Stein, R., Schubert, C., Grobe, H., Fütterer, D., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.363-368, MMS 94-0040, 20 refs.

Marine geology, Pleistocene, Quaternary deposits, Marine deposits, Sedimentation, Stratigraphy, Sampling, Periodic variations, Arctic Ocean

49-5925

Tectonics and petroleum potential of the Bering Sea bottom.

Golubev, V.M., International Conference on Arctic Margins, Anchorage, AK, Sep. 2-4, 1992. Proceedings, Anchorage, U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, Aug. 1994, p.381-386, MMS 94-0040, 7 refs.

Marine geology, Ocean bottom, Sedimentation, Hydrocarbons, Tectonics, Geologic processes, Exploration, Geological surveys, Bering Sea

49-5926

Cold climate landforms.

Evans, D.J.A., ed, Chichester, England, John Wiley & Sons Ltd., 1994, 526p., Refs. p.475-516. For individual papers see 49-5927 through 49-5947.

DLC GB641.C62 1994

Periglacial processes, Glacial geology, Glacial deposits, Glacial till, Moraines, Cryogenic soils, Solifluction, Frost weathering, Permafrost indicators, Slope processes, Geomorphology, Paleoclimatology

49-5927

Soil and climate relations in central and western Europe during the Würm glaciation.

Poser, H., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.3-22, Translated from Erdkunde, Vol.2, 1948, p.53-68.

Glaciation, Periglacial processes, Permafrost distribution, Permafrost indicators, Cryogenic soils, Soil dating, Geomorphology, Paleoclimatology

49-5928

Subnival or periglacial cycle of denudation.

Troll, C., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.23-44, Translated from Erdkunde, Vol.2, 1948, p.1-21.

Periglacial processes, Permafrost indicators, Cryogenic soils, Frost weathering, Solifluction, Cryoturbation, Altiplanation, Geomorphology, Paleoclimatology

49-5929

General view of periglacial Poland.

Dylik, J., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.45-81, Translated from Biuletyn peryglacjalny, Vol.4, 1956, p.195-238.

Glaciation, Periglacial processes, Quaternary deposits, Frost weathering, Solifluction, Cryoturbation, Ice wedges, Cryogenic soils, Geomorphology, Paleoclimatology, Poland

49-5930

Fossil pingos of Wales and the Hautes Fagnes, Belgium.

Pissart, A., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.83-100, Translated from Zeitschrift für Geomorphologie, Vol.7, 1963, p.119-135.

Pingos, Periglacial processes, Permafrost indicators, Peat, Soil dating, Geomorphology, Paleoclimatology, United Kingdom—Wales, Belgium

49-5931

Relict cryogenic morphology: fundamental characteristics and mapping.

Velichko, A.A., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.101-116, Translated from Zeitschrift für Geomorphologie, Vol.13, 1972, p.59-72.

Periglacial processes, Permafrost distribution, Permafrost indicators, Thermokarst, Cryogenic soils, Soil dating, Geomorphology, Paleoclimatology

49-5932

On the mechanical weathering of sandstones in temperate climates.

Łoziński, M.W., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.119-134, Translated from Bulletin international de l'Académie des sciences de Cracovie, Classe des sciences mathématiques et naturelles, Vol.1, 1909, p.1-25. 44 refs.

Periglacial processes, Frost weathering, Cryogenic soils, Desert soils, Geomorphology, Paleoclimatology

49-5933

Ground form and plant cover in North East Greenland.

Sørensen, T., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.135-175, For German original see 7-9471.

Periglacial processes, Patterned ground, Solifluction, Sorting, Cryogenic soils, Vegetation patterns, Vegetation factors, Geomorphology, Greenland

49-5934

On altiplanation terraces and ancient surfaces of levelling in the Urals and associated problems.

Boch, S.G., Krasnov, I.I., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.177-186, Translated from Vsesoiuznoe geograficheskoe obshchestvo. Izvestiia, Vol.75, 1943, p.14-25.

Periglacial processes, Slope processes, Altiplanation, Solifluction, Geomorphology, Paleoclimatology, Russia—Ural Mountains

49-5935

Quaternary nivation, cryoplanation and solifluction in western Brittany and the north Devonshire Hills.

Guilcher, A., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.187-204, Translated from Revue de Géomorphologie Dynamique, Vol.1, 1950, p.53-78.

Periglacial processes, Nivation, Altiplanation, Solifluction, Geomorphology, Paleoclimatology, France, United Kingdom—England

49-5936

Névés (firn) and glacial erosion.

Boyé, M., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.205-220, For French original see 7-9788.

Periglacial processes, Nivation, Firn, Snow erosion, Glacial erosion, Geomorphology, France—Pyrénées

49-5937

Experimental study of the problem of gelivation.

Tricart, J., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.221-251, Translated from Biuletyn Peryglacjalny, Vol.4, 1956, p.285-318.

Periglacial processes, Slope processes, Frost weathering, Frost shattering, Frozen rock strength, Geomorphology

49-5938

End moraines.

Gripp, K., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.255-267, Translated from Comptes rendus du Congrès International de Géographie, Amsterdam, 1938, III Section IIa, Géographie Physique, 1938, p.215-228.

Glacial geology, Moraines, Glacial till, Glacial deposits, Glacier oscillation, Geomorphology

49-5939

Question of drumlins in literature.

Czechówna, L., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.269-291, Translated from Czasopismo geograficzne, Vol.23/24, 1953, p.50-90.

Glacial geology, Glacial deposits, Moraines, Glacial till, Geomorphology

49-5940

On the origin of the Chodzież end moraine.

Kozarski, S., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.293-312, Translated from Badania Fizjograficzne nad Polska Zachodnia, Vol.5, 1959, p.45-69.

Glacial geology, Glacial deposits, Moraines, Glacial till, Glacier oscillation, Geomorphology, Poland

49-5941

On morphogenesis and sedimentation in the Quaternary glaciation area of northwest Germany.

Grube, F., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.313-321, Translated from Verhandlungen des Naturwissenschaftlichen Vereins in Hamburg (NF), Vol.23, 1979, p.69-80.

Glacial geology, Glaciation, Glacial deposits, Moraines, Glacial till, Glacier oscillation, Quaternary deposits, Geomorphology, Germany

49-5942

Notion of icefoot with special reference to the St. Lawrence estuary.

Dionne, J.C., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.325-349, For French original see 28-2952. For another translation see 32-4414.

Estuaries, River ice, Fast ice, Freezeup, Ice breakup, Ice push, Shoreline modification, Geomorphology, Canada—Quebec—St. Lawrence Estuary

49-5943

Strandflat problem in five high latitude countries.

Guilcher, A., Bodéré, J.C., Coudé, A., Hansom, J.D., Moign, A., Peulvast, J.P., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.351-393, Translated from Revue de Géologie Dynamique et de Géographie Physique, Vol.27, 1986, p.47-79.

Marine geology, Glacial geology, Frost shattering, Periglacial processes, Coastal topographic features, Shore erosion, Shoreline modification, Beaches, Geomorphology, Norway—Spitsbergen, Norway, Iceland, Ireland, Antarctica—South Shetland Islands

The problem of strandflat development is reexamined in western Spitsbergen, northern Norway (Lofoten-Vesterålen Is.), Iceland, western Ireland, and South Shetland Is. (Antarctica). In western Spitsbergen and in the South Shetlands, coastal erosion related to typical periglacial processes is presently in progress. In the South Shetlands, coastal platforms result principally from frost-shattering of cliffs and/or floating ice erosion. However, the present platforms in the South Shetlands have been prepared during previous sea levels related to (Wisconsin?) glaciation. The coasts of the South Shetland Is. include large platforms of the strandflat type. They occur at several levels, but the best ones are between 0 and 17 m above present sea level. According to several scientists, they are related to marine abrasion processes. Raised beaches and residual skerries, associated with a topography of emerged platform, closely resemble the present-day platform and shoreline. In the South Shetlands, the coastal platforms are mainly shaped by marine glacial processes in places where mechanical action of waves is minor. Gelifraction cliffs and platforms and rafting by floating ice are erosion processes which act efficiently and, according to site, at a rate evaluated between 0.17 and 2.30 m per year. (Auth. mod.)

49-5944

Remains of weathered mantles (saprolites) over basement rocks of high latitudes: identification, significance.

Godard, A., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.397-411, Translated from Zeitschrift für Geomorphologie, Vol.72, 1989, p.1-20.

Glacial geology, Glacial erosion, Regolith, Weathering, Lithology, Geomorphology, Paleoclimatology

49-5945

Studies of debris cones in Lappland and Spitsbergen.

Rapp, A., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.415-435, Translated from Zeitschrift für Geomorphologie, Vol.1, 1957, p.179-200.

Slope processes, Talus, Frost weathering, Mass movements (geology), Geomorphology, Paleoclimatology, Sweden—Lapland, Norway—Spitsbergen

49-5946

New data on grèzes bedding and their palaeoclimatic implications.

Bertran, P., Coutard, J.P., Francou, B., Ozouf, J.C., Texier, J.P., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.437-454, For French original see 47-831.

Slope processes, Talus, Solifluction, Cryoturbation, Stratigraphy, Geomorphology, Paleoclimatology, France

49-5947

Studies and measurements on rock glaciers at Macun in the Lower Engadine.

Barsch, D., Cold climate landforms. Edited by D.J.A. Evans, Chichester, England, John Wiley & Sons Ltd., 1994, p.457-473, For German original see 26-1638.

Rock glaciers, Glacier surveys, Glacier flow, Slope processes, Talus, Geomorphology, Switzerland

49-5948

Cometary activity and nucleus models.

Möhlmann, D., *Planetary and space science,* Mar.-Apr. 1995, 43(3-4), p.327-332, 21 refs.

Extraterrestrial ice, Geochemistry, Porous materials, Regolith, Cohesion, Ice sublimation, Ice physics, Dust, Models

49-5949

Interpretation of surface temperatures and activity of KOSI samples.

Kührt, E., Keller, H.U., Lorenz, E., *Planetary and space science,* Mar.-Apr. 1995, 43(3-4), p.333-340, 17 refs.

Extraterrestrial ice, Porous materials, Ice sublimation, Ice physics, Insolation, Vapor diffusion, Thermodynamics, Surface temperature, Temperature variations, Mathematical models, Simulation

49-5950

Energy analysis of porous water ice under space-simulated conditions: results from the KOSI-8 experiment.

Benkhoff, J., Seidensticker, K.J., Seiferlin, K., Spohn, T., *Planetary and space science,* Mar.-Apr. 1995, 43(3-4), p.353-361, 15 refs.

Extraterrestrial ice, Simulation, Porosity, Ice sublimation, Ice physics, Radiation absorption, Vapor diffusion, Insolation, Heat flux, Temperature variations

49-5951

Gas release from ice/dust mixtures: results from eleven KOSI experiments.

Lämmerzahl, P., Gebhard, J., Grün, E., Klees, G., *Planetary and space science,* Mar.-Apr. 1995, 43(3-4), p.363-373, 24 refs.

Extraterrestrial ice, Simulation, Ice sublimation, Ice physics, Ice solid interface, Porous materials, Vapor transfer, Insolation

49-5952

Phenomenology and dynamic behavior of the dust component in the KOSI experiments.

Thiel, K., Kölzer, G., Kochan, H., Lämmerzahl, P., Lorenz, E., *Planetary and space science,* Mar.-Apr. 1995, 43(3-4), p.375-390, 17 refs.

Extraterrestrial ice, Simulation, Ice physics, Ice sublimation, Vapor transfer, Dust, Particles, Mass transfer, Insolation, Scanning electron microscopy

49-5953

Dust particle emission dynamics from insolated ice/dust mixtures: results from the KOSI 5 experiment.

Kölzer, G., Grün, E., Kochan, H., Lämmerzahl, P., Thiel, K., *Planetary and space science,* Mar.-Apr. 1995, 43(3-4), p.391-407, 28 refs.

Extraterrestrial ice, Simulation, Ice sublimation, Insolation, Ice physics, Dust, Particles, Vapor transfer, Mass transfer, Thermodynamic properties

49-5954

Estimating the dynamics of the permafrost zone of northern Eurasia during global climate warming.

Velichko, A.A., Nechaev, V.P., *Russian Academy of Sciences. Transactions. Earth science sections,* July 1994, 324(4), p.191-195, For Russian original see 47-2037. 13 refs.

Permafrost transformation, Ground thawing, Frozen ground temperature, Climatic changes, Global warming, Forecasting

49-5955

Geoacoustic models of sediments of the Baltic and the Barents Seas.

Il'in, A.V., Shurko, I.I., *Russian Academy of Sciences. Transactions. Earth science sections,* July 1994, 324(4), p.221-224, Translated from Rossiĭskaia akademiia nauk. Doklady. 6 refs.

Oceanographic surveys, Marine geology, Bottom sediment, Acoustic measurement, Lithology, Seismic velocity, Models, Barents Sea

49-5956

Recent trends in arctic climate.

Aleksandrov, E.I., Nagurnyĭ, A.P., *Russian Academy of Sciences. Transactions. Earth science sections,* June 1994, 323(2), p.25-28, Translated from Rossiĭskaia akademiia nauk. Doklady. 3 refs.

Climatology, Climatic changes, Polar atmospheres, Air temperature, Periodic variations, Statistical analysis

49-5957

Gas hydrates of the cryolithozone.

Ershov, E.D., Lebedenko, IU.P., Chuvilin, E.M., Istomin, V.A., IAkushev, V.S., *Russian Academy of Sciences. Transactions. Earth science sections,* Apr. 1994, 322(1), p.66-69, Translated from Rossiĭskaia akademiia nauk. Doklady. 5 refs.

Geocryology, Hydrates, Natural gas, Ice microstructure, Microanalysis, Frozen ground physics

49-5958

Late Pleistocene glacial ice in the valley of the Amguema River, north Chukotka.

Korolev, S.IU., *Russian Academy of Sciences. Transactions. Earth science sections,* May 1995, 329A(3), p.56-61, 8 refs. For Russian original see 48-2610.

Pleistocene, Cryogenic structures, Ground ice, Glacier ice, Glacier beds, Permafrost structure, Permafrost indicators, Fossil ice, Lithology, Russia—Chukotka

49-5959

Grayling II site characterization and data summary.

Hahn, C.D., *U.S. Army Engineering Waterways Experiment Station. Smart Weapons Operability Enhancement Program. Report,* Nov. 1994, 94-7, 41p. + appends., ADA-295 174.

Military equipment, Military research, Vegetation patterns, Terrain identification, Infrared photography, Sensor mapping, Image processing, Resolution, Snow cover effect, Simulation, Computer applications

49-5960

How to select winter maintenance equipment. *Better roads,* Aug. 1995, 65(8), p.23-24.

Road maintenance, Winter maintenance, Road icing, Ice control, Snow removal equipment, Salting

49-5961

Smart salting: a winter maintenance strategy.

Lawson, M.W., *Better roads,* Aug. 1995, 65(8), p.29-30.

Winter maintenance, Road maintenance, Road icing, Ice melting, Chemical ice prevention, Salting, Sensors, Infrared equipment, Temperature measurement, Surface temperature

49-5962

Parmales in sediments of Prydz Bay, East Antarctica: a new biofacies and paleoenvironmental indicator of cold water deposition?

Franklin, D.C., Marchant, H.J., *Micropaleontology,* 1995, 41(1), p.89-94, 28 refs.

Marine biology, Marine deposits, Sedimentation, Plankton, Distribution, Sampling, Paleoclimatology, Antarctica—Prydz Bay

Siliceous wall plates of two species of Parmales are present in varying abundance in the surficial and downcore sediments of Prydz Bay. These organisms have a dramatically higher abundance and greater species diversity in polar and sub-polar environments than is seen in temperate and tropical waters. Based on findings of abundant and well-preserved walls of these organisms in antarctic sediments, it is suggested that they represent a useful biofacies and paleoenvironmental marker for deposition from cold water, and a potentially new biostratigraphic tool. (Auth. mod.)

49-5963

Ionization of chlorine nitrate on ice at 180 K.

Sodeau, J.R., Horn, A.B., Banham, S.F., Koch, T.G., *Journal of physical chemistry,* Apr. 20, 1995, 99(16), p.6258-6262, 16 refs.

Polar stratospheric clouds, Cloud physics, Atmospheric attenuation, Aerosols, Chemical properties, Ice vapor interface, Adsorption, Ionization, Simulation, Ice spectroscopy, Spectra

Fourier Transform Infrared Spectroscopy evidence is provided for the identification of chlorine nitrate $[H_2OCl]^+$ as an intermediate in the ionization of chlorine nitrate on water-ice at the stratospherically relevant temperature of 180 K. The result has important implications for the mechanism by which chlorine is reactivated by polar stratospheric clouds and suggests that the function of water molecules is to reduce the activation energy barrier for chlorine nitrate bond cleavage on the ice. (Auth. mod.)

49-5964

Limitations and innovations in the control of environmental impacts from petroleum industry activities in the Arctic.

Engelhardt, F.R., *Marine pollution bulletin,* 1994, 29(6-12), Environment Northern Seas '93, Stavanger, Norway, Aug. 24-27, 1993. Proceedings, p.334-341, 43 refs.

Petroleum industry, Oceanography, Ecology, Environmental impact, Oil spills, Water pollution, Ice cover effect, Exploration, Offshore drilling, Countermeasures, Arctic Ocean

49-5965

Environmental policy and regulation for oil exploration and shipping activities in the Barents Sea.

Futsæter, G., *Marine pollution bulletin,* 1994, 29(6-12), Environment Northern Seas '93, Stavanger, Norway, Aug. 24-27, 1993. Proceedings, p.348-353, 21 refs.

Oceanography, Petroleum industry, Exploration, Marine transportation, Water pollution, Environmental impact, Environmental protection, Standards, International cooperation, Legislation, Barents Sea

49-5966

Offshore and shipping activities in the Norwegian arctic areas: the environmental dimension—case: Norsk Hydro's drilling of well 73165-1, autumn 1992.

Thomassen, M., *Marine pollution bulletin,* 1994, 29(6-12), Environment Northern Seas '93, Stavanger, Norway, Aug. 24-27, 1993. Proceedings, p.354-360, 3 refs.

Oceanography, Offshore drilling, Drilling fluids, Oil spills, Water pollution, Exploration, Environmental impact, Environmental protection, Sea ice distribution, Countermeasures, Standards, Barents Sea

49-5967

Some aspects of international collaboration of arctic countries in the field of ecology.

Kalabin, G., *Marine pollution bulletin,* 1994, 29(6-12), Environment Northern Seas '93, Stavanger, Norway, Aug. 24-27, 1993. Proceedings, p.634-635.

Ecology, Economic development, Pollution, Countermeasures, International cooperation, Environmental protection

49-5968

Study of the phase transition in an ice accumulator.

Chumachenko, A.D., *Chemical and petroleum engineering,* July 1995, 30(11-12), p.564-565, Translated from Khimicheskoe i neftiannoe mashinostroenie. 3 refs.

Refrigeration, Ice makers, Ice formation, Phase transformations, Freezing rate, Air temperature, Ice solid interface

49-5969

Environmental constraints on the growth, photosynthesis and reproductive development of *Dryas octopetala* at a high arctic polar semi-desert, Svalbard.

Wookey, P.A., et al, *Oecologia,* June 1995, 102(4), p.478-489, 55 refs.

Plant ecology, Plant physiology, Ecosystems, Arctic landscapes, Growth, Photosynthesis, Climatic changes, Global warming, Statistical analysis, Temperature effects, Norway—Svalbard

49-5970

Failure of fresh-water granular ice under multiaxial compressive loading.

Weiss, J., Schulson, E.M., *Acta metallurgica et materialia,* June 1995, 43(6), p.2303-2315, 39 refs. For another version see 48-5588.

Ice mechanics, Ice strength, Compressive properties, Stress concentration, Cracking (fracturing), Ice microstructure, Brittleness, Ice plasticity, Phase transformations, Mechanical tests, Dynamic loads

49-5971

Isolation of ice-nucleating active bacteria from the freeze-tolerant frog, *Rana sylvatica*.

Lee, M.R., Lee, R.E., Jr., Strong-Gunderson, J.M., Minges, S.R., *Cryobiology,* Aug. 1995, 32(4), p.358-365, 37 refs.

Cryobiology, Microbiology, Bacteria, Frost resistance, Cold weather survival, Ice nuclei, Ice formation, Heterogeneous nucleation

49-5972

New design for an air-source heat pump using a ternary mixture for cold climates.

Sami, S.M., Tulej, P.J., *Heat recovery systems & CHP,* Aug. 1995, 15(6), p.521-529, 9 refs.

Heat pumps, Heat recovery, Indoor climates, Cold weather performance, Cold weather tests, Design, Temperature effects, Cost analysis

49-5973

Paleoclimatic significance of Late Quaternary eolian deposition on the Piedmont and High Plains, central United States.

Forman, S.L., Oglesby, R., Markgraf, V., Stafford, T., *Global and planetary change,* June 1995, 11(1-2), p.35-55, 80 refs.

Paleoclimatology, Paleoecology, Quaternary deposits, Eolian soils, Climatic changes, Radioactive age determination, Geochronology, Synoptic meteorology, United States—Colorado

49-5974

Methylmercury output from the Svartberget catchment in northern Sweden during spring flood.

Bishop, K., Lee, Y.H., Pettersson, C., Allard, B., *Water, air, and soil pollution,* Feb. 1995, 80(1-4), International Conference on Mercury as a Global Pollutant, 3rd, Whistler, British Columbia, July 10-15, 1994. Proceedings, p.445-454, 16 refs.

Watersheds, Water pollution, Soil pollution, Runoff, Hydrography, Sampling, Surface waters, Snowmelt, Snow hydrology, Snow impurities, Aerosols, Sweden

49-5975
Mercury in vegetation and lake sediments from the U. S. Arctic.
Landers, D.H., Ford, J., Gubala, C., Monetti, M., Lasorsa, B.K., Martinson, J., *Water, air, and soil pollution,* Feb. 1995, 80(1-4), International Conference on Mercury as a Global Pollutant, 3rd, Whistler, British Columbia, July 10-15, 1994. Proceedings, p.591-601, 53 refs.
Ecosystems, Air pollution, Environmental impact, Environmental tests, Sampling, Lichens, Lacustrine deposits, Limnology, Statistical analysis, United States—Alaska

49-5976
Current and historical inputs of mercury to high-latitude lakes in Canada and to Hudson Bay.
Lockhart, W.L., Wilkinson, P., Billeck, B.N., Hunt, R.V., Wagemann, R., Brunskill, G.J., *Water, air, and soil pollution,* Feb. 1995, 80(1-4), International Conference on Mercury as a Global Pollutant, 3rd, Whistler, British Columbia, July 10-15, 1994. Proceedings, p.603-610, 25 refs.
Limnology, Lacustrine deposits, Air pollution, Aerosols, Water pollution, Sampling, Profiles, Periodic variations, Environmental tests, Canada—Northwest Territories—Hudson Bay

49-5977
Sources of mercury in the Arctic.
Pacyna, J.M., Keeler, G.J., *Water, air, and soil pollution,* Feb. 1995, 80(1-4), International Conference on Mercury as a Global Pollutant, 3rd, Whistler, British Columbia, July 10-15, 1994. Proceedings, p.621-632, 27 refs.
Air pollution, Aerosols, Origin, Subpolar regions, Environmental tests, Environmental impact, Statistical analysis

49-5978
Mercury concentrations in fish in a remote Canadian arctic lake.
Stephens, G.R., *Water, air, and soil pollution,* Feb. 1995, 80(1-4), International Conference on Mercury as a Global Pollutant, 3rd, Whistler, British Columbia, July 10-15, 1994. Proceedings, p.633-636, 7 refs.
Ecology, Limnology, Water pollution, Biomass, Environmental tests, Environmental impact, Correlation, Canada—Northwest Territories

49-5979
Distribution of dissolved and particulate mercury in three Siberian estuaries and adjacent arctic coastal waters.
Coquery, M., Cossa, D., Martin, J.M., *Water, air, and soil pollution,* Feb. 1995, 80(1-4), International Conference on Mercury as a Global Pollutant, 3rd, Whistler, British Columbia, July 10-15, 1994. Proceedings, p.653-664, 21 refs.
Water pollution, Estuaries, Sea water, Water chemistry, Sampling, Environmental tests, Distribution, Turbulent diffusion, Statistical analysis, Russia—Siberia

49-5980
Methylated and elemental mercury cycling in surface and deep ocean water in the north Atlantic.
Mason, R.P., Rolfhus, K.R., Fitzgerald, W.F., *Water, air, and soil pollution,* Feb. 1995, 80(1-4), International Conference on Mercury as a Global Pollutant, 3rd, Whistler, British Columbia, July 10-15, 1994. Proceedings, p.665-677, 56 refs.
Oceanographic surveys, Subpolar regions, Sea water, Water chemistry, Sampling, Geochemical cycles, Atlantic Ocean

49-5981
Atmospheric mercury measurements in the northern hemisphere from 56° to 82.5°N latitude.
Schroeder, W.H., Ebinghaus, R., Shoeib, M., Timoschenko, K., Barrie, L.A., *Water, air, and soil pollution,* Feb. 1995, 80(1-4), International Conference on Mercury as a Global Pollutant, 3rd, Whistler, British Columbia, July 10-15, 1994. Proceedings, p.1227-1236, 25 refs.
Polar atmospheres, Atmospheric composition, Air pollution, Aerosols, Sampling, Environmental tests, Statistical analysis, Canada—Northwest Territories—Alert

49-5982
Ice formation on balanced outlet. [Isdannelse i balancerede aftræk]
Pedersen, P., *Dansk Geoteknisk Center a/c. Rapport. Teknisk note,* Nov. 1993, No.2, 34p., DE94-771106, In Danish. 5 refs.
Ducts, Ventilation, Ice formation, Ice accretion, Ice loads

49-5983
Impedance spectroscopy and temperature acclimation of forest trees.
Repo, T., *Joensuu. University. Faculty of Forestry. Research notes,* 1993, No.9, 43p., DE94-771057, Ph.D thesis to be defended at Joensuu University. Refs. p.39-53.
Plant ecology, Plant physiology, Trees (plants), Acclimatization, Cold tolerance, Frost resistance, Forest ecosystems, Electrical measurement, Electrical resistivity

49-5984
Radar backscatter measurements from simulated sea ice: CRRELEX'93 results.
Kanagaratnam, P., Gogineni, S.P., Beaven, S.G., Jezek, K.C., Zabel, I., MP 3639, *Kansas. University. Radar Systems and Remote Sensing Laboratory. Technical report,* June 1994, RSL-TR-8243-3, n.p., ADA-281 159, 5 refs.
Ice surveys, Sea ice, Ice detection, Ice surface, Ice cover thickness, Snow ice interface, Radar echoes, Backscattering, Environmental tests

The authors performed radar backscatter measurements on artificially grown sea ice in an indoor facility at the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) during the 1993 winter season. The objectives of these experiments were to study various mechanisms for simulating roughness and to better understand backscatter mechanisms. Backscatter measurements were made at 13.9 GHz and for incident angles ranging from 0 to 55° with all four linear polarization combinations: VV, HH, VH, and HV. In addition to the backscatter measurements from saline ice, the return from three calibration targets were measured. These targets included a Luneberg lens, a metal sphere and a dihedral corner reflector. These measurements eliminated the systematic error due to polarization impurity of the antenna and other systems effects.

49-5985
Ice formation in an estuarian salt marsh, Alaska.
Taylor, S., Racine, C.H., Collins, C.M., Gordon, E., SR 94-17, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* June 1994, 14p., ADA-283 346, 9 refs.
Estuaries, Wetlands, Ice formation, Ice growth, Ice cover effect, Bottom sediment, Water pollution, Soil pollution, United States—Alaska—Eagle River Flats

An extensive ice sheet builds up during the winter in a salt marsh complex at the mouth of Eagle River near Anchorage, AK. To clarify how snow accumulation, periodic tidal flooding, and freshwater flow contribute to the ice cover, ice cores were taken along a transect beginning at a deep pond along the edge of the salt marsh and traversing marsh, shallow pond, and mudflat areas. Ice structure, ice salinity, ice thickness, and presence or absence of sediment bands in the ice are described and were found to change markedly along the transect.

49-5986
Traveling wave solutions to the problem of quasi-steady freezing of soils.
Nakano, Y., CR 94-03, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Mar. 1994, 19p., ADA-280 971, 10 refs.
Soil freezing, Freezing front, Frost heave, Frozen ground thermodynamics, Ice lenses, Mathematical models

The results of mathematical and experimental studies presented in preceding reports clearly show that the model M1 accurately describes the properties of a frozen fringe when the steady growth of an ice layer occurs. In this work the steady growth of ice-rich frozen soil is studied by using M1. Deriving a traveling wave solution to the problem, the author has found that the condition of steady growth of ice-rich frozen soil is uniquely determined by a set of two physical variables, such as α_0 and α_1 used earlier, under given hydraulic conditions and over-burden pressures. The traveling wave solution converges to the solution to the problem of a steadily growing ice layer when the velocity of the 0°C isotherm relative to the unfrozen part of the soil vanishes.

49-5987
Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993.
Stamnes, K.H., ed, *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, 371p., Refs. passim. For selected papers see 49-5988 through 49-6002 or I-53314 through I-53318.
DLC QC.912.3.A83 1993
Polar atmospheres, Ozone, Cloud cover, Albedo, Radiation balance, Solar radiation, Ultraviolet radiation, Global warming

This book contains the proceedings of a meeting on atmospheric radiation held in Tromsø, Norway, June 30-July 1, 1993. Of a total of 41 papers, 15 are pertinent to high latitudes, and of those, five are explicitly pertinent to Antarctica. The papers pertinent to Antarctica deal with polar climate studies from space; solar flux between clouds and the underlying surface; two papers on the effect of atmospheric ozone content on surface UV irradiance; and the infrared optical properties of clouds. Global warming concerns are addressed in several of the papers.

49-5988
Polar climate studies from space: overview and current issues.
Lubin, D., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.2-8, 31 refs.
DLC QC.912.3.A83 1993
Polar atmospheres, Cloud cover, Ice surveys, Sea ice distribution, Ice conditions, Air ice water interaction, Radiation balance, Radiometry, Spaceborne photography

The polar regions are expected to be particularly sensitive to anthropogenic global change. Due to the difficulties in modeling high-latitude climate and the logistical challenges with polar field work, satellite remote sensing will have an increasingly important role to play in polar climate research. For studies of atmospheric radiation and meteorology, accurate cloud detection and classification are crucial. Modern methods for polar cloud classification utilize both multispectral threshold and automated pattern recognition techniques. For monitoring sea ice concentration, passive microwave sensors offer an all-weather advantage over visible or infrared scanners, although over clear-sky scenes the latter can provide a much finer spatial resolution. (Auth.)

49-5989
Lidar measurements of the arctic stratosphere.
Carswell, A.I., Ulitsky, A., Wardle, D.I., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.9-23, 6 refs.
DLC QC.912.3.A83 1993
Polar atmospheres, Stratosphere, Polar stratospheric clouds, Ozone, Aerosols, Haze, Weather stations, Lidar

49-5990
Role of cloud-surface interactions on the net surface solar flux in high latitudes: climatic implications.
Gautier, C., Yang, S.R., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.24-36, 13 refs.
DLC QC.912.3.A83 1993
Polar atmospheres, Cloud cover, Snow optics, Snow cover effect, Albedo, Radiation balance, Water vapor, Global warming

The Discrete Ordinate Radiative Transfer (DISORT) model has been used to investigate the role of cloud-surface interactions on the net surface solar flux in various atmospheric and surface conditions. These model-based results indicate that the partitioning of radiation between the atmosphere and the surface largely varies with cloud and surface conditions. Particularly, the amount of solar radiation absorbed by the atmosphere depends strongly on the type of surface underlying clouds and on cloud properties and type. This suggests that if in a global change scenario, for instance, cloud cover were to remain constant but clouds were to move from overlying the ocean to overlying much more reflecting surfaces, the radiation partitioning would be quite different and so probably would the atmospheric and oceanic circulations. The strongest change would occur if clouds were to move from ocean to snow or ice surfaces, as this could occur at high latitudes, in the vicinity of snow/ice edges. In a scenario where there is no change in cloud type but just a north or south cloud shift in the Southern Hemisphere in the vicinity of Antarctica, where the largest cloud forcing occurs, results suggest that a large change of absorption partitioning between the atmosphere and the surface could take place, if the clouds moved from being mostly located over an oceanic surface to being located mostly over a snow surface (or vice versa). (Auth. mod.)

49-5991

Annual CO_2 emission from forest floors predicted by simulation models including climate change.

Flanagan, P.W., Ramsey, L.T., Kostlan, E., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.37-55, 7 refs.

DLC QC.912.3.A83 1993

Forest ecosystems, Forest soils, Soil temperature, Soil water, Soil microbiology, Soil air interface, Nutrient cycle, Carbon dioxide, Global warming, Mathematical models, United States—Alaska—Fairbanks, United States—Alaska—Minchumina, Lake

49-5992

Atmospheric Radiation Measurements (ARM) program's North Slope of Alaska climate research site: ARM's window on the Arctic.

Stamnes, K.H., Zak, B.D., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.107-110, 10 refs.

DLC QC.912.3.A83 1993

Polar atmospheres, Atmospheric circulation, Cloud cover, Albedo, Radiation balance, Weather stations, United States—Alaska—North Slope

49-5993

Cloud/albedo effects on the radiation budget in the Arctic.

Leont'eva, E.N., Stamnes, K.H., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.111-118, 7 refs.

DLC QC.912.3.A83 1993

Polar atmospheres, Cloud cover, Albedo, Radiation balance, United States—Alaska—Barrow

49-5994

Mapping of surface UV over Antarctica using satellite observations.

Gautier, C., Ricchiazzi, P., Lubin, D., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.199-214, 19 refs.

DLC QC.912.3.A83 1993

Polar atmospheres, Ozone, Solar radiation, Ultraviolet radiation, Cloud cover, Albedo, Marine biology, Physiological effects, Radiometry, Spaceborne photography, Antarctica—Palmer Station

Two methods have been investigated to map UV surface irradiance over Antarctica and the adjacent oceans using satellite remote sensing and ground truth radiometer measurements. Both methods are based on radiance observations from the Advanced Very High Resolution Radiometer (AVHRR) and from the Total Ozone Mapping Spectrometer (TOMS). Surface albedo and cloud optical depth are estimated from visible and infrared AVHRR data, and ozone concentration is derived from TOMS data. Radiative transfer models are applied to retrieve geophysical parameters from satellite data but also to compute the surface UV irradiance. The two methods differ in: (1) the derivation of cloud optical depth, and (2) the type of radiative transfer model used. Preliminary results from both methods are presented and compared with ground measurements made at Palmer Station. (Auth.)

49-5995

Effects of arctic ozone depletions in 1992 and 1993 on UV exposure in Finland.

Jokela, K., Leszczynski, K., Visuri, R., Koskela, T., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.215-224, 9 refs.

DLC QC.912.3.A83 1993

Polar atmospheres, Ozone, Solar radiation, Ultraviolet radiation, Snow optics, Snow cover effect, Physiological effects, Health, Finland

49-5996

UV spectra from the sun and the moon and geophysical and biological applications.

Svenøe, T., Olsen, M., Henriksen, K., Stamnes, K.H., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.225-232, 4 refs.
DLC QC.912.3.A83 1993
Polar atmospheres, Ozone, Solar radiation, Ultraviolet radiation, Physiological effects

49-5997

UV irradiance and the risk of skin cancer in the Arctic.

Falk, E.S., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.233-242, 12 refs.
DLC QC.912.3.A83 1993
Polar atmospheres, Ozone, Solar radiation, Ultraviolet radiation, Physiological effects, Health

49-5998

Effect of changes in ozone on solar UV-B radiation at Reykjavik.

Bais, A.F., Zerefos, C.S., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.263-267, 7 refs.
DLC QC.912.3.A83 1993
Ozone, Solar radiation, Ultraviolet radiation, Iceland

49-5999

Discussion of the aerosol optical thickness of the atmosphere over the Norwegian Sea, obtained from different experimental data.

Kuśmierczyk-Michulec, J., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.268-274, 7 refs.
DLC QC.912.3.A83 1993
Polar atmospheres, Marine atmospheres, Aerosols, Atmospheric attenuation, Radiation balance, Norwegian Sea

49-6000

Spectral albedo and inside radiant flux density of snow by a multiple scattering model.

Aoki, T., Aoki, T., Fukabori, M., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.275-278, 7 refs.
DLC QC.912.3.A83 1993
Snow air interface, Snow surface, Snow optics, Snow heat flux, Albedo

49-6001

Infrared optical properties of clouds over the maritime Antarctic: radiometric FTIR measurements.

Lubin, D., Gautier, C., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.279-290, 13 refs.
DLC QC.912.3.A83 1993
Polar atmospheres, Marine atmospheres, Cloud cover, Radiation balance, Infrared radiation, Radiometry, Antarctica—Palmer Station
Spectrally resolved radiometric measurements of middle infrared atmospheric emission can be used in conjunction with detailed radiative transfer calculations to retrieve cloud emissivity, and to estimate cloud liquid water path (LWP), optical depth, and equivalent radius of the droplet size distribution. Using a discrete-ordinates radiative transfer formulation, an algorithm has been developed to retrieve these cloud properties from FTIR data. The algorithm has been successfully applied to a four-month antarctic data set provided by the CalSpace FTIR Spectroradiometer. Radiative transfer calculations were performed to estimate spectral cloud emissivity for a range of cloud optical depth, liquid water content, and equivalent radius, sufficient to bracket values expected in the field. These calculations made use of bi-modal droplet size distributions actually observed in antarctic clouds. Using a least-squares algorithm, a theoretical cloud emission spectrum is chosen which best reproduces a given measured brightness temperature spectrum. The results show marked differences in cloud emissivity between high and low overcast layers, and between clouds with and without precipitation. (Auth. mod.)

49-6002

Measured and modelled UV-B spectrum compared with some atmospheric parameters.

Koskela, T., Taalas, P., Kyrö, E., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2049, Atmospheric Radiation, Tromsø, Norway, June 30-July 1, 1993. Edited by K.H. Stamnes, p.296-306, 18 refs.
DLC QC.912.3.A83 1993
Polar atmospheres, Ozone, Solar radiation, Ultraviolet radiation, Finland, Sweden, Antarctica—Palmer Station
Spectral ultraviolet measurements in the wavelength range 290 to 325 nm made at Sodankylä, Finland in 1990-92 were used to study the effects of surface albedo, atmospheric total ozone and atmospheric aerosol content on UV irradiance on the surface of the Earth. A two-stream version of the discrete-ordinate-algorithm developed at the University of Alaska Fairbanks was tested against spectral measurements from Sodankylä, Norrköping in Sweden and Palmer Station. Agreement was excellent as regards Palmer Station data. However, with the two Northern Hemispheric data sources all model results were roughly 40% higher in the 305-325 nm range and matched below 305 nm within ±20%. A case study with data having common optical air masses and total ozone contents from all three sources revealed unexpectedly high irradiances at Palmer Station. The spectral ranges available were 290 to 325 nm in Sodankylä, 290 to 320 nm in Norrköping and 279.9 to 380.22 nm at Palmer Station. All data were presented at a resolution of about 0.5 nm. Surface UV irradiance at air mass 1.4±0.05 is 50 to 80% stronger in Antarctica than in Scandinavia with roughly similar total ozone contents. This result was unexpected and remains to be explained. (Auth. mod.)

49-6003

First Doppler weather radar studies of the wintertime meteorology of interior Alaska.

Fathauer, T., *Polar record,* July 1995, 31(177), p.287-296, 5 refs.
Snowfall, Snowstorms, Cloud cover, Air masses, Wind (meteorology), Weather forecasting, Weather stations, Radar tracking, Radar echoes, United States—Alaska—Fairbanks

49-6004

Merging remotely sensed data with geophysical models.

Searcy, C., Dean, K., Stringer, W.J., *Polar record,* July 1995, 31(177), p.297-304, 10 refs.
Deltas, River ice, Fast ice, Ice breakup, Ice surveys, Volcanoes, Volcanic ash, Cloud cover, Remote sensing, Spaceborne photography, Radiometry, Image processing, Computerized simulation

49-6005

Study of sea ice in the Sea of Okhotsk with SAR data.

Wakabayashi, H., Hirano, K., Nishio, F., Aota, M., Takahashi, S., *Polar record,* July 1995, 31(177), p.305-314, 15 refs.
Ice surveys, Sea ice distribution, Ice cover thickness, Ice conditions, Ice detection, Ice reporting, Spaceborne photography, Synthetic aperture radar, Backscattering, Okhotsk Sea, Japan—Hokkaido

49-6006

Early nineteenth century meteorological register from the eastern Canadian Arctic.

Kay, P.A., *Polar record,* July 1995, 31(177), p.335-342, 16 refs.
Polar atmospheres, Air temperature, Surface temperature, Wind direction, Meteorological data, Paleoclimatology, Statistical analysis, Canada—Northwest Territories—Igloolik Island

49-6007

Polar Session: Arctic Natural Environment Problems, Nov. 1994.

Polar Session: Arctic Natural Environment Problems, Lublin, Poland, November 1994, Repelewska-Pękalowa, J., ed, Pękala, K., ed, Lublin, Poland, Institute of Earth Sciences, Marie Curie-Skłodowska University, Permafrost Commission, Committee on Polar Research, Polish Academy of Sciences, 1994, 202p., With Polish summaries. Refs. passim. For selected papers see 49-6008 through 49-6026.
Environmental protection, Meteorology, Geomorphology, Soil microbiology, Environmental impact, Norway—Spitsbergen, Russia—Kola Peninsula, Barents Sea

49-6008

Run-off and dynamics of Calypsostranda underground waters (Western Spitsbergen).

Bartoszewski, S., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.37-46, With Polish summary. 18 refs.

Runoff, Ground water, Surface waters, Water level, Permafrost hydrology, Precipitation (meteorology), Norway—Spitsbergen

49-6009

Weather course in Calypsobyen (West Spitsbergen) in July and August 1994.

Bilik, A., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.47-53, With Polish summary. 8 refs.

Weather, Meteorology, Air masses, Atmospheric circulation, Precipitation (meteorology), Polar atmospheres, Norway—Spitsbergen

49-6010

Weather conditions in Calypsobyen in the summer 1993 (West Spitsbergen).

Czubla, P., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.55-60, With Polish summary. 15 refs.

Weather, Meteorology, Polar atmospheres, Air temperature, Wind velocity, Humidity, Cloud cover, Norway—Spitsbergen

49-6011

Preliminary evaluation of exposure effect on the soil cover studied on the slopes in Dyrstad and Tjørn valleys (West Spitsbergen) as the example.

Klimowicz, Z., Uziak, S., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.61-69, With Polish summary. 7 refs.

Slope orientation, Exposure, Tundra, Vegetation patterns, Soil chemistry, Soil composition, Norway—Spitsbergen

49-6012

Soils of the Dalnye Zelentsy tundra region in the northern part of the Kola Peninsula (Russia).

Skiba, S., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.71-77, With Polish summary. 8 refs.

Tundra, Soil composition, Soil chemistry, Soil profiles, Podsol, Lichens, Russia—Kola Peninsula

49-6013

Morphological structure and neotectonics of the coastal zone of the Murmansk east sea-shore (watershed zone of the Voronia and Rynda rivers).

Mitiaev, M.V., Gerasimova, M.V., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.79-85.

Tectonics, Watersheds, Geomorphology, Coastal topographic features, Russia—Murmansk, Russia—Voronia River, Russia—Rynda River

49-6014

Development of relief affected by contemporary morphogenetic processes in the Dalnye Zelentsy region (Kola Peninsula).

Pękala, K., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.87-92 + 3 plates, With Polish summary. 13 refs.

Geomorphology, Periglacial processes, Solifluction, Frost heave, Erosion, Russia—Kola Peninsula, Russia—Voronia River

49-6015

Summer thawing of ground in Calypsostranda in the Recherchefjorden region (Spitsbergen).

Repelewska-Pękalowa, J., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.93-103, With Polish summary. 21 refs.

Ground thawing, Active layer, Permafrost thickness, Thawing rate, Norway—Spitsbergen

49-6016

Paleohydrographical aspects of Weichselian land-sea-glacier dynamic system in the Barents Sea region.

Samoĭlovich, IU.G., Tarasov, G.A., Matishov, G.G., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skł odowska University, 1994, p.105-106, 1 ref.

Hydrography, Paleoclimatology, Ice water interface, Barents Sea

49-6017

Main elements of relief and Quaternary sediments in the Dalnye Zelentsy region (Kola Peninsula).

Superson, J., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.107-111, With Polish summary. 10 refs.

Quaternary deposits, Sediments, Geomorphology, Russia—Kola Peninsula, Russia—Voronia River, Russia—Rynda River

49-6018

Some questions of the sedimentation of modern deposits in the high-latitude Arctic areas.

Tarasov, G.A., Kukina, N.A., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.113-116.

Sedimentation, Bottom sediment, Icebergs, Chemical properties, Glacial deposits, Norway—Spitsbergen

49-6019

Conditions of Sandur Plain formation in the glacier forelands in the Recherchefjorden region (West Spitsbergen).

Warowna, J., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.117-126 + 2 plates, With Polish summary. 25 refs.

Glacial geology, Moraines, Glacial erosion, Glacier ablation, Norway—Spitsbergen

49-6020

Tectonics of the Dalnye Zelentsy region (Kola Peninsula).

Zgłobicki, W., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.127-132 + 2 plates, With Polish summary. 4 refs.

Tectonics, Geomorphology, Russia—Kola Peninsula

49-6021

Periglacial transformation of cliffs of raised marine terraces in the Calypsostranda area (Bellsund, Spitsbergen).

Zybała, K., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.133-140 + 2 plates, With Polish summary. 11 refs.

Periglacial processes, Terraces, Talus, Marine deposits, Solifluction, Moraines, Norway—Spitsbergen

49-6022

Rocky intertidal association in the vicinity of Hornsundfiord (Svalbard, West Spitsbergen).

Gruszczyński, M., Różycki, O., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.143-155, With Polish summary. 36 refs.

Littoral zone, Algae, Ecology, Marine biology, Norway—Spitsbergen

49-6023

Isolation and antagonism of soil bacteria in the Bellsund region in Western Spitsbergen.

Jóźwik, Z., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.157-160, With Polish summary. 5 refs.

Bacteria, Soil composition, Norway—Spitsbergen

49-6024

Pollution of the coast area of South Bellsund (Wedel Jarlsberg Land—West Spitsbergen).

Czubla, P., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.161-168, With Polish summary. 12 refs.

Littoral zone, Shores, Pollution, Environmental impact, Norway—Spitsbergen

49-6025

VIII. Heavy metals in the plants and soil of Calypsostranda in the Bellsund region (West Spitsbergen).

Jóźwik, Z., Magierski, J., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skłodowska University, 1994, p.179-189, With Polish summary. 14 refs.

Soil pollution, Pollution, Metals, Lichens, Plants (botany), Norway—Spitsbergen

49-6026

Preliminary study on determination of alpha emitting radioisotopes in the Barents Sea region.

Komosa, A., Szymula, M., Szczypa, J., Polar Session: Arctic Natural Environment Problems, Lublin, Poland, Nov. 1994. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Maria Curie-Skł odowska University, 1994, p.191-202, With Polish summary. 11 refs.

Radioactive isotopes, Fallout, Environmental impact, Mosses, Soil pollution, Lichens, Sediments, Plants (botany), Radioactive wastes, Waste disposal, Pollution, Barents Sea, Russia—Novaya Zemlya, Russia—Franz Josef Land, Russia—Kola Peninsula

49-6027

Temperature effects of passive greenhouse apparatus in high-latitude climate change experiments.

Kennedy, A.D., *Functional ecology,* Apr. 1995, 9(2), p.340-350, Refs. p.349-350.

Temperature variations, Plant ecology, Climatic changes, Air temperature, Meteorological factors, Global warming, Snow cover effect, Experimentation, Antarctica—Signy Island

Passive greenhouse apparatus is commonly used to investigate the *in situ* biological response of terrestrial communities to global warming. Here, the relationship between passive greenhouse thermal environment and future climate conditions is considered using temperature data collected from within and without greenhouses deployed in the maritime antarctic. It is revealed that in terms of thermal extremes, diel and annual variation, and overall distribution across the temperature spectrum, such apparatus achieves only poor simulation of GCM (general circulation model) forecasts. During summer, greenhouses induce an amplified daily range of temperatures, elevated maxima and accelerated rates of change. During spring and autumn, diel temperature variation continues inside the greenhouses while snow cover protects the controls. During winter, an inverse treatment effect occurs, in which the relative depth of snow cover causes lower temperatures in greenhouses than in controls. These treatment effects differ significantly from GCM climate predictions. (Auth. mod.)

49-6028
Environmental significance of ice to streamflow in cold regions.
Prowse, T.D., *Freshwater biology,* Oct. 1994, 32(2), p.241-259, Refs. p.255-259.
Hydrologic cycle, Stream flow, River ice, Freezeup, Ice cover effect, Ice water interface, Snowmelt, Runoff, Hydrography

49-6029
Ecological effects of river ice break-up: a review and perspective.
Scrimgeour, G.J., Prowse, T.D., Culp, J.M., Chambers, P.A., *Freshwater biology,* Oct. 1994, 32(2), p.261-275, Refs. p.271-275.
River flow, River ice, Ice breakup, Ice push, Sediment transport, Limnology, Environmental impact, Ecology, Ecosystems, Ice water interface, Ice cover effect

49-6030
Ecology of alpine streams.
Ward, J.V., *Freshwater biology,* Oct. 1994, 32(2), p.277-294, Refs. p.292-294.
Streams, Alpine tundra, Limnology, Ecology, Classifications, Biogeography

49-6031
Glacial rivers: physical habitat and ecology.
Milner, A.M., Petts, G.E., *Freshwater biology,* Oct. 1994, 32(2), p.295-307, 61 refs.
Glacial rivers, Glacial hydrology, Glacier melting, Runoff, Hydrography, Ecology, Limnology, Water temperature, Temperature effects, Models

49-6032
Altitudinal trends in the diatoms, bryophytes, macroinvertebrates and fish of a Nepalese river system.
Ormerod, S.J., Rundle, S.D., Wilkinson, S.M., Daly, G.P., Dale, K.M., Juttner, I., *Freshwater biology,* Oct. 1994, 32(2), p.309-322, 32 refs.
Ecology, Alpine landscapes, Watersheds, Limnology, Altitude, Rivers, Biomass, Classifications, Sampling, Nepal—Himalaya Mountains

49-6033
Benthic ecology of a spring-fed river of interior Alaska.
Laperriere, J.D., *Freshwater biology,* Oct. 1994, 32(2), p.349-357, 37 refs.
Subarctic landscapes, Taiga, Rivers, Sampling, Ecology, Biomass, Algae, Sampling, Seasonal variations, United States—Alaska—Clearwater Creek

49-6034
Mountain streams in Westland, New Zealand: benthic ecology and management issues.
Winterbourn, M.J., Ryan, P.A., *Freshwater biology,* Oct. 1994, 32(2), p.359-373, Refs. p.371-373.
Limnology, Watersheds, Streams, Glacial lakes, Alpine landscapes, Ecology, Biomass, Water chemistry, Sampling, Environmental protection, New Zealand

49-6035
Influence of water abstraction on the macroinvertebrate community gradient within a glacial stream system: La Borgne d'Arolla, Valais, Switzerland.
Petts, G.E., Bickerton, M.A., *Freshwater biology,* Oct. 1994, 32(2), p.375-386, 23 refs.
Glacial rivers, Alpine landscapes, Glacial hydrology, Meltwater, Biomass, Distribution, Ecology, Water flow, Water supply, Electric power, Switzerland—Valais

49-6036
Colonization and succession of invertebrate communities in a new stream in Glacier Bay National Park, Alaska.
Milner, A.M., *Freshwater biology,* Oct. 1994, 32(2), p.387-400, Refs. p.399-400.
Ecology, Limnology, Biomass, Distribution, Streams, Glacier melting, Meltwater, Water temperature, Sampling, United States—Alaska—Glacier Bay National Park

49-6037
Long-term effects of PO_4 fertilization on the distribution of bryophytes in an arctic river.
Bowden, W.B., Finlay, J.C., Maloney, P.E., *Freshwater biology,* Oct. 1994, 32(2), p.445-454, 32 refs.
Arctic landscapes, Tundra, Rivers, Limnology, Biomass, Algae, Distribution, Ecosystems, Sampling, Nutrient cycle, Periodic variations, United States—Alaska—Kuparuk River

49-6038
Controls on production of bryophytes in an arctic tundra stream.
Finlay, J.C., Bowden, W.B., *Freshwater biology,* Oct. 1994, 32(2), p.455-466, 46 refs.
Limnology, Biomass, Ecology, Arctic landscapes, Tundra, Streams, Sampling, Mosses, Growth, Distribution, Nutrient cycle, United States—Alaska—Kuparuk River

49-6039
Spatial structure in low-temperature amorphous phases of water.
Svishchev, I.M., Kusalik, P.G., *Chemical physics letters,* June 16,1995, 239(4,5,6), p.349-353, 16 refs.
Ice physics, Amorphous ice, Ice structure, Water structure, Molecular structure, Supercooling, Computerized simulation, Correlation, Low temperature tests

49-6040
Precipitation type characteristics at the surface in winter storms.
Crawford, R.W., Stewart, R.E., *Cold regions science and technology,* May 1995, 23(3), p.215-229, 29 refs.
Precipitation (meteorology), Storms, Snowfall, Particle size distribution, Atmospheric physics, Radar echoes, Phase transformations, Classifications, Atmospheric boundary layer, Mathematical models, Simulation

49-6041
Mathematical approach to modelling palsa formation: insights on processes and growth conditions.
An, W.D., Allard, M., *Cold regions science and technology,* May 1995, 23(3), p.231-244, 36 refs.
Permafrost physics, Geocryology, Permafrost heat transfer, Permafrost mass transfer, Frozen ground mechanics, Frost mounds, Frost heave, Ice lenses, Ice formation, Mathematical models

49-6042
In-situ dielectric constant of polar firn revisited.
Kovacs, A., Gow, A.J., Morey, R.M., MP 3638, *Cold regions science and technology,* May 1995, 23(3), p.245-256, 45 refs.
Ice sheets, Firn, Remote sensing, Radio echo soundings, Ice dielectrics, Ice physics, Dielectric properties, Ice cores, Correlation, Analysis (mathematics), Antarctica—McMurdo Ice Shelf
The success in using VHF and UHF systems for sounding polar ice sheets has been tempered by an uncertainty in the *in-situ* dielectric constant which controls the effective velocity of an electromagnetic wave propagating in an air-ice mixture. An empirical equation for determining the relative real dielectric constant vs. density of firn or ice was proposed in 1969 by Robin et al. where dielectric constant = $(1+0.851\rho)^2$. However, this expression has met with uncertainty because wide-angle radar refraction sounding techniques have produced dielectric constant values that are lower than Robin's equation predicts. This paper discusses radar soundings made on the McMurdo Ice Shelf and compares the resulting dielectric constant determinations with Robin's equation, laboratory measurements on firn and ice and other expressions given in the literature for determining the dielectric constant vs. the specific gravity of dry firn and ice. These findings indicate that the form of Robin's equation is valid. Reasons are suggested as to why previous wide-angle radar sounding studies did not reproduce Robin's findings. (Auth. mod.)

49-6043
Depth profiles of effective viscosities of temperate firn following from strain rate measurements at two firn pits (Kesselwandferner, Oetztal Alps, 1967-89).
Ambach, W., Huber, J., Eisner, H., Schneider, H., *Cold regions science and technology,* May 1995, 23(3), p.257-264, 20 refs.
Snow mechanics, Alpine glaciation, Firn, Viscosity, Snow density, Profiles, Strain tests, Shear properties, Austria—Alps

49-6044
Experimental observations of the brittle failure process of ice and ice-structure contact.
Tuhkuri, J., *Cold regions science and technology,* May 1995, 23(3), p.265-278, 22 refs.
Ice mechanics, Ice strength, Ice microstructure, Mechanical tests, Ice solid interface, Cracking (fracturing), Brittleness, Impact tests, Thin sections, Surface structure

49-6045
Life story of a first-year sea ice ridge.
Leppäranta, M., Lensu, M., Kosloff, P., Veitch, B., *Cold regions science and technology,* May 1995, 23(3), p.279-290, 16 refs.
Sea ice, Ice crystal structure, Ice growth, Pressure ridges, Ice mechanics, Porosity, Thermodynamic properties, Seasonal variations, Temperature effects

49-6046
Fundamentals of ice making by convection cooling followed by contact melting.
Vargas, J.V.C., Bejan, A., *International journal of heat and mass transfer,* Oct. 1995, 38(15), p.2833-2841, 19 refs.
Ice makers, Manufacturing, Ice physics, Ice formation, Ice solid interface, Freezing, Melting, Ice removal, Gravity, Heat transfer, Convection, Mathematical models

49-6047
High latitude river runoff in a doubled CO_2 climate.
Van Blarcum, S.C., Miller, J.R., Russell, G.L., *Climatic change,* May 1995, 30(1), p.7-26, 27 refs.
Climatic changes, Atmospheric composition, Carbon dioxide, Global warming, Watersheds, River flow, Hydrography, Runoff forecasting, Snowmelt, Mathematical models

49-6048
Canadian vegetation sensitivity to projected climatic change at three organizational levels.
Lenihan, J.M., Neilson, R.P., *Climatic change,* May 1995, 30(1), p.27-56, 49 refs.
Climatic changes, Global warming, Greenhouse effect, Vegetation patterns, Plant ecology, Forest ecosystems, Distribution, Environmental impact, Simulation, Canada

49-6049
Disequilibrium response of permafrost in boreal continental western Canada to climate change.
Halsey, L.A., Vitt, D.H., Zoltai, S.C., *Climatic change,* May 1995, 30(1), p.57-73, 50 refs.
Permafrost transformation, Discontinuous permafrost, Degradation, Permafrost distribution, Permafrost indicators, Climatic changes, Global warming, Soil temperature, Swamps, Landforms, Correlation, Canada

49-6050
Stress-deformation characteristics of a soil after freezing and thawing.
Aoyama, K., Fukuda, M., Danube-European Conference on Soil Mechanics and Foundation Engineering, 9th, Budapest, Hungary, Oct. 2-5, 1990. Proceedings. Edited by G. Petrasovits, Budapest, Akadémiai Kiadó, 1990, p.393-403, 5 refs.
DLC TA710.A1 D33
Frozen ground mechanics, Frozen ground strength, Soil tests, Freeze thaw tests, Frost heave, Thaw weakening, Loams, Mechanical properties

49-6051
Methane emission from a usually well-drained prairie soil after snowmelt and precipitation.
Wang, F.L., Bettany, J.R., *Canadian journal of soil science,* May 1995, 75(2), p.239-241, With French summary. 12 refs.
Soil air interface, Soil chemistry, Decomposition, Saturation, Geochemical cycles, Natural gas, Snowmelt, Seepage, Vapor transfer

49-6052

ONERA three-dimensional icing model.

Hedde, T., Guffond, D., *AIAA journal,* June 1995, 33(6), p.1038-1045, 14 refs.

Aircraft icing, Computerized simulation, Mathematical models, Ice accretion, Surface structure, Ice air interface, Thermodynamics, Turbulent boundary layer, Surface roughness

49-6053

Climatically induced floristic changes across the Eocene-Oligocene transition in the northern high latitudes, Yukon Territory, Canada.

Ridgway, K.D., Sweet, A.R., Cameron, A.R., *Geological Society of America. Bulletin,* June 1995, 107(6), p.676-696, 78 refs.

Paleoclimatology, Climatic changes, Paleobotany, Sedimentation, Stratigraphy, Palynology, Vegetation patterns, Forest ecosystems, Geochronology, Correlation, Canada—Yukon Territory

49-6054

Deglacial eolian regimes in New England.

Thorson, R.M., Schile, C.A., *Geological Society of America. Bulletin,* July 1995, 107(7), p.751-761, 76 refs.

Pleistocene, Ice sheets, Glacier melting, Paleoclimatology, Atmospheric circulation, Eolian soils, Sedimentation, Geomorphology, Stratification, Periglacial processes, Wind erosion, Ice cover effect, United States—Massachusetts

49-6055

Small-strain behavior of frozen sand in triaxial compression.

Andersen, G.R., Swan, C.W., Ladd, C.C., Germaine, J.T., *Canadian geotechnical journal,* June 1995, 32(3), p.428-451, With French summary. 38 refs.

Frozen ground mechanics, Frozen ground compression, Sands, Strain tests, High pressure tests, Strain measuring instruments, Soil physics, Temperature effects

49-6056

Ice lens formation at a silt-sand interface.

Smith, S.L., Williams, P.J., *Canadian geotechnical journal,* June 1995, 32(3), p.488-495, With French summary. 22 refs.

Frozen ground mechanics, Frozen ground expansion, Soil freezing, Cryogenic soils, Freeze thaw cycles, Frost heave, Ice lenses, Orientation, Ice solid interface

49-6057

Triaxial relaxation testing of a frozen sand.

Ladanyi, B., Benyamina, M.B., *Canadian geotechnical journal,* June 1995, 32(3), p.496-511, With French summary. 70 refs.

Frozen ground mechanics, Frozen ground strength, Frozen ground compression, Sands, Relaxation (mechanics), Stress strain diagrams, Soil creep

49-6058

In situ creep of frozen soil, Fenghuo Shan, Tibet Plateau, China.

Wang, B.L., French, H.M., *Canadian geotechnical journal,* June 1995, 32(3), p.545-552, With French summary. 30 refs.

Frozen ground mechanics, Soil creep, Slope processes, Slope orientation, Permafrost mass transfer, Frost heave, Geocryology, China—Tibet

49-6059

Vehicle bearing capacity of frozen ground over a soft substrate.

Shoop, S.A., MP 3640, *Canadian geotechnical journal,* June 1995, 32(3), p.552-556, With French summary. 16 refs.

Frozen ground strength, Frozen ground compression, Bearing strength, Substrates, Motor vehicles, Trafficability, Frost penetration, Standards

Freezing temperatures may allow the use of vehicles and heavy equipment on otherwise inaccessible or sensitive areas such as swamps, bogs, tundra, and peatlands. Predicting operable conditions in frozen ground is useful for forestry, mining, oil exploration, construction, and military operations. Guidelines for estimating the frost depth necessary to support a given vehicle load have been generated based on experience in forestry operations on peatlands and similarities in the strength behavior of frozen peat and frozen soils. Correlation with information in the literature leads to a simple equation relating safe trafficability of frozen ground over soft ground: $P=Cz^2$, where P is the maximum load and C is a constant depending on the strength of the frozen layer, which has a thickness z. Values for the constant C and a chart showing required frozen thickness for a variety of vehicles are given.

49-6060

Armoured dinoflagellates from the Norwegian, Greenland and Barents seas collected in the cruise of the RV "Oceania" in August 1992.

Okolodkov, IU.B., *Polish polar research,* 1993, 14(4), p.321-330, With Polish summary. 10 refs.

Oceanographic surveys, Plankton, Marine biology, Sampling, Classifications, Distribution, Barents Sea, Greenland Sea, Norwegian Sea

49-6061

Observations on the fast ice biota in the fjords of Spitsbergen.

Węsławski, J.M., Kwaśniewski, S., Wiktor, J., Zajączkowski, M., *Polish polar research,* 1993, 14(4), p.331-343.

Marine biology, Biomass, Fast ice, Sea ice, Ice composition, Plankton, Subglacial observations, Sampling, Classifications, Ecosystems, Ice water interface, Ice cover effect, Norway—Spitsbergen

49-6062

Some remarks about bioenergetic aspects of tundra soil.

Fischer, Z., Skiba, S., *Polish polar research,* 1993, 14(4), p.345-354, With Polish summary. 24 refs.

Arctic landscapes, Tundra soils, Cryogenic soils, Organic soils, Soil microbiology, Chemical composition, Soil profiles, Vegetation factors, Norway—Spitsbergen

49-6063

Populations of *Saxifraga oppositifolia* L., in Spitsbergen tundra in different ecological conditions.

Pirożnikow, E., *Polish polar research,* 1993, 14(4), p.355-382, With Polish summary. 27 refs.

Plant ecology, Biomass, Vegetation patterns, Distribution, Arctic landscapes, Growth, Solifluction, Microclimatology, Norway—Spitsbergen

49-6064

Net phytoplankton annual cycle (February 1990-January 1991) in Admiralty Bay, King George Island, Antarctica.

Kopczyńska, E.E., *Polish polar research,* 1993, 14(4), p.383-392, With Polish summary. 26 refs.

Marine biology, Plankton, Algae, Biomass, Sampling, Plant ecology, Distribution, Seasonal variations, Antarctica—Admiralty Bay

Net phytoplankton cell numbers in 50 m water column of Admiralty Bay, King George I. ranged between $0.2 \times 10^5/m^2$ on Aug. 24, 1990 and $2.3 \times 10^7/m^2$ on Nov. 15, 1990. Cluster analysis has confirmed the presence of two groups of samples: spring and summer ones (Oct. to Apr.), rich in cells and in species, and winter samples (June to Aug.) impoverished in algae. The abundance and succession of species in Admiralty Bay reflect seasonal differences in diatom growth; they also reflect mixed populations of the Weddell and Bellingshausen seas entering Admiralty Bay via Bransfield Strait. The striking scarcity of algae in some summer samples can most likely be attributed to zooplankton grazing. (Auth. mod.)

49-6065

Algae inhabiting creeks of the region of "H. Arctowski" Polish antarctic station, King George Island, South Shetlands.

Luścińska, M., Kyć, A., *Polish polar research,* 1993, 14(4), p.393-405, With Polish summary. 10 refs.

Limnology, Algae, Biomass, Streams, Sampling, Ecosystems, Classifications, Antarctica—King George Island

In material collected at 26 stations along the course of three creeks in the vicinity of Arctowski Station, 183 taxa of algae have been identified: 25 of Cyanophyta, 123 of Bacillariophyceae, 2 of Xanthophyceae, 2 of Chrysophyceae and 31 of Chlorophyta. The highest species diversity was found in the algal community in Creek II (132 taxa), followed by the "Petrified Forest Creek" (97 taxa), and the least diversified algal community was that from the "Ornithologists' Creek" (73 taxa). (Auth. mod.)

49-6066

INQUA International Symposium on Stratigraphy and Correlation of Quaternary Deposits of the Asian and Pacific Regions.

International Union for Quaternary Research, Harding, J.L., ed, Bangkok, Thailand, CCOP Technical Secretariat, Jan. 1991, 214p., Held in Nakhodka, U.S.S.R., Oct. 9-16, 1988. For selected papers see 49-6067 through 49-6076.

DLC QE696.I546 1988

Stratigraphy, Correlation, Quaternary deposits, Paleoclimatology, Pleistocene

49-6067

Geomorphological criteria of stratigraphical subdivision of quaternary alluvium and some problems of placer formation.

Postolenko, G.A., INQUA International Symposium on Stratigraphy and Correlation of Quaternary Deposits of the Asian and Pacific Regions, Nakhodka, U.S.S.R., Oct. 9-16, 1988. Edited by J.L. Harding, Bangkok, Thailand, CCOP Technical Secretariat, Jan. 1991, p.1-10, 15 refs.

Geomorphology, Alluvium, Quaternary deposits, Valleys, Pleistocene

49-6068

Stratigraphy of late Quaternary sediments in seas of Japan and Okhotsk and their paleoceanological conditions.

Gorbarenko, S.A., INQUA International Symposium on Stratigraphy and Correlation of Quaternary Deposits of the Asian and Pacific Regions, Nakhodka, U.S.S.R., Oct. 9-16, 1988. Edited by J.L. Harding, Bangkok, Thailand, CCOP Technical Secretariat, Jan. 1991, p.11-24, 25 refs.

Quaternary deposits, Sediments, Stratigraphy, Paleoclimatology, Oxygen isotopes, Marine deposits, Core samplers, Okhotsk Sea, Japan, Sea

49-6069

Late Cenozoic marine stratigraphy of northeast Asia.

Bylinskaia, M.E., Khoreva, I.M., INQUA International Symposium on Stratigraphy and Correlation of Quaternary Deposits of the Asian and Pacific Regions, Nakhodka, U.S.S.R., Oct. 9-16, 1988. Edited by J.L. Harding, Bangkok, Thailand, CCOP Technical Secretariat, Jan. 1991, p.33-38, 4 refs.

Pleistocene, Stratigraphy, Sedimentation, Quaternary deposits, Marine deposits, Glacial deposits, Russia—Chukotskiy Peninsula, Russia—Kamchatka Peninsula

49-6070

Main features for development of natural environment in the late Pleistocene-Holocene (south of the Soviet Far East).

Korotkiĭ, A.M., INQUA International Symposium on Stratigraphy and Correlation of Quaternary Deposits of the Asian and Pacific Regions, Nakhodka, U.S.S.R., Oct. 9-16, 1988. Edited by J.L. Harding, Bangkok, Thailand, CCOP Technical Secretariat, Jan. 1991, p.45-54, 17 refs.

Pleistocene, Palynology, Paleoclimatology, Landscape development, Geomorphology, Sedimentation, Geocryology, Climatic factors

49-6071

Microbiological approach to the paleoreconstruction of the north part of the Pacific Ocean region during the Quaternary.

Gilichinskiĭ, D.A., Fedorov-Davydov, D.G., Khlebnikova, G.M., Chaĭkovskaia, N.R., INQUA International Symposium on Stratigraphy and Correlation of Quaternary Deposits of the Asian and Pacific Regions, Nakhodka, U.S.S.R., Oct. 9-16, 1988. Edited by J.L. Harding, Bangkok, Thailand, CCOP Technical Secretariat, Jan. 1991, p.65-68, 2 refs.

Microbiology, Geocryology, Frozen rocks, Permafrost, Sediments

49-6072

Beringia at the end of Pleistocene (paleogeographical situations).

Svitoch, A.A., Poliakova, E.I., Taldenkova, E.E., INQUA International Symposium on Stratigraphy and Correlation of Quaternary Deposits of the Asian and Pacific Regions, Nakhodka, U.S.S.R., Oct. 9-16, 1988. Edited by J.L. Harding, Bangkok, Thailand, CCOP Technical Secretariat, Jan. 1991, p.145-158, 25 refs.

Pleistocene, Landscape types, Alpine tundra, Forest tundra, Taiga, Steppes, Deserts, Flooding, Bering Sea

49-6073

Pliocene-Pleistocene geological events in Yakutia.

Grinenko, O.V., Kamaletdinov, V.A., INQUA International Symposium on Stratigraphy and Correlation of Quaternary Deposits of the Asian and Pacific Regions, Nakhodka, U.S.S.R., Oct. 9-16, 1988. Edited by J.L. Harding, Bangkok, Thailand, CCOP Technical Secretariat, Jan. 1991, p.185-191, 17 refs.

Pleistocene, Quaternary deposits, Geologic processes, Paleoclimatology, Russia—Yakutia

49-6074

Correlation of the Pleistocene events in the north-Asian continent.

Arkhipov, S.A., INQUA International Symposium on Stratigraphy and Correlation of Quaternary Deposits of the Asian and Pacific Regions, Nakhodka, U.S.S.R., Oct. 9-16, 1988. Edited by J.L. Harding, Bangkok, Thailand, CCOP Technical Secretariat, Jan. 1991, p.193-202, 34 refs.

Pleistocene, Correlation, Stratigraphy, Moraines, Glaciation, Oxygen isotopes, Russia—Siberia

49-6075

Climo-environment changes in North Xinjiang since late Pleistocene.

Wen, Q.Z., Zheng, H.H., INQUA International Symposium on Stratigraphy and Correlation of Quaternary Deposits of the Asian and Pacific Regions, Nakhodka, U.S.S.R., Oct. 9-16, 1988. Edited by J.L. Harding, Bangkok, Thailand, CCOP Technical Secretariat, Jan. 1991, p.203-206.

Climatic changes, Paleoclimatology, Sediments, Alluvium, Correlation, China—Xinjiang Province

49-6076

Destruction of the continental morphostructures and reconstruction of relief in rift areas of the Laptev Sea in late Cenozoic.

Patyk-Kara, N.G., INQUA International Symposium on Stratigraphy and Correlation of Quaternary Deposits of the Asian and Pacific Regions, Nakhodka, U.S.S.R., Oct. 9-16, 1988. Edited by J.L. Harding, Bangkok, Thailand, CCOP Technical Secretariat, Jan. 1991, p.207-214, 2 refs.

Pleistocene, Shores, Coastal topographic features, Geomorphology, Russia—Laptev Sea

49-6077

Streamflow, water-temperature, and specific conductance data for selected streams draining into Lake Fryxell, lower Taylor Valley, Victoria Land, Antarctica.

Von Guerard, P., McKnight, D.M., Harnish, R.A., Gartner, J.W., Andrews, E.D., *U.S. Geological Survey. Open-file report,* 1995, No.94-545, 65p., 5 refs.

Meltwater, Hydrology, Water temperature, Stream flow, Limnology, Thermal conductivity, Antarctica—Fryxell, Lake, Antarctica—Taylor Valley

During the 1990-91 and 1991-92 field seasons in Antarctica, streamflow, water temperature, and specific conductance data were collected on 11 streams draining into Lake Fryxell. Instantaneous streamflow for all streams ranged from 0 to 0.651 m^3/s. Water temperatures for all streams ranged from 0 to 14.3°C. Specific conductance for all streams ranged from 11 to 491 microseismsl/cm at 25°C. It is probable that streamflow in the Lake Fryxell Basin during 1990-92 was larger than average. Examination of the 22-year streamflow record for the Onyx River in the Wright Valley revealed that in 1990 streamflow began earlier than for any previous year recorded and that the peak streamflow of record was exceeded. Similar high-flow conditions occurred during the 1991-92 field season. Thus, the data collected on streams draining into Lake Fryxell during 1990-92 are representative of greater than average streamflow conditions. (Auth. mod.)

49-6078

Sailing directions (planning guide & enroute) for Antarctica, Pub. 200, second edition, 1992.

U.S. Defense Mapping Agency. Hydrographic/Topographic Center, Washington, D.C., U.S. Defense Mapping Agency, 1992, 450p. + Appendices.

DLC VK805.S25

Ice navigation, Sea ice distribution, Meteorological charts, Maps, Ocean environments, Ocean currents, Tidal currents, Ocean waves

Pub. 200, Sailing Directions (Planning Guide) and (Enroute) for Antarctica is issued in Part One and Part Two with both Planning Guide and Enroute information combined in one volume. This publication has been corrected to Sep. 5, 1992, including Notice to Mariners No.36 of 1992. This information is provided for the region covering between 60°S and the coast of Antarctica. Sailing directions include detailed coastal and port approach information which supplements the latest revised prints of the largest scale chart on sale by the Defense Mapping Agency. An Index-Gazetteer of geographic names of the Antarctic, a route chart and atlas are provided in the back of the book.

49-6079

Ridge formation in the lower stratosphere and its influence on ozone transport: a general circulation model study during late January 1992.

Orsolini, Y., Cariolle, D., Déqué, M., *Journal of geophysical research,* June 20, 1995, 100(D6), p.11,113-11,135, 28 refs.

Polar atmospheres, Atmospheric physics, Stratosphere, Sounding, Atmospheric attenuation, Atmospheric circulation, Ozone, Turbulent diffusion

49-6080

Stratospheric effects of bromine activation on/in sulfate aerosol.

Danilin, M.Y., McConnell, J.C., *Journal of geophysical research,* June 20, 1995, 100(D6), p.11,237-11,243, 28 refs.

Polar atmospheres, Atmospheric attenuation, Cloud physics, Aerosols, Photochemical reactions, Heterogeneous nucleation, Simulation, Ozone

Heterogeneous reactions on/in stratospheric sulfate aerosol and polar stratospheric clouds are important in the photochemical balance of the stratosphere. Recent laboratory measurements indicate that heterogeneous reactions with bromine compounds are possible under stratospheric conditions. Herein a box photochemical model of the stratosphere with a detailed heterogeneous module is presented to evaluate the effect of heterogeneous reactions of the inorganic bromine for background and volcanic conditions at 60°S and 50 mbar. For the conditions studied the most important reaction is the hydrolysis of $BrONO_2$ on the aerosol, especially for volcanic conditions. It results in the indirect increase of the ClO_x fraction due to the suppression of NO_x (thus reducing $ClONO_2$) and the direct release of ClO_x due to additional consumption of HCl. The NO_x decrease is pronounced going into winter and leads to a ClO activation to about 0.5 ppvb 1 to 2 weeks earlier than without the heterogeneous reactions of bromine species. Due to the temperature sensitivity of the solubility of HCl, the reaction HOBr + HCl(a) $\rightarrow$ BrCl + H_2O results in direct activation of ClO at temperatures below ≈205 K. The enhanced processing for the bromine reactions leads to an additional increase ≈30% in ozone depletion for volcanic conditions during winter. (Auth. mod.)

49-6081

Aircraft measurements of O_3, HNO_3, and N_2 in the winter arctic lower stratosphere during the Stratosphere-Troposphere Experiment by Aircraft Measurements (STREAM) 1.

Bregman, A., et al, *Journal of geophysical research,* June 20, 1995, 100(D6), p.11,245-11,260, 75 refs.

Polar atmospheres, Atmospheric attenuation, Cloud physics, Ozone, Polar stratospheric clouds, Heterogeneous nucleation, Sampling, Aerial surveys

49-6082

Subsidence of the arctic stratosphere determined from thermal emission of hydrogen fluoride.

Traub, W.A., Jucks, K.W., Johnson, D.G., Chance, K.V., *Journal of geophysical research,* June 20, 1995, 100(D6), p.11,261-11,267, 13 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Fluid dynamics, Subsidence, Aerial surveys, Infrared spectroscopy, Spectra, Turbulent diffusion, Seasonal variations

49-6083

Heterogeneous conversion of HCl and $ClONO_2$ during the arctic winter 1992/1993 initiating ozone depletion.

Notholt, J., von der Gathen, P., Peil, S., *Journal of geophysical research,* June 20, 1995, 100(D6), p.11,269-11,274, 27 refs.

Polar atmospheres, Stratosphere, Atmospheric attenuation, Cloud physics, Polar stratospheric clouds, Infrared spectroscopy, Spectra, Ozone, Heterogeneous nucleation, Photochemical reactions

49-6084

On the theories of type 1 polar stratospheric cloud formation.

MacKenzie, A.R., Kulmala, M., Laaksonen, A., Vesala, T., *Journal of geophysical research,* June 20, 1995, 100(D6), p.11,275-11,288, 74 refs.

Polar atmospheres, Polar stratospheric clouds, Cloud physics, Heterogeneous nucleation, Condensation, Ice formation, Ice vapor interface, Aerosols, Temperature effects, Models

49-6085

Effect of riming on the ion concentrations of winter precipitation. 1. A quantitative analysis of field measurements.

Dixon, R.W., Mosimann, L., Oberholzer, B., Staehelin, J., Waldvogel, A., Collett, J.L., Jr., *Journal of geophysical research,* June 20, 1995, 100(D6), p.11,517-11,527, 42 refs.

Precipitation (meteorology), Cloud physics, Ice accretion, Snow crystal structure, Snow physics, Chemical properties, Scavenging, Aerosols, Mass transfer, Sampling, Ion density (concentration)

49-6086

Ice cores as an index of global volcanism from 1850 to the present.

Robock, A., Free, M.P., *Journal of geophysical research,* June 20, 1995, 100(D6), p.11,549-11,567, 87 refs.

Climatic changes, Climatology, Ice cores, Volcanic ash, Aerosols, Sampling, Correlation

To evaluate an important cause of past climate change, climate researchers need reliable estimates of volcanic aerosol loading in the atmosphere. Ice core acidity and sulfate records, because they contain physical evidence of atmospheric loading, are a promising source of information on past volcanic aerosols, but these records contain large nonvolcanic signals as well. This study compares Northern Hemisphere (NH) and Southern Hemisphere (SH) annual-average versions of five indices with eight NH and six SH ice core records for the period 1850 to the present in an attempt to identify the volcanic signal common to all records. The indices are all highly correlated with each other. For the NH, although the individual ice core records are, in general, not well correlated with each other or with any of the indices, a composite derived from averaging the cores, the ice core-volcano index (IVI), shows promise as a new index of volcanic aerosol loading. This new index correlates well with the existing non-ice core volcanic indices and with high-frequency temperature records. For the SH the individual ice cores and indices are better correlated. The SH IVI is again highly correlated with all indices and individual ice cores but not with high-frequency temperature records. For both hemispheres the Southern Oscillation index shows no significant correlation with the volcanic indices, ice cores or the IVI, thus providing no evidence for the impact of volcanic eruptions on El Niño/Southern Oscillation events. (Auth. mod.)

49-6087

Descent of long-lived trace gases in the winter polar vortex.

Bacmeister, J.T., Schoeberl, M.R., Summers, M.E., Rosenfield, J.E., Zhu, X., *Journal of geophysical research,* June 20, 1995, 100(D6), p.11,669-11,684, 31 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Atmospheric circulation, Gases, Vapor transfer, Turbulent diffusion, Mathematical models

Recent observations of CH_4 and HF from the UARS Halogen Limb Occultation Experiment (HALOE) suggest that vigorous descent occurs within the polar winter vortex with "mesospheric" values of CH_4 evident down to 30 mbar. This study shows that a highly accurate two-dimensional model advection scheme coupled with a modern radiation scheme, parameterized planetary and gravity wave drag algorithms can produce tracer distributions consistent with HALOE observations. The modeled tracer distribution within the polar vortex is found to be principally dependent on the strength of dynamical drag in the middle atmosphere and the strength of the planetary wave forcing. However, the strong downward transport of tracers at the poles during winter can be disrupted in midwinter by planetary wave mixing. Thus the weaker planetary wave forcing in the Southern Hemisphere winter allows for a more coherent descent of long-lived tracers from the mesosphere than during the Northern Hemisphere winter. Multiple-year integrations of the model reveal a general circulation of the stratosphere which lofts tracers to mesospheric altitudes. Material removed from the mesosphere returns to the stratosphere principally within the polar regions. (Auth. mod.)

49-6088

Morphometry of Bransfield Strait, West Antarctica.

Szeliga, J., Rakusa-Suszczewski, S., *Polish polar research,* 1994, 15(1-2), p.21-29, With Polish summary. 3 refs.

Marine geology, Sounding, Bottom topography, Geological maps, Antarctica—Bransfield Strait

On the basis of approx. 12,500 depth measurements of which 6700 were taken from R/V *Profesor Siedlecki,* 1300 from R/V *Polarstern* and the remainder from British navigation charts, a bathymetric chart of the Bransfield Strait in the scale 1:500,000 has been prepared. Within the assumed boundaries the total area of the Bransfield Strait covers 65,308.6 sq km, of which the Western Basin covers 23.5%, Central Basin, 47.3%, and Eastern Basin, 29.2%. Capacity of the entire Bransfield Strait amounts to 38,451 km^3. The average depth of the Bransfield Strait is 592 m. (Auth. mod.)

49-6089

Heat flux in selected polar soils in spring and summer (Hornsund, Spitsbergen).

Angiel, M., *Polish polar research,* 1994, 15(1-2), p.51-70, With Polish summary. 17 refs.

Arctic landscapes, Cryogenic soils, Tundra soils, Active layer, Periglacial processes, Soil temperature, Heat flux, Heat balance, Soil air interface, Seasonal variations, Insolation, Meteorological factors, Norway—Spitsbergen

49-6090

Properties of humic acids of arctic tundra soils in Spitsbergen.

Dziadowiec, H., Gonet, S., Plichta, W., *Polish polar research,* 1994, 15(1-2), p.71-81, With Polish summary. 24 refs.

Geocryology, Geochemistry, Tundra soils, Organic soils, Chemical properties, Soil analysis, Decomposition, Sampling, Thermal analysis, Norway—Spitsbergen

49-6091

Annual aerial photography of glaciers in northwest North America: how it all began and its golden age.

Post, A., *Physical geography,* Jan.-Feb. 1995, 16(1), p.15-26, 39 refs.

Glacier surveys, Aerial surveys, Photographic techniques, Photogrammetry, Glacier flow, Periodic variations

49-6092

Changes of glaciers in Glacier Bay, Alaska, using ground and satellite measurements.

Hall, D.K., Benson, C.S., Field, W.O., *Physical geography,* Jan.-Feb. 1995, 16(1), p.27-41, 36 refs.

Glacier melting, Glacier surveys, Glacier mass balance, Remote sensing, Spaceborne photography, LANDSAT, Maps, Correlation, Air temperature, Periodic variations, United States—Alaska—Glacier Bay

49-6093

Short-period velocity fluctuations of two glaciers on Mt. Wrangell, Alaska.

Sturm, M., MP 3641, *Physical geography,* Jan.-Feb. 1995, 16(1), p.42-58, 27 refs.

Glacier flow, Glacier surveys, Glacier oscillation, Glacial hydrology, Meltwater, Velocity measurement, Periodic variations, Volcanoes, Geothermal thawing, United States—Alaska—Wrangell, Mount

Mt. Wrangell, a glacier-covered volcano, has experienced increased heat flow since 1964. Coincident with this, glaciers on the northeast flank of the volcano began advancing. In 1981, a similar study was conducted on a glacier on the west flank. The west-flank glacier flowed faster and experienced five times greater fluctuations in velocity than the northeast-flank glacier. These fluctuations were generally synchronous throughout the lower part of the glacier, but asynchronous fluctuations were observed to propagate both up- and down-glacier. Periods of increased velocity coincided with uplift of the glacier surface (up to 10 cm); periods of decreased velocity followed abrupt surface subsidence. Changes in the velocity of the northeast-flank glacier were less coherent spatially, and significant movement of the glacier surface did not occur. The different styles of motion of the two glaciers may reflect fundamental differences in their subglacial water systems, or differences in the time of year of the studies. It also is possible that subglacial volcanic heating on the northeast flank of the volcano affected the flow.

49-6094

Taku and Le Conte glaciers, Alaska: calving-speed control of Late-Holocene asynchronous advances and retreats.

Post, A., Motyka, R.J., *Physical geography,* Jan.-Feb. 1995, 16(1), p.59-82, 53 refs.

Glacier flow, Glacier oscillation, Glacier mass balance, Icebergs, Calving, Estuaries, Sedimentation, Periodic variations, Ice water interface, United States—Alaska

49-6095

Simulation of the mesocyclonic activity in the Ross Sea, Antarctica.

Gallée, H., ed, *Monthly weather review,* July 1995, 123(7), p.2051-2069, 44 refs.

Polar atmospheres, Climatology, Cloud physics, Atmospheric circulation, Wind (meteorology), Marine meteorology, Turbulent boundary layer, Wind factors, Ice cover effect, Snow accumulation, Mathematical models, Antarctica—Ross Sea

The mesocyclonic activity in the southwestern Ross Sea is examined, with emphasis on its forcing by katabatic winds. The three-dimensional version of the meso-γ-scale primitive equation model Modèle Atmosphérique Régional is used in which a representation of cloud microphysical processes has been introduced. Idealized boundary conditions are prescribed. In particular, the ocean is assumed to be completely ice-free or partially ice-covered. The former case corresponds to a fall situation that coincides with the climatological maximum of estimated precipitation at McMurdo Station on Ross I. Due to the propagation of katabatic winds over the ocean, boundary layer fronts form. Clouds are generated in the fronts. A surface pressure trough also forms and extends northeastward from Terra Nova Bay. Mesocyclones are simulated in the trough. When the ocean is ice-free, strong sensible heat fluxes toward the atmosphere amplify the strength of the trough up to typically observed values. In this case, snow precipitation is associated with the boundary layer fronts and occurs in particular over McMurdo Sound. It is also found that latent heat release due to precipitation formation in the fronts does not significantly affect the deepening of the trough. (Auth. mod.)

49-6096

Forecasting of supercooled clouds.

Tremblay, A., Glazer, A., Szyrmer, W., Isaac, G.A., Zawadzki, I., *Monthly weather review,* July 1995, 123(7), p.2098-2113, 16 refs.

Cloud physics, Clouds (meteorology), Supercooled clouds, Forecasting, Aircraft icing, Ice forecasting, Ice formation, Snow pellets, Water content, Simulation, Ice vapor interface

49-6097

Environmental isotopes in ice and snow.

Moser, H., Stichler, W., Handbook of environmental isotope geochemistry, Vol.1: Terrestrial environment. Edited by P. Fritz et al, Amsterdam, Elsevier Scientific Publishing Co., 1980, p.141-178, Refs. p. 174-178.

DLC QE501.4.N9 H36

Snow cover, Geochemistry, Profiles, Metamorphism (snow), Climatology, Snow composition, Ice sheets, Isotope analysis, Precipitation (meteorology), Ice dating, Periodic variations

Investigations based on environmental isotopes in snow and ice have been primarily focussed on deuterium and ^{18}O measurements. By adopting special methods, it is possible to follow the processes during accretion and reduction of temporary snow covers, in the course of firning of the snow, and in the transition to ice. Related glaciological and hydrological problems can be studied successfully. To differentiate the phenomena with respect to time, measurements of the tritium contents and of precipitation fall-out have been utilized. Long-term dating of information stored in the ice using radioisotopes has been carried out only in isolated cases due to great difficulties associated with methodology and measuring techniques. As a result, many conceivable applications in the field of climatology, geology, volcanology, meteorology, atmospheric chemistry, and cosmic physics have to date been only partly explored or not at all through environmental isotope studies in snow and ice. (Auth. mod.)

49-6098

Characterization of model polar stratospheric cloud films using laser induced thermal desorption and optical interference techniques.

Berland, B.S., Haynes, D.R., Foster, K.L., Tolbert, M.A., George, S.M., *SPIE-The International Society for Optical Engineering. Proceedings,* 1994, Vol.2125, Laser techniques for surface science. Edited by H.L. Dai et al, p.31-51, 30 refs.

DLC TA418.7.L36

Polar stratospheric clouds, Aerosols, Simulation, Water films, Hydrates, Refractivity, Ice crystal optics, Heterogeneous nucleation, Lasers

Optical interference techniques were used to measure the real index of refraction of nitric acid/ice films representative of type I and type II polar stratospheric clouds (PSCs). Possible candidates for type I PSCs include amorphous HNO_3/H_2O mixtures, as well as crystalline nitric acid trihydrate (NAT), dihydrate (NAD), and monohydrate (NAM). Amorphous and crystalline model PSC films were grown in vacuum by vapor deposition on single-crystal Al_2O_3 substrates at low temperatures. The real indices of refraction at λ=632 nm were measured for these films using the time-dependent optical interference during film deposition. The stoichiometries of the HNO_3/H_2O films were determined using laser induced thermal desorption (LITD) techniques. For the amorphous films at 130 K, the refractive indices increased with increasing nitric acid content. The values ranged from n=1.31 for pure ice to n=1.47 for nearly pure nitric acid. A Lorentz-Lorenz analysis was in good agreement with the measured refractive indices of the amorphous HNO_3/H_2O films as a funtion of HNO_3 mole fraction. Growth of HNO_3/H_2O films at 175 K resulted in the formation of either crystalline NAM or NAD. The crystalline indices were substantially higher than their amorphous analogs. (Auth. mod.)

49-6099

Surface probes of porous toluene/water ices: adsorption kinetics and annealing spectra measured by second harmonic generation.

Henson, B.F., Robinson, J.M., *SPIE-The International Society for Optical Engineering. Proceedings,* 1994, Vol.2125, Laser techniques for surface science. Edited by H.L. Dai et al, p.140-149, 15 refs.

DLC TA418.7.L36

Ice physics, Water films, Ice vapor interface, Probes, Adsorption, Heterogeneous nucleation, Ice spectroscopy, Temperature effects, Thermodynamic properties, Cloud physics, Lasers

49-6100

Adsorption processes on ice surfaces studied by second harmonic generation.

Tridico, A.C., Lakin, M., Hicks, J.M., *SPIE-The International Society for Optical Engineering. Proceedings,* 1994, Vol.2125, Laser techniques for surface science. Edited by H.L. Dai et al, p.160-171, 22 refs.

DLC TA418.7.L36

Ice physics, Adsorption, Probes, Ice spectroscopy, Ice vapor interface, Surface properties, Lasers, Molecular energy levels

49-6101

Characteristics of the distribution of zones of oil and gas accumulation and hydrocarbon resources on the arctic shelf of Russia.

Prisiazhnyĭ, V.N., Gritsenko, A.I., Zotov, G.A., Zakharov, E.V., Khvedchuk, I.I., *Hydrotechnical construction,* Sep. 1994, 28(3), p.124-126, Translated from Gidrotekhnicheskoe stroitel'stvo.

Marine geology, Petroleum industry, Hydrocarbons, Distribution, Natural gas, Ocean bottom, Exploration, Barents Sea

49-6102

Economic and legal aspects of the organization of planning and construction of structures on the continental shelf of arctic seas of Russia.

Nikitin, B.A., Perchik, A.I., *Hydrotechnical construction,* Sep. 1994, 28(3), p.127-129, Translated from Gidrotekhnicheskoe stroitel'stvo. For another source see 49-3303.

Offshore structures, Petroleum industry, Construction, Economic development, Economic analysis, Legislation, Arctic Ocean

49-6103

"Rosshelf" company and development of the arctic shelf of Russia.

Velikhov, E.P., *Hydrotechnical construction,* Sep. 1994, 28(3), p.130-131, Translated from Gidrotekhnicheskoe stroitel'stvo. For another source see 49-3304.

Petroleum industry, Hydrocarbons, Economic development, Equipment, Offshore structures, Arctic Ocean

49-6104
Hydrometeorological support of shelf resources development and organization of environmental monitoring.
Kalatskiĭ, V.I., *Hydrotechnical construction,* Sep. 1994, 28(3), p.132-134, Translated from Gidrotekhnicheskoe stroitel'stvo. For another source see 49-3306.
Petroleum industry, Hydrocarbons, Economic development, Environmental impact, Oceanography, Ice conditions, Forecasting, Arctic Ocean

49-6105
Prospects of developing the Shtokman and Prirazlomnoe fields in the Barents Sea.
Dubin, I.B., *Hydrotechnical construction,* Sep. 1994, 28(3), p.135-137, Translated from Gidrotekhnicheskoe stroitel'stvo.
Petroleum industry, Hydrocarbons, Economic development, Offshore structures, Offshore drilling, Gas wells, Design, Barents Sea

49-6106
Concept of the transport system in the western part of the Arctic.
Parfenov, A.F., *Hydrotechnical construction,* Sep. 1994, 28(3), p.138-142., Translated from Gidrotekhnicheskoe stroitel'stvo. For another source see 49-3309.
Petroleum industry, Hydrocarbons, Economic development, Offshore structures, Marine transportation, Petroleum transportation, Pipelines, Arctic Ocean

49-6107
Training and retraining personnel for realizing arctic shelf resources development projects.
Simakov, G.V., *Hydrotechnical construction,* Sep. 1994, 28(3), p.143-144, Translated from Gidrotekhnicheskoe stroitel'stvo.
Petroleum industry, Economic development, Education, Offshore structures, Construction, Arctic Ocean

49-6108
Characteristics of designing, planning, and technology of constructing structures for developing arctic fields.
Mirzoev, D.A., *Hydrotechnical construction,* Sep. 1994, 28(3), p.145-150, Translated from Gidrotekhnicheskoe stroitel'stvo. For another source see 49-3307.
Petroleum industry, Hydrocarbons, Economic development, Offshore structures, Construction, Design, Design criteria, Arctic Ocean

49-6109
Major challenges in platform design for the Russian continental shelf.
Eranti, E., Kärnä, T., *Hydrotechnical construction,* Sep. 1994, 28(3), p.151-155, Translated from Gidrotekhnicheskoe stroitel'stvo. 5 refs. For another source see 49-3347.
Petroleum industry, Economic development, Offshore structures, Design, Protection, Sea ice, Ice loads, Ice solid interface, Ice mechanics, Arctic Ocean

49-6110
Ice loads on arctic platforms.
Shkhinek, K.N., *Hydrotechnical construction,* Sep. 1994, 28(3), p.156-160, Translated from Gidrotekhnicheskoe stroitel'stvo. 10 refs.
Offshore structures, Petroleum industry, Sea ice, Ice loads, Dynamic loads, Ice mechanics, Ice solid interface, Forecasting

49-6111
Operating requirements for and historical operations of arctic offshore drilling systems in the United States.
Regg, J.B., Kuranel, R.Y., Breitmeier, J., Smith, R., Walker, J., *Hydrotechnical construction,* Sep. 1994, 28(3), p.161-163, Translated from Gidrotekhnicheskoe stroitel'stvo. 4 refs. For another source see 49-3313.
Offshore drilling, Offshore structures, Standards, Floating structures, Environmental protection, Arctic Ocean

49-6112
Mechanisms of fracture of sea ice.
Dempsey, J.P., DeFranco, S.J., Blanchet, D., Prodanovic, A., *Hydrotechnical construction,* Sep. 1994, 28(3), p.164-168, 11 refs.
Sea ice, Ice floes, Cracking (fracturing), Crack propagation, Ice mechanics, Ice solid interface, Impact strength, Fracture zones, Dynamic loads, Analysis (mathematics)

49-6113
Comparison between theory and measurements for ice sheet forces on conical structures.
Nevel, D.E., *Hydrotechnical construction,* Sep. 1994, 28(3), p.169-173, 18 refs. For another source see 49-3334.
Sea ice, Ice floes, Ice mechanics, Offshore structures, Ice solid interface, Ice breaking, Impact strength, Ice loads, Ice models, Correlation

49-6114
Improved method for the calculation of ice loads on sloping structures in first-year ice.
Croasdale, K.R., Cammaert, A.B., *Hydrotechnical construction,* Sep. 1994, 28(3), p.174-179, 7 refs. For another source see 49-3333.
Sea ice, Ice floes, Ice solid interface, Cracking (fracturing), Offshore structures, Ice loads, Loads (forces), Ice push, Stress concentration, Topographic effects, Mathematical models

49-6115
Methods to map ice conditions, measure ice properties and quantify ice features.
Nortala-Hoikkanen, A., Riska, K., Salmela, O., Wilkman, G., *Hydrotechnical construction,* Sep. 1994, 28(3), p.180-188, 2 refs. For another source see 48-177.
Sea ice distribution, Ice reporting, Remote sensing, Ice navigation, Ice conditions, Expeditions, Arctic Ocean

49-6116
Frost heave in He.
Mizusaki, T., Hiroi, M., *Physica B,* May 1995, 210(3-4), Symposium on Vortices, Interfaces and Mesoscopic Phenomena in Quantum Systems, Jyväskylä, Finland, June 4-9, 1994. Proceedings, p.403-410, 26 refs.
Cryogenics, Gases, Liquid solid interfaces, Porous materials, Frozen liquids, Freezing, Phase transformations, Low temperature research, Frost heave, Temperature effects, Thermodynamic properties

49-6117
Potential impact of the reaction OH + ClO→HCl + O_2 on polar ozone photochemistry.
Lary, D.J., Chipperfield, M.P., Toumi, R., *Journal of atmospheric chemistry,* May 1995, 21(1), p.61-79, 34 refs.
Polar atmospheres, Atmospheric attenuation, Ozone, Stratosphere, Polar stratospheric clouds, Photochemical reactions, Cloud physics, Chemical properties, Models

49-6118
Solubility of HOCl in water and aqueous H_2SO_4 to stratospheric temperatures.
Huthwelker, T., Peter, T., Luo, B.P., Clegg, S.L., Carslaw, K.S., Brimblecombe, P., *Journal of atmospheric chemistry,* May 1995, 21(1), p.81-95, 26 refs.
Cloud physics, Polar atmospheres, Simulation, Aerosols, Hydrates, Solubility, Chemical properties, Thermodynamic properties, Temperature effects

49-6119
Phase diagram of the water-hydrogen system in the crystallization field of solid solutions based on ices Ih and II at high pressures.
Diadin, IU.A., Aladko, E.IA., *Journal of inclusion phenomena and molecular recognition in chemistry,* 1995, 20(2), p.115-121, 8 refs.
Ice physics, Clathrates, High pressure tests, Solutions, Decomposition, Ice melting, Phase transformations, Temperature effects, Stability

49-6120
Response of methane emission from arctic tundra to climatic change: results from a model simulation.
Christensen, T.R., Cox, P., *Tellus,* July 1995, 47B(3), p.301-309, 33 refs.
Tundra soils, Active layer, Soil physics, Tundra climate, Climatic changes, Natural gas, Vapor transfer, Soil air interface, Permafrost transformation, Simulation

49-6121
Distribution and behavior of Martian ground ice during past and present epochs.
Mellon, M.T., Jakosky, B.M., *Journal of geophysical research,* June 25, 1995, 100(E6), p.11,781-11,799, 29 refs.
Mars (planet), Regolith, Extraterrestrial ice, Ground ice, Soil air interface, Desiccation, Distribution, Surface temperature, Insolation, Frozen ground thermodynamics, Periodic variations, Models

49-6122
Structural characterization of an electrolytic aqueous solution, $LiCl\text{-}6H_2O$, in the glass, supercooled liquid, and liquid states.
Prével, B., Jal, J.F., Dupuy-Philon, J., Soper, A.K., *Journal of chemical physics,* Aug. 1, 1995, 103(5), p.1886-1896, 19 refs.
Solutions, Hydrates, Water structure, Supercooling, Phase transformations, Neutron scattering, Molecular structure, Structural analysis, Thermodynamic properties, Correlation

49-6123
Medium and long range correlations in the electrolyte $LiCl\text{-}4H_2O$: transition to the glass regime.
Prével, B., Jal, J.F., Dupuy-Philon, J., Soper, A.K., *Journal of chemical physics,* Aug. 1, 1995, 103(5), p.1897-1903, 10 refs.
Solutions, Hydrates, Water structure, Liquid phases, Supercooling, Phase transformations, Molecular structure, Thermodynamic properties, Correlation, Neutron scattering, Molecular energy levels

49-6124
Hyperquenched glassy films of water: a study by hole burning.
Kim, W.H., Reinot, T., Hayes, J.M., Small, G.J., *Journal of physical chemistry,* May 11, 1995, 99(19), p.7300-7310, 62 refs.
Ice physics, Water films, Amorphous ice, Radiation absorption, Infrared spectroscopy, Spectra, Low temperature tests, Molecular structure, Phase transformations, Temperature effects

49-6125
Asynchronous maximum advances of mountain and continental glaciers.
Gillespie, A., Molnar, P., *Reviews of geophysics,* Aug. 1995, 33(3), p.311-364, Refs. p.358-364.
Glaciology, Pleistocene, Alpine glaciation, Glacier oscillation, Mountain glaciers, Geochronology, Paleoclimatology, Correlation, Periodic variations

49-6126
Bistatic scattering characteristics of dense randomly distributed cylinders.
Clayton, C.W., Kuga, Y., *Radio science,* July-Aug. 1995, 30(4), p.817-826, 12 refs.
Atmospheric physics, Remote sensing, Scattering, Wave propagation, Radar echoes, Snow optics, Simulation

49-6127
Polarimetric scattering from layered media with multiple species of scatterers.
Nghiem, S.V., et al, *Radio science,* July-Aug. 1995, 30(4), p.835-852, 26 refs.
Remote sensing, Sea ice, Snow cover, Ice optics, Ice dielectrics, Wave propagation, Backscattering, Polarization (waves), Attenuation, Mathematical models, Simulation

49-6128

Numerical sensitivity study on the backscattering at 35.8 GHz from precipitation-sized hydrometeors.

Sturniolo, O., Mugnai, A., Prodi, F., *Radio science,* July-Aug. 1995, 30(4), p.903-919, 27 refs.

Cloud physics, Precipitation (meteorology), Ice optics, Remote sensing, Radar echoes, Wave propagation, Backscattering, Mathematical models, Simulation, Refractivity, Particle size distribution

49-6129

Arctic Ocean.

Walker, H.J., Ocean management in global change. Edited by P. Fabbri, Essex, Elsevier Science Publishers Ltd., 1992, p.550-575, 58 refs. Presented at the International Conference on Ocean Management in Global Change, Genoa, Italy, June 22-26, 1992.

DLC GC1015.2.O243

Oceanography, Natural resources, Economic development, Environmental impact, Monitors, International cooperation

49-6130

Dislocation mobility in HCl-doped ice.

Hu, X.H., Jia, K.L., Liu, F.P., Baker, I., Black, D., Materials Research Symposium Society. Symposium proceedings. Vol.375. Applications of synchrotron radiation techniques to materials science II. Edited by L.J. Terminello et al, Pittsburgh, Materials Research Society, 1995, p.287-292, 16 refs.

DLC TA404.2.A66

Ice physics, Doped ice, Ice crystal structure, Orientation, Dislocations (materials), X ray diffraction, Proton transport, Radiation absorption, Topographic features

49-6131

Orogenic enhancement of weathering and continental ice-sheet initiation.

Moore, T.L., Worsley, T.R., *Geological Society of America. Special paper,* 1994, No.288, Pangea: paleoclimate, tectonics and sedimentation during accretion, zenith, and breakup of a supercontinent. Edited by G.D. Klein, p.75-89, 76 refs.

DLC QE511.5.P355

Paleoclimatology, Climatic changes, Carbon dioxide, Ice sheets, Glaciation, Weathering, Tectonics, Geochemical cycles, Air temperature, Cooling, Ice cover effect

49-6132

Multivariate data analysis in palaeoecology and palaeobiogeography—a review.

Shi, G.R., *Palaeogeography, palaeoclimatology, palaeoecology,* Nov. 1993, 105(3-4), p.199-234, Refs. p.228-234.

Pleistocene, Quaternary deposits, Paleoecology, Biogeography, Classifications, Statistical analysis, Correlation

49-6133

Holocene history of Bering Glacier, Alaska: a prelude to the 1993-1994 surge.

Molnia, B.F., Post, A., *Physical geography,* Mar.-Apr. 1995, 16(2), p.87-117, 42 refs.

Mountain glaciers, Glacier oscillation, Glacier surges, Periodic variations, Glacier surveys, Pleistocene, United States—Alaska—Bering Glacier

49-6134

Late-Quaternary vegetation response to climatic-glacial forcing in North Pacific America.

Heusser, C.J., *Physical geography,* Mar.-Apr. 1995, 16(2), p.118-149, Refs. p.145-149.

Paleoecology, Palynology, Vegetation patterns, Revegetation, Quaternary deposits, Stratigraphy, Glacier oscillation, Glacial erosion, Climatic factors, Insolation, Correlation, United States—Alaska, Canada—British Columbia

49-6135

Recent trends in the Lemon Creek Glacier, Alaska.

Marcus, M.G., Chambers, F.B., Miller, M.M., Lang, M., *Physical geography,* Mar.-Apr. 1995, 16(2), p.150-161, 26 refs.

Glacier surveys, Geophysical surveys, Mapping, Photogrammetry, Glacier oscillation, Glacier mass balance, Periodic variations, United States—Alaska—Lemon Creek Glacier

49-6136

Paleozoic hydrocarbon source rocks, Truro Island, arctic Canada: organic petrology, organic geochemistry and thermal maturity.

Stasiuk, L.D., Fowler, M.G., *Bulletin of Canadian petroleum geology,* Dec. 1994, 42(4), p.419-431, With French summary. 23 refs.

Arctic landscapes, Geological surveys, Hydrocarbons, Sampling, Rock properties, Geochemistry, Stratigraphy, Thermal analysis, Exploration, Thin sections, Canada—Northwest Territories—Truro Island

49-6137

Wireline log response, petrography and reservoir properties of cored intervals: Kugmallit Sequence (Oligocene), Beaufort-Mackenzie Basin, arctic Canada.

Nentwich, F.W., Yole, R.W., *Bulletin of Canadian petroleum geology,* Dec. 1994, 42(4), p.432-448, With French summary. 55 refs.

Hydrocarbons, Marine geology, Bottom sediment, Well logging, Boreholes, Exploration, Drill core analysis, Geochemistry, Rock properties, Lithology, Beaufort Sea

49-6138

Lower Permian Raanes, Great Bear Cape and Trappers Cove formations, Sverdrup Basin, Canadian Arctic: stratigraphy and conodont zonation.

Beauchamp, B., Henderson, C.M., *Bulletin of Canadian petroleum geology,* Dec. 1994, 42(4), p.562-597, With French summary. 73 refs.

Geologic structures, Geologic processes, Marine deposits, Stratigraphy, Lithology, Tectonics, Sedimentation, Classifications, Geochronology, Canada—Northwest Territories—Great Bear Cape

49-6139

Pollen taphonomy in Holocene glaciolacustrine sediments, Glacier Bay, Alaska: a cautionary note.

Goodwin, R.G., *Palaios,* Nov. 1988, 3(6), p.606-611, 20 refs.

Lacustrine deposits, Glacial deposits, Palynology, Classifications, Bottom sediment, Stratification, Grain size, Sedimentation, Hydrodynamics, Paleoecology, United States—Alaska—Glacier Bay

49-6140

Parameterization of ice cloud radiative properties and its application to the potential climatic importance of mixed-phase clouds.

Sun, Z., Shine, K.P., *Journal of climate,* July 1995, 8(7), p.1874-1888, 44 refs.

Climatology, Cloud physics, Radiance, Optical properties, Ice crystal optics, Light scattering, Mathematical models, Simulation, Temperature effects

49-6141

Inferring snow wetness using C-band data from SIR-C's polarimetric synthetic aperture radar.

Shi, J.C., Dozier, J., *IEEE transactions on geoscience and remote sensing,* July 1995, 33(4), p.905-914, 28 refs.

Snow cover structure, Snow melting, Wet snow, Moisture detection, Remote sensing, Spaceborne photography, Synthetic aperture radar, Scattering, Runoff forecasting, Mathematical models

49-6142

Nonlinear statistical retrievals of ice content and rain rate from passive microwave observations of a simulated convective storm.

Skofronick-Jackson, G.M., Gasiewski, A.J., *IEEE transactions on geoscience and remote sensing,* July 1995, 33(4), p.957-970, 29 refs.

Precipitation (meteorology), Clouds (meteorology), Ice volume, Ice detection, Remote sensing, Microwaves, Radiometry, Statistical analysis, Mathematical models, Simulation, Image processing

49-6143

Surface damage of polymethylmethacrylate plates by ice and nylon ball impacts.

Wang, L.L., Field, J.E., Sun, Q., Liu, J., *Journal of applied physics,* Aug. 1, 1995, 78(3), p.1643-1649, 13 refs.

Ice erosion, Ice physics, Artificial hailstones, Impact tests, Ice solid interface, Stress concentration, Polymers, Plates, Damage, Simulation

49-6144

Experimental study of stably stratified flow in the lee of high mountains.

Smedman, A.S., Bergström, H., *Monthly weather review,* Aug. 1995, 123(8), p.2319-2333, 39 refs.

Wind (meteorology), Turbulent boundary layer, Turbulent flow, Profiles, Stratification, Icebound lakes, Ice air interface, Ice cover effect, Topographic effects

49-6145

Growth-ring analysis of Early Tertiary conifer woods from the Canadian High Arctic and its paleoclimatic interpretation.

Kumagai, H., et al, *Palaeogeography, palaeoclimatology, palaeoecology,* July 1995, 116(3-4), p.247-262, 47 refs.

Paleoclimatology, Climatic changes, Paleoecology, Sediments, Stratigraphy, Fossils, Growth, Age determination, Arctic landscapes, Canada—Northwest Territories—Ellesmere Island

49-6146

Effects of soil freezing stress on sap flow and sugar content of mature sugar maples (*Acer saccharum*).

Robitaille, G., Boutin, R., Lachance, D., *Canadian journal of forest research,* Apr. 1995, 25(4), p.577-587, With French summary. 42 refs.

Trees (plants), Forestry, Plant physiology, Plant tissues, Water content, Soil freezing, Temperature variations, Thermal stresses, Cold weather tests, Cold weather survival, Frost resistance, Viability

49-6147

Increased soil nitrate losses under mature sugar maple trees affected by experimentally induced deep frost.

Boutin, R., Robitaille, G., *Canadian journal of forest research,* Apr. 1995, 25(4), p.588-602, With French summary. 65 refs.

Forest soils, Forest ecosystems, Nutrient cycle, Organic soils, Soil freezing, Frost penetration, Soil water, Soil chemistry, Ion diffusion, Leaching, Cold weather tests

49-6148

Temperature variations in planting mounds during winter.

Lindström, A., Troeng, E., *Canadian journal of forest research,* Mar. 1995, 25(3), p.507-515, With French summary. 50 refs.

Forestry, Agriculture, Cold tolerance, Soil temperature, Temperature control, Thermal properties, Temperature variations, Temperature measurement, Organic soils, Snow cover effect, Topographic effects

49-6149
First stage of regeneration after fire of a subarctic conifer population. [Phase initiale de régénération après feu des populations conifériennes subarctiques]
Duchesne, S., Sirois, L., *Canadian journal of forest research,* Feb. 1995, 25(2), p.307-318, In French with English summary. 52 refs.
Subarctic landscapes, Plant ecology, Forest ecosystems, Trees (plants), Revegetation, Forest fires, Environmental impact, Forest soils, Substrates, Soil analysis, Canada—Quebec

49-6150
Analysis of macrofossils of a subarctic palsa (northern Québec). [Analyse macrofossile d'une palse subarctique (Québec nordique)]
Lavoie, C., Payette, S., *Canadian journal of botany,* Apr. 1995, 73(4), p.527-537, In French with English summary. 52 refs.
Subarctic landscapes, Frost mounds, Permafrost structure, Peat, Organic soils, Paleoecology, Paleobotany, Vegetation patterns, Soil analysis, Sediments, Fossils, Classifications, Age determination, Canada—Quebec

49-6151
Seed germination, seedling demography, and growth of *Salix setchelliana* on glacial river gravel bars in Alaska.
Douglas, D.A., *Canadian journal of botany,* Apr. 1995, 73(4), p.673-679, With French summary. 38 refs.
Trees (plants), Plant ecology, Growth, Subarctic landscapes, Glacial rivers, Littoral zone, Cold weather survival, Vegetation patterns, Sampling, United States—Alaska—Denali National Park

49-6152
Seasonal free amino acid fluctuations in red pine and white spruce needles.
Kim, Y.T., Glerum, C., *Canadian journal of forest research,* May 1995, 25(5), p.697-703, With French summary. 32 refs.
Forestry, Trees (plants), Plant physiology, Plant tissues, Acclimatization, Frost resistance, Temperature effects, Light effects, Seasonal variations

49-6153
Dendrochronological characteristics of alpine larch.
Colenutt, M.E., Luckman, B.H., *Canadian journal of forest research,* May 1995, 25(5), p.777-789, With French summary. 30 refs.
Trees (plants), Plant ecology, Alpine landscapes, Forest lines, Vegetation patterns, Growth, Age determination, Periodic variations

49-6154
Response of arctic tundra plant communities to winter vehicle disturbance.
Emers, M., Jorgenson, J.C., Raynolds, M.K., *Canadian journal of botany,* June 1995, 73(6), p.905-917, With French summary. 56 refs.
Tundra soils, Tundra vegetation, Arctic landscapes, Ecosystems, All terrain vehicles, Environmental impact, Soil surveys, Vegetation patterns, Damage, Revegetation

49-6155
Fundamental study on continuous ice making using flowing supercooled water.
Inaba, H., Takeya, K., Nozu, S., *JSME international journal B,* May 1994, 37(2), p.385-393, 11 refs.
Ice makers, Ice physics, Supercooling, Ice formation, Water flow, Laminar flow, Turbulent flow, Velocity, Liquid solid interfaces, Water temperature, Temperature effects, Freezing points

49-6156
Seismic studies of a bottom simulating reflection related to gas hydrate beneath the continental margin of the Beaufort Sea.
Andreassen, K., Hart, P.E., Grantz, A., *Journal of geophysical research,* July 10, 1995, 100(B7), p.12,659-12,673, 54 refs.
Oceanographic surveys, Seismic surveys, Ocean bottom, Bottom sediment, Hydrates, Natural gas, Seismic reflection, Wave propagation, Beaufort Sea

49-6157
Proceedings of the Second Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993.
Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, 12-13 January 1994, Inoue, G., ed, Tsukuba, Japan, National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, 231p., Refs. passim. For selected papers see 49-6158 through 49-6189.
Ground ice, Permafrost, Taiga, Tundra vegetation, Carbon dioxide, Atmospheric composition, Russia—Siberia

49-6158
Occurrence of ice-complex (edoma) in Lena River delta region and Big Lyakhovsky Island, high Arctic Eastern Siberia.
Fukuda, M., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.5-13, 4 refs.
Permafrost, Ground ice, Carbon dioxide, Ice composition, Ice physics, Ice melting, Pleistocene, Oxygen isotopes, Radioactive age determination, Russia—Siberia, Russia—Lena River, Russia—Bolshoy Lyakhovsky Island

49-6159
Properties of ice-complex deposits in Eastern Siberia.
Nagaoka, D., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.14-18.
Grain size, Paleoclimatology, Glacial deposits, Radioactive age determination, Sediments, Russia—Siberia, Russia—Bykovskiy Peninsula

49-6160
Origin of the ice-complex in the Bykovsky Peninsula, East Siberia.
Sone, T., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.19-21.
Ground ice, Origin, Continuous permafrost, Ice wedges, Russia—Siberia, Russia—Bykovskiy Peninsula

49-6161
Structural characteristics of ice-complex (edoma) at Bykovsky Peninsula near Tiksi, East Siberia.
Narita, H., Fukuda, M., Kameda, T., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.22-27, 5 refs.
Ground ice, Ice structure, Bubbles, Ice growth, Ice surface, Ice density, Ice thermal properties, Permafrost, Russia—Siberia, Russia—Bykovskiy Peninsula

49-6162
Methane and carbon dioxide analyzer in fields.
Akiyama, A., Izumi, K., Inoue, G., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.33-36.
Portable equipment, Carbon dioxide, Computer applications, Russia—Siberia

49-6163
Measurement of methane flux in a tundra wetland, Mustakh Island in 1993.
Nakayama, T., Akiyama, A., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.37-39.
Tundra, Wetlands, Peat, Thaw depth, Active layer, Ground thawing, Soil temperature, Russia—Mustakh Island

49-6164
Measurement of methane flux from alases around Yakutsk, Eastern Siberia in 1993.
Nakayama, T., Nojiri, Y., Zeng, Y.Q., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.40-44.
Alassy, Wetlands, Ground water, Permafrost, Russia—Siberia, Russia—Yakutia, Russia—Lena River

49-6165
Composition of gas bubbles of lakes around Yakutsk, Russia.
Nojiri, Y., Zeng, Y.Q., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.45-49.
Bubbles, Lakes, Carbon isotopes, Carbon dioxide, Russia—Yakutia

49-6166
Methane continuous concentration measurement system of atmosphere.
Yamamoto, K., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.50-55, 2 refs.
Atmospheric composition, Global warming, Carbon isotopes, Measuring instruments, Lasers, Airborne equipment

49-6167
Ground-based observation of atmospheric boundary layer in Siberia by laser radar.
Matsui, I., Lozovskiĭ, V., Alekseev, A., Pilipenko, V., Tiabotov, A., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.56-60, 1 ref.
Atmospheric boundary layer, Lasers, Remote sensing, Aerosols, Radiation balance, Measuring instruments, Radar, Russia—Siberia

49-6168
Distribution and emission of CH4 over the central West Siberia lowland "Airborne measurements of greenhouse gases over Siberia III".
Tohjima, Y., et al, Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.61-76, 15 refs.
Atmospheric composition, Greenhouse effect, Atmospheric circulation, Hydrocarbons, Measuring instruments, Wetlands, Tundra, Russia—Siberia

49-6169

Large scale variations of greenhouse gas concentrations related to meteorological conditions during the airborne atmospheric composition measurements.

Makshiutov, S., Izumi, K., Mitsumoto, S., Inoue, G., Tohjima, Y., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.77-82, 6 refs.

Greenhouse effect, Atmospheric composition, Airborne equipment, Air masses, Stratosphere

49-6170

Application of conditional sampling eddy flux measurement in West Siberia lowland.

Inoue, G., Makshiutov, S., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.83-85.

Wetlands, Sampling, Atmospheric composition, Measuring instruments, Measurement, Russia—Siberia

49-6171

Mapping vegetation on tundra-taiga transitional zone using satellite image.

Takao, G., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.91-93, 1 ref.

Mapping, Vegetation patterns, Tundra vegetation, Taiga, LANDSAT, Spaceborne photography, Aerial surveys

49-6172

Investigation of soils and vegetation in Siberia by satellite remote sensing.

Tamura, M., Yasuoka, Y., Yamagata, Y., Tokumura, K., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.94-98.

Remote sensing, Spaceborne photography, Vegetation patterns, Greenhouse effect, Russia—Siberia

49-6173

Analysis of forest dynamics in the transitional zone between taiga and tundra: a research plan.

Takenaka, A., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.99-103.

Taiga, Tundra, Trees (plants), Forest land, Russia—Yakutia, Russia—Siberia

49-6174

Quantitative analysis of vegetation structure in Eastern Siberia, with respect to biodiversity and coexistence.

Sato, T., Kudo, G., Takahashi, H., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.104-108.

Vegetation patterns, Taiga, Tundra vegetation, Trees (plants), Russia—Siberia, Russia—Lena River, Russia—Indigirka River, Japan, Russia—Verkhoyansk

49-6175

Vegetation of the boreal forest-tundra transition zone in the basin of Lena River. I. Forest stand structure.

Ishizuka, M., Uemura, S., Tsujii, T., Volotovskiĭ, K.A., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.109-115, 2 refs.

Vegetation patterns, Tundra vegetation, Forest land, River basins, Aerial surveys, Russia—Siberia, Russia—Lena River

49-6176

Timber limit vegetation of the northernmost taiga in the Lena River basin, Eastern Siberia.

Uemura, S., Tsujii, T., Ishizuka, M., Volotovskiĭ, K.A., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.116-121.

Vegetation patterns, Forest land, Taiga, Plants (botany), Russia—Siberia, Russia—Lena River

49-6177

Habitat and morphological features of *Ranunsulus* subgenus *Batrachium* in central-southern Yakutia.

Takahashi, H., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.122-126, 8 refs.

Plants (botany), Plant physiology, Russia—Yakutia

49-6178

Concentration of sulfur dioxide and nitrogen dioxide in Siberian urban atmosphere.

Ohta, S., Mizoguchi, I., Fukasawa, T., Makarov, V.N., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.142-147.

Air pollution, Atmospheric composition, Environmental impact, Russia—Siberia, Russia—Khabarovsk, Russia—Yakutsk, Russia—Noril'sk

49-6179

Biomass of a *Larix Gmelinii* (RUPR.) LITV. stand in Spaskayapad, Yakutsk.

Kanazawa, Y., Osawa, A., Ivanov, B.I., Maksimov, T.Ch., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.153-158, 3 refs.

Biomass, Trees (plants), Taiga, Forest ecosystems, Russia—Yakutia

49-6180

Forest fire history and tree growth patterns in East Siberia.

Osawa, A., Maksimov, T.Ch., Ivanov, B.I., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.159-163, 3 refs.

Forest fires, Climatic factors, Trees (plants), Russia—Siberia

49-6181

Gas exchange measurements on some major tree species in Siberian permafrost region in summer.

Tabuchi, R., Koike, T., Takahashi, K., Maksimov, T.Ch., Ivanov, B.I., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.164-168, 2 refs.

Trees (plants), Plant physiology, Climatic factors, Russia—Siberia

49-6182

Growth and homeostatic adjustment in the photosynthetic capacity of Siberian and Japanese birch growth under elevated CO_2 and temperature.

Koike, T., Lei, T.T., Tabuchi, R., Takahashi, K., Maksimov, T.Ch., Ivanov, B.I., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.169-176, 4 refs.

Trees (plants), Plant physiology, Carbon dioxide, Temperature effects, Russia—Siberia

49-6183

Carbon and nitrogen storage in soils developed on two different toposequence of the Lena River terrain.

Matsuura, Y., Sanada, M., Ohta, S., Desiatkin, R.V., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.177-182.

Soil surveys, Soil chemistry, Active layer, Soil profiles, Russia—Lena River, Russia—Siberia

49-6184

Wood formation after forest fire in Siberian taiga.

Sassa, T., Hasagawa, K., Ivanovich, I.B., Kristoforovich, M.T., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.183-186.

Forest fires, Trees (plants), Plant physiology, Taiga, Russia—Siberia

49-6185

Carbon storage of plant ecosystems in Yakutia.

Desiatkin, R.V., Maksimov, T.Ch., Ivanov, B.I., Takahashi, K., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.187-195, 19 refs.

Plant ecology, Forest ecosystems, Plant physiology, Plants (botany), Biomass, Tundra vegetation, Trees (plants), Forest soils, Tundra soils, Meadow soils, Russia—Yakutia

49-6186

Aircraft measurements of the stable carbon isotopic ratio of atmospheric CO_2 over Siberia.

Sugawara, S., et al, Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.196-204, 7 refs.

Carbon isotopes, Carbon dioxide, Atmospheric composition, Sampling, Russia—Siberia

49-6187

Aircraft measurements of atmospheric CO_2 and CH_4 over the West Siberian lowland.

Shirakawa, Y., et al, Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.205-214, 10 refs.

Carbon dioxide, Carbon isotopes, Air pollution, Environmental impact, Atmospheric composition, Russia—Siberia

49-6188

Distribution and uptake of CO_2 over central West Siberian lowland—airborne measurements of greenhouse gases over Siberia. II.

Izumi, K., et al, Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.220-225, 3 refs.

Carbon dioxide, Atmospheric composition, Greenhouse effect, Russia—Siberia

49-6189

Energy and water cycle in Siberia.

Yasunari, T., Symposium on the Joint Siberian Permafrost Studies between Japan and Russia in 1993, 2nd, Tsukuba, Japan, 12-13 Jan. 1994. Proceedings. Edited by G. Inoue, Tsukuba, Japan., National Institute for Environmental Studies; Forest and Forest Products Research Institute; Hokkaido University, 1994, p.226-231.

Tundra, Taiga, Permafrost hydrology, Water balance, Permafrost heat balance, Seasonal variations, Albedo, Russia—Siberia

49-6190

Manual on navigation of ships through the Northern Sea Route. [Rukhovodstvo dlia skvoznogo plavaniia sudov po Severnomu morskomu puti], St. Petersburg, Izd. Glavnogo upravleniia navigatsii i okeanografii Ministerstva oborony Rossiĭskoĭ Federatsii, 1995, 415p., No.4151, In Russian.

Manuals, Ice navigation, Marine transportation, Icebreakers, Ships, Northern Sea Route

49-6191

Glaciation of Pamir-Alay. [Oledenenie Pamiro-Alaia]

Kotliakov, V.M., ed, Moscow, Nauka, 1993, 255p., In Russian. Refs. p.249-255.
DLC GB2556.A38 O38 1993

Glaciation, Nivation, Radiation balance, Glacier heat balance, Snow cover, Glacier ablation, Glacier alimentation, Glacier oscillation, Mountain glaciers, Pamir-Alay

49-6192

Image analysis system for the production of sea ice maps from space.

Partington, K.C., Boakes, K.P., Oddy, C.J., Sephton, A.J., Walker, N.P., Willis, C.J., *GEC journal of research,* 1994, 11(3), p.141-149, 4 refs.

Remote sensing, Sea ice, Synthetic aperture radar, Icebergs, Mapping

49-6193

Aspects and results of antarctic ice shelves: velocity, flowline and deformation determination by GPS and NNSS.

Hinze, H., Seeber, G., International Geodetic Symposium on Satellite Positioning, Fifth, March 13-17, 1989. Proceedings, 1989, p.1006-1008, 2 refs.

Ice shelves, Drift, Velocity measurement, Antarctica—Ekström Ice Shelf, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Ice surface velocity parameters are derived from repeated position determination of the same station marker, e.g. a stake. Depending on the observation mode, the method of computation, the time interval between repeated measurements and the ice velocity itself different accuracy qualities are obtainable. With decreasing ice velocity or shorter intervals between the measurement epochs, the rms error of the velocity determination increases. One important aspect for field operation is that the rms error for velocity determination coming from single-point positioning with a one-year interval corresponds to results from simultaneous multistation positioning with shorter periods during a single field campaign. Both the Navy Navigation Satellite System (NNSS) and the Global Positioning System (GPS) can be used for the determination of ice velocity. In the single station mode with repeated measurements after one or more years, the capacity of both methods is equivalent, because the absolute accuracy is similar. NNSS may even have advantages because single point accuracy with precise ephemeris exceeds the current accuracy of GPS P-code results. The GPS, however, has the advantage of a much shorter observation time needed.

49-6194

NNSS and GPS monitor very slow ice motion.

Hinze, H., International Geodetic Symposium on Satellite Positioning, 4th, Apr. 28-May 2, 1986, Austin, Texas. Proceedings, 1986, p.1377-1390, Reprint of Conference Paper S9-10. 10 refs.

Remote sensing, Sea ice, Glacier ice, Drift, Antarctica—Anvers Island, Antarctica—Marr Ice Piedmont

NNSS and GSP are used to determine the surface motion of ice with velocities of a few dm/day from data of one field season in simultaneous observation modes. Ice motion of NNSS stations was determined with the modified geodetic GEODOPV software. Doppler satellite passes in the translocation mode with one stationary receiver and one receiver on the ice surface are divided into data groups. The variations of relative coordinates are fitted for the linear station motion estimation. Solutions are presented for data of an antarctic piedmont glacier. At Anvers I. glacier velocities of a few dm/day have been determined during one field season. The results are confirmed by the annual displacement vectors. Permanent GPS satellite availability will enable rapid positioning and ice motion determination.

49-6195

Secondary ions produced from gaseous and frozen H_2O under energetic (MeV/amu) Ar ion impact.

Matsuo, T., Tonuma, T., Kumagai, H., Shibata, H., Tawara, H., *Journal of chemical physics,* Sep. 15, 1994, 101(6), p.5356-5362, 28 refs.

Chemical composition, Ice spectroscopy, Ions, Water vapor

49-6196

New look at homogeneous ice nucleation in supercooled water drops.

Pruppacher, H.R., *Journal of the atmospheric sciences,* June 1, 1995, 52(11), p.1924-1933, 76 refs.

Cloud physics, Ice physics, Ice water interface, Ice formation, Homogeneous nucleation, Nucleation rate, Supercooling, Temperature effects, Thermodynamics, Mass transfer, Mathematical models

49-6197

Effect of melting processes on the development of a tropical and a midlatitude squall line.

Tao, W.K., Scala, J.R., Ferrier, B., Simpson, J., *Journal of the atmospheric sciences,* June 1, 1995, 52(11), p.1934-1948, 32 refs.

Precipitation (meteorology), Cloud physics, Atmospheric physics, Snow melting, Ice air interface, Cooling, Evaporation, Air flow, Wind direction, Thermodynamics, Mathematical models

49-6198

Microwave radiative transfer through clouds composed of realistically shaped ice crystals. Part 1: single scattering properties.

Evans, K.F., Stephens, G.L., *Journal of the atmospheric sciences,* June 1, 1995, 52(11), p.2041-2057, 37 refs.

Cloud physics, Remote sensing, Radiometry, Microwaves, Ice crystal optics, Ice crystal size, Particle size distribution, Light scattering, Attenuation, Radiation balance, Mathematical models

49-6199

Microwave radiative transfer through clouds composed of realistically shaped ice crystals. Part 2: remote sensing of ice clouds.

Evans, K.F., Stephens, G.L., *Journal of the atmospheric sciences,* June 1, 1995, 52(11), p.2058-2072, 17 refs.

Cloud physics, Microwaves, Remote sensing, Radiation balance, Upwelling, Scattering, Brightness, Ice crystal optics, Ice crystal size, Mathematical models, Polarization (waves)

49-6200

Modified Lagrangian-mean diagnostics of the stratospheric polar vortices. Part 1: formulation and analysis of GFDL SKYHI GCM.

Nakamura, N., *Journal of the atmospheric sciences,* June 1, 1995, 52(11), p.2096-2108, 30 refs.

Polar atmospheres, Stratosphere, Advection, Turbulent boundary layer, Fluid dynamics, Mass transfer, Turbulent diffusion, Mathematical models

A two-dimensional diagnostic model of tracer transport in the polar stratospheres is formulated. The model is a generalization of the area analysis method devised by Butchart and Remsberg but uses the mass element enclosed by the contours of a quasi-conservative tracer on a given isentropic surface as a "meridional" coordinate. This modified Lagrangian-mean coordinate is transparent to the advective effects of the winds, and thus unambiguously extracts the nonconservative effects on the tracer distribution. The derived transport equation takes an equivalent advective form; that is, the tracer contours are "advected" by the mean nonconservative mass flow while there are no "eddy flux" contributions. Hence, the mass flux is implied in the motion of the tracer contours. Not only is this model conceptually simple, it is also computationally economical for analyzing large, high-resolution datasets since time averaging can be omitted to define a robust mean field of the tracer. The model is used to diagnose the N_2O mixing ratio and potential vorticity simulated in the high-resolution, Geophysical Fluid Dynamics Laboratory SKYHI GCM. The analysis not only identifies the boundary of the polar vortex better than the Eulerian zonal-mean models but highlights how the nonconservative processes (diabatic heating and friction) contribute to the formation of the vortex edge. (Auth. mod.)

49-6201

Theoretical study of the wet removal of atmospheric pollutants. Part 5: the uptake, redistribution, and deposition of $(NH_4)_2SO_4$ by a convective cloud containing ice.

Respondek, P.S., Flossmann, A.I., Alheit, R.R., Pruppacher, H.R., *Journal of the atmospheric sciences,* June 1, 1995, 52(11), p.2121-2132, 27 refs.

Cloud physics, Precipitation (meteorology), Aerosols, Ice water interface, Mass transfer, Snow pellets, Scavenging, Microstructure, Mathematical models

49-6202

Kinetics of homogeneous nucleation in the freezing of large water clusters.

Huang, J.F., Bartell, L.S., *Journal of physical chemistry,* Mar. 23, 1995, 99(12), p.3924-3931, 72 refs.

Water structure, Homogeneous nucleation, Freezing, Ice formation, Phase transformations, Nucleation rate, Supercooling, Ice water interface, Thermodynamic properties, Molecular energy levels, Spectra

49-6203

Basic trends in land use in Yamal Peninsula under conditions of industrial development. [Osnovnye napravleniia ispol'zovaniia zemel' IAmala v usloviiakh promyshlennogo osvoeniia]

Gorokhova, T.B., Il'ina, I.S., Geografiia i khoziaĭstvo. Vyp.4: Raĭony prozhivaniia malochislennykh narodov Severa (Geography and economics. Vol.4: Sparsely-populated regions in the North). Edited by A.I. Chistobaev, Leningrad, GO SSSR, 1991, p.114-123, In Russian.

Economic development, Environmental impact, Environmental protection, Ecology, Russia—Yamal Peninsula

49-6204

Effects of the Holocene sea level rise on the evolution of the southeastern coast of the Canadian Beaufort Sea.

Héquette, A., Ruz, M.H., Hill, P.R., *Journal of coastal research,* 1995, 11(2), p.494-507, 31 refs.

Sea level, Pleistocene, Shoreline modification, Water erosion, Thermokarst lakes, Permafrost transformation, Geomorphology, Canada—Northwest Territories—Tuktoyaktuk Peninsula, Beaufort Sea

49-6205

Effect of ultraviolet irradiation on the ice nucleating ability of AgI-AgCl-CuI systems.

Sivanesan, S., Sagayaraj, P., *Crystal research and technology,* 1995, 30(3), p.419-424, 23 refs.

Cloud physics, Cloud seeding, Aerosols, Simulation, Silver iodide, Heterogeneous nucleation, Artificial nucleation, Ice crystal growth, Freezing points, Ultraviolet radiation, Radiation absorption, Photochemical reactions

49-6206

Structure-function relationship in the globular type III antifreeze protein: identification of a cluster of surface residues required for binding to ice.

Chao, H., Sönnichsen, F.D., DeLuca, C.I., Dykes, B.D., Davies, P.L., *Protein science,* Oct. 1994, 3(10), p.1760-1769, 31 refs.

Cryobiology, Antifreezes, Chemical analysis, Chemical composition, Molecular structure, Ice water interface, Surface properties, Solutions, Nuclear magnetic resonance, Ice spectroscopy

49-6207

Comparative modeling of the three-dimensional structure of Type II antifreeze protein.

Sönnichsen, F.D., Sykes, B.D., Davies, P.L., *Protein science,* Mar. 1995, 4(3), p.460-471, 60 refs.

Cryobiology, Antifreezes, Chemical composition, Molecular structure, Heterogeneous nucleation, Nuclear magnetic resonance, Ice water interface

49-6208

Morphological evidence as a guide to deglaciation following the Loch Lomond readvance: a review of research approaches and models.

Bennett, M.R., *Scottish geographical magazine,* Apr. 1994, 110(1), p.24-32, 89 refs.

Pleistocene, Ice sheets, Glacial geology, Glacier oscillation, Glacier melting, Geomorphology, Landscape development, Glacial deposits, Moraines, United Kingdom—Scotland

49-6209

Lateglacial pollen sites in the Western Isles of Scotland.

Edwards, K.J., Whittington, G., *Scottish geographical magazine,* Apr. 1994, 110(1), p.33-39, 25 refs.

Paleoclimatology, Paleoecology, Palynology, Lacustrine deposits, Stratigraphy, Vegetation patterns, Climatic changes, United Kingdom—Scotland

49-6210

County's massive gravel trucks do double duty in snow.

Monger, V., *Roads & bridges,* June 1994, 32(6), p.30.

Snow removal equipment, Modification, Winter maintenance

49-6211

Corrosion, environmental impacts key when assessing deicer alternatives.

Flynn, L., *Roads & bridges,* June 1994, 32(6), p.36,39.

Road icing, Ice melting, Chemical ice prevention, Cold weather performance, Salting, Environmental impact

49-6212

Liquid anti-icing 'hot' topic among continent's snowfighters.

Flynn, L., *Roads & bridges,* June 1994, 32(6), p.40-43.

Road icing, Winter maintenance, Chemical ice prevention, Liquids, Cold weather performance

49-6213

New snow/ice control technologies clear path for winter road maintenance.

Pletan, R., *Roads & bridges,* Mar. 1994, 32(3), p.30-32.

Road maintenance, Winter maintenance, Snow removal equipment, Ice control, Ice forecasting

49-6214

Americans can learn a lot from European, Japanese snowfighters.

Smithson, L.D., *Roads & bridges,* June 1995, 33(6), p.30-32.

Road maintenance, Winter maintenance, Ice control, Snow removal equipment, Warning systems, Ice forecasting

49-6215

Indiana DOT bolsters snow and ice control using high technology.

Ver Straate, M., *Roads & bridges,* June 1995, 33(6), p.38-39.

Winter maintenance, Road maintenance, Ice control, Snow removal, Forecasting, Computer applications, Route surveys, Mapping

49-6216

Snowfighters get jump on storms at North American Snow Conference.

Flynn, L., *Roads & bridges,* June 1995, 33(6), p.42-44.

Winter maintenance, Road maintenance, Surface properties, Snow removal, Forecasting, Microclimatology, Sensors, Remote sensing, Meteorological factors

49-6217

PC-based routing system boosts snowfighting efficiency, cash flow.

Kuennen, T., ed, *Roads & bridges,* June 1995, 33(6), p.48.

Winter maintenance, Road maintenance, Snow removal, Computer applications, Route surveys, Mapping, Logistics, Computer programs, Cost analysis

49-6218

On the history of the deep Arctic Ocean.

Khusid, T.A., Beliaeva, N.V., Burmistrova, I.I., *Oceanology,* June 1994, 33(6), p.822-825, Translated from Okeanologiia. 39 refs.

Oceanography, Marine deposits, Pleistocene, Marine biology, Sedimentation, Bottom sediment, Stratigraphy, Drill core analysis, Quaternary deposits, Age determination, Arctic Ocean

49-6219

Shape of things to come.

Wingham, D., *NERC news,* June 1995, No.32, p.7-9.

Oceanography, Glacier mass balance, Ice sheets, Ice melting, Height finding, Remote sensing, Radar echoes, Sea level, Gravity, Periodic variations

49-6220

Snow survey bulletin.

British Columbia. BC Environment. Water Management Division, Victoria, British Columbia, June 1995, 48p.

Snow surveys, Snow hydrology, Sampling, Snow depth, Snow accumulation, Seasonal variations, Statistical analysis, Runoff, River flow, Snow water equivalent, Canada—British Columbia

49-6221

Snow survey bulletin.

British Columbia. BC Environment. Water Management Division, Victoria, British Columbia, May 1995, 48p.

Snow surveys, Snow hydrology, Sampling, Snow depth, Snow accumulation, Seasonal variations, Statistical analysis, Runoff, River flow, Snow water equivalent, Canada—British Columbia—Fraser River

49-6222

Smart salting: field techniques to use.

Lawson, M.W., *Better roads,* Sep. 1995, 65(9), p.24,26.

Winter maintenance, Road maintenance, Road icing, Ice control, Snow removal, Salting, Surface temperature, Standards

49-6223

How you can make the most cost-effective use of deicers. *Better roads,* Sep. 1995, 65(9), p.29-30.

Road icing, Winter maintenance, Ice removal, Chemical ice prevention, Salting, Cold weather performance, Cost analysis, Ice forecasting

49-6224

Charging of ice grains by low-energy plasmas: application to Saturn's *E* ring.

Jurac, S., Baragiola, R.A., Johnson, R.E., Sittler, E.C., Jr., *Journal of geophysical research,* Aug. 1, 1995, 100(A8), p.14,821-14,831, 46 refs.

Ice physics, Ice dielectrics, Extraterrestrial ice, Atmospheric physics, Atmospheric electricity, Electric fields, Charge transfer, Ion diffusion, Backscattering, Mathematical models, Simulation

49-6225

Crack velocity measurements in sea ice.

Gluschenkov, O.V., Petrenko, V.F., Materials Research Society Symposium Proceedings. Vol.362 and Symposium on Grain Size and Mechanical Properties—Fundamentals and Applications, Boston, MA, Nov. 27-Dec. 2, 1994. Proceedings. Edited by M.A. Otooni et al, Pittsburgh, Materials Research Society, 1995, p.85-90, 24 refs.

DLC TA418.78.G66

Sea ice, Ice mechanics, Cracking (fracturing), Crack propagation, Velocity measurement, Ice dielectrics, Electrical measurement, Ice microstructure

49-6226

Physical mechanisms controlling the strength-deformation behavior of frozen sand: part 2.

Swan, C.W., Ladd, C.C., Germaine, J.T., Andersen, G.R., Massachusetts Institute of Technology. Department of Civil and Environmental Engineering. Final report, Cambridge, Massachusetts Institute of Technology, Apr. 1995, 253p., DAAL03-92-G-0226, Refs. p.187-191.

Frozen ground mechanics, Frozen ground strength, Frozen ground compression, Sands, Ice mechanics, Soil compaction, High pressure tests, Strain tests, Temperature effects, Ice solid interface, Stress strain diagrams, Compressive properties

49-6227

Proceedings. POAC 95.

International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995, St. Petersburg, Russia, 1995, 396p. (2 vols.), Refs. passim. For individual papers see 49-6228 through 49-6267.

Ice navigation, Icebreakers, Marine transportation, Ice solid interface, Ships, Ice cover, Design, Ice loads, Ice models, Ice conditions, Northern Sea Route

49-6228

Promising investigations of the SSC AARI for scientific support of shelf exploitation and navigation in the Russian Arctic.

Frolov, I.E., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.3-12, 7 refs.

Research projects, Organizations, Ice navigation, Sea ice, Remote sensing, Russia

49-6229

Perspective types of arctic icebreakers and their principal characteristics.

Tsoĭ, L.G., Stoianov, I.A., Mikhaĭlichenko, V.V., Livshits, S.G., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.13-26, 12 refs.

Icebreakers, Design, Ships, Marine transportation, Ice navigation, Design criteria, Northern Sea Route

49-6230

Main typical features in the distribution of ice cover characteristics and their influence on icebreaker motion in the Arctic basin in summertime (from data of high-latitudinal cruises).

Frolov, S.V., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.27-36, 8 refs.

Sea ice distribution, Ice conditions, Icebreakers, Ice solid interface, Ice navigation, Ice cover effect

49-6231

Ice passport of a new generation.

Kashtelian, V.I., Likhomanov, V.A., Timofeev, O.IA., Faddeev, O.V., Buzuev, A.IA., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.37-41, 8 refs.

Ice navigation, Ships, Icebreakers, Computer applications, Computer programs, Cost analysis, Safety

49-6232

Investigation of ice damages and increasing of demands to the ice strength of Arctic vessels.

Appolonov, E.M., Nesterov, A., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.42-51, 8 refs.

Damage, Ships, Design criteria, Ice solid interface, Ice loads, Analysis (mathematics), Ice navigation, Statistical analysis, Icebreakers, Design

49-6233

Way of reglamentation for allowable ice condition for navigating in ice in the frame of demands to the Arctic class of Arctic ships.

Appolonov, E.M., Nesterov, A.B., Stepanov, I.V., Timofeev, O.IA., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.52-61, 14 refs.

Ice conditions, Sea ice, Ice navigation, Ice cover thickness, Ice cover strength, Ice solid interface, Ships, Icebreakers, Design, Northern Sea Route

49-6234

Methods of ice strength standardization for large tonnage ice breaking transport vessels.

Triaskin, V.N., Bhat, S.U., Blanchet, D., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.62-86, 7 refs.

Ice strength, Ice navigation, Marine transportation, Tanker ships, Ice loads, Icebreakers, Design, Mathematical models, Design criteria, Ice solid interface

49-6235

Model experimental investigation of ice action on the offshore platform "Pechora".

Stepanov, I.V., Likhomanov, V.A., Nikolaev, P.M., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.87-95.

Ice solid interface, Offshore structures, Ice loads, Ice models, Hummocks, Ice cover thickness

49-6236

Interaction of ice cover with hydrotechnic structures of various types.

Afanas'ev, V.P., Afanas'ev, S.V., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.96-108, 20 refs.

Ice solid interface, Piles, Pile structures, Ice loads, Analysis (mathematics)

49-6237

Internal structure of ice pressure ridges in the Sea of Okhotsk.

Beketskiĭ, S.P., Truskov, P.A., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.109-111, 3 refs.

Pressure ridges, Ice pressure, Hummocks, Porosity, Ice models, Okhotsk Sea

49-6238

Long-term probability distributions of ice loads on a terminal for Arctic offshore.

Stepanov, I.V., Nikolaev, P.M., Chernousov, V.V., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.112-123, 1 ref.

Ice loads, Offshore structures, Ice solid interface, Design, Design criteria, Analysis (mathematics), Ice models

49-6239

Reliability estimate of ice belt construction of ice class ship and ice-resisting structures.

Timofeev, O.IA., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.124-134, 4 refs.

Ships, Icebreakers, Design, Design criteria, Ice solid interface, Offshore structures, Ice loads, Ice pressure, Safety, Forecasting

49-6240

Inlets, entrances and ice.

Bruun, P., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.135-143, 4 refs.

Countermeasures, Ports, Water intakes, River ice, Drift, Sea ice, Ice accretion, Shores, Littoral zone

49-6241

Forecasting of ice conditions in the Pechora Sea with a different period in advance for supporting engineering activities and shipping.

Mironov, E.U., Pozdnyshev, S.P., Speranskiĭ, D.A., Tiuriakov, A.V., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.144-149.

Ice conditions, Sea ice distribution, Long range forecasting, Ice edge, Ice forecasting, Mathematical models, Seasonal variations, Russia—Pechora Sea, Barents Sea

49-6242

R/V *Akademik Fedorov* expedition along the Northern Sea Route during summer 1994: ice conditions, ship performance in ice, and ice loads on the ship hull.

Frolov, S.V., Likhomanov, V.A., Masanov, A.D., Stepanov, I.V., Timofeev, O.IA., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.150-160, 3 refs.

Expeditions, Cold weather performance, Ice conditions, Ice loads, Ice solid interface, Oceanographic ships, Ice pressure, Hummocks, Ice cover thickness, Northern Sea Route

49-6243

Prediction of ice loads on a wide ice-resistant structure.

Gol'dshteĭn, R.V., Danilenko, V.I., Osipenko, N.M., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.161-170, 6 refs.

Ice loads, Ice solid interface, Analysis (mathematics), Hydraulic structures

49-6244

Free vibrations of an elastic ice cover with cracks, channels and ice ridges.

Gol'dshteĭn, R.V., Marchenko, A.V., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.171-180, 9 refs.

Ice cover, Pressure ridges, Ice cracks, Analysis (mathematics), Mathematical models

49-6245

Bearing capacity or penetration of (radially) cracked ice sheets.

Dempsey, J.P., Slepyan, L.I., Shekhtman, I.I., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.181-193, 19 refs.

Bearing strength, Ice cover strength, Ice cracks, Penetration, Analysis (mathematics)

49-6246

Russian ice-information system for the Arctic.

Bushuev, A.V., Grishchenko, V.D., Smirnov, V.G., Shcherbatov, IU.A., Brestkin, S.V., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.194-199.

Data processing, Ice conditions, Ice navigation, Computer applications

49-6247

Monte Carlo simulation to estimate Northern Sea Route transit time and cost.

Mulherin, N.D., Smith, O.P., Eppler, D.T., Proshutinskiĭ, T.O., MP 3642, International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.200-201.

Marine transportation, Cost analysis, Computerized simulation, Mathematical models, Ice navigation, Northern Sea Route

49-6248

System of specialized ice forecasts for shipping in the Arctic.

Brovin, A.I., IUlin, A.V., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.1, St. Petersburg, 1995, p.202-209, 10 refs.

Ice forecasting, Ice conditions, Ice navigation, Marine transportation, Northern Sea Route

49-6249

Damages of icebreakers and transport vessels in Russian Arctic.

Babtsev, V.A., Batskikh, E.M., Triaskin, V.N., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.3-20.

Damage, Ice navigation, Ships, Icebreakers, Accidents, Tanker ships, Ice solid interface, Russia

49-6250

Use of classification of ice cover distribution for hydrometeorological information support to engineering activities on the shelf of the Barents Sea.

Babko, O.I., Mironov, E.U., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.21-29, 4 refs.

Sea ice distribution, Ice cover, Data processing, Classifications, Ice conditions, Seasonal variations, Pipelines, Hydraulic structures, Ice edge, Barents Sea

49-6251

Empiric model of vessel movement in the ice and generalization of the experience of the model usage in hydrometeorological support of shipping in the Arctic.

Adamovich, N.M., Buzuev, A.IA., Fediakov, V.E., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.30-40, 10 refs.

Mathematical models, Ice navigation, Ships, Icebreakers, Ice solid interface, Marine transportation

49-6252
Automated forecasting system for the scientific-operational support of the navigation in the Arctic.
Kovalev, E.G., IUlin, A.V., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.41-50, 5 refs.
Ice forecasting, Long range forecasting, Ice navigation, Ice conditions, Data processing, Computer programs, Computer applications

49-6253
Methods of operational numerical forecasts of ice conditions for the Russian Arctic seas.
Aksenov, E.O., Gudkovich, Z.M., Pozdnyshev, S.P., Speranskiĭ, D.A., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.51-58, 1 ref.
Ice conditions, Sea ice distribution, Ice cover, Ice forecasting, Long range forecasting, Ice models, Mathematical models, Russia—Kara Sea

49-6254
Destruction of an ice by explosions of a gas.
Tripol'nikov, V., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.59-63, 6 refs.
Ice blasting, Explosion effects, Ice cover strength

49-6255
Model tests of towed seismic equipment protection means against ice floes in ice model basin.
Buravtsev, V.IU., Sazonov, K.E., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.64-70, 2 refs.
Countermeasures, Ice floes, Equipment, Ice breaking, Ice navigation, Ice solid interface, Ice models, Analysis (mathematics)

49-6256
Icebreaking noise study: tests in ice model basin.
Buravtsev, V.IU., Maĭzel, A.B., Sazonov, K.E., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.71-75, 1 ref.
Icebreakers, Models, Noise (sound), Ice breaking, Ice solid interface, Ice acoustics

49-6257
Scale effects in Arctic ice fracture events—part I.
Dempsey, J.P., Adamson, R.M., DeFranco, S.J., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.76-93, 40 refs. For part II see 49-6258.
Ice cracks, Fracturing, Sea ice, Ice cover, Ice breakup, Lake ice, Ice solid interface, Ice acoustics

49-6258
Scale effects in Arctic ice fracture events—part II.
Dempsey, J.P., Mulmule, S.V., Adamson, R.M., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.94-107, 44 refs. For part I see 49-6257.
Ice cracks, Fracturing, Sea ice, Ice cover strength, Anisotropy, Ice crystals, Ice models, Analysis (mathematics)

49-6259
U.S. Army Corps of Engineers Northern Sea Route reconnaissance study.
Smith, O.P., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.108-109.
Marine transportation, Ice navigation, Economic analysis, Northern Sea Route

49-6260
Underwater transport system for the Arctic.
Kuteĭnikov, A.V., Vinogradov, V.P., Chernousov, V.V., Tsagarely, D.V., Likhomanov, V.A., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.110-117.
Marine transportation, Submarines, Tanker ships, Design

49-6261
Compressing of sea ice and local strain of ice field.
Smirnov, V.N., Sheĭkin, I.B., Shushlebin, A.I., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.118-127, 5 refs.
Sea ice, Compressive properties, Pack ice, Ice floes, Ice cover, Pressure ridges, Strains, Ice deformation

49-6262
Internal stresses at typical local inhomogeneities of sea ice cover.
Sukhorukov, K.K., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.128-137, 7 refs.
Sea ice, Ice cover thickness, Ice temperature, Thermal stresses, Compressive properties
On the basis of representative full-scale studies performed under different conditions of the Arctic and the Antarctic (drift station Weddell-1, 1992), the structure of normal internal stresses at typical inhomogeneities of ice cover (relief inhomogeneities, disturbance of isostatic equilibrium, temperature differences) was identified. (Auth. mod.)

49-6263
Ice pressure ridges and stamukhas offshore of Sakhalin.
Surkov, G.A., Truskov, P.A., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.140-142, 1 ref.
Pressure ridges, Drift, Sea ice, Ice solid interface, Russia—Sakhalin Island

49-6264
Iceberg gouging in Greenland waters.
Christensen, F.T., Zorn, R., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.143-155, 14 refs.
Ice scoring, Icebergs, Mathematical models, Greenland

49-6265
Energy saving means and ice-cover break up technologies.
Zuev, V.A., Gramuzov, E.M., Kovalev, A., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.156-168, 7 refs.
Ice breakup, Ice breaking, Air cushion vehicles, Ships, Floating structures, Design, Analysis (mathematics), Ice navigation, Resonance, Pressure

49-6266
Physical and mathematical models of ice-cover break up.
Zuev, V.A., Gramuzov, E.M., Dvoĭchenko, IU.A., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.169-176, 12 refs.
Ice cover, Ice breaking, Ice breakup, Mathematical models, Ice models, Simulation

49-6267
Models of interaction of ice-breakers with ice cover at unstationary conditions.
Zuev, V.A., Gramuzov, E.M., Kalinina, N.V., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.2, St. Petersburg, 1995, p.177-187, 6 refs.
Ice solid interface, Icebreakers, Ice cover, Ice breaking, Ice navigation, River ice, Mathematical models, Ice cover thickness

49-6268
Applications of the Clapeyron equation to water and ice in porous media.
Black, P.B., CR 95-06, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Mar. 1995, 7p., ADA-294 677, 17 refs.
Analysis (mathematics), Ice water interface, Mass flow, Frozen ground, Porous materials
The equilibrium condition for water and ice in an ice-free porous medium is presented. The equation of state for this system is the Clapeyron equation. This equation is presented in a general form that explicitly shows the pressure-difference dependence with temperature for water and ice. Five solution scenarios are then discussed in terms of applicability to porous media.

49-6269
Permafrost formation time.
Lunardini, V.J., CR 95-08, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Apr. 1995, 44p., ADA-295 515, 35 refs.
Permafrost origin, Permafrost thickness, Paleoclimatology, Freeze thaw cycles, Heat balance, Latent heat, Thermal conductivity, Mathematical models, Computer programs
The age of permafrost is closely linked to the time required for soil systems to freeze, since the permafrost must be at least as old as the formation time. Cycles of freeze-thaw will complicate the relation between the freeze rate and the age. A model based on pure conduction heat transfer with freeze-thaw is used to predict the time required for a given thickness of permafrost to develop, either heterogenetically or syngenetically. The formation time is a function of the long-term geothermal gradient (initial temperature of the thawed soil), the ratios of the frozen to thawed thermal properties, and the temperature history of the upper surface of the permafrost (higher than the air temperature). The simple theory allows universal graphs to be produced that predict the formation time for a given thickness of permafrost. Realistic soil property ratios and paleotemperature scenarios will then lead to estimates of the formation time of permafrost for a specific site. The model indicates that deep permafrost (more than 1500 m) requires formation times on the order of the complete Quaternary Period.

49-6270
Winter navigation on the Great Lakes: a review of environmental studies.
Wuebben, J.L., ed, CR 95-10, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* May 1995, 52p., ADA-295 586, Refs. p.47-52.
Ice navigation, Oil spills, Environmental impact, Sediment transport, Shore erosion, Countermeasures, Ice control, Heat transfer, Rivers, Lakes, Great Lakes
In 1970, Congress authorized a three-part Great Lakes-St. Lawrence Seaway Navigation Season Extension Program. It authorized a winter navigation demonstration program, a detailed survey study of season extension feasibility and a study of insurance rates for shippers. This report provides a review of numerous environmental and engineering studies conducted as part of the demonstration and feasibility portions of the program, as well as many environmental studies conducted after the completion of the original program. Topics include sediment transport, shoreline erosion, shore structure damage, oil and hazardous substance spills, biological effects, ship-induced vibrations and ice control systems.

49-6271
Susceptibility of ABS, FEP, FRE, FRP, PTFE, and PVC well casings to degradation by chemicals.
Ranney, T.A., Parker, L.V., SR 95-01, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Jan. 1995, 19p., ADA-294 734, 26 refs.
Well casings, Degradation, Wells
This study compares the chemical resistance of four less commonly used materials for casing groundwater monitoring wells: acrylonitrile butadiene styrene (ABS), fluorinated ethylene propylene (FEP), fiberglass-reinforced epoxy (FRE), and fiberglass-reinforced plastic (FRP), with two more commonly used casing materials: polyvinyl chloride (PVC) and polytetrafluoroethylene (PTFE). The six materials were exposed to 28 neat organic compounds (including one acid) and to extremely acidic and alkaline conditions for up to 112 days. This was done to simulate some of the most aggressive environments

that monitoring well casings may be exposed to. The casings were observed for changes in weight and signs of physical degradation (swelling, softening, decrease in strength, deterioration, or dissolution). As expected, the two fluorinated polymers (FEP and PTFE) were the most inert materials tested. They were not degraded by any of the test chemicals, although samples exposed to a few organic chemicals did show a slight weight gain (≈1%). Among the nonfluorinated products tested, FRE was the most inert. Three organic chemicals caused particles to flake from the FRE surface, followed by separation of the glass fibers, and two organic chemicals caused weight gains exceeding 10%.

49-6272

Thermal design of an antarctic water well.

Lunardini, V.J., Rand, J., SR 95-10, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Mar. 1995, 98p., ADA-295 513, 22 refs.

Reservoirs, Water reserves, Wells, Computer programs, Mathematical models, Cold weather performance, Antarctica—Amundsen-Scott Station

The thermal and mechanical aspects of a potable water reservoir, formed at depth in a permanent snowfield in Antarctica, are detailed. The thermal model can be used for preliminary design, to predict reservoir size and depth, water temperature and mass, and energy requirements as a function of time. Predictions are made for the South Pole environment, but the model is valid for other permanent snowfields. The reservoir characteristics are influenced by the rate and timing of potable water removal during the lifetime of the reservoir. (Auth.)

49-6273

Freeze-thaw processes and soil chemistry.

Marion, G.M., SR 95-12, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Mar. 1995, 23p., ADA-295 688, Refs. p.18-23.

Freeze thaw cycles, Frozen ground chemistry, Soil chemistry, Frost heave, Freezing points, Unfrozen water content, Decomposition

This review broadly examines the interactions between freeze-thaw processes and soil chemistry, focusing on 1) the effect of solutes on physical properties such as freezing-point depression, unfrozen water and frost heaving, 2) the effect of freeze-thaw cycles and low temperatures on soil chemistry, and 3) modeling of freeze-thaw processes and chemistry. The presence of solutes causes a freezing-point depression, which increases the amount of unfrozen water in soils. Liquid films on soil particles provide the dominant route for the flow of water and associated solutes in frozen soils. In general, salts reduce the hydraulic conductivity and water flow to the freezing front, which reduces frost heaving. Solute exclusion during freezing leads to supersaturated solutions, which promotes the precipitation of secondary minerals in soils. At the watershed level, ionic concentrations in early meltwaters are often 2-9 times higher than snowpack concentrations. Temperature is the dominant factor controlling decomposition rates, with minimal detectable rates occurring at temperatures as low as -10°C; both bacteria and fungi are physiologically active at subzero temperatures.

49-6274

Ice impacts on flow along the Missouri River.

Wuebben, J.L., Daly, S.F., White, K.D., Gagnon, J.J., Tatinclaux, J.-C., Zufelt, J.E., SR 95-13, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Mar. 1995, 33p., ADA-294 570, 4 refs. For another version see 47-1237.

River ice, Ice jams, Hydraulics, Ice cover, River flow, Flow control, Reservoirs, Ice cover effect, United States—Missouri River

In recent years, drought conditions in the Missouri River basin have required more accurate control of releases at Gavins Point Dam, the furthermost downstream flow control structure on the river, to meet competing water needs for irrigation and recreation upstream and for navigation and municipal and industrial water supply downstream. In winter, ice accumulations can seriously affect flow distribution along the river. This paper summarizes a study of such ice effects. It proposes methods to determine minimum flow releases at Gavins Point Dam to meet downstream water supply without unduly depleting upstream reservoirs.

49-6275

Ice jam flood assessment for the St. John River basin, Aroostook County, Maine.

Wuebben, J.L., Deck, D.S., Zufelt, J.E., Tatinclaux, J.-C., SR 95-15, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1995, 22p., ADA-295 607, 4 refs.

Ice jams, River basins, Freezeup, Ice breakup, Ice control, Dams, Warning systems, United States—Maine—St. John River, United States—Maine—Aroostook River

Ice jams occur almost every year on the Aroostook and St. John rivers in northern Maine. While most of these jams cause minor flooding or no flooding at all, ice jams have caused severe flooding six times in the last 20 years. In 1991 ice jams on the St. John River caused damage estimated at $14 million. This report reviews field observations of the ice regime on the rivers and discusses possible mitigation measures—ice retention structures, channel modifications and early warning systems. In addition, since the 1991 ice jam caused water levels to rise so quickly that people were stranded in their homes, the development and installation of an ice jam motion detection system is described. To aid in early warning, a system to predict the potential for ice jams and their severity that is based on a correlation of hydro-meteorological data with the ice regime is presented.

49-6276

Preservation of water samples containing nitroaromatics and nitramines.

Jenkins, T.F., Thorne, P.G., McCormick, E.F., Myers, K.F., SR 95-16, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* May 1995, 31p., ADA-295 723, 21 refs.

Explosives, Chemical properties, Preserving, Water pollution, Chemical analysis, Ground water, Rivers

This study was conducted to develop a method for stabilizing water samples to be analyzed for nitroaromatic and nitramine explosives using SW846 Method 8330. Several options were tested using river water fortified with 15 nitroaromatic, nitramine, and aminonitroaromatic analytes. Acidification to pH2 using sodium bisulfate was selected based on its ability to retard microbiological and chemical transformations, its ease of use under field conditions, and its usability with both the direct and preconcentration procedures in Method 8330. Holding-time studies were performed over a 64-day storage period using fortified river water and groundwaters with and without chemical stabilization. Nonacidified samples showed rapid loss of tetryl, TNB, and TNT and slower loss of the dinitroaromatics. These losses were accompanied by increasing concentrations of transformation products. Losses of these nitroaromatics were completely eliminated by acidification to pH2. Nitramines were stable over the entire period whether samples were acidified or not. A small loss of the aminodinitroaromatics was observed for both acidified and unacidified samples. The rate of loss for acidified samples was initially greater than for nonacidified samples. Sample acidification caused no adverse effects on SW846 Method 8330, although samples to be preconcentrated using salting-out solvent extraction should be neutralized prior to extraction to prevent additional loss of aminodinitroaromatics.

49-6277

Glacial stratigraphy of the island of Als, southern Denmark.

Sjörring, S., *Zeitschrift für Geomorphologie,* Apr. 1977, Suppl.27, p.1-11, With German and French summaries. 7 refs.

DLC GB588.56.C66

Glacial till, Glacial deposits, Stratigraphy, Glacial geology, Denmark—Als Island

49-6278

Study of the course of the Weichselian in Schleswig-Holstein. [Untersuchungen über den Verlauf der Weichsel-Kaltzeit in Schleswig-Holstein]

Stephan, H.-J., Menke, B., *Zeitschrift für Geomorphologie,* Apr. 1977, Suppl.27, p.12-28, In German with English and French summaries. 33 refs.

DLC GB588.56.C66

Glaciation, Landscape development, Glacier ablation, Germany

49-6279

Structure and morphology of kames and end moraines in the central districts of the German Democratic Republic. [Struktur und Morphologie von Kames und Endmoränen in den mittleren Bezirken der Deutschen Demokratischen Republik]

Weisse, R., *Zeitschrift für Geomorphologie,* Apr. 1977, Suppl.27, p.29-45, In German with English and French summaries. 23 refs.

DLC GB588.56.C66

Moraines, Glacier surfaces, Glacial deposits, Classifications, Glacial geology, Germany

49-6280

Recent research on structures of selected examples of end moraines from the area of the last glaciation in Poland.

Pasierbski, M., *Zeitschrift für Geomorphologie,* Apr. 1977, Suppl.27, p.46-58, With German and French summaries. 18 refs.

DLC GB588.56.C66

Moraines, Glaciation, Glacial deposits, Glacial geology, Poland

49-6281

Character and course of deglaciation during the Weichselian glaciation in Lithuania. [Charakter und Verlauf des Eisabbaues während der Weichselvereisung in Litauen]

Basalykas, A., Gudelis, V., *Zeitschrift für Geomorphologie,* Apr. 1977, Suppl.27, p.59-67, In German with English and French summaries. 20 refs.

DLC GB588.56.C66

Glaciation, Landforms, Paleoclimatology, Glacial geology, Ablation, Lithuania

49-6282

Ice-marginal formations and the main regularities of the deglaciation in Estonia.

Raukas, A., *Zeitschrift für Geomorphologie,* Apr. 1977, Suppl.27, p.68-78, With German and French summaries. 32 refs.

DLC GB588.56.C66

Landforms, Glacial deposits, Glacial geology, Moraines, Bedrock, Estonia

49-6283

On the Salpausselkä ice-marginal formations in southern Finland.

Glückert, G., *Zeitschrift für Geomorphologie,* Apr. 1977, Suppl.27, p.79-88, With German and French summaries. 22 refs.

DLC GB588.56.C66

Glacial geology, Moraines, Glacial till, Periglacial processes, Geomorphology, Deltas, Finland

49-6284

Some comments on the retreat of the inland ice sheet at Mount Billingen (Västergötland, Sweden) and the drainage of the Baltic ice lake. [Einige Bemerkungen zum Rückzug des Inlandeises am Billingen (Västergötland, Schweden) und dem Ausbruch des Baltischen Eisstausees]

Strömberg, B., *Zeitschrift für Geomorphologie,* Apr. 1977, Suppl.27, p.89-111, In German with English and French summaries. 45 refs.

DLC GB588.56.C66

Ice sheets, Icebound lakes, Drainage, Sweden

49-6285

Features of the use of piles in Eastern Siberia. [Osobennosti primeneniia svaĭ v Vostochnoĭ Sibiri]

Kozakov, IU.N., Bulankin, N.F., Shishkanov, G.F., Korol', V.A., Krasnoyarsk, Stroĭizdat, 1992, 267p., In Russian. 66 refs.

Piles, Pile structures, Foundations, Concrete piles, Russia—Siberia

49-6286

Ozone in the troposphere and stratosphere. Part 1.

Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992, Hudson, R.D., ed, NASA conference publication 3266, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, 436p. + append., N95-10590, Refs. passim. For selected papers see 49-3001, 49-6287 through 49-6315, or I-52204 and I-53396 through I-53406.

Ozone, Atmospheric composition, Atmospheric circulation, Polar atmospheres, Stratosphere, Air pollution, Global warming

This book contains Part 1 of the papers presented at the 1992 Quadrennial Ozone Symposium held in Charlottesville, VA. Most of the approximately 100 papers did not specify a particular range of latitudes or dealt with low or mid-latitudes but 29 were pertinent to high latitudes, and of those, 11 were pertinent to Antarctica. The papers dealt with global ozone measurements from ground stations, ozonesonde, and satellite; modeling of stratospheric aerosol surface processes; modeling of radiative and temperature effects on global ozone; possible relativistic electron induced ozone depletion; modeling of the effects of emissions from proposed stratospheric aircraft on ozone; effects of the quasi-biennial oscillation on ozone; solar proton effects on ozone; and a general circulation model of global ozone depletion.

49-6287

Ozone measurements from a global network of surface sites.

Oltmans, S.J., Levy, H., II, Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.19-23, N95-10595, 13 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Seasonal variations, Global change, Weather stations, Meteorological data

From a network of surface ozone monitoring sites distributed primarily over the Atlantic and Pacific oceans, the seasonal, day-to-day, and diurnal patterns are delineated. At most of the Northern Hemisphere sites there is a spring maximum and late summer or autumn minimum. All the sites in the Southern Hemisphere show winter maxima and summer minima. Air of tropical origin has much lower ozone concentrations than air from higher latitudes. At four of the locations (Barrow, AK; Mauna Loa, HI; American Samoa; and South Pole) there are 15 through 20-year records which allow one to look at longer term changes. At Barrow there has been a large summer increase over the 20 years of measurements. At the South Pole, on the other hand, summer decreases of nearly 25% over the 16 years of measurements have led to a significant overall decline in surface ozone amounts during that period. (Auth. mod.)

49-6288

Tropospheric ozone and aerosol variability observed at high latitudes with an airborne lidar.

Browell, E.V., Butler, C.F., Fenn, M.A., Kool, S.A., Grant, W.B., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.115-118, N95-10617, 9 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Aerosols, Tundra climate, Wetlands, Lidar

49-6289

Long-term observed ozone trends in the free troposphere and lower stratosphere.

London, J., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.181-185, N95-10633, 11 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Global change

The vertical distributions of ozone trends in the free troposphere and lower stratosphere were derived from ozonesonde observations taken over an average period of about 20 years. The results for the annual trends show a consistent pattern of increased ozone of about 1%/yr to 2%/yr up to about 300 mb and decreased ozone of about -0.6%/yr from about 100 to 50 mb. Statistically significant positive trends found in mid-troposphere (about 500 mb) at a set of representative stations in the Northern Hemisphere have little apparent seasonal variation. Negative trends are generally strongest at 50-70 mb with a tendency to be larger during spring. A highly significant negative trend of about -5%/yr is found near 100 mb over Showa Station (69°S) during spring. (Auth.)

49-6290

Total ozone trends over the U.S.A. during 1979-1991 from Dobson spectrophotometer observations.

Komhyr, W.D., Grass, R.D., Koenig, G.L., Quincy, D.M., Evans, R.D., Leonard, R.K., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.195-198, N95-10636, 6 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Global change

49-6291

TOMS total ozone data compared with northern latitude Dobson ground stations.

Heese, B., Barthel, K., Hov, Ø., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.215-218, N95-10641, 10 refs.

Ozone, Polar atmospheres, Atmospheric composition, Atmospheric circulation, Meteorological data, Weather stations, Spaceborne photography

49-6292

Total ozone change estimations for different time intervals.

Fioletov, V.E., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.223-225, N95-10643, 5 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Stratosphere, Global change, Statistical analysis

49-6293

Global distribution of ozone destruction rates obtained from 13 years of Nimbus/TOMS data (1979-1991).

Herman, J.R., Stolarski, R.S., McPeters, R., Larko, D., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.244-148, N95-10649, 17 refs.

Ozone, Polar atmospheres, Atmospheric composition, Atmospheric circulation, Global change, Meteorological data, Spaceborne photography

Long-term ozone trends (percentage change) have been computed from 13 years of Nimbus/TOMS (Total Ozone Mapping Spectrometer) data as a function of latitude, longitude, and month for the period Jan. 1, 1979 to Dec. 31, 1991. In both hemispheres, the ozone column content has decreased at latitudes above 30° by amounts that are larger than predicted by homogeneous chemistry models for the 13-year time period. The largest rates of ozone decrease occur in the Southern Hemisphere during winter and spring, with recovery during the summer and autumn. The large winter ozone loss rates are consistent with observed low stratospheric temperatures, ice-cloud formation, and heterogeneous chemistry at middle and high latitudes. There are similar, but smaller changes observed in the Northern Hemisphere. At mid-latitudes, there are increased zonal average ozone depletion rates that correspond to 5 geographically localized regions of increased ozone depletion rates. Only the equatorial band between plus or minus 20° shows little or no long-term ozone change since Jan. 1979. The long-term winter ozone depletion rate data for both hemispheres suggests that heterogeneous chemistry processes may operate over a wide range of latitudes during half of the year. (Auth.)

49-6294

Stable ozone layer in Norway and USSR.

Henriksen, K., Svenøe, T., Terez, E.I., Terez, G.A., Roldugin, V.C., Larsen, S.H.H., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.254-258, N95-10651, 11 refs.

Ozone, Polar atmospheres, Atmospheric composition, Atmospheric circulation, Weather stations, Meteorological data, Global change, Statistical analysis, Norway, Russia

49-6295

Three dimensional model calculations of the global dispersion of high speed aircraft exhaust and implications for stratospheric ozone loss.

Douglass, A.R., Rood, R.B., Jackman, C.H., Weaver, C.J., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.281-284, N95-10657, 10 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Stratosphere, Aircraft, Condensation trails, Air pollution, Global change

49-6296

Qualitative study on the behavior of minor species during a stratospheric warming with a 3-D model.

Ramaroson, R., Pirre, M., Cariolle, D., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.285-289, N95-10658, 7 refs.

Ozone, Polar atmospheres, Atmospheric composition, Atmospheric circulation, Stratosphere, Air pollution, Global warming

49-6297

Effects of stratospheric aerosol surface processes on the LLNL two-dimensional zonally averaged model.

Connell, P.S., Kinnison, D.E., Wuebbles, D.J., Burley, J.D., Johnston, H.S., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.302-306, N95-10662, 8 refs.

Ozone, Polar atmospheres, Atmospheric composition, Atmospheric circulation, Stratosphere, Polar stratospheric clouds, Aerosols

Heterogeneous chemical processes associated with stratospheric sulfuric acid aerosol are incorporated into the LLNL (Lawrence Livermore National Laboratory), two-dimensional, zonally averaged model of the troposphere and stratosphere. The primary interest is in changes in partitoning within the Cl- and N- families in the lower stratosphere. The heterogeneous hydrolysis reactions N_2O_5 + H_2O(aerosol) $\rightarrow$ $2HNO_3(\uparrow)$ and $ClONO_2$ + H_2O(aerosol) $\rightarrow$ $HOCl(\uparrow)$ + $HNO_3(\uparrow)$ are considered alone and in combination with the proposed formation of nitrosyl sulfuric acid (NSA) in the aerosol and its reaction with HCl, that is, HCl + $NOHSO_4$(aerosol) $\rightarrow$ $ClNO(\uparrow)$ + H_2SO_4. Inclusion of these processes produces significant changes in partitioning in the NO_y and ClO_y families in the middle stratosphere. $ClONO_2$ becomes the dominant inorganic Cl-containing species, especially at southern high latitudes. (Auth. mod.)

49-6298

Evolution of chemically processed air parcels in the lower stratosphere.

Stolarski, R.S., Douglass, A.R., Schoeberl, M.R., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.307-309, N95-10663, 7 refs.

Ozone, Polar atmospheres, Atmospheric composition, Atmospheric circulation, Stratosphere, Polar stratospheric clouds

49-6299

3-D model study of ozone eddy transport in the winter stratosphere.

Hsu, N.C., Cunnold, D.M., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.314-317, N95-10665, 9 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Stratosphere

49-6300

Impact of supersonic and subsonic aircraft on ozone: including heterogeneous chemical reaction mechanisms.

Kunnison, D.E., Wuebbles, D.J., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.318-321, N95-10666, 11 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Stratosphere, Aircraft, Condensation trails, Air pollution

49-6301

Chemistry of bromine in the stratosphere: influence of a new rate constant for the reaction BrO + HO_2.

Pirre, M., Marceau, F.J., Le Bras, G., Maguin, F., Poulet, G., Ramaroson, R., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.330-333, N95-10669, 11 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Stratosphere

49-6302

Ozone depletion potentials on halocarbons: their dependence of calculation assumptions.

Karol', I.L., Kiselev, A.A., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.334-337, N95-10670, 6 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Air pollution, Global change

49-6303

Model evaluation of the radiative and temperature effects of the ozone content changes in the global atmosphere of 1980s.

Karol', I.L., Frol'kis, V.A., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.338-341, N95-10671, 9 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Stratosphere, Radiation balance, Global warming

Radiative and temperature effects of the observed ozone and greenhouse gas atmospheric content changes in 1980-1990 are evaluated using the two-dimensional energy balance radiative-convective model of the zonally and annually averaged troposphere and stratosphere. Calculated radiative flux changes for standard conditions quantitatively agree with their estimates in the WMO/UNEP 1991 review. Model estimates indicate rather small influence of ozone depletion in the lower stratosphere on the greenhouse tropospheric warming rate, being more significant in the non-tropical Southern Hemisphere. The calculated cooling of the lower stratosphere is close to the observed temperature trends there in the last decade. (Auth.)

49-6304

Search for relativistic electron induced stratospheric ozone depletion.

Aikin, A.C., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.342-346, N95-10672, 12 refs.

Ozone, Polar atmospheres, Atmospheric composition, Stratosphere, Solar activity

Possible ozone changes at 1 mb associated with the time variation and precipitation of relativistic electrons are investigated by examining the Nimbus 7 SBUV ozone data set and corresponding temperatures derived from NMC data. No ozone depletion was observed in high-latitude summer when temperature fluctuations are small. In winter more variation in ozone occurs, but large temperature changes make it difficult to identify specific ozone decreases as being the result of relativistic electron precipitation. No correlation has been found between ozone depletions over Scott Base and the south geomagnetic pole and the solar events studied. (Auth. mod.)

49-6305

Impact of stratospheric aircraft on calculations of nitric acid trihydrate cloud surface area densities using NMC temperatures and 2D model constituent distributions.

Considine, D.B., Douglass, A.R., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.347-350, N95-10673, 6 refs.

Ozone, Polar atmospheres, Atmospheric composition, Atmospheric circulation, Stratosphere, Polar stratospheric clouds, Aircraft, Condensation trails, Air pollution

A parametrization of NAT (nitric acid trihydrate) clouds is developed for use in 2D models of the stratosphere. The parametrization uses model distributions of HNO_3 and H_2O to determine critical temperatures for NAT formation as a function of latitude and pressure, based on data from the NMC (National Meteorological Center). The increase in the NAT cloud formation in the presence of a fleet of stratospheric aircraft is also considered. The stratospheric aircraft NO_x and H_2O perturbations result in increased HNO_3 as well as H_2O. This increases the probability of NAT formation substantially, especially if it is assumed that the aircraft perturbations are confined to a corridor region. The north polar occurrence probability of NAT clouds at the 90 mb surface peaks in December/January. The south polar occurrence probability peaks in August, and is large in both July and September. Probabilities at the 50 mb surface remain about the same in the northern and southern polar regions. (Auth. mod.)

49-6306

Detailed evaluation of heating processes in the middle atmosphere.

Mlynczak, M., Solomon, S., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.359-362, N95-10676, 18 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Stratosphere, Radiation balance

49-6307

Impact of stratospheric aircraft emissions on ozone: a two dimensional model study.

Natarajan, M., Callis, L.B., Boughner, R.E., Lambeth, J.D., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.367-369, N95-10678, 6 refs.

Ozone, Polar atmospheres, Atmospheric composition, Atmospheric circulation, Stratosphere, Aircraft, Condensation trails, Air pollution

Atmospheric perturbations caused by the emission of nitrogen oxides from a projected fleet of stratospheric aircraft are studied with a two-dimensional chemistry transport model. Photochemistry of the lower stratosphere, the region where these aircraft may fly, is now known to be influenced by heterogeneous reactions involving sulfuric acid aerosols. This study examines the sensitivity of the atmospheric effects of aircraft to heterogeneous reactions. It is found that heterogeneous reactions make the lower stratospheric ozone less sensitive to perturbations in the odd nitrogen level. The calculated reduction in global ozone due to NO_x injection from a fleet of Mach 2.4 aircraft is 1.28% if gas phase reactions only are considered in the model, and 0.06% if heterogeneous reactions are included. In the high latitude Southern Hemisphere, ozone reductions of 0.8% are seen. (Auth. mod.)

49-6308

Ozone and stratospheric height waves for opposite phases of the QBO.

Mo, K.C., Nogués-Paegle, J., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.370-373, N95-10679, 5 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Polar atmospheres, Stratosphere

49-6309

On ozone correlation with meteofields in the Northern Hemisphere.

Kadygrova, T.V., Fioletov, V.E., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.390-392, N95-10684, 3 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Stratosphere, Statistical analysis

49-6310

Manifestation of quasi-biennial oscillation in ozone vertical distribution.

Sitnov, S.A., Gruzdev, A.N., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.393-396, N95-10685, 15 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Stratosphere, Weather stations, Meteorological data

49-6311

Quasi-biennial oscillation in total ozone: global behaviour derived from ground-based measurements.

Gruzdev, A.N., Mokhov, I.I., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.397-400, N95-10686, 8 refs.

Ozone, Polar atmospheres, Atmospheric composition, Atmospheric circulation, Stratosphere, Seasonal variations, Weather stations, Meteorological data

The quasi-biennial oscillation (QBO) in total ozone (TO) is studied on the basis of TO measurements at the world ground-based ozone network during 1972-1988. The TO content is on the whole greater in the tropical belt and smaller in high latitudes during the westerly phase of the QBO of the equatorial stratospheric 50 mb wind than during the easterly phase in all seasons. The appropriate TO difference (westerly category minus easterly category) displays certain space structures changing during a year. There are regions with the peculiar annual evolution of this difference, particularly in the Arctic and Antarctic. Different regimes of the TO QBO in the Southern Hemisphere middle and polar latitudes are due to dynamical isolation of the antarctic stratosphere during the period of the winter circumpolar vortex. The spring reversal of stratospheric circulation which supplies the SH polar region with ozone causes the spring TO minimum over the Antarctic during that period. (Auth. mod.)

49-6312

Total ozone seasonal and interannual variations in the principle air masses of the Northern Hemisphere in 1975-1990.

Karol', I.L., Kliagina, L.P., Shalamianskiĭ, A.M., IAgovkina, S.V., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.401-404, N95-10687, 10 refs.

Ozone, Polar atmospheres, Atmospheric composition, Atmospheric circulation, Air masses, Seasonal variations, Meteorological data, Statistical analysis

49-6313

Solar proton effects on austral ozone during the final months of 1989.

Stephenson, J.A.E., Scourfield, M.W.J., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.405-408, N95-10688, 9 refs.

Ozone, Polar atmospheres, Atmospheric composition, Polar stratospheric clouds, Solar activity

Intense solar activity during 1989 prompted six major particle events. Four of these occurred between August and December. Energetic solar protons are a natural source of ozone depletion due to the nitric oxides they produce in the polar atmospheres. In particular, modeling of an event that peaked on Oct. 20 (with >10 MeV proton flux of 73,000 particles $cm^{-2}s^{-1}ster^{-1}$) yields 55% column density enhancements of NO over the southern polar cap. An increase in the spatial extent of the August to December 1989 ozone hole over a region extending from 90°S to 70°S, compared to previous years of moderate solar activity (1984 to 1988), was detected. The enhancement of NO_x concentrations due to SPE's (solar proton events) may be seen as a likely source to increase the probability of NAT PSC (nitric acid trihydrate polar stratospheric cloud) formation. However, the addition of NO_x may in some instances result in larger ice particles rather than increasing the area of coverage of PSCs. In addition, extra odd nitrogen will have no effect in regions where processing of ozone is complete. (Auth. mod.)

49-6314

Temperature dependent absorption cross-sections of HNO_3 and N_2O_5.

Rattigan, O.V., Harwood, M.H., Jones, R.L., Cox, R.A., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.413-416, N95-10690, 10 refs.

Ozone, Polar atmospheres, Atmospheric composition, Atmospheric circulation, Stratosphere

49-6315

General circulation model study of the climatic effect of observed stratospheric ozone depletion between 1980 and 1990.

Dudek, M.P., Wang, Y.C., Liang, X.Z., Li, Z., Quadrennial Ozone Symposium, Charlottesville, VA, June 4-13, 1992. Ozone in the troposphere and stratosphere. Part 1. Edited by R.D. Hudson, Greenbelt, MD, U.S. National Aeronautics and Space Administration. Goddard Space Flight Center, 1994, p.433-436, N95-10694, 5 refs.

Ozone, Atmospheric composition, Atmospheric circulation, Stratosphere, Radiation balance, Global warming

Satellite measurements have shown a significant reduction in the stratospheric ozone over the middle and high latitudes of both hemispheres between the years 1979 and 1991. Recent studies indicate that the net effect depends not only on latitudes and seasons but also on the response of the lower stratospheric temperature. A general circulation model (GCM) is used to calculate the climatic effect due to stratospheric ozone depletion and compare the effect with that due to observed increases of trace gases CO_2, CH_4, N_2O, and CFCs for the period 1980-1990. In the simulations, the middle and high latitudes in both hemispheres show column ozone losses, while the tropics show a slight increase from February to July. The antarctic ozone hole is evident, with over a 40% reduction in column ozone at the pole in October and November. (Auth. mod.)

49-6316

Antarctic micrometeorites.

Kurat, G., Koeberl, C., Presper, T., Brandstätter, F., Maurette, M., *Lunar and Planetary Institute, Houston, TX. Technical report,* 1994, LPI/TR-94-02, Workshop on the Analysis of Interplanetary Dust Particles, Houston, TX, May 15-17, 1993, p.34-36, N95-10961, 32 refs.

Ice sheets, Ice composition, Impurities, Cosmic dust

Micrometeorites in the size range of 50-500 microns dominate the flux onto the Earth. Contrary to theoretical predictions, many of them survive atmospheric entry almost unchanged. Such micrometeorites can be collected from the antarctic ice sheet where they account for a surprisingly large proportion of the total dust content of the ice. Early studies of this important class of extraterrestrial material have revealed that some antarctic micrometeorites are similar to CM chondrites in chemical bulk composition and mineral composition, while a few seem to resemble CI chondrites. However, none of the micrometeorites investigated so far match CM or CI chondrites exactly, nor is there a match between average bulk micrometeorite composition and that of any other chondrite class. Also, the micrometeorite mineral chemistry is different from that of carbonaceous chondrites. Several elements are depleted in micrometeorites as compared to carbonaceous chondrites while some are enriched. (Auth. mod.)

49-6317

Collection and curation of IDPs in the stratosphere and below. Part 2: The Greenland and antarctic ice sheets.

Maurette, M., Hammer, C., Harvey, R., Immel, G., Kurat, G., Taylor, S., MP 3643, *Lunar and Planetary Institute, Houston, TX. Technical report,* 1994, LPI/TR-94-02, Workshop on the Analysis of Interplanetary Dust Particles, Houston, TX, May 15-17, 1993, p.36-40, N95-10962, 24 refs.

Ice sheets, Ice composition, Artificial melting, Meltwater, Impurities, Cosmic dust

The recovery of unmelted to partially melted 50-400 μm-sized IDP's (interplanetary dust particles) from the Greenland and antarctic ice sheets is described. Ice samples are melted in the field by steam generators and pumped through sieves to obtain IDPs. More than 40,000 IDPs have been recovered from 360 tons of ice at Cap Prudhomme, Antarctica, grouped in four size fractions (25-50, 50-100, 100-400, and >400 μm), but mostly in the 50-100 μm-size fraction, and are now stored at CSNSM (Centre de Spectrométrie Nucléaire et de Spectrométrie de Masse) in Orsay, France. This is the purest and richest sample of IDPs ever extracted from terrestrial sediments.

49-6318

Continuous measurement of aircraft wing icing.

Yao, S.S.C., National Technology Transfer Conference and Exposition, 4th, Anaheim, CA, Dec. 7-9, 1993. Technology 2003. NASA conference publication 3249, Vol.2, Washington, D.C., U.S. National Aeronautics and Space Administration, [1993], p.295-300, N94-32454.

Aircraft icing, Ice detection, Chemical ice prevention, Monitors

49-6319

Microwave sensor for ice detection.

Arndt, G.D., Chu, A., Stolarczyk, L.G., Stolarczyk, G.L., National Technology Transfer Conference and Exposition, 4th, Anaheim, CA, Dec. 7-9, 1993. Technology 2003. NASA conference publication 3249, Vol.2, Washington, D.C., U.S. National Aeronautics and Space Administration, [1993], p.318-325, N94-32457, 6 refs.

Aircraft icing, Ice detection, Chemical ice prevention, Monitors

49-6320

Application of artificial neural networks in hydrological modeling: a case study of runoff simulation of a Himalayan glacier basin.

Buch, A.M., Narain, A., Pandey, P.C., 1994 Goddard Conference on Space Applications of Artificial Intelligence, Greenbelt, MD, May 10-12, 1993 NASA conference publication 3268, Washington, D.C., U.S. National Aeronautics and Space Administration, p.223-230, N94-35061, 13 refs.

Glacier surveys, Mountain glaciers, Glacial hydrology, Subglacial drainage, Glacial rivers, Meltwater, Runoff forecasting, Computerized simulation, Himalaya Mountains

49-6321

Upward and downward continuation of airborne electromagnetic data.

Morris, T.L., New Orleans, University, 1989, 121p., M.S. thesis. 17 refs.

Helicopters, Airborne radar, Radar echoes, Radio echo soundings, Image processing, Ice surveys, Ice cover thickness, Ocean bottom, Bottom topography

49-6322

Numerical modeling of optically significant characteristics of falling snow.

Yousefian, V., Dvore, D., Martinez-Sanchez, M., Vaglio-Lauren, R., Billerica, MA, Aerodyne Research, Inc., 1982, 27p. + figs., 12 refs. For another source see 41-2314.

Falling snow, Snowflakes, Snow optics, Snow crystal growth, Snowstorms, Cloud physics, Coalescence, Visibility, Weather forecasting, Mathematical models

49-6323

Application of remote sensing for natural and cultural resource management. Final report.

Jarrett, J.L., et al, MP 3653, Aberdeen Proving Ground, MD, U.S. Army Environmental Center, 1995, Var. p., Refs. passim. Report on a workshop sponsored by the U.S. Army Corps of Engineers at Fort Belvoir, VA, Apr. 19-20, 1995.

Military facilities, Site surveys, Vegetation patterns, Soil surveys, Soil conservation, Land reclamation, Regional planning, Remote sensing, Aerial surveys, Spaceborne photography

49-6324

Selection of resilient welding parameters for arctic fabrication and repair.

Olson, D.L., Ibarra, S., Liu, S., International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.3, Part A, New York, American Society of Mechanical Engineers, 1991, p.125-130, 13 refs.

Steels, Steel structures, Welding, Frost resistance, Cold weather performance

49-6325

Mechanical testing of a new ice impact protection system for FPV's.

Valenchon, C., Falcimaigne, J., O'quin, F., International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.3, Part B, New York, American Society of Mechanical Engineers, 1991, p.615-622, 7 refs.

Floating structures, Offshore structures, Ice loads, Ice solid interface, Icebergs, Ice control, Impact tests

49-6326

MANIS: Manual of ice services. First edition.

Canada. Atmospheric Environment Service. Ice Branch, Ottawa, Ontario, 1992, 54p. + append., 7 refs. With French version separately paged.

Ice reporting, Ice surveys, Ice detection, Ice forecasting, Sea ice distribution, Ice cover thickness, Data transmission, Canada

49-6327

Sediment discharge data for the lower reach of Campbell Creek, Anchorage, Alaska: May to September 1987.

Lipscomb, S.W., *U.S. Geological Survey. Open-file report,* 1988, No.88-81, 12p., 6 refs.

Stream flow, Suspended sediments, Sediment transport, Statistical analysis, Hydrography, United States—Alaska—Campbell Creek

49-6328

Lateral movement of contaminated ground water from Merrill Field landfill, Anchorage, Alaska.

Brunett, J.O., *U.S. Geological Survey. Open-file report,* 1990, No.89-624, 20p., 14 refs.

Waste disposal, Municipal engineering, Ground water, Chemical composition, Leaching, Water pollution, Wetlands, Environmental tests, Electromagnetic prospecting, Soil surveys, United States—Alaska—Anchorage

49-6329

Atlas of facies microfabrics of the Bootlegger Cove formation using the scanning electron microscope.

Updike, R.G., Oscarson, R.L., *U.S. Geological Survey. Open-file report,* 1987, No.87-60, 18p. + appends., 30 refs.

Clay soils, Slope stability, Glacial deposits, Soil analysis, Drill core analysis, Scanning electron microscopy, Soil texture, Microstructure, Classifications, Landslides, Forecasting, United States—Alaska—Bootlegger Cove

49-6330

Mesoscale temperature fluctuations and polar stratospheric clouds.

Murphy, D.M., Gary, B.L., *Journal of the atmospheric sciences,* May 15, 1995, 52(10), p.1753-1760, 34 refs.

Polar atmospheres, Cloud physics, Chemical properties, Condensation nuclei, Polar stratospheric clouds, Air temperature, Temperature variations, Mass transfer, Aerosols, Supersaturation

Remote sensing measurements of temperature fluctuations on isentropic surfaces, as well as *in situ* measurements, are used to show that even high-resolution trajectory calculations seriously underestimate the rate of change of temperature experienced by air parcels. Rapid temperature fluctuations will affect the nucleation of polar stratospheric cloud (PSC) droplets and could promote the formation of metastable phases in PSCs. Mesoscale temperature fluctuations are large enough to produce significant departures from equilibrium in established PSCs. The large cooling rates experienced by air parcels have important implications for denitrification and dehydration: nearly all condensation nuclei should be activated when a PSC is first formed and mass must be redistributed to larger aerosols during the evolution of a PSC if denitrification is to occur. (Auth.)

49-6331
Model for the anelastic straining of saline ice subjected to cyclic loading.
Cole, D.M., MP 3644, *Philosophical magazine A*, 1995, 72(1), p.231-248, 35 refs.
Sea ice, Salt ice, Ice models, Ice mechanics, Strain tests, Ice relaxation, Dislocations (materials), Dynamic loads, Porosity, Temperature effects
This work formulates a model of the anelastic response of saline ice based on dislocation and grain-boundary relaxations. The dislocation-based mechanism generally dominates the behavior, having a relaxation strength of approximately an order of magnitude greater than the grain-boundary relaxation. The latter process explains the anelasticity observed at higher frequencies and lower temperatures. An expression for the oscillatory motion of basal plane dislocations is developed that derives its temperature dependence from the dislocation drag term, which is found to be approximately the same as in freshwater ice. Predictions of transient and steady-state cyclic loading behavior are examined in detail and compared with experimental observations. Aspects of the model that are still under development, related primarily to temperature effects on the microstructure and the incorporation of explicit microstructural parameters, are also discussed.

49-6332
Superstructure spray and ice accretion on a large U.S. Coast Guard cutter.
Ryerson, C.C., MP 3645, *Atmospheric research*, 1995, Vol.36, p.321-337, 34 refs. For another version see 48-855.
Marine meteorology, Cloud physics, Ship icing, Spray freezing, Superstructures, Ice solid interface, Ice accretion, Ablation, Cloud droplets, Statistical analysis
Superstructure spray flux and ice accretion were measured on a 115 m Coast Guard cutter in the North Pacific Ocean and the Bering Sea during Feb. and Mar. 1990. This was the first such measurement cruise on a large ship; all previous measurements have been on trawlers and patrol boats. The drop number concentration of most spray clouds was high, ranging from 2.0×10^5 to 3.0×10^5 drops/m^3. Spray cloud drop sizes ranged from 14 to 770 µm, with geometric median of 234 µm. Spray cloud liquid water contents had a very large range with a mean of 64.1 g/m^3. Ice accretion rates were low, but sufficient to observe greater ice thicknesses on decks than on bulkheads. The ice accretion process was also found to be extremely dynamic, alternately accreting and ablating several times before reaching maximum thickness. No simple relationships were found between time-series of ice thickness during two icing events and controlling environmental parameters.

49-6333
Laser scanning of natural and artificial snow packs.
Itagaki, K., Lemieux, G.E., Ji, N., MP 3646, Material Research Society Symposium Proceedings. Vol.367, Materials Research Society, 1995, p.379-384, 7 refs.
Snow cover structure, Physical properties, Simulation, Snow optics, Lasers, Imaging, Light transmission, Statistical analysis
In an effort to numerically describe a snow pack as a disordered aggregate of irregularly shaped particles, a new optical analysis system was conceived. The system measured light transmission through snow samples impregnated with an opaque fluid. An analysis of the results is presented.

49-6334
Effect of change in thermal properties on the propagation of a periodic thermal wave: application to a snow-buried rocky outcrop.
Gray, J.M.N.T., Morland, L.W., Colbeck, S.C., MP 3647, *Journal of geophysical research*, Aug. 10, 1995, 100(B8), p.15,267-15,279, 18 refs.
Snow cover stability, Thermal regime, Surface temperature, Temperature distribution, Wave propagation, Snow thermal properties, Ice solid interface, Rocks, Subsurface investigations, Heat balance, Heat transfer, Mathematical models, Avalanche forecasting
The propagation of a periodic thermal wave into snow is significantly altered by the presence of a shallow rock interface because of the large difference in thermal properties of the two media. The temperature distribution is modeled using classical heat conduction equations subject to a periodic diurnal or seasonal surface heat flux condition, jump conditions at the interface, and insulating conditions in the far-field. If the interface lies close to or within the skin depth then large temperature gradients can be sustained in the snow before temperature oscillations are forced through to the underlying rock. These features are explained by an analytic one-dimensional periodic solution. A numerical algorithm is constructed to solve for the temperature around plane two-dimensional rock geometries. The results show that during a period of atmospheric cooling the presence of a buried rocky outcrop increases the snow temperature and temperature gradients simultaneously to produce very favorable conditions for crystal growth and avalanche formation.

49-6335
RIGIDICE model of secondary frost heave.
Black, P.B., CR 95-11, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, May 1995, 32p., ADA-297 392, 17 refs.
Frozen ground mechanics, Frozen ground strength, Soil freezing, Frost heave, Mathematical models, Ice solid interface, Ice lenses, Ice formation, Ice models, Computer programs
A revised version of an earlier attempt to numerically solve Miller's equations for the RIGIDICE model of frost heave is presented that corrects earlier mistakes and incorporates recent improvements in the scaling factors of ground freezing. The new version of the computer code also follows the concepts of Object Oriented Numerics, which allow for easy modification and enhancements. Analysis of the program is accomplished with the symbolic math program MathCad. A brief sensitivity analysis of the input variables indicates that those parameters that determine the hydraulic conductivity have the greatest influence on the variability of predicted heaving pressure.

49-6336
Sealants and cold regions pavement seals—a review.
Ketcham, S.A., CR 95-11, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, May 1995, 20p., ADA-297 360, 53 refs.
Pavements, Deformation, Cold weather performance, Cold weather tests, Protective coatings, Sealing, Joints (junctions), Polymers, Mechanical properties, Viscoelasticity, Standards
This report reviews the specific problems and requirements that cold climates create for the performance of elastomeric seals. Emphasis is placed on the material response behavior that can lead to failure of a seal. In an attempt to clarify the mechanics of sealant and seal performance associated with low-temperature pavement applications and to address the issue of low-temperature stiffening that should be a dominant factor in the selection of a sealant, this report presents background information on the formulation and mechanical properties of elastomeric seal materials and the structural behavior of field-molded joint and crack seals.

49-6337
Evolution of the dehydration in the antarctic stratospheric vortex.
Vömel, H., Oltmans, S.J., Hofmann, D.J., Deshler, T., Rosen, J.M., *Journal of geophysical research*, July 20, 1995, 100(D7), p.13,919-13,926, 14 refs.
Polar atmospheres, Stratosphere, Sounding, Air temperature, Freezing points, Profiles, Water vapor, Desiccation, Ice sublimation, Ice vapor interface, Seasonal variations, Antarctica—McMurdo Station
In 1994 an intensive program of balloon-borne frost point measurements was performed at McMurdo. During this program a total of 19 frost point soundings was obtained between Feb. 7 and Oct. 5, which cover a wide range of undisturbed through strongly dehydrated situations. Together with several soundings from Amundsen-Scott Station between 1990 and 1994, they give a comprehensive picture of the general development of the dehydration in the antarctic stratospheric vortex. The period of dehydration typically starts around the middle of June, and a rapid formation of large particles leads to a fast dehydration of the vortex. The evaporation of falling particles leads to rehydration layers, which have significantly higher water vapor concentrations than the undisturbed stratosphere. Through the formation of these rehydration layers in the early stages of the dehydration, particle fall speed of 1/3 km/d and thus a mean particle size of 4 µm is estimated. (Auth. mod.)

49-6338
Interhemispheric differences in springtime production of HCl and $ClONO_2$ in the polar vortices.
Douglass, A.R., et al, *Journal of geophysical research*, July 20, 1995, 100(D7), p.13,967-13,978, 29 refs.
Polar atmospheres, Stratosphere, Atmospheric density, Chemical properties, Aerosols, Photochemical reactions, Photometry, Ozone, Sounding, Seasonal variations, Correlation
Upper Atmospheric Research Satellite observations of O_3 and ClO (Microwave Limb Sounder), $ClONO_2$ and HNO_3 (Cryogenic Array Etalon Spectrometer), NO, NO_2, and HCl (Halogen Occultation Experiment), and model calculations are used to produce an exposition of the different processes through which the reservoir gases $ClONO_2$ and HCl are reformed at the end of the polar winter. Comparison of the observations within the polar vortices shows that HCl increases more rapidly in the antarctic vortex in spring than in the arctic vortex. Model analysis shows that this occurs because the O_3 concentrations in the southern vortex fall well below those in the northern vortex. The Cl/ClO fraction calculated for the Southern Hemisphere is therefore up to 30 times higher, leading to rapid HCl formation by Cl + CH_4. The concentrations of NO observed by HALOE are substantially lower for the Northern Hemisphere than for the Southern Hemisphere, even for similar values of the concentration of HNO_3 and the production of NO_x from HNO_3 through photolysis and reaction with OH. This is consistent with the dependence of the NO/NO_x ratio on the O_3 concentration, i.e., the daytime production rate of NO_2 via NO + O_3 is reduced, leading to higher NO in the Southern Hemisphere. (Auth. mod.)

49-6339
Determination of the stratospheric organic chlorine budget in the spring arctic vortex from MIPAS B limb emission spectra and air sampling experiments.
von Clarmann, T., et al, *Journal of geophysical research*, July 20, 1995, 100(D7), p.13,979-13,997, 46 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Aerosols, Chemical properties, Turbulent diffusion, Sounding, Infrared spectroscopy, Spectra, Profiles

49-6340
Chlorine monoxide in the antarctic spring vortex. 1. Evolution of midday vertical profiles over McMurdo Station, 1993.
De Zafra, R.L., Reeves, J.M., Shindell, D.T., *Journal of geophysical research*, July 20, 1995, 100(D7), p.13,999-14,007, 18 refs.
Polar atmospheres, Stratosphere, Aerosols, Atmospheric attenuation, Chemical properties, Ozone, Sounding, Profiles, Spectra, Seasonal variations, Antarctica—McMurdo Station
A prolonged record of emission spectra from chlorine monoxide in the vicinity of McMurdo Station during formation of the austral spring ozone hole of 1993 has been obtained. These spectra were processed to obtain vertical mixing ratio profiles by deconvolution of pressure-broadened line shapes. The resulting profiles give a detailed evolution for both altitude distribution and mixing ratio of ClO during development of a major ozone hole event. In early September, very strong emission was observed from pressure-broadened low-altitude ClO. A brief significant decrease in ClO content occurred in late September when the inner vortex edge approached McMurdo, signifying that a strong gradient in ClO exists near the inner vortex edge. A rapid and apparently final deactivation of chlorine in the lower stratosphere was observed to start about Oct. 1-2. The findings of initially large values of ClO well above 20 km are consistent with observation of polar stratospheric cloud formation in this range during the austral winter of 1993, and with observations showing increased ozone depletion above 20 km relative to previous years. (Auth. mod.)

49-6341
April 1993 arctic profiles of stratospheric HCl, $ClONO_2$, and CCl_2F_2 from atmosphere trace molecules spectroscopy/ATLAS 2 infrared solar occultation spectra.
Rinsland, C.P., et al, *Journal of geophysical research*, July 20, 1995, 100(D7), p.14,019-14,027, 38 refs.
Polar atmospheres, Stratosphere, Infrared spectroscopy, Remote sensing, Atmospheric composition, Chemical properties, Aerosols, Spectra, Profiles, Subsidence

49-6342
Water vapor feedback over the Arctic Ocean.
Curry, J.A., Schramm, J.L., Serreze, M.C., Ebert, E.E., *Journal of geophysical research*, July 20, 1995, 100(D7), p.14,223-14,229, 37 refs.
Climatology, Oceanography, Polar atmospheres, Water vapor, Humidity, Sounding, Greenhouse effect, Seasonal variations, Air ice water interaction, Ice cover effect, Surface temperature, Arctic Ocean

49-6343
Coupled energy-balance/ice-sheet model simulations of the glacial cycle: a possible connection between terminations and terrigenous dust.
Peltier, W.R., Marshall, S., *Journal of geophysical research*, July 20, 1995, 100(D7), p.14,269-14,289, 80 refs.
Glaciology, Paleoclimatology, Pleistocene, Ice sheets, Glacier ablation, Albedo, Radiation absorption, Dust, Sedimentation, Heat balance, Insolation, Simulation, Mathematical models

49-6344
Chemical composition of ancient atmospheres: a model study constrained by ice core data.
Martinerie, P., Brasseur, G.P., Granier, C., *Journal of geophysical research*, July 20, 1995, 100(D7), p.14,291-14,304, 77 refs.
Paleoclimatology, Ice sheets, Ice cores, Atmospheric composition, Chemical composition, Carbon dioxide, Ozone, Greenhouse effect, Simulation

A coupled chemistry radiation transport two-dimensional model of the lower and middle atmosphere was adapted to study the chemical composition of the atmosphere at preindustrial time and last glacial maximum (LGM). The model was constrained by trace gas concentrations (CO_2, CH_4, and H_2O) inferred from polar ice core records. The formulation of tropospheric dynamics and chemistry was improved in order to more accurately simulate the transport and the oxidation processes below the tropopause. The objectives are to infer the changes in middle-atmosphere temperature, ozone layer, and oxidation capacity of the atmosphere (e.g., methane lifetime) over the last 18,000 years. A middle-atmosphere cooling was obtained between LGM and preindustrial Holocene (PIH) as well as between PIH and present time, mainly due to changes in the CO_2 and chlorofluorocarbon (CFC) concentrations, respectively. Between LGM and PIH the compensating effects of CO_2 and N_2O lead to little variation in stratospheric ozone. The corresponding changes in the methane sink are too small to have played a dominant role in the past methane concentration changes. The model-derived methane emissions for LGM, PIH, and present time are in good agreement with methane sources evaluated during these three periods. (Auth. mod.)

49-6345

Microdischarges between ice particles.

Coquillat, S., Chauzy, S., Médale, J.C., *Journal of geophysical research,* July 20, 1995, 100(D7), p.14,327-14,334, 23 refs.

Atmospheric electricity, Charge transfer, Cloud physics, Cloud electrification, Lightning, Electric fields, Icicles, Ice electrical properties, Simulation, Cold chambers, Temperature effects

49-6346

On the influence of coastline orientation on the steady state width of a latent heat polynya.

Darby, M.S., Wilmott, A.J., Somerville, T.A., *Journal of geophysical research,* July 15, 1995, 100(C7), p.13,625-13,633, 11 refs.

Sea ice distribution, Oceanography, Polynyas, Ice edge, Shores, Orientation, Frazil ice, Drift, Ice water interface, Latent heat, Ice heat flux, Mathematical models, Antarctica—Terra Nova Bay

This paper investigates under what conditions the steady state shape of a coastal latent heat polynya is influenced by (1) the direction of flow of free-drifting frazil ice and the consolidated offshore ice sheet and (2) coastline orientation. Analytical solutions are obtained for coastal polynyas when the coastline is straight and when it has a single step. It is shown that the asymptotic polynya width is given by the generalized Pease (1987) width, $L \cos \theta$, where L is the "classical Pease width" and θ is the angle between the consolidated ice sheet velocity and the normal to the coastline. An expression is also obtained for the alongshore length scale L_C, over which the polynya adjusts toward its asymptotic width. It is shown that L_C depends upon the directions of travel of the frazil ice and the consolidated ice sheet. When the frazil ice and the consolidated ice sheet both drift offshore normal to the coast, $L_C=0$, in agreement with the classical Pease theory. Variations in the coastline which occur on a length scale much smaller than L_C are not reproduced in the polynya shape. (Auth. mod.)

49-6347

Internal wave generation by ice floes moving in stratified water: results from a laboratory study.

Waters, J.K., Bruno, M.S., *Journal of geophysical research,* July 15, 1995, 100(C7), p.13,635-13,639, 9 refs.

Sea ice, Ice floes, Drift, Simulation, Ice water interface, Internal friction, Salinity, Stratification, Hydrodynamics, Wave propagation

49-6348

Underside topography of sea ice over the continental shelf of the Beaufort Sea in the winter of 1990.

Melling, H., Riedel, D.A., *Journal of geophysical research,* July 15, 1995, 100(C7), p.13,641-13,653, 29 refs.

Oceanography, Sea ice, Ice surveys, Ice cover thickness, Ice bottom surface, Bottom topography, Profiles, Acoustic measurement, Statistical analysis, Fractals, Classifications, Beaufort Sea

49-6349

Path-averaged measurements of turbulence beneath ice in the Arctic.

Menemenlis, D., Farmer, D.M., *Journal of geophysical research,* July 15, 1995, 100(C7), p.13,655-13,663, 36 refs.

Underwater acoustics, Sea ice, Ice water interface, Turbulent boundary layer, Turbulent flow, Acoustic measurement, Fluid dynamics, Subglacial observations, Statistical analysis, Buoyancy, Mathematical models, Arctic Ocean

49-6350

Polarimetric signatures of sea ice. 1. Theoretical model.

Nghiem, S.V., Kwok, R., Yueh, S.H., Drinkwater, M.R., *Journal of geophysical research,* July 15, 1995, 100(C7), p.13,665-13,679, 48 refs.

Sea ice, Remote sensing, Electromagnetic properties, Ice crystal optics, Ice crystal structure, Light scattering, Topographic effects, Polarization (waves), Ice dielectrics, Ice models, Snow cover effect, Analysis (mathematics)

49-6351

Polarimetric signatures of sea ice. 2. Experimental observations.

Nghiem, S.V., Kwok, R., Yueh, S.H., Drinkwater, M.R., *Journal of geophysical research,* July 15, 1995, 100(C7), p.13,681-13,698, 34 refs.

Sea ice, Ice surveys, Airborne radar, Radar photography, Synthetic aperture radar, Polarization (waves), Backscattering, Ice optics, Anisotropy, Correlation, Classifications

49-6352

Bounds on the complex permittivity of sea ice.

Golden, K., *Journal of geophysical research,* July 15, 1995, 100(C7), p.13,699-13,711, 33 refs.

Sea ice, Ice models, Ice physics, Mathematical models, Ice dielectrics, Ice microstructure, Dielectric properties, Electromagnetic properties, Brines, Ice water interface, Statistical analysis

49-6353

Warm Weddell Deep Water west of Maud Rise.

Gordon, A.L., Huber, B.A., *Journal of geophysical research,* July 15, 1995, 100(C7), p.13,747-13,753, 15 refs.

Oceanography, Water temperature, Heat flux, Air ice water interaction, Sea ice distribution, Ice melting, Ice cover effect, Periodic variations, Antarctica—Weddell Sea

A pool of relatively warm (>1.0°C) Weddell Deep Water (WDW) immediately west of Maud Rise appears to be a quasi-stationary feature. The "warm pool" is derived from the flow of warm WDW around the flanks of Maud Rise. An austral spring 1989 expedition of the R/V *Akademik Fedorov* obtained detailed measurements of this warm pool. It displays the general regional relationship of temperature maximum warmth to shallowness of the pycnocline, as well as mixed layer oxygen concentration well below full saturation. Depression of oxygen values is a product of injection of WDW into the mixed layer during the ice-covered winter period. Associated with this transfer are high vertical fluxes of heat and salt which limit the thickness of the sea ice cover. In the winter the atmosphere is sufficiently cold to remove the WDW heat without massive sea ice melting, though the regional ice thickness is restricted. In the spring the atmospheric conditions cannot remove the ocean heat, and ice melting ensues before the atmospheric heat budget alone can account for the ice melt. This is clearly seen in the warm pool as very low mixed layer oxygen, which is a reflection of high WDW entrainment and vertical heat flux and is normally associated with high mixed layer salinity. (Auth. mod.)

49-6354

Ice mechanics—1995.

Dempsey, J.P., ed, Rajapakse, Y.D.S., ed, AMD-Vol.207, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, 277p., Refs. passim. Presented at the 1995 Joint ASME Applied Mechanics and Materials Summer Meeting, Los Angeles, CA, June 28-30, 1995. For individual papers see 49-5453 and 49-6355 through 49-6374.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice elasticity, Ice microstructure, Ice cracks, Crack propagation

49-6355

Mechanisms of crack nucleation in ice.

Frost, H.J., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.1-8, 44 refs.

Ice deformation, Ice cover strength, Ice elasticity, Ice microstructure, Ice cracks, Crack propagation, Stress concentration, Dislocations (materials)

49-6356

Failure surface for brittle failure of orthotropic (columnar) saline ice under triaxial compression.

Gratz, E.T., Schulson, E.M., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.9-20, 10 refs.

Salt ice, Ice cover strength, Ice loads, Ice pressure, Ice deformation, Brittleness

49-6357

Microcracking due to grain boundary sliding in S2 ice under uniaxial compression.

Elvin, A.A., Shyam Sunder, S., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.21-32, 15 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice elasticity, Ice microstructure, Ice cracks, Crack propagation

49-6358

Prediction of elastic and viscoelastic properties of anisotropic columnar ice.

Wang, L., Schapery, R.A., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.33-47, 13 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice creep, Ice elasticity, Ice microstructure, Ice cracks, Mathematical models

49-6359

Inelastic effects in fracture of columnar-grained ice.

Abdel-Tawab, K., Rodin, G.J., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.49-63, 26 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice creep, Ice elasticity, Ice microstructure, Ice cracks, Mathematical models

49-6360

Crack closure and related problems.

Slepyan, L.I., Dempsey, J.P., Shekhtman, I.I., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.81-96, 19 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice elasticity, Ice cracks, Crack propagation, Mathematical models

49-6361

Part-through bending cracks in sea ice plates: mathematical modeling.

Bažant, Z.P., Kim, J.J.H., Li, Y.N., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.97-105, 11 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice cracks, Crack propagation, Mathematical models

49-6362

Large-scale in-situ ice fracture experiments. Part I: experimental aspects.

Adamson, R.M., Dempsey, J.P., DeFranco, S.J., Xie, Y.B., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.107-128, 39 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice elasticity, Ice cracks, Strain tests

49-6363

Large-scale in-situ ice fracture experiments. Part II: modeling aspects.

Mulmule, S.V., Dempsey, J.P., Adamson, R.M., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.129-146, 44 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice elasticity, Ice cracks, Ice models

49-6364

Method to determine the constitutive equation of ice by using dynamic indentation data.

Borodich, F.M., Gol'dshteĭn, R.V., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.147-159, 15 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice elasticity, Ice structure, Impact tests, Mathematical models

49-6365

In-situ and laboratory measurements of the physical and mechanical properties of first-year sea ice.

Cole, D.M., et al, MP 3648, Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.161-178, 16 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice creep, Ice elasticity, Ice cracks, Ice microstructure, United States—Alaska—Barrow

This paper presents an overview of a set of field and laboratory measurements made to investigate the evolution of the physical and mechanical properties of first-year sea ice through a growth season. The primary objectives of the study were 1) to examine the influence of sample size on the strength and constitutive behavior of first-year sea ice through in-situ experiments, 2) to improve understanding of the interrelations between physical and mechanical properties, and 3) to verify models based on small-scale isothermal behavior. To address these concerns for young, mid-winter and spring conditions, replicate sets of loading experiments and physical properties observations were made in Nov. 1993, Mar. 1994, and May 1994. Each set consisted of in-situ fracture, creep, creep recovery and cyclic loading experiments at a site in Elson Lagoon, near Barrow, AK, and laboratory measurements of flexural strength. Physical properties characterization included profiles of salinity, fabric, density, grain size and platelet spacing for each set of experiments.

49-6366

Controls on the flexural strength of small plates and beams of first-year sea ice.

Shapiro, L.H., Weeks, W.F., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.179-188, 8 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice structure, Flexural strength

49-6367

Effect of c-axis alignment on the constitutive behavior of sea ice at low strains.

Cole, D.M., Durell, G.D., MP 3649, Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.189-199, 15 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice elasticity, Ice structure, Strain tests, United States—Alaska—Barrow

This paper gives the results of laboratory cyclic loading experiments on horizontal cores from aligned sea ice. The cores, taken parallel, perpendicular and at 45° to the preferred c-axis direction, were harvested early in the growth season from a 0.3-m thick sheet in the Alaskan Arctic. The experiments examined the constitutive behavior under reversed direct-stress conditions for 10^{-3} to 10 Hz, peak stresses between 0.1 and 0.4 MPa, and temperatures between -3 and -10°C. Significant orientation effects emerged on the effective elastic and anelastic components of deformation and they are examined in terms of the underlying micromechanical processes. The paper presents crystallographic information and micrographs that give useful insight into the size and spatial distribution of the brine- and gas-filled voids. This work is part of a larger program to examine the evolution of the physical and mechanical properties of arctic sea ice during an annual cycle.

49-6368

Measurements of crack velocity and electromagnetic emission from cracks in sea ice.

Petrenko, V.F., Gluschenkov, O.V., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.201-209, 24 refs.

Ice cover strength, Ice pressure, Ice deformation, Ice microstructure, Ice electrical properties, Ice cracks, Crack propagation

49-6369

Ice pile-up problem: a comparison between experiments and simulations.

Hopkins, M.A., MP 3650, Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.211-218, 3 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice pileup, Ice override, Environmental tests, Computerized simulation

Onshore pile-up of river ice and sea ice is common on northern rivers and around arctic seas. The forces exerted by the ice during pile-up may damage embankments and structures. Physical experiments were performed in which a moving inclined ramp was pushed against a long stationary strip of intact floating ice. The forces exerted on the structure, the total energy expended, and the change in the potential energy of the ice were measured in each experiment. A parallel set of experiments were performed using a discrete element computer model and measured ice properties. A direct comparison between the two sets of results shows that the simulation closely approximates the physical experiments.

49-6370

Acoustic signatures of falling ice blocks.

Pritchard, R.S., Xie, Y., Farmer, D.M., Coon, M.D., Knocke, G.S., Echert, D.C., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.219-230, 12 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Pressure ridges, Ice acoustics

49-6371

Seismo-acoustic remote sensing of ice fractures.

Schmidt, H., Dudko, Y., Von der Heydt, K., Scheer, E.K., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.231-237, 6 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice cracks, Ice acoustics

49-6372

Force-displacement measurements of a first-year pressure ridge keel.

Coon, M.D., Echert, D.C., Knoke, G.S., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.239-254, 18 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Pressure ridges, Ice cover thickness, Ice bottom surface

49-6373

Effect of sea ice rheology on arctic buoy drift.

Hibler, W.D., III, Ip, C.F., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.255-263, 12 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Drift, Internal friction

49-6374

Nucleation of splitting column cracks in ice.

Gupta, V., Picu, R.C., Bergström, J.S., Ice mechanics—1995. AMD-Vol.207. Edited by J.P. Dempsey and Y.D.S. Rajapakse, New York, American Society of Mechanical Engineers. Applied Mechanics Division, 1995, p.265-275, 7 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice microstructure, Ice cracks, Crack propagation, Dislocations (materials)

49-6375

Growth and environment: challenging extreme frontiers; IDEEA Two Conference Proceedings.

International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993, Montreal, Canada, 1994, 691p., Refs. passim. For selected papers see 49-6376 through 49-6390 or A-53437, G-53435, G-53436, G-53438 through G-53442.

Buildings, Design, Design criteria, Fuels, Waste disposal, Sanitary engineering

These proceedings cover a broad range of issues, needs, challenges, technologies and concepts related to different types of extreme environments. Such environments include, but are not limited to space, oceans, the Arctic, Antarctica [e.g., Dome C, Amundsen-Scott, Casey, Concordia, Oasis and Vostok stations], deserts, mountains, and natural and man-made disaster areas. All of these environments share many kinds of technical and operational priorities. Key among these is the need for advanced construction systems, efficient energy, effective and environmentally-responsive waste management, versatile and reliable automation/robotic devices, and emergency accommodations. (Auth. mod.)

49-6376

Concordia Station.

Cucinotta, A., Godon, P., Ponzo, U., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.17-36.

Buildings, Design, Design criteria, Water treatment, Waste disposal, Water supply, Antarctica—Charlie, Dome

The cooperative agreement between the Institute Francais pour la Recherche et la Technologie Polaires and the Programma Nazionale di Richerche in Antartide (the Italian Antarctic Project) has the aim of building a permanent station on the Antarctic Plateau for a program of scientific and technological research. The base, called Base Concordia, will be built on the Antarctic Plateau at about 1000 km from the coastal stations of Dumont d'Urville and Terra Nova Bay. It will have the capacity to house 16 people during winter and 32 during summer. Its design is environment-friendly and consequently a modular construction has been foreseen, with complete retrograding of solid and liquid wastes; furthermore, in order to ensure a high level of safety, most of the technological facilities have been doubled and most materials used are fireproof. The station will consist of two 3-floor buildings of polygonal section. Each of them is supported by six steel columns adjustable in height to compensate for snow pile-up at the foundation level. The two buildings have a steel structure and a double wooden wall with rock-wool insulation, facing outward. Total internal surface will be 1470 sq m, subdivided into laboratories, facilities, sleeping and living areas and storage areas. (Auth.)

49-6377

Habitability of Australian Antarctic stations.

Nelson, L., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.37-45, 25 refs.

Buildings, Human factors, Safety, Antarctica

It has been well recognized that living in an extreme and remote environment, under isolated and confined conditions, can have a significant impact on psychological well-being. The effect of these conditions on people living on small antarctic research stations has been documented in psychological studies conducted over the past 35 years, being the period of permanent occupation of Antarctica. Most common amongst the physical and psychological symptoms are depression, irritability, withdrawal, sleep disturbance, and cognitive and sensory impairment. So common are these symptoms that they have been labelled "winter-over syndrome". Recognizing the potential negative impact on station productivity and efficiency, the designers of the newly rebuilt Australian Antarctic Stations aimed to use the built environment to enhance the living and working conditions of expeditioners. Habitability principles were applied with the aim of creating a place where people can 'thrive and not just survive'. Features which give individuals privacy whilst encouraging social cohesiveness, provide sensory and spatial variation, and connect the interior and exterior environments were included in the design of the new stations. A project assessing the success of these designs is currently being conducted at the three Australian antarctic stations. This paper outlines the methodology of this five year project, based on questionnaires, interviews and observational studies and report preliminary data from the first two years of the study. (Auth.)

49-6378

Architectural concept of Antarctic station of a new generation.

Sheĭnsteĭn, A.S., Kotliakov, V.M., Bardin, V.I., Asadov, A.R., Krulova, N.V., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.53-56.

Buildings, Heating, Design, Fuels, Design criteria, Antarctica

This paper describes the architectural concept of an antarctic station based on use of advanced technologies. Special emphasis has been laid on the use of energy-saving technologies. The concept has been worked out in the framework of a joint program between the Russian Committee on Antarctic Research, IDEEA Russia, and the Moscow Institute of Architects. (Auth.)

49-6379

Stress analysis of a proposed tunnel under the South Pole skiway.

Sodhi, D.S., Rand, J.H., Tobiasson, W., MP 3651, International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.57-66, 8 refs.

Snow tunnels, Snow elasticity, Snow strength, Stresses, Antarctica—Amundsen-Scott Station

Unlined tunnels in the snow at the Amundsen-Scott Station will be used for safe movement of personnel to satellite science buildings during the austral winter. The first 1.8 m wide x 3 m high tunnel will pass under the existing skiway. This study determined the depth at which that tunnel should be located so that it is safe when aircraft pass over it. Three efforts were undertaken: (a) conducting a three-dimensional, elastic stress analysis of the snow around the tunnel, (b) comparing the maximum tensile and shear stresses from that analysis with corresponding strengths published in the literature, and (c) performing two experiments at South Pole to determine the surface pressure required to fail the snow around model tunnels. The authors found general agreement of theoretical and experimental results and recommended that the roof of the tunnel be located at least 6.1 m below the surface of the skiway. (Auth.)

49-6380

Design and construction techniques in the North.

Nadji, K., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.247-271.

Houses, Shelters, Design, Design criteria, Cold weather construction

49-6381

Alternative energy systems for Antarctic stations: investing for the future.

Guichard, A., Steel, J., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.347-363, With French summary. 11 refs.

Fuels, Environmental protection

A French-Australian cooperative research project focusing on energy systems at antarctic research stations has been initiated. Its aims are to investigate the current energy requirements of the Australian and French stations and to conduct a feasibility study on the use of alternative energy systems. This is designed to reduce both the quantity of fuel used and the impact on the environment. The paper outlines the various issues addressed, presents the first options identified and provides a basis for identifying directions for future work. (Auth.)

49-6382

Selection of sanitation alternatives: a strategy for remote Alaskan communities.

Olofsson, J.A., Iwamoto, L.A., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.365-374, 11 refs.

Waste disposal, Sewage disposal, United States—Alaska

49-6383

Performance of PV panels for solar energy conversion at the South Pole.

Peeran, S.M., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.375-391, 2 refs.

Panels, Electric power, Solar radiation, Walls, Roofs, Antarctica—Amundsen-Scott Station

Expanding research facilities at Amundsen-Scott Station require increased electric power generation. Presently, power generation is by diesel generators using JP8 fuel. As the station is accessible only for a short period during the austral summer, there are limitations upon the supply of fuel for power generation. This makes it necessary to seriously consider the use of renewable energy sources. Although there is no sunlight for six months in the year, abundant solar energy is available during the remaining 6 months because of the clear skies, the clarity of the air and the low humidity at the South Pole. As the buildings at the South Pole are built either without windows or with only porthole type windows, large areas of the walls and roof are available for mounting photovoltaic (PV) panels. There is also unlimited space around the station for constructing a PV panel "farm". Four types of PV panels are evaluated: 2-axis tracking panels, vertical 1-axis tracking panels, fixed vertical panels on the walls of buildings and mounted outdoors and fixed horizontal panels on the roofs of the buildings. Equations are developed for the power output in kW/sq ft and annual energy in kWh/sq ft for each type of panel. The equations include the effects of the inclination of the sun above the horizon, the movement of the sun around the horizon, the direct, reflected and diffused components of the solar radiation, the characteristics of the solar cells and the types of dc/ac inverters used to interface the output of the cells with the existing ac power. A conceptual design of a 150-kW PV generation system suitable for South Pole is discussed. (Auth.)

49-6384

Technico-economical characteristics of photovoltaics and windmills for the Antarctic inland stations.

Sheĭnsteĭn, A.S., Shpilraĭn, E.E., Popel', O.S., Rasgonaev, IU.V., Zaks, M.B., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.392-396, 3 refs.

Electric power, Wind power generation, Solar radiation, Cost analysis, Antarctica—Vostok Station, Antarctica—Oasis Station

This paper describes the results of a feasibility study of PV (photovoltaic), windmill and hybrid power systems with renewable energy sources for the conditions of Vostok and Oasis stations. It has been shown that the use of hybrid power systems with renewable sources of energy under the conditions of Vostok Station is now economically advantageous. (Auth. mod.)

49-6385

Autonomous industrial settlement complexes based on waste-processing technologies for tundra oil-bearing regions of Russian North.

Ganzha, S., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.458-471.

Economic development, Urban planning, Design, Design criteria, Environmental impact, Waste treatment, Tundra, Russia—Far North

49-6386

Arctic adaptation and climate change.

Agnew, T.A., Headley, A., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.534-544, 18 refs.

Climatic changes, Sea ice, Permafrost, Climatic factors, Air temperature, Ecosystems, Petroleum industry

49-6387

Solving sanitation problems in the Alaskan bush: overcoming socioeconomic factors.

Olofsson, J.A., Schroeder, H.P., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.575-587, 9 refs.

Sanitary engineering, Water supply, Waste disposal, Waste treatment, United States—Alaska

49-6388

Large-scale airborne surveys from light research platforms.

Tarussov, A., Piekutowski, T., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.619-622, 4 refs.

Remote sensing, Aircraft

49-6389

Light and imaging in extreme environments.

Uzzo, S.M., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.623-645, 17 refs.

Imaging, Image processing, Cold weather operation, Instruments, Remote sensing

49-6390

Pulse-type vital environment for extreme conditions of the North.

Buslaev, A., International Design for Extreme Environment Assembly, 2nd, Montreal, Oct. 24-27, 1993. Growth and Environment: challenging extreme frontiers; IDEEA Two conference proceedings, Montreal, Canada, 1994, p.680-691.

Economic development, Design, Buildings, Residential buildings, Russia—Siberia

49-6391

Hardiness of vegetation under conditions in the North: ecological-biochemical aspects. [Ustoĭchivost' rasteniĭ v usloviiakh Severa: ekologo-biokhimicheskie aspekty]

Alekseev, V.G., Novosibirsk, Nauka, 1994, 151p., In Russian. Refs. p.141-151.

Plant physiology, Plants (botany), Plant ecology, Vegetation, Cold tolerance, Acclimatization, Russia—Far North, Russia—Yakutia, Russia—Siberia

49-6392

Radionuclides in the ecosystem of the Barents and Kara seas region. [Radionuklidy v ekosisteme regiona Barentseva i Karskogo moreĭ]

Matishov, G.G., Matishov, D.G., Szczypa, J., Rissanen, K., Apatity, Murmansk Marine Biological Institute, Kola Scientific Center, Russian Academy of Sciences, 1994, 237p., In Russian with English title page, summary and table of contents. Refs. p.227-233.

Radioactivity, Radioactive isotopes, Environmental impact, Fallout, Soil pollution, Water pollution, Bottom sediment, Plankton, Mosses, Algae, Lichens, Ecosystems, Ecology, Barents Sea, Russia—Kara Sea, Russia—Yamal Peninsula, Russia—Kola Peninsula, Russia—Franz Josef Land, Russia—Novaya Zemlya

49-6393

Environment and ecosystems of the Franz Josef Land (archipelago and shelf). [Sreda obitaniia i ekosistemy zemli Frantsa-Iosifa (Arkhipelag i shel'f)]

Matishov, G.G., et al, Apatity, KSC RAS Press, 1994, 256p., In Russian with English title page, summary and table of contents. Refs. p.232-252.

Ecosystems, Marine biology, Plankton, Environmental impact, Environmental protection, Site surveys, Plants (botany), Ecology, Russia—Franz Josef Land

49-6394

Adapting construction machinery to conditions in the Russian North and Siberia. [Prisposoblenie stroitel'nykh mashin k usloviiam rossiĭskogo Severa i Sibiri]

Karnaukhov, N.N., Moscow, Nedra, 1994, 351p., Refs. passim.

Analysis (mathematics), Computer programs, Cold weather performance, Machinery, Cold weather operation, Cold weather construction, Roads, Construction equipment, Russia—Far North, Russia—Siberia

49-6395

Assessment of potential cargo from and to Europe via the NSR.

Andersen, Ø., Heggeli, T.J., Wergeland, T., *International Northern Sea Route Programme (INSROP). Working paper (III.10.1),* March 31, 1995, No.11, 40p., 3 refs.

Marine transportation, Ice navigation, Northern Sea Route

49-6396

Oil product export from north west Russia.

Ramsland, T.R., *International Northern Sea Route Programme (INSROP). Working paper (III.01.3),* Jan. 24, 1995, No.8, 34p., Refs. passim.

Marine transportation, Petroleum products, Petroleum industry, Cost analysis, Ice navigation, Ports, Northern Sea Route, Russia

49-6397

Routing, communication and IT-customizing.

Kjerstad, N., *International Northern Sea Route Programme (INSROP). Working paper (I.1.1),* June 30, 1994, No.2, 48p., 6 refs.

Ice navigation, Marine transportation, Radio communication, Radio beacons, Radar, Northern Sea Route

49-6398

Northern Sea Route—a traffic potential study.

Arpiainen, P., *Center for Maritime Studies. Report,* May 17, 1994, 44p., 18 refs.

Marine transportation, Icebreakers, Ships, Ice navigation, Ports, Northern Sea Route, Russia

49-6399

Plying the Northwest Passage.

Simon, W.E., *Explorers journal,* Winter 1994/95, p.144-152.

Marine transportation, Northwest passage

49-6400

You, too, can be a polar hero.

Cahill, T., *Outside,* Dec. 1993, p.44-51, 119-120, 122-125.

Northwest passage, Marine transportation

49-6401

Northern Sea Route (from the Barents Sea to the Bering Sea).

Shapaev, V.M., *Marine observer,* Oct. 1969, 39(226), p.183-190, 9 refs.

Ice navigation, Marine transportation, History, Northern Sea Route

49-6402

Measurement and analysis of polar stratospheric ClO and N_2O by ground-based mm-wave spectroscopy.

Emmons, L.K., Stony Brook, State University of New York, 1994, 139p., University Microfilms order 94-33182, Ph.D. thesis. Refs. p.130-139.

Ozone, Stratosphere, Air temperature, Polar regions, Measurement, Antarctica—McMurdo Station

Analysis and interpretation of measured spectra of spring-time stratospheric ClO and N_2O made at McMurdo Station during Sep. and Oct. in 1992, and at Thule Air Base, Greenland, during Feb. and Mar. 1992 and 1993, using a ground-based mm-wave receiver, are presented. Measurements of ClO, a direct product of ozone destruction, were made through the evolution of the antarctic ozone hole. The emission spectrum of ClO at 278.632 GHz was observed and vertical profiles have been determined from measurements both inside and outside the polar vortex; a sharp difference is seen between them. Comparisons are made to coincident balloon and satellite measurements of ozone, and ground-based measurements of N_2O. The diurnal variation of the low altitude layer of ClO present in the antarctic ozone hole has also been measured. The mixing ratio increases after sunrise, from less than 0.1 ppbv just before sunrise to about 1.5 ppbv at midday, and decreases with increasing solar zenith angle after midday. This diurnal record is unique and is valuable for the validation of photochemical models of the polar stratosphere. N_2O is a good tracer of stratospheric dynamics, having only ground sources and a long chemical lifetime in the atmosphere. Correlations with coincident ozonesonde measurements show no indication of appreciable ozone depletion during this period. (Auth. mod.)

49-6403

Morphology and morphogenesis of *Thigmokeronopsis antarctica* nov. spec. and *T. crystallis* nov. spec. (Ciliophora, Hypotrichida) from antarctic sea ice.

Petz, W., *European journal of protistology,* May 26, 1995, 31(2), p.137-147, 24 refs.

Marine biology, Sea ice, Antarctica—Weddell Sea

The morphology and morphogenesis of *Thigmokeronopsis antarctica* n.sp. and *T. crystallis* n.sp., discovered in brine channels of antarctic sea ice, were investigated using protargol silver impregnation. Both species are characterized by a left postoral ciliary field which is composed of many fewer longitudinal files than in *T. jahodai,* the type species of the genus. In addition, the new species have unique morphogenetic features, viz. all marginal and dorsal primordia originate de novo and the macronuclear nodules fuse incompletely during cell division. *T. antarctica* is distinguished from *T. jahadai* by shortened midventral rows, 1 left postoral file and 3-4 buccal cirri. *T. crystallis* has long midventral rows, usually 5 slightly irregular left postoral files, 1 buccal, and 8 transverse cirri. Morphogenesis is similar in both species, i.e. an anarchic field originates close to left midventral cirri and produces the opisthe's adoral membranelles, undulating membranes, and fronto-ventral-transverse (FVT) cirri; the proter's anarchic field forms near the paroral membrane and splits into primordia for undulating membranes and adoral membranelles; the FVT anlage originates independently close to the anterior left midventral cirri; all primordia form apparently de novo and all parental cirri are replaced. Reorganization resembles the development of the proter. (Auth.)

49-6404

Three new species of *Thaumatomastix* (Thaumatomastigidae, Protista incertae sedis), a ubiquitous genus from the antarctic ice biota.

Thomsen, H.A., Kosman, C., Ikävalko, J., *European journal of protistology,* May 26, 1995, 31(2), p.174-181, 16 refs.

Marine biology, Sea ice, Ecology, Antarctica—Weddell Sea

Recent opportunities to sample live material from antarctic ice biota have resulted in the discovery of numerous autotrophic and heterotrophic flagellate components of this community. In certain samples, some of these hitherto neglected types of organisms are obviously key components of the ice biota. One such example is found in species of the heterotrophic flagellate genus *Thaumatomastix* (Thaumatomastigidae, Protista incertae sedis). Three new species are described *(T. splendida* sp. nov., *T. fragilis* sp. nov., and *T. fusiformis* sp. nov.) one of which *(T. splendida)* has been found to be ubiquitous in antarctic sea ice and also most likely a significant member of the arctic sea ice community. (Auth.)

49-6405

Analysis of the winter low-flow balance of the semiarid White River, Nebraska and South Dakota.

Ferrick, M.G., Mulherin, N.D., Calkins, D.J., MP 3652, *Water resources research,* Aug. 1995, 31(8), p.1999-2009, 22 refs.

River basins, Water supply, Stream flow, Hydrography, River ice, Water balance, Flow measurement, Ice (water storage), Ice cover effect, Ground water, Seasonal variations, Analysis (mathematics), United States—Nebraska

The low-flow water balance of a river in a cold region is simplified in winter because evapotranspiration is negligible, irrigation water withdrawals and diversions are halted, and precipitation occurs largely as snow, minimizing the spatial and temporal variability of runoff. The authors investigated monthly low-flow water balance of White River reaches over seven consecutive winters. Water going into or out of storage as ice or melt, obtained with an air temperature index model, can be a dominant component of the water balance. The point estimate method is used to account for parameter uncertainty and variability providing the mean, variance, and limits of dependent variables such as water storage as ice and inflow from a subbasin. Negative surface water yield from several-thousand km subbasins occurred regularly through the period, indicating a significant flow from the river to the alluvial aquifers. The winter water balance results suggest either a perched river or a coupled surface water-groundwater hydrologic system in particular subbasins, consistent with the field investigations of Rothrock (1942). The winter flow exchange between the surface and subsurface can be used to estimate the annual exchange for both hydrologic conditions.

49-6406

Analytic expression for the composition of aqueous HNO_3-H_2SO_4 stratospheric aerosols including gas phase removal of HNO_3.

Carslaw, K.S., Luo, B.P., Peter, T., *Geophysical research letters,* July 15, 1995, 22(14), p.1877-1880, 10 refs.

Polar atmospheres, Polar stratospheric clouds, Cloud physics, Chemical composition, Aerosols, Absorption, Phase transformations, Analysis (mathematics)

The recognition that stratospheric aerosols may remain liquid at polar winter temperatures leads to a need for reliable methods of estimating the aerosol composition, both for the interpretation of particle observations and for use within stratospheric chemical models. This paper presents an analytic expression for the composition of ternary aerosols and the gaseous HNO_3 concentration in terms of the temperature and total amounts of H_2SO_4, HNO_3 and H_2O, based upon the thermodynamic model of Carslaw et al. (1995). (Auth. mod.)

49-6407

Very low oxygen concentration in basal ice from Summit, central Greenland.

Souchez, R., Janssens, L., Lemmens, M., *Geophysical research letters,* Aug. 1, 1995, 22(15), p.2001-2004, 17 refs.

Ice sheets, Glacier beds, Bottom ice, Ice composition, Oxygen, Profiles, Ice cores, Chemical analysis, Ice vapor interface, Vapor diffusion, Greenland

49-6408

Cratering experiments on ice: dependence of crater formation on projectile materials and scaling parameter.

Iijima, Y., Kato, M., Arakawa, M., Maeno, N., Fujimura, A., Mizutani, H., *Geophysical research letters,* Aug. 1, 1995, 22(15), p.2005-2008, 20 refs.

Extraterrestrial ice, Ground ice, Simulation, Impact tests, Pit and mound topography, Ice solid interface, Ice mechanics, Shock waves, Wave propagation

49-6409

Grain size dependence of eolian saltation lengths during snow drifting.

Maeno, N., Nishimura, K., Sugiura, K., Kosugi, K., *Geophysical research letters,* Aug. 1, 1995, 22(15), p.2009-2012, 20 refs.

Snow physics, Blowing snow, Drift, Simulation, Wind tunnels, Sediment transport, Grain size, Snow air interface

49-6410

Polar stratospheric clouds as deduced from MLS and CLAES measurements.

Ricaud, P.D., et al, *Geophysical research letters,* Aug. 1, 1995, 22(15), p.2033-2036, 18 refs.

Polar atmospheres, Polar stratospheric clouds, Radiometry, Spectroscopy, Detection, Heterogeneous nucleation, Ozone

From Aug. 30, 1992 to Sep. 3, 1992 a supersaturated area at 465 K potential temperature is deduced from Microwave Limb Sounder water vapor measurements over western Antarctica, where high extinction coefficients measured by spectrometry indicate polar stratospheric clouds (PSCs). These PSCs are attributed partly to the effect of an anticyclone located over South America and partly to localized orographic waves, which raise the isentropes and generate rapid adiabatic cooling. A local minimum in column O_3 is observed in this area, which is believed to be a consequence of the dynamics. Enhanced ClO abundances downstream of the region indicate PSC processing and chlorine activation. (Auth. mod.)

49-6411

Influence of meteorology on rime and snow chemistry at a mountaintop site in northern California.

Berg, N., Heggli, M., Monteverdi, J., *Water, air and soil pollution,* Mar. 1995, 81(1-2), p.25-36, 17 refs.

Snowstorms, Snowfall, Sampling, Snow impurities, Chemical composition, Glaze, Sampling, Ion density (concentration), Atmospheric composition, Statistical analysis, Meteorological factors, United States—California

49-6412

Halo heaven.

Gedzelman, S.D., *Weatherwise,* Aug.-Sep. 1995, 48(4), p.34-40.

Cloud physics, Cloud cover, Light scattering, Ice crystal optics, Imaging, Computerized simulation

49-6413

Combined hydrologic and acoustic study of the polar front in the Barents Sea by contact and remote sensing techniques.

Berezutskiĭ, A.V., Maximov, S.E., Rogionov, V.G., Skliarov, V.E., *Oceanology,* Aug. 1994, 34(1), p.32-36, Translated from Okeanologiia. 13 refs.

Oceanography, Hydrology, Ocean currents, Water transport, Underwater acoustics, Sound transmission, Scattering, Remote sensing, Correlation, Barents Sea

49-6414
Radiative transfer in cirrus clouds. Part 3: light scattering by irregular ice crystals.
Takano, Y., Liou, K.N., *Journal of the atmospheric sciences,* Apr. 1, 1995, 52(7), p.818-837, 36 refs.
Cloud physics, Cloud cover, Optical properties, Light scattering, Wave propagation, Ice crystal optics, Albedo, Ice crystal structure, Radiation absorption, Polarization (waves), Mathematical models, Climatic factors

49-6415
Study of arctic sea ice and sea-level pressure using POP and neural network methods.
Tang, B.Y., Flato, G.M., Holloway, G., *Atmosphere-ocean,* Sep. 1994, 32(3), p.507-529, With French summary. 24 refs.
Sea ice distribution, Ice forecasting, Statistical analysis, Air ice water interaction, Wind factors, Atmospheric pressure, Atmospheric circulation, Periodic variations, Ice cover effect, Arctic Ocean

49-6416
Generalized secondary frost heave model.
Fowler, A.C., Krantz, W.B., *SIAM journal on applied mathematics,* Dec. 1994, 54(6), p.1650-1675, 20 refs.
Geocryology, Frost heave, Frozen ground mechanics, Mathematical models, Ice growth, Freezing front, Water pressure, Saturation, Ice water interface, Ice lenses

49-6417
Thermal stratification effects near a vertical ice slab in cold water.
Kukulka, D.J., Lamb, J., Mollendorf, J.C., *Journal of thermophysics,* July-Sep. 1995, 9(3), p.555-558, 10 refs.
Floating ice, Ice water interface, Laminar flow, Ice melting, Heat transfer, Unsteady flow, Temperature variations, Convection, Stratification, Hydrodynamics

49-6418
On the structure and origin of major glaciation cycles. 2. The 100,000-year cycle.
Imbrie, J., *Paleoceanography,* Dec. 1993, 8(6), p.699-735, Refs. p.731-735.
Paleoclimatology, Oceanography, Climatic changes, Glaciation, Insolation, Glacier oscillation, Ice age theory, Periodic variations, Models

49-6419
On the structure and origin of major glaciation cycles. 1. Linear response to Milankovitch forcing.
Imbrie, J., et al, *Paleoceanography,* Dec. 1992, 7(6), p.701-738, Refs. p.733-738.
Pleistocene, Oceanography, Ocean currents, Paleoclimatology, Glaciation, Climatic changes, Glacier oscillation, Periodic variations, Ice age theory
Time series of ocean properties provide a measure of global ice volume and monitor key features of the wind-driven and density-driven circulations over the past 400,000 years. Cycles with periods near 23,000, 41,000, and 100,000 years dominate this climatic narrative. When the narrative is examined in a geographic array of time series, the phase of each climatic oscillation is seen to progress through the system in essentially the same geographic sequence in all three cycles. This paper maintains that the 23,000- and 41,000-year cycles of glaciation are continuous, linear responses to orbitally driven changes in the arctic radiation budget, and uses the phase progression in each climatic cycle to identify the main pathways along which the initial local responses to radiation are propagated by the atmosphere and ocean. (Auth. mod.)

49-6420
Effect of ice on airfoil stall at high Reynolds numbers.
Cebeci, T., *AIAA journal,* July 1995, 33(7), p.1351-1352, 6 refs.
Aircraft icing, Buoyancy, Fluid dynamics, Turbulent boundary layer, Air flow, Ice air interface, Surface roughness, Topographic effects, Models

49-6421
Workshop on Permafrost Data Rescue and Access.
Barry, R.G., Heginbottom, J.A., Brown, J., *Glaciological data,* June 1995, GD-28, 134p., 15 refs.
Permafrost surveys, Permafrost physics, International cooperation, Geocryology, Ground ice, Geological surveys, Data processing, Classifications, Computer applications

49-6422
^{14}C AMS measurements from the Late Weichselian part of the Swedish time scale.
Björck, S., Wohlfarth, B., Possnert, G., *Quaternary international,* 1995, Vol.27, Baltic Ice Lake—Yoldia Sea Symposium, Mar. 1993. Proceedings, p.11-18, 48 refs.
Pleistocene, Quaternary deposits, Paleoecology, Glacial deposits, Geochronology, Radioactive age determination, Correlation, Sweden

49-6423
Review of the history of the Baltic Sea, 13.0-8.0 ka BP.
Björck, S., *Quaternary international,* 1995, Vol.27, Baltic Ice Lake—Yoldia Sea Symposium, Mar. 1993. Proceedings, p.19-40, Refs. p.37-40.
Pleistocene, Marine geology, Shoreline modification, Quaternary deposits, Glacial lakes, Geomorphology, Glacial deposits, Glacial geology, Ice dams, Geochronology, Baltic Sea

49-6424
Seismic stratigraphy of Quaternary deposits in the north-western Baltic proper—a pilot study.
Book, T., *Quaternary international,* 1995, Vol.27, Baltic Ice Lake—Yoldia Sea Symposium, Mar. 1993. Proceedings, p.41-45, 35 refs.
Pleistocene, Glacier oscillation, Glacial deposits, Moraines, Marine deposits, Quaternary deposits, Seismic reflection, Stratigraphy, Geochronology, Baltic Sea

49-6425
Baltic Ice Lake in south Finland and its outlets.
Glückert, G., *Quaternary international,* 1995, Vol.27, Baltic Ice Lake—Yoldia Sea Symposium, Mar. 1993. Proceedings, p.47-51, 35 refs.
Pleistocene, Quaternary deposits, Glacial lakes, Water level, Glacier melting, Subglacial drainage, Lacustrine deposits, Geochronology, Finland

49-6426
Time dependent glaciological model of the Weichselian ice sheet.
Holmlund, P., Fastook, J.L., *Quaternary international,* 1995, Vol.27, Baltic Ice Lake—Yoldia Sea Symposium, Mar. 1993. Proceedings, p.53-58, 30 refs.
Ice sheets, Glaciation, Glacier oscillation, Pleistocene, Paleoclimatology, Glacial geology, Quaternary deposits, Basal sliding, Ice models, Ice cores, Geochronology, Baltic Sea

49-6427
Baltic Ice Lake transgression in the southwestern Baltic: evidence from Fakse Bugt, Denmark.
Jensen, J.B., *Quaternary international,* 1995, Vol.27, Baltic Ice Lake—Yoldia Sea Symposium, Mar. 1993. Proceedings, p.59-68, 42 refs.
Pleistocene, Quaternary deposits, Glacial deposits, Lacustrine deposits, Profiles, Glacial lakes, Marine geology, Stratigraphy, Seismic reflection, Geomorphology, Geochronology, Baltic Sea

49-6428
Baltic Ice Lake and Yoldia Sea stages, based on data from diatom analysis in the central, south-eastern and eastern Baltic.
Kabailienė, M., *Quaternary international,* 1995, Vol.27, Baltic Ice Lake—Yoldia Sea Symposium, Mar. 1993. Proceedings, p.69-72, 12 refs.
Pleistocene, Quaternary deposits, Glacial deposits, Lacustrine deposits, Plankton, Paleoecology, Classifications, Sedimentation, Stratigraphy, Baltic Sea

49-6429
Late Pleistocene and Early Holocene paleogeography of the Darss Sill area, southwestern Baltic.
Lemke, W., Kuijpers, A., *Quaternary international,* 1995, Vol.27, Baltic Ice Lake—Yoldia Sea Symposium, Mar. 1993. Proceedings, p.73-81, 18 refs.
Pleistocene, Glacial lakes, Marine geology, Quaternary deposits, Marine deposits, Sedimentation, Sampling, Stratigraphy, Baltic Sea

49-6430
Baltic Ice Lake—Yoldia Sea transition.
Mörner, N.A., *Quaternary international,* 1995, Vol.27, Baltic Ice Lake—Yoldia Sea Symposium, Mar. 1993. Proceedings, p.95-98, 21 refs.
Pleistocene, Geomorphology, Classifications, Glacial lakes, Lacustrine deposits, Quaternary deposits, Marine geology, Geochronology, Baltic Sea

49-6431
Palaeoenvironment during preboreal-boreal in Närke, south central Sweden.
Robertsson, A.M., *Quaternary international,* 1995, Vol.27, Baltic Ice Lake—Yoldia Sea Symposium, Mar. 1993. Proceedings, p.103-109, 22 refs.
Pleistocene, Palynology, Paleoecology, Plankton, Marine deposits, Quaternary deposits, Radioactive age determination, Sweden

49-6432
Lateglacial of Lake Onega—contribution to the history of the eastern Baltic basin.
Saarnisto, M., Grönlund, T., Ekman, I., *Quaternary international,* 1995, Vol.27, Baltic Ice Lake—Yoldia Sea Symposium, Mar. 1993. Proceedings, p.111-120, 29 refs.
Pleistocene, Glacial lakes, Quaternary deposits, Lacustrine deposits, Plankton, Paleoecology, Stratigraphy, Geochronology, Marine geology, Baltic Sea

49-6433
Late Weichselian-Early Holocene stratigraphy and environmental conditions in southwestern Värmland Sweden: reflected by benthic forminafera and molluscs.
Wastegård, S., *Quaternary international,* 1995, Vol.27, Baltic Ice Lake—Yoldia Sea Symposium, Mar. 1993. Proceedings, p.131-143, 34 refs.
Pleistocene, Marine deposits, Glacial deposits, Quaternary deposits, Paleoecology, Stratigraphy, Geochronology, Sweden

49-6434
Impact of melting of frozen oceans on the early Earth: implications for the origin of life.
Bada, J.L., Bigham, C., Miller, S.L., *National Academy of Sciences. Proceedings,* Feb. 15, 1994, 91(4), p.1248-1250, 32 refs.
Pleistocene, Oceanography, Sea ice, Ice melting, Ice solid interface, Impact, Freeze thaw cycles, Geochemistry, Ecology, Ice age theory

49-6435
Ethylene glycol: its use in thermal storge and its impact on the environment.
Rogers, E.C., Stefl, B.A., *ASHRAE technical data bulletin,* 1993, 9(2), p.1-9, Includes discussion. 21 refs.
Cooling systems, Heat recovery, Brines, Solutions, Antifreezes, Thermal properties, Ice makers, Environmental impact, Waste disposal, Standards, Environmental impact

49-6436
Grain-boundary sliding and across-column cracking in columnar ice.
Nickolaev, O.Y., Schulson, E.M., *Philosophical magazine letters,* Aug. 1995, 72(2), p.93-97, 13 refs.
Ice mechanics, Ice crystal structure, Orientation, Ice solid interface, Sliding, Strain tests, Shear stress, Cracking (fracturing), Crack propagation, Ice deformation

49-6437
Predicting the risk of frost occurrence after the budburst of Norway spruce in Sweden.
Hannerz, M., *Silva fennica,* 1994, 28(4), p.243-249, 24 refs.
Trees (plants), Forestry, Plant physiology, Growth, Frost forecasting, Frost resistance, Acclimatization, Meteorological data, Air temperature, Degree days, Temperature effects, Periodic variations, Sweden

49-6438

Effect of weather and climatological background on snow damage of forests in southern Finland in November 1991.

Solantie, R., *Silva fennica*, 1994, 28(3), p.203-211, 5 refs.

Precipitation (meteorology), Forestry, Forest canopy, Snow accumulation, Snow loads, Snow cover effect, Damage, Environmental impact, Wind factors, Finland

49-6439

Advanced types of ships; collected scientific papers. [Perspektivnye tipy sudov; sbornik nauchnykh trudov]

Peresypkin, V.I., ed, Moscow, Transport, 1991, 205p., In Russian. Refs. passim. For selected papers see 49-6440 through 49-6445.

Ships, Icebreakers, Design, Design criteria, Ice navigation

49-6440

Scientific basis for building ships for the future and the preparation of the nation's industry for it. [Nauchnye obosnovaniia sozdaniia sudov budushchego i podgotovlennost' k nim otechestvennoĭ promyshlennosti]

Zakharov, B.N., Sokolov, L.G., Perspektivnye tipy sudov; sbornik nauchnykh trudov (Advanced types of ships; collected scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1991, p.3-17, In Russian. 3 refs.

Ships, Icebreakers, Marine transportation, Cost analysis, Design

49-6441

Problems in developing the merchant fleet. [Problemy razvitiia morskogo flota]

Dranitsyn, S.N., Perspektivnye tipy sudov; sbornik nauchnykh trudov (Advanced types of ships; collected scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1991, p.18-34, In Russian.

Ships, Icebreakers, Marine transportation, Tanker ships

49-6442

Results of model tests on the speed of icebreakers with various hull forms in smooth pack and crushed ice. [Rezul'taty model'nykh ispytaniĭ khodkosti ledokolov s razlichnoĭ formoĭ korpusa v rovnykh sploshnykh i melkobitykh l'dakh]

Tsoĭ, L.G., Dubov, A.A., Perspektivnye tipy sudov; sbornik nauchnykh trudov (Advanced types of ships; collected scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1991, p.103-120, In Russian. 2 refs.

Icebreakers, Ships, Design, Velocity, Ice navigation, Performance

49-6443

Results of long-term field investigations of the strength of new icebreaker-transport ships for arctic navigation. [Rezul'taty dolgosrochnykh naturnykh issledovaniĭ ledovoĭ prochnosti novykh ledokol'nogo-transportnykh sudov arkticheskogo plavaniia]

Karavanov, S.B., Perspektivnye tipy sudov; sbornik nauchnykh trudov (Advanced types of ships; collected scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1991, p.166-174, In Russian. 10 refs.

Icebreakers, Ships, Ice navigation, Marine transportation

49-6444

Distribution of extreme stress from ice loads on a ship's hull. [Raspredelenie ekstremal'nykh napriazheniĭ ot ledovykh nagruzok v korpuse sudna]

Gutman, I.M., Perspektivnye tipy sudov; sbornik nauchnykh trudov (Advanced types of ships; collected scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1991, p.185-191, In Russian. 3 refs.

Ships, Icebreakers, Ice loads, Stresses, Ice navigation, Analysis (mathematics), Statistical analysis

49-6445

Calculating the wear of hull structures of ice-navigating ships. [K uchetu iznosa korpusnykh konstruktsiĭ sudov ledovogo plavaniia]

Faddeev, O.V., Likhomanov, V.A., Perspektivnye tipy sudov; sbornik nauchnykh trudov (Advanced types of ships; collected scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1991, p.191-196, In Russian. 3 refs.

Ships, Icebreakers, Ice navigation, Performance, Safety

49-6446

Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers. [Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov]

Gavrilova, M.K., ed, Novosibirsk, Nauka, 1991, 192p., In Russian. Refs. passim. For individual papers see 49-6447 through 49-6483.

Geocryology, Frozen ground temperature, Frozen ground thermodynamics, Hydrothermal processes, Thaw depth, Soil temperature, Soil water, Freeze thaw cycles, Russia—Siberia, Russia—Far East

49-6447

Scientific legacy of Pavel Ivanovich Koloskov. [Nauchnoe nasledie Pavla Ivanovicha Koloskova]

Gavrilova, M.K., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.5-13, In Russian. Refs. p.11-13.

History, Bibliographies, Geocryology

49-6448

P.I. Koloskov as a geocryologist. [P.I. Koloskov kak merzlotoved]

Solov'ev, P.A., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.14-17, In Russian. 12 refs.

Geocryology, History

49-6449

Drought and dry winds in Yakutia. [Zasukha i sukhoveĭ v IAkutii]

Sverlova, L.I., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.17-28, In Russian. 7 refs.

Wind factors, Wind (meteorology), Air temperature, Soil water, Russia—Yakutia

49-6450

Effective radiation of slopes. [Ob effektivnom izluchenii sklonov]

Potemkin, V.L., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.32-35, In Russian. 7 refs.

Slopes, Radiation balance, Turbulent exchange, Analysis (mathematics), Surface temperature, Solar radiation

49-6451

Microzonality of the hydrothermal regime of soils on slopes. [Mikrozonal'nost' gidrotermicheskogo rezhima gruntov na sklonakh]

Varlamov, S.P., Skachkov, IU.B., Skriabin, P.N., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.36-40, In Russian. 5 refs.

Hydrothermal processes, Thermal regime, Soil temperature, Geocryology, Frozen ground temperature, Slopes

49-6452

Problem of differentiating terrains in the cryolithozone. [K probleme differentsiatsii landshaftov v kriolitozone]

Fedorov, A.N., Vasil'ev, I.S., Dorofeev, I.V., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.40-45, In Russian. 8 refs.

Landscape types, Taiga, Permafrost, Frozen ground temperature, Russia—Yakutia

49-6453

Terrain regionalization in western Yakutia. [Landshaftnoe raĭonirovanie Zapadnoĭ IAkutii]

Nikolaeva, N.A., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.45-49, In Russian. 3 refs.

Landscape types, Soil surveys, Taiga, Frozen ground, Russia—Yakutia

49-6454

Features of the hydrothermal regime and agrophysical properties of alassy soils. [Osobennosti gidrotermicheskogo rezhima i agrofizicheskikh svoĭstv alasnykh pochv]

Dmitriev, A.I., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.49-54, In Russian.

Hydrothermal processes, Alassy, Soil physics, Agriculture, Soil temperature, Thaw depth, Soil water, Permeability, Frozen ground physics, Frozen ground temperature

49-6455

Hydrothermal regime and agrophysical properties of frozen pale yellow soils of mid-alassy. [Gidrotermicheskiĭ rezhim i agrofizicheskie svoĭstva merzlotnykh palevykh pochv mezhalas'ia]

Pesterev, A.P., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.54-57, In Russian. 3 refs.

Hydrothermal processes, Agriculture, Frozen ground physics, Alassy, Thaw depth, Frozen ground temperature, Soil water, Moisture, Russia—Yakutia

49-6456

Radiation characteristics of the Amur River region, the Upper Zeya River lowlands, and their local variations during a disturbance of the natural cover. [Radiatsionnye kharakteristiki Priamur'ia, Verkhnezeiskoi ravniny i ikh lokal'nye izmeneniia pri narushenii estestvennogo pokrova]

Cherdonova, V.S., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.57-64, In Russian. 1 ref.

Radiation balance, Albedo, Freeze thaw cycles, Seasonal freeze thaw, Snow cover effect, Mosses, Vegetation, Radiation absorption, Russia—Amur River, Russia—Zeya River

49-6457

Thermal regime of soils in the solonetz complexes in the forest-steppe of Western Siberia during the cold period of the year. [Temperaturnyi rezhim pochv solontsovykh kompleksov iuzhnoi lesostepi Zapadnoi Sibiri v kholodnoe vremia goda]

Voronina, L.V., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.65-69, In Russian. 3 refs.

Thermal regime, Chernozem, Frozen ground temperature, Forest soils, Steppes, Frozen ground thermodynamics, Russia—Siberia

49-6458

Features of the climate of soils during overhead irrigation of feed crops in Central Yakutia. [Nekotorye osobennosti klimata pochvy pri dozhdeval'nom oroshenii kormovykh kul'tur v TSentral'noi IAkutii]

Ugarov, I.S., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.70-73, In Russian. 4 refs.

Agriculture, Irrigation, Vegetation, Soil temperature, Ground ice, Ground thawing, Valleys, Russia—Yakutia, Russia—Amga River

49-6459

Regulating the regime of crop irrigation based on temperature and air humidity in Central Yakutia. [Regulirovanie rezhima orosheniia rastenii v zavisimosti ot temperatury i vlazhnosti vozdukha v TSentral'noi IAkutii]

Uvarov, O.D., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.74-76, In Russian.

Irrigation, Agriculture, Humidity, Air temperature, Analysis (mathematics), Russia—Yakutia

49-6460

Features of the hydrothermal regime of frozen meadow-chernozem soils in the Amga River valley during fall moisture-loading irrigation. [Osobennosti gidrotermicheskogo rezhima merzlotnykh lugovo-chernozemnykh pochv doliny r. Amgi pri osennikh vlagozariadkovykh polivakh]

Savvinov, G.N., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.77-82, In Russian. 2 refs.

Irrigation, Hydrothermal processes, Frozen ground thermodynamics, Meadow soils, Chernozem, Agriculture, Valleys, Russia—Amga River

49-6461

Moisture content and temperature of soils and ground based on observations in the Abyysk (Syagannakhskiy) meadow-improving plot in arctic Yakutia. [Vlazhnost' i temperatura pochvogrunta po nabliudeniiam na Abyiskom (Syagannakhskom) lugomeliorativnom poligone v zapoliarnoi IAkutii]

Cheremkina, L.G., Malyshev, V.I., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.82-87, In Russian.

Soil temperature, Soil water, Moisture, Meadow soils, Russia—Yakutia

49-6462

Perennial thawing of ground beneath shallow lakes. [Mnogoletnee protaivanie gruntov pod melkovodnym ozerom]

Skriabin, P.N., Antipina, Z.N., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.88-92, In Russian. 8 refs.

Ground thawing, Mathematical models, Frozen ground thermodynamics, Bottom sediment, Russia—Yakutia

49-6463

System of algorithms and programs for modeling the formation processes of the temperature field in ground. [Kompleks algoritmov i programm dlia modelirovaniia protsessov formirovaniia temperaturnogo polia v gruntakh]

Tetel'baum, A.S., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.93-96, In Russian. 3 refs.

Computer programs, Mathematical models, Stefan problem, Soil temperature, Frozen ground temperature, Snow cover effect

49-6464

Petrographic and mineral-geochemical features of seasonally thawing rocks in the Amga River valley. [Petrograficheskie i mineralogo-geokhimicheskie osobennosti sezonnoprotaivaiushchikh porod doliny r. Amgi]

Zigert, Kh., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.96-103, In Russian. 3 refs.

Frozen rocks, Seasonal freeze thaw, Valleys, Rock properties, Lithology, Permafrost, Russia—Amga River

49-6465

Effect of freeze-thaw cycles on mass exchange characteristics of soils. [Vliianie tsiklov promerzaniia-protaivaniia na massoobmennye kharakteristiki gruntov]

Kurilko, A.S., Kravtsova, O.N., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.103-106, In Russian. 4 refs.

Freeze thaw cycles, Mass transfer, Frozen ground mechanics, Soil mechanics, Frozen ground thermodynamics, Diffusion, Seepage

49-6466

Effect of salinity on the heat and moisture regime of soils. [Vliianie zasolennosti na teplovlazhnostnyi rezhim pochvogrunta]

Permiakov, P.P., Romanov, P.G., Munkhalova, L.A., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.106-110, In Russian. 8 refs.

Salinity, Saline soils, Water content, Soil water, Mathematical models, Thermal regime, Soil temperature, Frozen ground temperature

49-6467

Automated routine for determining the quantity of unfrozen water in saline soils, run on a micro-IBM. [Avtomatizirovannaia ustanovka dlia opredeleniia kolichestva nezamerzshei vody v zasolennykh gruntakh, upravliaemaia mikroEBM]

Ivanov, V.A., Stepanov, A.V., Timofeev, A.M., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.111-114, In Russian. 2 refs.

Unfrozen water content, Saline soils, Soil water, Computer programs, Computer applications

49-6468

Experimental studies on erosion of frozen ground. [Eksperimental'nye issledovaniia razmyvaemosti merzlykh gruntov]

IAkovlev, A.V., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.114-118, In Russian. 3 refs.

Frozen ground mechanics, Soil erosion, Frozen ground temperature, Soil water, Water erosion, Water flow

49-6469

Thermal energy and thermal development of frozen soils. [O teploenergetike i teplomelioratsii merzlotnykh pochv]

Kulikov, A.I., Dugarov, V.I., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.118-122, In Russian. 12 refs.

Frozen ground thermodynamics, Frozen ground physics, Heat transfer

49-6470

Features of land reclamation in Central Yakutia. [Osobennosti melioratsii zemel' v TSentral'noi IAkutii]

Mandarov, A.A., Klimat, pochva, merzlota: kompleksnye issledovaniia v raionakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.122-126, In Russian. 4 refs.

Land reclamation, Irrigation, Estuaries, Russia—Yakutia

49-6471

Soil-frozen ground conditions of land reclamation in Southern Yakutia in the Malyy BAM zone. [Pochvenno-merzlotnye usloviia melioratsii zemel' IUzhnoĭ IAkutii v zone malogo BAMa]

Dmitriev, I.G., Lobasheva, G.A., Syromiatnikov, S.V., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.127-130, In Russian. 4 refs.

Land reclamation, Railroads, Soil chemistry, Soil physics, Soil water, Agriculture, Ground ice, Peat, Russia—Yakutia, Baykal Amur railroad

49-6472

Construction and operation of a reclamation system in Transbaykal. [Opyt stroitel'stva i ekspluatatsii meliorativnykh sistem Zabaĭkal'ia]

Shesternev, D.M., Druzhinin, A.S., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.131-134, In Russian. 6 refs.

Land reclamation, Thaw depth, Slope orientation, Agriculture, Transbaykal

49-6473

Dynamics of the thermal regime of an earth dam. [Dinamika temperaturnogo rezhima gruntovoĭ damby]

Alekseeva, O.I., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.135-138, In Russian. 5 refs.

Earth dams, Thermal regime, Thermodynamics, Isotherms, Soil temperature, Frozen ground temperature, Russia—Yakutia

49-6474

Optimal thermal insulation of ground from freezing. [Optimal'naia teplozashchita grunta ot promerzaniia]

Romanov, P.G., Permiakov, P.P., Nogovitsyn, V.D., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.138-142, In Russian. 5 refs.

Thermal insulation, Heat transfer, Albedo, Soil temperature, Frozen ground temperature, Soil freezing, Analysis (mathematics), Climatic factors, Russia—Yakutia

49-6475

Cryogenic processes around the city of Yakutsk. [Kriogennye protsessy na territorii g. IAkutska]

Petrov, S.B., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.143-146, In Russian.

Geocryology, Frost heave, Terraces, Erosion, Russia—Yakutia, Russia—Lena River

49-6476

Results of field observations of the development of alassy in Central Yakutia. [Rezul'taty naturnykh nabliudeniĭ za razvitiem alasov Tsentral'noĭ IAkutii]

Bosikov, N.P., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.146-152, In Russian. 15 refs.

Alassy, Thaw depth, Thermokarst lakes, Thermokarst, Russia—Yakutia, Russia—Lena River, Russia—Amga River

49-6477

Features of cryogenic-morphogenesis in the Kular GOK area of operation. [Osobennosti kriomorfogeneza v raĭone deiatel'nosti Kularskogo GOKa]

Grigor'ev, M.N., Zobachev, V.A., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.152-157, In Russian. 3 refs.

Active layer, Permafrost, Degradation, Surface properties, Ground ice, Russia—Indigirka River, Russia—Yana River

49-6478

Fluvial transformation of the ice complex in the lower reaches of the Indigirka River. [Fliuvial'naia pererabotka ledovogo kompleksa v nizov'e r. Indigirki]

Murzin, IU.A., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.157-162, In Russian. 13 refs.

Streams, Banks (waterways), Rivers, Alluvium, Ice veins, Erosion, Glacial deposits, Russia—Indigirka River

49-6479

Zonality of the formation of a seasonally thawing layer. [O zonal'nosti formirovaniia sezonno-talogo sloia]

Vasil'ev, I.S., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.162-165, In Russian. 4 refs.

Seasonal freeze thaw, Active layer, Freeze thaw cycles, Frozen ground temperature, Taiga, Tundra soils, Russia—Yakutia

49-6480

New developments in the hydrogeological regionalization of Yakutia. [Novoe v gidrogeologicheskom raĭonirovanii IAkutii]

Dmitriev, E.M., Tolstikhin, O.N., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.166-170, In Russian. 8 refs.

Hydrogeology, Geocryology, Russia—Yakutia

49-6481

Hydrotechnical structures designed for water supply in a permafrost zone. [Gidrotekhnicheskie sooruzheniia vodokhoziaĭstvennogo naznacheniia v zone vechnoĭ merzloty]

Chzhan, R.V., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.170-175, In Russian. 23 refs.

Water supply, Hydraulic structures, Permafrost beneath structures, Earth dams, Geocryology, Russia

49-6482

Ecological consequences of draining lakes in the cryolithozone. [Ekologicheskie posledstviia osusheniia ozer kriolitozony]

Shumilov, IU.V., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.175-180, In Russian.

Ecology, Environmental impact, Drainage, Agriculture, Regional planning, Lakes, Geocryology, Russia—Chukotskiy Peninsula, Russia—Yakutia

49-6483

Problems in land reclamation development in the Chukotskiy Peninsula. [Problemy meliorativnogo osvoeniia zemel' Chukotki]

Krivoshchekov, V.S., Maslov, V.IA., Tepkin, N.A., Zheleznov, N.K., Klimat, pochva, merzlota: kompleksnye issledovaniia v raĭonakh Sibiri i Dal'nego Vostoka; sbornik nauchnykh trudov (Climate, soil, frozen ground: integrated studies in regions of Siberia and the Far East; collected scientific papers). Edited by M.K. Gavrilova, Novosibirsk, Nauka, 1991, p.180-184, In Russian. 4 refs.

Land reclamation, Land development, Agriculture, Subpolar regions, Russia—Chukotskiy Peninsula

49-6484

Technological parameters and quality of winter concreting. [Parametry tekhnologii i kachestvo zimnego betonirovaniia]

Golovnev, S.G., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* May-June 1995, No.5-6, p.82-85, In Russian. 4 refs.

Winter concreting, Analysis (mathematics), Electric heating, Concretes

49-6485

Diffusion model for analyzing atmospheric air quality of an industrial city during anomalous unfavorable meteorological conditions. [Diffuzionnaia model' dlia otsenki kachestva atmosfernogo vozdukha promyshlennogo goroda v period anomal'nykh neblagopriiatnykh meteorologicheskikh usloviĭ]

Shiliaev, M.I., Makarov, E.IA., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* May-June 1995, No.5-6, p.95-99, In Russian. 3 refs.

Mathematical models, Air pollution, Atmospheric composition, Temperature inversions, Russia—Far North, Russia—Siberia

49-6486

Moisture content of a single-layer structure enclosure under the climatic conditions of Yakutia. [Vlazhnostnoe sostoianie odnosloĭnoĭ ograzhdaiushcheĭ konstruktsii zdaniĭ v usloviiakh klimata IAkutii]

Nikitina, L.M., Timoshenko, A.T., Efimov, S.S., Popov, G.G., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* May-June 1995, No.5-6, p.100-103, In Russian. 3 refs.

Moisture, Cold weather construction, Indoor climates, Thermal properties, Walls, Russia—Yakutia

49-6487

Aspects of forming residential areas in a large Siberian city (in the example of Tomsk). [O nekotorykh aspektakh formirovaniia zhilykh raĭonov krupnogo goroda Sibiri (na primere g. Tomska)]

Boldyrev, V.F., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo,* May-June 1995, No.5-6, p.118-122, In Russian.

Cold weather construction, Urban planning, Residential buildings, Reinforced concretes, Russia—Tomsk

49-6488

Architectural-structural type, seagoing and ice navigation characteristics of transport ships; collected scientific papers. [Arkhitekturno-konstruktivnyĭ tip, morekhodnye i ledovye kachestva transportnykh sudov; sbornik nauchnykh trudov]

Peresypkin, V.I., ed, St. Petersburg, TsNIIMF, 1992, 183p., In Russian. Refs. passim. For selected papers see 49-6489 through 49-6494.

Ships, Icebreakers, Tanker ships, Marine transportation, Ice navigation, Design

49-6489

Status and prospects for the development of seagoing icebreakers. [Sostoianie i perspektivy razvitiia morskikh ledokolov]

Tsoĭ, L.G., Arkhitekturno-konstruktivnyĭ tip, morekhodnye i ledovye kachestva transportnykh sudov; sbornikh nauchnykh trudov (Architectural-structural type, seagoing and ice navigation characteristics of transport ships; collected scientific papers). Edited by V.I. Peresypkin, St. Petersburg, TsNIIMF, 1992, p.11-38, In Russian.

Icebreakers, Ships, Design, History

49-6490

Rational area of application of nuclear power plants in icebreakers. [O ratsional'noĭ oblasti primeneniia iadernykh energeticheskikh ustanovok na ledokolakh]

Tsoĭ, L.G., Arkhitekturno-konstruktivnyĭ tip, morekhodnye i ledovye kachestva transportnykh sudov; sbornikh nauchnykh trudov (Architectural-structural type, seagoing and ice navigation characteristics of transport ships; collected scientific papers). Edited by V.I. Peresypkin, St. Petersburg, TsNIIMF, 1992, p.96-102, In Russian. 2 refs.

Nuclear power, Icebreakers, Ships, Design, Diesel engines

49-6491

Effect of the bow form of icebreakers on navigability in calm waters and waves. [Vliianie formy nosovykh obvodov ledokolov na khodkost' na tikhoĭ vode i volnenii]

Tsoĭ, L.G., Glebko, IU.V., Arkhitekturno-konstruktivnyĭ tip, morekhodnye i ledovye kachestva transportnykh sudov; sbornikh nauchnykh trudov (Architectural-structural type, seagoing and ice navigation characteristics of transport ships; collected scientific papers). Edited by V.I. Peresypkin, St. Petersburg, TsNIIMF, 1992, p.116-124, In Russian. 3 refs.

Ships, Icebreakers, Design, Ice navigation

49-6492

Feasibility of developing a single system for classification of ships designated for use in the Arctic. [Vozmozhnost' razrabotki edinoĭ sistemy klassifikatsii sudov, prednaznachennykh dlia ekspluatatsii v Arktike]

Karavanov, S.B., Arkhitekturno-konstruktivnyĭ tip, morekhodnye i ledovye kachestva transportnykh sudov; sbornikh nauchnykh trudov (Architectural-structural type, seagoing and ice navigation characteristics of transport ships; collected scientific papers). Edited by V.I. Peresypkin, St. Petersburg, TsNIIMF, 1992, p.133-147, In Russian. 11 refs.

Ships, Icebreakers, Classifications, Ice navigation, International cooperation, Legislation

49-6493

Determining the coefficients for mass reduction during the operation of coupled ships in ice. [Opredelenie koeffitsientov privedeniia massy pri rabote stseplennykh sudov vo l'dakh]

Kirdiumov, V.A., Arkhitekturno-konstruktivnyĭ tip, morekhodnye i ledovye kachestva transportnykh sudov; sbornikh nauchnykh trudov (Architectural-structural type, seagoing and ice navigation characteristics of transport ships; collected scientific papers). Edited by V.I. Peresypkin, St. Petersburg, TsNIIMF, 1992, p.147-154, In Russian. 3 refs.

Ships, Icebreakers, Ice navigation, Mathematical models, Mass transfer

49-6494

Impact of basic features of an icebreaker on its ice navigability. [K voprosu o vliianii osnovnykh kharakteristik ledokola na ego ledoprokhodimost']

Titov, I.A., Arkhitekturno-konstruktivnyĭ tip, morekhodnye i ledovye kachestva transportnykh sudov; sbornikh nauchnykh trudov (Architectural-structural type, seagoing and ice navigation characteristics of transport ships; collected scientific papers). Edited by V.I. Peresypkin, St. Petersburg, TsNIIMF, 1992, p.167-173, In Russian.

Icebreakers, Ships, Design, Ice navigation, Propellers

49-6495

Ground freezing in practice.

Harris, J.S., London, Thomas Telford Services Ltd., 1995, 264p., Refs. passim. and bibliography p.211-260.

Soil freezing, Artificial freezing, Engineering geology, Soil stabilization, Frozen ground strength, Frozen ground thermodynamics, Rock drilling, Excavation

49-6496

One-dimensional freezing of seawater in a constrained volume.

Szilder, K., Lozowski, E.P., Forest, T.W., *Canadian geotechnical journal*, Feb. 1995, 31(1), p.122-127, With French summary. 14 refs.

Sea water freezing, Brines, Slush, Temperature distribution, Ice water interface, Ice formation, Salinity, Temperature effects, Thermal conductivity, Mathematical models

49-6497

Monitoring of a drifting giant iceberg in the South Atlantic. *World Meteorological Organization. WMO Bulletin*, Jan. 1992, 41(1), p.80-82.

Icebergs, Antarctica—Weddell Sea

Until 1986 this iceberg was part of the Filchner Barrier in the far southern Weddell Sea; in Aug 1988 a NOAA satellite image showed the berg to consist of three large ice islands. In Feb 1990, the easternmost of these islands broke away as a tabular berg and began moving on a northwesterly track with the currents. As it moved toward the Antarctic Peninsula its course took on a more northerly heading and by Oct 10, 1991 it had passed between Clarence Island and the South Orkneys, reaching a position at about 59S 52W, moving northward at approximately 5 kph.

49-6498

Pilot study on the interactions between katabatic winds and polynyas at the Adélie Coast, eastern Antarctica.

Adolphs, U., Wendler, G., *Antarctic science*, Sep. 1995, 7(3), p.307-314, Refs. p.313-314.

Wind factors, Polynyas, Sea ice, Antarctica—Adélie Coast

Infrared satellite images of the coastal area off Adélie Land were examined together with two wind data sets, one from the Dumont d'Urville Station, the other from an Automated Weather Station during the 1986 winter. A correlation between the development of open water areas (polynyas) and the appearance of extremely strong offshore winds can be drawn. The wind direction tended to be more perpendicular to the coastline during these extreme 'events', suggesting a katabatic origin of the increase in wind strength. In the study area the influence of the katabatic wind on the sea ice extends 20-100 km offshore. Sea ice motion further off the coast seems to be more dominated by synoptic-scale weather systems. Broader scale atmospheric influences may create large polynyas which influence the development of coastal winds, as the temperature contrast between open water and the cold continent generates its own circulation. Strong wind events can have a weakening effect on the coastal sea ice which can lead to a much more sensitive reaction of the sea ice in response to following anomalous wind events. (Auth.)

49-6499

Local surface energy balance of the Ecology Glacier, King George Island, Antarctica: measurements and modelling.

Bintanja, R., *Antarctic science*, Sep. 1995, 7(3), p.315-325, 24 refs.

Glacier heat balance, Glacier mass balance, Glacier ablation, Meteorological factors, Antarctica—King George Island

Meteorological measurements performed during the austral summer of 1990-91 are used to evaluate the surface energy balance and ablation at an elevation of 100 m asl on the Ecology Glacier, which is an outlet glacier of the main ice cap of King George I. Strong, gusty westerly winds prevail, although occasional southeasterly winds from the Weddell Sea reach the island. Generally, the climate can be characterized as relatively warm and humid with mean summer temperatures well above 0°C. As a result, considerable ablation (0.75 m water equivalent per month) takes place in the lower parts of the glacier. In spite of the large amount of cloud (0.83), solar radiation provided most of the energy used for melting (70.3 W/m^2). The longwave radiation, sensible heat flux and latent heat flux contributed -9.5, 27.4 and 7.4 W/m^2 respectively. Calculations show that a temperature rise of 1°C increases the ablation by almost 15%. (Auth. mod.)

49-6500

Synoptic origins of precipitation over the Antarctic Peninsula.

Turner, J., Lachlan-Cope, T.A., Thomas, J.P., Colwell, S.R., *Antarctic science*, Sep. 1995, 7(3), p.327-337, 16 refs.

Meteorological data, Precipitation (meteorology), Atmospheric disturbances, Snow accumulation, Antarctica—Antarctic Peninsula

The synoptic origins of precipitation on the western side of the Antarctic Peninsula over the one year period Mar. 1992 to Feb. 1993 are investigated using meteorological observations, satellite imagery and analyses produced by the UK Meteorological Office. Precipitation at Rothera Station was found to occur at 30% of the synoptic reporting time with 80% of precipitation reports being associated with cyclonic disturbances. Although three quarters of all precipitation reports were for snow, the proximity of Rothera to the zone of maximum cyclonic activity meant that incursions of mild air produced rain in all seasons. During the year 95% of all precipitation was classed as slight. Variability of precipitation on the intraseasonal timescale was highly dependent on the synoptic-scale circulation. The most common synoptic situation for precipitation was a frontal cyclone over the Bellingshausen Sea which accounted for 38% of all precipitation events and 62% of the moderate and heavy precipitation reports. Of the extra-tropical cyclones that gave precipitation 49% were found to have developed south of 60°S. (Auth. mod.)

49-6501

Polar Ozone and Aerosol Measurement experiment (POAM II).

Bevilacqua, R.M., et al, *SPIE—The International Society for Optical Engineering. Proceedings*, 1994, Vol.2266, Optical Spectroscopic Techniques and Instrumentation for Atmospheric and Space Research, San Diego, California, 25-27 July, 1994. Edited by J.X. Wang and P.B. Hays, p.374-382.

DLC QC450.O67

Ozone, Stratosphere, Remote sensing, Spaceborne photography, Polar regions, Aerosols, Measuring instruments, Water vapor, Atmospheric composition

The Polar Ozone and Aerosol Measurement experiment (POAM II) was launched on the SPOT 3 satellite on Sep. 25, 1993. POAM II is designed to measure the vertical profiles of the polar ozone, aerosols, water vapor, nitrogen dioxide, atmospheric density and temperature in the stratosphere and upper troposphere. It makes solar occultation measurements in nine channels defined by narrowband filters. The field of view is 0.01 by 1.2°, with an instantaneous vertical resolution of 0.6 km at the tangent point in the earth's atmosphere. The SPOT 3 satellite is in a 98.7° inclined sun-synchronous orbit at an altitude of 833 km. From the measured transmissions, it is possible to determine the density profiles of aerosols, O_3, H_2O, and NO_2. Using the assumption of uniformly mixed oxygen, one is also able to determine the temperature. The authors present details of the POAM II instrument design, including the optical configuration, electronics and measurement accuracy. They also present preliminary results from the occultation measurements made to date. (Auth.)

49-6502

IGARSS'95. Quantitative remote sensing for science and applications.

International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995, New York, Institute of Electrical and Electronics Engineers, 1995, 2331p. (3 vols.), Refs. passim. For selected papers see 49-6503 through 49-6578 or F-53477, F-53478, F-53480 through F-53484 and I-53479.

Remote sensing, Spaceborne photography, Synthetic aperture radar, Radio echo soundings, Radiometry, Backscattering, Ice surveys, Sea ice distribution, Snow surveys, Glacier surveys

This is a collection of papers presented at the International Geoscience and Remote Sensing Symposium held in Florence, Italy, July 10-14, 1995. Eight papers are pertinent to Antarctica and deal with the following: comparison of seasonal sea ice model results with satellite microwave data; comparison of variations in seasonal sea ice formation with bottom water outflow data; atmospheric composition measurements; time series data analyses for climate change detection; azimuthal modulation of the microwave signature over antarctic sea and glacial ice; sea ice motion analysis; retrieval of temperature profiles over sea ice; and characterization of antarctic firn.

49-6503

Atmospheric attenuation correction and ice flag algorithms for NSCAT.

Yueh, S.H., Tsai, W.Y., Huddleston, J.N., Lou, S.H., Houshmand, B., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.74-76, 5 refs.

Ice detection, Ice water interface, Marine meteorology, Marine atmospheres, Wind (meteorology), Atmospheric circulation, Ocean currents, Terrain identification, Radar echoes, Atmospheric attenuation, Spaceborne photography

49-6504

Detection of abnormal vegetation change in the Monchegorsk, Russia, area.

Solheim, I., Høgda, K.A., Tømmervik, H.A., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.105-107, 8 refs.

Air pollution, Environmental impact, Vegetation patterns, Plant physiology, Physiological effects, Terrain identification, Spaceborne photography, Russia—Kola Peninsula, Russia—Monchegorsk

49-6505

Assessment of dependence between SAR data focusing parameters and tundra habitat classification.

Bel'chanskiĭ, G.I., Ovchinnikov, G.K., Kozlenko, N.N., Douglas, D.C., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.219-221, 5 refs.

Tundra vegetation, Tundra terrain, Vegetation patterns, Plant ecology, Ecosystems, Terrain identification, Geobotanical interpretation, Synthetic aperture radar, Spaceborne photography, United States—Alaska—Prudhoe Bay

49-6506

New balloon-borne MIPAS-B2 limb emission sounder.

Friedl-Vallon, F., Maucher, G., Oelhaf, H., Seefeldner, M., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.242-244, 7 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Ozone, Sounding, Meteorological instruments, Balloons, Sweden

49-6507

Statistics of thermal microwave emission from furrowed fields.

Bobrov, P.P., Shchetkin, I.M., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.281-283, 3 refs.

Frost penetration, Thaw depth, Soil surveys, Aerial surveys, Radiometry, Agriculture

49-6508

Comparative evaluation of ALMAZ, ERS-1, JERS-1 and Landsat-TM for discriminating wet tundra.

Bel'chanskiĭ, G.I., Ovchinnikov, G.K., Douglas, D.C., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.309-311, 2 refs.

Tundra vegetation, Tundra terrain, Vegetation patterns, Plant ecology, Wetlands, Terrain identification, Geobotanical interpretation, Synthetic aperture radar, Spaceborne photography, United States—Alaska—Prudhoe Bay

49-6509

Comparison of seasonal sea-ice model results with satellite microwave data in the Weddell Sea.

Drinkwater, M.R., Fischer, H., Kreyscher, M., Harder, M., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.357-359, 9 refs.

Ice surveys, Sea ice distribution, Drift, Ice water interface, Ice models, Oceanographic surveys, Drift stations, Synthetic aperture radar, Spaceborne photography, Antarctica—Weddell Sea

Sea-ice simulations are generated with a dynamic-thermodynamic coupled ice-ocean model in the Weddell Sea for a period in 1992. The model output is compared with detailed measurements made at a drifting ice camp, and with ice kinematics measurements made by ERS-1. Results indicate that the model reproduces Eulerian drift velocity at ISW-1 relatively well during the early drift period, provided rheological parameters are scaled correctly. Deviations of velocity components from observed values along a Lagrangian drift trajectory also require parameter adjustments to achieve correspondence. (Auth.)

49-6510

Analysis of C-band backscatter measurements of thin arctic sea ice.

Pettersson, M., Grandell, J., Carlström, A., Pallonen, J., Ulander, L.M.H., Hallikainen, M., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.360-362, 6 refs.

Ice surveys, Sea ice distribution, Ice cover thickness, Radio echo soundings, Backscattering, Airborne radar, Helicopters, Synthetic aperture radar, Spaceborne photography

49-6511

Passive microwave observations of snow and frozen soil at 3.95 GHz.

Boiarskiĭ, D.A., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.383-385, 5 refs.

Snow surveys, Snow stratigraphy, Snow temperature, Soil surveys, Frozen ground temperature, Frost penetration, Radiometry

49-6512

Temporal change in the extinction coefficient of snow on the Greenland ice sheet from an analysis of Seasat and Geosat altimeter data.

Davis, C.H., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.386-388, 5 refs.

Ice sheets, Glacier surveys, Glacier oscillation, Glacier thickness, Glacier surfaces, Snow ice interface, Snow cover effect, Backscattering, Radiation absorption, Radio echo soundings, Spaceborne photography, Greenland

49-6513

Optical propagation through sea ice.

Longacre, J.R., Clark, J.H., Landry, M.A., Manstan, R.R., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.399-401, 5 refs.

Ice surveys, Sea ice, Ice optics, Ice cover thickness, Ice structure, Ice growth, Lidar, Light transmission, Attenuation

49-6514

Comparison of variations in sea-ice formation in the Weddell Sea with seasonal bottom-water outflow data.

Drinkwater, M.R., Long, D.G., Early, D.S., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.402-404, 7 refs.

Ice formation, Air ice water interaction, Ice cover effect, Ice water interface, Ice heat flux, Brines, Ocean currents, Water transport, Antarctica—Weddell Sea

Seasonal and interannual variability of antarctic sea ice formation were observed using ERS-1 satellite microwave radar in the Weddell Sea. Time series from 6 antarctic regions with recurring ice-shelf polynya systems indicate relationships between the timing of seasonal peaks in measured bottom water outflow and ice formation rates. Results provide evidence about the critical periods of high surface heat fluxes and clues to primary brine production locations. (Auth.)

49-6515

Spatial and temporal observations of summer ice melt using ERS-1 SAR imagery.

Holt, B., Martin, S., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.405-406, 6 refs.

Pack ice, Ice floes, Ice melting, Ice water interface, Ice heat flux, Ice openings, Synthetic aperture radar, Spaceborne photography

49-6516

Investigation of scattering mechanisms from snow covered ice.

Fung, A.K., Bredow, J.W., Gogineni, S.P., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.407-409, 1 ref.

Salt ice, Snow ice interface, Snow cover effect, Brines, Backscattering

49-6517

Permittivity of sea ice at Ka-band.

Lytle, V.I., Ackley, S.F., MP 3654, International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.410-413, 4 refs.

Ice surveys, Sea ice, Ice dielectrics, Ice electrical properties, Ice structure, Ice growth, Brines, Radio echo soundings

Measurements of the complex permittivity of sea ice at Ka-Band (26.5 to 40 GHz) were collected in the CRREL laboratory using a step frequency radar. Columnar and granular sea ice samples were prepared from cores of laboratory-grown sea ice sheets with salinities ranging from 3 to 8 ppt. The authors measured the permittivity at temperatures from -30 to -12 C in three orthogonal directions. It was found for all samples that the imaginary part of the dielectric constant is highly dependent on the brine volume of the sea ice, which in turn depends on the bulk salinity and the temperature of the sample. For columnar ice, consisting of approximately ellipsoidal brine pockets embedded in an ice matrix, the imaginary part of the dielectric constant was anisotropic, and depended on the relative orientation of the electric field and the axes of the brine pockets. The highest values of the imaginary part of the permittivity were measured when the electric field was oriented parallel to the direction of ice growth, or along the longest axes of the brine pockets.

49-6518

Unsupervised classification of arctic sea ice using neural network.

Comiso, J.C., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.414-418, 10 refs.

Ice surveys, Sea ice distribution, Ice cover thickness, Ice conditions, Ice surface, Ice edge, Radiometry, Radio echo soundings, Spaceborne photography

49-6519

Study of the relationship between the scale of sea ice deformation and radar backscatter intensity using ERS-1 SAR.

Onstott, R.G., Miller, D., Shuchman, R.A., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.419-421, 3 refs.

Ice surveys, Sea ice distribution, Ice cover thickness, Ice deformation, Pressure ridges, Ice surface, Backscattering, Synthetic aperture radar, Spaceborne photography

49-6520

Low frequency microwave radiometer observations of saline ice.

Bennett, E., Knapp, E., Swift, C.T., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.423-425, 2 refs.

Ice surveys, Salt ice, Ice cover thickness, Ice temperature, Radiometry, Environmental tests

49-6521

Atmospheric composition measurements by the Microwave Limb Sounder (MLS) on the Upper Atmosphere Research Satellite.

Peckham, G.E., et al, International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.429-431, 22 refs.

Polar atmospheres, Atmospheric composition, Atmospheric circulation, Stratosphere, Ozone, Meteorological instruments, Sounding, Spaceborne photography, Antarctica

The Microwave Limb Sounder (MLS) has monitored the composition of the stratosphere and lower mesosphere for more than three years since its launch on the Upper Atmosphere Research Satellite in Sep. 1991. The MLS measures thermal emission from the atmospheric limb at millimeter wavelengths and is the first limb sounder to operate at these wavelengths from space. Major results to date are summarized. The depletion of ozone in the antarctic spring is illustrated with maps for 1991, '92 and '93. Maps for the Arctic are compared with corresponding maps for the Antarctic. A significant decrease in gaseous HNO_3 has been observed in the antarctic vortex. Water vapor fields used as tracers illustrate dynamical features of the winter polar vortices. (Auth. mod.)

49-6522

Airborne polar experiment (APE).

Stefanutti, L., MacKenzie, R., Borrmann, S., Khattatov, V.U., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.432-434, 1 ref.

Polar atmospheres, Atmospheric composition, Stratosphere, Polar stratospheric clouds, Aerosols, Ozone, Airborne radar

49-6523

Observations of the stratospheric composition with the balloon-borne and space-based MIPAS limb emission sounders.

Oelhaf, H., Fischer, H., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.435-439, 18 refs.

Polar atmospheres, Atmospheric composition, Stratosphere, Ozone, Meteorological instruments, Balloons, Spaceborne photography

49-6524

Time series analysis of SMMR and SSM/I data for climate change detection.

Johannessen, O.M., Miles, M.W., Bjørgo, E., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.625-626.

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Radiometry, Spaceborne photography, Statistical analysis, Global warming, Antarctica

Sea ice is a sensitive component of the climate system, hence reductions in arctic and antarctic sea ice covers could be indicative of greenhouse warming. The most consistent source of information on sea ice parameters is microwave remote sensing from polar-orbiting satellites. Previous analyses of Scanning Multichannel Microwave Radiometer (SSMR) data from 1978-87 revealed a significant decrease in arctic sea ice extent with no changes in the Antarctic. Here, the authors extend the record to 1994 by including data from the subsequent Special Sensor Microwave Imager (SSM/I). This involves intercalibrating the SMMR-SSM/I data during their six-week overlap period, achieved at the sea ice concentration level using the NORSEX algorithm. Analysis of the merged 1978-94 continuous sea ice time series reveals continued decreases in arctic ice extent and area. A slight decrease in antarctic ice extent during the period was found. (Auth. mod.)

49-6525

Combined use of radar and microwave radiometer in classification of sea ice types.

Hallikainen, M., Toikka, M., Kurvonen, L., Grandell, J., Mäkynen, M., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.627-629, 1 ref.

Ice surveys, Sea ice distribution, Ice conditions, Ice reporting, Radiometry, Airborne radar, Synthetic aperture radar, Spaceborne photography, Bothnia, Gulf

49-6526

Wave spectra of SAR imagery of the Odden ice tongue.

Wadhams, P., Parmiggiani, F., Tadross, M., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.630-633, 12 refs.

Ice surveys, Sea ice distribution, Ice cover thickness, Ice edge, Ice water interface, Ocean waves, Radio echo soundings, Synthetic aperture radar, Spaceborne photography, Greenland Sea

49-6527

Effect of summer-to-fall transition on ERS-1 SAR and SSM/I images of sea ice.

Beaven, S.G., Gogineni, S.P., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.634-637, 12 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice formation, Backscattering, Synthetic aperture radar, Spaceborne photography

49-6528

Exploration of C-band σ^o dependence on azimuth angle over antarctic sea and glacial ice.

Early, D.S., Long, D.G., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.638-640, 3 refs.

Ice surveys, Sea ice, Ice surface, Ice cover effect, Glacier surveys, Glacier surfaces, Glacier ice, Backscattering, Spaceborne photography, Antarctica

In previous studies, the radar backscatter measurements from polar glacial ice have demonstrated modulation in azimuth angle. Azimuthal modulation is a function of the wind-induced surface characteristics of the glacial ice. In a continuing evaluation of the ERS-1 C-band scatterometer as a tool for studying polar sea ice, the authors evaluate the azimuthal modulation characteristics of antarctic sea ice. By using several study regions dispersed in the antarctic seasonal sea ice pack, the scatterometer data is evaluated for evidence of azimuthal modulation. The incidence angle dependence is estimated and removed in each study region before determining whether azimuthal modulation is present in the data. Results show that there is negligible azimuthal modulation at the scale of observation of the ERS-1 C-band scatterometer. (Auth.)

49-6529

Ice motion analysis on different spatial scales in the Weddell Sea.

Rebhan, H., Li, A.N., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.641-643, 5 refs.

Ice surveys, Sea ice distribution, Drift, Ice air interface, Wind factors, Radiometry, Synthetic aperture radar, Spaceborne photography, Antarctica—Weddell Sea

Ice motion vector fields derived from satellite images are analyzed for one region in the central part of the Weddell Sea. By taking overlapping ERS-1 SAR and NOAA-AVHRR data the analysis could be made for approximately the same time period. Whereas mean values for velocity and direction are consistent for each sensor, the shear of the ice pack is much higher for the AVHRR frames. Short time variations due to changing surface wind conditions are clearly visible in the AVHRR data. (Auth.)

49-6530

Seasonal variations in active microwave signatures of sea ice in the Greenland Sea during 1992 and 1993.

Thomsen, B.B., Skriver, H., Pedersen, L.T., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.644-646, 7 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice surface, Ice water interface, Polynyas, Backscattering, Synthetic aperture radar, Spaceborne photography, Greenland Sea

49-6531

Extracting curvilinear features from synthetic aperture radar images of arctic ice: algorithm discovery using the genetic programming paradigm.

Daida, J.M., Hommes, J.D., Ross, S.J., Vesecky, J.F., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.673-675, 6 refs.

Ice surveys, Ice cover thickness, Ice surface, Pressure ridges, Backscattering, Synthetic aperture radar, Spaceborne photography, Image processing, Computer programs

49-6532

Effects of snow cover on sea ice emission.

Tjuatja, S., Fung, A.K., Comiso, J.C., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.697-699, 7 refs.

Ice surveys, Sea ice, Ice surface, Ice structure, Ice temperature, Snow ice interface, Snow cover effect, Radiance, Radiometry

49-6533

Emissivity of snow-covered terrains for spaceborne applications.

Noll, J., Poiares Baptista, J.P.V., Borgeaud, M., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.716-718, 4 refs.

Snow surveys, Snow surface, Snow temperature, Snow water equivalent, Snow cover effect, Radiance, Radiometry, Spaceborne photography

49-6534

Winter boreal forest canopy BRF results: comparisons between airborne data, laboratory simulations and geometrical-optical model data.
Soffer, R.J., Miller, J.R., Wanner, W., Strahler, A.H., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1995, p.800-802, 6 refs.
Plant ecology, Vegetation patterns, Forest ecosystems, Forest canopy, Snow cover effect, Environment simulation, Radiometry, Aerial surveys, Spaceborne photography

49-6535

Microwave methods for discriminating among sea ice, surface winds, and atmospheric parameters in the Arctic.
Cavalieri, D.J., Chang, A.T.C., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.845-847, 6 refs.
Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Air ice water interaction, Humidity, Wind factors, Radiometry, Synthetic aperture radar, Spaceborne photography, Bering Sea, Chukchi Sea

49-6536

Use of satellite remote sensing to monitor lead dynamics.
Onstott, R.G., Wackerman, C.C., Shuchman, R.A., Fett, R.W., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.848-850, 2 refs.
Ice surveys, Sea ice distribution, Ice openings, Polynyas, Ice water interface, Air ice water interaction, Radiometry, Synthetic aperture radar, Spaceborne photography, Beaufort Sea

49-6537

Measurements with the CARABAS SAR sensor during BEERS-94.
Gustavsson, A., et al, International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.851-855, 11 refs.
Ice surveys, Sea ice distribution, Ice conditions, Pressure ridges, Ice reporting, Radiometry, Synthetic aperture radar, Airborne radar, Spaceborne photography, Baltic Sea

49-6538

Real-time use of ERS-1 SAR imagery for monitoring the ice in the Baltic Sea.
Håkansson, B., Moberg, M., Thompson, T., Gustavsson, A., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.856-858, 5 refs.
Ice surveys, Sea ice distribution, Ice conditions, Ice reporting, Ice forecasting, Synthetic aperture radar, Spaceborne photography, Baltic Sea

49-6539

Ultra-wideband radar measurements over bare and snow-covered saline ice.
Gogineni, S.P., Jezek, K.C., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.859-861, 2 refs.
Ice surveys, Salt ice, Ice surface, Ice structure, Ice salinity, Snow ice interface, Backscattering, Radio echo soundings

49-6540

Delay/Doppler radar altimeter for ice sheet monitoring.
Raney, R.K., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.862-864, 18 refs.
Ice sheets, Glacier surveys, Glacier thickness, Glacier surfaces, Height finding, Topographic surveys, Radio echo soundings, Spaceborne photography

49-6541

Design and performance of a phase-monopulse radar altimeter for continental ice sheet measurement.
Jensen, J.R., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.865-867, 5 refs.
Ice sheets, Glacier surveys, Glacier thickness, Glacier surfaces, Height finding, Topographic surveys, Radio echo soundings, Spaceborne photography

49-6542

Identification of the deformed sea ice fields from ERS-1 SAR image by wavelets.
Similä, M., Helminen, J., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.868-870, 4 refs.
Ice surveys, Ice conditions, Ice surface, Ice deformation, Pressure ridges, Ice reporting, Synthetic aperture radar, Radio echo soundings, Spaceborne photography, Baltic Sea

49-6543

Retrieval of dry and wet snow distributions from SSM/I measurements and MMS forecast results.
Schols, J.L., Weinman, J.A., Stewart, R.E., Lawson, R.P., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.887-889, 10 refs.
Snowstorms, Falling snow, Snowfall, Particle size distribution, Weather forecasting, Radiometry, Radio echo soundings, Spaceborne photography

49-6544

Overview of ERS-1 scientific results obtained from ocean and sea ice observations.
Johannessen, J.A., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1035-1037, 4 refs.
Ice surveys, Sea ice distribution, Ice conditions, Ice forecasting, Marine meteorology, Ocean currents, Weather forecasting, Spaceborne photography

49-6545

Retrieval of temperature profiles over sea ice with multisensor analysis: combination of the DMSP's SSM/I, OLS, and SSM/T1 sensors.
Miao, J.G., Markus, T., Burns, B.A., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1142-1144, 6 refs.
Polar atmospheres, Marine atmospheres, Ice surveys, Sea ice distribution, Ice conditions, Ice temperature, Ice air interface, Air temperature, Surface temperature, Radiometry, Spaceborne photography, Antarctica—Weddell Sea

In polar regions the surface conditions are complex, with mixtures of open water and different types of ice having different emissivities and coverage in the footprints of Special Sensor Microwave Temperature (SSM/T1.) In this paper the authors have combined SSM/T1 data with coincident data from the Special Sensor Microwave Imager (SSM/I) and the Operational Linescan System (OLS) to get surface information, specifically ice concentration and surface temperature, from which the emissivities of open water and two ice types at a frequency of 50.5 GHz are estimated. The temperature retrieval algorithm is based on the constrained linear inversion method. Temperature profiles are retrieved for the Weddell Sea region during July 1992, and compared to radiosonde data from the German research vessel *Polarstern*. The results show that multisensor retrieval on the average gives a 1°K (rms) improvement in the lower troposphere (h<5 km). (Auth. mod.)

49-6546

Direct estimates of CO_2 flux in arctic environments using a spectral vegetation index.

Hope, A.S., et al, International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1236-1238, 5 refs.

Polar atmospheres, Atmospheric composition, Atmospheric circulation, Tundra climate, Tundra vegetation, Vegetation patterns, Nutrient cycle, Radiometry, Carbon dioxide, United States—Alaska—North Slope

49-6547

Mapping of air pollution effects on the vegetation cover in the Kirkenes-Nikel area using remote sensing.

Høgda, K.A., Tømmervik, H.A., Solheim, I., Lauknes, I., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1249-1251, 6 refs.

Polar atmospheres, Air pollution, Environmental impact, Vegetation patterns, Plant physiology, Physiological effects, Spaceborne photography, Norway, Russia—Kola Peninsula

49-6548

Analysis of optical beam spread measurements in sea ice with modelled physical properties.

Tanis, F.J., Grace, D., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1442-1444, 5 refs.

Ice surveys, Sea ice, Ice optics, Ice water interface, Ice structure, Lidar, Light scattering

49-6549

Theoretical models for active and passive remote sensing of sea ice.

Lee, Y.H., Lee, J.K., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1451-1453, 6 refs.

Ice surveys, Sea ice, Ice structure, Ice salinity, Ice density, Ice models, Radiometry, Backscattering

49-6550

Spectral detection of subarctic vegetation phenophases.

Shibayama, M., et al, International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1488-1490, 5 refs.

Phenology, Plant ecology, Plant physiology, Vegetation patterns, Radiometry, Global warming, Finland

49-6551

Observations of the emissivity of snow and ice surfaces from the SAAMEX and MACSI airborne campaigns.

English, S.J., Jones, D.C., Hewison, D.J., Saunders, R.W., Hallikainen, M., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1493-1495, 8 refs.

Ice surveys, Snow surveys, Ice surface, Snow ice interface, Snow cover effect, Snow surface, Snow temperature, Snow water content, Radiometry, Airborne radar, Bothnia, Gulf, Finland

49-6552

Potential of RADARSAT data to estimate the snow water equivalent based on results from ERS-1.

Bernier, M., Fortin, J.P., Gauthier, Y., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1496-1498, 11 refs.

Snow surveys, Snow water equivalent, Radiometry, Synthetic aperture radar, Airborne radar, Spaceborne photography, Canada—Quebec

49-6553

Semi-empirical model for radar backscatter from snow at 35 and 94 GHz.

Ulaby, F.T., Siqueira, P., Nashashibi, A., Sarabandi, K., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1499-1501, 3 refs.

Snow surveys, Snow depth, Snow density, Snow water content, Backscattering, Radio echo soundings

49-6554

In-situ backscattering measurements of snow-cover with coherent scatterometers at 5.3 and 35 GHz.

Strozzi, T., Mätzler, C., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1502-1504, 9 refs.

Snow surveys, Snow depth, Snow density, Snow cover structure, Snow electrical properties, Backscattering, Radio echo soundings, Radar

49-6555

Analysis of DEM corrected ERS-1 SAR data for snow monitoring.

Guneriussen, T., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1505-1507, 5 refs.

Snow surveys, Snow cover distribution, Snow water content, Backscattering, Synthetic aperture radar, Spaceborne photography

49-6556

SIR-C/X-SAR mapping snow in alpine region.

Shi, J.C., Dozier, J., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1508-1510, 6 refs.

Snow surveys, Snow cover distribution, Terrain identification, Topographic effects, Backscattering, Synthetic aperture radar, Spaceborne photography

49-6557

Combined use of radar and microwave radiometer in retrieval of snow characteristics.

Hallikainen, M., Kurvonen, L., Koskinen, J., Jääskeläinen, V., Mäkynen, M., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1511-1514, 3 refs.

Snow surveys, Snow cover distribution, Snow water equivalent, Terrain identification, Backscattering, Radiometry, Synthetic aperture radar

49-6558

Simulation of geometric distortion in a synthetic aperture radar image of alpine terrain.

Corner, W.R., Rees, W.G., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1515-1517, 6 refs.

Terrain identification, Mountains, Topographic effects, Synthetic aperture radar, Spaceborne photography, Image processing

49-6559

Evaluation of the data obtained by satellite-borne microwave sensor for snowpack observations.

Suzuki, M., Sasaki, M., Murata, K., Fujino, K., Takeda, K., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1518-1520, 1 ref.

Snow surveys, Snow depth, Snow water content, Snow density, Snow cover structure, Backscattering, Synthetic aperture radar, Spaceborne photography

49-6560

SIR-C/X-SAR investigations of snow properties in alpine region.

Shi, J.C., Dozier, J., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1582-1584, 9 refs.

Snow surveys, Snow cover distribution, Snow water content, Snow density, Synthetic aperture radar, Spaceborne photography

49-6561

Investigation of the Martian thermal parameters with radiowave active-passive approach.

Armand, N.A., Kozenko, A.V., Shmaleniuk, A.S., Tishchenko, IU.G., Zharkov, V.N., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1995, p.1613-1615, 4 refs.

Mars (planet), Planetary environments, Permafrost thickness, Permafrost heat balance, Geothermy, Radiometry, Spacecraft, Spaceborne photography

49-6562

Detection of hail areas with airborne weather radar.

IAnovskiĭ, F.IU., Shupiatskiĭ, A.B., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1670-1672, 6 refs.

Hail clouds, Hailstone growth, Cloud physics, Ice detection, Weather forecasting, Airborne radar, Meteorological instruments

49-6563

Monitoring temporal dynamics of snowmelt with ERS-1 SAR.

Rott, H., Nagler, T., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1747-1749, 5 refs.

Snow surveys, Snow cover distribution, Snow hydrology, Snowmelt, Runoff forecasting, Synthetic aperture radar, Spaceborne photography, Austria

49-6564

Snow cover monitoring using multitemporal ERS-1 SAR data.

Piesbergen, J., Holecz, F., Haefner, H., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1750-1752, 7 refs.

Snow surveys, Snow cover distribution, Snow line, Snow water content, Backscattering, Synthetic aperture radar, Spaceborne photography

49-6565

Simultaneous 35, 95, and 225 GHz fully polarimetric measurements of fallen snow.

Lohmeier, S.P., Baker, J.M., Mead, J.B., McIntosh, R.E., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1753-1755, 5 refs.

Snow surveys, Snow cover structure, Snow water content, Radio echo soundings, Backscattering, Statistical analysis

49-6566

Reassessment of the growth of the Greenland ice sheet using Seasat and Geosat altimeter data referenced to the same earth geoid.

Davis, C.H., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1756-1758, 11 refs.

Ice sheets, Glacier surveys, Glacier oscillation, Glacier thickness, Glacier surfaces, Height finding, Radio echo soundings, Spaceborne photography, Greenland

49-6567

Combination of ERS-1 altimetry and Landsat visible data for mapping of polar ice mass elevation.

Bingham, A.W., Rees, W.G., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1759-1761, 6 refs.

Ice sheets, Glacier surveys, Glacier oscillation, Glacier thickness, Glacier surfaces, Topographic surveys, Height finding, Radio echo soundings, Spaceborne photography

49-6568

Radiometric and structural measurements of snow samples.

Weise, T., Mätzler, C., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1762-1764, 6 refs.

Snow surveys, Snow cover structure, Snow temperature, Snow density, Radiometry, Radio echo soundings

49-6569

Monitoring Swiss alpine snow cover variations using digital NOAA-AVHRR data.

Holzer, T., Baumgartner, M.F., Apfl, G., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1765-1767, 9 refs.

Snow surveys, Snow cover distribution, Snow depth, Snow line, Snow hydrology, Snowmelt, Runoff forecasting, Radiometry, Spaceborne photography, Switzerland

49-6570

Identification of glacier snow equilibrium line using a fuzzy rule-based classifier.

Binaghi, E., Madella, P., Montesano, M.G., Rampini, A., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1768-1770, 12 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Snow line, Spaceborne photography, Image processing, Statistical analysis, Italy

49-6571

Polarimetric signatures of sea ice in the Greenland Sea.

Skriver, H., Pedersen, L.T., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1792-1794, 5 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice floes, Backscattering, Airborne radar, Synthetic aperture radar, Greenland Sea

49-6572

Simultaneous implementation of a synthetic aperture radar and a high resolution optical imager.

Sephton, A.J., et al, International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1797-1799, 1 ref.

Snow surveys, Snow cover distribution, Snow hydrology, Snowmelt, Snow line, Glacier surveys, Glacial hydrology, Glacier mass balance, Runoff forecasting, Synthetic aperture radar, Spaceborne photography

49-6573

EMAC-95 snow and ice airborne campaign.

Hallikainen, M., Attema, E., Wooding, M., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1811-1813, 3 refs.

Snow surveys, Ice surveys, Glacier surveys, Snow cover distribution, Snow water equivalent, Sea ice distribution, Ice conditions, Airborne radar, Synthetic aperture radar

49-6574

First results of a novel 93 GHz airborne imaging radiometer.

Kemppinen, M., Pallonen, J., Lantto, E., Auer, T., Hallikainen, M., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1814-1816, 3 refs.

Ice surveys, Sea ice distribution, Snow surveys, Snow cover distribution, Radiometry, Finland

49-6575

Mutual effects of the climate change and the alpine snow cover and their influence on the runoff regime evaluated with the aid of satellite remote sensing.

Ehrler, C., Seidel, K., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.1973-1975, 9 refs.

Snow surveys, Snow cover distribution, Snow hydrology, Snowmelt, Runoff forecasting, Global warming, Spaceborne photography, Switzerland

49-6576

Characterization of antarctic firn by means of ERS-1 scatterometer measurements.

Rott, H., Rack, W., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.2041-2043, 8 refs.

Ice sheets, Glacier surveys, Snow ice interface, Snow morphology, Snow stratigraphy, Firn stratification, Wind factors, Radio echo soundings, Backscattering, Spaceborne photography, Antarctica

Mean intensities, angular dependence and azimuthal anisotropy of backscattering were analyzed over Antarctica based on scatterometer measurements from ERS-1. The backscattering parameters enable discrimination of various types of snow and ice due to differences in morphology which are the result of accumulation rate, temperature, and wind activity. Azimuthal anisotropy is strongly pronounced in katabatic wind zones and can be related to dominant wind direction. (Auth. mod.)

49-6577

Ground-based millimeter-wave measurements of stratospheric ozone and chlorine monoxide at the arctic NDSC-station Ny-Ålesund.

Sinnhuber, B.M.A., Raffalski, U., Schwaab, G.W., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.2072-2074, 4 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Ozone, Radiometry, Weather stations, Meteorological instruments, Radio echo soundings, Norway—Spitsbergen

49-6578

Results from model comparisons with ERS-1 and field data for snow water equivalent estimation.

Fortin, J.P., Bernier, M., International Geoscience and Remote Sensing Symposium, Firenze (Florence), Italy, July 10-14, 1995. IGARSS'95. Quantitative remote sensing for science and applications. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1995, p.2176-2178, 8 refs.

Snow surveys, Snow cover distribution, Snow stratigraphy, Snow hydrology, Snow water equivalent, Runoff forecasting, Backscattering, Synthetic aperture radar, Radio echo soundings, Spaceborne photography

49-6579

Proceedings.

International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994, Rothrock, D.A., ed, *Annals of glaciology,* 1995, Vol.21, 421p., Refs. passim. For individual papers see 49-6580 through 49-6642 or F-53488 through F-53502, I-53486 and I-53487.

Ice sheets, Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Glacial meteorology, Snow ice interface, Ice cores, Air ice water interaction, Polar atmospheres, Atmospheric circulation, Paleoclimatology, Global warming

This is a collection of papers presented at the International Symposium on the Role of the Cryosphere in Global Change, held in Columbus, OH, Aug. 7-12, 1994. The antarctic research reported deals with climate models and atmospheric analyses, precipitation, snow and ice accumulation rates, ice dating, ice sheet and ground heat flux, climate sensitivity of blue ice areas, subsurface melting, glacier velocities, glaciological maps, sea ice and paleoclimatology. A program of sessions and an author index are included.

49-6580

Greenland under changing climates: sensitivity experiments with a new three-dimensional ice-sheet model.

Fabre, A., Letréguilly, A., Ritz, C., Mangeney, A., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.1-7, 22 refs.

Ice sheets, Glacier oscillation, Glacier mass balance, Glacial meteorology, Ice cores, Paleoclimatology, Global warming, Computerized simulation, Greenland

49-6581

Polythermal three-dimensional modelling of the Greenland ice sheet with varied geothermal heat flux.

Greve, R., Hutter, K., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.8-12, 24 refs.

Ice sheets, Glacier heat balance, Glacier mass balance, Glacier flow, Glacial meteorology, Glacier beds, Ice heat flux, Geothermy, Computerized simulation, Mathematical models, Greenland

49-6582

Surface energy exchange at the equilibrium line on the Greenland ice sheet during onset of melt.

Steffen, K., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.13-18, 6 refs.

Ice sheets, Glacier heat balance, Glacier mass balance, Glacial meteorology, Glacier oscillation, Glacial hydrology, Glacier melting, Glacier surfaces, Snow ice interface, Snow evaporation, Global warming, Greenland

49-6583

1200 year record of accumulation from northern Greenland.

Friedmann, A., Moore, J.C., Thorsteinsson, T., Kipfstuhl, J., Fischer, H., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.19-25, 21 refs.

Ice sheets, Glacier oscillation, Glacier alimentation, Ice cores, Ice dating, Snow ice interface, Snow stratigraphy, Paleoclimatology, Global warming, Greenland

49-6584

Effect of ice-sheet thickness change on the accumulation history inferred from GISP2 layer thicknesses.

Cutler, N.N., Raymond, C.F., Waddington, E.D., Meese, D.A., Alley, R.B., MP 3655, *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.26-32, 21 refs.

Ice sheets, Glacier thickness, Glacier oscillation, Glacier flow, Glacier alimentation, Ice cores, Firn stratification, Snow ice interface, Snow stratigraphy, Paleoclimatology, Greenland

Net accumulation rates at the Greenland summit have been inferred using layer-thickness data from the GISP2 ice core with corrections for strain using a non-linear, one-dimensional flow model of an ice sheet. The flow model accounts for thickness changes in ice-sheet in response to mass-balance variations. The model is used to investigate how net accumulation-rate changes affect the time evolution of: (1) ice thickness, (2) vertical strain rate, and (3) the corresponding internal annual-layer structure. The model, parameterized to fit the present net accumulation rate and thickness of the Greenland ice-sheet summit, has a characteristic time constant for adjustment to accumulation-rate changes of about 6000 a and yields an ice sheet 200-400 m thinner than its present thickness during the last glacial period. Accumulation-rate histories inferred from GISP2 layer-thickness data using both a constant- and a variable-thickness model are compared. The variable-thickness model predicts accumulation rates about 25% lower than the constant-thickness model. Results also indicate that high-frequency changes in accumulation rates (i.e. after the Younger Dryas event) are consistent with earlier analyses.

49-6585

Constraints on Holocene ice-thickness changes in central Greenland from the GISP2 ice-core data.

Bolzan, J.F., Waddington, E.D., Alley, R.B., Meese, D.A., MP 3656, *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.33-39, 17 refs.

Ice sheets, Glacier thickness, Glacier oscillation, Glacier flow, Glacier alimentation, Ice cores, Ice dating, Firn stratification, Snow ice interface, Snow stratigraphy, Paleoclimatology, Greenland

The depth-age relation observed in the GISP2 ice core is the result of the integrated effects of ice-sheet changes over time, as well as the accumulation-rate history. Here the authors construct a forward model to compute ages at various depths in the core. In the model, these ages are functions of parameters that describe the ice thickness as a function of time. Using the maximum-likelihood inverse method, these parameters are iteratively adjusted until measured and computed ages agree satisfactorily. The results suggest that the thickness along the flowline connecting the GISP2 and GRIP drill sites has not changed significantly since the onset of the Holocene.

49-6586

Ground-based radar observations of snow stratigraphy and melt processes in the percolation facies of the Greenland ice sheet.

Zabel, I.H.H., Jezek, K.C., Baggeroer, P.A., Gogineni, S.P., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.40-44, 11 refs.

Ice sheets, Glacier surveys, Glacier oscillation, Glacial hydrology, Glacier melting, Glacial meteorology, Snow ice interface, Snow stratigraphy, Firn stratification, Radio echo soundings, Greenland

49-6587

Characterizing the long-term variability of snow-cover extent over the interior of North America.

Brown, R.D., Hughes, M.G., Robinson, D.A., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.45-50, 19 refs.

Snow cover distribution, Snowfall, Snow line, Snow air interface, Climatic factors, Atmospheric circulation, Global warming

49-6588

Melt features in ice cores from Site J, southern Greenland: some implications for summer climate since AD 1550.

Kameda, T., Narita, H., Shoji, H., Nishio, F., Fujii, Y., Watanabe, O., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.51-58, 31 refs.

Ice sheets, Glacial hydrology, Glacial meteorology, Glacier melting, Ice cores, Firn stratification, Snow ice interface, Snow stratigraphy, Paleoclimatology, Greenland

49-6589

Indications of melt in near-surface ice-core stratigraphy: comparisons with passive-microwave melt signals over the Greenland ice sheet.

Rowe, C.M., Anderson, M.R., Mote, T.L., Kuivinen, K.C., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.59-63, 7 refs.

Ice sheets, Glacial hydrology, Glacial meteorology, Glacier melting, Ice cores, Firn stratification, Snow ice interface, Snow stratigraphy, Radiometry, Spaceborne photography, Greenland

49-6590

Variations in melt-layer frequency in the GISP2 ice core: implications for Holocene summer temperatures in central Greenland.

Alley, R.B., Anandakrishnan, S., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.64-70, 33 refs.

Ice sheets, Glacial hydrology, Glacial meteorology, Glacier melting, Ice cores, Firn stratification, Snow ice interface, Snow stratigraphy, Paleoclimatology, Greenland

49-6591

Recent variations and regional relationships in Northern Hemisphere snow cover.

Robinson, D.A., Frei, A., Serreze, M.C., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.71-76, 15 refs.

Snow cover distribution, Snowfall, Snow line, Snow air interface, Meteorological data, Statistical analysis, Global warming

49-6592

Variations in aerologically derived arctic precipitation and snowfall.

Serreze, M.C., Rehder, M.C., Barry, R.G., Walsh, J.E., Robinson, D.A., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.77-82, 20 refs.

Polar atmospheres, Atmospheric circulation, Precipitation (meteorology), Snowfall, Snow water equivalent, Snow air interface, Snow evaporation, Snow cover effect, Meteorological data, Global warming

49-6593

Simulations of the 1979-88 polar climates by global climate models.

Chen, B., Bromwich, D.H., Hines, K.M., Pan, X.G., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.83-90, 18 refs.

Polar atmospheres, Atmospheric circulation, Air ice water interaction, Cloud cover, Precipitation (meteorology), Evaporation, Global warming, Computerized simulation

Simulation of the northern and southern polar climates for 1979-88 by 14 global climate models (GCMs), using the observed monthly averaged sea-surface temperatures and sea-ice extents as boundary conditions, is part of an international effort to determine the systematic errors of atmospheric models under realistic conditions, the so-called Atmospheric Model Intercomparison Project (AMIP). In this study, intercomparison of the models' simulation of polar climate is discussed in terms of selected surface and vertically integrated monthly averaged quantities, such as sea-level pressure, cloudiness, precipitable water, precipitation and evaporation/sublimation. The results suggest that the accuracy of model-simulated climate features in high latitudes primarily depends on the horizontal resolution and the treatment of physical processes in the GCMs. AMIP offers an unprecedented opportunity for the comprehensive evaluation and validation of current atmospheric models and provides valuable information for model improvement. (Auth.)

49-6594

Climate change and the arctic hydrologic cycle as calculated by a global coupled atmosphere-ocean model.

Miller, J.R., Russell, G.L., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.91-95, 15 refs.

Polar atmospheres, Atmospheric circulation, Air ice water interaction, Hydrologic cycle, Global warming, Computerized simulation

49-6595

Waxing and waning of the Northern Hemisphere ice sheets.

Marsiat, I., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.96-102, 10 refs.

Ice sheets, Glacier oscillation, Glacier mass balance, Glacial meteorology, Glaciation, Paleoclimatology, Computerized simulation

49-6596

Ice-sheet models as tools for palaeoclimatic analysis: the example of the European ice sheet through the last glacial cycle.

Boulton, G.S., Hulton, N.R.J., Vautravers, M., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.103-110, 17 refs.

Ice sheets, Glacier oscillation, Glacier mass balance, Glacial meteorology, Glaciation, Paleoclimatology, Computerized simulation

49-6597

Thermomechanical modelling of Northern Hemisphere ice sheets with a two-level mass-balance parameterization.

Huybrechts, P., T'siobbel, S., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.111-116, 22 refs.

Ice sheets, Glacier oscillation, Glacier mass balance, Glacial meteorology, Glaciation, Paleoclimatology, Computerized simulation

49-6598

Arctic and antarctic precipitation simulations produced by the NCAR community climate models.

Bromwich, D.H., Chen, B., Tzeng, R.Y., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.117-122, 15 refs.

Polar atmospheres, Atmospheric circulation, Precipitation (meteorology), Evaporation, Humidity, Hydrologic cycle, Global change, Computerized simulation

Precipitation predictions from global-climate models (GCMs) for the ice-covered Arctic Ocean and the ice sheets of Antarctica are among the most important aspects of the inferred response of the polar areas to climate change. The present-day atmospheric-moisture budget poleward of 70 latitude in both hemispheres, as represented by two versions of the NCAR (U.S. National Center for Atmospheric Research) community climate model (CCM1 and CCM2), is compared with observational analyses. The quantities examined on the seasonal and annual time-scales are precipitation, evaporation/sublimation and atmospheric poleward moisture transport. The results are discussed in terms of the physiographic and climatic characteristics of both polar regions and of how the particular models handle moisture transport; CCM1 uses the positive-moisture fixer and CCM2 the semi-Lagrangian transport. A particularly important test both for models and for observations is the degree to which the independently determined moisture-budget quantities actually balance. Deficiencies of both observations and models are discussed. (Auth. mod.)

49-6599

Accumulation in Antarctica and Greenland derived from passive-microwave data: a comparison with contoured compilations.

Zwally, H.J., Giovinetto, M.B., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.123-130, 33 refs.

Ice sheets, Glacier oscillation, Glacier mass balance, Glacier alimentation, Glacial meteorology, Glacier surveys, Radiometry, Spaceborne photography, Statistical analysis, Greenland, Antarctica

The annual rate of net mass accumulation at the surface in the Antarctic and Greenland ice sheets is determined from firn emissivity based on Nimbus-5 ESMR and Nimbus-7 THIR data. In this study the determinations are limited to the areas of dry-snow facies and are based on a hyperbolic function of emissivity. Two coefficients of the function are selected for particular regions of each ice sheet after a comparison with field data selected for their reliability (82 stations in East Antarctica, 69 stations in West Antarctica and 89 stations in Greenland). Derived accumulation values are produced for grid-point locations 100 km apart. These values are compared with interpolated values obtained from the latest contoured compilations of field data. The means of derived values for East and West Antarctica are 12% and 39% larger, respectively, than the mean obtained from interpolated values, suggesting that the isopleth patterns as drawn in the compilation of field data lead to underestimates. (Auth. mod.)

49-6600

Recent increase in South Pole snow accumulation.
Mosley-Thompson, E., et al, MP 3667, *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.131-138, 26 refs.
Ice sheets, Glacier oscillation, Glacier mass balance, Glacier alimentation, Glacial meteorology, Glacier surveys, Snow ice interface, Snow accumulation, Snow surveys, Snow water equivalent, Global warming, Antarctica—Amundsen-Scott Station
This paper summarizes the 37 year history of net accumulation measurements at the geographic South Pole obtained by numerous investigators using a variety of techniques. These data led to the conclusion that annual net snow accumulation has increased in the vicinity of Amundsen-Scott Station since 1955. The records were examined for evidence of a "station effect" but it is concluded that not all of the observed increase can be attributed to snow drift associated with the presence of the station. Furthermore, the accumulation increase at South Pole appears consistent with increases observed at other locations on the East Antarctic Plateau, and in the Peninsula region as well. These data suggest that the recent accumulation increase at Amundsen-Scott Station may be regionally extensive over the East Antarctic Plateau. (Auth.)

49-6601

Ages and ablation and accumulation rates from ^{14}C measurements on antarctic ice.
Van Roijen, J.J., Van der Borg, K., De Jong, A.F.M., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.139-143, 14 refs.
Ice sheets, Glacier oscillation, Glacier mass balance, Glacier flow, Ice cores, Ice spectroscopy, Ice composition, Ice dating, Paleoclimatology, Antarctica—Queen Maud Land
Shallow ice cores from an antarctic blue-ice area at Scharffenbergbotnen were ^{14}C-analyzed using a dry-extraction technique and accelerator mass spectrometry. The in-situ production was determined from the ^{14}CO component and used to deduce the natural $^{14}CO_2$ component. The ages were measured at 10,000±3000 bp. The accumulation and ablation rates determined from the in-situ production are 7-20 and 10 cm/a, respectively, showing agreement with field observations. The derived ages and air-yield data show a nearby origin for the surface ice. (Auth.)

49-6602

Climate, the antarctic ice sheet and ground heat flux.
Paltridge, G.W., Zweck, C.M., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.144-148, 12 refs.
Ice sheets, Glacier oscillation, Glacier mass balance, Glacier heat balance, Glacier thickness, Subglacial drainage, Glacial lakes, Glacier beds, Heat flux, Paleoclimatology, Antarctica
A simple steady-state energy and mass-balance model of the antarctic ice sheet is developed. Basically it is a set of two equations with two unknowns of steady-state height h and potential basal temperature T_b. T_b determines whether, and to what extent, there is liquid water at the base of the ice, which in turn affects the values of h and T_b. Simultaneous changes of sea-level temperature and precipitation changes related to each other, as might be expected from global climate models, indicate a maximum in the field of possible steady-state ice volumes which may not be far from the presently observed conditions. The possibility of cyclical variation in ground heat flux associated with convection of water and heat in the continental crust is discussed. The mechanism might be capable of generating cycles of ice-sheet volume with relatively short periods similar to those of Milankovitch forcing. (Auth.)

49-6603

Antarctic moisture flux and net accumulation from global atmospheric analyses.
Budd, W.F., Reid, P.A., Minty, L.J., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.149-156, 29 refs.
Polar atmospheres, Atmospheric circulation, Humidity, Hydrologic cycle, Ice sheets, Glacier oscillation, Glacier mass balance, Glacier alimentation, Glacial meteorology, Sea level, Global warming, Antarctica
Previous attempts to derive the antarctic surface net accumulation distribution from atmospheric-moisture fluxes, in reasonable agreement with the observed distribution, have encountered many difficulties. The present analysis uses the Australian Bureau of Meteorology Global Atmospheric Assimilation and Prediction Scheme (GASP), which has been operational since 1989, to derive the net air-mass and moisture fluxes over the Antarctic. It is shown that the annual mean net surface accumulation closely resembles the glaciologically observed distribution and provides a physical basis for the observed pattern, through the moisture transports. The variations with latitude and elevation and through the annual cycle are also well reproduced. Although some mass-closure errors still exist, they are expected to become insignificant with the new generation of improved analysis schemes. Consequently, the atmospheric analyses can provide a sound basis for both assessing the performance of global climate models in simulating antarctic accumulation rates and monitoring long-term changes which may occur with global warming. (Auth.)

49-6604

Climate sensitivity of antarctic blue-ice areas.
Bintanja, R., Van den Broeke, M.R., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.157-161, 8 refs.
Ice sheets, Glacier oscillation, Glacier mass balance, Glacier heat balance, Glacial meteorology, Glacier surfaces, Ice air interface, Ice heat flux, Ice sublimation, Antarctica—Heimefront Range
On time-scales of less than ca. 100 years, when the ice topography can be considered stationary, the extent of antarctic blue-ice areas is governed mainly by the surface mass balance. In and near high-elevation blue-ice areas, ablation is due entirely to sublimation. An estimate of the mass-balance profile ranging from a blue-ice area to the adjacent snow surface is presented. By considering changes in sublimation induced by variations in local climate, the deviation from the mass-balance profile is evaluated. It is concluded that even for considerable changes in local climate these deviations remain relatively small and have only little effect on the extent of a blue-ice area. This can be attributed mainly to the steep mass-balance profile. (Auth.)

49-6605

Sub-surface melting in blue-ice fields in Dronning Maud Land, Antarctica: observations and modelling.
Bøggild, C.E., Winther, J.G., Sand, K., Elvehøy, H., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.162-168, 17 refs.
Ice sheets, Glacier oscillation, Glacier mass balance, Glacier melting, Glacial hydrology, Subglacial drainage, Glacial meteorology, Antarctica—Queen Maud Land
During the Norwegian Antarctic Research Expedition 1993-94, field studies were conducted on a blue-ice field in Jutulgryta, Queen Maud Land. Measurements of subsurface temperatures revealed that temperatures in blue ice were about 6°C higher than in the adjacent snow. Despite the predominantly negative air temperatures, a subsurface melt layer was discovered within the uppermost meter of the blue ice. Here the temperature maximum was consistent throughout the entire month of observations, and resulted in both internal melt and water transport. The melting is a consequence of solar radiative penetration and absorption within the ice, i.e. the "solid-state greenhouse". Sensitivity experiments using a non-stationary combined radiative and thermodynamic model reveal that the physical properties (here extinction coefficient, radiation transmittance and albedo) strongly control the formation and vertical extent of the melt layer. The persistence of the subsurface melt layer increases the runoff volume from blue-ice fields, which otherwise might be restricted to a few yearly events when air temperatures reach or exceed the freezing point. (Auth. mod.)

49-6606

340 year record of biogenic sulphur from the Weddell Sea area, Antarctica.
Pasteur, E.C., Mulvaney, R., Peel, D.A., Saltzman, E.S., Whung, P.Y., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.169-174, 26 refs.
Ice sheets, Ice cores, Ice composition, Impurities, Marine atmospheres, Atmospheric composition, Atmospheric circulation, Aerosols, Nutrient cycle, Marine biology, Global change, Antarctica—Dolleman Island, Antarctica—Weddell Sea
Detailed records of methanesulphonic acid (MSA) and non-sea-salt sulphate (nss SO_4^{2}) have been obtained from ice cores drilled on Dolleman I. Annual average concentrations of MSA are presented for the period 1652-1992. Over this time span, the mean annual concentration of MSA is 0.69 µeq/l, the range is 0.13-2.35 µeq/l, and the MSA/nss-SO_4^{2-} ratio is 0.22. The high MSA concentration reflects the proximity of the Weddell Sea, believed to be a region of high marine phytoplankton production. The overall mean nss-SO_4^{2-} concentration is about 66% of the total sulphate deposited in the snowfall. Low-frequency variations of MSA and oxygen-isotope signals correlate closely, indicating that they may be modulated by similar atmospheric processes. Positive correlations are observed between the oxygen-isotope signature and both MSA and nss SO_4^{2-}, significant at the 99% level. A small negative correlation can be seen between both species and the annual duration of sea ice at Scotia Bay, Laurie I., since 1902. (Auth. mod.)

49-6607

1000 year climate ice-core record from the Guliya ice cap, China: its relationship to global climate variability.

Thompson, L.G., et al, *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.175-181, 33 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Ice cores, Ice dating, Firn stratification, Glacial meteorology, Atmospheric circulation, Paleoclimatology, Global warming, China—Kunlun Mountains

49-6608

485 year record of atmospheric chloride, nitrate and sulfate: results of chemical analysis of ice cores from Dyer Plateau, Antarctic Peninsula.

Dai, J.C., Thompson, L.G., Mosley-Thompson, E., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.182-188, 12 refs.

Ice sheets, Ice cores, Ice composition, Snow composition, Snow impurities, Scavenging, Polar atmospheres, Marine atmospheres, Atmospheric composition, Paleoclimatology, Antarctica—Dyer Plateau

Detailed ionic analyses of Dyer Plateau snow show that major soluble impurities in snow include sodium (Na^+), chloride (Cl^-), nitrate (NO_3^-), sulfate (SO_4^{2-}), and acidity (H^+). The ratios of Na^+ to Cl^- concentrations are close to that of sea water, indicating little or no fractionation of sea-salt aerosols. The analyses of core sections from three sites along a 10 km transect show that local spatial variation of snow chemistry in this area is minimal and that temporal (decadal, inter-annual and sub-annual) variations in snow chemistry are very well preserved. Anion analyses of the upper 181 m section of two 235 m ice cores yield a data set of 485 years (1505-1989) of annual snow accumulation and fluxes of Cl^-, NO_3^- and non-sea-salt (nss) SO_4^{2-}. No significant long-term trends are evident in any of the anion fluxes. This is consistent with other antarctic ice-core records showing no significant anthropogenic atmospheric pollution in the high southern latitudes. (Auth. mod.)

49-6609

1000 years of climatic change in China: ice-core $\sigma^{18}O$ evidence.

Lin, P.N., Thompson, L.G., Davis, M.E., Mosley-Thompson, E., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.189-195, 41 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Ice cores, Ice composition, Ice dating, Isotope analysis, Glacial meteorology, Atmospheric circulation, Paleoclimatology, Global warming, China—Qinghai-Xizang Plateau

49-6610

Recent warming as recorded in the Qinghai-Tibetan cryosphere.

Yao, T.D., Thompson, L.G., Jiao, K.Q., Mosley-Thompson, E., Yang, Z.H., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.196-200, 13 refs.

Mountain glaciers, Glacier surveys, Ice cores, Ice composition, Ice dating, Isotope analysis, Glacial meteorology, Paleoclimatology, Global warming, China—Qinghai-Xizang Plateau

49-6611

Mass-balance variability as a base for interpreting ice-core data.

Mikhalenko, V.N., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.201-205, 15 refs.

Mountain glaciers, Glacier surveys, Glacier mass balance, Glacier oscillation, Glacial meteorology, Ice cores, Statistical analysis, Kazakhstan—Tuyuksu Glacier, Tien Shan

49-6612

Application of inventory data for estimating characteristics of and regional climate-change effects on mountain glaciers: a pilot study with the European Alps.

Haeberli, W., Hoelzle, M., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.206-212, 29 refs.

Mountain glaciers, Alpine glaciation, Glacier surveys, Glacier mass balance, Glacier oscillation, Glacial meteorology, Paleoclimatology, Global warming, Computerized simulation, Statistical analysis, Alps

49-6613

Ice-core chemistry record from Snøfjellafonna, northwestern Spitsbergen.

Goto-Azuma, K., et al, *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.213-218, 27 refs.

Ice cores, Ice composition, Ice dating, Snow composition, Scavenging, Glacial meteorology, Polar atmospheres, Marine atmospheres, Atmospheric composition, Atmospheric circulation, Air pollution, Norway—Spitsbergen

49-6614

Are changes in atmospheric cleansing responsible for observed variations of impurity concentrations in ice cores.

Hansson, M.E., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.219-224, 18 refs.

Ice sheets, Ice cores, Ice composition, Impurities, Scavenging, Glacial meteorology, Polar atmospheres, Atmospheric composition, Atmospheric circulation, Air pollution, Global warming, Greenland

49-6615

Recent ice-core climate records from the Cordillera Blanca, Peru.

Davis, M.E., Thompson, L.G., Mosley-Thompson, E., Lin, P.N., Mikhalenko, V.N., Dai, J.C., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.225-230, 21 refs.

Mountain glaciers, Ice cores, Ice composition, Ice dating, Scavenging, Glacial meteorology, Atmospheric circulation, Atmospheric composition, Paleoclimatology, Global warming, Isotope analysis, Peru

49-6616

Recent changes of McCall Glacier, Alaska.

Rabus, B., Echelmeyer, K.A., Trabant, D.C., Benson, C., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.231-239, 23 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier thickness, Glacier mass balance, Glacial meteorology, Polar atmospheres, Global warming, United States—Alaska—Romanzof Mountains

49-6617

"Little Ice Age" glaciers in Kamchatka, northeastern Russia.

Solomina, O.N., Murav'ev, IA.D., Bazanova, L.I., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.240-244, 8 refs.

Alpine glaciation, Glacier surveys, Glacier oscillation, Glacial deposits, Moraines, Soil dating, Volcanic ash, Lichens, Paleoclimatology, Russia—Kamchatka Peninsula

49-6618

On the use of radiosondes to model glacier ablation.

Conway, H., Rasmussen, L.A., Hayes, P., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.245-250, 15 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier ablation, Glacier mass balance, Glacial meteorology, United States—Washington

49-6619

Change in position and altitude of a small outlet glacier during the period 1943-92: Leverett Glacier, West Greenland.

Van Tatenhove, F.G.M., Roelfsema, C.M., Blommers, G., Van Voorden, A., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.251-258, 14 refs.

Glacier surveys, Glacier oscillation, Glacier thickness, Glacial meteorology, Aerial surveys, Photogrammetric surveys, Greenland—Leverett Glacier

49-6620

Thickening of Jakobshavns Isbræ, West Greenland, measured by airborne laser altimetry.

Thomas, R.H., Krabill, W.B., Frederick, E.B., Jezek, K.C., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.259-262, 7 refs.

Glacier surveys, Glacier oscillation, Glacier thickness, Aerial surveys, Lidar, Height finding, Greenland—Jakobshavns Isbræ

49-6621

Relation of glacier variations to climate changes in Iceland.

Sigurdsson, O., Jónsson, T., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.263-270, 18 refs.

Glacier surveys, Glacier oscillation, Glacial meteorology, Glacier surges, Climatic changes, Iceland

49-6622

Glaciological observations of Brúarjökull, Iceland, using synthetic aperture radar and thematic mapper satellite data.

Hall, D.K., Williams, R.S., Jr., Sigurdsson, O., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.271-276, 26 refs.

Glacier surveys, Glacier oscillation, Glacier surges, Glacier surfaces, Snow line, Snow ice interface, Glacial lakes, Synthetic aperture radar, Backscattering, Spaceborne photography, Iceland

49-6623

Velocities of Pine Island Glacier, West Antarctica, from ERS-1 SAR images.

Lucchitta, B.K., Rosanova, C.E., Mullins, K.F., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.277-283, 19 refs.

Ice sheets, Glacier surveys, Glacier flow, Glacier surfaces, Glacier oscillation, Glacier mass balance, Synthetic aperture radar, Spaceborne photography, Antarctica—Pine Island Glacier

Pine Island Glacier is one of the major ice streams draining West Antarctica. The authors calculated average velocities for both its grounded and floating parts by tracking crevasses and other patterns moving with the ice on two sequential images acquired in Feb. and Dec. 1992 by ERS-1 SAR. Velocities in the fast-moving central parts of the glacier range from ca. 1.3 km/a on the grounded part to ca. 2.6 km/a on the floating part. Velocity increases rapidly just below the grounding line. For the floating part, velocities are approximately 0.3 km/a faster than previously established from Landsat images by other workers. This observation suggests that the discharge is larger, and therefore the mass balance less positive than previously thought; however, the study also shows that current information is insufficient to allow for precise mass-balance calculations. Images of the glacier front show that a calving event released an iceberg about 5 km wide between Feb. and Dec., 1992. The position of the glacier front has not changed substantially between 1973 (Landsat image) and 1992 (ERS-1 images). (Auth.)

49-6624

Coastal-change and glaciological maps of Antarctica.

Williams, R.S., Jr., Ferrigno, J.G., Swithinbank, C., Lucchitta, B.K., Seekins, B.A., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.284-290, 25 refs.

Ice sheets, Ice shelves, Glacier surveys, Glacier oscillation, Glacier flow, Glacier tongues, Coastal topographic features, Mapping, Spaceborne photography, Antarctica

In 1990 the U.S. Geological Survey in cooperation with the Scott Polar Research Institute began a long-term coastal mapping project in Antarctica that is based on analysis of Landsat images and ancillary sources. Analysis of images used in producing the first five of 24 maps has shown that ice fronts, iceberg tongues and glacier tongues are the most dynamic and changeable features in the coastal regions of Antarctica. Seaward of the grounding line of outlet glaciers, ice streams and ice shelves, the floating margin is subject to frequent large calving events and rapid flow. Although calving does occur along ice walls, the magnitude of their change on an annual to decadal basis is generally not discernible from Landsat images; therefore, ice walls can be used as relatively stable reference features for measuring other changes along the coast. Velocities of outlet glaciers, ice streams and ice shelves range from 0.1 to several km/y. (Auth. mod.)

49-6625

Satellite imagery, a base line for glacier variation study on James Ross Island, Antarctica.

Skvarca, P., Rott, H., Nagler, T., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.291-296, 13 refs.

Ice sheets, Ice shelves, Glacier surveys, Glacier oscillation, Global warming, Spaceborne photography, Antarctica—James Ross Island

Sequential visible and radar satellite imagery are used to document the fluctuations of 39 outlet glaciers on James Ross I. (JRI). The monitoring time interval of 17.4 years extends from late 1975 to early 1993. The study is based on synergistic use of different sensors for monitoring glacier variations. The digitally enhanced Landsat TM images also allowed definition of boundaries between grounded and floating ice within Röhss Bay and detection of ice rumples, resulting in an improved measurement of the areal extent of JRI. The satellite data show a general glacier retreat since 1975, resulting in clear decrease of overall glacier area on JRI. Of 39 glaciers measured, 33 retreated in the period 1975-93, 15 of which showed significant retreat in comparison to glacier size. This is in accordance with the pronounced atmospheric-warming trend recorded during the last two decades on the Antarctic Peninsula. The analysis of glacier areas on JRI thus provides a base line for detection of future changes. (Auth.)

49-6626

Recent variations of calving glaciers in Patagonia, South America, revealed by ground surveys, satellite-data analyses and numerical experiments.

Naruse, R., Aniya, M., Skvarca, P., Casassa, G., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.297-303, 21 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier thickness, Glacier mass balance, Calving, Patagonia

49-6627

Modelling mass balance on former maritime ice caps: a Patagonian example.

Hulton, N.R.J., Sugden, D.E., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.304-310, 21 refs.

Mountain glaciers, Glacier mass balance, Glacier oscillation, Glacier alimentation, Glacial meteorology, Snow ice interface, Snowfall, Patagonia

49-6628

Glaciar Upsala, Patagonia: rapid calving retreat in fresh water.

Warren, C.R., Greene, D.R., Glasser, N.F., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.311-316, 27 refs.

Mountain glaciers, Glacier oscillation, Glacier flow, Glacial lakes, Calving, Patagonia

49-6629

Glacier inventory in Chile: current status and recent glacier variations.

Casassa, G., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.317-322, 45 refs.

Mountain glaciers, Alpine glaciation, Glacier surveys, Glacier oscillation, Snow line, Chile

49-6630

Spatial and temporal variability of arctic ice thickness.

Flato, G.M., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.323-329, 21 refs.

Sea ice distribution, Ice cover thickness, Ice volume, Drift, Air ice water interaction, Ice models

49-6631

Spring-season climate variability in the central Canadian Arctic Islands.

Agnew, T.A., Silis, A., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.330-336, 17 refs.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air masses, Air temperature, Surface temperature, Air ice water interaction, Ice surface, Snow ice interface, Snow melting, Canada—Northwest Territories—Resolute Bay

49-6632

Spectral albedo of snow-covered first-year and multi-year sea ice during spring melt.

De Abreu, R.A., Barber, D.G., Misurak, K., LeDrew, E.F., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.337-342, 10 refs.

Sea ice, Ice melting, Ice surface, Snow ice interface, Snow cover effect, Albedo

49-6633

Sensitivity experiments to sea surface temperatures, sea-ice extent and ice-sheet reconstruction, for the Last Glacial Maximum.

Ramstein, G., Joussaume, S., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.343-347, 18 refs.

Ice sheets, Glaciation, Glacial meteorology, Ice age theory, Sea ice distribution, Air ice water interaction, Surface temperature, Paleoclimatology, Atmospheric circulation, Global change, Computerized simulation

49-6634

Recent sea-ice advances in Baffin Bay/Davis Strait and retreats in the Bellingshausen Sea.

Parkinson, C.L., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.348-352, 7 refs.

Ice surveys, Sea ice distribution, Air ice water interaction, Polar atmospheres, Marine atmospheres, Global warming, Spaceborne photography, Baffin Bay, Davis Strait, Antarctica—Bellingshausen Sea

Experience over the past two decades with the continually lengthening satellite record has frequently revealed prominent increases or decreases in regional or even hemispheric sea-ice coverage which last for a several-year period and are then reversed. Also, in almost any multi-year period in the short satellite record available, at least one region could be highlighted as having prominent ice-cover increases and at least one as having prominent ice-cover decreases. In the 1988-91 period of low ice coverage in the Bellingshausen Sea, mid-winter sea-ice extents noticeably increased in the Baffin Bay/Davis Strait region. Placed in the longer temporal context of ice extents since the late 1970s, the ice-extent increases from 1988 to 1991 in Baffin Bay/Davis Strait conform much better to an interpretation of cyclically varying wintertime ice extents than with one of a long-term upward trend. The time series for the Bellingshausen Sea also shows marked multi-year fluctuations and, although in the 1989-91 period the summertime coverage was unusually low, the wintertime ice coverage noticeably increased. (Auth. mod.)

49-6635

Influence of the albedo-temperature feed-back on climate sensitivity.

Bintanja, R., Oerlemans, J., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.353-360, 24 refs.

Sea ice distribution, Ice cover effect, Air ice water interaction, Snow cover distribution, Snow cover effect, Albedo, Radiation balance, Atmospheric circulation, Global warming, Computerized simulation

A vertically integrated, zonally averaged energy-balance climate model coupled to a two-dimensional ocean model with prescribed overturning pattern is employed to assess the seasonally and latitudinally varying response of the climate system to changes in radiative forcing. Since the sensitivity of the climate system depends on its actual state, considerable attention is given to the correct simulation of the important features of the present-day climate (such as surface ice temperature, sea-ice and snow amount and meridional energy transport). The climate variability induced by the various elements of the albedo-temperature (e.g. sea-ice and snow) feedback is quantified. It appears that the variability caused by sea-ice variations is approximately twice as large as for snow variations. (Auth.)

49-6636

On the effect of sea-ice dynamics on oceanic thermohaline circulation.

Hibler, W.D., III, Zhang, J.L., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.361-368, 11 refs.

Air ice water interaction, Ice water interface, Ice cover effect, Ice heat flux, Ocean currents, Water transport, Global warming, Computerized simulation

49-6637

Effects of the snow cover on antarctic sea ice and potential modulation of its response to climate change.

Eicken, H., Fischer, H., Lemke, P., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.369-376, 22 refs.

Pack ice, Ice growth, Ice cover thickness, Air ice water interaction, Snow ice interface, Snow cover effect, Ice models, Global warming, Antarctica—Weddell Sea

Based on field data, it is shown that snow contributes roughly 8% to the total mass of ice in the Weddell Sea. Snow depth averages 0.16 m on first-year ice (average thickness 0.75 m) and 0.53 m on second-year ice (average thickness 1.70 m). Due to snow loading, sea ice is depressed below water level and flooded by sea water. As a result of flooding, snow ice forms through congelation of sea water and brine in a matrix of meteoric ice. Sea-ice growth has been simulated with a one-dimensional model, treating the evolution of salinity, porosity and thermal properties of the ice. Simulations demonstrate that in the presence of a snow cover, ice growth is significantly reduced. Brine volumes increase by a factor of 1.5-2, affecting properties such as ice strength. Snow-ice formation depends on the evolution of freeboard and ice permeability. Effects of accumulation-rate changes have been assessed for the Weddell Sea with a large-scale sea-ice model accounting for snow-ice formation. (Auth. mod.)

49-6638

Simulation of past variability in seasonal snow in the Southern Alps, New Zealand.

Fitzharris, B.B., Garr, C.E., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.377-382, 14 refs.

Snow cover distribution, Snowfall, Snow accumulation, Snow line, Snow water equivalent, Water balance, Runoff forecasting, Statistical analysis, New Zealand

49-6639

Climatic-change implications from long-term (1823-1994) ice records for the Laurentian Great Lakes.

Assel, R.A., Robertson, D.M., Hoff, M.H., Selgeby, J.H., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.383-386, 8 refs.

Lake ice, Freezeup, Ice breakup, Ice surveys, Ice conditions, Ice air interface, Air temperature, Global warming, Great Lakes

49-6640

Sensitivity of lake freeze-up and break-up to climate change: a physically based modeling study.

Liston, G.E., Hall, D.K., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.387-393, 13 refs.

Lake ice, Freezeup, Ice breakup, Ice growth, Ice cover thickness, Ice forecasting, Ice air interface, Ice heat flux, Climatic changes, Mathematical models, Canada—Northwest Territories—Great Slave Lake, United States—Montana—Glacier National Park

49-6641

Ion content of polygonal wedge ice on Bolshoi Lyakhov: a source of palaeoenvironmental information.

Savoskul, O.S., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.394-398, 11 refs.

Permafrost surveys, Ice wedges, Ground ice, Fossil ice, Ice composition, Ice dating, Soil dating, Ion density (concentration), Quaternary deposits, Paleoclimatology, Russia—Novosibirskiye Ostrova

49-6642

Simulating the effects of mean annual air-temperature changes on permafrost distribution and glacier size: an example from the Upper Engadin, Swiss Alps.

Hoelzle, M., Haeberli, W., *Annals of glaciology,* 1995, Vol.21, International Symposium on the Role of the Cryosphere in Global Change, Columbus, OH, Aug. 7-12, 1994. Proceedings. Edited by D.A. Rothrock, p.399-405, 30 refs.

Permafrost distribution, Permafrost heat balance, Permafrost forecasting, Glacier oscillation, Glacier mass balance, Glacier heat balance, Glacial meteorology, Global warming, Computerized simulation, Switzerland

49-6643

Ice core studies of global biogeochemical cycles.
Delmas, R.J., ed, North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I: Global environmental change, Vol.30, Berlin, Springer-Verlag, 1995, 475p., Refs. passim. Proceedings of a NATO Advanced Research Workshop, Annecy, France, Mar. 26-31, 1993. For selected papers see 49-6644 through 49-6662 or F-53506, F-53508 through F-53512, I-53504, I-53505 and I-53507.
Polar atmospheres, Marine atmospheres, Atmospheric composition, Atmospheric circulation, Geochemical cycles, Air pollution, Scavenging, Snow composition, Ice composition, Ice cores, Paleoclimatology
This volume contains manuscripts of scientific presentations of the Annecy NATO ARW, held in Annecy, France on Mar. 26 to 31, 1993. The main topics addressed concern polar aerosol studies by chemists and glaciologists, to determine the aerosol composition, source, transport and nature. The focus is on the pollution of atmosphere, ocean, and ice and snow, and the relation between climate and atmospheric mobilization and depositional processes established through studies of ancient ice and recent snow from the Antarctic.

49-6644

Arctic aerosols: composition, sources and transport.
Barrie, L.A., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.1-22, 37 refs.
Polar atmospheres, Marine atmospheres, Atmospheric composition, Atmospheric circulation, Air pollution, Aerosols, Haze, Carbon black, Scavenging, Ice cores, Canada—Northwest Territories—Alert

49-6645

Nature and origin of antarctic submicron aerosols.
Ito, T., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.23-38, 28 refs.
Polar atmospheres, Marine atmospheres, Atmospheric composition, Atmospheric circulation, Air pollution, Aerosols, Particle size distribution, Antarctica—Showa Station
The phenomenological behavior of submicron aerosols in the antarctic atmosphere is summarized and discussed in relation with their significance in aerosol processes in Antarctica. It is inferred that two types of aerosols with different histories are important in the antarctic troposphere. The intrusion of maritime air during the cyclonic storms that occur mostly during cold months causes sea-salt particles and aged sulfate particles, originally contained in the clean maritime air, to dominate the aerosols; on the other hand, during warm months, aerosols in the chemical form of sulfuric acid are predominant. These sulfuric acid aerosols are formed by photochemical oxidation of sulfur-bearing gases in the sunlit troposphere over Antarctica, although the detailed process of the aerosol formation is still an open question. (Auth.)

49-6646

Ocean/atmosphere cycling of dimethylsulfide.
Saltzman, E.S., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.65-89, Refs. p.85-89.
Marine atmospheres, Atmospheric composition, Atmospheric circulation, Air water interactions, Geochemical cycles, Nutrient cycle, Marine biology
Recent progress in the cycling of dimethylsulfide (DMS) through the ocean and atmosphere is reviewed, and the mechanisms by which climatic change may impact on the emissions, transformations, or deposition of oceanic sulfur are discussed. Several pertinent studies carried out in the Antarctic, such as the complete annual cycle of aerosol chemistry at Mawson Station, are cited.

49-6647

Sulphur-derived species in polar ice: a review.
Legrand, M., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.91-119, Refs. p.116-119.
Polar atmospheres, Marine atmospheres, Atmospheric composition, Atmospheric circulation, Geochemical cycles, Air pollution, Scavenging, Snow composition, Ice composition, Ice cores, Paleoclimatology, Greenland, Antarctica
Sulphate trapped in polar ice is associated with several chemical compounds including sea salt, Na_2SO_4, $CaSO_4$, NH_4HSO_4, $(NH_4)_2SO_4$, and H_2SO_4 which are present in varying proportions depending on the location and on the considered time period. While sulphuric acid dominates the sulphate budget of ice of present-day climatic conditions, the contribution of sulphate associated with sea salt and soil dust increased in ice deposited during past colder climate. NH_4HSO_4, the concentration of which is insignificant in antarctic ice, is believed to be present in significant amounts in Greenland ice. Numerous studies have demonstrated that sulphate concentrations of Greenland and antarctic ice increased often, but for short-time periods (a few months to two years), after large volcanic eruptions. Ice-core data also suggest that the non-volcanic natural sulphate background level is mainly marine and biogenic (DMS emissions) in origin in Antarctica under present climatic conditions as well as during the last two ice ages. It is also suggested that the rate of these DMS emissions has changed in the past in response to short and long-term climatic variations. (Auth. mod.)

49-6648

Contributions of wet, fog, and dry deposition to the summer SO_4^{2-} flux at Summit, Greenland.
Bergin, M.H., et al, Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.121-138, 21 refs.
Polar atmospheres, Marine atmospheres, Atmospheric composition, Atmospheric circulation, Geochemical cycles, Air pollution, Scavenging, Snow composition, Ice composition, Ice cores, Paleoclimatology, Greenland

49-6649

Chemistry and climatic role of biogenic sulfur: group discussion.
Peel, D.A., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.167-173, 15 refs.
Polar atmospheres, Marine atmospheres, Atmospheric composition, Atmospheric circulation, Geochemical cycles, Nutrient cycle, Air pollution, Scavenging, Snow composition, Ice composition, Ice cores, Paleoclimatology
The discussion leads to the following conclusions: that the ocean-atmosphere sulfur cycle is highly sensitive to climate change on both sub-decadal and glacial-interglacial time-scales; that the nss-SO_4^{2-} deposition over coastal and central areas of Antarctica is primarily a result of oceanic sulfurous emissions, mainly of DMS; that there were much higher concentrations of MSA (methlysulphonic acid) in central Antarctica during the last glacial maximum and by contrast, seemingly lower concentrations over NE Greenland; that there is a much stronger seasonality of MSA near the coast in Antarctica, compared with inland; that the MSA/nss-SO_4^{2-} fraction is higher in coastal parts of Antarctica and also generally higher during climatically warm periods in Antarctica; and that MSA can migrate in ice cores, especially where it is relatively warm, and in these cases can disturb the preserved seasonal signal.

49-6650

1250 years of global volcanism as revealed by central Greenland ice cores.
Clausen, H.B., et al, Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.175-194, 27 refs.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Volcanic ash, Snow composition, Ice composition, Ice cores, Ice dating, Paleoclimatology, Greenland

49-6651

Nitrate in polar ice.
Wolff, E.W., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.195-224, Refs. p.220-224.
Polar atmospheres, Marine atmospheres, Atmospheric composition, Atmospheric circulation, Air pollution, Scavenging, Snow impurities, Snow composition, Ice composition, Ice cores, Paleoclimatology, Greenland, Antarctica
Nitrate is one of the major impurities in polar snow, and is relatively easy to analyze. Large amounts of data therefore exist, including some from cores extending into the last glaciation. However, the data are not easy to interpret, and the authors do not yet have an adequate knowledge of even the present-day sources of nitrate to polar snow, nor of the deposition processes that control the concentration seen. It is clear that anthropogenic pollution has increased the concentrations in Greenland snow by a factor of two in recent decades, while no similar increase is seen in Antarctica. In pre-industrial Greenland ice, a clear seasonality allows annual layer counting. The sources in pre-industrial ice are probably lightning and/or the stratosphere, while soil exhalation may be an additional major component in Greenland. Whereas nitrate in Holocene ice is present as nitric acid, in ice from the last glaciation it is present as neutral salt, associated with terrestrial cations. (Auth.)

49-6652

Preliminary study of the air-snow relationship for nitric acid in Greenland.
Silvente, E., Legrand, M., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.225-240, 41 refs.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Air pollution, Scavenging, Snow air interface, Snow impurities, Snow composition, Ice composition, Greenland

49-6653

Nitric acid in firn: discussion.
Bales, R.C., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.241-245, 10 refs.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Scavenging, Snow air interface, Snow composition, Ice composition, Firn
Post-depositional changes in the HNO_3 content of polar snow and firn limit the ability to infer past atmospheric concentrations and changes in concentration from an analysis of NO_3^- in polar ice cores. Nitrate is present in snow, firn and polar ice both as HNO_3 and as nitrate salts, and is a widely measured parameter in ice cores. Wolff (this book) presents a thorough review of reported nitrate data, and summarizes what has been inferred about nitrate sources. Because nitrate concentrations in near-surface snow can apparently decrease after deposition, presumably by re-emission to the atmosphere, Wolff largely confines his review to ice and firn that are buried and not in close contact with the atmosphere. There are several reports of apparent HNO_3 loss from near-surface snow, though a quantitative understanding of the loss processes has yet to emerge. (Auth. mod.)

49-6654

H_2O_2 and HCHO in polar snow and their relation to atmospheric chemistry.
Neftel, A., Bales, R.C., Jacob, D.J., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.249-264, 36 refs.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Scavenging, Snow air interface, Snow composition, Ice composition, Ice cores, Paleoclimatology, Greenland, Antarctica—Siple Station
The ability to infer past atmospheric concentrations of hydrogen peroxide (H_2O_2) and formaldehyde (HCHO) from concentrations measured in polar firn and ice cores is limited by the lack of understanding of the atmosphere-snow transfer functions for the two species. Continuous H_2O_2 records going back into the last century have been obtained from Dye 3 and Summit in central Greenland and Siple Station, Antarctica, with some measurements preserved back into the last glaciation. HCHO records also extend back into the last glaciation in these same cores. Surface-snow and pit studies clearly show that H_2O_2 and HCHO concentrations in snow change in the days to weeks after the snow is deposited. It is thought that buried layers reflect seasonal average values, mediated by the amount and seasonal pattern of water accumulation and the temperature. Development of process models of phase exchange in the snow and firn is essential for interpreting the ice core records of H_2O_2 and HCHO in terms of trends in the oxidizing power of the atmosphere. (Auth. mod.)

49-6655

Photochemical modeling of chemical cycles: issues related to the interpretation of ice core data.
Thompson, A.M., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.265-297, Refs. p.294-297.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Geochemical cycles, Nutrient cycle, Photochemical reactions, Scavenging, Snow composition, Ice composition, Ice cores, Paleoclimatology

49-6656
Combustion carbonaceous aerosols in the atmosphere: implications for ice core studies.
Cachier, H., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.313-346, Refs. p.343-346.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Forest fires, Carbon black, Aerosols, Air pollution, Scavenging, Ice cores, Paleoclimatology

49-6657
Boreal biomass burning over the last 80 years recorded in a Summit-Greenland ice core.
Legrand, M., De Angelis, M., Cachier, H., Gaudichet, A., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.347-360, 19 refs.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Forest fires, Carbon black, Air pollution, Scavenging, Ice cores, Paleoclimatology, Greenland

49-6658
Preliminary investigations of post depositional effects on HCl, HNO_3, and organic acids in polar firn layers.
De Angelis, M., Legrand, M., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.361-381, 24 refs.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Air pollution, Scavenging, Snow composition, Snow impurities, Firn, Ice cores, Greenland, Antarctica
Concentration changes occurring for HNO_3, HCl and several organic acids in snow recently deposited over central polar areas have been investigated. These changes, referred to as "post depositional effects", were studied for time periods varying from one month in Greenland to several decades in Antarctica. In Antarctica, HCl and HNO_3 seem to progressively escape from snow in sites where snow accumulation rates are very low (i.e. lower than 6 to 8 cm H_2O/yr). This phenomenon takes place within the upper meter of firn for HNO_3 and between 8-10 m depth and the surface for HCl. In central Greenland, HCl and HNO_3 content of snow sampled within a few days or a few weeks after the precipitation are significantly higher than concentrations measured in aged firn layers (more than one year old). Over and above the effect of smoothing due to diffusion processes, a portion of these two species may escape from firn layers, as proposed for Antarctica. However, a direct comparison between Antarctica and Greenland cannot be made because the meteorological conditions prevailing over the two polar ice caps are drastically different. (Auth.)

49-6659
New approach to glaciochemical time series analysis.
Meeker, L.D., Mayewski, P.A., Bloomfield, P., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.383-400, 33 refs.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Ice composition, Ice dating, Ice cores, Statistical analysis, Paleoclimatology

49-6660
Mercury in ancient ice and recent snow from the Antarctic.
Vandal, G.M., Fitzgerald, W.F., Boutron, C.F., Candelone, J.P., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.401-415, 47 refs.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Air pollution, Geochemical cycles, Scavenging, Snow impurities, Snow composition, Ice composition, Ice dating, Ice cores, Paleoclimatology, Antarctica—Charlie, Dome
This study demonstrates the predominance of oceanically derived Hg as the source of natural Hg to the Antarctic, a region remote from continental sources, during preindustrial times. Limited studies of oceanic Hg evasion, primarily in the Equatorial Pacific Ocean, show a relationship between Hg° evasion and chlorophyll-*a*. Investigations also suggest that oceanic evasion is a major source of Hg to the atmosphere. It is concluded that temporal variations of Hg in ice cores may prove to be useful indicators of paleoproductivity and oceanic emissions of reduced sulfur gases. Human-related changes in Hg deposition to Antarctica should be addressed from a continuous core that can provide a history over the past two centuries. Studies of seasonal variations in snow Hg concentrations in conjunction with nss SO_4 and MSA measurements would help elucidate the importance of the oceanic Hg° source to the antarctic continent.

49-6661
Plutonium from Nagasaki A-Bomb as a possible tracer for global transport, using existing initial conditions and ice cores.
Kudo, A., et al, Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.417-425, 5 refs.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Nuclear explosions, Fallout, Ice cores

49-6662
Current status of atmospheric studies at Summit (Greenland) and implications for future research.
Jaffrezo, J.L., Dibb, J.E., Bales, R.C., Neftel, A., Ice core studies of global biogeochemical cycles. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.30. Edited by R.J. Delmas, Berlin, Springer-Verlag, 1995, p.427-458, Refs. p.453-458.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Air pollution, Scavenging, Snow impurities, Snow composition, Ice composition, Ice cores, Paleoclimatology, Global warming, Greenland

49-6663
Dynamics of Holocene deglaciation in West Greenland with emphasis on recent ice-marginal processes.
Van Tatenhove, F.G.M., Amsterdam, University, 1995, 202p., Ph.D. thesis. With Dutch summary. Refs. p.194-202.
Ice sheets, Glaciation, Glacier surveys, Glacier oscillation, Glacier mass balance, Glacial geology, Glacial deposits, Moraines, Paleoclimatology, Greenland

49-6664
Scientific-technical provision for the electrification of railroads. [Nauchno-tekhnicheskoe obespechenie elektrifikatsii zheleznykh dorog]
Chuchev, A.P., Orel, A.A., Shelest, A.I., *Transportnoe stroitel'stvo*, Apr.-May 1995, No.4-5, p.32-36, In Russian.
Railroads, Electric power, Cold weather operation

49-6665
Concreting of transportation structures for increased service life under winter conditions. [Betonirovanie transportnykh sooruzheniĭ povyshennoĭ dolgovechnosti v zimnikh usloviiakh]
Dobshits, L.M., *Transportnoe stroitel'stvo*, June 1995, No.6, p.21-24, In Russian. 2 refs.
Winter concreting, Concrete admixtures, Frost resistance, Concrete structures

49-6666
On a method for observing the thermal regime of permafrost foundations for bridge supports. [K voprosu o metodike nabliudeniĭ za temperaturnym rezhimom vechnomerzlykh gruntov osnovaniĭ opor mostov]
Passek, V.V., Poz, G.M., *Transportnoe stroitel'stvo*, June 1995, No.6, p.25-27, In Russian. 5 refs.
Thermal regime, Permafrost bases, Foundations, Supports, Bridges, Frozen ground temperature, Tundra

49-6667
Durability of concrete for transportation structures. [Dolgovechnost' betonov transportnykh sooruzheniĭ]
Dobshits, L.M., *Transportnoe stroitel'stvo*, Mar. 1995, No.3, p.17-20, In Russian. 6 refs.
Concrete durability, Concrete structures, Frost resistance, Winter concreting, Concrete admixtures, Porosity

49-6668
Significance of the Tynda-Berkakit line. [Znachenie linii Tynda-Berkakit]
Glazunov, S.I., *Transportnoe stroitel'stvo*, Dec. 1994, No.12, p.20-22, In Russian.
Railroads, Cold weather operation, Baykal Amur railroad

49-6669
To the North by the Baykal Amur Railroad. [Na sever ot BAMa], *Transportnoe stroitel'stvo*, Dec. 1994, No.12, p.22-24, In Russian.
Railroads, Cold weather operation, History, Baykal Amur railroad

49-6670
Scientific developmental studies of systems controlling the quality of the earth roadbed of the Baykal Amur Railroad. [Nauchnye issledovaniia po sozdaniiu deĭstvennykh kompleksov upravleniia kachestvom zemlianogo polotna Baĭkalo-Amurskoĭ zheleznoĭ dorogi]
Bryksin, V.N., *Transportnoe stroitel'stvo*, Nov. 1994, No.11, p.15-16, In Russian.
Roadbeds, Railroads, Baykal Amur railroad

49-6671
Restoring the service life of river supports for large bridges (new technology and materials). [Vosstanovlenie sluzhebnogo resursa rechnykh opor bol'shikh mostov (novaia tekhnologiia i materialy)]
Kostelianets, B.A., *Transportnoe stroitel'stvo*, Nov. 1994, No.11, p.22-23, In Russian.
Supports, Bridges, River ice, Cold weather operation

49-6672
Soil corrosion of pipeline steels and mainline pipelines. [Pochvennaia korroziia truboprovodnoĭ stali i magistral'nykh truboprovodov]
Marchenko, A.F., *Stroitel'stvo truboprovodov*, Jan. 1995, No.1, p.29-34, In Russian.
Pipelines, Steels, Corrosion, Frozen ground temperature, Soil temperature

49-6673
Inter-branch Commission for Arctic and Antarctic Regions; scientific-technical council. [Mezhvedomstvennaia komissiia po delam Arktiki i Antarktiki; nauchno-tekhnicheskiĭ sovet], *Stroitel'stvo truboprovodov*, Jan. 1995, No.1, p.38, In Russian.
Research projects, Organizations

49-6674
Bridge construction in 1945-1994. [Mostostroenie v 1945-1994 gg.]
Podol'tsev, L.N., *Transportnoe stroitel'stvo*, Sep.-Oct. 1994, No.9-10, p.70-74, In Russian.
Bridges, Cold weather performance, Steels, History, Russia

49-6675
Current status and prospects for the development of pipeline transportation in Russia. [Sovremennoe sostoianie i perspektivy razvitiia truboprovodnogo transporta v Rossii]
Shmal', G.I., *Stroitel'stvo truboprovodov*, Mar.-Apr. 1995, No.2, p.3-9, In Russian. Report given at the 3rd International conference "Transportation of Oil and Gas in the Former Soviet Union. Pipeline Transportation Systems".
Pipelines, Gas pipelines, Petroleum transportation, Cold weather operation, Russia

49-6676
Problems in ecological safety of oil pipelines in northern regions of the Russian Federation. [Problemy ekologicheskiĭ bezopasnosti nefteprovodov v severnykh raĭonakh Rossiĭskoĭ Federatsii]
Mazur, I.I., Moldavanov, O.I., Popov, IA.P., *Stroitel'stvo truboprovodov*, May-June 1995, No.3, p.5-7, In Russian.
Safety, Ecology, Environmental impact, Environmental protection, Pipelines, Petroleum transportation, Russia

49-6677
Problems of recultivation and self-recovery of tundra terrain disturbed during construction of oil and gas projects in the Arctic zone of Western Siberia. [Problemy rekul'tivatsii i samovosstanovleniia tundrovykh landshaftov, narushennykh pri stroitel'stve neftegazovykh ob"ektov v arkticheskoĭ zone Zapadnoĭ Sibiri]
Masalkin, S.D., Shishov, V.N., *Stroitel'stvo truboprovodov*, May-June 1995, No.3, p.8-10, In Russian.
Environmental impact, Revegetation, Tundra terrain, Petroleum industry, Gas production, Russia—Siberia

49-6678
Ethical principles of research in the Arctic: initiative of the International Arctic Scientific Committee. [Eticheskie printsipy issledovaniĭ v Arktike: initsiativa Mezhdunarodnogo arkticheskogo nauchnogo komiteta]
Mel'nik, B.P., *Stroitel'stvo truboprovodov*, May-June 1995, No.3, p.11, In Russian.
International cooperation, Environmental impact, Accuracy, Legislation, Research projects

49-6679
Test site for development of scientific research, construction and utilization problems with respect to liquefied natural gas pipelines. [Poligon dlia otrabotki nauchno-issledovatel'skikh stroitel'nykh i ekspluatatsionnykh voprosov primenitel'no k SPG-provodam]
Polozov, A.E., *Stroitel'stvo truboprovodov*, May-June 1995, No.3, p.12-14, In Russian.
Gas pipelines, Natural gas, Liquefied gases, Test equipment, Cold weather operation

49-6680
Floating base "Imandra" for recharging reactors and servicing nuclear icebreakers. [Plavuchaia baza "Imandra" dlia perezariadki reaktorov i obsluzhivaniia atomnykh ledokolov]
Gerbikh, I.A., Kovalenko, V.K., Starsbinov, V.A., Panshin, S.I., *Sudostroenie*, Feb.-Mar. 1994, No.2-3, p.3-6, In Russian. 2 refs.
Icebreakers, Nuclear power, Ships, Maintenance

49-6681
Problems of manufacturing and developing a new generation of materials handling equipment and machinery. [Problemy sozdaniia i razvitiia novogo pokoleniia pod"emno-transportnykh mashin i ustroĭstv]
Danilov, A.T., *Sudostroenie*, Feb.-Mar. 1994, No.2-3, p.47-49, In Russian.
Machinery, Equipment, Cold weather performance

49-6682
Causes and tendencies of changes in the quality of ground water. [Prichiny i tendentsii izmeneniia kachestva podzemnykh vod]
Kraĭnov, S.R., Zakutin, V.P., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia*, Jan.-Feb. 1995, No.1, p.36-49, In Russian. 20 refs.
Ground water, Water pollution, Water chemistry, Geochemistry, Environmental impact, Russia—Siberia

49-6683
Seismic properties of clayey soils in different states. [Seĭsmicheskie svoĭstva glinistykh gruntov razlichnogo sostoianiia]
Dzhurik, V.I., Basov, A.D., Drennov, A.F., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia*, Jan.-Feb. 1995, No.1, p.60-71, In Russian. 11 refs.
Clay soils, Seismic surveys, Soil temperature, Frozen ground temperature, Mathematical models, Earthquakes, Ground ice, Russia—Siberia

49-6684
Role of the approach in engineering-geological zoning. [O roli podkhoda pri inzhenerno-geologicheskom raĭonirovanii]
Trofimov, V.T., Ziling, D.G., *Geoekologiia; inzhenernaia geologiia, gidrogeologiia, geokriologiia*, Jan.-Feb. 1995, No.1, p.86-95, In Russian. 16 refs.
Engineering geology, Landscape types, Plains, Permafrost, Geocryology

49-6685
Oxygen isotope analysis of ground ice in northwestern Siberia, Yakutia and Chukotka. [Izotopno-kislorodnyĭ analiz podzemnykh l'dov severa Zapadnoĭ Sibiri, IAkutii i Chukotki]

Vaĭkmiae, R.A., Vasil'chuk, IU.K., Zavershaiushchiĭ etap Pleistotsena, proekt No.253 (Final stage of the Pleistocene, No.253), Tallinn, Institute of Geology, Estonian Academy of Sciences, 1991, 70p., In Russian with English summary. 31 refs.

Oxygen isotopes, Isotope analysis, Ground ice, Permafrost, Paleoclimatology, Pleistocene, Ice wedges, Moraines, Geocryology, Russia—Siberia, Russia—Yakutia, Russia—Chukotskiy Peninsula

49-6686

Biennial report 1989/1990. [Tätigkeitsbericht 1989/1990]

BGR Bundesanstalt für Geowissenschaften und Rohstoffe, Hannover, Germany, 1991, 207p. (Pertinent p.148-156), In German and English.

Research projects, Expeditions, Geology, Glacial deposits, Ice shelves, Antarctica—Ross Ice Shelf, Antarctica—Shackleton Range

The report provides a bilingual exposition of German geological surveying activities in northern Victoria Land, the Ross Sea, the Riiser-Larsen Ice Shelf region off the coast of Antarctica, and the east coast of Greenland centered on 80°N. The antarctic focus is on the crust thickness below the Transantarctic Mountains and the seismology/tectonics below the Ross Sea. The arctic phase accents the submarine geology and glacial deposits off the northeast Greenland coast.

49-6687

15th Polar Symposium: general status and selected problems in Polish polar research. [XV Sympozjum Polarne: Stan obecny i wybrane problemy polskich badań polarnych]

Polar Symposium, 15th, Wrocław, Poland, May 19-21, 1988, Jahn, A., ed, Pereyma, J., ed, Szczepankiewicz-Smyrka, A., ed, Wrocław, Uniwersytet Wrocławski, 1988, 420p., In Polish with English summaries and table of contents. Refs. passim. For selected papers see 49-6688 through 49-6731.

DLC G578.S955 1988

Snow cover, Glaciers, Geomorphology, Tundra, Glacial geology, Moraines, History, Expeditions, Ice navigation, Plants (botany), Norway—Spitsbergen

49-6688

Directions of joint patterns and neotectonic movements on the southern shore of Bellsund. [Kierunki spękań ciosowych a neotektonika południowego wybrzeża Bellsundu]

Ozimkowski, W., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.5-7, In Polish with English summary. 2 refs.

Geology, Topography, Glaciers, Norway—Spitsbergen

49-6689

Results of mineralogical studies of glaciomarine bottom sediments in the Wijdefjorden, Spitsbergen. [Wyniki badań mineralogicznych glacjalnomorskich osadów dna Wijdefjorden, Spitsbergen]

Rudziński, W., Kowalewski, W., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.20-24, In Polish with English summary. 6 refs.

Glacial deposits, Bottom sediment, Core samplers, Minerals, Norway—Spitsbergen

49-6690
Interaction of the sea, glaciers and glacial lakes in the morphogenesis of the Bille-Aust interfjord region (central Spitsbergen). [Interakcja działalności morza, lodowców oraz jezior glacjalnych w morfogenezie międzyfiordzia Bille-Aust (Spitsbergen Środkowy)]
Stankowski, W., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.25-33, In Polish with English summary. 9 refs.
Ice water interface, Glacial lakes, Glacier oscillation, Glacial geology, Geomorphology, Norway—Spitsbergen

49-6691
Quaternary landforms and sediments of the eastern Petuniabukta seaside (Olaf V Land, Spitsbergen). [Rzeźba i osady Czwartorzędowe wschodniego obramowania Petuniabukta (Olaf V Land, Spitsbergen)]
Kłysz, P., Lindner, L., Marks, L., Wysokiński, L., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.45-52, In Polish with English summary. 14 refs.
Pleistocene, Quaternary deposits, Landforms, Sediments, Geomorphology, Beaches, Paleoclimatology, Glacier oscillation, Glacial geology, Norway—Spitsbergen

49-6692
Forms of aeolian accumulation in western Sörkapp Land (Spitsbergen). [Formy akumulacji eolicznej w zachodniej części Sörkapp Land (Spitsbergen)]
Gębica, P., Szczęsny, R., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.53-56, In Polish with English summary. 2 refs.
Eolian soils, Hummocks, Banks (waterways), Beaches, Wind erosion, Permafrost, Norway—Spitsbergen

49-6693
Forms of marginal zones of the Erdman and Sartorius glaciers in the Ytter Valley (western Spitsbergen). [Formy stref marginalnych lodowców Erdmanna i Sartorius w dolinie Ytter (Spitsbergen Zachodni)]
Bortniczuk, M., Drecki, J., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.66-67, In Polish.
Glaciers, Glacier oscillation, Glacier flow, Norway—Spitsbergen

49-6694
Methods of measuring mass movements of mountain massifs on slopes in the NW part of Wedel Jarlsberg Land, Spitsbergen. [Metody pomiarów ruchów masowych na zboczach masywów górskich w NW części ziemi Wedela Jarlsberga, Spitsbergen]
Nitychoruk, J., Dzierżek, J., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.68-70, In Polish with English summary. 11 refs.
Geomorphology, Slopes, Measurement, Mass movements (geology), Norway—Spitsbergen

49-6695

Directional elements of the fluted ground moraine within the marginal zone of Renard Glacier (Spitsbergen). [Elementy kierunkowe w morenie typu "fluted" na przedpolu lodowca Renarda (Spitsbergen)]

Merta, T., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.76-81, In Polish with English summary. 7 refs.

Moraines, Streams, Glacial deposits, Glacier oscillation, Norway—Spitsbergen

49-6696

Sandur deposits from Renard Glacier, West Spitsbergen. [Osady sukcesji sandrowej lodowca Renarda, Spitsbergen Zachodni]

Łanczont, M., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.82-87, In Polish.

Outwash, Moraines, Glacier alimentation, Glacial deposits, Norway—Spitsbergen

49-6697

Map of the Quaternary deposits in western Sörkapp Land (Spitsbergen). [Mapa osadów czwartorzędowych zachodniego Sörkapp Land (Spitsbergen)]

Czeppe, Z., Ziaja, W., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.88-93, In Polish with English summary.

Quaternary deposits, Moraines, Marine deposits, Solifluction, Talus, Alluvium, Periglacial processes, Norway—Spitsbergen

49-6698

Chemical and mechanical denudation in selected river basins of the southern margin of Bellsund (West Spitsbergen). [Denudacja chemiczna i mechaniczna w wybranych zlewniach południowego obrzeżenia Bellsundu (W Spitsbergen)]

Bartoszewski, S., Repelewska-Pękalowa, J., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.94-100, In Polish with English summary. 6 refs.

Water erosion, River basins, River flow, River ice, Norway—Spitsbergen

49-6699

Current denudative system of the Dynamiskbakken and Ebbaelva catchments (Petuniabukta, West Spitsbergen). [Współczesny system denudacyjny zlewni Dynamiskbekken i Ennaelva (Petuniabukta, Spitsbergen Zachodni)]

Kostrzewski, A., Klimczak, R., Stach, A., Zwoliński, Z., Kaniecki, A., Kapuścinski, J., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.101-108, In Polish with English summary. 4 refs.

Water erosion, Ice cover effect, Runoff, Norway—Spitsbergen

49-6700

Late Quaternary sea level changes and glacial history of the Horsund area. [Późno-czwartorzędowe zmiany poziomu morza i historia glacjalna rejonu Hornsundu]

Chmal, H., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.109-114, In Polish with English summary. 14 refs.

Quaternary deposits, Sea level, Pleistocene, Glacial deposits, Glacial geology, Terraces, Norway—Spitsbergen

49-6701

Glacial relief of the Kebnekaise massif (Swedish Lapland). [Rzeźba glacjalna masywu Kebnekaise (Szwedzka Laponia)]

Musiał, A., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.115-123, In Polish with English summary. 12 refs.

Glacial geology, Moraines, Geomorphology, Glaciers, Sweden—Lapland

49-6702

Post-neoglacial degradation of glaciation in the Glacier Bay-Muir Inlet area on the basis of the relief and depositional environments. [Post-neoglacjalna degradacja zlodowacenia obszaru Glacier Bay-Muir Inlet na tle rzeźby i środowisk depozycyjnych]

Olszewski, A., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.124-135, In Polish with English summary. 8 refs.

Glacier ablation, Glacial erosion, Degradation, Glaciation, Glaciers, Glacier oscillation, United States—Alaska—Glacier Bay, United States—Alaska—Muir Inlet

49-6703

Deposits and landforms in the marginal zone of K2 Glacier, Karakorum Mountains. [Osady i formy strefy marginalnej lodowca K2 w górach Karakorum]

Drozdowski, E., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.136-143, In Polish with English summary. 2 refs.

Glacial deposits, Landforms, Glacier oscillation, Moraines, Glaciers, Mountain glaciers, Karakoram Mountains

49-6704

Chemical variability of water basins on raised marine terraces in the Ebba Valley, June-July 1987. [Zmienność chemiczna zbiorników wodnych na podniesionych terasach morskich w dolinie Ebby, w okresie czerwiec-lipiec 1987]

Stankowska, A., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.145-150, In Polish with English summary.

Water chemistry, Snowmelt, Meltwater, Degradation, Permafrost, Terraces, Ions, River basins, Norway—Spitsbergen

49-6705

Hydrochemical characteristics of Hoglandvatnet and Ålandvatnet (central Spitsbergen). [Charakterystyka hydrochemiczna Hoglandvatnet i Ålandvatnet (Spitsbergen środkowy)]

Stankowska, A., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.151-157, In Polish with English summary.

Meltwater, Water chemistry, Glacier melting, Ions, Surface waters, Norway—Spitsbergen

49-6706

Outflow conditions in the Scott River Basin (Spitsbergen). [Stosunki odpływu w zlewni rzeki Scotta (Spitsbergen)]

Bartoszewski, S., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.158-163, In Polish with English summary. 5 refs.

River basins, River flow, Glacier ablation, Meltwater, Runoff, Snowmelt, Norway—Spitsbergen

49-6707

Outflow of the periglacial basins in the Calypsobyen region (Spitsbergen). [Odpływ w zlewniach peryglacjalnych w okolicy Calypsobyen (Spitsbergen)]

Bartoszewski, S., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.164-168, In Polish with English summary. 5 refs.

Runoff, Rivers, River flow, Snowmelt, Meltwater, Permafrost, Periglacial processes, Streams, Norway—Spitsbergen

49-6708

Preliminary characteristics of surface runoff from the basin area of the Werenskiold Glacier (Spitsbergen)in the summer of 1986. [Wstępna charakterystyka odpływu ze zlewni lodowca Werenskiolda (Spitsbergen) w sezonie letnim 1986 roku]

Kropka, J., Leszkiewicz, J., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.169-177, In Polish with English summary. 7 refs.

Runoff, River basins, Glacier ablation, Glacial rivers, Norway—Spitsbergen

49-6709

Air temperature variations in the Svalbard region. [Kolisani teploty vzduchu v oblasti Svalbardu]

Brázdil, R., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.187-195, In Czech with English summary. 3 refs.

Air temperature, Temperature variations, Polar atmospheres, Norway—Svalbard

49-6710

Influence of synoptic situations on precipitation conditions in Hornsund (Spitsbergen). [Wpływ sytuacji synoptycznych na stosunki opadowe w Hornsundzie (Spitsbergen)]

Niedźwiedź, T., Ustrnul, Z., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.196-202, In Polish with English summary. 7 refs.

Synoptic meteorology, Precipitation (meteorology), Polar atmospheres, Norway—Spitsbergen

49-6711

Annual changes in climatic, hydrographic and biological conditions in the south Spitsbergen region. [Roczne zmiany warunków klimatycznych, oceanograficznych i biologicznych w rejonie południowego Spitsbergenu]

Pereyma, J., Swerpel, S., Węsławski, J.M., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.203-206, In Polish with English summary. 4 refs.

Atmospheric circulation, Air temperature, Climatic factors, Fast ice, Ice cover, Water temperature, Ocean currents, Plankton, Norway—Spitsbergen

49-6712

Microclimate of selected tundra sites in the Calypsobyen area, southwest Spitsbergen. [Mikroklimat wybranych siedlisk tundry w rejonie Calypsostrandy, SW Spitsbergen]

Łanczont, M., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.212-216, In Polish. 4 refs.

Microclimatology, Tundra climate, Norway—Spitsbergen

49-6713

Selected features of the topoclimate in South Bellsund during the spring-summer season, 1987 (SW Spitsbergen). [Wybrane cechy topoklimatu Płd. Bellsundu w sezonie wiosenno-letnim 1987 r. (SW Spitsbergen)]

Piasecki, J., Gluza, A., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.217-225, In Polish with English summary. 6 refs.

Topographic effects, Climatic factors, Air temperature, Temperature gradients, Humidity, Moraines, Glacier ablation, Glacier alimentation, Norway—Spitsbergen

49-6714

Thermal conditions of the snow cover on the tundra in the Fuglebergett basin in Spitsbergen. [Termika pokrywy śnieżnej na tundrze w zlewni Fugleberget na Spitsbergenie]

Pereyma, J., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.226-229, In Polish with English summary. 4 refs.

Snow cover, Snow temperature, Snow water equivalent, Temperature gradients, Snow density, Snow depth, Tundra climate, Norway—Spitsbergen

49-6715

Snow cover effect on the active layer of permafrost in the Hornsund area (SW Spitsbergen). [Wpływ pokrywy śnieżnej na warstwę aktywną zmarzliny w rejonie Hornsundu (SW Spitsbergen)]

Migała, K., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.230-239, In Polish with English summary.

Snow cover effect, Active layer, Permafrost, Snow cover structure, Soil temperature, Frozen ground temperature, Snow temperature, Ground thawing, Ablation, Snow depth, Norway—Spitsbergen

49-6716

Snow cover structure during the ablation season 1987 in the Calypsostranda region, SW Spitsbergen. [Struktura pokrywy śnieżnej w sezonie ablacyjnym 1987 w rejonie Calypsostrandy, SW Spitsbergen]

Rodzik, J., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.240-241, In Polish.

Snow cover structure, Ablation, Norway—Spitsbergen

49-6717

Accumulation and ablation on Scott and Renard glaciers in 1987 (South Bellsund, Spitsbergen). [Akumulacja i ablacja na lodowcach Scott i Renard w 1987 r. (Płd. Bellsund, Spitsbergen)]

Piasecki, J., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.242-253, In Polish with English summary. 4 refs.

Glacier alimentation, Glacier ablation, Snow depth, Snow density, Snow cover structure, Snow water equivalent, Norway—Spitsbergen

49-6718

Vertical profile of soil temperature at Hornsund Station from measurements for the years 1978-1986. [Pionowy profil temperatury gruntu na stacji w Hornsundzie w świetle pomiarów z lat 1978-1986]

Miętus, M., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.254-259, In Polish. 9 refs.

Soil temperature, Soil profiles, Frozen ground temperature, Analysis (mathematics), Norway—Spitsbergen

49-6719

Graphical modeling of the mean vertical profile of soil temperature in Hornsund. [Graficzne modelowanie pionowego profilu temperatury gruntu w Hornsundzie]

Miętus, M., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.260-262, In Polish. 1 ref.

Soil temperature, Soil profiles, Frozen ground temperature, Models, Norway—Spitsbergen

49-6720

Influence of local factors on the thickness and thermal conditions of the permafrost active layer in Calypsostranda (Bellsund region, western Spitsbergen). [Wpływ lokalnych czynników na miąższość i termikę czynnej warstwy zmarzliny na Calypsostrandzie (rejon Bellsundu, Zachodni Spitsbergen)]

Repelewska-Pękalowa, J., Gluza, A., Pękala, K., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.263-270, In Polish with English summary. 8 refs.

Active layer, Permafrost thermal properties, Ground thawing, Permafrost thickness, Thawing rate, Norway—Spitsbergen

49-6721

Intensity of metabolic processes in tundra soils in Spitsbergen. [Intensywność procesów metabolizmu gleby tundry Spitsbergenu]

Fischer, Z., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.271-275, In Polish with English summary. 3 refs.

Tundra soils, Humidity, Mosses, Soil water, Soil physics, Soil temperature, Norway—Spitsbergen

49-6722

Dynamics of moisture, oxidation-reduction potential, and oxidation in selected soils in Calypsostranda (Spitsbergen). [Dynamika wilgotności, potencjału oksydo-redukcyjnego i natlenieia wybranych gleb Calypsostrandy (Spitsbergen)]

Melke, J., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.276-278, In Polish with English summary.

Soil water, Air water interactions, Oxygen, Soil profiles, Cryogenic soils, Norway—Spitsbergen

49-6723

Vascular plants of the southern Bellsund Bay (Western Spitsbergen). [Rośliny naczyniowe południowego obrzeża Bellsundu (Spitsbergen Zachodni)]

Swięs, F., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.289-296, In Polish with English summary. 13 refs.

Plants (botany), Vegetation patterns, Arctic landscapes, Norway—Spitsbergen

49-6724

Phenological season of the year in Sörkapp Land (Spitsbergen). [Fenologiczne pory roku na Sörkapp Land (Spitsbergen)]

Dubiel, E., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.297-304, In Polish with English summary. 6 refs.

Plants (botany), Plant physiology, Norway—Spitsbergen

49-6725

Occurrence of some varieties of mosses in the Calypsostranda region (Wedel-Jarlsberg Land, Spitsbergen). [Występowanie niektórych gatunków mchów w rejonie Calypsostranda (Wedel-Jarlsberg Land, Spitsbergen)]

Rzętkowska, A., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.305-309, In Polish with English summary. 9 refs.

Plants (botany), Mosses, Tundra vegetation, Norway—Spitsbergen

49-6726

II Geographical Expedition of the Marie Curie-Skłodowska University to Spitsbergen in 1987. [II wyprawa geograficzna Uniwersytetu Marii Curie-Skłodowskiej na Spitsbergen w 1987 r.]

Pękala, K., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.383-386, In Polish with English summary.

Expeditions, Geography, Research projects, Norway—Spitsbergen

49-6727

Research problems in an expedition by the Quaternary Research Institute—Spitsbergen 1987. [Problematyka badawcza i przebieg wyprawy Instytutu Badań Czwartorzędu—Spitsbergen 1987]

Stankowski, W., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.387-389, In Polish with English summary.

Expeditions, Research projects, Geomorphology, Glacial geology, Norway—Spitsbergen

49-6728

"Svalbard '87" Expedition by the Students' Scientific Society of Geographers of Adam Mickiewicz University. [Wyprawa Studenckiego Koła Naukowego Geografów UAM "Svalbard '87"]

Rachlewicz, G., Rygielski, W., Sprutta, M., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.390-392, In Polish with English summary.

Expeditions, Organizations, Norway—Svalbard

49-6729

Voyages of the schooner "St. Roch" through the Northwest Passage in 1940-1942 and 1944. [Rejsy szkunera "St. Roch" przejściem Północno-Zachodnim w latach 1940-1942 i 1944]

Matalewski, S., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.400-402, In Polish with English summary. 4 refs.

Northwest passage, History, Navigation

49-6730

Sixtieth anniversary of the Italian Arctic Expedition aboard the dirigible "Italia" (Apr.-May 1928). [60-lecie włoskiej wyprawy Arktycznej na sterowcu "Italia" (kwiecień-maj 1928)]

Matalewski, S., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.403-406, In Polish with English summary. 8 refs.

Expeditions, History, Accidents, Dirigibles

49-6731

Oldest Polish Polar publication: 350 years of its existence (1638-1988). [Najstarsza Polska publikacja polarna: 350 lat jej istnienie (1638-1988)]

Migała, K., XV Sympozjum Polarne: stan obecny i wybrane problemy polskich badań polarnych (15th Polar Symposium: general status and selected problems in Polish polar research). Edited by A. Jahn, J. Pereyma and A. Szczepankiewicz-Smyrka, Wrocław, Uniwersytet Wrocławski, 1988, p.407-408, In Polish.

History, Organizations

49-6732

Estimation of mean velocity for flow under ice cover.

Teal, M.J., Ettema, R., Symposium on Fundamentals and Advancements in Hydraulic Measurements and Experimentation, Buffalo, NY, Aug. 1-5, 1994. Proceedings, New York, American Society of Civil Engineers, 1994, p.242-250, 10 refs.

DLC TC177.F86 1994

River ice, Ice cover effect, Ice water interface, River flow

49-6733

Effects of simulated ice on the performance of Price type-AA current meter rotors.

Fulford, J.M., Symposium on Fundamentals and Advancements in Hydraulic Measurements and Experimentation, Buffalo, NY, Aug. 1-5, 1994. Proceedings, New York, American Society of Civil Engineers, 1994, p.251-258, 2 refs.

DLC TC177.F86 1994

River ice, Slush, Frazil ice, River flow, Flow measurement, Measuring instruments

49-6734

Innovative instrumentation for a physical model of river ice transport.

Larsen, J., Zufelt, J.E., Crissman, R.D., MP 3657, Symposium on Fundamentals and Advancements in Hydraulic Measurements and Experimentation, Buffalo, NY, Aug. 1-5, 1994. Proceedings, New York, American Society of Civil Engineers, 1994, p.259-267, 2 refs.

DLC TC177.F86 1994

River ice, Ice jams, Ice control, River flow, Flow control, Water intakes, Hydraulic structures, Environmental tests, Niagara River

Large physical models often require the use of innovative instrumentation and measurement techniques. Hydraulic models that attempt to simulate the effects of stationary ice covers put constraints on the types of instrumentation that can be used to successfully measure water velocities and stages. Ice transport models compound these measurement problems, since the motion of the ice is one of the primary variables of interest. The challenges of measuring the thickness, velocity, and concentration of moving ice in the field are significant. The challenges are only marginally easier in a physical model. These obstacles were addressed in a physical model study of the ice transport processes in the Grass Island Pool of the Upper Niagara River, which forms part of the border between the State of New York and the Province of Ontario.

49-6735

Annual report 1994.

Danish Polar Center, Copenhagen, Dansk Polarcenter, 1995, 37p., Refs. p.34-36.

Organizations, Research projects, Cost analysis, Logistics, Greenland

49-6736

Comparison of models for predicting thermally-induced ice loads.

Watson, D.A., Timco, G.W., *National Research Council Canada. Hydraulics Laboratory. Technical report,* Aug. 1995, HYD-TR-003, 57p. + append., With French summary. 19 refs.

Lake ice, River ice, Ice loads, Ice pressure, Ice push, Ice solid interface, Ice thermal properties, Thermal expansion, Reservoirs, Dams, Computer programs

49-6737

Thermal impact of a buried chilled gas pipeline at highway crossings.

Raad, L., Yuan, X.L., *Alaska. University, Fairbanks. Institute of Northern Engineering. Transportation Research Center. Report,* May 1991, INE-TRC 91.01, 104p., 20 refs.

Gas pipelines, Underground pipelines, Pipeline freezing, Soil freezing, Frost heave, Freezing front, Frost protection, Road maintenance

49-6738

Measurement frequency analysis for pipe and ground temperatures from the Norman Wells to Zama pipeline thermal monitoring program, Northwest Territories.

Riseborough, D.W., *Canada. Geological Survey. Open file,* 1994, No.2888, 60p., 2 refs.

Underground pipelines, Permafrost beneath structures, Permafrost heat balance, Frozen ground temperature, Soil temperature, Canada—Northwest Territories—Norman Wells

49-6739

High Arctic IRMA automatic weather station field data 1991-92. Part 1—documentation, Part 2—plots.

Labine, C.L., et al, *Canada. Geological Survey. Open file,* 1994, No.2898, 52p. + appends., 6 refs. + bibliography in Appendix 1.

Polar atmospheres, Weather stations, Meteorological data, Air temperature, Surface temperature, Wind (meteorology), Humidity, Snow depth, Computer programs, Canada—Northwest Territories—Queen Elizabeth Islands

49-6740

Investigation of indentation contact and penetration of ice.

Veitch, B., Tuhkuri, J., *Helsinki University of Technology. Ship Laboratory. Report,* 1995, M-198, 57p., 52 refs.

Ice solid interface, Metal ice friction, Ice cutting, Ice deformation, Ice loads, Ice pressure, Ice cover strength, Ice cracks, Ships, Propellers, Mathematical models

49-6741

Boundary element analysis of cracks under normal compressive stresses.

Tuhkuri, J., *Helsinki University of Technology. Ship Laboratory. Report,* 1995, M-197, 44p., 53 refs.

Ice deformation, Ice friction, Ice elasticity, Ice cracks, Crack propagation, Boundary value problems, Mathematical models

49-6742

H-bond acidity of solvents: II, transformation of the Snyder chi proton donor scale to the Taft-Kamlet alpha scale.

Leggett, D.C., MP 3658, *Journal of solution chemistry,* 1994, 23(6), p.697-701, 10 refs.

Solutions, Solubility, Hydrogen bonds, Proton transport, Chemical properties, Chemical analysis

By including a solvent cohesion term it was possible to transform Snyder's χ_d scale into the Taft-Kamlet α scale for aliphatic H-bonding solvents. The transforming equation was: $\alpha=2.386\chi_d+1.271\alpha\beta-0.482$ where $\alpha\beta$ is the product of solvent acidity and basicity. Alpha is estimated for several solvents previously not thought to possess H-donor ability. These are dimethyl sulfoxide, nitroethane, dimethylformamide, dioxane, dimethylacetamide, propylene carbonate, ethyl acetate, butyrolactone, N-methylpyrrolidinone, and cyclohexanone.

49-6743

GPR for underground detection.

Arcone, S.A., MP 3659, *Military engineer,* Aug.-Sep. 1995, 87(572), p.18-20.

Soil pollution, Water pollution, Oil spills, Ground water, Subsurface investigations, Electromagnetic prospecting, Military facilities, Radar

49-6744

Accumulation and use of nitrogen and phosphorus following fertilization in two alpine tundra communities.

Bowman, W.D., *Oikos,* 1994, 70(2), p.261-270, 46 refs.

Alpine tundra, Tundra vegetation, Tundra soils, Plant ecology, Plant physiology, Nutrient cycle, Biomass, Soil chemistry, United States—Colorado—Front Range

49-6745

Analytical methods for white phosphorus (P_4) in sediment and water.

Walsh, M.E., Taylor, S.T., Anderson, D., McCarty, H., MP 3660, Waste Testing and Quality Assurance Symposium, 11th, Washington, D.C., July 23-28, 1995. Proceedings, Philadelphia, American Society for Testing and Materials (ASTM), 1995, p.380-387, 16 refs.

Soil pollution, Water pollution, Soil chemistry, Water chemistry, Chemical analysis, Explosives

White phosphorus (P_4) can produce severe adverse ecological impacts if released into the environment. To date, there is no standard analytical method for detecting white phosphorus in environmental matrices. The authors have been using an analytical method based on solvent extraction and gas chromatography to determine white phosphorus in sediments and water from an Army training area. For sediments, a threshold of less than 1 µg/kg was achieved for white phosphorus extracted with isoctane and determined with a portable capillary gas chromatograph equipped with a nitrogen-phosphorus detector. For water, extraction with isoctane may be used to determine concentrations greater than 0.1 μg/L. With a diethyl ether preconcentration procedure, a detection threshold of less than 0.01 μg/L was achieved.

49-6746

Suitability of polymeric tubings for sampling well water to be analyzed for trace-level organics.

Parker, L.V., Ranney, T.A., MP 3661, Waste Testing and Quality Assurance Symposium, 11th, Washington, D.C., July 23-28, 1995. Proceedings, Philadelphia, American Society for Testing and Materials (ASTM), 1995, p.305-314, 17 refs.

Soil pollution, Water pollution, Ground water, Soil chemistry, Water chemistry, Chemical analysis, Wells, Well casings

There is concern in the groundwater monitoring industry that polymeric tubings used to sample groundwater can affect contaminant concentrations. Results from a recent study that looked for sorption and leaching of organic contaminants by twenty polymeric tubings will be presented. The flexible and rigid tubings tested included several polyethylene and polypropylene formulations, several different fluoropolymers, as well as polyurethane, polyamide, and flexible PVC. Based on the findings from this study and relative cost, the authors tentatively recommend PVDF when a rigid tubing can be used and a copolymer of vinylidene fluoride and hexafluoropropylene [P(VDF-HFP)] when a more flexible tubing is required. However, since this study was conducted under static conditions, and sampling usually involves continual replenishment of the contacting solution, studies under dynamic conditions are currently being conducted.

49-6747

Determining volatile organic compound concentration stability in soil.

Hewitt, A.D., MP 3662, Waste Testing and Quality Assurance Symposium, 11th, Washington, D.C., July 23-28, 1995. Proceedings, Philadelphia, American Society for Testing and Materials (ASTM), 1995, p.173-183, 18 refs.

Soil pollution, Soil chemistry, Soil tests, Chemical analysis

The pre-analysis concentration stability of volatile organic compounds (VOCs) in soil matrices was evaluated independent of volatilization losses. Soil subsamples were fortified with benzene, toluene, ethyl benzene, p-xylene, o-xylene, trans-1,2-dichloroethylene, trichloroethylene and perchloroethylene, sealed inside glass ampoules and handled in a manner consistent with the EPA's SW-846 Method 8240. Experiments have repeatedly shown that chlorinated-hydrocarbon concentrations remain fairly constant, while aromatic hydrocarbons often experience a complete (>99%) loss when soils are held at 22°C for several days. While refrigeration at 4°C reduces the rate of biodegradation, more than 50% of some hydrocarbons are lost when soils are held for 14 days. Chemical preservation by soil acidification with $NaHSO_4$ mitigates the loss of these aromatic hydrocarbons for periods beyond 14 days when held at 22°C.

49-6748

Evaluation of the new clean solid phases for extraction of nitroaromatics and nitramines from water.

Jenkins, T.F., Thorne, P.G., Myers, K.F., McCormick, E.F., MP 3663, Waste Testing and Quality Assurance Symposium, 11th, Washington, D.C., July 23-28, 1995. Proceedings, Philadelphia, American Society for Testing and Materials (ASTM), 1995, p.128-142, 17 refs.

Soil pollution, Water pollution, Ground water, Soil chemistry, Water chemistry, Explosives, Chemical analysis, Military facilities

Salting-out solvent extraction (SOE) is the preconcentration step currently specified in SW846 Method 8330, the reversed-phase high-performance liquid chromatography (RP-HPLC) method for nitroaromatics and nitramines in water. Previous attempts to utilize solid phase extraction (SPE) in the laboratory indicated that use of the solid phases commercially available at the time led to introduction of unacceptable interferences for some matrices. Recently, several manufacturers have introduced new cleaner solid phases. This study was conducted to evaluate their utility in providing preconcentration for low level determination of these analytes.

49-6749

SPOT survey of wild rice in northern Minnesota.

Bolus, R.L., MP 3664, *Journal of imaging science and technology,* Dec. 1994, 38(6), p.594-597, 5 refs.

Wetlands, Vegetation patterns, Plant ecology, Biogeography, Terrain identification, Spaceborne photography, Image processing, United States—Minnesota

A survey of the areal extent of wild rice around three lakes in northern Minnesota has been conducted. Wild rice is a desirable natural marsh grass that is sensitive not only to the phosphorus washed from farm, urban, and industrial areas, but also to water level. The objective of the survey was to produce a geographic information system map from the remotely sensed Satellite Pour l'Observation de la Terra (SPOT) data, showing identification and location of the wild rice on a Chippewa reservation and listing its acreage. The approach used was the technique of supervised spectral classification. The results surprisingly show three distinct and separate spectral populations of wild rice. Although it is unrealistic that different varieties are growing in close proximity, some possible causes for the results are that (1) dissimilar land cover backgrounds are causing different mixed pixel responses, (2) varying crop canopies are causing different detected radiance, and (3) varying water content of the vegetation is causing radiance differences.

49-6750

Downslope fertilizer movement in arctic tussock tundra.

Kummerow, J., Mills, J.N., Ellis, B.A., Hastings, S.J., Kummerow, A., *Holarctic ecology,* 1987, 10(4), p.312-319, 16 refs.

Tundra vegetation, Plant ecology, Plant physiology, Phenology, Nutrient cycle, Biomass, Slope processes, United States—Alaska—North Slope

49-6751

Ice effects on riprap.

Wuebben, J.L., MP 3665, River, coastal and shoreline protection: erosion control using riprap and armourstone, Chichester, England, John Wiley & Sons, Ltd., 1995, p.513-530, 33 refs.

River ice, Ice cover strength, Ice loads, Ice pressure, Ice push, Ice override, Ice pileup, Ice erosion, Rock fills, Bank protection (waterways)

Riprap structures are customarily designed to withstand forces from water currents and wave action. However, when such structures are built in ice-prone areas, their design must also take into consideration those forces induced by ice formation and movement, as well as the effect of freeze-thaw processes. Ice formation and breakup can affect the performance of riprap structures in a number of ways, depending on the environmental driving forces and the physical characteristics of the ice and riprap structure. In this paper, the modes of direct ice action on riprap and the influence of ice-affected river hydraulics are outlined, and information on the magnitude of ice-related forces and the effects of seasonal freezing on installation integrity are presented.

49-6752

Real-time use of satellite data in ice monitoring for arctic operations.

Sandven, S., Johannessen, O.M., Kloster, K., Oceanology International 1994, Kingston-upon-Thames, England, Spearhead Exhibitions Ltd., 1994, 8p. + figs., 8 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice reporting, Ice forecasting, Spaceborne photography, Synthetic aperture radar, Data transmission

49-6753

Danger—black ice. Traffic Technology International '94, 1994, 4p.

Road icing, Ice detection, Chemical ice prevention, Safety, Warning systems, Road maintenance, Germany

49-6754

Computing thickness of sea ice from polarimetric SAR data: application of neural network for retrieving sea ice thickness from model-generated polarimetric scattering coefficients.

Huynh, D.D., Yueh, S.H., Nghiem, S.V., Kwok, R., *California Institute of Technology. Jet Propulsion Laboratory. JPL new technology report,* July 1995, NPO-19343, 2p. + p.1a-39a, 12 refs. Included as Item 40 in NASA technical briefs, Vol.19, No.7, July 1995.

Ice surveys, Sea ice distribution, Ice cover thickness, Radio echo soundings, Synthetic aperture radar, Backscattering, Spaceborne photography, Image processing

49-6755

Shoot and root development of tall and hard fescues in two different soils.

Brar, G.S., Palazzo, A.J., MP 3666, *Journal of environmental quality,* July-Aug. 1995, 24(4), p.777-781, 38 refs.

Grasses, Roots, Revegetation, Land reclamation, Soil conservation, Soil stabilization

Tall (*Festuca arundinacea* Schreb.) and hard fescue [*Festuca ovina* var. *longifolia* (L.) Koch] are among the most widely sown grasses used to stabilize disturbed soils in both the cool-humid and transition climatic zones of the US. The present objective was to evaluate the root and shoot development of two turfgrasses grown in sand and silt loam soils. Significant differences in leaf area, plant height, shoot and root dry matter, root depth (RD), root branching (RB), and root length (RL) were recorded, tall fescue being compared with hard fescue. Greater leaf area, leaf number, plant height, shoot and root dry matter, and RL were observed when the grasses were grown in a silt loam soil. Greater RD and root/shoot ratio were recorded in sandy soil. Both turfgrass species and soil texture affected leaf area, leaf number, plant height, shoot dry matter, RD, RL, RB, root dry matter, and the root/shoot ratio. Significant correlations were obtained for shoot dry matter with root dry matter and RL; leaf area with shoot dry matter and root dry matter; root dry matter with TRL and RB; RD with root/shoot ratio; RL with leaf area; and RB with TRL and RD. Turfgrasses and soil types had a significant impact on shoot and root development.

49-6756

Uncoupling of coupled flows in soil—a finite element method.

Sheng, D.C., Axelsson, K., *International journal for numerical and analytical methods in geomechanics,* 1995, Vol.19, p.537-553, 31 refs.

Soil freezing, Freezing front, Frozen ground thermodynamics, Frozen ground chemistry, Soil water migration, Engineering geology, Mathematical models

49-6757

Field and wind tunnel testing of ice free anemometer: a preliminary report.

Krishnasamy, S.G., Kastelein, M., Motycka, J., Electricity '94: a new energy order, Toronto, Mar. 1994, Montreal, Canadian Electrical Association, 1994, 9p. + figs., 2 refs.

Power line icing, Ice storms, Anemometers, Cold weather performance, Ice prevention, Wind tunnels

49-6758

Characterization of humic acids isolated from antarctic soils.

Calace, N., Campanella, L., De Paolis, F., Petronio, B.M., *International journal of environmental analytical chemistry,* 1995, Vol.60, p.71-78, 23 refs.

Soil chemistry, Soil pollution, Soil analysis, Nutrient cycle, Geochemistry, Geochemical cycles, Antarctica—Victoria Land

Humic acids isolated from antarctic soils have been characterized by FTIR, ^{13}C NMR and element analysis; aminoacid content has been determined after hydrolysis with 6 N HCl. Nitrogen and hydrogen contents of HAs are very high, indicating that more proteinaceous material, covalently bound to the structures, has not undergone appreciable transformation during the humification processes. Moreover, the aliphatic carbon prevails over the aromatic one, owing to the nature of non-ligniferous material as precursor. With the progress of the humification process obtained in temperate climatic conditions, the proteinaceous material decreases, as shown by analysis of aminoacids, and the molecular weight of the humic compounds increases, whereas aromatic carbon does not. (Auth.)

49-6759

Study of humic fractions from water of an antarctic lake.

Campanella, L., Petronio, B.M., Braguglia, C., Cini, R., Degli Innocenti, N., *International journal of environmental analytical chemistry,* 1995, Vol.60, p.49-60, 29 refs.

Lake water, Water chemistry, Limnology, Water pollution, Nutrient cycle, Hydrogeochemistry, Geochemical cycles, Lacustrine deposits, Bottom sediment, Soil pollution, Antarctica—Terra Nova Bay

Soluble humic compounds isolated from water of an antarctic lake have been characterized by IR, NMR spectrophotometry and fluorimetric measurements. Gel chromatography on Sephadex G resins of fulvic acids, present in the water in high concentration, has shown that a great fraction of them consists of compounds having molecular weight greater than 50,000 dalton. The high level of humics and the presence in soluble form of compounds having high molecular weight and similar structure to the humic acids of lake sediments may be due to the high pH value of the water examined. (Auth.)

49-6760

[Proceedings].

CANMET/ACI International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 4th, Montreal, Oct. 1994, Malhotra, V.M., ed, ACI Special publication SP-148, Detroit, American Concrete Institute, 1994, 455p., Refs. passim. For selected papers see 49-6761 through 49-6767.

DLC TP884.A3C358 1994

Concrete admixtures, Air entrainment, Concrete strength, Concrete durability, Frost resistance, Freeze thaw tests

49-6761

Application of a new superplasticizer for ultra high-strength concrete.

Mitsui, K., Yonezawa, T., Kinoshita, M., Shimono, T., CANMET/ACI International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 4th, Montreal, Oct. 1994. ACI Special publication SP-148. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.27-45, 7 refs.

Concrete admixtures, Concrete strength, Concrete durability, Frost resistance, Freeze thaw tests, Bridges

49-6762

Cement/superplasticizer/air-entraining agent compatibility.

Baalbaki, M., Aïtcin, P.C., CANMET/ACI International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 4th, Montreal, Oct. 1994. ACI Special publication SP-148. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.47-62, 9 refs.

Concrete admixtures, Cements, Air entrainment, Concrete durability, Frost resistance, Freeze thaw tests

49-6763

Mixture proportion, flowability, strength and durability of flowing concrete.

Kasai, Y., Hiraishi, S., Tobinai, K., Osada, K., CANMET/ACI International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 4th, Montreal, Oct. 1994. ACI Special publication SP-148. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.209-226, 8 refs.

Concrete admixtures, Water cement ratio, Concrete strength, Concrete durability, Frost resistance, Freeze thaw tests

49-6764

Split addition of a HRWRA and its effect on high-performance concrete.

Schemmel, J.J., Arora, V., Williams, J., CANMET/ACI International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 4th, Montreal, Oct. 1994. ACI Special publication SP-148. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.301-316, 9 refs.

Concrete admixtures, Water cement ratio, Concrete strength, Concrete durability, Frost resistance, Freeze thaw tests

49-6765

Effect of moist curing and modifier content on performance in freezing and thawing of two latex-modified concretes.

Newtson, C.M., Janssen, D.J., CANMET/ACI International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 4th, Montreal, Oct. 1994. ACI Special publication SP-148. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.317-332, 8 refs.

Concrete admixtures, Concrete curing, Air entrainment, Concrete strength, Concrete durability, Frost resistance, Freeze thaw tests

49-6766

Practical implications of lithium-based chemicals and admixtures in controlling alkali-aggregate reactions.

Wang, H.H., Tysl, S.R., Gillott, J.E., CANMET/ACI International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 4th, Montreal, Oct. 1994. ACI Special publication SP-148. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.353-366, 7 refs.

Concrete admixtures, Air entrainment, Water cement ratio, Concrete strength, Concrete durability, Frost resistance, Freeze thaw tests

49-6767

Performance evaluation of set accelerators for concrete.

Jeknavorian, A.A., Berke, N.S., Shen, D.F., CANMET/ACI International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 4th, Montreal, Oct. 1994. ACI Special publication SP-148. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1994, p.385-405, 21 refs.

Concrete admixtures, Concrete curing, Concrete hardening, Air entrainment, Concrete strength, Concrete durability, Winter concreting, Frost resistance, Cold weather construction

49-6768

Kola Peninsula: new beginnings for mining in Russia; February 1994 roundtables; Murmansk Oblast, Russia; New York City, February 2, 1994; Denver, February 8, 1994. Geonomics Institute Round Table Series, Middlebury, Vt., Geonomic Institute, 1994, 1 vol. (various pagings) + maps.

Natural resources, Mining, International cooperation, Legislation, Cost analysis, Minerals, Natural gas, Crude oil, Russia, Russia—Kola Peninsula, Russia—Murmansk, Northern Sea Route, Russia—Monchegorsk

49-6769

Structure of the vegetation cover in the northern taiga of the Kola Peninsula. [Struktura rastitel'nogo pokrova severnoĭ taigi Kol'skogo poluostrova]

Paianskaia-Gvozdeva, I.I., Leningrad, Botanicheskiĭ Institut AN SSSR, 1990, 107p., In Russian with English summary and table of contents. Refs. p.100-107.

DLC QK63.P34 1990

Vegetation patterns, Taiga, Forest land, Floodplains, Ecology, Trees (plants), Russia—Kola Peninsula

49-6770

Organization of fleet operations in Siberian basins; collected scientific papers. [Organizatsiia raboty flota v basseĭnakh Sibiri; sbornik nauchnykh trudov]

Zachesov, V.P., ed, Novosibirsk, NIIVT, 1990, 86p., In Russian. For individual papers see 49-6771 through 49-6782.

DLC TC709.O74 1990

Ships, Water transport, Rivers, Cost analysis, Steam, Navigation, Ice navigation, Mathematical models, Russia—Siberia

49-6771

Ob-Enisey junction. [Ob"-Eniseĭskoe soedinenie]

Zachesov, V.P., Aksenova, M.A., Organizatsiia raboty flota v basseĭnakh Sibiri; sbornik nauchnykh trudov (Organization of fleet operations in Siberian basins; collected scientific papers). Edited by V.P. Zachesov, Novosibirsk, NIIVT, 1990, p.4-16, In Russian. 2 refs.

Rivers, Cost analysis, Water transport, Russia—Siberia, Russia—Ob' River, Russia—Yenisey River

49-6772

Scientific research progress in the operation of transportation on small rivers in Western Siberia. [Nauchno-issledovatel'skiĭ progress v upravlenii perevozkami po malym rekam Zapadnoĭ Sibiri]

Vasin, I.N., Organizatsiia raboty flota v basseĭnakh Sibiri; sbornik nauchnykh trudov (Organization of fleet operations in Siberian basins; collected scientific papers). Edited by V.P. Zachesov, Novosibirsk, NIIVT, 1990, p.16-18, In Russian.

Water transport, Rivers, Russia—Siberia

49-6773

Analysis and modeling of industrial-financial results of the operational activities of Western Siberian steam navigation. [Analiz i modelirovanie proizvodstvenno-finansovykh rezul'tatov ekspluatatsionnoĭ deiatel'nosti Zapadno-Sibirskogo parokhodstva]

Kalinina, S.A., Nikiforov, V.S., Organizatsiia raboty flota v basseĭnakh Sibiri; sbornik nauchnykh trudov (Organization of fleet operations in Siberian basins; collected scientific papers). Edited by V.P. Zachesov, Novosibirsk, NIIVT, 1990, p.18-25, In Russian.

Water transport, Rivers, Cost analysis, Steam, Navigation, Russia—Siberia

49-6774

Elements of the theory of dynamic programming in optimization problems. [Elementy teorii dinamicheskogo programmirovaniia v optimizatsionnykh zadachakh]

Buntashova, S.V., Organizatsiia raboty flota v basseĭnakh Sibiri; sbornik nauchnykh trudov (Organization of fleet operations in Siberian basins; collected scientific papers). Edited by V.P. Zachesov, Novosibirsk, NIIVT, 1990, p.26-29, In Russian.

Water transport, Rivers, Mathematical models, Russia—Siberia

49-6775

Classification of reserves of operational activity of a water transport enterprise. [Klassifikatsiia rezervov ekspluatatsionnoĭ deiatel'nosti vodnotransportnogo predpriiatiia]

Mikhaĭlov, Z.T., Nikiforov, V.S., Organizatsiia raboty flota v basseĭnakh Sibiri; sbornik nauchnykh trudov (Organization of fleet operations in Siberian basins; collected scientific papers). Edited by V.P. Zachesov, Novosibirsk, NIIVT, 1990, p.30-33, In Russian. 2 refs.

Water transport, Rivers, Ports, Steam, Navigation, Russia—Siberia

49-6776

Improving the planning of operating time on small rivers and new sections of the route. [Sovershenstvovanie planirovaniia vremeni sledovaniia pri rabote na malykh rekakh i novykh uchastkakh puti]

Kitov, A.G., Organizatsiia raboty flota v basseĭnakh Sibiri; sbornik nauchnykh trudov (Organization of fleet operations in Siberian basins; collected scientific papers). Edited by V.P. Zachesov, Novosibirsk, NIIVT, 1990, p.33-42, In Russian. 7 refs.

Water transport, Rivers, Cost analysis, Mathematical models, Ships, Water level, Russia—Siberia

49-6777

Determining zones of service and a basis for a rational scheme of goods traffic newly developed for navigation on waterways. [Opredelenie zony obsluzhivaniia i obosnovanie ratsional'noĭ skhemy gruzopotokov vnov' osvaivaemykh dlia sudokhodstva vodnykh puteĭ]

Glodenis, T.V., Organizatsiia raboty flota v basseĭnakh Sibiri; sbornik nauchnykh trudov (Organization of fleet operations in Siberian basins; collected scientific papers). Edited by V.P. Zachesov, Novosibirsk, NIIVT, 1990, p.43-51, In Russian. 3 refs.

Rivers, Mathematical models, Water transport, Russia—Siberia

49-6778

Improving the transport service of goods deliveries to points along branch and small rivers. [Sovershenstvovanie transportnogo obsluzhivaniia dostavki gruzov v punkty bokovykh i malykh rek]

Sinitsyn, G.IA., Organizatsiia raboty flota v basseĭnakh Sibiri; sbornik nauchnykh trudov (Organization of fleet operations in Siberian basins; collected scientific papers). Edited by V.P. Zachesov, Novosibirsk, NIIVT, 1990, p.47-51, In Russian. 3 refs.

Water transport, Rivers, Nomographs, Steam, Ice navigation, Russia—Siberia

49-6779

Natural conditions and transportation development in the Taz River basin. [Prirodnye usloviia i transportnoe osvoenie basseǐna r. Taz]

Kostarev, V.B., Organizatsiia raboty flota v basseǐnakh Sibiri; sbornik nauchnykh trudov (Organization of fleet operations in Siberian basins; collected scientific papers). Edited by V.P. Zachesov, Novosibirsk, NIIVT, 1990, p.52-60, In Russian. 3 refs.

River basins, Rivers, Water transport, River ice, Ice conditions, Ice navigation, Russia—Siberia, Russia—Taz River, Russia—Chasel'ka River, Russia—Karal'ka River

49-6780

Coordinating joint operations of the main and branch transfer installations in the process of ship cargo operations. [Soglasovanie sovmestnoǐ raboty osnovnoǐ i dopolnitel'nykh peregruzochnykh ustanovok v protsesse gruzovoǐ obrabotki sudna]

Shatsionok, V.F., Organizatsiia raboty flota v basseǐnakh Sibiri; sbornik nauchnykh trudov (Organization of fleet operations in Siberian basins; collected scientific papers). Edited by V.P. Zachesov, Novosibirsk, NIIVT, 1990, p.61-69, In Russian. 2 refs.

Water transport, Rivers, Mathematical models, Ships, Russia—Siberia

49-6781

Integrated economic-mathematical model for spacing the fleet along small rivers. [Kompleksnaia ekonomiko-matematicheskaia model' rasstanovki flota po malym rekam]

Zotov, V.V., Organizatsiia raboty flota v basseǐnakh Sibiri; sbornik nauchnykh trudov (Organization of fleet operations in Siberian basins; collected scientific papers). Edited by V.P. Zachesov, Novosibirsk, NIIVT, 1990, p.69-73, In Russian. 1 ref.

Mathematical models, Water transport, Rivers, Ships, Cost analysis, Russia—Siberia

49-6782

Analysis of scheduled planning and calculating the operation of "Siberian"-type ships under arctic navigation conditions. [K analizu reǐsovogo planirovaniia i ucheta raboty sudov tipa "Sibirskiǐ" v usloviiakh arkticheskoǐ navigatsii]

Fedorov, V.A., Organizatsiia raboty flota v basseǐnakh Sibiri; sbornik nauchnykh trudov (Organization of fleet operations in Siberian basins; collected scientific papers). Edited by V.P. Zachesov, Novosibirsk, NIIVT, 1990, p.74-83, In Russian.

Water transport, Ships, Rivers, Russia—Siberia

49-6783

Survival of intracellular freezing by the antarctic nematode *Panagrolaimus davidi*.

Wharton, D.A., Ferns, D.J., *Journal of experimental biology*, June 1995, 198(6), p.1381-1387, Refs. p.1386-1387.

DLC QH301.J68

Cryobiology, Acclimatization, Marine biology, Antarctica—McMurdo Sound

The authors have observed freezing and melting in all body compartments, including intracellular compartments, of the antarctic nematode *Panagrolaimus davidi*. Inoculative freezing from the surrounding water occurs via the body openings, rather than across the cuticle; most frequently it occurs via the excretory pore. Individual nematodes that have frozen intracellularly will subsequently grow and reproduce in culture. Determining the mechanisms by which this nematode survives intracellular freezing could have important applications in the cryopreservation of a variety of biological materials. (Auth. mod.)

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