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GLACIOLOGICAL LITERATURE

This is a selected list of glaciological literature on the scientific study of snow and ice and of their effects on the Earth; for the literature on polar expeditions, and also on the "applied" aspects of glaciology, such as snow ploughs, readers should consult the bibliographies in each issue of *Recent Polar Literature* (supplement to the *Polar Record*). For Russian material the system of transliteration used is that agreed by the U.S. Board on Geographic Names and the Permanent Committee on Geographical Names for British Official Use in 1947. Readers can greatly assist by sending reprints of their publications to the Society, or by informing Dr J. W. Glen of publications of glaciological interest. It should be noted that the Society does not necessarily hold copies of the items in this list, and also that the Society does not possess facilities for microfilming or photocopying.

Conferences

Aseyev, A. A., *and others, ed. International geography '76. XXIII International Geographical Congress, Moscow, 1976. Section 12. Additional volume. Editors A. A. Aseyev [and 7 others]*. Moscow, [Vneshtorgizdat], 1976. 340 p. [Contains material omitted from other sections for various reasons, including: B. E. Holmgren, "Turbidity of the Arctic atmosphere in relation to open leads in the pack ice", p. 77–80; V. S. Nazarov, "The ice cover of the ocean—the indicator of the Earth climate", p. 83–84.]

Aseyev, A. A., *and others, ed. International geography '76. XXIII International Geographical Congress, Moscow, 1976. Section 1. Geomorphology and paleogeography. Editors A. A. Aseyev, A. A. Velichko, I. I. Spasskaya*. Moscow, [Vneshtorgizdat], 1976. 409 p. [Includes papers on Pleistocene and Holocene glaciation, mainly of the U.S.S.R., and on periglacial conditions during these periods.]

Lvovich, M. I., *and others, ed. International geography '76. XXIII International Geographical Congress, Moscow, 1976. Section 2. Climatology, hydrology, glaciology. Editors M. I. Lvovich, V. M. Kotlyakov, Yu. L. Rauner*. Moscow, [Vneshtorgizdat], 1976. 385 p. [Contents include: E. Michna and S. Paczos, "Climatological criteria for evaluation of snow conditions required for recreation and winter sports by example of south-east Poland", p. 72–75; D. S. Munro and J. A. Davies, "Diurnal energy flux variations and glacier surface hydrology", p. 75–77; A. Ohmura and F. Müller, "Heat balance measurement of Arctic tundra (Axel Heiberg Island, Canadian Arctic Archipelago)", p. 80–84; J. A. Shear, "The coreless winter of high latitudes", p. 97–100; S. Ya. Sergin and O. P. Chizhov, "Modeling of global changes of climate and glaciation in Pleistocene", p. 128–32; W. P. Adams, "Calculation of mean lake ice densities", p. 171–76; Z. Churski, "Caractéristique et évolution du réseau fluvial de l'avant-pays du Skeidararjökull en Islande", p. 176–78; M. K. Koo, "Hydrology of a small basin in the Canadian high Arctic", p. 204–07; R. Braithwaite and F. Müller, "On the simulation of glacier melt using temperature data from remote weather stations", p. 274–76; S. B. McCann, "Margin of the Ellesmere ice cap, N.W.T., Canada", p. 277–79; V. S. Revyakin and N. V. Revyakina, "Some peculiarities of glaciation regression of intercontinental mountain area", p. 279–83; M. V. Tronov, "On some glacioclimatology problems of intracontinental highlands (with reference to Altai)", p. 283–87; G. N. Golubev, A. N. Krenke, G. K. Tushinskiy and R. Vivian. "General and specific features of regime of glaciers and their oscillations in the west Alps and in the Caucasus", p. 288–93; G. Gvirtzman, "Late Wurm temperature depression in the Middle East −15°C: evidence from fossil snowlines on Mount Hermon and Jebel Catharina, Sinai", p. 294–97; V. S. Koryakin, "Fluctuations of glaciers within the Eurasian part of the Arctic", p. 298–301; A. N. Krenke and V. Schytt, "Fluctuation of glaciers over a historical period", p. 301–04; K. G. Makarevich and V. F. Suslov, "Contemporary and historical fluctuations of the glaciers in Soviet and foreign parts of Central Asia", p. 304–07; A. V. Shnitnikov, "Volume evolution of some mountain glaciers during Holocene", p. 308–11; V. F. Gracovich, "Establishment of glaciological data bank and creation of the atlas of world snow and ice resources", p. 328–29; L. A. Kanayev and Yu. D. Moskalev, "The experience of avalanche mapping and working out of the normative-reference glaciological handbooks", p. 329–31; V. I. Korsun and V. M. Kotlyakov, "Soviet cadasters and reference books on climatology, hydrology and glaciology", p. 334–38; V. M. Kotlyakov, G. N. Golubev, N. N. Dreyer and V. I. Kravtsova, "The world atlas of snow and ice resources", p. 339–42; O. N. Vinogradov, "The glacier inventory of the USSR and its scientific significance", p. 379–83.]

Markov, K. K., *ed. International geography '76. XXIII International Geographical Congress, Moscow, 1976. Section 3. Geography of the ocean*. Moscow, [Vneshtorgizdat], 1976. 102 p. [Papers on world-wide aspects of oceanography. Includes M. L. Bryan, "The interpretation of 25 cm imaging radar data of Arctic sea ice", p. 13–14.]

[Union Géodésique et Géophysique Internationale. Association Internationale des Sciences Hydrologiques. Commission des Neiges et Glaces.] *Symposium. Isotopes et impuretés dans les neiges et glaces. Actes du colloque de Grenoble, août/septembre 1975*. Dorking [printed], International Association of Hydrological Sciences, 1977. xvi, 419 p. (IAHS–AISH Publication No. 118.) [Available from W. W. Hastings, 1909 K Street NW, Washington, DC 20006, U.S.A. For details of papers, see elsewhere in this list.]

General glaciology

Kotlyakov, V. M. *Gory, l'dy i gipotezy [Mountains, ice and hypotheses]*. Leningrad, Gidrometeoizdat, 1977. 168 p. [An account of glaciological expeditions, 1968–73, to the Pamir of Soviet Central Asia, discussing natural features and peoples.]

Krouse, H. R., *and others*. Climatic and spatial dependence of the retention of D/H and $^{18}O/^{16}O$ abundances in snow and ice of North America, [by] H. R. Krouse, R. Hislop, H. M. Brown, K. West and J. L. Smith. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 242–47. [In areas sampled (Sierra Nevadas, California, and Rocky Mountains, St. Elias Mountains, and Ellesmere Island, all in Canada), isotopic preservation lifetimes ranged from few hours to many years.]

McKay, G. A. Hydrological mapping. (*In* Rodda, J. C., *ed. Facets of hydrology*. London, etc., John Wiley and Sons, [c1976], p. 1–36. (Wiley–Interscience Publication.)) [Discusses maps of variables, including snow cover (p. 21–26) and ice on inland waters (p. 27–29).]

Martinec, J. Snow and ice. (*In* Rodda, J. C., *ed. Facets of hydrology*. London, etc., John Wiley and Sons, [c1976], p. 85–118. (Wiley–Interscience Publication.)) [Ch. 4 in this book. Discusses role of snow and ice in hydrological cycle.]

Oeschger, H. Summary of work by the Physics Institute, Bern, on Alpine and polar ice. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 408–10. [Main emphasis on radioactive dating of firn and ice, and on history of cosmophysical and geophysical parameters recorded in ice.]

Glaciological instruments and methods

Adamcyk, R. J., *and others*. Use of regression equations and hydrologic models for flood forecasting—a case study, [by] R. J. Adamcyk, J. P. Jolly and S. I. Solomon. *Proceedings of the* 33rd *annual Eastern Snow Conference*, 1976, p. 83–97. [Presents results of study in Newfoundland, Canada, to establish technique for forecasting 7-day inflow volumes to reservoir using available meteorologic and hydrologic data during the snow melt–run-off period.]

Adams, W. P., *and others*. Improving the data base of snow science, by W. P. Adams, B. F. Findlay, B. E. Goodison. *Proceedings of the* 33rd *annual Eastern Snow Conference*, 1976, p. 23–40. [Discusses some current international practices for measurement and recording of snowfall and snow cover as example of importance of reassessing standard practices.]

Baker, T. H. W. Transportation, preparation, and storage of frozen soil samples for laboratory testing. *A[merican] S[ociety for] T[esting and] M[aterials]. Special Technical Publication* 599, 1976, p. 88–112. [Reviews procedures used and difficulties encountered.]

Bengtsson, L. Snowmelt estimated from energy budget studies. *Nordic Hydrology*, Vol. 7, No. 1, 1976, p. 3–18. [Discusses degree day method.]

Burt, T. P., *and* Williams, P. J. Hydraulic conductivity in frozen soils. *Earth Surface Processes*, Vol. 1, No. 4, 1976, p. 349–60. [Describes adaptation of conventional apparatus for use with frozen soils. Soils known to be susceptible to frost heave showed hydraulic conductivities well below 0°C. Ice lenses reduced hydraulic conductivity.]

Chizhov, A. N., *and others*. Radiolokatsionnyy impul'snyy metod izmereniya tolshchiny ledyanogo pokrova [A radar pulse method for measuring the thickness of ice cover]. [By] A. N. Chizhov, V. G. Glushnev, B. D. Slutsker. *Meteorologiya i Gidrologiya*, 1977, No. 4, p. 91–96. [Ice cover of rivers, lakes and reservoirs. English summary, p. 96.]

Cox, L. M., *and others*. A device for evaluating the water vapor exchange between snow and air, [by] L. M. Cox, J. F. Zuzel and L. Perkins. *Water Resources Research*, Vol. 12, No. 1, 1976, p. 22. [Describes device which is most suitable for snow-packs that have density exceeding 35%.]

Doronin, Yu. P., *and* Sychev, V. I. Gidrodinamicheskiy metod rascheta sostoyaniya ledyanogo pokrova Severnogo Ledovitogo okeana [Hydrodynamic method of calculating ice cover conditions in the Arctic Ocean]. *Problemy Arktiki i Antarktiki*, Vyp. 50, 1977, p. 57–62.

Farnsworth, R. K. A mathematical model of soil surface layers for use in predicting significant changes in infiltration capacity during periods of freezing weather. *Dissertation Abstracts International*, B, Vol. 37, No. 6, 1976, p. 3014-B. [Discusses thermal properties of soil and frost penetration. Abstract of Ph.D. thesis, University of Michigan, 1976. University Microfilms order no. 76-27481.]

Fedoseyeva, V. I., *and others*. Opredeleniye udel'noy poverkhnosti melkodispersnogo l'da po adsorbtsii organicheskikh veshchestv iz rastvorov [Determination of the specific area of finely divided ice according to the adsorption of organic substances from solution]. [By] V. I. Fedoseyeva, Ye. A. Nechayev, O. A. Strel'tsova. *Kolloidnyy Zhurnal*, Tom 39, Vyp. 5, 1977, p. 1009–11. [Study of adsorption of 34 organic substances on snow surfaces. Adsorption believed to proceed by donor-acceptor mechanism. English summary p. 1011.]

Flock, W. L. Monitoring open water and sea ice in the Bering Strait by radar. *IEEE Transactions on Geoscience Electronics*, Vol. GE-15, No. 4, 1977, p. 196–202. [Demonstrates utility of land-based radar systems providing both moving-target-identification and short-time-constant video signals for monitoring sea surface areas containing open water and loose pack ice.]

Gudkovich, Z. M., *and* Smetannikova, A. V. Gidrodinamicheskiye metody ledovykh prognozov i raschetov [Hydrodynamic methods of ice forecasting and calculations]. *Problemy Arktiki i Antarktiki*, Vyp. 50, 1977, p. 27–31. [Experiences in Arctic waters.]

Hanley, T. O'D., *and* Michel, B. Laboratory formation of border ice and frazil slush. *Canadian Journal of Civil Engineering*, Vol. 4, No. 2, 1977, p. 153–60. [Describes apparatus, method used, and variables taken into account, and presents results.]

Johnsen, S. J. Stable isotope homogenization of polar firn and ice. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 210–19. [Describes method that allows re-establishing apparently lost $\delta(^{18}O)$ cycles in very deep ice. This may extend range of ice core dating by this method. Discussion, p. 219.]

Johnsen, S. J. Stable isotope profiles compared with temperature profiles in firn with historical temperature records. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 388–92. [Method described enables climatic information of $\delta(^{18}O)$-records to be understood, and allows climatic regime of ice cap stations in Greenland to be established.]

Kauranne, L. K. Mustavalko, väri- ja väärävärі-ilmakuvien rakennusgeologisesta tulkinnasta [Engineering-geological interpretation of black-and-white, colour and false-colour air photos]. *Geological Survey of Finland.*

Report of Investigation, No. 12, 1976, 39 p. [Results from air surveys of terrain in southern Finland for application to drift mapping. English summary, p. 29–39.]

KIRILLOV, A. A., *and others*. Fiziko-statisticheskiye metody dolgosrochnykh ledovykh prognozov [Physical-statistical methods of long-range ice forecasts]. [By] A. A. Kirillov, Ye. G. Kovalev, V. A. Spichkin, Yu. V. Nikolayev. *Problemy Arktiki i Antarktiki*, Vyp. 50, 1977, p. 23–26.

KUDRYASHOV, B. B., *and others*. Termoburovoy snaryad dlya polucheniya orientirovannogo ledyanogo kerna [A thermodrill for obtaining an oriented ice core]. [By] B. B. Kudryashov, V. G. Vartykyan, V. K. Chistyakov. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 94, 1977, p. 60–62.

LAMBERT, G., *and others*. Accumulation of snow and radioactive debris in Antarctica: a possible refined radiochronology beyond reference levels, [by] G. Lambert, B. Ardouin, J. Sanak, C. Lorius and M. Pourchet. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 146–58. [Accurately dated core from Terre Adélie may be considered as reference core for chronology of artificial radioactive deposition in large part of Antarctica. Discussion, p. 158.]

LOGAN, L. A. A computer-aided snowmelt model for augmenting winter streamflow simulation in a southern Ontario drainage basin. *Canadian Journal of Civil Engineering*, Vol. 3, No. 4, 1976, p. 531–54. [Lumped-parameter mathematical model is formulated to represent physical processes of accumulating and melting snow-pack within drainage basin.]

MCNAIR, D., *and* WOLFE, F., *jr*. An acoustic emissions monitoring system for avalanche snowpacks. *U.S. Dept. of Agriculture. Forest Service. Research Note* RM-340, 1977, 4 p. [Describes instrumentation which detects emissions in frequency range 0.5 Hz to 3 kHz.]

MARTINEC, J., *and others*. Assessment of processes in the snowpack by parallel deuterium, tritium and oxygen-18 sampling, [by] J. Martinec, H. Moser, M. R. de Quervain, W. Rauert and W. Stichler. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 220–31. [Simultaneous interpretation of T, D, and ^{18}O data provides refined information and, at same time, reveals false conclusions which would be reached with only a single isotope. Discussion, p. 230–31.]

MURZIN, A. I. Ekonomicheskaya effektivnost' ledovoy aviarazvedki v arkticheskom moreplavanii [Economic effectiveness of ice air reconnaissance for Arctic navigation]. *Problemy Arktiki i Antarktiki*, Vyp. 50, 1977, p. 119–20. [Methods of calculation discussed with reference to Northern Sea Route navigation.]

OESCHGER, H., *and others*. Extraction of gases and dissolved and particulate matter from ice in deep boreholes, [by] H. Oeschger, B. Stauffer, P. Bucher and H. H. Loosli. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 307–11. [Describes technique.]

PAVSKIY, YE. I. Sposoby priblizhennogo rascheta ekonomicheskogo effekta kratkosrochnykh ledovykh prognozov [On ways of making an approximate estimation of economic effectiveness of short-range ice forecasts]. *Problemy Arktiki i Antarktiki*, Vyp. 50, 1977, p. 67–70.

PEEL, D. A. The search for organochlorine residues in Antarctic snow. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 108–11. [Describes improved method for examining DDT residues and polychlorobiphenyls in Antarctic snow. Results for near Halley Bay station: DDT 0.1 to 2.0×10^{-12} g/g snow, and PCBs 0.1×10^{12} g/g snow.]

PRANTL, F. A., *and* LOIJENS, H. S. Nuclear techniques for glaciological studies in Canada. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 237–41. [Demonstrates that tritium measurements of waters in large drainage basins may be used to estimate spring run-off from seasonal snow cover and summer melt of glacial ice.]

PRICE, A. G., *and* DUNNE, T. Energy balance computations of snowmelt in a subarctic area. *Water Resources Research*, Vol. 12, No. 4, 1976, p. 686–94. [Applies energy balance method to prediction of daily snow melt on plots in boreal forest and tundra of sub-Arctic Labrador.]

QUICK, M. C., *and* PIPES, A. A combined snowmelt and rainfall runoff model. *Canadian Journal of Civil Engineering*, Vol. 3, No. 3, 1976, p. 449–60. [Describes watershed and flow models, which are set of computer programmes for calculation of hydrologic behaviour of watershed and river systems. Describes actual application for stream flow forecasting and planning studies.]

RANGO, A., *and others*. Seasonal streamflow estimation in the Himalayan region employing meteorological satellite snow cover observations, [by] A. Rango and V. V. Salomonson, J. L. Foster. *Water Resources Research*, Vol. 13, No. 2, 1977, p. 109–12. [This method of mapping snow-covered areas during early April over Indus and Kabul river basins, Pakistan, is very suitable for remote regions concerned with water resources management.]

ROSSITER, J. R., *and* GUSTAJTIS, K. A. Iceberg sounding by impulse radar. *Nature*, Vol. 271, No. 5640, 1978, p. 48–50. [Shows estimates of draft of irregularly-shaped icebergs can be obtained quickly and easily by using airborne short-pulse radar, referring to sounding of small iceberg in Twillingate Harbour, Newfoundland, in June 1977.]

SAGE, J. D. An operational model for hourly snowfall. *Proceedings of the* 33rd *annual Eastern Snow Conference*, 1976, p. 98–128. [Describes model which was developed for use in snow removal system.]

SCHNEIDER, S. R., *and others*. River basin snow mapping at the National Environmental Satellite Service, [by] S. R. Schneider, D. R. Wiesnet, M. C. McMillan. *NOAA Technical Memorandum*, NESS 83, 1976, iii, 19 p. [Outlines development of 16-year-old programme and describes present techniques.]

SEMTNER, A. J., *jr*. A model for the thermodynamic growth of sea ice in numerical investigations of climate. *Journal of Physical Oceanography*, Vol. 6, No. 3, 1976, p. 379–89. [Presents model whereby thickness and extent of sea ice may be predicted in climatic simulations.]

SHUPE, S. D., *and others*. Multistage remote sensing of snowcover in the Adirondacks—a progress report, [by] S. D. Shupe, D. Meisner and A. R. Eschner. *Proceedings of the* 33rd *annual Eastern Snow Conference*, 1976, p. 145–52. [Heavily forested hilly region examined by means of satellites and photographs taken from aircraft. Results compared and discussed.]

SKOU, N., *and* SØNDERGAARD, F. *Radioglaciology. A 60 MHz ice sounder system.* Lyngby, Technical University of Denmark, 1976. 124 leaves. (R 169.) [Describes 10 kW radar system designed to operate in severe environmental conditions. Successfully used in Greenland and Antarctica, except for some areas where excessive surface scattering due to ice lenses and crevasses masks bedrock echo.]

VAN STEIJN, H. The development of a laboratory set-up to measure creep induced by freeze–thaw cycles. *Earth Surface Processes*, Vol. 2, Nos. 2–3, 1977, p. 247–50. [Describes apparatus and technique.]

VOYEVODIN, V. A., *and others.* Instrumental'nyye aerometody dlya opredeleniya szhatiya l'da [Instrumental air methods for the determination of ice compression]. [By] V. A. Voyevodin, V. V. Drabkin, V. S. Loshchilov. *Vestnik Leningradskogo Universiteta*, 1977, No. 6, *Seriya Geologii i Geografii*, Vyp. 1, p. 123–33. [Observations of sea ice by side-looking airborne radar, aircraft reconnaissance and satellites are compared. English summary, p. 132.]

WIESNET, D. R. Remote sensing and its application to hydrology. (*In* Rodda, J. C., *ed. Facets of hydrology.* London, etc., John Wiley and Sons, [c1976], p. 37–59. (Wiley–Interscience Publication.)) [Ch. 2 in this book. Discusses types of sensors, their platforms, variables (which include forms of snow and ice), and future trends.]

ZMIYEVA, YE. S., *and* SUBBOTIN, A. I. O tochnosti izmereniya zapasov vody v snezhnom pokrove standartnym plotnomerom [On the accuracy of measurements of water storage in snow cover with the aid of a standard densitometer]. *Meteorologiya i Gidrologiya*, 1977, No. 6, p. 114–17.

PHYSICS OF ICE

ADAMS, D. M., *and others.* Spectroscopy at very high pressures. 14: Laser Raman scattering in ultrasmall samples in a diamond anvil cell, [by] D. M. Adams, S. K. Sharma and R. Appleby. *Applied Optics*, Vol. 16, No. 9, 1977, p. 2572–75. [Problem of obtaining Raman spectra discussed, and successful results given for ice VI, VII, and VIII.]

ALEKSEYEV, B. F., *and others.* Dvukhprotonnyye zapreshchennyye perekhody atomarnogo deyteriya v nizkotemperaturnykh vodnokislotnykh l'dakh [Two-proton forbidden transitions of atomic deuterium in low-temperature frozen aqueous solutions of acids]. [By] B. F. Alekseyev, Yu. V. Bogachev, S. G. Fedin. *Fizika Tverdogo Tela* (Leningrad), Tom 19, Vyp. 6, 1977, p. 1831–34. [Mixture of H_2O, D_2O, H_2SO_4 (or H_3PO_4), and hydroquinone irradiated at 77 K. H_3PO_4 stabilizes H and D in larger traps than H_2SO_4. Annealing also produces larger traps. Forbidden transitions more intense in H than D. English translation in *Soviet Physics—Solid State*, Vol. 19, No. 6, 1977, p. 1069–70.]

ASHWORTH, T. On the precision continuous method of calorimetry and its application to determination of surface energy. (*In* Buzás, I., *ed. Thermal analysis. [Proceedings of the fourth International Conference on Thermal Analysis held at Budapest, Hungary, July 8–13, 1974]*, London, New York, Rheine, Heyden, [c1975], Vol. 3, p. 799–807.) [Discusses possibility of measuring surface energy in this way and gives some preliminary experimental results.]

BARER, S. S., *and others.* Tolshchina i vyazkost' tonkikh nezamerzayushchikh prosloyek mezhdu poverkhnostyami l'da i kvartsa [Thickness and viscosity of thin non-freezing interlayers between the surface of ice and quartz]. [By] S. S. Barer, V. I. Kvlividze, A. B. Kurzayev, V. D. Sobolev, N. V. Churayev. *Doklady Akademii Nauk SSSR*, Tom 235, No. 3, 1977, p. 601–03. [Nuclear magnetic resonance used to determine thickness, and measurement of shear of ice in quartz capillaries used to deduce viscosity.]

BARTLEY, D. L. Anisotropic crystal growth by nucleation of crystalline embryos at ice–vapor interfaces. (*In* Kerker, M., *ed. Colloid and interface science. Vol. 2. Aerosols, emulsions, and surfactants. Proceedings of the International Conference on Colloids and Surfaces—50th Colloid and Surface Science Symposium, held in San Juan, Puerto Rico, on June 21–25, 1976.* New York, etc., Academic Press, Inc., 1976, p. 31–43.) [Theoretical study of nucleation of monolayer ice-like clusters on basal and prism surfaces of ice shows prism-face clusters to have lower critical energy thus explaining anisotropic crystal growth at high saturations.]

BELYSHKIN, D. V. Elektrofizicheskoye issledovaniye zamorozhennykh sistem napolnitel'–svyazka [Electrophysical study of filler–binder frozen systems]. *Zavodskaya Laboratoriya*, Tom 42, Vyp. 12, 1976, p. 1480–81. [A system in which the binder was deionized frozen water and the filler electrotechnical SiC formed a cryogenic varistor with a temperature variation of resistance that changed sign.]

BENTLEY, C. R. Impurities and seismic wave attenuation in the west Antarctic ice sheet. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 13–16. [Measurements of attenuation near "Byrd" station interpreted in terms of internal friction of ice. Possible use to measure impurity concentration deep in ice sheets.]

BERTIE, J. E., *and* BATES, F. E. Mid-infrared spectra of deuterated ices at 10°K and interpretation of the OD stretching bands of ices II and IX. *Journal of Chemical Physics*, Vol. 67, No. 4, 1977, p. 1511–18. [Absorption bands due to OD stretching and D_2O rotational vibrations change little between 10 and 100 K in these ordered phases. Details of the spectra discussed.]

BERTIE, J. E., *and* JACOBS, S. M. Far-infrared absorption by ices I*h* and I*c* at 4.3°K and the powder diffraction pattern of ice I*c*. *Journal of Chemical Physics*, Vol. 67, No. 6, 1977, p. 2445–48. [Features agree with published Raman spectra. Differences between ice Ih and Ic observed and explained. "Extra lines" in Ic powder diffraction patterns may have been misattributed to Ih impurity.]

BUXTON, G. V., *and others.* Two types of localized excess electrons in crystalline D_2O ice, [by] G. V. Buxton, H. A. Gillis and N. V. Klassen. *Canadian Journal of Chemistry*, Vol. 55, No. 12, 1977, p. 2385–95. [Pulse radiolysis study of D_2O reveals an infra-red absorption band which is attributed to trapped electrons. Effects of adding NH_4F, HF, and ND_3 studied and nature of trap discussed.]

COUACH, M., *and others.* Studies of sublimation using a differential scanning calorimetry method, by M. Couach, E. Bonjour, D. Simatos. (*In* Buzás, I., *ed. Thermal analysis. [Proceedings of the fourth International Conference on*

Thermal Analysis held at Budapest, Hungary, July 8–13, 1974], London, New York, Rheine, Heyden, [c1975], Vol. 3, p. 937–47.) [Method to determine heat of sublimation described and used to study kinetics of sublimation of ice in small capillaries.]

DUVAL, P. The role of the water content on the creep rate of polycrystalline ice. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 29–33. [Creep-law constants determined for ice of varying water content. Effect of water on creep rate discussed in terms of controlling mechanisms for deformation.]

EDMONDS, D. T., *and others*. The nuclear quadrupole resonance of deuterium and oxygen-17 in ice II, [by] D. T. Edmonds, S. D. Goren, A. L. Mackay, and A. A. White and W. F. Sherman. *Journal of Magnetic Resonance*, Vol. 23, No. 3, 1976, p. 505–14. [Nuclear double resonance with spin mixing by level crossing used to deduce electric field gradient parameters and deductions concerning ice II structure.]

EDMONDS, D. T., *and others*. Nuclear quadrupole resonance of deuterium-2 and oxygen in ices V, VI, VIII, and IX, by D. T. Edmonds, S. D. Goren, A. A. White, W. F. Sherman. *Journal of Magnetic Resonance*, Vol. 27, No. 1, 1977, p. 35–44. [Measurement and correlation with different structures.]

FITZGERALD, W. J., *and others*. Are the anomalous dielectric properties of polar ice due to impurities? [By] W. J. Fitzgerald, J. W. Glen and J. G. Paren. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 3–8. [Dielectric behaviour of grated ice crystals is similar to that of natural snows or polar ice, not that of the original ice. This implies properties of polar ice are due to its history. Discussion, p. 6–8.]

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SCHRIBER, G., *and others*. $^{18}O/^{16}O$, $^{2}H/^{1}H$ and ^{3}H measurements on precipitation and air moisture samples from the North Water area, [by] G. Schriber, B. Stauffer and F. Müller. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 182–87. [Part of mesoclimatic study conducted on snow samples from area between north Greenland and Ellesmere Island with aim of assessing influence of North Water polynya.]

SCHWERDTFEGER, P., *and* WELLER, G. Radiative heat transfer processes in snow and ice. (*In* Businger, J. A., *ed. Meteorological studies at Plateau station, Antarctica*. Washington, D.C., American Geophysical Union, 1977, p. 35–39. (Antarctic Research Series, Vol. 25.)) [Examines transfer of radiative heat in terms of scattering and absorption, relating these processes to physical properties of medium.]

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SNOW

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Eastern Snow Conference, 1976, p. 1–21. [Describes development of 1972–73 snow cover at Peterborough, Ontario, Canada, and compares with snow covers of 1970–71 and 1973–74.]

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Isyumov, N., *and* Mikitiuk, M. Climatology of snowfall and related meteorological variables with application to roof snow load specifications. *Proceedings of the* 33rd *annual Eastern Snow Conference*, 1976, p. 41–69. [Presents mathematical models describing statistics of individual snowfall amounts, wind speed and directions, and air temperature, based on analysis of daily meteorological data obtained at Canadian stations over period of 30 years.]

JOHANNESSEN, M., *and others*. Acid precipitation in Norway: the regional distribution of contaminants in snow and the chemical concentration processes during snowmelt, [by] M. Johannessen, T. Dale, E. T. Gjessing, A. Henriksen and R. F. Wright. [Union Géodésique . . . .] *Symposium. Isotopes et impuretés dans les neiges et glaces. . . . 1975*, 1977, p. 116–20. [Very heavy depositions of atmospheric pollutants found in south-east and north Norway. Concentration is 2 to 3 times higher in first melt water fractions than in bulk snow. Discusses effects on fresh-water ecosystems.]

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KHALKECHEV, V. A. O roli nachal'nogo impul'sa v obrazovanii laviny iz svezhevypavshego snega [On the role of the initial impulse in formation of an avalanche of freshly-fallen snow]. *Meteorologiya i Gidrologiya*, 1977, No. 9, p. 62–66. [Initial impulse may be collapse of snow cornice, explosion, etc. Mathematical analysis of its importance. English summary, p. 66.]

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WELLER, G., *and* SCHWERDTFEGER, P. Thermal properties and heat transfer processes of low-temperature snow. (*In* Businger, J. A., *ed. Meteorological studies at Plateau station, Antarctica*. Washington, D.C., American Geophysical Union, 1977, p. 27–34. (Antarctic Research Series, Vol. 25.)) [Temperature measurements in snow at Plateau station during 1967 are analysed by using Fourier methods. Non-conductive processes shown to extend down to 8 m.]

WIESNET, D. R., *and* MATSON, M. Satellite record of winter snow cover in North America and Eurasia 1966–1975. *Proceedings of the* 33rd *annual Eastern Snow Conference*, 1976, p. 129–44. [Winter season snow and ice charts of the northern hemisphere based on NOAA satellite data were examined to determine duration and extent of snow cover. No significant increase in North America. Large fluctuation in Eurasia.]