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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

KONDRAT'YEV, K. YA., *and others, ed. Sovetsko-amerikanskiy eksperiment "Bering". Trudy zaklyuchitel'nogo simpoziuma po itogam sovmestnoy ekspeditsii. Leningrad, 12–17 maya 1974* [*U.S.S.R./U.S.A. Bering Sea experiment. Proceedings of the final symposium of the joint Soviet-American expedition. Leningrad, 12–17 May 1974*]. [*Edited by*] *K. Ya. Kondrat'yev, Yu. I. Rabinovitch, W. Nordberg*. Leningrad, Gidrometeoizdat, 1975. 315 p. [Collected articles by Russian and American scientists on hydrometeorology of the Bering Sea. Includes: W. J. Campbell, P. Gloersen and R. O. Ramseier, "Synoptic ice dynamics and atmospheric circulation during the Bering Sea experiment", p. 164–85; V. P. Gavrilo, A. V. Gusev and V. A. Nikitin, "Issledovaniye mekhanicheskikh kharakteristik l'dov Beringova morya [Study of the mechanical characteristics of ice in the Bering Sea]", p. 186–90; P. Gloersen, R. O. Ramseier, W. J. Campbell, T. C. Chang and T. T. Wilheit, "Variation of ice morphology of selected mesoscale test areas during the Bering Sea experiment", p. 196–218; V. V. Bogorodskiy and G. P. Khokhlov, "Elektricheskiye svoystva l'da prikromochnoy zony Beringova morya na chastote 10 GGts [Electrical properties of sea ice in the ice edge zone of the Bering Sea at 10 GHz frequency]", p. 219–33; R. O. Ramseier, P. Gloersen, W. J. Campbell and T. C. Chang, "Mesoscale description for the principal Bering Sea ice experiment", p. 234–70; V. V. Vinogradov, N. N. Lazarenko and L. V. Mironov, "Izmereniya radiatsionnoy temperatury podstilayushchey poverkhnosti severnoy chasti Beringova morya [Determination of sea surface temperature in the northern Bering Sea]", p. 271–81; P. Gloersen, R. O. Ramseier, W. J. Campbell, P. M. Kuhn and W. J. Webster, Jr., "Ice thickness distribution as inferred from infrared and microwave remote sensing during the Bering Sea experiment", p. 282–93; Yu. I. Rabinovich, V. S. Loshchilov and Ye. M. Shul'gina, "Analiz rezul'taty izmereniy kharakteristik ledyanogo pokrova (variant C) [Analysis of the results of measurements of ice cover characteristics (option C)]", p. 294–313. Russian articles have English abstracts; English articles have Russian abstracts.]

[UNION GÉODÉSIQUE ET GÉOPHYSIQUE INTERNATIONALE. ASSOCIATION INTERNATIONALE DES SCIENCES HYDROLOGIQUES. COMMISSION DES NEIGES ET GLACES.] *Symposium. Mécanique de la neige. Actes du colloque de Grindelwald, avril 1974*. [Budapest, Association Internationale des Sciences Hydrologiques, 1975.] xii, 442 p. (IAHS–AISH Publication No. 114.) [For details of papers, see elsewhere in this list.]

[UNION GÉODÉSIQUE ET GÉOPHYSIQUE INTERNATIONALE. ASSOCIATION INTERNATIONALE DES SCIENCES HYDROLOGIQUES. COMMISSION DES NEIGES ET GLACES.] *Symposium. Neiges et glaces. Actes du colloque de Moscow, août 1971*. [Budapest, Association Internationale des Sciences Hydrologiques, 1975.] xi, 394 p. (IAHS–AISH Publication No. 104.) [For details of papers, see elsewhere in this list.]

GENERAL GLACIOLOGY

BENSON, C. S., *and others*. Glaciological and volcanological studies at the summit of Mt. Wrangell, Alaska, [by] C. S. Benson, D. K. Bingham and G. B. Wharton. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 95–98. [Describes studies carried out at 4 000 m summit since 1961.]

CLARK, B. R., *and* MULLIN, R. P. Martian glaciation and the flow of solid carbon dioxide. *Icarus*, Vol. 27, No. 2, 1976, p. 215–28. [Experiments show strength of solid CO_2 near its sublimation point is considerably less than that of ice near its melting point and that power-law creep equation holds, hence polar CO_2 caps are plausible on Mars.]

DELSEMME, A. H. Vaporization theory and nongravitational forces in comets. *Colloques Internationaux C.N.R.S.*, No. 207, 1974, p. 305–10. [Recent data strongly support theory based on vaporization of icy conglomerate, and this is used to predict non-gravitational force.]

HAMANN, G. Die Entdeckung des Franz-Josefs-Landes vor hundert Jahren. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 10, 1974, p. 153–80. [Describes history of exploration of Zemlya Frantsa-Iosifa.]

MEIER, M. F. Presidential address. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 1–7.

GLACIOLOGICAL INSTRUMENTS AND METHODS

AMBACH, W., *and* DENOTH, A. On the dielectric constant of wet snow. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 136–42. [Describes development of instrument for determining free water content of snow cover by dielectric measurements. Discussion, p. 140–42.]

BAKER, T. H. W. Preparation of artificially frozen sand specimens. *Canada. National Research Council. Division of Building Research. DBR Paper* No. 682, 1976, [18] p. [In determining mechanical properties of frozen soils, specimens were compared which had been prepared by either compaction by vibration and saturation under water head or compaction by rodding and saturation under vacuum.]

BELOUSOVA, I. M., *and others*. The estimation of the velocity of glacier movement and deformation by means of the Doppler effect, [by] I. M. Belousova, V. V. Bogorodskiy and I. P. Ivanov. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 241–45. [Describes use of He–Ne laser. Experiments carried out at Molodezhnaya station, Antarctica.]

BUDD, W. F., *and* ALLISON, I. F. An empirical scheme for estimating the dynamics of unmeasured glaciers. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 246–56. [Describes method and recent application to hitherto unmeasured glacier on Heard Island, southern Indian Ocean.]

DROSDOV, O. A., *and* MOSOLOVA, G. I. Method for estimating the melting of snow on glaciers. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 70–73. [Discusses importance of absorption of solar radiation and heat taken from atmosphere if this is warmer than 0°C in melting snow and ice.]

GOOD, W. Numerical parameters to identify snow structure. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 91–102. [Analyses thin sections of snow and ice, using automatic scanning microscope in combination with software package to perform subsequent data analysis. Compares alpine and Greenland snow. Discussion, p. 101–02.]

GRZÉS, M., *and* JANKOWSKI, A. T. Uwagi o przydatności zdjęć lotniczych do badań zjawisk lodowych jezior [Remarks on the usefulness of aerial photographs for investigating ice phenomena of lakes]. *Acta Universitatis Nicolai Copernici. Nauki Matematyczno-Przyrodnicze*, Zeszyt 35. *Geografia*, 11, 1975, p. 145–54. [Discusses field results from air observations of formation and decay of lake ice in Poland. English summary, p. 154.]

KHODAKOV, V. G. Glaciers as water resource indicators of the glacial areas of the USSR. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 22–29. [Presents method of estimating water and snow resources of glacial areas and applies to U.S.S.R.]

LADANYI, B. Use of the static penetration test in frozen soils. *Canadian Geotechnical Journal*, Vol. 13, No. 2, 1976, p. 95–110. [Describes field studies of test. Load- and penetration-rate controlled tests were carried out with electric penetrometer and compared with short-term and stage-loaded pressuremeter tests.]

LANG, L. C. New permafrost blasting method developed at Asbestos Hill. *Canadian Mining Journal*, Vol. 97, No. 3, 1976, p. 48–53. [Describes development of slurry explosive which is still pliable at −30°F (−34.5°C) and has critical diameter of 5 in (13 cm) at −60°F (−51°C).]

LVOVICH, M. I., *and* TSIGELNAYA, I. D. A method for studying the water balance and estimating the water resources of glacial mountain areas. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 229–32. [Describes method, in which river run-off is differentiated into snow melt, glacial and ground-water components. Applied to mountain area of Central Asia.]

NOWAKOWSKI, K. T. Applied glaciometry; geometrical analysis. *Lunds Universitets Naturgeografiska Institution. Rapporter och Notiser*, No. 30, 1976, 13 leaves.

SHIMIZU, H., *and* HUZIOKA [i.e. FUJIOKA], T. Internal strains and stresses of snow cover on slopes. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 321–31. [Direct observation of internal strain carried out by measuring deformation of configuration of set of holes bored in snow cover parallel to contour line of slope. Discussion, p. 331.]

SOMMERFELD, R. A. Continuous measurements of deformations on an avalanche slope. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 293–97. [Describes designs of three instruments for measuring stresses in snow slabs: slope-parallel, vertical and creep-angle gauges. Field experiences in Colorado described. Discussion, p. 297.]

TANGBORN, W. V., *and others*. A comparison of glacier mass balance by glaciological, hydrological and mapping methods, South Cascade Glacier, Washington, [by] W. V. Tangborn, R. M. Krimmel and M. F. Meier. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 185–96. [Close agreement found between glaciological and mapping methods. Hydrological method was unreliable over short periods.]

YOUNG, G. J. *An approach to glacier mass-balance analysis utilizing terrain characterization*. Ottawa, Environment Canada. Inland Waters Directorate. Water Resources Branch, 1976. v, 34 p. (Scientific Series, No. 60.) [Describes largely automated system for reducing snow accumulation and ablation measurements to readily understandable mapped and tabulated form.]

ZIEGLER, H. Continuum mechanics: a powerful tool in solving ice and snow problems. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 185–95. [Discussion of laws of continuum mechanics and of their applicability to practical problems.]

PHYSICS OF ICE

ANDERSON, B. J., *and* HALLET, J. Supersaturation and time dependence of ice nucleation from the vapor on single crystal substrates. *Journal of the Atmospheric Sciences*, Vol. 33, No. 5, 1976, p. 822–32. [Microscopy used to study nucleation times on covellite and AgI.]

BARON, BILL, *and* WILLIAMS, FERD. X-ray photoelectron spectroscopy of amorphous ice. *Journal of Chemical Physics*, Vol. 64, No. 9, 1976, p. 3896–97. [Letter. Results, together with preliminary results on ice Ic obtained by warming, show electronic states of water molecule to be perturbed on condensation with consequent structural changes.]

BELLOWS, J. C., *and* PRASAD, P. N. Phonon bands in disordered systems with both mass and force constant defects: isotopic mixed ice Ih. *Journal of Chemical Physics*, Vol. 64, No. 9, 1976, p. 3674–78. [Study of D_2O–H_2O mixed crystals shows absence of isotope selectivity of H-bonds and that additional disorder due to isotopes is purely dynamic.]

BERNAS, A., *and* TRUONG, T.-B. On the neutralization luminescence in γ-irradiated pure or alkaline ices. *Chemical Physics Letters*, Vol. 39, No. 2, 1976, p. 379–81. [Discussion of origin of stimulated luminescence at 380 nm; OH^- and H^- both unlikely.]

BONED, C., *and others*. Propriétés diélectriques de la glace obtenue par solidification de solutions aqueuses de NH_4Cl et de sels alcalins, par C. Boned, H. Saint-Guirons et R. Cazaban-Marque. *Journal de Chimie Physique et de Physico-Chimie Biologiques*, Tom. 73, No. 4, 1976, p. 367–73. [Measurements on massive samples and also samples of a few cubic micrometres obtained from supercooled solutions. Effect of doping more important in latter case.]

ELDRUP, M. Vacancy migration and void formation in γ-irradiated ice. *Journal of Chemical Physics*, Vol. 64, No. 12, 1976, p. 5283–90. [Positron annihilation techniques used to identify effects of irradiation at -196°C on polycrystalline and monocrystalline ice. Effects attributed to vacancies and disappearance on heating above -165°C to void formation. Deduced vacancy migration activation energy is 0.34 eV.]

FEINER, S. An extremely simple technique for maintaining an ice bath at 0°C. *Chemistry and Industry*, 1976, No. 9, p. 416–17. [Bubbling a stream of air through the ice–water mixture maintains temperature to ± 0.05 deg.]

FIRMENT, L. E., *and* SAMORJAI, G. A. The surface structures of vapor-grown ice and naphthalene crystals studied by low-energy electron diffraction. *Surface Science*, Vol. 55, No. 2, 1976, p. 413–26. [Thin film formed on (111) face of Pt as substrate is hexagonal. It only forms between 125 and 155 K and could be (0001) of ice Ih or (111) of ice Ic.]

FROST, H. J., *and others*. Kink velocities on dislocations in ice. A comment on the Whitworth, Paren and Glen model, by H. J. Frost, D. J. Goodman and M. F. Ashby. *Philosophical Magazine*, Eighth Ser., Vol. 33, No. 6, 1976, p. 951–61. [Alternative model with identical physics but different statistical summation gives same result, that predicted movement of dislocations is much too slow if dielectric relaxation time is used for proton re-arrangement.]

GERBER, H. E. Relationship of size and activity for AgI smoke particles. *Journal of the Atmospheric Sciences*, Vol. 33, No. 4, 1976, p. 667–77. [Measurement of ice nucleating ability as function of particle size, temperature and time.]

HASE, H., *and* KAWABATA, K. Trapped electrons in crystalline D_2O ice at 4°K. *Journal of Chemical Physics*, Vol. 65, No. 1, 1976, p. 64–67. [Observations show that 1.5% H_2O reduces trapped electron yield and shortens half life. Effect of dopants also studied.]

HULER, E., *and* ZUNGER, A. Calculation of the equilibrium configuration and intermolecular frequencies of water dimers and hexagonal ice. *Chemical Physics*, Vol. 13, No. 4, 1976, p. 433–40. [Calculation using Hartree–Fock potential with corrections for dispersion interactions. Zero-point energy effects shown to have little effect on equilibrium structure.]

INCHACKAL, J. J., *and* WEBER, A. H. Electrical properties of KF-doped hexagonal ice. *Journal of Chemical Physics*, Vol. 64, No. 12, 1976, p. 4952–56. [Dielectric properties 50 to 20×10^3 Hz measured from -10 to -90°C for 10^{-6} to 10^{-3} N dopant. Temperature variation of a.c. conduction and of relaxation time were determined and d.c. conduction showed temperature dependence.]

JOHARI, G. P. The dielectric properties of H_2O and D_2O ice Ih at MHz frequencies. *Journal of Chemical Physics*, Vol. 64, No. 10, 1976, p. 3998–4005. [Measurements 0.5 to 100 MHz, 243–273 K. Temperature variation of ϵ_∞ unexpected compared with that of lattice vibrations. Deuteration decreases ϵ_∞. Secondary relaxation in MHz range found. Little anisotropy.]

JOHARI, G. P. Entropy of vitreous ice. *Nature*, Vol. 260, No. 5550, 1976, p. 421–22. [Letter. Calculation of entropy from known calorimetric results and discussion of value obtained.]

JOHARI, G. P., *and* JONES, S. J. Dielectric properties of polycrystalline D_2O ice Ih (hexagonal). *Proceedings of the Royal Society of London*, Ser. A, Vol. 349, No. 1659, 1976, p. 467–95. [Measurements 10^{-2} to 5×10^7 Hz, 77–274 K. Three relaxation processes identified.]

JOHARI, G. P., *and* WHALLEY, E. Dielectric properties of ice VI at low temperatures. *Journal of Chemical Physics*, Vol. 64, No. 11, 1976, p. 4484–89. [Measurements of dielectric dispersion down to 128 K to seek for evidence of ordering. Dispersion strength increases as temperature falls, but no transition reached. Activation energy of relaxation time is constant.]

JOHNSON, L. R. The phases of the AgI–KI–H_2O system. *Journal of Applied Crystallography*, Vol. 8, Pt. 5, 1975, p. 507–14. [X-ray diffraction study and discussion of results in connection with nucleating ability for ice.]

JOHNSON, R. A., *and others*. Performance of liquid–liquid cyclones, by R. A. Johnson, W. E. Gibson and D. R. Libby. *Industrial and Engineering Chemistry, Fundamentals*, Vol. 15, No. 2, 1976, p. 110–15. [Experimental test of the ability of a cyclone to separate Freon drops from water and from an ice–brine slurry and comparison with theory.]

KALLUNGAL, J. P. The growth of single ice crystals parallel to the a-axis in subcooled quiescent and flowing water. *Dissertation Abstracts International*, B, Vol. 36, No. 10, 1976, p. 5162-B–63-B. [Experiments on growth rates with various supercoolings, flow velocities and growth directions. Abstract of Ph.D. thesis, Syracuse University, 1975. University Microfilms order no. 76-7657.]

KRASTANOV, L., *and* LEVKOV, L. Mechanism of ice formation on β-AgJ. *Doklady Bolgarskoy Akademii Nauk*, Tom. 29, No. 1, 1976, p. 57–60. [Theoretical study of work necessary to form ice embryos on prismatic and basal faces of silver iodide crystal.]

LAGOURETTE, B. Study of the dielectric properties of disperse micro-crystals of ice near the melting temperature. Section I: experimental results. *Journal de Physique*, Tom. 37, Nos. 7–8, 1976, p. 945–54. [Study of these emulsions 20 Hz to 3 MHz. Debye absorption and other lower frequency dispersions observed.]

LAGOURETTE, B., *and others*. Study of the dielectric properties of disperse micro-crystals of ice near the melting temperature. Section II: discussion and interpretation, [par] B. Lagourette, C. Boned et R. Royer. *Journal de Physique*, Tom. 37, Nos. 7–8, 1976, p. 955–64. [Explanation of observations on disperse emulsions based on pre-melting phenomena above about -20°C and a liquid-like surface layer.]

LEBEDEV, D. P., *and* ANDREYEV, YE. F. Opredeleniye koeffitsiyenta kondensatsii vodyanogo para v led v vakuume pri pomoshchi datchika teplovogo potoka [Determination of the coefficient of condensation of water vapour

on ice *in vacuo* using a heat-flow sensor]. *Zhurnal Fizicheskoy Khimii*, Tom 50, Vyp. 4, 1976, p. 1036–38. [English translation in *Russian Journal of Physical Chemistry*, Vol. 50, No. 4, 1976, p. 626–28.]

MAE, S. Kōri no kesshōryūnai oyobi ryūkainai ni keisei sareru Chindaru-zō no keitai [The shape of small Tyndall figures in pure ice]. *Seppyō*, Vol. 37, No. 3, 1975, p. 107–13. [Description of shapes both inside grains and at grain boundaries for various formation rates.]

MAÏ, C. Étude par topographie X du comportement dynamique des dislocations dans la glace Ih. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences*, Sér. B, Tom. 282, No. 22, 1976, p. 515–18. [X-ray topographic study shows that below *c.* 260 K dislocation velocity is proportional to stress whereas above a non-linearity is found. Theoretical explanation suggested.]

MIYAUCHI, S. Poriechiren gurikōru ni yoru yūhyō [Melting of ice with polyethylene glycol]. *Seppyō*, Vol. 37, No. 3, 1975, p. 140–42. [Refrigerator surface coated with this substance does not frost, and ice placed in contact melts at temperatures down to −14°C.]

PEREZ, J., *and others*. Internal friction and microplasticity of ice I_h, [by] J. Perez, C. Maï, J. Tatibouët and R. Vassoille. *Nuovo Cimento*, Ser. 11, Vol. 33B, No. 1, 1976, p. 86–95. [Internal friction of ice single crystals shows relaxation peak as temperature increases followed by increased damping above 260 K. Plastic deformation affects both phenomena.]

PRINCE, R. H., *and others*. Fluorescence of ice by low energy electrons, by R. H. Prince, G. N. Sears and F. J. Morgan. *Journal of Chemical Physics*, Vol. 64, No. 10, 1976, p. 3978–84. [Results on thin films deposited at 77 K show differences from those of high-energy radiolysis. Three emissions observed and D_2O substitution used to help attribution.]

RYAN, B. F., *and others*. The growth rates and densities of ice crystals between −3°C and −21°C, [by] B. F. Ryan, E. R. Wishart and D. E. Shaw. *Journal of the Atmospheric Sciences*, Vol. 33, No. 5, 1976, p. 842–50. [Dimensions parallel to *c*- and *a*-axes as a function of time and temperature.]

SAVEL'YEVA, E. M., *and* ROKHINSON, E. YE. Vliyaniye magnitnoy obrabotki razbavlennykh vodnykh rastvorov elektrolitov na kinetiku kristallizatsii l'da [Effect of magnetic treatment of dilute aqueous solutions of electrolytes on the kinetics of ice crystallization]. *Elektronnaya Obrabotka Materialov*, No. 2, 1976, p. 59–62. [Effect of prior exposure of KCl solution to a magnetic field on subsequent crystallization. More ions are incorporated in ice and interface electric field is changed by this treatment.]

SCHALLER, R. C. A study of heterogeneous ice nucleation mechanisms using a new ice thermal diffusion chamber. *Dissertation Abstracts International*, B, Vol. 36, No. 10, 1976, p. 5091-B–92-B. [Description of new form of diffusion chamber and presentation of results and their interpretation in terms of nucleation mechanism. Abstract of Ph.D. thesis, University of Denver, 1975. University Microfilms order no. 76-8184.]

SCHLICK, S., *and others*. ESR line shape studies of trapped electrons in γ-irradiated ^{17}O enriched 10*M* NaOH alkaline ice glasses: model for the geometrical structure of the trapped electron, [by] S. Schlick, P. A. Narayana and L. Kevan. *Journal of Chemical Physics*, Vol. 64, No. 8, 1976, p. 3153–60.

SHUMSKIY, P. A. O zakone techeniya polikristallicheskogo l'da [On the flow law of polycrystalline ice]. *Institut Mekhaniki MGU. Nauchnyye Trudy*, No. 42, 1975, p. 54–68. [Analysis of available data and new proposal for an empirical flow law.]

TSAREV, V. P., *ed. Fizika l'da i ledotekhnika* [*The physics of ice and ice technology*]. Yakutsk, Izdaniye Yakutskogo Filiala SO AN SSSR, 1974. 203 p. [Includes the following papers: N. S. Ivanov, "O problemakh fiziki l'da i ledotekhniki pri osvoyenii rayonov Kraynego Severa [On problems of the physics of ice and ice technology in development regions of the far north]", p. 5–29; B. A. Savel'yev, "Termodinamicheskiye osobennosti formirovaniya ledyanykh pokrytiy [Thermodynamic peculiarities in the formation of ice covers]", p. 30–59; E. A. Bondarev and A. V. Kolmogorov, "Dinamika ledyanykh mass [Dynamics of ice masses]", p. 60–86; A. V. Karakin, "K vyvodu osnovnykh uravneniy mekhaniki tayushchego l'da [The derivation of the fundamental equations of the mechanical melting of ice]", p. 87–97; A. V. Karakin, "Mekhanizm vneshnego zhidkogo treniya [The mechanism of external fluid friction]", p. 98–113; A. V. Karakin, "Nekotoryye voprosy dinamiki tonkikh sloyev pri techenii lednikov [Some questions on the dynamics of thin layers during glacier flow]", p. 114–27; V. P. Tsarev, "Zony gidratoobrazovaniya v rayonakh rasprostraneniya moshchnykh ledyanykh pokrovov [Zones of hydrate formation in regions of thick ice cover]", p. 128–34; A. S. Rudnev, "Osobennosti zamerzaniya reki Vilyuy i vozmozhnost' yego prognoza [Peculiarities in the freezing of the river Vilyuy and the possibility of their prediction]", p. 135–48; E. A. Bondarev and L. I. Fayko, "K raschety temperaturnogo rezhima ledyanykh poley pered vskrytiyem rek i vodoyemov [On the calculation of the temperature regime of an ice field before break-up on a river and reservoir]", p. 149–51; E. A. Bondarev and L. I. Fayko, "O teplofizicheskikh kriteriyakh protsessa smerzaniya [On the thermophysical criteria of the sintering process]", p. 152–57; A. G. Groysman, "Teplofizicheskiye svoystva gazovykh gidratov dvuokisi ugleroda [Thermophysical properties of the gaseous hydrates of carbon dioxide]", p. 158–61; L. D. Afanas'yeva and A. G. Groysman, "Teplofizicheskiye kharakteristiki l'da, soderzhashchego kislorod pod davleniyem [Thermophysical characteristics of ice containing oxygen under pressure]", p. 162–64; I. V. Savel'yev, "Izucheniye nezamerzshey vody v nekotorykh dispersnykh gruntakh metodom spinovogo ekha [The study of unfrozen water in some disperse soils by the method of spin echo]", p. 165–73; B. D. Ivanov, "Sorbtsionnaya teoriya gazovykh gidratov [Sorption theory of gaseous hydrates]", p. 174–79; B. D. Ivanov, "Primeneniye potentsiala Kikhari dlya vychisleniya konstant Lengmyura gazovykh gidratov [Application of the Kikhar potential for the calculation of the Langmuir constant of the gaseous hydrates]", p. 180–87; A. G. Groysman and V. P. Tsarev, "O novom mekhanizme razdeleniya isotopov v prirode [On a new mechanism for the separation of isotopes in nature]", p. 188–91; B. D. Ivanov and V. P. Tsarev, "Sravneniye energii razryva vodorodnoy svyazi molekul vody v klatratnykh gidratakh i deytratakh [Comparison of the rupture energy of hydrogen bonds in water molecules of the clathrate hydrates and deuterates]", p. 192–95.]

VOLYNETS, A. Z., *and others*. Sublimatsiya l'da v krupnodispersnykh porodakh pri uslovii kvaziizotermicheskogo rezhima [Sublimation of ice in coarsely dispersed rocks under quasi-isothermal conditions]. [By] A. Z.

Volynets, E. D. Yershov, I. A. Komarov, V. K. Safonov. *Inzhenerno-Fizicheskiy Zhurnal*, Tom 30, No. 4, 1976, p. 640–45. [Theoretical study of sublimation of ice in coarsely dispersed rocks and comparison with experimental data. English summary, p. 645.]

Wong, P. T. T., *and* Whalley, E. Optical spectra of orientationally disordered crystals. VI. The Raman spectrum of the translational lattice vibrations of ice Ih. *Journal of Chemical Physics*, Vol. 65, No. 2, 1976, p. 829–36. [Study of Raman spectrum, 350–20 cm^{-1}, and interpretation using theory of Raman scattering by translational vibrations of disordered crystals.]

Zumer, S. Study of the ultraslow motion correlation functions via dipolar spin-lattice relaxation. (*In* Allen, P. S., *and others, ed. Magnetic resonance and related phenomena. Proceedings of the 18th Ampère Congress, Nottingham, 9–14 September, 1974, edited by P. S. Allen, E. R. Andrew and C. A. Bates*. Amsterdam, North-Holland, 1975, Vol. 2, p. 465–66.) [General relation deduced between dipole spin-lattice relaxation time T_{1D} and autocorrelation function of dipolar coupling. Applied to ice Ih, $\tau = 0.4T_{1D}$ obtained.]

Land ice. Glaciers. Ice shelves

Allison, I. Morphology and dynamics of the tropical glaciers of Irian Jaya. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 10, 1974, p. 129–52. [Presents results of observations made on Carstensz and Meren glaciers, Papua–New Guinea.]

Ambach, W., *and others*. Studie zum Schmelzwasserabfluss aus dem Akkumulationsgebiet eines Alpengletschers (Hintereisferner, Ötztaler Alpen), von W. Ambach und M. Elsässer, H. Behrens und H. Moser. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 10, 1974, p. 181–87. [Calculates, from experimental evidence, time of melt water discharge from accumulation area of this Austrian glacier.]

Bazhev, A. B. Artificial augmentation of snow melting in a firn basin of a mountain glacier with the aim of increasing runoff. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 211–18. [Presents results of coal-dusting experiments on Lednik Medvezhiy, western Pamir, U.S.S.R.]

Bazhev, A. B., *and others*. The problems of present-day glaciation of the Pamir-Alai, [by] A. B. Bazhev, V. M. Kotlyakov, O. V. Rototayeva and G. M. Varnakova. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 11–21. [Considers elevation of equilibrium line, glacier morphology, glacier regime, and classification of region according to glacier regime and predominant type of ice formation.]

Behrens, H., *and others*. Study of the discharge of Alpine glaciers by means of environmental isotopes and dye tracers, [by] H. Behrens [and 7 others]. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 219–24. [Model developed and applied to Kesselwandferner and Hintereisferner in drainage area of Rofenache, Ötztaler Alpen, Austria.]

Budd, W. F., *and* Jenssen, D. Numerical modelling of glacier systems. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 257–91. [Discussion of method of setting up a computer model to deduce the dynamics of any glacier system as a function of time given bedrock and mass balance distribution. Several specific examples given.]

Churski, Z. *Wybrane zagadnienia z hydrografii przedpola lodowca Skeidarárjökull na Islandii* [*Some problems of the hydrography of the forefield of Skeiðarárjökull in Iceland*]. Toruń, Uniwersytet Mikołaja Kopernika, 1974. 202 p. [Presents results of field study of drainage system of this glacier, commenting on effect on terrain. English summary, p. 199–202.]

Derikx, L. The heat balance and associated runoff from an experimental site on a glacier tongue. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 59–69. [To determine hydrological response time of porous ice exposed at surface in ablation area of glacier, run-off was compared with ice melt computed from meteorological measurements during same hourly intervals.]

Dolgushin, L. D., *and* Osipova, G. B. Glacier surges and the problem of their forecasting. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 292–304. [Presents observations on glacier surges in U.S.S.R., especially Lednik Medvezhiy, and discusses forecasting.]

Golubev, G. N. The water regime of the glaciological zones. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 111–22. [Examines water regimes of Shumskiy's glaciological zones in order to show common and differing features.]

Grigoryan, S. S., *and* Shumskiy, P. A. Prosteyshaya matematicheskaya model' trekhmernogo nestatsionarnogo lednika [The simplest mathematical model of a three-dimensional non-stationary glacier]. *Institut Mekhaniki MGU. Nauchnyye Trudy*, No. 42, 1975, p. 43–53. [Mathematical model for the stress and velocity field of a glacier where curvatures of bed and surface can be neglected and solution for isothermal case.]

Haefeli, R., *and* Sury, H. V. von. Strain and stress in snow, firn and ice along the EGIG profile of the Greenland ice sheet. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 342–52. [Presents and discusses recent results. Discussion, p. 352.]

Hambrey, M. J. Debris, bubble, and crystal fabric characteristics of foliated glacier ice, Charles Rabots Bre, Okstindan, Norway. *Arctic and Alpine Research*, Vol. 8, No. 1, 1976, p. 49–60. [Assesses significance of these characteristics in relation to development of foliation.]

Hattersley-Smith, G., *and others*. Oxygen isotope analysis in accumulation studies on an ice cap in northern Ellesmere Island, NWT, [by] G. Hattersley-Smith, H. R. Krouse and K. E. West. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 123–28. [Objectives of study were to assess annual accumulation in area where deep coring may be undertaken and to evaluate oxygen isotope analysis as tool for stratigraphic identification on ice cap in zone of percolation facies.]

Hofmann, W. Die Internationale Glaziologische Grönland-Expedition (EGIG). 2. Die geodätische Lagemessung. Eisbewegung 1959–1967 in den EGIG-Profilen. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 10, 1974, p. 217–24. [Presents measurements of ice movement and change of height of ice surface between 1959 and 1967 during programme of the Expédition Glaciologique Internationale au Groenland.]

HOINKES, H. C., *and* STEINACKER, R. Hydrometeorological implications of the mass balance of Hintereisferner, 1952–53 to 1968–69. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 144–49. [Presents observations from this Austrian glacier.]

HUGHES, T. J. A differential ablation-longitudinal compression mechanism for generating wave trains on cold alpine glaciers. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 305–17. [Presents model for formation of waves on alpine glaciers in dry valleys region of south Victoria Land, Antarctica, with particular reference to Meserve Glacier, Wright Valley.]

KICK, W. Application of geodesy, photogrammetry, history and geography to the study of long-term mass balances of Central Asiatic glaciers. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 150–60. [Discusses these possibilities.]

KOTLYAKOV, V. M., *and* LEBEDEVA, I. M. Nieve and ice penitentes. Their way of formation and indicative significance. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 10, 1974, p. 111–27. [Describes appearance and formation of these ablation features, with reference to those observed in eastern Pamir, U.S.S.R.]

KRAUS, H. An energy balance model for ablation in mountainous areas. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 74–82. [Discusses development of model and its significance.]

LEBEDEVA, I. M. The heat balance and ablation of the glaciers in Soviet Central Asia. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 83–87. [Six characteristic types of ablation in this glacial zone can be distinguished by air temperature, which serves as indicator of heat balance structure.]

LLIBOUTRY, L. A. La catastrophe de Yungay (Pérou). [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 353–63. [Describes effects of earthquake in Peru on 31 May 1970, which covered several glaciers and eroded lower slopes.]

LLIBOUTRY, L. A. Études glaciologiques au Glacier de Saint-Sorlin. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 10, 1974, p. 225–31. [Reviews development of glaciological research on this French glacier since 1891.]

LLIBOUTRY, L. A., *and* ECHEVIN, M. Mesure des bilans annuels en zone d'accumulation. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 10, 1974, p. 71–88. [Presents results from Glacier de Saint-Sorlin, France, and discusses implications.]

LORIUS, C., *and* DELMAS, R. Géochemie des calottes polaires: aspects atmosphériques et climatiques. *Journal de Physique, Colloque*, No. C8, 1975, p. 37–43. [Review of variations in D and ^{18}O composition in ice sheets of Greenland and Antarctica and climatic deductions. Other chemical measurements also discussed.]

MAKAREVICH, K. G., *and others*. Liquid runoff from regions of mountain glacier accumulation, [by] K. G. Makarevich, P. F. Shabanov and Ye. N. Vilesov. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 233–38. [Presents results obtained from studies on central Lednik Tuyuksu, Zailiy Alatau, U.S.S.R., carried out since 1963.]

MOKIEVSKY-ZUBOK, O. Half decade study of mass balance at Sentinel Glacier, BC, Canada. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 202–07. [Discusses results, 1966–70, from this glacier in British Columbia, Canada.]

MUROZUMI, M. Mizuho kōgen, nishi-Endābii-rando seppyōsō no chikyū kagakuteki kenkyū [Geochemical investigation of ice sheets in Mizuho plateau and west Enderby Land]. *Nankyoku Shiryō: Antarctic Record*, [No.] 54, 1975, p. 49–67. [Sea salts account for more than 90% of total weight of components. Annual accumulation of chemical components, $\mu g/cm^2$, is 0.1 for Si dusts and 0.40, 0.03, 0.10 and 0.06 for Na, K, Mg and Ca originating in latter source. English abstract, p. 49.]

PANTALEO, M. Note toponomastiche sui ghiacciai dei gruppi del Bernina e dell'Adamello. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 23, 1975, p. 83–100. [Notes on derivations or origins of names of 86 glaciers in Italian Alps.]

RADOK, U., *and* WATTS, D. A synoptic background to glacier variations of Heard Island. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 42–56. [Appears to be some justification for claiming that preferred tracks of depressions explain temperature conditions and thereby changes of glaciers in this region.]

ROBERTSON, J. D. Geophysical studies on the Ross Ice Shelf. *Dissertation Abstracts International*, B, Vol. 36, No. 11, 1976, p. 5484-B. [Seismic, radio-echo and gravity surveys and their interpretation in terms of the structure and origin of the ice shelf and of isostasy. Abstract of Ph.D. thesis, University of Wisconsin–Madison, 1975. University Microfilms order no. 76-2503.]

SCHNEEBELI, W., *and* RÖTHLISBERGER, F. 8 000 Jahrer Walliser Gletschegeschichte. Ein Beitrag zur Erforschung des Klimaverlaufs in der Nachzeit. I. Teil. Untersuchungen von Gletscherschwankungen im Val de Bagnes. II. Teil. Gletscher- und Klimaschwankungen im Raum Zematt, Ferpècle und Arolla. *Die Alpen*, 52. Jahrg., 3.-4. Quartal, 1976, 152 p.+2 fold-out illus. [Two papers both concerned with evidence from historical, geomorphological and dating methods for glacier variations over the last 8 000 years in Canton Valais, Switzerland, with introduction by G. Furrer, Teil I by W. Schneebeli, Teil II by F. Röthlisberger and final summary of chronology and of radiocarbon dating.]

SHUMSKIY, P. A. Izucheniye rezhima lednikov s pomoshch'yu rablyudeniy na poverkhnosti [The study of the regime of glaciers with the help of surface observations]. *Institut Mekhaniki MGU. Nauchnyye Trudy*, No. 42, 1975, p. 12–42. [Discussion of observations it is desirable to make on the surface of a glacier to establish its balance strain and velocity fields.]

SHUMSKIY, P. A. Mechanisms and causes of glacier variations. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 318–32. [Discussion, referring to specific glaciers in Austria, Antarctica and U.S.S.R.]

SHUMSKIY, P. A. Vzaimnaya oriyentatsiya vektora skorosti i tenzora skorosti deformatsii [Mutual orientation of the velocity vector and the strain-rate tensor]. *Institut Mekhaniki MGU. Nauchnyye Trudy*, No. 42, 1975,

p. 69–73. [Analysis of data and application to Hintereisferner (Austria) and Denman and Scott glaciers (Antarctica).]

Shumskiy, P. A. Zadachi i metody izucheniya kolebaniy lednikov [Problems and methods of studying fluctuations of glaciers]. *Institut Mekhaniki MGU. Nauchnyye Trudy*, No. 42, 1975, p. 5–11. [General survey of the problem of measuring and interpreting glacier fluctuations.]

Slupetzky, H. Untersuchungen zur Massenbilanz eines Hanggletschers. Ergebnisse und Schlussfolgerungen aus der Messreihe 1963/64–1970/71 vom Stubacher Sonnblickkees (Hohe Tauern). *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 10, 1974, p. 11–69. [Presents and discusses results of recent mass balance studies on Stubacher Sonnblickkees, Hohe Tauern, Austria.]

Smiraglia, C. Note sull'evoluzione recente del glacialismo dell'alta Valpelline. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 23, 1975, p. 119–30. [Discusses recent behaviour of Tza de Tzan and Grandes Murailles glaciers, Valpelline, Italy.]

Stanley, A. D. Mass and water balance studies at selected glacier basins in western Canada. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 181–84. [Describes studies initiated in 1965. Ram River, Peyto, Woolsey, Sentinel and Place glaciers had negative balance up to 1970, while Berendon had definite positive balance.]

Steinhauser, P. Seismisch bestimmte Eigenschaften des Eises der Dachsteingletscher. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 10, 1974, p. 101–09. [Investigation yields statistical relation between geometry of glacier and density of ice.]

Vinogradov, V. N. The peculiarities of accumulation and ablation on glaciers of the volcanic regions of Kamchatka. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 129–33. [Accumulation varies from 660 to 2 470 mm; ablation is intensive, attributable to low elevation of glacier margins.]

Weller, G., *and others*. Physical characteristics of the McCall Glacier, Brooks Range, Alaska, [by] G. Weller, D. Trabant and C. [S.] Benson. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 88–91.

Wendler, G. A note on the advection of warm air towards a glacier. A contribution to the International Hydrological Decade. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 10, 1974, p. 199–205. [Increased amount of ablation at edge of glacier measured for 17-day period. Increase explained by advection of warm air and by increased long-wave radiation from adjacent warm moraine.]

Wendler, G., *and others*. Mass balance studies on McCall Glacier, Brooks Range, Alaska, [by] G. Wendler, C. Fahl and S. Corbin. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 197–201. [Results given for 1968/69 and 1969/70 hydrological years.]

Yemelyanov, Ya. N., *and* Konovalov, V. G. Estimation of total ablation on Central Asian glaciers. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 99–105. [Outlines some results of developing and applying rated scheme for estimating total ablation on basis of relation to absorbed solar radiation.]

Young, G. J. Accumulation and ablation patterns as functions of the surface geometry of a glacier. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 134–38. [Method described and applied to Peyto Glacier, Alberta, Canada.]

Icebergs. Sea, river and lake ice

Capello, C. F. Un particolare tipo di "valanghe di ghiaccio". *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 23, 1975, p. 26–30. [Describes how avalanche occurred on iceberg in Davis Strait, and its effects.]

Diachok, O. I. Recent advances in Arctic hydroacoustics. *Naval Research Reviews*, Vol. 29, No. 5, 1976, p. 48–63. [Reviews recent advances in understanding ice-related underwater acoustic phenomena.]

Farhadieh, R., *and* Tankin, R. S. A study of the freezing of sea water. *Journal of Fluid Mechanics*, Vol. 71, Pt. 2, 1975, p. 293–304. [Attention focused on interaction between thermal convective currents in sea-water and ice–water interface during early stages of freezing and on salt plumes appearing in sea-water during later stages of freezing.]

Gosink, T. A., *and others*. Gas movement through sea ice, [by] T. A. Gosink, J. G. Pearson, J. J. Kelley. *Nature*, Vol. 263, No. 5572, 1976, p. 41–42. [Letter. Data indicate gas migration is important factor in ocean–atmosphere winter communication particularly when surface temperature is above −10°C.]

Johnson, G. L. The Fridtjof Nansen drift station. *Naval Research Reviews*, Vol. 29, No. 5, 1976, p. 64–76. [Describes proposal to freeze ship into Arctic pack ice for multidisciplinary study, including determination of heat and mass balance of ice cover in Eurasian basin.]

Maguire, R. J. *Effects of ice and snow cover on transmission of light in lakes*. Burlington, Ontario, Environment Canada. Inland Waters Directorate. Canada Centre for Inland Waters Branch, 1975. v, 24 p. (Scientific Series, No. 54.) [Reviews chemical and biochemical effects of ice and snow cover on lakes with particular attention to attenuation of photosynthetically active light by this cover and resulting decrease in amount of dissolved oxygen in lakes.]

Maguire, R. J. *Light transmission through snow and ice*. Burlington, Ontario, Environment Canada. Inland Waters Directorate. Canada Centre for Inland Waters Branch, 1975. v, 4 p. (Technical Bulletin No. 91.) [Transmission of photosynthetically active radiation by snow and ice examined, and extinction coefficients determined for various types. Values used to predict transmission by snow and ice systems of varying composition and thickness.]

Michel, B. Ice bridges of the James Bay project: reply. *Canadian Geotechnical Journal*, Vol. 13, No. 2, 1976, p. 181. [Comments on paper by L. W. Gold, ibid., Vol. 12, No. 3, 1975, p. 441–44.]

Miron, M. Opération du réseau hydrométrique durant l'hiver. *Ressources. Bulletin de la Direction Générale des Eaux*, Vol. 7, No. 1, 1976, p. 10–13. [Problem of operating hydrometrical network in winter when rivers may be affected by ice.]

[NAVIGATION UNDER FLOATING ICE.] Navigating under ice. *Naval Research Reviews*, Vol. 29, No. 5, 1976, p. 7, 17. [Note describing study on this problem, named Marginal Ice Zone Pacific (MIZPAC).]

STOLYAROVA, G. A. K voprosu o raschete splochennosti l'dov v Tatarskom prolive [On problems of calculating the concentration of ice in Tatarskiy Zaliv]. *Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut. Trudy*, Vyp. 50, 1975, p. 33–37. [Sea ice.]

TROWBRIDGE, R. The Arctic Ice Dynamics Joint Experiment (AIDJEX). *Naval Research Reviews*, Vol. 29, No. 5, 1976, p. 8–17. [Describes development and aims of experiment.]

TSANG, G. *Ice conditions and the proposed containment and removal of spilled oil on St. Clair and Detroit rivers. A report for Operation Preparedness, Oil Spill on St. Clair and Detroit Rivers.* Burlington, Ontario, Environment Canada. Inland Waters Directorate. Canada Centre for Inland Waters, 1975. v, 25 p. (Scientific Series, No. 56.) [Study of winter flow and ice conditions on these rivers, probability of winter oil spills, effects of ice on this, and containment and recovery of oil from rivers under winter conditions.]

WISEMAN, W. J., *jr.*, *and* SHORT, A. D. Arctic coastal processes: an overview. *Naval Research Reviews*, Vol. 29, No. 5, 1976, p. 35–47. [Describes effects of ice freeze-up and break-up, and of storm surges in summer.]

YAKUNIN, L. P. Vliyaniye stoka r. Amur na ledoobrazovaniye v Amurskom limane [Influence of the river Amur current on ice formation in the Amur lagoon]. *Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut. Trudy*, Vyp. 50, 1975, p. 66–70. [Study based on data obtained 1938–68.]

GLACIAL GEOLOGY

ARMANDO, E., *and others*. Ricerche sull'evoluzione del clima e dell'ambiente durante il Quaternario nel settore delle Alpi occidentali italiane. 5. La formazione di torbiera presso la fronte attuale del Ghiacciaio del Rutor (Valle d'Aosta): suo significato per la ricostruzione degli ambienti naturali del Piemonte nell'Olocene medio e superiore, [by] E. Armando, G. Charrier, L. Peretti [and] G. Piovano. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 23, 1975, p. 7–25. [Study of peat lake deposit in end moraine of this Italian glacier from palynological and palaeoglaciological points of view. English abstract, p. 7–8.]

BIBUS, E. Geomorphologische Untersuchungen zur Hang- und Talentwicklung im zentralen West-Spitzbergen. *Polarforschung*, Jahrg. 45, Nr. 2, 1975, p. 102–19. [Discusses development of valleys in central Spitsbergen.]

CLAGUE, J. J. Quadra Sand and its relation to the late Wisconsin glaciation of southwest British Columbia. *Canadian Journal of Earth Sciences*, Vol. 13, No. 6, 1976, p. 803–15. [Quadra Sand is sediment deposited in response to climatic deterioration at onset of Fraser glaciation, suggesting this occurred before 28 800 B.P.]

CROFTS, R. S. Scenery of Britain. Rocks in the highland and island mists. *Geographical Magazine*, Vol. 48, No. 10, 1976, p. 602–10. [Describes geology of northern Scotland, effects of glacial erosion and deposition, and modifications caused by natural and man-induced present-day landforming processes.]

DOAKE, C. S. M. Land beneath the Antarctic ice. *Geographical Magazine*, Vol. 48, No. 11, 1976, p. 670–74. [Short description of how topography of Antarctica is studied by means of radio-echo sounding.]

ENGLAND, J. Postglacial isobases and uplift curves from the Canadian and Greenland high Arctic. *Arctic and Alpine Research*, Vol. 8, No. 1, 1976, p. 61–78. [Plots pattern of post-glacial uplift between north-eastern Ellesmere Island and north-western Greenland on basis of recent field work.]

GLAZYRIN, G. E. The formation of ablation moraines as a function of the climatological environment. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 106–10. [Presents and describes simple mathematical model of formation of ablation moraine, which was tested on Ayutor-2 glacier, western Tyan'-Shan', U.S.S.R.]

GRAF, W. L. Cirques as glacier locations. *Arctic and Alpine Research*, Vol. 8, No. 1, 1976, p. 79–90. [Attempts to identify significant characteristics of geomorphology of cirques which help to preserve glaciers and to specify exact differences between glacierized and empty cirques.]

HARRISON, J. E. Evolution of a landscape: the Quaternary period in Waterton Lakes National Park. *Canada. Geological Survey. Miscellaneous Report* 26, 1976, [iv], 33 p. [Describes glacial history of this area in south-western Alberta, Canada.]

IVES, J. D., *and others*. Glacial history and palaeoecology of northwestern Nouveau-Québec and northern Labrador, [by] J. D. Ives, H. Nicols, S. Short. *Arctic*, Vol. 29, No. 1, 1976, p. 48–52. [Describes preliminary field observations for future work on Holocene climatic and ecological history.]

JOHNSON, C. B. Characteristics and mechanics of formation of glacial arcuate abrasion cracks. *Dissertation Abstracts International*, B, Vol. 36, No. 11, 1976, p. 5476-B. [Discusses different forms of cracks and reasons for their development. Abstract of Ph.D. thesis, Pennsylvania State University, 1975. University Microfilms order no. 76-10738.]

KING, L. H. Relict iceberg furrows on the Laurentian Channel and western Grand Banks. *Canadian Journal of Earth Sciences*, Vol. 13, No. 8, 1976, p. 1082–92. [Revealed by side-scan sonar survey. Probably of late Pleistocene age.]

KOLP, O. Submarine Uferterrassen der südlichen Ost- und Nordsee als Marken des holozänen Meeresanstiegs und der Überflutungsphasen der Ostsee. *Petermanns Geographische Mitteilungen*, Jahrg. 120, Quartalsht. 1, 1976, p. 1–23. [Evolution of Baltic Sea.]

KÜTTEL, M. Zum alpinen spät- und frühen Postglazial: das Profil Obergurbs (1 910 m) im Diemtigtal, Berner Oberland, Schweiz. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 10, 1974, p. 207–16. [Significance of sediments obtained by drilling on mountains above Gurbs valley, Switzerland, discussed in relation to chronology of alpine late glacial period and of ice retreat in valley.]

LUNDQVIST, J., *and* LAGERBÄCK, R. The Pärve fault: a late-glacial fault in the Precambrian of Swedish Lapland. *Geologiska Föreningens i Stockholm Förhandlingar*, Vol. 98, Pt. 1, No. 564, 1976, p. 45–51. [Study of fault, about 150 km long, shows movement occurred in late glacial time and was associated with deglaciation.]

SACHS, H. M. Evidence for the role of oceans in climatic change: tests of Weyl's theory of ice ages. *Journal of Geophysical Research*, Vol. 81, No. 18, 1976, p. 3141–50. [Palaeooceanographic evidence supports some aspects of Weyl's theory, but also shows inadequacy of mechanism for climatic change suggested by Weyl.]

STÄBLEIN, G. Eisrandlagen und Küstenentwicklung in West-Grönland. *Polarforschung*, Jahrg. 45, Nr. 2, 1975. p. 71–86. [Describes coastal forms resulting from Holocene deglaciation of west Greenland and, from these, analyses glacial eustasy and isostasy of region.]

WANKIEWICZ, P. Formation of ice-moulded features. *Albertan Geographer*, No. 12, 1976, p. 61–70. [Reviews major theories, particularly those dealing with formation of ice-moulded streamlined features.]

FROST ACTION ON ROCKS AND SOIL. FROZEN GROUND. PERMAFROST

FRENCH, H. M. Current field measurements concerning the nature and rate of periglacial processes. Results of a survey sponsored by I.G.U. Co-Ordinating Committee for Periglacial Research. *Biuletyn Peryglacjalny*, No. 25, 1976, p. 79–91. [Information sought as to process and/or phenomenon being investigated, location and duration of study, methods used, and publications arising from research.]

GONZALEZ, M. A., *and* CORTE, A. E. Pleistocene geocryogenic structures at 38° S.L., 60° W. and 200 m above sea level, Gonzalez Chavez, Buenos Aires province, Argentina. *Biuletyn Peryglacjalny*, No. 25, 1976, p. 23–33. [Describes ice wedge casts and gelifluction covers.]

HEIDMANN, L. J. Frost heaving of tree seedlings: a literature review of causes and possible control. *U.S. Dept. of Agriculture. Forest Service. General Technical Report* RM-21, 1976, 10 p. [Describes phenomenon. Suggested methods of control involve lowering freezing point of soil water or restricting water flow through soil to freezing front.]

KETTLE, R. J., *and* WILLIAMS, R. I. T. Frost heave and heaving pressure measurements in colliery shales. *Canadian Geotechnical Journal*, Vol. 13, No. 2, 1976, p. 127–38. [Describes technique for measuring pressure generated when heaving is restrained in frozen soil, freezing being achieved by thermoelectric cooling.]

MACKAY, J. R., *and* MACKAY, D. K. Cryostatic pressures in nonsorted circles (mud hummocks), Inuvik, Northwest Territories. *Canadian Journal of Earth Sciences*, Vol. 13, No. 7, 1976, p. 889–97. [Observations show cryostatic pressures during freeze-back period are no more important than thaw displacement in summer.]

MOTTERSHEAD, D. N. Quantitative aspects of periglacial slope deposits in southwest England. *Biuletyn Peryglacjalny*, No. 25, 1976, p. 35–57. [Sediment characteristics described.]

OSTERKAMP, T. A conceptual model of offshore permafrost. *Northern Engineer*, Vol. 7, No. 4, 1975–76, p. 5–10. [Develops model and discusses implications.]

PISSART, A., *and* FRENCH, H. M. Pingo investigations, north-central Banks Island, Canadian Arctic. *Canadian Journal of Earth Sciences*, Vol. 13, No. 7, 1976, p. 937–46. [Describes closed-system pingos, differing from classic closed-system examples in terms of irregularity of form and geomorphic settings.]

RAYNAL, R., *and* CAILLEUX, A. Propositions pour une recherche sur la régionalité des phénomènes périglaciaires. *Biuletyn Peryglacjalny*, No. 25, 1976, p. 93–98.

STUIVER, M., *and others*. Permafrost isotope ratios and chronology of three cores from Antarctica, [by] M. Stuiver and In Che Yang, G. H. Denton. *Nature*, Vol. 261, No. 5561, 1976, p. 547–50. [Permafrost sediments were deposited in marine (0–85 m deep) and fresh-water (100–125 m deep) environments in Harbor Bay, Ross Ice Shelf. Oxygen isotope ratios suggest extension of ice shelf predates 150 000 B.P., whereas radiocarbon date of its retreat is about 5 800 B.P.]

THORNTON, D. E. Steady-state and quasi-static thermal results for bare and insulated pipes in permafrost. *Canadian Geotechnical Journal*, Vol. 13, No. 2, 1976, p. 161–71. [Presents results describing gross features of transient and steady-state thermal regime, and in particular the thaw boundary, around both non-insulated and insulated pipelines in permafrost.]

VAN EVERDINGEN, R. O. Geocryological terminology. *Canadian Journal of Earth Sciences*, Vol. 13, No. 6, 1976, p. 862–67. [Discusses use of word "frozen", and suggests new term "cryotic" would be helpful.]

VINCENT, P. J. Some periglacial deposits near Aberystwyth, Wales, as seen with a scanning electron microscope. *Biuletyn Peryglacjalny*, No. 25, 1976, p. 59–64. [Examination of quartz grain surface textures indicates deposits cannot be regarded solely as products of periglacial slope activity; grains in Blue Head deposit have surface texture attributable to glacial abrasion.]

WHITE, S. E. Is frost action really only hydration shattering? A review. *Arctic and Alpine Research*, Vol. 8, No. 1, 1976, p. 1–6. [Discusses efficacy of pressure of adsorbed water (hydration) as wedging process in splitting rocks.]

METEOROLOGICAL AND CLIMATOLOGICAL GLACIOLOGY

BOYD, D. W. Normal freezing and thawing degree-days from normal monthly temperatures. *Canadian Geotechnical Journal*, Vol. 13, No. 2, 1976, p. 176–80. [Presents method of computation and results of its application to Canadian data.]

BROWNING, K. A., *and* FOOTE, G. B. Airflow and hail growth in supercell storms and some implications for hail suppression. *Quarterly Journal of the Royal Meteorological Society*, Vol. 102, No. 433, 1976, p. 499–533. [Observations during such a storm in Colorado confirm earlier ideas on hail growth and make seeding possibly a dangerous method of hail suppression.]

CHISNELL, R. F., *and* LATHAM, J. Ice particle multiplication in cumulus clouds. *Quarterly Journal of the Royal Meteorological Society*, Vol. 102, No. 431, 1976, p. 133–56. [Theory developed consistent with field observations. Two main processes in many cases are splinter production by riming and capture of splinters by drops. Comments by B. J. Mason, ibid., Vol. 102, No. 433, 1976, p. 716–18, with reply by authors, p. 718–19.]

COGLEY, J. G., *and* MCCANN, S. B. An exceptional storm and its effects in the Canadian high Arctic. *Arctic and Alpine Research*, Vol. 8, No. 1, 1976, p. 105–10. [Describes and discusses heavy rainfall over Queen Elizabeth Islands, 21–23 July 1973. Possible that it catalysed jökulhlaup which issued from ice-dammed lake 10 days later.]

DYE, J. E., *and others*. Use of a sailplane to measure microphysical effects of silver iodide seeding in cumulus clouds, [by] J. E. Dye, G. Langer, V. Toutenhoofd, T. W. Cannon and C. A. Knight. *Journal of Applied Meteorology*, Vol. 15, No. 3, 1976, p. 264–74. [Correlation of presence of ice particles with presence of AgI.]

HOBBS, P. V., *and* ATKINSON, D. G. The concentrations of ice particles in orographic clouds and cyclonic storms over the Cascade Mountains. *Journal of the Atmospheric Sciences*, Vol. 33, No. 7, 1976, p. 1362–74. [Airborne measurements and discussion of possible explanations for high particle concentrations sometimes found.]

JOUZEL, J., *and others*. Isotopic study of hail, [by] J. Jouzel, L. Merlivat and E. Roth. *Journal of Geophysical Research*, Vol. 80, No. 36, 1975, p. 5015–30. [Determination of T and D in hailstones and interpretation in terms of mode of formation.]

KNUTSON, E. O., *and others*. Aerosol collection by snow and ice crystals, [by] E. O. Knutson, S. K. Sood and J. D. Stockham. *Atmospheric Environment*, Vol. 10, No. 5, 1976, p. 395–402. [Measurement of scavenging efficiencies.]

KRENKE, A. N. Climatic conditions of present-day glaciation in Soviet Central Asia. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 30–41.

MARTIN, S. Corrélation bilans de masse annuels — facteurs météorologiques dans les Grandes Rousses. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 10, 1974, p. 89–100. [Study of meteorological factors affecting annual balance of Saint-Sorlin and Sarennes glaciers, France, over 16 years.]

MARTNER, B. E., *and* BATTAN, L. J. Calculations of Doppler radar velocity spectrum parameters for a mixture of rain and hail. *Journal of Applied Meteorology*, Vol. 15, No. 5, 1976, p. 491–98. [Calculations for dry and wet ice spheres and rain with hail.]

MASON, B. J. In reply to a critique of precipitation theories of thunderstorm electrification by C. B. Moore. *Quarterly Journal of the Royal Meteorological Society*, Vol. 102, No. 431, 1976, p. 219–25. [Discussion of criticism of theory of thunderstorm electricity as due to falling hail made by Moore at fifth International Conference of Atmospheric Electricity, Garmisch-Partenkirchen, 1974, and reply by Moore, p. 225–40.]

MASON, B. J. Production of ice crystals by riming in slightly supercooled cumulus. *Quarterly Journal of the Royal Meteorological Society*, Vol. 101, No. 429, 1975, p. 675–79. [Suggests that splinters released during growth of soft hail as observed in the laboratory may account for ice crystal concentrations in clouds. Comments by R. F. Chisnell and J. Latham, ibid., Vol. 102, No. 433, 1976, p. 713–15 and by S. C. Mossop, p. 715–16, with reply by Mason, p. 716–18.]

MESSERLI, B., *and others*. Die Schwankungen des Unteren Grindelwaldgletschers seit dem Mittelalter. Ein interdisziplinärer Beitrag zur Klimageschichte, von B. Messerli [and 6 others]. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 11, Ht. 1, 1975, p. 3–110. [Collection of articles relating fluctuations of lower Grindelwald glacier, Switzerland, during Middle Ages to its present history and climate. Contents include: B. Messerli, "Einleitung und Problemstellung", p. 11; H. J. Zumbühl, "Die Schwankungen des Unteren Grindelwaldgletschers in den historischen Bild- und Schriftquellen des 12. bis 19. Jahrhunderts", p. 12–50; M. Zurbuchen, "Topographischer Plan des Gletschervorfeldes im Massstab 1 : 2 000", p. 51–52; H. Kienholz, "Versuch einer relativen Altersbestimmung mit Hilfe von Aktivitätsgradmessungen des 'Freien Eisens' ", p. 53–60; H. Oeschger, "Die C 14-Datierung im Gletschervorfeld", p. 61–62; K. Ammann, "Pollenanalytische und vegetationskundliche Untersuchungen im Vorfeld", p. 63–73; C. Pfister, "Die Schwankungen des Unteren Grindelwaldgletschers im Vergleich mit historischen Witterungsbeobachtungen und Messungen", p. 74–90; B. Messerli, "Methoden und Ergebnisse — ihre Aussagen und ihre Bedeutung", p. 91–94. Papers have abstracts in English, p. 7–9, and French, p. 5–7.]

MOSSOP, S. C. Production of secondary ice particles during the growth of graupel by riming. *Quarterly Journal of the Royal Meteorological Society*, Vol. 102, No. 431, 1976, p. 45–57. [Experiments show this happens between −3 and −8°C. Possible mechanisms discussed.]

ORHEIM, O. Past and present mass balance variations and climate at Deception Island, South Shetland Islands, Antarctica. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 161–80. [Discusses climate of island, mass and heat balances of glacier situated far from recent volcanic activity, mass balance variations on island from 1750 to present, and climatic inferences based on these variations.]

PARKIN, D. W. Solar constant during a glaciation. *Nature*, Vol. 260, No. 5546, 1976, p. 28–30. [Radiation curves used to estimate Earth's radiation and heat budget with a glacial climate on assumption that solar luminosity variations are prime cause of climatic cycles.]

SNOW

AKITAYA, E. Studies on depth hoar. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 42–48. [Describes laboratory investigations on growth of depth hoar. Discussion, p. 48.]

BARABASH, V. YE., *and* DYUNIN, A. K., *ed. Sneg i laviny Sakhalina; sbornik statey* [*Snow and avalanches in Sakhalin; collected articles*]. Leningrad, Gidrometeoizdat, 1975. [184] p. [Includes articles on seasonal distribution of snow, conditions leading to avalanche formation and protective measures against avalanches.]

BOIS, P., *and others*. Multivariate data analysis as a tool for day-by-day avalanche forecast, [by] P. Bois, C. Obled and W. Good. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 391–403. [Describes work in progress for the Davos region of Switzerland. Discussion, p. 403.]

BOROVIKOVA, L. N., *and* DENISOV, YU. M. The consideration of glacial feed in the runoff of mountain rivers. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 225–28. [Model developed which describes distribution of water-equivalent of snow as function of altitude, and hence elevation of seasonal

snow-line and volume of snow for any day. Method suggested for computing contribution of glacial water to total income.]

Bovis, M. J., *and* Mears, A. I. Statistical prediction of snow avalanche runout from terrain variables in Colorado. *Arctic and Alpine Research*, Vol. 8, No. 1, 1976, p. 115–20. [Variables used were starting zone area (which accounted for 65% of variation in run-out distance) and longitudinal gradients of avalanche track and of run-out zone (which together accounted for less than 2%.)]

Bradley, C. C., *and* St Lawrence, W. F. Kaiser effect in snow. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 147–54. [Laboratory tests indicate that snow exhibits memory of previous stress. Discussion, p. 154.]

Brown, C. B., *and* Evans, R. J. Effect of glide and creep on rigid obstacles. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 407–14. [Concerned with development of element which has facility of conforming to snow-pack kinematics in neutral zones and boundary conditions on rigid obstacles. Once developed and included in finite element solution scheme, forces on rigid obstacles and regimes of creep and glide may be predicted. Discussion, p. 414.]

Brown, R. L., *and* Lang, T. E. On the fracture properties of snow. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 196–207. [Investigates thermodynamics associated with fracture by employing principles of continuum thermodynamics.]

Camp, P. R. Charge, morphology, and *p*H of natural snow. *Journal of Geophysical Research*, Vol. 81, No. 9, 1976, p. 1589–92. [Presents results of sea-level observations of 11 storms over 6 year period; particles were sorted by electrostatic deflection so that flakes gathered over short time interval could be observed at once.]

Cerutti, A. V. Le condizioni termometriche e nivometriche del periodo 1936–70 sul versante meridionale del Monte Bianco e le variazioni di volume delle precipitazioni nevose nei bacini glaciali. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 23, 1975, p. 31–50. [Presents observations on temperature and snow conditions between 1936 and 1970 on southern slope of Mont Blanc, and discusses variations in volume of snow precipitated in the glacier basins. French abstract, p. 31–32.]

Colbeck, S. C. Grain and bond growth in wet snow. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 51–61. [Distinguishes between pendular and funicular conditions of saturation. Discussion, p. 60–61.]

Denisov, Y. M., *and* Trofimova, E. B. A mathematical model representing snow as a multiphase medium. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 292. [Abstract.]

Dyunin, A. K. The new results in mechanics of snow storms. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 181. [Abstract. Discusses dynamic and diffusion theories of snow-storms.]

Gow, A. J. Time–temperature dependence of sintering in perennial isothermal snowpacks. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 25–41. [Reviews results of recent investigations on sintering, occurring over protracted periods of time in perennial polar snow-packs (Antarctica and Greenland). Discussion, p. 41.]

Grigoryan, S. S. Mechanics of snow avalanches. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 355–68. [Reviews current state of knowledge, with particular reference to studies carried out at Moscow University. Discussion, p. 367–68.]

Grigoryan, S. S., *and* Urumbayev, N. A. O prirode lavinoy vozdushnoy volny [On the nature of avalanche air-waves]. *Institut Mekhaniki MGU. Nauchnyye Trudy*, No. 42, 1975, p. 74–83. [Data from a number of years in the pre-Elbrus region used to explain the nature of the "enigmatic" appearance of air-waves in association with avalanches.]

Gubler, H. U. On the Rammsonde hardness equations. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 110–21. [Describes modifications and improvement. Discussion, p. 120–21.]

Harrison, H., *and others*. Computer simulation of snowflake size distribution and radar Doppler-velocities, [by] H. Harrison, B. Simon and R. Weiss. (*In 16th Radar Meteorology Conference. Sponsored by the American Meteorological Society, April 22–24, 1975, Houston, Texas.* Boston, American Meteorological Society, [1975], p. 447–50.) [Presents numerical model constructed to simulate principal effects of snow-flake accretion and radar backscatter and compares with measurements of snowfall Doppler spectra from vertically pointing X-band radar.]

Higuchi, K. On the relation between mass balance of perennial snow patches and climatic variation in central Japan. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 141–43. [Can be expected from climatic variation during recent 40 years that perennial snow-patches in northern part of central Japan have tendency to expand as secular variation.]

Isayenko, E. P. Snow avalanche impact pressure on an obstacle. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 433–40. [Discussion, p. 440.]

Kikuchi, K. Nankyokuten ni furu yuki no monogatari [Snow crystals at the South Pole]. *Kyokuchi: Polar News*, Vol. 11, No. 1, 1975, p. 31–38. [Describes development of scientific knowledge of deformed snow crystals found in Antarctica.]

Kojima, K. A field experiment on the rate of densification of natural snow layers under low stresses. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 298–308. [Describes field experiment with snow of low densities from 0.1 to 0.3 g cm^{-3} under stresses less than 15 g cm^{-2}. Discussion, p. 308.]

Kuroiwa, D. Mechanics and structure of snow as a dispersed system. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 3–15. [Reviews work on fundamental structural and intrinsic properties of snow in relation to its mechanical properties. Discussion, p. 14–15.]

Kuroiwa, D. Metamorphism of snow and ice sintering observed by time lapse cine-photomicrography. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 82–88. [Observations of snow crystals and grains under alternating temperature gradient. Discussion, p. 88.]

LANG, T. E., *and* BROWN, R. L. Stress concentration in sloping snowpack from geometric imperfections. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 311–20. [Presents results from developed equations on prediction of state of stress and creep in idealized sloping snow slab perturbed by basal layer shear imperfection. Discussion, p. 319–20.]

LANGHAM, E. J. The mechanism of rotting of ice layers within a structured snowpack. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 73–81. [Ice layers that form on surface of snow-pack become part of structure when buried by subsequent snowfalls. Considers mechanism of disintegration in relation to meteorological conditions. Discussion, p. 81.]

MCCLUNG, D. M. Creep and the snow–earth condition in the seasonal alpine snowpack. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 236–48. [Deals with creep and glide. Discussion, p. 247–48.]

MARTINEC, J., *and* QUERVAIN, M. R. DE. The effect of snow displacement by avalanches on snow melt and runoff. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 364–77. [Demonstrates different aspects of problem by means of simple model. Investigates real avalanche to check connections established in model and demonstrate quantitatively complications involved in real event.]

MARTINEC, J., *and others*. New insights into the run-off mechanism by environmental isotopes, [by] J. Martinec, U. Siegenthaler, H. Oeschger, E. Tongiorgi. *Isotope techniques in groundwater hydrology, 1974. Proceedings of a symposium organized by the International Atomic Energy Agency and held in Vienna, 11–15 March 1974*. Vienna, International Atomic Energy Agency, Vol. 1, 1974, p. 129–43. [T and ^{18}O used to study subsurface flow and ground-water recharge in a watershed dominated by snow-melt.]

MATVIYENKO, V. S., *and* GERBER, A. R. The effect of explosions on a snow cover. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 341. [Abstract.]

MELLOR, M. A review of basic snow mechanics. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 251–91. [Includes sections on deformation, failure and boundary friction.]

MOSER, H., *and* STICHLER, W. Deuterium and oxygen-18 contents as an index of the properties of snow covers. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 122–35. [On the basis of field and laboratory observations, it is suggested how and whereby these contents change in snow cover in course of time. Discussion, p. 135.]

MOSKALEV, Y. D. On the origin of wind blasts and air jets caused by the motion of avalanches. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 381. [Abstract.]

NAKAMURA, T., *and* YAMADA, Y. Yunesuko e no Nippon no saigai nadare hokoku ni tsuite [Japanese report of destructive avalanches to UNESCO]. *Seppyō*, Vol. 37, No. 3, 1975, p. 151–55. [Summarizes report to UNESCO of avalanche disasters in Japan, 1970–74.]

NISHIO, F., *and* KUSUNOKI, K. Mizuho kōgen no kiban hyomen chikei oyobi sekisetsu no taiseki ni tsuite [On the bedrock, surface formation and snow accumulation in the Mizuho plateau]. *Nankyoku Shiryō: Antarctic Record*, [No.] 54, 1975, p. 42–48. [Presents and comments upon spectral analyses of net snow accumulation, surface and bedrock profiles along 40° E. from Syowa station to South Pole. English summary, p. 42.]

PERLA, R. I. Stress and fracture of snow slabs. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 208–21. [Detailed study of slab avalanches. Discussion, p. 220–21.]

PRICE, A. G. Snowmelt runoff processes in a subarctic area. *Dissertation Abstracts International*, B, Vol. 36, No. 10, 1976, p. 4915-B. [Physical processes in daily snow-melt are modelled theoretically and predictions compared with hydrographs. Abstract of Ph.D. thesis, McGill University, Montreal, 1975. Microfiche copies obtainable from National Library of Canada, Ottawa.]

RACHNER, M. A working model for investigation of snow supply. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 341–46. [Presents results of investigation to determine water reserves of snow cover, based on data obtained from Selke/Harz area, East Germany.]

RUNICH, A. V., *and* ZALIKHANOV, M. CH. Structure and mechanical properties of avalanche snow. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 180. [Abstract. Discusses characteristic values of thickness and density of snow deposits of non-powder avalanches.]

SAEKI, M., *and others*. Hyōsō-yukinadare ni yoru sugi-bayashi no higai [Damage of Japanese cedar forest by surface avalanche]. [By] M. Saeki, S. Watanabe, Y. Ōzeki. *Seppyō*, Vol. 37, No. 3, 1975, p. 143–47. [Describes damage caused to 50-year-old forest in Niigata prefecture, Japan, by avalanche in January 1974. English summary, p. 147.]

ST LAWRENCE, W. F., *and* BRADLEY, C. C. The deformation of snow in terms of a structural mechanism. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 155–70. [Develops one-dimensional theory to describe deformation of snow, which considers process in terms of inter- and intragranular deformations. Theory rests heavily upon use of acoustic emission data. Discussion, p. 168–70.]

SAITŌ, T., *and* TAMURA, T. Neppan ni yoru kōsetsu-kyōdo no renzoku kenshutsu hō [Methods of continuous detection of the intensity of snowfall by heated plates]. *Seppyō*, Vol. 37, No. 3, 1975, p. 122–30. [One method based on measurement of temperature change on heated plate caused by snowfall when supply of heat is constant; other based on measurement of changing amount of supplied heat flow when temperature of plates regulated to maintain constant low value. English summary, p. 130.]

SALM, B. A constitutive equation for creeping snow. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 222–35. [Establishes constitutive equation for creeping snow in a quasistationary state, based on principle of least irreversible force.]

SCHAERER, P. A. Friction coefficients and speed of flowing avalanches. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 425–32. [Observations made of speed of avalanches by timing advance of front over section of track covered with deep snow. Discussion, p. 431–32.]

SCHAERER, P. A. Relation between the mass of avalanches and characteristics of terrain at Rogers Pass, B.C., Canada. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 378–80. [Shows that

10- and 30-year maximum avalanche occurring at site depends on theoretical maximum amount of snow that can accumulate in catchment area. Slope of terrain and size of individual starting zones has little influence.]

SEKIOKA, M., *and* YUHARA, K. Futta yuki no ichiriyōrei—chinetsu chiiki ni okeru hyōmen-hōnetsuryō no sokutei [An example of utilization of snowfall—estimation of surface heat discharge from geothermal fields]. *Seppyō*, Vol. 37, No. 3, 1975, p. 131–39. [Confirms usefulness of method. English summary, p. 139.]

SHODA, M. On the extension of Haefeli's one-dimensional theory of stress distribution within a sloping snow cover. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 415–24. [Discussion, p. 424.]

SIMONETTA, C. L'andamento del ciclo nivale in Piemonte negli inverni 1964–1965 e 1970–1971. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 23, 1975, p. 101–18. [Compares snowfalls and permanence of snow cover during these two winters in Piedmont, Italy.]

SMITH, F. W., *and* CURTIS, J. O. Stress analysis and failure prediction in avalanche snowpacks. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 332–40. [Presents results of finite element stress analyses of five-layered avalanche snow-pack, observed at Berthoud Pass, Colorado, U.S.A. Discussion, p. 339–40.]

STRUEMPLER, A. W. Trace metals in rain and snow during 1973 at Chadron, Nevada. *Atmospheric Environment*, Vol. 10, No. 1, 1976, p. 33–37. [Atomic absorption spectroscopy used to measure metallic ion concentrations before new coal-fired power plants began operation.]

TAKEUCHI, M., *and others*. Fubukiryō to hisetsuryō suichoku bunpu [A study of drift snow transport]. [By] M. Takeuchi, K. Ishimoto, T. Nohara. *Seppyō*, Vol. 37, No. 3, 1975, p. 114–21. [Study of general theory and experimental formulae of transport of drifting snow by measuring vertical distribution between surface and height of 30 cm. English summary, p. 120–21.]

THEAKSTON, F. H. Snow control by model techniques. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 382–90. [In an open channel water flume, water represents wind currents and silica sand represents snow. Using this model, snow drifting of airports, highways, town sites and railways has been studied, and avalanches investigated. Discussion, p. 389–90.]

TOCHON-DANGUY, J.-C., *and* HOPFINGER, E. J. Simulation of the dynamics of powder avalanches. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 369–80. [Describes simulation in densimetric Froude number. Discussion, p. 379–80.]

TSUNOGAI, S., *and others*. A chemical study of snow formation in the winter-monsoon season: the contribution of aerosols and water vapor from the continent, by S. Tsunogai, K. Fukuda and S. Nakaya. *Journal of the Meteorological Society of Japan*, Ser. 2, Vol. 53, No. 3, 1975, p. 203–13. [Discusses factors affecting chemical constituents, radionuclides and stable isotopes in snow samples from Sea of Japan coast.]

TURČAN, J. Snow storage distribution in mountain watersheds. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 335–40. [Discusses determination of snow storage in mountain catchment areas.]

TUSHINSKIY, G. K. The part avalanches play in the formation and dynamics of mountain glaciers and snow patches in the territory of the USSR. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 381–89.

TUSIMA [i.e. TSUSHIMA], K. The temperature dependence of hardness of snow. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 103–09. [Investigated using Kinosita's [Kinoshita's] hardness gauge in temperature range 0 to −56°C. Discussion, p. 108–09.]

USHAKOVA, L. A., *and* TROSHKINA, YE. S. Role of the liquid-like layer in snow metamorphism. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 62–65.

VOYTKOVSKIY, K. F., *and others*. Creep-induced changes in structure and density of snow, [by] K. F. Voytkovskiy, A. N. Bozhinskiy, V. N. Golubev, M. N. Laptev, A. A. Zhigulskiy and Yu. Ye. Slesarenko. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 171–79. [Describes recent work and applies to behaviour of snow cover on mountain slopes. Discussion, p. 179.]

VOYTKOVSKIY, K. F., *and others*. Mass transfer and metamorphism in snow cover, [by] K. F. Voytkovskiy, V. N. Golubev, N. I. Lapteva, [Ye.] S. Troshkina and A. V. Pavlov. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 16–24. [Discusses roles of diffusion and conduction in metamorphic processes. Discussion, p. 23–24.]

WAKAHAMA, G. The role of meltwater in densification processes of snow and firn. [Union Géodésique . . . .] *Symposium. Mécanique de la neige. . . . 1974*, [1975], p. 66–72. [Describes field and laboratory studies on densification processes and metamorphism of wet snow containing 0–30% free water. Discussion, p. 72.]

WAKAHAMA, G., *and* NARITA, H. Metamorphism from snow to firn and ice in a small snow patch on Mt. Daisetsu, Hokkaido, Japan. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 347–50. [Studies suggest that liquid water in snow-patch may accelerate both transformation process from snow to ice and formation of large single crystals of ice.]

ZALIKHANOV, M. CH. Hydrological role of avalanches in the Caucasus. [Union Géodésique . . . .] *Symposium. Neiges et glaces. . . . 1971*, [1975], p. 390–94. [Stresses significance of redistribution of snow by avalanches in nourishment of glaciers and run-off.]

ZHIDIKOV, A. P., *and others*. A snowmelt runoff model and its application to short-range forecasting of flood discharges, [by] A. P. Zhidikov, A. G. Levin, N. S. Nechayeva and E. G. Popov. *Hydrological Sciences Bulletin*, Vol. 21, No. 1, 1976, p. 195–202. [Model derived for relatively small rivers and applied to inflows into Gorky and Kuibyshev reservoirs on Volga river.]