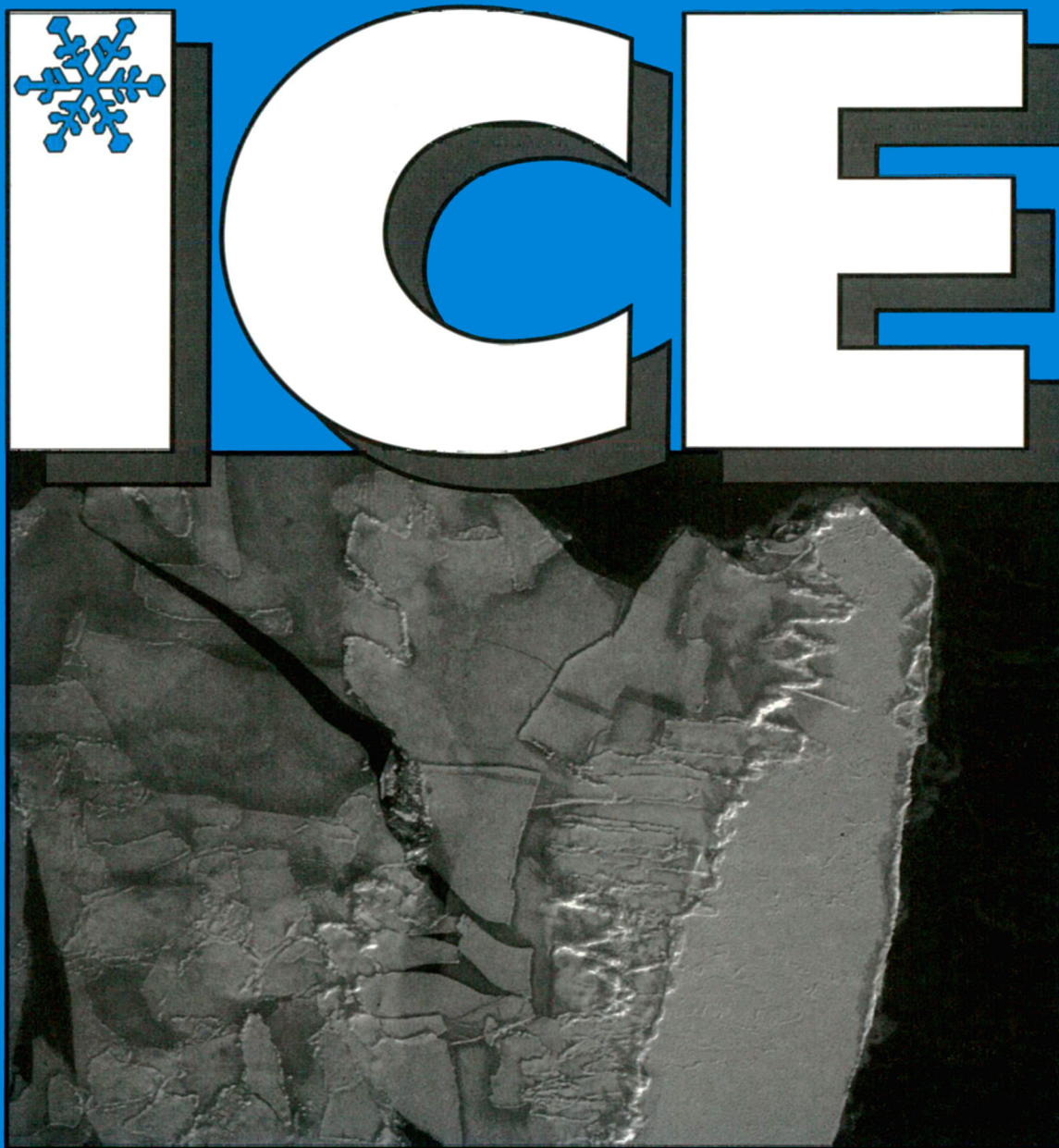


*Number 124*

*3rd Issue 2000*



**NEWS BULLETIN  
OF THE INTERNATIONAL  
GLACIOLOGICAL  
SOCIETY**





# ICE

## NEWS BULLETIN OF THE INTERNATIONAL GLACIOLOGICAL SOCIETY

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Number 124

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### CONTENTS

2	<b>Recent Work</b>	11	IGS Awards
2	<i>JAPAN (Hokkaido)</i>	12	<b>Recent Meetings (of other organizations)</b>
2	Floating ice	12	Midwest Glaciologists' Meeting
2	Frozen ground	12	<b>Future Meetings (of other organizations)</b>
2	Snow	12	1st European Permafrost Conference
3	Glaciers	13	Snow and Ice
3	General	13	Earth System Processes
4	<b>ABBREVIATIONS</b>	13	Glacier-Influenced Sedimentation
4	<b>International Glaciological Society</b>	14	<b>News</b>
4	Student competition, Fairbanks	14	100th Anniversary of Ukichiro Nakaya
5	Remote Sensing Meeting, 2nd Circular	14	<b>Glaciological Diary</b>
7	Ice Cores and Climate Meeting, 2nd Circular	15	<b>Books Received</b>
9	Journal of Glaciology	16	<b>Donors</b>
9	Annals of Glaciology (Vol. 32)	16	<b>New members</b>

**COVER PICTURE:** Sea ice in Baffin Bay–Smith Sound region, Canada. Finger rafting of grey ice.  
(Photograph by Konrad Steffen)

Scanning electron micrograph of the ice crystal used in headings by kind permission of William P. Wergin,  
Agricultural Research Service, U.S. Department of Agriculture

**EXCLUSION CLAUSE:** *While care is taken to provide accurate accounts and information in this Newsletter, neither the editor nor the International Glaciological Society undertakes any liability for omissions or errors.*



## RECENT WORK

### JAPAN (Hokkaido)

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(For abbreviations used see page 4)

#### FLOATING ICE

##### Ice climatology of Okhotsk and Baltic Seas

(K. Shirasawa, T. Kawamura, N. Ishikawa, ILTS/HU; M. Lepparanta, Geophys/UFel)

A Japanese–Finnish study, supported by JSPS, FMTI, MESSCJ and the Academy of Finland, has been carried out by Hokkaido University and the University of Helsinki since 1995. The objectives are to: (1) examine long-term variability of ice seasons; (2) develop analytical and numerical ice models for ice evolution; and (3) analyze remote sensing of sea ice. During the past two years analytical and numerical ice models for ice evolution, including ice growing and melting processes, have successfully been developed by examining in-situ field data from both seas. The datasets for input to the model were collected from field programs around Hanko Peninsula, the Baltic Sea and Saroma-ko lagoon, on the Okhotsk Sea coast of Hokkaido, Japan. A preliminary study, using sea-ice radar data, has been carried out for modeling coastal sea-ice dynamics along the Okhotsk Sea coast.

(kunio@pop.lowtem.hokudai.ac.jp)

#### PERMAFROST

##### Yukon Water and Energy Experiment (YuWEX)

(N. Ishikawa, ILTS/HU; S. Urano, T. Hirano, Ag/HU; H. Shibata, EF/HU; K. Chikita, FSci/HU; K. Kawachi, MurIT; K. Yabe, SSA; T. Ozeki, HUE; T. Sato, A. Sato, NIED/STA)

Hydrologic processes in the headwater regions of the Yukon River exert a major controlling influence over flows in the river and upon the regional climate of interior Alaska. To further this understanding, an integrated and comprehensive examination of the physical, chemical and biological processes occurring in an experimental watershed in interior Alaska was undertaken as a joint project with WERC/UAK-F and USGS-AK. The water balance of this watershed is being examined, especially focusing on the interaction between ground water and surface water across the permafrost layer. The interactions and interdependence of ground water and surface water impact such processes as soil moisture, rates of evapotranspiration, stream-flow rates and stream chemistry. In this study, the total hydrological balance and interactions with other environmental phenomenon are being examined across a valley profile and then analyzed in conjunction with complementary data such as soil type, vegetation distribution, snow and water conditions, ground temperature, and soil thermal

and hydraulic conductivity. The project is supported by the JAMSTEC.

In 2000 the following observations were made: (1) field studies of hydrologic processes within the CPCRW; (2) intensive measurements of snow distribution, evapotranspiration, CO<sub>2</sub> efflux, depth of active layer, ground-water level, runoff, chemical contents of soil and water, dependencies of soil moisture on topography and vegetation; (3) annual water/heat balance of the CPCRW; (4) runoff along the Yukon River; and (5) climatological and hydrological data collection within the Yukon basin.

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##### Hydrologic cycle in a Siberian tundra basin

(Y. Ishii, Y. Kodama, N. Sato, T. Ohata, ILTS/HU; M. Nomura, EF/HU; H. Yabuki, FORS)

As a part of GAME (GEWEX Asian Monsoon Experiment)–Siberia project, hydrological observations of water balance and streamflow regime in an Arctic tundra basin have been carried out in eastern Siberia during the three summer seasons 1997–1999. The study was supported by MESSCJ and FORS. The field site is 7 km southeast of Tiksi (71°35′ N, 128°46′ E) near the mouth of the Lena River. Snowmelt was found to be greater than rainfall among the input components, especially in dry summers. Runoff was the most predominant output component, and evapotranspiration was approximately 50 mm in dry or wet summers. Since the soil thaw depth was shallow, and the capacity of soil-water retention was small, the runoff response to the rainfall event didn't change significantly with the increase of soil thaw depth.

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#### SNOW

##### Hydrologic cycle in cold and nival drainage basin, northern Japan

(Y. Ishii, Y. Kodama, N. Ishikawa, D. Kobayashi, ILTS/HU)

The Moshiri experimental watershed is located in northern Hokkaido, Japan. This basin is in one of the coldest areas in Japan, with an annual mean air temperature of 3.5°C. In winter the basin is thickly covered with snow, 2–3 m deep (700–900 mm w.e.), and the minimum air temperature can drop to –35° to –40°C. However, the soil under the snow does not freeze during the winter because of the thick snowpack. During the past five years the following studies have been carried out in this watershed: (1) the relationship

between stream temperature and shallow soil temperature during snowmelt runoff and rainfall runoff; (2) seasonal variations in the spring-water runoff and its hydrochemistry in the mountainous headwater basin; (3) episodic acidification of stream water caused by snowmelt; (4) contributions of snow to the annual water balance in the snowy drainage basin; and (5) the relationship between interannual variations in basin water balance and snow-water storage. The studies were supported mainly by MESSCJ.

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## GLACIERS

### Glaciological research, Patagonia, summers 1998/99 and 1999/2000

(R. Naruse, ILTS/HU; M. Aniya, Geophys/UTsuk)  
Glaciological investigations were undertaken in Patagonia in the austral summers of 1998/99 and 1999/2000, together with Chilean and Argentine researchers. The primary objective was a shallow firn/ice coring in Hielo Patagónico Sur (HPS, Southern Patagonia Icefield). After a two-week wait for good weather, six members, led by S. Kohsh, were flown in by helicopter on 29 November 1999 to establish a drilling camp at 1756 m a.s.l. in the accumulation area of Glaciar Tyndall. By 9 December they had successfully drilled to a depth of 46 m through wet firn. The firn cores are now being analyzed in Japan. Other research included: (1) surveys of glacier dynamics and hydrology at Glaciar Soler, Hielo Patagónico Norte (HPN: Northern Patagonia Icefield) in November and December 1998; (2) studies on Holocene glacier variations in the Rio Soler valley (HPN) in November 1998; (3) observations of calving events and measurements of terminus flow velocities of Glaciar Perito Moreno (HPS) in December 1999; (4) bathymetric survey at Brazo Upsala of Lago Argentino (HPS) in December 1999; (5) study of snow/ice biology (insects and algae) at Glaciar Tyndall in November 1999; and (6) aerial surveys of Glaciar Soler and HPN outlet glaciers in November 1998 and November 1999.

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### Surface velocity, Koryto glacier, Kamchatka Peninsula, Russia

(S. Yamaguchi, S. Sugiyama, R. Naruse, ILTS/HU)  
Ice-flow surveys of Koryto glacier, Kamchatka Peninsula, Russia (54.83° N, 161.84° E), were carried out during 40 days from August to September 2000. Five survey points were established between the terminus and accumulation area along a flowline and their positions were surveyed every few days using a GPS. The maximum surface speed obtained was 0.20 m d<sup>-1</sup> near the terminus (430 m a.s.l.) and the minimum was 0.06 m d<sup>-1</sup> around 950 m a.s.l. Diurnal changes in surface speeds were observed everywhere; as the ablation season passed the surface speeds became larger. The maximum surface speed was one and a half times the minimum one near the terminus. A good relationship was found between the

surface melt rate and the surface flow speed near the terminus; the speed becoming larger as the melt rate increased. This project was supported by MESSCJ.

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### Hydrometeorological characteristics of Koryto Glacier, Kamchatka Peninsula, Russia

(T. Matsumoto, K. Konya, T. Yamada, ILTS/HU; Y.D. Muravyev, IV/RAS)

Hydrological and meteorological observations were made from late July to mid-September 2000 at Koryto glacier. The objective was to clarify heat-balance characteristics and the subglacial hydrological condition of the glacier, which is characterized by an intensive mass exchange and a maritime climate. Glacier melt-water drained through two subglacial channels which joined about 300 m downstream from the terminus. Total discharge from the glacier varied in a clear diurnal cycle from 3–12 m<sup>3</sup> s<sup>-1</sup>. Specific electric conductivity of stream water was inversely correlated with variation of discharge and varied from 0.8–1.5 mS m<sup>-1</sup>. From the result of tracer injection into a moulin, subglacial flow velocity near the terminus was estimated at 0.1 m s<sup>-1</sup>. Stream water and suspended sediment were sampled four times a day for chemical analyses of runoff and estimation of subglacial conditions. A weather station was installed in the upper part of the glacier for heat-balance analysis. It records air temperature, relative humidity, wind speed, wind direction, global radiation, net radiation and surface temperature. Surface ablation was measured using snow stakes at eight points. Maximum and minimum daily air temperatures in this period were 16.6°C and 4.2°C. The project was supported by MESSCJ.

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## GENERAL

### Kitami Institute, Department of Civil Engineering

Investigations by associates of the KIT included the following: studies by A. Hachikubo, T. Aoki and H. Enomoto involving meteorological and snow-pit observations in Kitami and at Saroma Lagoon leading to expressions of snow albedo as a function of snow grain-size and an assessment of the impurity effects of snow grain-size and impurity on spectral albedo; drifting-snow studies by S. Takahashi who has observed the fall velocity of snow particles and the threshold velocity for the start of snow drifting as part of a fundamental study of snowdrifting; observations of the physical properties of Greenland ice cores by H. Shoji, A. Miyamoto and K. Shimohara on the GRIP and North GRIP ice cores including mechanical tests and measurement of air inclusions; use of microwave remote-sensing techniques by H. Enomoto and K. Tateyama to estimate sea-ice thickness in the seasonal sea-ice zone.

(hachi@snow2.civil.kitami-it.ac.jp)

*Submitted by Nobuyoshi Ishikawa*



#### Abbreviations used in the text

Ag	Agriculture
CE	Civil Engineering
CPCRW	Caribou Poker Creek Res. Watershed
EF	Experimental Forests
FMTI	Finnish Ministry of Trade and Industry
FORS	Frontier Observational Research System
FSci	Faculty of Science
Geophys	Geophysics
HU	Hokkaido Univ., Sapporo 060, Japan
HUE	Hokkaido Univ. of Education, Kushiro-shi 085, Japan
ILTS/HU	Inst. of Low Temperature Science
IV/RAS	Institute of Volcanology, Petropavlovsk, 683006 Kamchatskiy, Russia
JAMSTEC	Japan Marine Science and Technology Center, Yokosuka 237, Japan
JSPS	Japan Soc. for the Promotion of Science

KIT	Kitami Institute of Technology, Kitami 090-8507, Japan
MESSCJ	Ministry of Education, Science, Sports and Culture of Japan
MurIT	Muroran Institute of Technology, Muroran-shi 050, Japan
NIED	National Research Institute for Earth Science and Disaster Prevention, Shinjo, Yamagata 996, Japan
RAS	Russian Academy of Sciences
SSA	Sapporo School of the Arts
STA	Science and Technology Agency
UAK-F	Univ. of Alaska Fairbanks, Fairbanks, Alaska AK 99775-7320, U.S.A.
UHel	Univ. of Helsinki, Finland
USGS-AK	U.S. Geological Survey, 800 Yukon Drive, Fairbanks, AK 99709, U.S.A.
UTsuk	Univ. of Tsukuba, Ibaraki 305, Japan
WERC	Water and Environmental Res. Center



## INTERNATIONAL GLACIOLOGICAL SOCIETY

### STUDENT COMPETITION, FAIRBANKS SEA-ICE SYMPOSIUM

A student paper competition was held at the IGS Symposium on Sea Ice and its Interactions with the Ocean, Atmosphere and Biosphere at the University of Alaska Fairbanks, 19–23 June 2000. The objective was to promote student participation in the symposium and membership of the IGS by sending a strong message that the IGS cares about students and the next generation of researchers. By subjecting student papers to scrutiny by a panel of experts and fostering discussion of their work, we hoped to leave the students with a better appreciation of the symposium and the IGS.

Awards were made for *Best Oral Presentation by a Student* and *Best Poster Presentation by a Student*. The talks and posters were judged according to the following criteria:

1. Scientific quality;
2. Originality of research;
3. Clarity and conciseness of presentation;
4. Independence of research;
5. Relevance to current problems.

The panel of judges was:

Matthew Sturm, CRREL, U.S.A. (Chairman)  
 Jerry Johnson, CRREL, U.S.A.  
 Stephen Jones, National Research Council, Canada  
 Manfred Lange, University of Münster, Germany  
 Rob Massom, Antarctic CRC, Australia  
 Hiro Wakabayashi, NASDA, Japan

The winner of the *Best Oral Presentation by a Student* was Inga Smith, Department of Physics, University of Otago, New Zealand (Platelet Ice and Landfast Ice of McMurdo Sound, Antarctica).

The award for *Best Poster Presentation by a Student* went to two individuals, as the panel of judges was unable to distinguish between their high-quality presentations:

Karen Junge, School of Oceanography, University of Washington, U.S.A. (A Microscopic Approach to Investigate Bacteria Under In Situ Conditions in Sea Ice Samples)

Aaron Stierle, Department of Geology and Geophysics, University of Alaska Fairbanks, U.S.A. (Characterization of Sedimentary Particles and Salt Precipitates in Coastal Sea Ice from Barrow, Alaska).

Four students received honourable mentions for their posters:

Tina Tin, University of Alaska Fairbanks, U.S.A.  
 Richard Hall, University of Cambridge, U.K.  
 Stefan Kern, University of Bremen, Germany  
 Karoline Frey, University of Alaska Fairbanks, U.S.A.

Five students received honourable mentions for their talks:

Melanie Fitzpatrick, University of Washington, U.S.A.  
 Hezi Gildor, Weizmann Institute of Science, Israel  
 Sheldon Drobot, University of Nebraska Lincoln, U.S.A.  
 Ted Maksym, University of Alaska Fairbanks, U.S.A.  
 Christopher Mundy, University of Manitoba, Canada

The winners each received a two-year membership in the IGS.

*Martin Jeffries  
 Hajo Eicken  
 Matthew Sturm*

# 4TH INTERNATIONAL SYMPOSIUM ON REMOTE SENSING IN GLACIOLOGY

College Park, Maryland, U.S.A., 4–8 June 2001

## CO-SPONSORED BY

ICESat Project

National Aeronautics and Space Administration (NASA)

National Science Foundation (NSF)

## SECOND CIRCULAR

The International Glaciological Society will hold the Fourth International Symposium on Remote Sensing in Glaciology in 2001 at the University of Maryland Inn and Conference Center, College Park, Maryland, U.S.A. with registration on 3 June 2001 and sessions from 4–8 June 2001.

## SYMPOSIUM ORGANIZATION

S. Ommanney

## LOCAL ARRANGEMENTS COMMITTEE

Dorothy K. Hall (Chair), Waleed Abdalati, Robert A. Bindschadler, Donald J. Cavalieri, Alfred T.C. Chang, Joey C. Comiso, Mark A. Fahnestock, James L. Foster, Sirpa Häkkinen, Christopher A. Shuman

## EDITORIAL BOARD

Jan-Gunnar Winther and Rune Solberg (Chief Editors), Alfred T.C. Chang, Dorothy K. Hall, Kenneth C. Jezek, Ian R. Joughin, Jeffrey R. Key, W. Gareth Rees, Eric Rignot, Helmut Rott, Theodore A. Scambos, Konrad Steffen, Richard S. Williams Jr, Duncan Wingham, Neal W. Young

## PARTICIPATION

Contact the IGS for the separate accommodation booking form. The IGS registration form and accompanying payment should be returned before 26 February 2001. There will be a £50 surcharge for late registrations. The participant's registration fee covers organization costs, a set of abstracts, the icebreaker, banquet, the mid-week excursion and a copy of the *Annals of Glaciology*. The accompanying person's registration fee includes organization costs, the icebreaker, the mid-week excursion and the banquet. A local programme is being developed and details will be announced later. There is an administration charge for participants who are not members of the International Glaciological Society.

## REGISTRATION FEES

UK £

Participant (IGS member)	250
Participant (not IGS member)	300
Student and Retired IGS members	100
Accompanying person aged 18 or over	55
Late registration surcharge (after 26 February)	50

Refunds on registration fees will be made on a sliding scale, according to date of receipt of notification, up to 22 May 2001. After that date it may be impossible to make any refund. See booking form for methods of making payment. All who pre-register will receive a copy of the third circular and programme prior to the meeting.

## THEME

Snow and ice comprise the cryosphere and are interactive components of the Earth system and knowledge of these interactions with the land, oceans, atmosphere and ecosystems is vital to our understanding of global change.

Most of the cryosphere occurs in remote locations on the Earth, making remote sensing an efficient means of studying this climate component. Since the last IGS-sponsored symposium on this theme, many more nations have launched remote-sensing platforms and existing satellite programs have been expanded. This symposium is intended to bring together remote-sensing experts and glaciologists to exchange information on the latest techniques and methodologies for study of the cryosphere, as well as to discuss scientific results derived using remote sensing.

## TOPICS

The suggested topics include remote-sensing aspects of:

1. Seasonal snow on land;
2. Sea, river and lake ice;
3. Glaciers, ice sheets and ice shelves;
4. Permafrost.

Sessions will be developed around specific research themes or methodologies rather than instruments, in order to address advances in glaciological research using remote-sensing data and to highlight the synergies achievable with multiple-instrument approaches.

## SESSIONS

Oral presentations will be held on four full days and one half-day. There will be ample opportunity for poster displays.

## PAPERS

### (I) SUBMISSION OF ABSTRACTS

Participants who want to contribute to the Symposium should submit an abstract of their proposed paper. This abstract must contain sufficient detail to enable us to judge the scientific merit and relevance of the proposed paper. It should not exceed one page of typescript, on international-size paper A4 (210 x 297 mm). References and illustrations should not be included. Place the title and author(s) names and address(es) at the top of the abstract, not on a separate sheet. Indicate at the bottom which specific topic it intends to address, and whether a poster or





# INTERNATIONAL SYMPOSIUM ON ICE CORES AND CLIMATE

Kangerlussuaq, Greenland, 19–23 August 2001

## CO-SPONSORED BY

Danish Natural Science Foundation  
University of Copenhagen

## SECOND CIRCULAR

The International Glaciological Society will hold an International Symposium on Ice Cores and Climate in 2001 in the Kangerlussuaq Hotel and Conference Center in Kangerlussuaq, Greenland. Registration will take place on 18 August and sessions will be held from 19–23 August 2001.

### SYMPOSIUM ORGANIZATION

S. Ommanney

### LOCAL ARRANGEMENTS COMMITTEE

Dorthe Dahl-Jensen (Chair), Gary Clow, Heinz Miller

### EDITORIAL BOARD

Eric Wolff (Chief Editor), Richard Alley, Kumiko Goto-Azuma, Jo Jacka, Sigfús Johnsen, Valerie Masson, Dave Morse, Bernhard Stauffer, J.-P. Steffensen, Eric Steig

### PARTICIPATION

Participants should contact the IGS or check the Web site for the separate Team Arctic travel and accommodation form. The IGS registration form and accompanying payment should be returned before 25 May 2001. Note: participants must pay BOTH the IGS registration fee and the Team Arctic charges (either package or non-package per separate booking form). There will be a £50 surcharge for late registrations. The participant's IGS registration fee, in combination with the Team Arctic package, covers return travel to Greenland, full board and lodging during the symposium, organization costs, a set of abstracts, the icebreaker, banquet, the mid-week excursion and a copy of the *Annals of Glaciology*. The accompanying person's registration fee, together with the Team Arctic package, covers return travel to Greenland, full board and lodging during the symposium, organization costs, the icebreaker, the mid-week excursion and the banquet. A variety of local activities will be available for booking on site. There is an administration charge for participants who are not members of the International Glaciological Society.

### REGISTRATION FEES

	UK £
Participant (IGS member)	75
Participant (not IGS member)	125
Student and Retired IGS members	50
Accompanying person aged 18 or over	10
Late registration surcharge (after 25 May)	50

Refunds on registration fees will be made on a sliding scale, according to date of receipt of notification, up to 3 August 2001. After that date it may be impossible to make any refund. See booking form for methods of making payment. All who pre-register will receive a copy of the third circular and programme prior to the meeting.

### THEME

Ice cores provide a wealth of information on the past climate. Measurements range from detailed studies of the air–snow transfer processes in firn to those of deep ice cores that cover several hundred-thousand years of climate evolution. Comparison of ice-core records from different geographical sites, as well as with other palaeoclimatic data, can establish detailed information about past climates. Their interpretation helps in understanding climatic processes.

Recently, several deep ice cores and many shallow cores have been drilled and analysed. New and more sophisticated analytical methods have been developed.

This symposium will focus on results from ice-core measurements and what they reveal about our understanding of global, regional and historical climates.

### TOPICS

The suggested topics include:

1. Interpretation of ice-core records;
  2. Comparison of results from different ice cores;
  3. Meteorological, modelling and air–snow transfer studies aimed at improving ice-core interpretation;
  4. Comparison between ice-core records and other palaeoclimatic and palaeoenvironmental records;
  5. Mass balance and climate on ice sheets (including PARCA);
  6. Geophysical and borehole measurements;
  7. Ice rheology in relation to the flow of ice sheets.
- Sessions will be developed around these themes.

### SESSIONS

Oral presentations will be held on four full days and one half-day. There will be ample opportunity for poster displays.

### PAPERS

#### (I) SUBMISSION OF ABSTRACTS

Participants who want to contribute to the Symposium should submit an abstract of their proposed paper. This abstract must contain sufficient detail to enable us to judge the scientific merit and relevance of the proposed paper. It should not exceed one page of typescript, on international-size paper A4 (210 × 297 mm). References and illustrations should not be included. Place the title and author(s) names and address(es) at the top of the abstract, not on a separate sheet. Indicate at the bottom which specific topic it intends to address, and whether a poster or oral presentation is preferred. When selecting material, authors should bear in mind that the final version of the paper should not exceed five printed pages in the *Annals*; extra pages will be charged at



## JOURNAL OF GLACIOLOGY

The following papers have been accepted for publication in the *Journal of Glaciology*:

- R Bintanja and C H Reijmer  
Meteorological conditions over Antarctic blue ice areas  
and their influence on the local surface mass balance
- B W Brock, I C Willis and M J Sharp  
Measurement and parameterisation of albedo  
variations at Haut Glacier d'Arolla, Switzerland
- D Cohen  
Rheology of ice at the bed of Engabreen, Norway
- D Cullen and I Baker  
Correspondence. The chemistry of grain boundaries  
in Greenland ice
- M A Fahnestock, T A Scambos, R A Bindschadler and G  
Kvaran  
A millennium of variable ice flow recorded by the  
Ross Ice Shelf, Antarctica
- P Gauer  
Numerical modeling of blowing and drifting snow in  
Alpine terrain
- T S Hooyer and N R Iverson  
Diffusive mixing between shearing granular layers:  
constraints on bed deformation from till contacts
- J C King, P S Anderson and G W Mann  
The seasonal cycle of sublimation over an Antarctic  
ice shelf
- C Kull and M Grosjean  
Late Pleistocene climate conditions in the north  
Chilean Andes drawn from a climate–glacier model
- R Kwok, M J Siegert and F D Carsey  
Ice motion over Lake Vostok, Antarctica: constraints  
on inferences regarding the accreted ice
- D Mair, P Nienow, I Willis and M Sharp  
Spatial patterns of glacier dynamics during an early  
melt-season high velocity event: Haut Glacier  
d'Arolla, Switzerland
- R H Morin, G E Descamps and L DeW Cecil  
Acoustic televiewer logging in glacier boreholes
- S F Price and I M Whillans  
Crevasse patterns at the onset to Ice Stream B, West  
Antarctica
- C F Raymond  
Energy balance of ice streams
- M J Siegert and J L Bamber  
Correspondence. Subglacial water at the heads of  
Antarctic ice-stream tributaries
- S Suter, M Laternser, W Haeberli, R Frauenfelder and M  
Hoelzle  
Cold firn and ice of high-altitude glaciers in the  
Alps: measurements and distribution modelling
- T Thorsteinsson and C F Raymond  
Sliding versus till deformation in the fast motion of  
an ice stream over a viscous till
- P Wagnon, P Ribstein, B Francou and J E Sicart  
The influence of the 1997–98 El Niño–Southern  
Oscillation warm event on tropical glaciers

## ANNALS OF GLACIOLOGY

The following papers from the International Symposium on Snow, Avalanches and Impact of the Forest Cover held in Innsbruck, Austria, 22–26 May 2000 have been accepted for publication in *Annals of Glaciology* Vol. 32, edited by K. Hutter:

- O Abe  
Creep experiments and numerical simulations of very  
light artificial snowpacks
- M Barbolini and F Savi  
Estimate of uncertainties in avalanche hazard mapping
- P Bartelt and V Stöckli  
The influence of tree and branch fracture, overturning  
and debris entrainment on snow avalanche flow
- T Baunach, C Fierz, P K Satyawali and M Schneebeli  
A model for kinetic grain growth
- R Bintanja  
Buoyancy effects induced by drifting snow particles
- R Bintanja, H Lilienthal and H Tüg  
Observations of snowdrift over Antarctic snow and  
blue-ice surfaces
- K W Birkeland, C J Mock and J J Shinker  
Avalanche extremes and atmospheric circulation  
patterns
- A N Bozhinsky, A N Nazarov and P A Chernouss  
Avalanches: a probabilistic approach to modelling

- B Brabec and R Meister  
A nearest-neighbor model for regional avalanche forecasting
- C Camponovo and J Schweizer  
Rheological measurements of the viscoelastic properties of snow
- P Chernouss and Yu Fedorenko  
Application of statistical simulation for avalanche risk evaluation
- H H Christiansen  
Snow cover depth, distribution and duration data from NE Greenland obtained by continuous automatic digital photographing
- M Clement-Rastello  
A study on the size of snow particles in powder-snow avalanches
- C Coléou, B Lesaffre, J-B Brzoska, W Ludwig and E Boller  
Three-dimensional snow images by X-ray microtomography
- J Doorschot, N Raderschall and M Lehning  
Measurements and one-dimensional model calculations of snow transport over a mountain ridge
- Y Durand, G Guyomarc'h and L Mérindol  
Numerical experiments of wind transport over a mountainous instrumented site: Part 1. Regional scale
- P Etchevers, Y Durand, F Habets, E Martin and J Noilhan  
Impact of spatial resolution on the hydrological simulation of the Durance high-Alpine catchment
- P M B Föhn  
Simulation of surface-hoar layers for snow-cover models
- D Font, G Furdada and J M Vilaplana  
Aeolian susceptibility maps: methodology and applications
- D Font, T Sato, K Kosugi, A Sato and J M Vilaplana  
Mass flux measurements in a cold wind tunnel, calibration of the mechanical traps using a snow particle counter
- C Genthon, M Fily and E Martin  
Numerical simulations of Greenland snow-pack and comparison with passive microwave spectral signatures
- G P Giani, S Silvano and G Zanon  
Avalanche of January 18, 1997 on Brenva Glacier (Mont Blanc Group, Western Italian Alps): an unusual process of formation
- U Gruber and S Margreth  
Winter 1999: a valuable test of the avalanche hazard mapping procedure in Switzerland
- A Hachikubo  
Numerical modelling of sublimation on snow and comparison with field measurements
- S H Haraldsdóttir, H Olafsson, Y Durand, L Mérindol and G Giraud  
SAFRAN-Crocus snow simulations in an unstable and windy climate
- C Harbitz, A Harbitz and F Nadim  
On probability analysis in snow avalanche hazard zoning
- P Höller  
The influence of the forest on night-time snow-surface temperature
- B Jamieson and C D Johnston  
Evaluation of the shear frame test for weak snow-pack layers
- T Jóhannesson  
Run-up of two avalanches on the deflecting dams at Flateyri, northwestern Iceland
- A Jónsson and E Hestnes  
The proposed open pit protection of Bolungarvík, Iceland
- B Kohl, M Fuchs, G Markart and G Patzelt  
Heavy rain on snow cover
- F Louchet  
A transition in dry-snow slab avalanche triggering modes
- D Marks, T Link, A Winstral and D Garen  
Simulating snowmelt processes during rain-on-snow over a semi-arid mountain basin
- S Marshall, R J Oglesby and A W Nolin  
Effect of western U.S. snow cover on climate
- E Martin, G Giraud, Y Lejeune and G Boudart  
Impact of a climate change on avalanche hazard
- D M McClung  
Characteristics of terrain, snow supply and forest cover for avalanche initiation caused by logging
- J McElwaine, K Nishimura, T Ogura, Y Ito, Y Nohguchi, S Keller and K Izumi  
Ping-pong ball avalanche experiments
- J-L Michaux, F Naaim-Bouvet and M Naaim  
Drifting snow studies over a mountainous instrumented site: measurements and numerical model



- T Nagasaki, K Izumi, S Kobayashi and T Yamada  
Prediction of avalanche paths deviated from the stream by centre-of-mass model
- C Pielmeier, M Schneebeli and T Stucki  
Snow texture: a comparison of empirical versus simulated texture index for Alpine snow
- T Sato, K Kosugi and A Sato  
Saltation-layer structure of drifting snow observed in wind tunnel
- M Schaer and D Issler  
Particle densities, velocities and size distributions in large avalanches from impact-sensor measurements
- H Schreiber, W L Randeu, H Schaffhauser and L Rammer  
Avalanche dynamics measurement by pulsed Doppler radar
- J Schweizer and C Camponovo  
The skier's zone of influence in triggering slab avalanches
- M Shimizu and O Abe  
Recent fluctuation of snowcover on mountainous areas in Japan
- T Sidorova, N Belaya and V Perov  
Distribution of slush flows in northern Europe and their potential change due to global warming
- S A Sokratov and A Sato  
The effect of wind on snow cover
- S A Sokratov, A Sato and Y Kamata  
Water vapor in the pore space of snow
- B Sovilla, F Somnavilla and A Tomaselli  
Measurements of mass balance in dense snow avalanche events
- M Stähli, A Papritz, P Waldner and F Forster  
Time-space linear regression analysis of the snow cover in a pre-Alpine semi-forested catchment
- E Suriñach, G Furdada, F Sabot, B Biescas and J M Vilaplana  
On the characterisation of seismic signals generated by snow avalanches for monitoring purposes
- Y C Tai, J M N T Gray, K Hutter and S Noelle  
Flow of dense avalanches past obstructions
- Y-C Tai, S Noelle, J M N T Gray and K Hutter  
An accurate shock-capturing finite-difference method to solve the Savage-Hutter equations in avalanche dynamics
- I Takei and N Maeno  
The low-frequency conductivity of snow near the melting temperature
- Y Takeuchi, S Kobayashi, T Sato, K Izumi, K Kosugi, Wang Xin, Zhang Jiapin and Peng Yongheng  
The effect of wind direction on drift control by snow fences
- E Troshkina, T Glazovskaya, N Kondakova and V Sokolov  
Zoning of snowiness and avalanching in the mountains of western Transcaucasia
- J Vallet, U Gruber and F Dufour  
Avalanche mass balance measurements at Vallée de la Sionne
- Wei Wenshou, Qin Dahe and Liu Mingzhe  
Properties and structure of the seasonal snow cover in the continental regions of China

## IGS AWARDS

Members are invited to submit nominations for the Society's awards. Accompanying documentation should include biographical data, testimonials from colleagues, as well as a clear explanation of the particular contribution(s) made that warrant(s) consideration for the award proposed. The supporting documentation from other scientists should describe their perception of the contribution that has been made, e.g. how it has impacted the development of the science or their own work. Proposers should approach appropriate colleagues in the strictest confidence.

The International Glaciological Society has three different ways of recognizing contributions to the science of glaciology and to its objectives. These are:

### SELIGMAN CRYSTAL

*"..... shall be awarded from time to time to one who has made an outstanding scientific contribution to glaciology so that the subject is now enriched."*

### HONORARY MEMBERSHIP

*"Honorary Members shall be elected by the Council in recognition of eminent contributions to the objects of the Society, and shall not exceed twelve in number."*

### RICHARDSON MEDAL

*"..... is awarded from time to time to one who has given outstanding service to glaciology."*

Members should submit nominations in confidence to the Chairman of the Awards Committee

Dr. Wilford F. Weeks  
6533 S.W. 34th Avenue  
Portland, Oregon  
OR 97201-1077, U.S.A.  
(Tel/Fax: [1](503)244-1695; w-f-weeks@excite.com)

with a copy to the Secretary General.



## RECENT MEETINGS (of other organizations)

### MIDWEST GLACIOLOGISTS' MEETING

The Pennsylvania State University Department of Geosciences was host to the 9th Annual Midwest Glaciologists' Meeting, 24–26 March, 2000. The meeting was organized by Sarah Das, with able assistance from Peter Burkett, Kramer Campden, Todd Dupont, Byron Parizek, Dave Reusch, Matt Spencer and Don Voigt. Richard Parizek led a post-meeting field trip. As in past years, attendees (and indeed the meeting site itself) reflected a broad definition of “Midwestern U.S.,” representing such distant lands as California, Washington State and Slovenia.

The 25 presentations spanned both geography and geologic time, including many interesting topics from student researchers. West Antarctica (WA) was, as usual, a popular topic. The details of how subglacial till affects WA ice-stream flow has long been a matter of heated discussion — this year's MGM attendees learned that till micromorphology is a hot topic as well. More traditional ice mechanics were considered in a report that vertical velocity (“coffee can” or “superpole”) measurements at the head of Ice Stream D indicate thinning at a mean rate of  $0.5 \text{ m a}^{-1} \pm 0.2 \text{ m a}^{-1}$ . Ice thinning was also on the minds of two speakers who considered its effect on ice temperature gradients over spatial and temporal domains. It was suggested that temperature gradients measured in WA ice streams imply relatively recent thinning of the ice sheet and that it may never have been as thick as some popular reconstructions suggest. New borehole temperature measurements at Siple Dome — an apparently immutable feature in the hustle and bustle of WA — were used to compute a geothermal heat flux of  $70.4 \text{ mW m}^{-2}$  for that location. The measurement fits well with the popular notion of heat flow in WA and is the largest value yet reported. Observations, by seismic profiling, and the implications for flow of variations in ice fabric were also discussed. An innovative numerical flowline model that accounts explicitly for ice anisotropy, was used to demonstrate a more than 3-fold increase in the

flow-law enhancement factor with depth along a Law Dome transect. The increase is due to shear layers at depth. Another superb implementation of a flowline model compared periodicity in the GRIP temperature record with periodicity in a Laurentide ice sheet forced to change by its own dynamics and by climate. Natural oscillations, it seems, are more rare than one might expect.

The increasingly important role of satellite remote sensing in glaciology was hard to miss. Applications of synthetic-aperture-radar data to an Antarctic DEM, velocity mapping, Antarctic coastline monitoring, the search for change in the Greenland ice sheet (GIS), and estimation of accumulation in the GIS's dry-snow zone were all discussed. The visible, NIR, SW, and TIR data products available from NASA's new Landsat & mission were advertised, with a new, customer-friendly pricing structure.

Floating ice was also a sensation at MGM 2000. A remotely-sensed chronicle of events near the front of the Ross Ice Shelf showed the growth of large rifts from 1983 to the March 2000 calving of the mighty iceberg B-15. A numerical model of post-calving drift showed that an iceberg's progress along the front depends in part on collisions with the intact ice. Even ancient floating ice was considered, via intriguing research into the viability of global ice shelves on a “snowball Earth.”

In summary, a fine motto for MGM was suggested in meeting sponsor Richard Alley's discussion of the erosive power of temperate glaciers: “Glaciers DO!”

Northern Illinois University, in DeKalb, will host MGM 2001 (properly termed MGM Millenium). The meeting will be convened on 11 and 12 March, in the NIU Department of Geology and Environmental Geosciences and is sponsored by Reed Scherer. A meeting website will be announced via the IGS e-mail list.

*Christina Hulbe (chulbe@ice.gsfc.nasa.gov)*



## FUTURE MEETINGS (of other organizations)

### 1ST EUROPEAN PERMAFROST CONFERENCE

Rome, Italy, 26–30 March 2001

The IGS will be co-sponsoring the forthcoming European Permafrost Conference on Permafrost Science and Engineering. Topics will include permafrost and climate (including final reports of the European PACE project); rock glaciers; distribution modelling of mountain permafrost; permafrost engineering; and past, present and potential future permafrost conditions in Europe.

Abstracts were due by 1 September 2000.

For further information contact:

Charles Harris, Department of Earth Sciences, Cardiff University, P.O. Box 914, Cardiff CF1 3YE, Wales, U.K.  
(Tel [44](1222)874336; Fax [44](1222)874326;  
harrisc@cardiff.ac.uk)

<http://www.cf.ac.uk/uwc/earth/pace/>

# SNOW AND ICE: PRINCIPLES, PROCESSES, MANAGEMENT AND USE

Ottawa, Ontario, Canada, 14–17 May 2001

The joint meeting of the Eastern Snow Conference (ESC), the Canadian Geophysical Union (Hydrology Section, CGU-HS) and the Committee on River Ice Processes and the Environment (CRIPE), co-sponsored by the International Glaciological Society, will include special sessions on "Snow and Ice: Principles, Processes, Management and Use". The joint sessions will feature a broad range of topics on snow, glacier, cold-regions hydrologic, river-ice, remote-sensing, chemical and cryospheric science. A major scientific theme is Polar Research and Climate Systems. The abstract deadline is 31 January 2001. Submitted papers will be considered for publication in the *Proceedings of the Eastern*

*Snow Conference* and a special issue of *Hydrological Processes*. Student travel assistance and several student paper awards are available.

For further information contact:

ESC (<http://www1.tor.ec.gc.ca/CRYSYS/esc/>)  
J.W. Pomeroy (John.Pomeroy@aber.ac.uk)

CGU (<http://ecsask65.innovplace.saskatoon.sk.ca/cguhs/>)  
R.D. Moore (rdmoore@geog.ubc.ca)

CRIPE — R. Bourdages (raymond.bourdages@ec.gc.ca)

## EARTH SYSTEM PROCESSES

Edinburgh, Scotland, U.K., 24–28 June 2001

A meeting on Earth System Processes, sponsored by the Geological Society of America and Geological Society of London, will include some sessions that may be of interest to IGS members: e.g. the snowball Earth hypothesis: theory and observations; causes of rapid climate

changes in the Quaternary; and interactions between the cryosphere and biogeochemical cycles

For further information check the sponsors' web sites:  
[www.geosociety.org](http://www.geosociety.org) or [www.geolsoc.org.uk](http://www.geolsoc.org.uk)

## GLACIER-INFLUENCED SEDIMENTATION ON HIGH-LATITUDE CONTINENTAL MARGINS: MODERN AND ANCIENT

University of Bristol, Bristol, England, U.K., 29–30 March 2001

The last decade has seen important advances in the understanding of glacier-influenced sedimentation on high-latitude continental margins. Sedimentary packages in fjord-shelf-slope settings preserve a record of interactions between glaciers, oceans and climate. The objective of this meeting is to provide researchers working on these topics, in both modern and ancient environments, with a forum for presentation and discussion of their research. The scope is intended to be broad, reflecting the frequently interdisciplinary nature of the topic.

Topics to be addressed include, but are not limited to:

- Geophysical and geological investigations of glacier-influenced sedimentation on continental shelves and slopes
- Glacimarine sedimentary processes and facies in high-latitude fjords
- Controls on glacier-influenced sedimentation on continental margins
- Reconstruction of former glacier-dynamics from geological and geophysical investigations along continental margins
- Sedimentological investigations of ancient glacier-influenced margins
- Genetic discrimination of glacier-influenced lithofacies on continental slopes
- Records of Quaternary iceberg rafting in glacier-influenced seas

Invited speakers will include: J.B. Anderson, J.T. Andrews, E.A. Cowan, A. Elverhøi, M.J. Hambrey, R.D. Powell and J.P.M. Syvitski.

It is intended to publish refereed papers from this meeting as a *Geological Society Special Publication*.

Those wishing to contribute to this meeting should fill in the registration and abstract forms provided on the conference web page.

Registration fee: £45 professionals, £30 members of the Geological Society and students. Fee includes abstracts booklet, tea/coffee and lunches. There will also be a formal conference dinner (£30). Delegates are asked to arrange their own accommodation directly.

Registration details, including a list of accommodation and location maps, are provided on the conference web page at:

<http://www.ggy.bris.ac.uk/glac/msgmtg/glacimarine.html>

### Convenors

Professor Julian A. Dowdeswell Dr. Colm Ó Cofaigh  
Tel [44](117)9289068 Tel [44](117)9289830  
[j.a.dowdeswell@bris.ac.uk](mailto:j.a.dowdeswell@bris.ac.uk) [colm.ocofaigh@bris.ac.uk](mailto:colm.ocofaigh@bris.ac.uk)

Both at:  
Bristol Glaciology Centre, School of Geographical Sciences, University of Bristol, Bristol, BS8 1SS, England, U.K. (Fax [44](117)9287878)



## NEWS

### 100TH ANNIVERSARY OF PROF. UKICHIRO NAKAYA'S BIRTHDAY

A general assembly of the Japanese Society of Snow and Ice took place from 1–5 October 2000 and celebrated the 100th anniversary of the birthday of the late Prof.

Nakaya, in Katayamaz, where he was born in 1900, and at the Nakaya Ukichiro Museum of Snow and Ice; established in 1994 to commemorate his birthplace. He was one of the founders of snow and ice research in Japan and was famous, not only for his research and teaching, but also for his essays on science and philosophy. Most Japanese know the phrase from one of his essays: *a snow crystal is a letter sent from heaven*.

His research started on snow and ice by investigating natural snow crystals with respect to their classification, and followed by making various types of snow crystals artificially, leading to completion of the famous Nakaya

diagram. Subsequently, he initiated research on the physical properties of permafrost and single crystals of ice. Just before died, he spent four summers in Greenland investigating the visco-elastic properties of snow and ice-core samples retrieved from the ice sheet.

A memorial symposium was held at the assembly, attended by his daughters and many participants, where a lecture on the scientific essay was given after selected phrases had been read from one of his own essays. His life was also reviewed in pictures, and his film "Snow crystals" was presented. Finally, recent advances in three research areas, corresponding to his research history — crystal growth of snow crystals, permafrost and ice-core studies — were introduced by his successors.

*M. Nakawo (nakawo@ihas.nagoya-u.ac.jp)*



## GLACIOLOGICAL DIARY

\*\* IGS sponsored \* IGS co-sponsored

30 January – 2 February 2001

Winter Cities 2001 International Conference, Québec, Quebec, Canada

Sommet Mondiale de la Nordicité, 1327 Avenue Maguyire, Bureau 200, Sillery, Quebec G1T 1Z2, Canada (Tel [1](418)684-3144; Fax [1](418)684-8815; [wintercitiesquebec@videotron.ca](mailto:wintercitiesquebec@videotron.ca))

4–8 February 2001

16th International Symposium on Okhotsk Sea and Sea Ice, Mobetsu, Japan

K. Shirasawa, OSCORA, Hokkaido University, 6-4-10 Minamigaoka, Mobetsu, Hokkaido 094-0013, Japan (Tel [81](1582)3-3722; Fax [81](1582)3-5319; [OSCORA@pop.lowtem.hokudai.ac.jp](mailto:OSCORA@pop.lowtem.hokudai.ac.jp); <http://www.hokudai.ac.jp/lowtem/sirl/shome.html>)

7–9 March 2001

Second Wadati Conference on Global Change and Polar Climate, Tsukuba Science City, Japan  
Hiroshi L. Tanaka, University of Tsukuba, Tsukuba, Ibaraki 305, Japan ([tanaka@atm.geo.tsukuba.ac.jp](mailto:tanaka@atm.geo.tsukuba.ac.jp))

11–12 March 2001

Midwest Glaciology Meeting 2001, Northern Illinois University, DeKalb, Illinois, U.S.A.  
([reed@geol.niu.edu](mailto:reed@geol.niu.edu) or [chulbe@ice.gsfc.nasa.gov](mailto:chulbe@ice.gsfc.nasa.gov))

25–30 March 2001

European Geophysical Society XXVI General Assembly, Nice, France  
([www.copernicus.org/EGS/egsga/nice01/nice01.htm](http://www.copernicus.org/EGS/egsga/nice01/nice01.htm))

### Glaciology-related Symposia

*OA32. Glaciers and ice sheets* (Conveners: Jonathan L. Bamber, [j.l.bamber@bristol.ac.uk](mailto:j.l.bamber@bristol.ac.uk); G. Hilmar Gudmundsson, [hilmar@vaw.baum.ethz.ch](mailto:hilmar@vaw.baum.ethz.ch); Philippe Huybrechts, [phuybrec@awi-bremerhaven.de](mailto:phuybrec@awi-bremerhaven.de))

*OA14.02. Energy and mass exchange of snow covers and glaciers* (Conveners: Dieter Scherer, [dieter.scherer@unibas.ch](mailto:dieter.scherer@unibas.ch); Wouter Greuell, [w.greuell@phys.uu.nl](mailto:w.greuell@phys.uu.nl))

*NH7.06 Snow and avalanches* (Conveners: Mohamed Naaim, [mohamed.naaim@cemagref.fr](mailto:mohamed.naaim@cemagref.fr); Joan Manuel Vilaplana, [jman@natura.geo.ub.es](mailto:jman@natura.geo.ub.es))

26–30 March 2001

\* 1st European Permafrost Conference, Rome, Italy  
C. Harris, Department of Earth Sciences, University of Wales, P.O. Box 914, Cardiff CF1 3YE, Wales, U.K. (Tel [44](1222)874-336; Fax [44](1222)874-326; [harrisc@cardiff.ac.uk](mailto:harrisc@cardiff.ac.uk))

29–30 March 2001

Glacier-Influenced Sedimentation on High-Latitude Continental Margins: Modern and Ancient, Bristol Glaciology Centre, University of Bristol, Bristol, England, U.K.

C. Ó Cofaigh, Bristol Glaciology Centre, School of Geographical Science, University of Bristol, University Road, Bristol BS8 1SS, England, U.K. (Tel [44](117)928-9830; Fax [44](117)928-7878; [colm.ocofaigh@bristol.ac.uk](mailto:colm.ocofaigh@bristol.ac.uk); <http://www.ggy.bris.ac.uk/glac/glacmarine.html>)



14–17 May 2001

- \* Snow and Ice: Principles, Processes, Management and Use, Ottawa, Ontario, Canada.  
S. Pagiatakis, Geomatics Canada, 615 Booth Street, Ottawa, Ontario K1A 0E0, Canada [Tel [1](613)-995-8720; Fax [1](613)992-6628;  
sppagiat@NRCan.gc.ca; <http://www.cgu-ugc.ca>]

4–8 June 2001

- \*\* Fourth International Symposium on Remote Sensing in Glaciology, College Park, Maryland, U.S.A.  
Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, England, U.K. ([www.spri.cam.ac.uk/igs/home.htm](http://www.spri.cam.ac.uk/igs/home.htm))

13–18 June 2001

- \* Millennial-scale Events in the North Atlantic Region during Termination I. International Conference and Associated Field Meeting University of Ulster, Northern Ireland. U.K.  
J. Knight, School of Environmental Studies, University of Ulster, Coleraine, Co Londonderry BT52 1SA, Northern Ireland, U.K. (Tel [44](28)7032-3179; Fax [44](28)7032-4911; [j.knight@ulst.ac.uk](mailto:j.knight@ulst.ac.uk))

17–22 June 2001

ISOPE-2001, 11th Annual International Offshore and Polar Engineering Conference, Stavanger, Norway  
ISOPE-2001, P.O. Box 189, Cupertino, CA 95015-0189, U.S.A. (Tel [1](408)980-1784; Fax: [1](408)980-1787; [meetings@isope.org](mailto:meetings@isope.org); <http://www.isope.org>)

6–10 August 2001

Conference on the Geophysical Detection of Subsurface Water on Mars, Lunar And Planetary Institute, Houston, Texas, U.S.A.  
S. Clifford, Lunar and Planetary Institute, Box 58407, Houston, TX 77058, U.S.A. (Tel [1](281)486-2146; Fax [1](281)486-2162; [clifford@lpi.usra.edu](mailto:clifford@lpi.usra.edu); <http://cass/jsc.nasa.gov/meetings/geomars2001/>)

12–17 August 2001

16th International Conference on Port and Ocean Engineering under Arctic Conditions (POAC'01), Ottawa, Ontario, Canada  
[poac@nrc.ca](mailto:poac@nrc.ca) or G.W. Timco, Canadian Hydraulics Centre, National Research Council of Canada, Ottawa, Ont., K1A 0R6, Canada (Tel [1](613)993-6673; Fax [1](613)952-7679; [garry.timco@nrc.ca](mailto:garry.timco@nrc.ca))

19–23 August 2001

- \*\* International Symposium on Ice Cores and Climate, Kangerlussuaq, Greenland  
Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, England, U.K. ([www.spri.cam.ac.uk/igs/home.htm](http://www.spri.cam.ac.uk/igs/home.htm))

3–7 September 2001

Avalanches and Related Subjects, II International Conference, Kirovsk, Murmansk Region, Russia  
Pavel A. Chernouss, Centre of Avalanche Safety "Apatit" JSC, 50th Anniversary of October st., 33 'A', Kirovsk, Murmansk 184250, Russia (Tel [7](815)319-62-30; Fax [7](815)31-12; [p.chernouss@apatit.com](mailto:p.chernouss@apatit.com))

8–13 October 2001

2nd International Conference on the Oceanography of the Ross Sea, Ischia, Naples, Italy  
Ross Sea 2001, Istituto di Meteorologia e Oceanografia, via De Gasperi 5, I-80133 Naples, Italy (Tel [39](081)-547-5586; Fax [39](081)551-3157; [RossSea@nava3.uninav.it](mailto:RossSea@nava3.uninav.it); <http://antartide.uninav.it>)

## 2002

June 2002

- \*\* International Symposium on Fast Glacier Flow, Yakutat, Alaska, U.S.A.  
Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, England, U.K. ([www.spri.cam.ac.uk/igs/home.htm](http://www.spri.cam.ac.uk/igs/home.htm))

15–19 July 2002

International Conference on the Physics and Chemistry of Ice, St. John's, Newfoundland, Canada  
Stephen J. Jones, National Research Council of Canada, Institute for Marine Dynamics, P.O. Box 12093, Stn. A, St. John's, Newfoundland A1B 3T5, Canada (Tel [1](709)772-5403; Fax [1](709)772-2462; [Stephen.Jones@nrc.ca](mailto:Stephen.Jones@nrc.ca))

25–30 August 2002 (date to be confirmed)

- \*\* International Symposium on Modelling Physical and Mechanical Processes in Ice, Chamonix, France  
Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, England, U.K. ([www.spri.cam.ac.uk/igs/home.htm](http://www.spri.cam.ac.uk/igs/home.htm))



## BOOKS RECEIVED

Hardy, J.P., M.R. Albert and P. Marsh, eds. 1999. Snow hydrology: the integration of physical, chemical and biological systems. *Hydrol. Processes*, 13(14), 2117–2482.

Jackson, M. 2000. Svartisen subglacial laboratory. *Norges Vassdrags og Energidirektorat, Document 14*, 27 pp.

MacDowall, J. 1999. *On floating ice: two years on an Antarctic ice-shelf south of 75°S*. Durham, U.K., Pentland Press Limited. (ISBN 1-85821-720-2, Hardback. £20.00)

Mickelson, D.M. and J.W. Attig, eds. 1999. *Glacial processes: past and present*. Boulder, CO, Geological Society of America. (Special Paper 337.)

## DONORS

The International Glaciological Society wishes to thank all the Supporting and Contributing members who have provided additional support for its work during one or all of the years from 1998 to 2000 through their higher membership rates. The names of those who have not requested anonymity are acknowledged below.

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### Supporting

Helgi Björnsson  
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