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ICE

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CONTENTS

COVER PICTURE: Iceberg on the western side of the Antarctic Peninsula, January 1998 (Photograph by Finlo Cottier).

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

RECENT WORK

ICELAND

(For abbreviations used see page 4)

Glacier variations in Iceland 1930–95

(Oddur Sigurðsson, NEA)

Records of the advance and retreat of glaciers in Iceland from 1930 to 1995 from the database of the Iceland Glaciological Society have been computerized, checked, corrected and published in volume 45 of the periodical *Jökull*. The record is now available from the anonymous ftp site of the National Energy Authority in Iceland (net address: ftp.os.is, location: /pub/glaciers/variations, files: advret.zip or advret.gz).

The monitoring of glacier length in Iceland by the Iceland Glaciological Society is continuing and the files will be updated yearly at the above mentioned ftp site.

Ice coring on Langjökull

(Þorsteinn Þorsteinsson, UIce-SI, and AWI; Helgi Björnsson, Finnur Pálsson, Guðrún Larsen, Árný Sveinbjörnsdóttir, and Guðbjörg Aradóttir, UIce-SI).

In April 1997, a drill, built at the Alfred-Wegener Institute in Bremerhaven, was used to retrieve a 70 m ice core from the northern dome of Langjökull, in the western highland of Iceland (64°49.25′ N, 19°57.00′ W, 1400 m a.s.l.). The ice cap is temperate throughout. A water table was encountered 25 m down the hole, but below 43 m the hole was mostly dry down to 70 m. The average core length was 57 cm.

The increase in density with depth, typical for a temperate ice cap and glacier ice ($r = 0.83$ g cm^{-3}), has formed by a depth of 30 m. Heavy summertime melting and rainfall lead to obliteration of the seasonal variation in oxygen isotopes and chemical constituents making these parameters unsuitable for annual-layer counting. Visual stratigraphic observation revealed the presence of bubble-free or bubble-poor ice layers, formed by melting/refreezing at the surface and it is believed that bundles of such layers constitute a clear summer signal. In addition, about 40 dirty-ice layers 5–7 mm thick were observed in the core, formed by deposition of dust from neighbouring deserts and lava fields during summer or autumn storms.

An attempt to date the core using these visual indicators revealed 37 annual layers. This dating is supported by the detection of a layer of volcanic ash at 60 m depth, which most likely stems from the 1970 eruption of Hekla. The data indicate an accumulation rate of 2 m w.e. a^{-1} at the drilling site, with large year-to-year variations. Ongoing studies on the core include thin-section analysis of crystal size and orientation, microprobe analysis of volcanic ash and oxygen-isotope measurements.

Ice-volcano interaction at Vatnajökull

(Magnús T. Gudmundsson, Helgi Björnsson, Finnur Pálsson, Þórdís Högnadóttir, UIce-SI; Freysteinn Sigmundsson, NORVO)

The subglacial eruption in Vatnajökull in 1996 and its aftermath provided a unique opportunity for studying the interaction of an erupting volcano and an overlying ice cap. The eruption took place along a 6 km fissure under the ice, initially 500–750 m thick. The eruption melted a few cubic km of ice and caused a large jökulhlaup. The volcano has been named Gjálp after a mythological giantess (according to the legend, Gjálp caused a large flood nearly drowning the Nordic god Thor). During the eruption, the rate of melting and the response of the ice cap was studied with aerial inspection and radar altimetry. The development of ice cauldrons over the erupting fissure was monitored and development of these cauldrons since the eruption has been studied. Surface measurements of size, form, ice velocity and melting rate have been carried out as well as radio-echo soundings of the form of the subglacial ridge created in the eruption. Other geophysical methods have been applied to study the structure of the new volcano. The effects of enhanced melting and flow of meltwater into the subglacial Grímsvötn lake are also monitored. The research effort should shed new light on conditions during Pleistocene glaciations when many of the hyaloclastite mountains in Iceland and elsewhere were formed.

Effects of the 1963–64 surge of Brúarjökull on runoff and ablation

(Magnús T. Gudmundsson, Þórdís Högnadóttir, Helgi Björnsson, UIce-SI)

The largest surges that occur in Iceland are those of Brúarjökull, a broad northern outlet of Vatnajökull. The last surge, in 1963–64, affected some 1400 km^2 and involved the movement of 700 km^3 of ice. The maximum advance of the glacier was 10 km and its size increased by 160 km^2. The aim of the project is to assess the effect of changes in elevation and size of the glacier on runoff. These changes were estimated using available data, maps and aerial photographs as well as data on ablation on Brúarjökull. The findings suggest increased size and decreased elevation caused an increase in runoff from the glacier in the years after the surge. However, an even larger effect seems to come from increased roughness of the surface in the ablation area after the surge. Discharge records of the rivers draining the glacier have been analysed and the increase in discharge due to the surge estimated.

Jökulhlaup warning system

(Árni Snorrason, NEA)

Jökulhlaups (glacier outburst floods) are a major hazard in Iceland. Warning of an impending jökulhlaup is warranted. The Hydrological Service of the National Energy Authority has established a warning system in some river courses leading from glaciers in the volcanic zone. It consists of a water-level gauge to detect fast rises in the hydrograph. This is connected to a remotely controlled telephone system. The warning system should give up to 10 hours warning in case of flash floods before the flood wave hits the main road system.

Collaboration between USGS, NASA and NEA in glacier research

(R.S. Williams, Jr, USGS-WH; J.B. Garvin, D.K. Hall, J.S. Barton, NASA/GSFC/G; Oddur Sigurðsson, NEA)

The National Energy Authority (NEA) has been collaborating with the U.S. Geological Survey on three related efforts in glacier research: (1) the preparation of an annotated English translation of Sveinn Pálsson's 1795 treatise on Iceland's glaciers; (2) the preparation of a comprehensive Gazetteer of Geographical Place Names of the Glaciers of Iceland, including historic and modern names from maps and publications; and (3) the preparation of Chapter D, Glaciers of Iceland, Satellite Image Atlas of the Glaciers of the World (U.S.G.S. Professional Paper 1386-D) to be released in three formats: print, CD-ROM and Internet.

The NEA has also been collaborating with NASA's Goddard Space Flight Center and the U.S. Geological Survey in two related efforts: (1) analysis of geodetic airborne laser-altimeter survey data of the Vatnajökull and Hofsjökull ice caps, including surveys before and after a subglacial eruption in northwestern Vatnajökull and subsequent jökulhlaup; and (2) analysis of ERS and Radarsat radar imagery of Vatnajökull and Hofsjökull, including the preparation of an experimental DEM of Hofsjökull (25 m contour interval) from radar interferometric data.

Four-wheel-drive vehicles for glacier research

(Freyr Jónsson, IGS, 4X4)

For more than a decade Icelandic scientists have been using four-wheel-drive trucks on big soft balloon tires for transport on the Icelandic glaciers. Today, these trucks are the main transportation methods used in most glacier expeditions in Iceland only supported by tracked vehicles when the transport of heavy loads is needed and by snow scooters for the worst crevassed areas. The trucks, which are easily driven on normal roads, provide fast and comfortable transport in difficult terrain and are safe in bad weather conditions. During 1997–98 two modified Toyota Land Cruiser vehicles, provided by Arctic Trucks Iceland, were used during the Antarctic research program in Dronning Maud Land. This was the first time such vehicles were used in Antarctica for an expedition to the high plateau. The vehicles were mainly used for snow radar-echo soundings and ice-depth measurement. For fast and light trips the trucks were perfect, e.g. short core drilling (PICO), GPS measurements and collecting snow samples. The trucks provided comfortable transport for people and cargo of a few hundred kilos. It is possible to airlift the vehicles by helicopter and they are a comfortable as a sleeping place. Different types of equipment such as GPS, radios and telephones are easily installed in these vehicles. The trucks used in Antarctica have diesel engines. The fuel consumption varied from 0.25–0.58 L km^{-1} depending on the snow surface. With 300 L fuel-tank capacity the trucks averaged more than 600 km without refueling. These Icelandic modified trucks proved to be reliable and the use of the trucks expanded the scientific program considerably and made the most out of the valuable time of the short summer season in Antarctica.

Stable-isotope measurements on Greenland glacier ice

(Árný E. Sveinbjörnsdóttir, UIce-SI; Sigfús J. Johnsen, UIce-SI and NBI)

Stable- isotope analyses of oxygen and hydrogen have been performed on glacier ice using the Finnegan MAT 251 mass spectrometer (SI), mainly for paleoclimate research. Iceland was a member of the Greenland Ice Core Project (GRIP), an international European joint effort organised by the European Science Foundation, that drilled a 3029 m ice core at Summit, central Greenland, during the summers of 1990–92. The stable-isotope results indicated that climate instability was not confined to the glacial periods as several strong excursions to cold temperatures were found within the last interglacial period Eem/Sangamon. In order to verify these controversial findings a new deep core is being drilled in North Greenland by the North GRIP project organised by the Geophysical Department (UCop). Our task is to measure both hydrogen and oxygen isotopes in specially chosen samples, especially when accurate measurements are needed, e.g. when the deuterium excess and the annual cycles at some depth are studied. Contributions to data interpretation include ice-flow modelling, studies of diffusion and interpretation of the stable-isotope profile.

ARCTIS, regional investigation of Arctic snow chemistry

(P. de Caritat, GSN; G. Hall, GSC; C. Reimann, GSN; W. Belsey, LUES; M. Braun, BLM; Sigurður R. Gíslason, UIce-SI; N. Golubeva, MMBI; H.K. Olsen, GGMO; J.O. Scheie, SKLN)

Through a tightly knit network of enthusiastic partners, field workers and laboratories, collection of snow samples (cores) at a low spatial density took place at the end of winter 1997. This relied mainly on expeditions going to the Arctic for other purposes, or through local environmental-management authorities. Twenty two snow samples were taken in Russia, Alaska, Canada, Greenland, Iceland, Svalbard, Norway, Sweden and Finland. Of these, there are four pairs of duplicates, meaning 18 different locations have been covered. Ten additional snow samples were taken from one locality in

Canada, which will be used for testing lab methods and QA/QC purposes, as well as testing the local chemical heterogeneity of the snow. This sample set adds one locality, bringing the total to 19 localities sampled.

Snow samples were collected with the same type of equipment by all parties, and were sent frozen to a one laboratory, that of the Geological Survey of Canada in Ottawa. Sample preparation included melting at room temperature and in-line filtering (0.45 μm) in an ultra-clean room facility. Both the meltwater and the filter residue were analyzed for major, minor, and trace elements, isotopes and organic compounds. Meltwater and filter residue were subjected to somewhat different analytical programs. For instance, the filter residues were studied by SEM/EDX and/or electron microprobe for particle characterization.

Sea-ice monitoring in Icelandic waters

(Þór Jakobsson, ICMO)

Sea ice along the coasts of Iceland has been observed and recorded throughout the ages in the sagas, annals and farmers' diaries. Recently it has been described by scientists and investigated more or less systematically by sea-ice reconnaissance and by recording of reported observations, including ever more detailed information.

The Sea Ice Research Unit is in charge of the sea-ice service in Iceland. Ice in the Iceland Sea, in Denmark Strait (Greenland Sound) between Iceland and Greenland, and in Icelandic waters in general, is monitored with the assistance of the Icelandic Coast Guard, the fishing fleet, transport vessels and oceanographic vessels of the Marine Research Institute of Iceland.

Using Icelandic and foreign weather forecasts, a general outlook on changes in the sea-ice extent and its movements is offered to those who need it. Requests are mainly received from the fishing fleet, transport vessels, tourist ships, sailors and the news media.

Charts are submitted to ice services abroad. Observations and other data are preserved. An annual report on sea ice along the coasts of Iceland is published and distributed to subscribers. At the moment there is a lag of a few years in the publication of the annual reports.

The Sea Ice Research Unit participates in international projects on sea ice and atmosphere–ocean interaction studies in northern latitudes.

The unit has participated in several international projects, e.g. from 1996–99, in the Nordic Environmental Research Program on "Time scales of climate and sea ice; variability in the Nordic Seas" and in the European project, ESOP-2, European Subpolar Ocean Programme, Phase 2. Several undergraduate and graduate students participated in this research, working on various aspects such as sea-ice history and climate fluctuations, sea-ice modelling, atmospheric energy budgets and data processing.

Submitted by Oddur Sigurðsson

ABBREVIATIONS

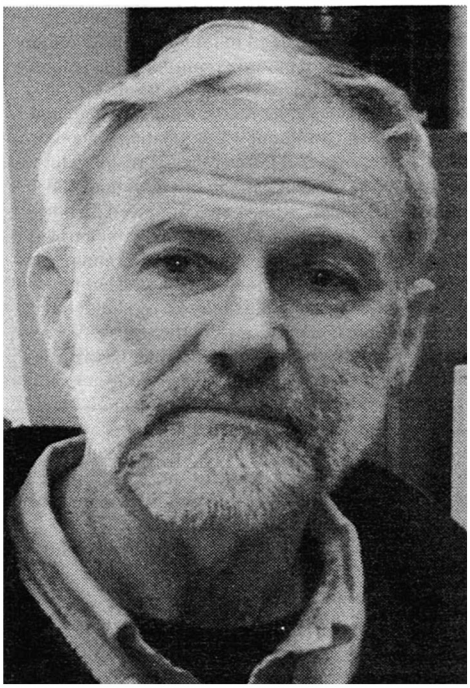
4X4	Four-by-Four Travelling Club, Mörkinni 6, IS-108 Reykjavík
AWI	Alfred-Wegener-Institut für Polar- und Meeresforschung, D-27515 Bremerhaven, Germany
BLM	Bureau of Land Management, Northern District Office, 1150 University Avenue, Fairbanks AK 99709-3899, U.S.A.
GGMO	Government of Greenland, Minerals Office, PO Box 1015, DK-3900 Nuuk, Greenland
GSC	Geological Survey of Canada, Ottawa, Ontario K1A0E8, Canada
GSFC/G	Goddard Space Flight Center, Greenbelt, MD 20771, U.S.A.
GSN	Geological Survey of Norway, PO Box 3006-Lade, N-7002 Trondheim, Norway
ICMO	Iceland Meteorological Office, Bústaðavegi 9, IS-150 Reykjavík
IGS	Iceland Glaciological Society, P.O.Box 5128, IS-125 Reykjavík
LUES	Leo Ussak Elementary School, GNWT Postal Bag 002, Rankin Inlet, NWT X0C0G0, Canada
MMBI	Murmansk Marine Biological Institute, Vladimirskaya St. 17, 183010 Murmansk, Russia
NASA	National Aeronautics and Space Administr.
NBI	Niels Bohr Institute for Astronomy, Physics and Geophysics, UCop
NEA	National Energy Authority, Grensásvegi 9, IS-108 Reykjavík
NORVO	Nordic Volcanological Institute, Grensásvegi 50, IS-108 Reykjavík
SKLN	Sysselmannskontoret, N-9170 Longyearbyen, Norway
UCop	University of Copenhagen, DK-2100 Copenhagen Ø, Denmark
UIce-SI	Science Institute, University of Iceland, Dunhaga 5, IS-107 Reykjavík
USGS-WH	United States Geological Survey, Woods Hole, MA 02543-1598, U.S.A.

INTERNATIONAL GLACIOLOGICAL SOCIETY

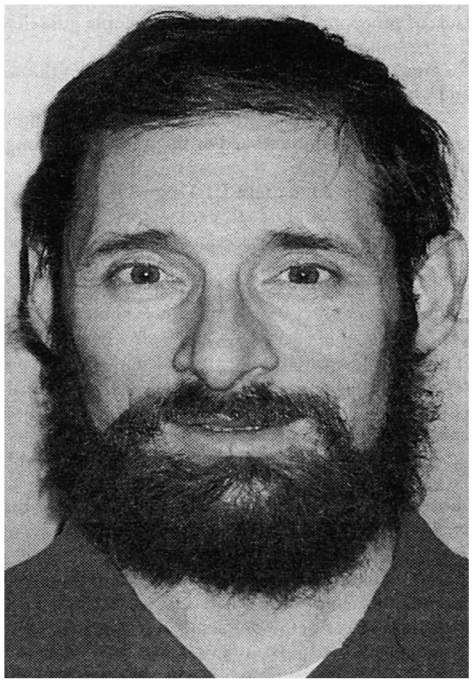
On 1 January 1988, Will Harrison and Matthew Sturm became the new chief editors of the Journal of Glaciology, with the capable administrative support of Monica Court, generously provided by the Geophysical Institute, University of Alaska.

JOURNAL OF GLACIOLOGY – NEW EDITORS' MESSAGE

All three of us are in Fairbanks and are in close communication. We are taking over after the impressive performance of Doug MacAyeal, who has continued to handle papers submitted before 1 January 1998.



Will Harrison



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Will is called the Chief Editor and Matthew the Assistant Chief Editor. There are two of us because we both spend extended amounts of time in the field and need to be able to cover for each other. We have worked in a variety of research areas, but at the moment Matthew's specialty is snow, and Will's is glaciers and ice sheets. We are hoping to continue the *Journal*'s committment to publishing high-quality papers, but also to broaden the *Journal* somewhat, by attracting more papers in the area of sea ice, for example.

The purpose of the Chief Editors continues to be the scientific editing of submitted manuscripts, with heavy reliance on our international group of Scientific Editors and referees. Production editing continues to be done in Cambridge.

After a year as Editors, two things are becoming

clear. First, we receive many excellent manuscripts. Second, many of the other manuscripts have problems which could be avoided if the authors knew more about (1) the basics of how a scientific paper is organized, (2) the principle of clarity, and (3) how to interact with editors. We offer our experience in these three areas in the hope that that they will expedite the publication of your manuscripts.

ORGANIZATION OF A SCIENTIFIC PAPER

One of the most easily preventable problems we have seen in the manuscripts submitted to the *Journal* is a lack of proper organization. Here are some guidelines for structuring a scientific paper.

The **INTRODUCTION** section motivates the work and gives the necessary background.

The **METHODS** section summarizes the methods used, whether observational or theoretical, in enough detail to allow readers to assess their validity.

The content of the **RESULTS** (or **OBSERVATIONS**, etc.) section is self explanatory, except that some documentation of data quality (or model accuracy) is usually necessary.

The **INTERPRETATION** section, if the paper is primarily an observational one, gives some theoretical explanation of observations, suggests a hypothesis, etc. If the paper is primarily theoretical, a more appropriate section title might be **APPLICATION** (or **EXAMPLES**, etc.), and authors are encouraged to apply their theoretical or modeling techniques to specific observations.

The meaning of the **DISCUSSION** (or **SUMMARY** or **SUMMARY AND DISCUSSION**) section is self-explanatory. It should include comments on the wider meaning of the findings, or caveats on how they can be interpreted or applied.

This format, and the section titles, can be modified slightly to accommodate the eccentricities of individual papers, but bear in mind that it is the format of most good scientific papers. At any rate, results must always be clearly separated from interpretation, because the former are useful even if the latter is erroneous or becomes superseded.

CLARITY

Scientific content and proper organization are obviously key points in getting a paper published, but they are not sufficient in themselves. Papers must be clear as well. Some authors convey the impression that publication of a paper is sufficient, whether the paper is readable or not. From the editors' point of view a paper has to be readable. It is true that some highly technical papers will have limited readership, but authors should make every effort to maximize the accessibility of their papers. In the editors' view, the *Journal* is more a vehicle for communication of ideas than a place where one can "patent" a research idea by publishing it.

INTERACTION WITH EDITORS

Unfortunately, papers can take much longer than necessary to reach publication, or worse, not get published at all, when authors are unaware of how to interact with the editors during review and revision.

The review process is interactive, with the Scientific Editors acting as intermediaries between the authors and the anonymous referees (this promotes a candid exchange). Since the Scientific Editors are generally experts in the field, their views also constitute a set of review comments that carry equal weight to those of the referees. These sets of comments, in our experience, are rarely arbitrary or vindictive. Authors who address them in a positive way tend to fare better than authors who fight them. In all cases, a point-by-point response by the authors to all the comments is needed. A letter listing what changes were made, what were not, and why, is essential. Additionally, annotating a manuscript to show where the changes were made really helps the editors expedite the comparison of an original and revised paper. When authors are convinced that they are right and a referee or editor is wrong, the burden is upon them to demonstrate (to both editors and reviewers) the correctness of their approach. It is not unusual for us to find that the authors may be right, but have failed to explain their positions in the text sufficiently for referees to understand it. Unfortunately, this is as much a reason for rejection as being wrong, so the burden is on the authors to explain their positions clearly.

Several things can guarantee that editors and referees will be predisposed to be negative or return unfavorable reviews. These are the same sorts of things that tend to damage authors' reputations and wear out referees and editors (who are volunteers):

1) papers that have many typos and errors and show signs of having been submitted hastily or as "trial balloons" to see if they can get through.
2) papers whose tables and figures are preliminary, incomplete, poorly done, lack units, or are incorrectly called out in the text.
3) papers that were previously submitted (perhaps to other journals) but not revised in accordance with the reviews received (it is surprising how often this comes to light when a referee tells us he or she has seen the paper before).
4) papers that have not made use of, or cited, pertinent previous research (it is not unusual to find that the referee is the one whose work has not been cited).
5) papers written in poor English.

Perhaps the single most effective method of ensuring an efficient and smooth review and revision process is to have your colleagues read your paper before it is submitted. In our experience, most good authors use this informal peer-review approach extensively. For non-native English-speakers, having an English editor look at your paper can reduce the review and revision time by many months.

Will Harrison and Matthew Sturm

JOURNAL OF GLACIOLOGY

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

K A ECHELMEYER AND W D HARRISON
Ongoing margin migration of Ice Stream B, Antarctica

T KAMEDA, H YOSHIMI, N AZUMA AND H MOTOYAMA
Correspondence. Observation of "yukimarimo" on the snow surface of the inland plateau, Antarctic ice sheet

R KATTELMANN AND J DOZIER
Observations of snowpack ripening in the Sierra Nevada

C MAYER AND P HUYBRECHTS
Ice-dynamic conditions across the grounding zone, Ekströmisen, East Antarctica

K MORRIS, S LI AND M JEFFRIES
Meso- and micro-scale sea ice motion in the East Siberian Sea as determined from ERS-1 SAR data

E SCHLOSSER
Effects of seasonal variability of accumulation on yearly mean $\delta^{18}O$ values in Antarctic snow

ANNALS OF GLACIOLOGY

The following papers from the International Symposium on Glaciers and the Glaciated Landscape held in Kiruna, Sweden, 17–21 August 1998, have been accepted for publication in *Annals of Glaciology* Vol. 28, edited by J. Kleman:

W BLAKE, JR
Glaciated landscapes along Smith Sound, Ellesmere Island and Greenland

I BORGSTRÖM
Basal ice temperatures during Late-Weischselian deglaciation: a comparison of landform assemblages in west-central Sweden

A BOUZETTE AND R SOUCHEZ
Katabatic wind influence on meltwater supply to fuel glacier-substrate interactions at grounding line (Terra Nova Bay, Antarctica)

J BRAUN, D ZWARTZ AND J H TOMKIN
A new surface processes model combining glacial and fluvial erosion

A CLARHÄLL AND J KLEMAN
Distribution and glaciological implications of relict surfaces on the Ultevis Plateau, northwest Sweden

C D CLARK
Palimpsest glacial landform systems of the Labrador sector of the Laurentide ice sheet and explanations of generation — preservation

P T DAVIS, P R BIERMAN, K A MARSELLA, M W CAFFEE AND J R SOUTHON
Cosmogenic analysis of glacial terrains in the eastern Canadian Arctic: a test for inherited nuclides and the effectiveness of glacial erosion

J DENNER, D E LAWSON, J C STRASSER, G J LARSON, R B ALLEY, E B EVENSON AND S KOPCZYNSKI
Seasonal variability in hydrologic system response to intense rain events, Matanuska Glacier, Alaska

S L ENSMINGER, E B EVENSON, G J LARSON, D E LAWSON, R B ALLEY AND J C STRASSER
Preliminary study of laminated, silt-rich debris bands: Matanuska Glacier, Alaska, U.S.A

D J A EVANS AND B R REA
The geomorphology and sedimentology of surging glaciers: a landsystems approach

I S EVANS
Was the cirque glaciation of Wales time-transgressive or not?

D FABEL AND J HARBOR
The use of in-situ-produced cosmogenic radionuclides in glaciology and glacial geomorphology

U H FISCHER AND B HUBBARD
Subglacial sediment textures: character and evolution at Haut Glacier d'Arolla, Switzerland

S J FITZSIMONS, K J MCMANUS AND R D LORRAIN
Structure and strength of basal ice and substrate of a dry-based glacier: evidence for substrate deformation at sub-freezing temperatures

R GREVE, K-H WYRWOLL AND A EISENHAUER
Deglaciation of the Northern Hemisphere at the onset of the Eemian and of the Holocene

G H GUDMUNDSSON, A BAUDER, M LÜTHI, U H FISCHER AND M FUNK
Estimating rates of basal motion and internal ice deformation from continuous tilt measurements

C HÄTTESTRAND, D GOODWILLIE AND J KLEMAN
Size distribution of two cross-cutting drumlin systems in northern Sweden: a measure of selective erosion and formation time length

J K HART
A discussion on the problems of the identification of fast ice flow from lanform assemblages in the geological record

R C A HINDMARSH
Influence of slip on coupled ice–till dynamics

R HOCK, A IKEN AND A WANGLER
Tracer experiments in moulins and boreholes in the overdeepening of Aletschgletscher, Switzerland

R HODGKINS, J O HAGEN AND SVEIN-E HAMRAN
20th century mass balance and thermal regime change at Scott Turnerbreen, Svalbard

K N JANSSON AND J KLEMAN
The horned crag-and-tails of the Ungava Bay landform swarm, Quebec–Labrador, Canada

P JANSSON, C RICHARDSON AND S JONSSON
Assessment of requirements for cirque formation in northern Sweden

A E KEHEW, L P NICKS AND W T STRAW
Palimpsest tunnel valleys: evidence for relative timing of advances in an interlobate area of the Laurentide ice sheet

H KERSCHNER, S IVY-OCHS AND C SCHLÜCHTER
Paleoclimatic interpretation of the early late-glacial glacier in the Gschnitz valley, Central Alps, Austria

A KHATWA, J K HART AND A J PAYNE
A grain textural analysis across a range of glacial facies

J KLEMAN, C HÄTTESTRAND AND A CLARHÄLL
Zooming in on frozen bed patches: scale dependent controls on Fennoscandian ice sheet basal thermal zonation

S J KLUIVING, L R BARTEK AND F M VAN DER WATEREN
Multi-scale analyses of subglacial and glaciomarine deposits from the Ross Sea continental shelf, Antarctica

J KNIGHT, S G MCCARRON AND A M MCCABE
Style and pattern of Rogen (ribbed) moraine modification along an east central Ireland ice stream

R D LORRAIN, S J FITZSIMONS, M J VANDERGOES AND M STIÉVENARD
Ice composition evidence for the formation of basal ice from lake water beneath a cold-based Antarctic glacier

M MAISCH, W HAEBERLI, M HOELZLE AND J WENZEL
Occurrence of rocky and sedimentary glacier beds in the Swiss Alps as estimated from glacier inventory data

M J MUNRO-STASIUK
Evidence for water storage and drainage at the base of the Laurentide ice sheet, south-central Alberta, Canada

M NAKAWO, H YABUKI AND A SAKAI
Characteristics of Khumbu Glacier, Nepal Himalayas: recent changes in the debris-covered area

C Ó COFAIGH, D S LEMMEN, D J A EVANS AND J BEDNARSKI
Glacial landform/sediment assemblages in the Canadian High Arctic and their implications for late-Quaternary glaciation

M OLVMO, K LIDMAR-BERGSTRÖM AND G LINDBERG
Genesis of granite landforms in an area of "glacial scouring", southwestern Sweden

C J PATTERSON AND T J BOERBOOM
The significance of pre-existing, deep weathering of crystalline rock in interpreting the effects of glaciation on the Canadian Shield, Minnesota

A J PAYNE AND D J BALDWIN
Thermomechanical modelling of the Scandinavian ice sheet: implications for ice-stream formation

M PELFINI
Dendrogeomorphology as a method for the study of glacier fluctuations in the Italian Alps during the Little Ice Age

B R REA, W B WHALLEY, T S DIXON AND J E GORDON
Plateau icefields as contributing areas to valley glaciers and the potential impact on reconstructed ELAs: a case study from the Lyngen Alps, North Norway

R SAILER AND H KERSCHNER
Equilibrium line altitudes and rock glaciers in the Ferwall-Group (western Tyrol, Austria) during the Younger Dryas cooling event

M SKIDMORE AND M SHARP
Drainage system behaviour of a High Arctic polythermal glacier

C R STOKES AND C D CLARK
Geomorphological criteria for identifying Pleistocene ice streams

C VANUZZO AND M PELFINI
Interpretation of deglaciated areas for assessing the rate of surface and volume retreat of the Val d'Aoste glaciers (Western Alps, Italy)

SCIENCE CITATION INDEX

With the increased use of bibliometric analysis for the assessment of productivity, both that of individuals and of organizations and university departments, the absence of the *Annals of Glaciology* from the Science Citation Index (SCI) was becoming a matter of some concern. In some countries the SCI has now become the only measure of a "legitimate" publication.

During the past year we approached the Institute for Scientific Information (ISI) to remedy this oversight. We felt there were many reasons why the *Annals* should be included: a) it is an established serial that has been published since 1980 (this year we will be publishing volumes 28 and 29); b) thematic material, such as is now published in the *Annals*, used to be published regularly in the *Journal of Glaciology*; c) the decision to publish the *Annals* as a series separate from the *Journal* was largely an economic one that also meant members and libraries could limit orders to those volumes of special interest to them; d) the editorial procedures used for both serials are similar, with all papers assigned to an editor and subject to review by two referees; e) in terms of the sources of papers referenced in the *Journal*, the *Annals* is clearly a principal glaciological journal, its frequency of citation being similar to the *Journal* but much greater than that of the Journal of Geophysical Research, Cold Regions Science and Technology, Nature or Science; f) omission of the *Annals* eliminated a substantial proportion of current glaciological papers; and g) many SCI journals have started publishing thematic volumes of refereed papers from specialist symposia, directly comparable to the *Annals*.

At the end of last year we were informed by ISI that we had been successful and that henceforth the *Annals of Glaciology* would be included in the SCI. This would start with *Annals* 27, paper from the Hobart meeting on the Antarctic and Global Change. Unfortunately *Annals* 26, containing papers from the Chamonix symposium on Snow and Avalanches could not be included because it had already been indexed by ISI in Scientific and Technical Proceedings and it was not possible to reprocess it.

Our thanks go to Terry Tucker who handled the initial approach to ISI on our behalf and all subsequent communication leading to this desirable result.

IGS AWARDS

Members are invited to submit nominations for the Society's awards. Accompanying documentation should included biographical data as well as a clear rationale as to the particular contribution(s) made that warrants consideration for the award proposed. The Awards Committee will require supporting documentation from other reputable scientists as to 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. William F. Budd, Antarctic CRC,
University of Tasmania, GPO Box 252-80,
Hobart 7005, Tasmania, Australia
(Fax: [61](3)6226 2973; w.f.budd@utas.edu.au)

with a copy to the Secretary General.

NEWS

ANTARCTIC ICE VELOCITIES, SIPLE COAST

NSDIC recently completed a new group of web pages that contain Antarctic ice velocity vectors for the Siple Coast. The pages include contour maps and data-location maps, and the data may be transferred via ftp over the web.

http://www-nsidc.colorado.edu/nsidc/antarct_veloc

We are interested in expanding this site to include any and all ice velocity data, and in particular older data that have been accurately measured and documented. Let me know if you would like to contribute to the website.

Ted Scambos (teds@icehouse.colorado.edu)

COMPLETION OF SIPLE DOME ICE CORE (1004 m), ANTARCTICA

For several years we have been recovering core from Siple Dome (82°S, 150°W). The ice is 1004 m thick and should be about 100,000 years old at the bed. The main goals are to reconstruct a paleoclimate record and investigate the West Antarctic ice sheet history. The project is funded by the Office of Polar Programs, NSF. There are 18 different universities involved. The drilling was done by the Polar Ice Coring Drilling Office, University of Nebraska, Lincoln (Karl Kuivinen; kkuivinen@unlinfo.unl.edu).

Yesterday (24 January 1999) WE GOT TO THE BED!!! We recovered about 2 m of ice with banded silt and then hit something hard. We bent the core dogs trying to pull it up and figured that was a sign to stop. We had hoped to collect a rock core, but have run out of time this season. We might come back sometime later and try to recover a few meters of rock. (see http://www.maxey.dri.edu/WRC/waiscores)

Kendrick Taylor (kendrick@dri.edu)

RECENT MEETINGS (of other organizations)

FIRST INTERNATIONAL CONFERENCE ON MARS POLAR SCIENCE AND EXPLORATION

Houston, Texas, U.S.A., 19–22 October 1998

Attendees included leading researchers from the deep terrestrial drilling projects in Greenland and Antarctica, the Viking missions and the present Mars missions underway or soon to be launched.

The latest results from Mars Orbiter were presented, expectations from the MVACS (Mars volatile lander) and some surprising results from the laboratory and from some old Viking images. We came away from the pleasant but rain-soaked forests of Camp Allen, Texas, generally agreeing that the layers of the polar caps are a Rosetta Stone for the last 100 million years of Martian surficial history.

Dedicated missions to the polar caps are essential for understanding the depositional/climate history and for searching for life and the surface-water resources necessary for human exploration.

What really made this conference ground breaking however was the science presented and the changes in thinking this will force.

1. The Mars Orbiter Laser Altimeter (MOLA) results for the northern polar regions were presented in detail and showed the Northern Cap is at least 3 km thick, exhibits a multi-domed complicated surface regime and sits on an incredibly flat plain that may be an ancient sea bed whose waters still reside under the surface. MOLA data show the South Cap terrain is 6 km higher than the Northern Cap, an asymmetry that most likely explains differences between the two ice caps.

2. The shape of the Northern Cap is now well established. The ice rheology that best fits it appears to be governed by an ice flow-law rarely seen on Earth, namely a power one law that holds under conditions of extremely small strain rates.

3. Two old Viking images of the South Polar Cap were presented along with an accurate stereoscopic analysis, which showed for the first time that the South Cap is at least 2.5 km thick! This was a shocker both because these images have been available for over 25 years and because it was never realized they could be used in this way. The surface elevation map produced is accurate and detailed enough to resolve the ablation scarps.

4. New laboratory measurements on CO_2 ice rheology were reported that make it clear a CO_2 ice cap could be 1 km thick at most. A major re-thinking about the atmospheric CO_2 reservoir seems to be in order.

5. Professor John Nye surprised the space community with his observations on the likely shortcomings of the ground/ice-penetrating radar on the Mars Express orbiter. His subsequent comments were attended to with great respect by the planetary mission planners.

6. My own accublation/scarp theory for the mass balance and appearance of Martian ice caps seems to have spawned interest in other groups and one poster even named the mechanism "Fisher accublation". One should be more careful inventing new names!

The conference worked out a consensus on the main science questions for future missions to the ice caps. It was generally agreed that a traverse down the slopes of the Northern Cap is a must. The whole temporal stratigraphy could be sampled without drilling. The climate history and possible life habitats are available on the surface.

The Geological Survey of Canada (GSC) was a co-convener and financial supporter of the conference that was sponsored by the Lunar and Planetary Institute (LPI). The conveners, and editors of the special *Icarus* issue, in which many of the papers will be published, were Stephen Clifford (LPI), David Fisher (GSC) and James Rice (NASA Ames).

David Fisher (fisher@NRCan.gc.ca)

FUTURE MEETINGS (of other organizations)

SATELLITE MEASUREMENTS AND MONITORING OF GLACIERS AND ICE SHEETS

14–15 August 1999, Zürich, Switzerland

A glacier remote-sensing working group meeting on "Satellite Measurements and Monitoring of Glaciers and Ice Sheets" will be held at ETH, Zürich on 14 August 1999; depending on interest, it may be extended to 15 August. This is the weekend prior to the related IGS Symposium on the Verification of Cryospheric Models (16–20 August). We expect to limit attendance to about 40.

This will be the first meeting of an international consortium comprising GLIMS (Global Land-Ice Measurements from Space) that we hope will facilitate broader discussion on the meeting theme. Interested researchers are encouraged to attend and contribute oral and/or poster presentations. Prospective participants should fill out the Indication of Interest form and mail it (or e-mail it) by early April 1999 to:

Jeff Kargel
U.S. Geological Survey
2255 N. Gemini Dr.
Flagstaff, AZ 86001, U.S.A.
jkargel@flagmail.wr.usgs.gov

Abstracts will be solicited in the next announcement, which will be sent before 17 April to those who have responded.

This meeting may include some of the following:

1. Status reports on recent/upcoming missions (AM-1, Landsat 7, GLAS, ...).
2. Results of recent glacier measurements using satellite multispectral or SAR imaging.
3. Satellite remote sensing/glacier monitoring projects.
4. Software demos or descriptions of algorithms for application to satellite measurements of glaciers and ice sheets.
5. Field validation, site descriptions and potential for ground-measurement programs to help validate satellite measurements.
6. Global and regional glacier study programs.

In addition, we hope to have a lively discussion on the general issues of:

a. What glaciological features or parameters can be, and really need to be, measured by satellite, but are not being studied adequately?
b. How can we better link field studies with satellite studies?

If interest merits, we can explore possibilities for publication of full papers.

INDICATION OF INTEREST

A. Name: _____

B. Institution: _____

C. Address: _____

_____

D. Fax: _____

E. Tel: _____

F. E-mail: _____

G. I [will] [probably will] [might] attend

H. I [would] [would not] like to make a presentation

I. Title(s): _____

_____

J. I prefer an [oral presentation] [poster] [both oral and poster presentation].

K. I [will] [will not] also be attending the IGS Symposium.

L. Comments or suggestions: _____

_____

MAGNITUDE AND FREQUENCY IN THE GLACIAL AND GLACIO-FLUVIAL SEDIMENTARY RECORD OF MODERN AND ANCIENT GLACIERS

XV International Congress of the International Union for Quaternary Research, Durban, South Africa, 3–11 August 1999

Recent attention has focused on event phenomenon such as glacier surging and glacial-outburst floods. The spectacular November 1996 jökulhlaup in Iceland generated renewed debate as to the role of volcanic activity and storage–release events in the creation of distinctive sedimentary successions in proglacial fluvial systems. Glacier surging in Iceland, North America and Svalbard has highlighted links between glacier motion,

hydrology and the creation of distinctive ice-marginal environments. The coupling of glacier fluctuations with re-organizations of glacier-drainage networks is associated with major spatial and temporal variations in meltwater discharge with significant implications for proglacial fluvial sedimentology.

The symposium will provide a forum for the discussion and synthesis of the latest ideas concerning the magnitude and frequency of glacial and fluvial events within both modern and ancient ice-marginal systems.

Contributions are welcomed from sedimentologists, glaciologists, geomorphologists and Quaternary researchers. The session will be held on Monday, 9 August 1999

General conference details can be obtained from:
http://inqua.geoscience.org.za
Further details can be obtained from:
a.j.russell@keele.ac.uk

Andy Russell

CONFERENCE ON MONITORING OF THE CRYOSPHERE

Pushchino, Moscow region, Russia, 20–23 April 1999

An International Conference on Monitoring of the Cryosphere will be held on 20–23 April 1999 in Pushchino (Moscow region), hosted by the Institute on Basic Problems of Biology, Russian Academy of Sciences. Geocryologists, glaciologists, cryopedologists, climatologists and others interested in the topic are invited to participate. The languages of the conference will be Russian and English; simultaneous translation will be provided.

The main conference themes include:

- Earth cryosphere (concept, objects of study, methods of global studies)
- Monitoring of snow cover, lake ice and glaciers;
- Monitoring of soils in cold regions;
- Active-layer and upper-permafrost monitoring;
- Prediction of the cryosphere evolution in XXI century;
- Monitoring of the northern natural–technical geosystems;
- Geographical and geocryological information systems (GIS, databases).

Selected papers will be published in Russian in a special issue of *Earth Cryosphere*.

For further information contact: Consolidated Scientific Council on Earth Cryology, Russian Academy of Sciences, Fersman str. 11/2, apt.68, 117312 Moscow, Russia
or by e-mail: kriozem@glas.apc.org

FIFTH INTERNATIONAL CONFERENCE ON GEOMORPHOLOGY

International Association of Geomorphologists,Tokyo, Japan, 23–28 August 2001

The 5th International Conference on Geomorphology will be held at the Korakuen Campus, Chuo University, Tokyo, Japan, located in the center of Tokyo about 60 km from Tokyo (Narita) International Airport. It will contain plenary lectures, symposia, sessions (paper, poster, video and computer display), one-day excursions and other events. Pre- and post-conference activities include field trips, commission and workshop meetings.

Tentative themes for the symposia are:

- Rock control in geomorphological processes;
- Rapid mass movements and related fluvial processes;
- Geomorphological significance of active faults and seismo-tectonics;
- Volcanic landforms;
- Hydrogeomorphological processes in humid regions;
- Geomorphic response to global change;
- Geomorphic processes and lake sedimentation;
- Lab approaches to geomorphological problems;
- Geomorphological consequences of large-scale anthropogenic transformation of Earth's surface;
- Geomorphometry, modeling and theory;
- GIS and Geomorphology.

Some special issues of the Transactions of the Japanese Geomorphological Union will be devoted to proceedings of the Conference

Several pre- and post-conference field trips have been proposed and will be run if there are sufficient participants.

All communication should be addressed to K. Kashiwaya, Department of Earth Sciences, Kanazawa University, Kakuma, Kanazawa, 920-1192 Japan (Tel/Fax [81](76)264-5735; kashi@kenroku.anazawa-u.ac.jp).

Up to date information on the Conference can also be obtained through the 5th ICG home page:
http://wwwsoc.nacsis.ac.jp/jgu/.

BOOKS RECEIVED

Ahnert, F. 1998. *Introduction to geomorphology.* London, etc., Arnold.

Herren, E.R. and M. Hoelzle. 1998. *Die Gletscher der Schweizer Alpen 1991/92 und 1992/93. Les variations des glaciers Suisses 1991/92 et 1992/93 [The glaciers of the Swiss Alps 1991/92 and 1992/93].* Zürich, Schweizer-ischen Akademie der Naturwissenschaften. (Jahrbuch der Glaziologischen Kommission der SANW Bericht 113 and 114.) [In German and French with English summary.]

Ice Core Working Group (ICWG). 1998. *Ice core contributions to global change research: past successes and future directions.* Durham, NH, University of New Hampshire. National Ice Core Laboratory. Ice Core Working Group.

Jeffries, M.O., *ed.* 1998. *Antarctic sea ice: physical processes, interactions and variability.* Washington, DC, American Geophysical Union. (Antarctic Research Series 74.)

Lizotte, M.P. and K.R. Arrigo, *eds.* 1998. *Antarctic sea ice: biological processes, interactions, and variability.* Washington, DC, American Geophysical Union. (Antarctic Research Series 73.)

Shi Yafeng. 1998. *English works on glacial and environmental studies (33 articles during 1964–1995).* Lanzhou, Gansu, Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology.

Slupetzky, H., *ed.* 1998. 4th International Symposium on Glacier Caves and Cryokarst in Polar and High Mountain Regions, September 1–7, 1996. *Salzburger Geographische Materialen* 28, 155 pp. (ATS 200, ISBN 3-85283-016-8.)

Spain: Ministerio de Medio Ambiente. 1998. *La nieve en las cordilleras españolas. Programa ERHIN, Año 1994/1995.* Madrid, Ministerio de Medio Ambiente. Dirección General de Obras Hidráulicas y Calidad de las Aguas.

Yamada, T. 1998. *Glacier lake and its outburst flood in the Nepal Himalaya.* Tokyo, Japanese Society of Snow and Ice. Data Center for Glacier Research.

GLACIOLOGICAL DIARY

** IGS sponsored * IGS co-sponsored

1999

19–22 April
64th Western Snow Conference, Lake Tahoe: a Microcosm of Water Issues in the West, South Lake Tahoe, California, U.S.A.
R. Kattlemann, Sierra Nevada Aquatic Research Lab., Star Route 1, P.O. Box 198, Mammoth Lakes, CA 93546, U.S.A. (Tel [1](619)935-4903; Fax [1](619)935-4867; rick@icess.ucsb.edu; http://snobear.colorado.edu/WSC/WSC.html)

20–23 April
International Conference on Monitoring of the Cryosphere, Pushchino, Moscow region, Russia.
Consolidated Scientific Council on Earth Cryology, Russian Academy of Sciences, Fersman Street 11/2, Apt. 68, 117312 Moscow, Russia (kriozem@glas.apc.org)

19–23 April
European Geophysical Society General Assembly, Den Haag, The Netherlands Arne Richter: EGS@linax1.dnet.gwdg.de

* EISMINT/EPICA Symposium on Ice Sheet Modelling and Deep Ice Drilling (20–22 April), C.S.M. Doake, British Antarctic Survey, High Cross, Madingley Road, Cambridge CB3 OET, U.K. (Tel [44](1223)251-488; Fax [44](1223)362-616; csmd@bas.ac.uk)
Symposium on Ice Thickness and Volume of Glaciers (23 April), M. Kuhn, Institute of Meteorology and Geophysics, Universität Innsbruck, Innrain 52, A-6020 Innsbruck, Austria (Tel [43](512)507-5450; Fax [43](512)507-2924; michael.kuhn@uibk.ac.at)

21–26 May
European Research Conference on Palaeoclimate Modelling and Analysis: Quaternary Earth System Interactions and Modelling, Albufeira, Portugal
Office of European Research Conferences (EURESCO), 1 quai Lezay-Marnésia, F-67080 Strasbourg Cedex, France (Tel [33](3)88-76-71-35; Fax: [33](3)88-36-69-87; euresco@esf.org; http://www.esf.org/euresco)

30 May – 4 June
ISOPE-99, 9th International Offshore and Polar Engineering Conference, Brest, France
ISOPE-99, P.O. Box 1107, Golden, CO 80402-1107, USA (Tel [1](303)420-8114; Fax: 303-420-3760; http://www.ifremer.fr/isope99/)

31 May – 4 June
1999 Spring Meeting, American Geophysical Union, Boston, Massachusetts, U.S.A.
(http://www.agu.org)

2–4 June
56th Eastern Snow Conference, Monitoring Snow and Ice: Methods and Techniques for Operational Applications and Climate Change Studies, Fredericton, New Brunswick, Canada
D.K. Hall, Code 974, NASA/Goddard Space Flight Center, Greenbelt, MD 20771, U.S.A. (Tel [1](301) 614-5771; Fax [1](301)614-5808; dhall@glacier.gsfc.nasa.gov; http://www.tor.ec.gc.ca/CRYSYS/esc/)

11–16 July
OMAE '99, 18th International Conference on Offshore Mechanics and Arctic Engineering, St. John's, Newfoundland, Canada
J. Myrick-Harris, Conference Office, Hatcher House, Memorial University of Newfoundland, St. John's, Newfoundland, Canada (Tel [1](709)737-7922; Fax [1](709)737-3520; jharris@morgan.ucs.mun.ca; http://www.mun.ca/ccore/omae99/)

18–23 July
5th International Conference on Mars, Pasadena, California, U.S.A.
A.L. Albee, Graduate Office, Mail Code 02-31, California Institute of Technology, Pasadena, CA 91125, U.S.A. (Tel [1](626)395-6367; Fax [1](626)577-9246; 5thMars99@caltech.edu)

19–30 July
XXII General Assembly of the International Union of Geodesy and Geophysics, Birmingham, U.K.
(http://www.bham.ac.uk/IUGG99/)
Interactions Between the Cryosphere, Climate and Greenhouse Gases
M. Tranter, Department of Geography, University of Bristol, Bristol BS8 1SS, U.K. (Tel [44](117)928-8307; Fax [44](117)928-7878; tranter@bris.ac.uk; http://www.wlu.ca/~wwwiahs/index.html)
Hydrology of Ice-covered Rivers
M.G. Ferrick, CRREL, 72 Lyme Road, Hanover, NH 03755-1290, U.S.A. (Tel [1](603)646-4287; Fax [1](603)646-4785: mferrick@crrel.usace.army.mil)
Ice Sheets, Oceans, and the Earth's Shape: Modern Perspectives on Sea-level Change
C.R Bentley, Geophysical and Polar Research Center, University of Wisconsin, 1215 West Dayton Street, Madison, WI 53706, U.S.A. (Tel [1](608) 262-1922; Fax [1](608)262-0693; bentley@geology.wisc.edu)

3–11 August
Magnitude and Frequency in the Glacial and Glaciofluvial Sedimentary Record of Modern and Ancient Glaciers, XV INQUA International Congress, Durban, South Africa
A.J. Russell, Department of Geography, Keele University, Keele, Staffs ST5 5BG, U.K. (Tel [44](1782)584-303; Fax [44](1782)715-261; a.j.russell@keele.ac.uk; http://inqua.geoscience.org.za)

14–15 August 1999
Satellite Measurements and Monitoring of Glaciers and Ice Sheets, Zürich, Switzerland
J.S. Kargel, U.S. Geological Survey, 2255 North Gemini, Flagstaff, AZ 86001, U.S.A. (Tel [1](602) 556-7034; Fax [1](602)556-7014; jkargel@flagmail.wr.usgs.gov)

16–20 August
** International Symposium on the Verification of Cryospheric Models, Zürich, Switzerland
Secretary General, International Glaciological Society, Lensfield Road, Cambridge, CB2 1ER, UK
(http://www.geo.umnw.ethz.ch/igs-symposium)

22–25 August
* 6th International Symposium on Thermal Engineering and Sciences for Cold Regions, Darmstadt, Germany
Y.Wang, Institut für Mechanik, Technische Universität Darmstadt, Hochschulstrasse 1, D-64289 Darmstadt, Germany (Tel [49](6151)163196; Fax [49](6151)164120; wang@mechanik.tu-darmstadt.de; www.mechanik.tu-darmstadt.de/ag3/ ISTESCR99)

23–27 August
POAC 99, 15th International Conference on Port and Ocean Engineering under Arctic Conditions, Espoo, Finland
K.A. Riska, Ship Laboratory, Helsinki University of Technology, P.O. Box 4100, FIN-02150 HUT, Finland (Tel [358](9)451-3498; Fax [358](9)451-3493; kaj.riska@hut.fi; info@tsgcongress.fi)

7–8 September 1999
* International Conference on the Deformation of Glacial Materials, London, England
Bryn P. Hubbard, Centre for Glaciology, Inst. of Geography & Earth Sciences, University of Wales, Aberystwyth SY23 3DB, Ceredigion, Wales, U.K. (Tel [44](1970)622-783; Fax [44](1970)622-780; byh@aber.ac.uk; http://www.gaber.ac.uk/~byh/dgm99.html)

9–12 September
Alpine Glaciers and Climate Change, 8th Italian Glaciological Meeting, Bormio, Italy
Dipartimento di Scienze dell'Ambiente e del Territorio, Università Milano, via Emanueli 15, I-20126 Milano, Italy (Fax [39](2)64-47-44-00; glacialp@alpha.disat.unimi.it; http://www.disat.unimi.it/glacialp)

17–22 September
European Research Conference on Polar Regions and Quaternary Climate: Towards High-Resolution Records of the Last Cliamtic Cycle — The Antarctic Perspective, Giens, near Toulouse, France
Office of European Research Conferences (EURESCO), 1 quai Lezay-Marnésia, F-67080 Strasbourg Cedex, France (Fax: [33](3)88-36-69-87; euresco@esf.org; http://www.esf.org/euresco)

27–30 September
Fifth International Ice Drilling Technology Workshop, University of Nebraska, Lincoln, Nebraska
PICO, P.O. Box 830850, University of Nebraska-Lincoln, Lincoln, NE 68583-0850, U.S.A. (Tel [1](402)472-9833; Fax [1](402)472-9832; sirg-pico@unlinfo.unl.edu)

2000

22–26 May
** International Symposium on Snow, Avalanches and Impact of the Forest Cover, Innsbruck, Austria
Secretary General, International Glaciological Society, Lensfield Road, Cambridge, CB2 1ER, UK

28 May – 2 June
ISOPE-2000, 10th International Offshore and Polar Engineering Conference and Exhibition, Seattle, Washington, U.S.A.
ISOPE-98, P.O. Box 1107, Golden, CO 80402-1107, U.S.A. (Tel [1](303)273-3673; Fax: [1](303)420-3760; meetings@isope.org)

18–23 June
** International Symposium on Sea Ice and its Interactions with the Ocean, Atmosphere and Biosphere, Fairbanks, Alaska, U.S.A.
Secretary General, International Glaciological Society, Lensfield Road, Cambridge, CB2 1ER, UK (http://www.gi.alaska.edu/seaicesymposium)

19–22 June
4th International Conference on Snow Engineering, Trondheim, Norway
SEVU-Congress Department, Norwegian University of Science and Technology (Tel [47]73-59-52-47; Fax [47]73-59-51-50; snoweng@sevu.ntnu.no; http://www.ntnu.no/sevu/)

26–30 June
Interpraevent 2000, Durable Protection from Floodings, Debris Flow and Avalanches, Villach, Austria
Interpraevent 2000, Postfach 117, A-9020 Klagenfurt, Austria (Tel [43](463)536-31818; Fax [43](463)536-31828; interpraevent@ktn.gv.at; http://www.ktn.gv.at/akl/abt18/interpraevent.htm)

2001

23–27 July
Physics and Chemistry of Ice, University of Kent, Canterbury, U.K.
John Dore and Vicky Nield (Fax [44](1227)827558; pcice@ukc.ac.uk; http://kiwi.ukc.ac.uk/physics/events.html)

2001
** Remote Sensing in Glaciology, Washington, DC, U.S.A.
Secretary General, International Glaciological Society, Lensfield Road, Cambridge, CB2 1ER, U.K.

August 2001
** Ice Cores and Climate, Kangerlussuag, Greenland
Secretary General, International Glaciological Society, Lensfield Road, Cambridge, CB2 1ER, U.K.

23–28 August 2001
5th International Conference on Geomorphology, Chuo University, Tokyo, Japan
K. Kashiwaya, Department of Earth Sciences, Kanazawa University, Kakuma, Kanazawa 920-1192, Japan (kashi@kenroku.kanazawa-u.ac.jp; http://wwwsoc.nacsis.ac.jp/jgu/)

2003

23–27 June 1998
8th International Conference on Permafrost, Zürich, Switzerland

NEW MEMBERS

Baldwin, Duncan J., Department of Geography, University of Southampton, Highfield, Southampton SO17 1BJ, England, U.K. (Tel [44](1703)596-711; Fax [44](1703)593-295; d.j.baldwin@soton.ac.uk)

Cohen, Denis,Department of Geology and Geophysics, Yale University, P.O. Box 208109, New Haven, CT 06520-8109, U.S.A. (Tel [1](203)432-3167; Fax [1](203)432-3134; cohen@cloudy.geology.yale.edu)

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Mair, Douglas, Department of Geography, University of Cambridge, Downing Place, Cambridge CB2 3EN, England, U.K. (Tel [44](1223)333-399; dwfm100@hermes.cam.ac.uk)

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