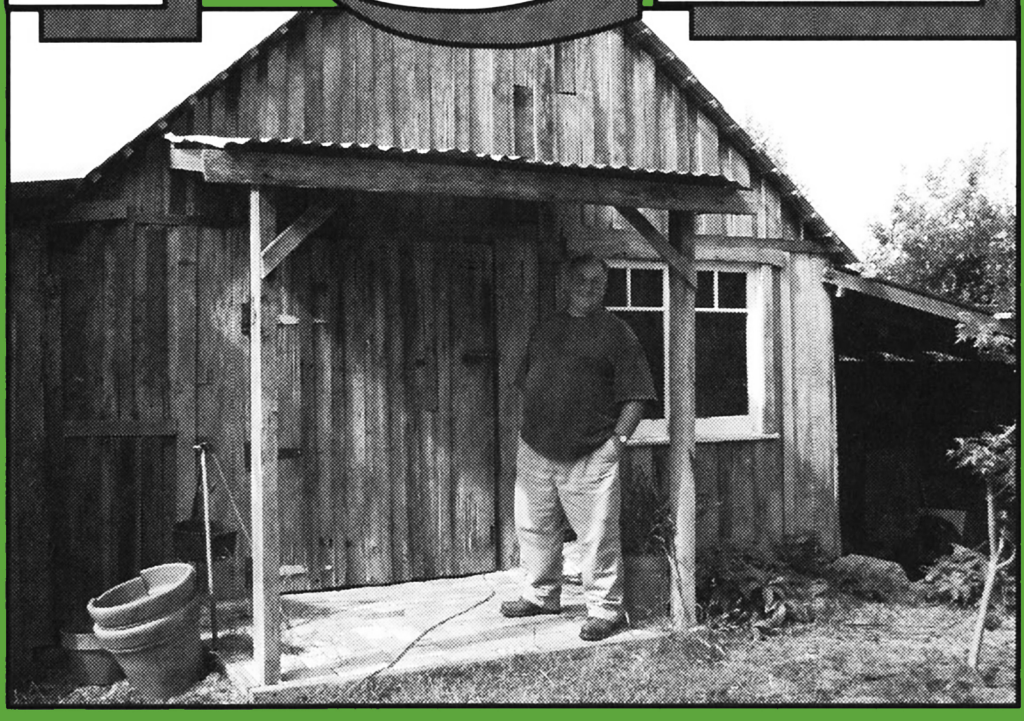
Number 132/133 *2nd & 3rd Issue 2003*

ICE



NEWS BULLETIN OF THE INTERNATIONAL GLACIOLOGICAL SOCIETY

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ICE

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COVER PICTURE: The new Chief Scientific Editor Dr Jo Jacka in front of the IGS chief editorial office in Tasmania. (Photograph by Dorthe Dahl-Jensen)

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.*

FROM THE EDITOR

Dear IGS members

At long last here is my first ICE. I hope these long overdue issues bring you some news as to what is happening in the field of glaciology. I would also like to tell you in a few words what we have been doing at the IGS office.

As you will see under "New staff" we have increased our staff considerably. I think we have been very lucky with the people who joined us.

We have completely updated the computer and telephone systems within the office and we have installed a high speed internet link into the office. Now everyone has their own e-mail address, the idea being that you, our members, can contact the person you have business with directly rather than having to go through a central internet address. It will of course also be easier for us to contact you directly.

The office furniture also got the once over in an effort to make the working environment more in line with Health and Safety requirements.

We have had to store a lot of our old stock of *Journals* and *Annals* at a different location, but not too far from the IGS office, so it is fairly easy for us to fetch copies when you request back issues. But as a result the office has now a more pleasant working environment. And of course with the increase in the staff it is not as crowded as it otherwise would have been.

It is also our intention to conduct a good deal of IGS business over the internet and we would thus like you to inform us of any changes that occur in your contact details.

We have also updated all our software, some of which was getting very out of date, and acquired some new software. We want to make certain that we can handle most things that you send us. To speed up production, we may return some files to you for proper submission, e.g. we will be asking you to submit your text and figures in a few specific ways. This is to help us cut production costs and streamline our production. So please try and help us in this.

We have introduced on screen editing for our copy editor, Ken Moxham. He will now edit your papers directly on the electronic file and we do not then have to type in his corrections, as we used to. This will speed things up and help us clear the backlog of papers. We also intend to follow up on papers more aggressively than has been done in the past, send more e-mails to chase after authors and editors and if that does not work, phone. We know you will support us in this.

Magnús Már Magnússon
Secretary General

RECENT WORK

THE NETHERLANDS

(for abbreviations used and email addresses, see page 6)

POLAR METEOROLOGY

Automatic Weather Stations in Dronning Maud Land, Antarctica
(Michiel van den Broeke, Carleen Reijmer, Roderik van de Wal, IMAU)
In collaboration with international partners, IMAU operates several Automatic Weather Stations (AWS) in Dronning Maud Land, East Antarctica, and one on Thyssen Höhe, Berkner Island. The AWS, that have been operational since 1996/97 (Berkner Island) and 1997/98 (Dronning Maud Land), measure air pressure, temperature, humidity, wind speed and direction, incoming and reflected shortwave radiation fluxes, incoming and outgoing longwave radiation fluxes, surface height (accumulation) and snow temperatures at various depths. The AWS monitor the local climate, observe the surface radiation and energy balance, detect precipitation events for use in ice-core studies and validate the performance of global and regional meteorological models over Antarctica. The radiation measurements also can be used to detect clouds and to derive surface temperature from as validation for remote sensing applications. In the near-future, the AWS data will be included in the GTS to support logistic operations in the area. The maintenance of the AWS is made possible through collaboration with the Swedish Antarctic Research Programme (Polar Research Secretariat) and the Alfred Wegener Institute, Germany.

Automatic Weather Stations in west Greenland
(Michiel van den Broeke, Roderik van de Wal, Johannes Oerlemans, IMAU)
In conjunction with the long term mass balance monitoring project, IMAU operates three Automatic Weather Stations (AWS) on the ice sheet near Kangerlussuaq (Søndre Strømfjord), west Greenland. The AWS are situated at elevations of approximately 500, 1000 and 1500 m asl. The AWS design is similar to that of the Antarctic AWS (see above), but the middle site, approximately 40 km from the ice edge, is also equipped with a full eddy correlation system, logging both sensible and latent heat fluxes. This system was installed in August 2003 and will be removed in August 2004 for analysis of data and sensor functioning. A similar setup is planned for the Antarctic AWS in 2005/06.

Long-term, high resolution modelling of the climate and mass balance of Antarctica
(Michiel van den Broeke, Carleen Reijmer, Willem Jan van den Berg, IMAU; Erik van Meijgaard, KNMI)
The newest version of the Regional Atmospheric Climate Model (RACMO2) was run over Antarctica. This model includes a full hydrological cycle and is driven at its lateral boundaries by the European Centre for Medium-Range Weather Forecasts Re-Analysis 1957-2002 (ERA40). RACMO2 uses the same physics package as ERA40, but with adjusted descriptions of, among other things, surface albedo and surface roughness lengths for scalars. The high resolution of 55 km is unprecedented for such a long run and large domain and has produced, in great detail, a climatology of surface mass balance and climate for the Antarctic ice sheet which is presently being analyzed.

A meteorological experiment in Dronning Maud Land, Antarctica
(Michiel van den Broeke, Dirk van As, Roderik van de Wal, IMAU)
The EPICA-Netherlands Atmospheric Boundary-Layer Experiment (ENABLE) was held in January/February 2002 at Kohnen base (75 S, 15 E/W, 2892 m asl) in Dronning Maud Land, Antarctica. Main goal of the experiment was to quantify the energy and moisture exchange at the Antarctic snow surface and to study the dynamics of the Antarctic atmospheric boundary layer. This project was held in the framework of EPICA (European Project for Ice Coring In Antarctica); one of the EPICA deep ice sores is presently being retrieved at Kohnen station. ENABLE included detailed measurements of the radiation balance, profiles of wind, temperature and humidity, and snow drift. We also performed numerous cabled balloon ascents in the lowest 500 m above the ground while radiosonde launches gauged the atmosphere up to 20 km height. Snowdrift measurements and eddy-correlation observations were also performed. The data are presently being analyzed.

GLACIERS AND CLIMATE

Automatic weather stations on glaciers
(Johannes Oerlemans, IMAU)
Calibration and validation of mass balance models for glaciers requires knowledge of the glacier microclimate and good insight into the processes that regulate the exchange of mass and energy between glacier surface and atmosphere. At IMAU weather stations have been developed that can operate unattended in zones with strong melting for a considerable period of time.
At present (June 2004) five automatic weather stations are in operation in ablation zones of glaciers: one on Breidamerkurjökull, Iceland; two in southern Norway (Hardangerjökulen, Storbreen); two on the

Morteratschgletscher, Switzerland. Most of these stations have records extending over many years. Morteratsch-I has a record starting in October 1995 without any significant gaps.
The AWS data have been used extensively to study the glacier microclimate and to construct parameterizations for energy balance models. This involves for instance the relation between cloudiness and radiation, and schemes to relate the surface albedo to the thickness and the age of the snowpack.

Glacier fluctuations and glacier mass balance
(Johannes Oerlemans, Guy Calluy, IMAU)
Valley glaciers are very sensitive indicators of climate change, as witnessed by the world-wide retreat of glacier tongues as a response to moderate global warming (~0.5 K over the last hundred years). Although the first-order analysis has been performed, there are many possibilities to refine the picture. We use dynamic glacier models to study the sensitivity of individual glaciers for which long records exist (e.g. Nigardsbreen, Aletschgletscher, Franz-Josef Glacier). These models are used to make a climatic interpretation of the historical length records, and also to study how these glaciers might react to future enhanced greenhouse warming.
Another component of this project deals with mass-balance observations and modelling. This involves the use of satellite measurements (can we detect glacier mass balance from space?) as well as driving mass balance models with meteorological data from weather stations and ECMWF re-analysis data. One of the questions we want to answer is how accurate glacier mass balance can be obtained from meteorological fields produced by climate models. This is of great importance with respect to projection of future glacier melt and associated sea-level rise.

Dynamics of calving glaciers
(Johannes Oerlemans, Faezeh Nick, IMAU)
In this project models of different complexity are used to study the response of calving glaciers to climate change. The basic nonlinearity introduced by the dependence of the calving flux on water depth is explored in some detail. Different formulations of the calving flux are compared.
The experimental component of the project focuses on Breidamerkurjokull (Iceland), which is currently retreating at a rate of several hundreds of meters per year. Ice velocity measurements (GPS) and feature tracking of photographs and satellite imagery provide information about the velocity field close to the calving front. We have also installed automatic cameras to get more insight into the nature of the calving process.

Mass Balance of the K-transect West Greenland
(Roderik van de Wal, Michiel van den Broeke, Carleen Reijmer, Wouter Greuell, Johannes Oerlemans, IMAU)
In conjunction with the automatic weather station project, IMAU maintains a transect of mass balance measurements on the ice sheet near Kangerlussuaq (K-transect), west Greenland. The mass balance measurements form a continuous series since 1990. Measurements sites range from an altitude of 340 m asl to 1850 m asl whereas the equilibrium line is around 1500 m asl in this area. A continuation of the measurements is foreseen for the near future.

REMOTE SENSING OF GLACIER ALBEDO

Measurements and model simulations of BRDFs
(Elise Hendriks, Wouter Greuell, IMAU)
One of the processing steps needed to retrieve the surface albedo from satellite data is a correction for anisotropic reflection at the surface. The distribution of the reflected radiation over the hemisphere is described by so-called Bi-directional Reflectance Distribution Functions (BRDFs). At present, insufficient knowledge of BRDFs of glacier ice and snow exists. We have performed extensive measurements of BRDFs over glacier ice on the Morteratschgletscher (Switzerland) and over snow at Weissfluhjoch (Switzerland). We have analyzed the measurements and are now developing models to simulate BRDFs. For snow we strongly build on existing single scattering and multiple scattering modules. For glacier ice we intend to build a Monte Carlo model. Measurements and simulations will lead to parameterizations that can be incorporated in albedo retrieval procedures.

Narrowband-to-broadband albedo conversion
(Wouter Greuell, IMAU)
Another processing step needed to retrieve the surface albedo from satellite data is narrowband-to-broadband conversion (NTB conversion). In the past, we have developed equations for NTB conversion based on measurements and model simulations. However, the measurements were limited to Thematic Mapper (TM) bands and Advanced Very High Resolution Radiometer (AVHRR) bands. Also, the characteristics of the observed ice and snow surfaces covered a limited range of the natural variability, especially for AVHRR. We are now acquiring a more comprehensive data set. Apart from the measurements in the TM and the AVHRR bands, we also carry out measurements in MODerate resolution Imaging Spectroradiometer (MODIS) and Multi-angle Imaging SpectroRadiometer (MISR) bands. Our sensors recorded data during a complete year in the ablation zone of the Morteratschgletscher (Switzerland) and will do the same in the ablation zone of the K-transect (Greenland).

Estimation of the surface mass balance from satellite-derived albedos
(Wouter Greuell, Guy Calluy, Johannes Oerlemans, IMAU)
We have developed a method that uses surface albedos derived from satellite data to estimate the surface mass balance. The albedo is retrieved for cloudless days, averaged over the glacier and then interpolated in time.

Next, the albedo is combined with the incoming short-wave radiation at the top of the atmosphere to obtain an estimate of the short-wave radiation absorbed at the surface. Integration over time yields an estimate of the short-wave radiation absorbed at the surface summed over the ablation season and averaged over the glacier. This quantity correlates significantly with the measured annual mass balance averaged over the glacier. So far, we have applied the method to various outlets of Vatnajökull (Iceland) and to the K-transect (Greenland) using AVHHR images. The resulting relationships will be used to reconstruct the mass balance for the period with suitable AVHRR data but lacking direct measurements (1981-1990 for the K-transect).

EVOLUTION OF ICE SHEETS ON LONGER TIME SCALES

Interaction of ice sheets with the solid earth
(Roderik van de Wal, Jojanneke van den Berg, Johannes Oerlemans, IMAU)
Ice sheet models usually assume a laterally homogeneous lithosphere. In reality large differences exist for example between oceans and continents. These differences are potentially important for the evolution of ice sheets since most large ice sheets extended towards the continental shelf during the Last Glacial Maximum. In this project a numerical model is developed in which the full flexural equation is solved. At present the model is used for prescribed ice sheet histories and synthetic experiments. In the next stage the model will be applied to Antarctica.

Cenozoic history of the Antarctic ice sheet
(Roderik van de Wal, Carlijn van Tuyll, Johannes Oerlemans, IMAU)
In this project we study the effect of the opening of the oceanographic gateways and changes in the atmospheric composition in order to understand the inception and evolution of the Antarctic ice sheet over the last 50 million years. A hierarchy of models will be used, ranging from relatively simple models to coupled three-dimensional ocean-atmosphere-ice sheet models.

Simulation of ice sheets during the Pleistocene
(Richard Bintanja, Roderik van de Wal, Johannes Oerlemans, IMAU)
In this project it is attempted to develop glaciological models which are consistent with respect to surface air temperature, deep-sea temperature and sea level. Isotopic records from benthic foraminifera depend on the mean isotopic composition of the world oceans and on local deep-sea temperatures. The first is a function of the average composition of the ice sheets. We use a detailed model of the North American and Eurasian ice sheets to relate land ice volume and ocean isotopic depletion to temperature and sea level. A key result is a reconstruction of the mean Northern hemispheric temperature over the last glacial cycle. In near future it will be attempted to extend this to a period of approximately 1000 kyr.

ICE AND FIRN ANALYSES

Modelling oxygen isotopes using backward trajectories
(Roderik van de Wal, Michiel Helsen, Michiel van den Broeke, Carleen Reijmer, IMAU; in collaboration with Erik Kerstel, Harro Meijer, CIO; M.P. Scheele, KNMI; Valerie Masson-Delmotte, Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette, France)
Isotopic fractionation is studied in Dronning Maud Land. Backward trajectories are used in combination with fractionation models to describe the isotopic composition of moisture during transport to Antarctica. Results show that the air mass is not saturated along the greater part of the trajectory. Modelled fractionation along the trajectories was too limited to explain the measured isotopic content of the snow. It is shown that the observed isotopic composition of precipitation resulted from fractionation of initially more depleted water. This lower initial isotopic composition of water vapour might result from atmospheric mixing with more depleted air along the trajectory or from earlier condensation cycles, not captured by the trajectories. This is in accordance with isotope fields resulting from general circulation models, indicating a gradient in isotopic composition from the equator towards Antarctica. Results will be compared with local snow measurements over a period of 4 years.

Firn-air modelling
(Roderik van de Wal, Karsten Kaspers, Michiel van den Broeke, IMAU; in collaboration with Jakob Schwander, Physics Institute, University of Bern; Nicole van Lipzig, BAS; Carl Brenninkmeijer, Max Planck Institute for Chemistry, Mainz, Germany)
The age of firn air at pore close-off depth is modeled across Antarctica. Main goal of this project is to quantify the age of the oldest firn air and locate this for future drilling operations. It turned out that the key parameters could be expressed in terms of meteorological variables. Results indicate that the oldest air can be found between Dome Fuji, Dome Argos and Vostok. It is estimated that the age of this air is approximately 150 years. Firn air analyses from this area will deliver an unprecedented record of atmospheric trace gas history.

14C analyses of ice and firn air
(Roderik van de Wal, IMAU; in collaboration with R. Neubert, Harro Meijer, CIO)
In the framework of EPICA (European Project for Ice Coring In Antarctica) ice samples are analyzed for 14C. Gases were obtained with a dry-extraction method. Care has been taken to avoid contamination with drilling fluid. Low 14CO concentrations show that very little in situ 14C produced in the firn has been retained in the ice at Dome C. Ice samples from Kohnen Station are presently analyzed. In addition to the ice samples we

sampled firn air in Dronning Maud Land. Results of the last experiment will provide insights in the initial concentration of 14C in ice.

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CIO: Centre for Isotope Research, University of Groningen
BAS: British Antarctic Survey, Cambridge, U.K.

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INTERNATIONAL GLACIOLOGICAL SOCIETY

ANNUAL GENERAL MEETING 2003

MINUTES OF THE ANNUAL GENERAL MEETING OF THE
INTERNATIONAL GLACIOLOGICAL SOCIETY

5 June 2003, Sanada Room, International Congress Centre, Davos, Switzerland

The Vice President, Dr Atsumu Ohmura, was in the Chair.
27 members from 8 countries were present.

1. The Minutes of the last Annual General Meeting, published in the ICE, 2002, No 129, p. 9-11, were approved on a motion by K. Hutter, seconded by M. Sturm and signed by the Vice President.

2. The President's Report for 2002-2003 vas given by the Vice President:

This is my first report as IGS President and it comes at the end of a year that has seen significant changes for the Society. Simon Ommanney has stepped down as Secretary General, after almost 10 years in the post, to return to his family in Canada. His successor, Magnús Már Magnússon, was appointed following our meeting last year in Chamonix and arrived in Cambridge at the end of April to take over. Simon will remain until the end of July to help with the transition before moving to Toronto. The arrival of a new Secretary-General will naturally brings changes and Magnus and I hope that Council Members will not hesitate to bring forward their own new ideas for organising the Society so that we can have a broad-ranging discussion about the way forward. One thing we have already started, is updating the Office IT systems.

Simon as you know worked extremely hard on matters concerned with the publication side of our work and had to contend with a shortage of man-power in this area. Some of you who were at the Chamonix meeting met our new Production Manager, Tim Labrum, there. We hoped that we had at last solved the problem of finding a good assistant for Simon, but unfortunately, things did not work out that easily and Tim left before the end of the year. We have now decided to try the experiment of using two half-time people as production assistants. The job has been advertised and a number of candidates have applied. Interviews will be held next week and we hope to have the new people in place and trained before Simon departs. The Cambridge office has been closed this week to allow Linda Gorman, the assistant to the Secretary General, to join us here in Davos. Many of you will have communicated with her over the years and now you have had an opportunity to put a face to the name. Two others who help with the production of the Journal of Glaciology and Annals of Glaciology are not with us today. Ann Leeding, who typesets your papers, and Ken Moxham, who reads every word you write with utmost care and tries to correct those inadvertent mistakes that even the most careful writer can make. I would like to express my appreciation to the Society's staff in Cambridge for the hard work they do on your behalf.

I would now like to update you on our extensive publication efforts. Last year saw the production of two new Annals volumes. Volume 34, containing selected papers from our International Symposium on Remote Sensing in Glaciology, held in Maryland, U.S.A., which was edited by Jan-Gunnar Winther and Rune Solberg. Volume 35, with selected papers from our International Symposium on Ice Cores and Climate, held in Kangerlussuaq, Greenland, was edited by Eric Wolff. Distribution of this volume did not actually take place until earlier this year. Thanks to arrangements we have made with Ingenta, both these volumes, and all future ones, will be available to subscribers online and details of how to register for access will be published in the next Annals and the next Journal.

At the moment, the office is working on the next two Annals. Selected papers from the meeting in Yakutat, Alaska, U.S.A., on Fast Glacier Flow, edited by Charles F. Raymond and Kees van der Veen, have been set and edited and the final proofs are with Page Bros, our printers in Norwich. The pagination has been done, so the table of contents of Annals 36 can now be viewed on our web-site. All the papers from the International Symposium on Physical and Mechanical Processes in Ice in Relation to Glacier and Ice-Sheet Modelling, held in Chamonix-Mont Blanc, France, last August, and edited by Paul Duval for Annals 37, have been copy-edited, set and most of the proofs already received back from the authors. About two-thirds of the papers will be shipped to Page Bros by mid-June, and the balance once the remaining proofs are returned from authors.

We have experienced significant delays with the production of the Journal of Glaciology, so that although No.163 has been printed you will not yet have received it. This year, we are moving the printing of the Journal of Glaciology from Lochemdruk to Page Bros. Our Dutch printers have seen us through many changes, but as we make the transition to providing web access to our journals, we have decided that it is time to change to a company with broader experience of journal publishing and, in particular, with the proven ability to provide the necessary products for electronic journals. Papers for the first two issues of the Journal for 2003 are now with Page Bros, but it will likely be a month or two before these are in your hands. We do expect the

last two issues of this volume to follow fairly quickly, so publication of the Journal will be back on schedule by the end of the year. The arrangement with Ingenta also covers the Journal, so issues published in this and subsequent years will also be available to subscribers online.

As will be noted in the Treasurer's report, there has been an increase in the number of pages printed by the Society in its journals from 1668 pages in 2001 to 1694 in 2002.

Another transition that will take place later this year is that of the editorial office for the Journal of Glaciology, from the Geophysical Institute at the University of Alaska to Hobart, Australia. We are immensely grateful to our Chief Editors, Will Harrison and Matthew Sturm, and their extremely capable assistant, Monica Court, for their management and running of this office during the past six years and we will definitely miss them. Jo Jacka, the new Chief Editor, will start taking papers in September. We would like to thank all those editors who have served on the Editorial Board during the past year, who have helped maintain the high standards we expect.

Three issues of ICE were published last year. The first issue for 2003 has been delayed pending receipt of a national report. As the publication schedule of ICE does depend a great deal on the regular flow of national reports, I would like to encourage all National Correspondents to try and ensure that reports on national activities are provided at regular two-year intervals. The name of your National Correspondent is published in ICE and on our web-site, so do contact yours if you feel too much time has elapsed since the last time your work was profiled.

Let me also update you on IGS-sponsored or co-sponsored meetings. With regard to the meeting being held here in Davos, I would like to thank Walter Amman for the support of his Institute and so many of his staff, and commend the local committee, particularly Paul Föhn, Barbara Miller and our Kongress Centre contact Daniela Schenk for their hard work and excellent organisation, as well as that of our Cambridge team. We also very much appreciate Paul and his team of editors, Massimiliano Barbolini, Bob Brown, Richard Essery, Bruce Jamieson, Eric Martin, Mohamed Naaim, Kouichi Nishimura, Frode Sandersen, Jürg Schweizer, Michael Staudinger and Matthew Sturm for the job they have done; unfortunately not all were able to be with us this week. We are most grateful to Yves Durand for stepping to help with Eric Martin's papers. They have been considering some 90 papers for possible inclusion in Annals of Glaciology Vol. 38. We are expecting final versions of all the accepted papers in Cambridge by mid-July, for publication in 2004.

Later this year, we will be receiving papers from the SCAR Seventh International Symposium on Antarctic Glaciology (ISAG-7) for review, editing and subsequent publication in Annals of Glaciology Vol. 39. As more than 250 abstracts were submitted for this meeting, the publication could be another very large volume along the lines of Annals 27 or 33. We are most grateful that Jo Jacka has agreed to edit this volume, despite the commitment he has made for the Journal of Glaciology.

Next year, we will be back to hosting two meetings: an International Symposium on Ice–Water Interactions, to be held at Portland State University, Portland, Oregon, U.S.A., in July; and an International Symposium on Arctic Glaciology, to be held in Geilo, Norway in August. We already have commitments for 2005, but anyone wanting to work with us on a meeting in 2006 or later should contact the Secretary General as soon as possible.

Later this year, we are co-sponsoring the Third International Conference on Mars Polar Science and Exploration, in Lake Louise, Alberta, Canada. We also agreed to co-sponsor all the cryospheric sessions at the recent EGS-AGU-EUG Joint Assembly, held in Nice, France. As you may know we are also co-sponsors of 8th International Conference on Permafrost to be held in Zurich, Switzerland, 21–25 July this year.

In summary, the activity of IGS remains very high. We have had some difficulty in keeping up with the publication schedule but my feeling is that, with a combination of new technology in the office and the appointment of new staff we should be able to get back on track reasonably quickly. My personal aim is to make sure that the new Secretary General has all the support he needs in this first critical year.

And finally, I am delighted to be able to tell you that last night, following the recommendation of our Awards Committee, Council unanimously approved the award of a Seligman Crystal to Professor Kolumban Hutter. This award is made to Koli in recognition of his fundamental contributions to mathematical glaciology that have helped illuminate the coupled physics that controls ice in the environment and underlies a variety of complex phenomena including thermomechanical processes in polythermal glaciers, the flow of water through ice-walled conduits and the dynamics of icy mixtures.

No new Honorary Memberships can be considered because we currently have the twelve which is the limit set by our Constitution.

Unfortunately we do not have our Treasurer, John Heap, with us today. In a moment, our former Secretary General will present the accounts on behalf of the Treasurer and report on the state of our finances. At its next meeting, Council will be considering a slight increase in the rates for 2004 to offset the effects of new legislation, regulations and taxation in the U.K. and some reductions in our normal sources of revenue.

Later this year we will be sending our Constitution to all members for ratification. Following review by the Charity Commissioners, it appears that the 1992 version and some of the previous amendments have not been properly filed with them. Hence, there is a legal requirement for your approval of the current Constitution. I hope that all of you will return your ballots when requested.

In closing I would like to say that you all benefit from the publication of quality papers in our journals, but this ability, and the continuation of this activity,

depends very much on the degree to which you, individually, are willing and able to support us through your membership and the commitment of your time in support of our work. This society is here to help you further your science and your career, through the publication and promotion of your work. Its future, and the future of the Journal of Glaciology and the Annals of Glaciology, depend very much on the personal commitment you, as an individual, are willing to make in support of your professional organisation.

Thank you for your kind attention.

R. Bindschadler proposed, and K. Hutter seconded, that the President's report be accepted. This was carried unanimously.

3. The former Secretary general C. Simon L. Ommanney, presented the following reported with the audited Financial Statements for the year ended 31 December 2002, on behalf of the Treasurer, Dr J.A. Heap:

"The state of the Society's finances is best summarised by considering the changes from 31 December 2001 to 31 December 2002 in the following funds, as shown on page 13 of the accounts:

Seligman Fund: decreased from £7283 to £7143 as a consequence of a disbursement of £452 for two crystals set against accrued interest of £595;

Contingencies Fund: maintained at the same level of £12,684;

Annals Fund: decreased from £93,937 to £60,437; due to the loss incurred on the Maryland meeting. The fund was established to guard against this eventuality but this is the first time it has been needed;

Publications Fund: increased from £21,825 to £26,090, as a consequence of sales, royalties and interest accrual;

Future Volumes: decreased from £22,378 to £44,384 reflecting late payments for Annals 35 and advanced income received with respect to Annals 36 and Annals 37;

Accumulated Fund: increased from £360,464 to £423,589 (page 6) consequent upon a profit in that account for the year of £63,125 which included a loss of £2,124 in the value of investments due to an adjustment to market value (page 12, note 7). Although there was once again a substantial reduction in expenditure due to staff vacancies, income from memberships and library sales was down and that from page charges was substantially lower than forecast. Without the £75,500 legacy from Loris Seligman, the Society would have shown a loss for this fiscal year.

In 2002, the Society published 642 pages in the Journal of Glaciology and 1056 pages in the Annals of Glaciology. In 2001 the figures were 696 for the Journal and 972 for the Annals, a year with two issues of the Annals. The reduction of more than £16,000 in page-charge revenue, almost half the total revenue received from members' dues, indicates how vulnerable we are to fluctuations in this income and how particularly grateful we must be to all those authors who have been both able and willing to support the Society in this way.

May I, again, make a plea to members of the Society to do all in their power to increase the membership. Although we are continuing to receive new memberships these are now balanced by those retiring or moving to other fields. Our target is a base of at least 1000 and there is still some way to go. Please encourage your colleagues and students to join. I believe they will find it is extremely good value for money. Also, please ensure that libraries in any institutions over which you have influence either maintain their subscriptions or take one out."

R. Bindschadler proposed, and M. Sturm and J. Meyssonnier seconded, that the Treasurer's report be accepted. This was carried unanimously.

4. Election of auditors for 2003 accounts.
K. Hutter proposed, and J. Meyssonnier seconded, that Messrs Peters Elworthy and Moore of Cambridge be elected auditors for the 2003 accounts. This was carried unanimously.

5. Elections to Council. After circulation to all members of the Society of the Council's suggested list of nominees for 2003-2006, no further nominations were received, and the following members were therefore elected unanimously.

Elective Members (3)	Anthony J. Payne
	Stephen G. Warren
	Yao Tandong

In addition, Edwin D. Waddington had been proposed by the Council to fill the balance of Keith Echelmeyer>s term (until 2004), following Keith's resignation from the Council. This appointment was unanimously approved by the AGM.

6. Other business:
The Vice President announced that the Council had unanimously approved the suggestion by the Awards committee to award the Seligman Crystal to Professor Kolumban Hutter.

Professor Hutter responded and thanked the society for this honour. He also expressed his appreciation to his mentors and to his students.

The retired Secretary General Mr. Simon Ommanney addressed the AGM and thanked the members for a fruitful collaboration over his 10 year term as Secretary General. He called upon his assistant Linda Gorman, his assistant throughout his term as Secretary General and formally thanked her for their collaboration during the last 10 years and presented her with an engraved dish.

The AGM was adjourned on a motion from R. Bindschadler, seconded by K. Hutter.

FROM THE *JOURNAL OF GLACIOLOGY* CHIEF EDITOR

It is now 9 months since I took over from Will Harrison and Matthew Sturm as Chief Scientific Editor (CSE) of the *Journal of Glaciology*. Will and Matthew were *Journal* CSEs for 6 years, and I am sure I have the support of all the membership in congratulating and thanking them for the excellent work they did. Monica Court expertly assisted Will and Matthew with the administration, and she also generated excellent computer documentation of names and addresses of editors, reviewers, authors, etc. – a resource that she passed on to me and that I now find extremely valuable.

During my first 3 months on the job, I was also responsible for scientific editing for *Annals of Glaciology* 39 and a few *Journal* papers were delayed by up to a month or so. I offer my apologies to any authors who may have been affected by that delay in processing your papers. On the other hand, I do not believe it led to any delay in actual publication of the *Journal*. Now that scientific editing for *Annals* 39 is complete, I have also caught up with *Journal* editing, and it is running smoothly.

My ability to catch up with the *Journal* editing in a few months, has been due very largely to Will, Matthew and Monica, who managed the *Journal* editing so expertly, and in such an ordered way that it was extremely straight forward for me to continue on the job with a minimum of fuss. It has also been in large part due to the excellent work of the Scientific Editors (SE). The work carried out by this group of people has been an eye opener to me. They liaise with the authors, they organise reviewers and act as the link between the reviewers and the authors (on occasions this may take several communications to the authors) and finally they prepare a report for me of the editorial process. It is then my task to decide the final fate of submitted manuscripts, based on the report I receive from the SE. So you see, it is the SEs who do the bulk of the editorial work. Without exception, the SEs willingly agree to take on the editorial tasks when I ask them, and the quality of the reports I receive from them is outstanding. This really does make the CSE job very straight forward.

While I am on the topic of SEs, I wish to thank Kurt Cuffey for the excellent work he has done. Kurt has now resigned as an SE "because he thinks he can make a more useful contribution as a reviewer", so he certainly is not opting out of any involvement. At the same time I welcome Jane Hart as a new SE. Jane's area of expertise is glacial sedimentology, an area that was lacking on the Editorial Board. I would also like to congratulate John Glen who has been awarded Honorary Life Membership of the European Association of Science Editors.

Of course, we all rely on high quality reviews of manuscripts, to maintain the scientific excellence of the *Journal of Glaciology*. I know that each of the editors would want me to acknowledge the work that those of you who carry out reviews for the *Journal* do. Some editors have asked me to particularly name a few people who have provided outstanding reviews. This is done in a table following this report. Members should not underestimate the quality of work carried out by these people, or the utmost importance of their work for the continued improvement of the scientific quality of the *Journal of Glaciology*.

I have been asked to write something about my aims as CSE of the *Journal of Glaciology*. There are a few changes being developed – one of these that I know many of you have been eagerly awaiting has been to make *Journal* papers available on the web. This has now been done and *Journal* papers (as of Volume 49) are available at

http://www.ingentaselect.com/rpsv/cw/igsoc/00221430/contp1.htm

Note also that *Annals of Glaciology* papers are available at

http://www.ingentaselect.com/rpsv/cw/igsoc/02603055/contp1.htm

My own primary aim (I believe unchanged from that of CSEs before me) is to strive to continuously improve the scientific quality of the *Journal*. I hope (it is you who will ultimately decide whether I have been successful) also to be a CSE who has an 'open door policy', i.e. who is always available for comment and feedback; so if you have any questions or comments to make about the operation or quality of the *Journal*, do not hesitate to let me know.

Jo Jacka
Chief Scientific Editor, *Journal of Glaciology*
jglac@bigpond.com

REFEREE RECOGNITION

The Editors of the *Journal of Glaciology* and the IGS wish to express their appreciation to the following referees who have provided particularly insightful or helpful reviews in the immediate past.

Jean-Louis Tison
Edgar Adreas
Perry Bartelt
Ed Adams
Peter Jansson
Hans Oerter
Charlie Bentley
Charlie Knight
Willy Weeks
Richard Alley
Throstur Thorsteinsson
Thomas A. Douglas
Dave Fisher
Piers Barnes
Hugh Corr
Jacob Schwander
Kolumban Hutter
Vladimir Ya Lipenkov
Andreas Vieli,
Richard Hindmarsh
Roland Warner

JOHN GLEN PRIZE

As in previous years, John Glen judged the competitions for the best student oral and poster presentations at the 2003 Annual General Meeting of the British Branch of the International Glaciological Society. He personally presented the John Glen Prize to Jonathan Carrivick (Keele University) for the best oral presentation, entitled 'Characteristics of Holocene jökulhaups from Kverkfjöll, Iceland', and to Duncan Quincey (University of Wales Aberystwyth) for the best poster presentation, entitled 'Modelling and monitoring downwasting rates on debris-covered glaciers using digital photogrammetry and stereo satellite data'.

The meeting was hosted jointly by the Schools of Civil Engineering (Bernd Kulessa) and Geography (Brian Whalley), Queen's University Belfast. It was attended by over 40 delegates, and included 23 oral and over 10 poster presentations covering a large selection of the earth's major glaciated areas.

A field trip to a local drumlin was led by one of Kulessa's colleagues, and explored the interface between glaciological and engineering approaches to investigating the physical properties of glacial tills. The field group also found time to visit a nearby ring fort, and to admire a street march by a local protestant band!

The social highlight of the meeting was a Civic Reception in Belfast City Hall hosted by the High Sheriff, Councillor Ruth Patterson, which included a warm welcome by the High Sheriff, a generous buffet and bar, as well as a guided tour of the City Hall's chambers.

SELIGMAN CRYSTAL FOR K. HUTTER

At the recent meeting on Snow and Avalanches in Davos, Switzerland, the Vice President of the International Glaciological Society, Atsumu Ohmura, announced the unanimous decision of the IGS Council to award a Seligman Crystal to Professor Kolumban Hutter in recognition of his fundamental contributions to mathematical glaciology that have helped illuminate the coupled physics that controls ice in the environment and underlies a variety of complex phenomena including thermomechanical processes in polythermal glaciers, the flow of water through ice-walled conduits and the dynamics of icy mixtures.

RICHARDSON MEDAL FOR C. SIMON L. OMMANNEY

At a banquet held in honour of the outgoing Secretary General in Davos in June 2003 (see ICE 131), the Vice President of the International Glaciological Society, Atsumu Ohmura, also announced the unanimous decision of the IGS Council to award a Richardson Medal to Simon Ommanney in recognition of his service to the Society during the past 10 years.

JOURNAL OF GLACIOLOGY

Papers accepted for publication up to 31 December 2003. Some of these papers have already been published.

Neil S. Arnold, W. Gareth Rees
Self-similarity in glacier surface characteristics

Ian Baker and Daniel Cullen
SEM/EDS observations of impurities in polar ice: artifacts or not?

P. R. F. Barnes and E.W. Wolff
Distribution of soluble impurities in cold glacial ice

Toby J. Benham and Julian A. Dowdeswell
A simple visualization method for distinguishing subglacial-bed and side-wall returns in radio-echo records from outlet and valley glaciers

Etienne Berthier, Bruce Raup, Ted Scambos
New velocity map and mass-balance estimate of Mertz Glacier, East Antarctica, derived from Landsat sequential imagery

Adam Bucki, Keith Echelmeyer
The flow of Fireweed rock glacier, Alaska, U.S.A.

Anders E. Carlson
Genesis of dewatering structures and its implications for melt-out till identification

Carissa L. Carter, David P. Dethier, Robert L. Newton
Subglacial environment inferred from bedrock-coating "siltskins", Mendenhall Glacier, Alaska, U.S.A.

Javier Chueca, Asunción Julián and Ignacio López
Variations of Glaciar Coronas, Pyrenees, Spain, during the 20th century

Chris D. Clark, Slawek M. Tulaczyk, Chris R. Stokes and Miquel Canals
A groove-ploughing theory for the production of mega-scale glacial lineations, and implications for ice-stream mechanics

Garry K. C. Clarke
Hydraulics of subglacial outburst floods: new insights from the Spring–Hutter formulation

Luke Copland, Martin J. Sharp and Peter Nienow
Links between short-term velocity variations and the subglacial hydrology of a predominantly cold polythermal glacier

Luke Copland, Martin J. Sharp, Peter W. Nienow and Robert G. Bingham
The distribution of basal motion beneath a High Arctic polythermal glacier

Martijn S. de Ruyter de Wildt and Johannes Oerlemans
Satellite retrieval of mass balance: comparing SAR images with albedo images and in situ mass-balance observations

Hermann Engelhardt
Ice temperature and high geothermal flux and Siple Dome, West Antarctica, from borehole measurements

Gwenn E. Flowers, Helgi Björnsson and Finnur Pálsson
New insights into the subglacial and periglacial hydrology of Vatnajökull, Iceland, from a distributed physical model

Andrew G. Fountain, Martyn Tranter
Evolution of cryoconite holes and their contribution to meltwater runoff from glaciers in the McMurdo Dry Valleys, Antarctica

Johannes Freitag and Hajo Eicken
Meltwater circulation and permeability of Arctic sea ice

O. Gagliardini, G. Durand, Y. Wang
Grain area as a statistical weight for polycrystal constituents

Kristín Martha Hákonardóttir, Andrew J. Hogg, Tómas Jóhannesson and Gunnar G. Tómasson
A laboratory study of the retarding effects of braking mounds on snow avalanches

Brian Hanson, Roger LeB. Hooke
Buckling rate and overhang development at a calving face

Boris V. Ivanov, Sebastian Gerland, Jan-Gunnar Winther and Harvey Goodwin
Energy exchange processes in the marginal ice zone of the Barents Sea, Arctic Ocean, during spring 1999

H. Paul Jacobson, Edwin D. Waddington
Recumbent folding in ice sheets: a core-referential study

Martin P. Kirkbride and Andrew J. Dugmore
Glaciological response to distal tephra fallout from the 1947 eruption of Hekla, south Iceland

E.J. (Lisette) Klok, Wouter Greuell, Johannes Oerlemans
Temporal and spatial variation of the surface albedo of Morteratschgletscher, Switzerland, as derived from 12 Landsat images

Oliver Lang, Bernhard T. Rabus, Stefan W. Dech
Velocity map of the Thwaites Glacier catchment, West Antarctica

E. Larour, E. Rignot and D. Aubrey
Processes involved in the propagation of rifts near Hemmen Ice Rise in the Ronne Ice Shelf, Antarctica

Katherine C. Leonard and Andrew C. Fountain
Map-based methods for estimating glacier equilibrium-line altitudes

E. Le Meur, C. Vincent
A two-dimensional shallow ice-flow model of Glacier de Saint-Sorlin, France

Lowell A. Rasmussen and Howard B. Conway
Using upper-air conditions to estimate South Cascade Glacier (Washington, U.S.A.) summer balance

Douglas Mair, Ian Willis, Urs H. Fischer, Bryn Hubbard, Peter Nienow, Alun Hubbard
Hydrological controls on patterns of surface, internal and basal motion during three "spring events": Haut Glacier d'Arolla, Switzerland

Bryan G. Mark and Geoffrey O. Seltzer
Tropical glacier meltwater contribution to stream discharge: a case study in the Cordillera Blanca, Peru

Maurice Meunier and Christophe Ancey
Towards a conceptual approach to predetrmining long-return-period avalanche run-out distances

Johan Jacob Mohr, Niels Reeh and Søren Nørvang Madsen
Accuracy of three-dimensional glacier surface velocities derived from radar interferometry and ice-sounding radar measurements

Maurine Montagnat and Erland M. Schulson
On friction and surface cracking during sliding of ice on ice

Elizabeth M. Morris, R. Mulvaney
Recent variations in surface mass balance of the Antarctic Peninsula ice sheet

Elizabeth M. Morris, J. David Cooper
Instruments and Methods. Density measurements in ice boreholes using neutron scattering

Thomas A. Neumann, Edwin D. Waddington
Effects of firn ventilation on isotopic exchange

Felix Ng and Helgi Björnsson
On the Clague–Mathews relation for jökulhlaups

Shad O'Neel, Keith A. Echelmeyer, Roman J. Motyka
Short-term variations in calving of a tidewater glacier: LeConte Glacier, Alaska, U.S.A.

Laurie Padman, Matt King, Derek Goring, Hugh Corr, Richard Coleman
Ice-shelf elevation changes due to atmospheric pressure variations

Frank Pattyn and Renji Naruse
The nature of complex ice flow in Shirase Glacier catchment, East Antarctica

Erin C. Pettit and Edwin D. Waddington
Ice flow at low deviatoric stress

Sergey V. Popov, Alexander N. Sheremet'yev, Valery N. Masolov, Valery V. Lukin, Anatoliy V. Mironov and Vadim S. Luchininov
Velocity of radio-wave propagation in ice at Vostok station, Antarctica

Hamish Pritchard, Tavi Murray, Tazio Strozzi, Stuart Barr and Adrian Luckman
Surge-related topographic change of the glacier Sortebræ, East Greenland, derived from synthetic aperture radar interferometry

Niels Reeh, Johan Jacob Mohr, Søren Nørvang Madsen, Hans Oerter and Niels S. Gundestrup
Three-dimensional surface velocities of Storstrømmen glacier, Greenland, derived from radar interferometry and ice-sounding radar measurements

Carleen H. Reijmer, Michiel R. van den Broeke
Temporal and spatial variability of the surface mass balance in Dronning Maud Land, Antarctica, as derived from automatic weather stations

Alan W. Rempel and J. S. Wettlauffer
Isotopic diffusion in polycrystalline ice

Thomas Schneider, Peter Jansson
Internal accumulation in firn and its significance for the mass balance of Storglaciaren, Sweden

Vandy Blue Spikes, Beáta M. Csathó, Gordon S. Hamilton and Ian M. Whillans
Thickness changes on Whillans Ice Stream and Ice Stream C, West Antarctica, derived from laser altimeter measurements

Vandy Blue Spikes, Beáta M. Csathó and Ian M. Whillans
Laser profiling over Antarctic ice streams: methods and accuracy

Matthew Sturm and Glen E. Liston
The snow cover on lakes of the Arctic Coastal Plain of Alaska, U.S.A.

K. C. Taylor, R. B. Alley
Two dimensional electrical stratigraphy of the Siple Dome, Antarctica ice core

Wilfred H. Theakstone
Oxygen isotopes in glacier-river water, Austre Okstindbreen, Okstindan, Norway

Robert H. Thomas
Force-perturbation analysis of recent thinning and acceleration of Jakobshavn Isbrae, Greenland

Robert H. Thomas, Waleed Abdalati, Earl Frederick, William B. Krabill, Serdar Manizade and Konrad Steffen
Investigation of surface melting and dynamic thinning on Jakobshavn Isbræ, Greenland

Throstur Thorsteinsson, Charles F. Raymond, G. Hilmar Gudmundsson, Robert A. Bindschadler, Paul Vornberger, Ian Joughin
Bed topography and lubrication inferred from surface measurements on fast-flowing ice streams

F. Traufetter, H. Oerter, H. Fischer, R. Weller, H. Miller
Spatio-temporal variability in volcanic sulphate deposition over the past 2 kyr in snow pits and firn cores from Amundsenisen, Antarctica

M. J. Tribbeck, R. J. Gurney, E. M. Morris and D. W. C. Pearson
A new Snow-SVAT to simulate the accumulation and ablation of seasonal snowcover beneath a forest canopy

Martin Truffer
The basal speed of valley glaciers: an inverse approach

John Woodward, Tavi Murray, Roger A. Clark, Graham W. Stuart
Glacier surge mechanisms inferred from ground-penetrating radar: Kongsvegen, Svalbard

Satoru Yamaguchi, Renji Naruse, Shin Sugiyama, Takane Matsumoto and Yaroslav D. Murav´yev
Initial investigations of dynamics of the maritime Koryto glacier, Kamchatka, Russia

Yang Jianping, Ding Yongjian, Chen Rensheng, Liu Shiyin, Lu Anxin
Causes of glacier change in the source regions of the Yangtze and Yellow rivers on the Tibetan Plateau

ANNALS OF GLACIOLOGY, VOLUME 38

The following papers from the International Symposium on Snow and Avalanches held in held at Davos, Switzerland 2–6 June 2002 have been accepted for publication in *Annals of Glaciology* Vol. 38, edited by Paul M.B. Föhn:

Osamu Abe
Shear strength of snow layers including graupel

Eli Alfnes, Liss M. Andreassen, Rune V. Engeset, Thomas Skaugen and Hans-Christian Udnæs
Temporal variability in snow distribution

Romeu André Pieritz, Jean-Bruno Brzoska, Frédéric Flin, Bernard Lesaffre and Cécile Coléou
From snow X-ray microtomograph raw volume data to micromechanics modeling: first results

Thorsteinn Arnalds
Avalanche hazard zoning in Iceland based on individual risk

M. Barbolini and F. Cappabianca
Risk assessment in avalanche prone areas

Richard Bintanja
The mass balance of a dry snow surface during snowdrift

K. Birkeland, K. Kronholm, M. Schneebeli and C. Pielmeier
Changes in the shear strength and micro-penetration hardness of a buried surface hoar layer

Alexi Bouchet, Mohamed Naaim, Herve Bellot and Frederic Ousset
Experimental study of dense snow flowing laws

A. N. Bozhinskiy
The Monte-Carlo simulation of avalanche-type processes

Yves Durand, Gilbert Guyomarc'h, Laurent Mérindol and Javier G. Corripio
2D numerical modelling of surface wind velocity and associated snow drift effects over complex mountainous topography

Richard Essery and John Pomeroy
Implications of spatial distributions of snow mass and melt energy on snowcover depletion: theoretical considerations

P. Etchevers, E. Martin, R. Brown, C. Fierz, Y. Lejeune, E. Bazile, A. Boone, Y.-J. Dai, R. Essery, A. Fernandez, Y. Gusev, R. Jordan, V. Koren, E. Kowalczyk, N. O. Nasonova, R. D. Pyles, A. Schlosser, A. B. Shmakin, T. G. Smirnova, U. Strasser, D. Verseghy, T. Yamazaki and Z.-L. Yang
Valuation of the energy budget of an alpine snowpack simulated by several snow models (SNOWMIP project)

Jocelyn Étienne, Pierre Saramito and Emil J. Hopfinger
Numerical simulations of dense clouds on steep slopes: application to powder-snow avalanches

T. Faug, M. Naaim and F. Naaim-Bouvet
Experimental and numerical study of granular flow and fence interaction

J. Heierli, R. Purves, A. Felber and J. Kowalski
Verification of nearest neighbours interpretations in avalanche forecasting

Frédéric Flin, Jean-Bruno Brzoska, Bernard Lesaffre, Cécile Coléou and Romeu André Pieritz
3D geometric measurements of snow microstructure evolution under isothermal conditions

N. Foppa, S. Wunderle, A. Hauser, D. Oesch and F. Kuchen
Operational sub-pixel snow mapping over the Alps with NOAA-AVHRR data

Peter Gauer and Dieter Issler
Possible erosion mechanisms in snow avalanches

V. N. Golubev and S. A. Sokratov
Regular packing of grains as a model of snow structure

Urs Gruber, Pascal Hägeli, David M. McClung and Evan Manners
Large-scale snow instability patterns in Western Canada: first analysis of the CAA-InfoEx database 1991—2002

Pascal Hägeli and David M. McClung
Hierarchy theory as a conceptual framework for scale issues in avalanche forecast modeling

Svanbjörg H. Haraldsdóttir, Haraldur Ólafsson, Yves Durand, Gérald Giraud and Laurent Mérindol
A system for prediction of avalanche hazard in the windy climate of Iceland

Erik Hestnes and Steinar Bakkehi
Slushflow hazard prediction and warning

Hiroyuki Hirashima, Kouichi Nishimura, Emiko Baba, Akihiro Hachikubo and Michael Lehning
SNOWPACK model simulations for snow in Hokkaido, Japan

Masaaki Ishizaka
Climatic response of snow depth at heavy snowfall areas in Japan to recent warmer winter seasons

Christian Jaedicke, Florence Naaim-Bouvet and Matthias Granig
Wind tunnel study of snow drift around avalanche defense structures

Bruce Jamieson and Charles Fierz
Heat flow from wet to dry snowpack layers and associated faceting

Alan S. T. Jones and Bruce Jamieson
Statistical avalanche-runout estimation for short slopes in Canada

T. Keller, C. Pielmeier, C. Rixen, F. Gadient, D. Gustafsson and M. Stähli
Impact of artificial snow and ski slope grooming on snow pack properties and soil thermal regime in a sub-alpine ski area

Kalle ronholm, Martin Schneebeli and Jürg Schweizer
Spatial variability of micropenetration resistance in snow layers on a small slope

Michael Lehning, Charles Fierz, Bob Brown and Bruce Jamieson
Modelling instability for the snow cover model SNOWPACK

Li Jun and H. Jay Zwally
Modeling the density variation in the shallow firn-layer

Stefan Margreth and Walter J. Ammann
Hazard scenarios for avalanche actions on bridges

J. N. McElwaine
Calculation of two-dimensional avalanche velocities from opto-electronic sensors

J. N. McElwaine, N. Maeno and K. Sugiura
The splash function for snow from wind-tunnel measurements

Ingo Meirold-Mautmer and Michael Lehning
Measurements and model calculations of the solar shortwave fluxes in snow on Summit/Greenland

Aloke Mishra and Punit Mahajan
A constitutive law for snow taking into account the compressibility

Ricard Molina, Elena Muntán, Laia Andreu, Glória Furdada, Pere Oller, Emilia Gutiérrez, Pere Martínez and Joan Manuel Vilaplana
Using vegetation to characterize the avalanche of Canal del Roc Roig, Vall de Nuria (Eastern Pyrenees, Spain)

Elena Muntán, Laia Andreu, Pere Oller, Emilia Gutiérrez and Pere Martínez
Dendrochronological study of the Canal del Roc Roig avalanche path: first results of the Aludex project in the Pyrenees

F. Naaim-Bouvet, M. Naaim and T. Faug
Dense and powder avalanches: omentum reduction generated by a dam

M. Nemoto, K. Nishimura, S. Kobayashi and K. Izumi
Numerical study of the time development of drifting snow and its relation to the spatial development

J. Oerlemans and E. J. Klok
Effect of summer snowfall on glacier mass balance

John Pomeroy, Richard Essery and Brenda Toth
Implications of spatial distributions of snow mass and melt energy on snowcover depletion: observations in a sub-arctic mountain catchment

Shiva Prasad Pudasaini, Yongqi Wang and Kolumban Hutter
Dynamics of avalanches along general mountain slopes

Sirpa Rasmus, Jouni Räisänen and Michael Lehning
Estimating snow conditions in Finland in the late 21st century using the SNOWPACK –model with regional climate scenario data as input

Kunio Rikiishi and Junko Sakakibara
Seasonal cycle of the snow coverage in the former Soviet Union and its relation with atmospheric circulation

Kunio Rikiishi, Eisuke Hashiyai and Masafumi Imai
Linear trends of the length of snow-cover season in the Northern Hemisphere as observed by the satellites in the period 1972—2000

Claudia Roeger, David McClung and Roland Stull
Verified combination of numerical weather and avalanche prediction models at Kootenay Pass, British Columbia, Canada

Peter Sampl and Thomas Zwinger
Avalanche Simulation with SAMOS

Takeshi Sato, Kenji Kosugi and Atsushi Sato
Development of saltation layer of drifting snow

C. Scapozza, F. Bucher and P. Amann
The temperature and density dependent acoustic emission response of snow in mono-axial compression tests

Martin Schneebeli
Numerical simulation of elastic stress in the microstructure of snow

Jürg Schweizer, Gerard Michot and Helmut O. K. Kirchner
On the fracture toughness of snow

Thomas Skaugen, Eli Alfnes, Elin G. Langsholt and Hans-Christian Udnæs
Time variant snow distribution for use in hydrological models

M. Stähli, M. Stacheder, D. Gustafsson, S. Schlager, M. Schneebeli and A. Brandelik
A new in-situ sensor for large-scale snow cover monitoring

Matthew Sturm and Carl Benson
Scales of the spatial heterogeneity for perennial and seasonal snow layers

Iwao Takei and Norikazu Maeno
Mechanical vibration responses of snow samples near the melting temperature

Satoru Yamaguchi, Atsushi Sato and Michael Lehning
Application of the numerical snowpack model (SNOWPACK) to the wet snow region in Japan

Tatsuya Yamamoto, Kenichi Matsuoka and Renji Naruse
Observation of internal structures of snow covers with a ground-penetrating radar

M. Zaiser
Slab avalanche release viewed as interface fracture in a random medium

Antonia Zeidler and Bruce Jamieson
A nearest neighbour model for forecasting skier-triggered dry slab avalanches on persistent weak layers in the Columbia Mountains of Canada

ANNALS OF GLACIOLOGY, VOLUME 39

The following papers from from the Seventh International Symposium on Antarctic Glaciology (ISAG-7) held at Milano, Italy, 25–29 August, 2003 have been accepted for publication in *Annals of Glaciology* Vol. 39, edited by Jo Jacka

Mary Albert, Christopher Shuman, Zoe Courville, Rob Bauer, Mark Fahnestock, Ted Scambos
Extreme firn metamorphism: impact of extended ventilation and vapor transport at a low-accumulation glazed site on the East Antarctic plateau

Steven A. Arcone, Vandy B. Spikes, Gordon Hamilton, Paul A. Mayewski
Continuity, vertical resolution and origin of stratigraphy in 400-MHz short-pulse radar profiles of firn in West Antarctica

C. Baroni, A. Biasini, A. Bondesan, A. Cimbelli, M. Frezzotti, M. Meneghel, G. Orombelli, M.C. Salvatore, I.E. Tabacco, L. Vittuari
Antarctic geomorphological and glaciological 1:250,000 map series. Mt Murchison Quadrangle (northern Victoria Land)

S. Becagli, M. Proposito, S. Benassai, O. Flora, L. Genoni, R. Gragnani, O. Largiuni, S.L. Pili, M. Severi, B. Stenni, R. Traversi, R. Udisti, M. Frezzotti
Chemical and isotopic snow variability in east antarctica along the 2001/02 ITASE traverse

Bertler, N.A.N., Barrett, P.J., Mayewski, P.A., Sneed, S., Handley, M., Kreutz, K.J.
Snow Chemistry Gradients Across the McMurdo Dry Valleys

C. Bianchi, A. Forieri, I. E. Tabacco
Electromagnetic reflecting properties of sub-ice surfaces

Ian C. Brown, Ted A. Scambos
Monitoring changes in blue ice extent near Byrd Glacier, Antarctica

Gino Casassa, Andrés Rivera, Heiner Lange
Elevation change and ice flow at Horseshoe Valley, Patriot Hills

Mike Craven, Ian Allison, Russell Brand, Alan Elcheikh, Mark Hemer, Shavawn Donohue
The AMISOR hot water drilling project

Daniel Dixon, Paul Mayewski, Sharon Sneed, Mike Handley
A 200-year West Antarctic paleoclimate record from U.S. ITASE ice cores

Mark R. Drinkwater, Nicolas Floury, Marco Tedesco
L-band Antarctic ice sheet brightness temperatures: spectral emission modelling, temporal stability and impact of the ionosphere.

M.R. Drinkwater, R. Francis G. Ratier, and D.J. Wingham
CryoSat: an ESA mission to measure variability in the cryosphere

A.A. Ekaykin, V.Ya. Lipenkov, I.N. Kuzmina, J.R. Petit, V. Masson-Delmotte, S.J. Johnsen
The changes in isotope composition and accumulation of snow at Vostok Station over the past 200 years

Hermann Engelhardt
Thermal regime and dynamics of the West Antarctic ice sheet

Evgeniy Ermolin, Hernán De Angelis, Frank Rau Pedro Skvarca
Ground ice in permafrost on Seymour (Marambio) and Vega islands, Antarctic peninsula

Sérgio H. Faria, Sepp Kipfstuhl
Preferred slip band orientations and bending observed in the Dome Concordia ice core

Jane G. Ferrigno, Richard S. Williams Jr, Kevin M. Foley
Coastal change and glaciological map of the saunders coast area, Antarctica, 1972–1997.

Forieri Alessandro,Luisa Zuccoli Alfredo Bini, Achille Zirizzotti, Ignazio Ezio Tabacco
New bed topography of Dome C

Frezzotti M., G. Bitelli, F. Coren, P. De Michelis, A. Deponti, A. Forieri, S. Gandolfi, V. Maggi, F. Mancini, F. Rémy, P. Sterzai, S. Urbini, L. Vittuari, A. Zirizzotti
Geophysical survey at Talos Dome (East Antarctica): the search for a deep new drilling site

Christophe Genthon
Space-time Antarctic surface mass balance variability from climate models

A.J. Gow, Debra Meese, Robert Bialas
Density profiles and crystal growth trends observed in U.S. ITASE firn and ice cores from West Antarctica

Mauro Guglielmin, Hugh M. French
Ground ice in the northern foothills (northern Victoria Land, Antarctica)

Gordon Hamilton
Topographic forcing of local accumulation rate variability and implications for ice core interpretation

Jim Hedfors, Veijo Allan Pohjola
Ice flux and dynamic character of Plogbreen, Dronning Maud Land, Antarctica

M.M. Helsen, R.S.W. van de Wal, M.R. van den Broeke, C.H. Reijmer, H.A.J. Meijer, E.R.Th. Kerstel
Modelling the isotopic composition of Antarctic snow using backward trajectories: a case study for Dronning Maud Land.

Akira Hori, Takeo Hondoh, and Vladimir Ya. Lipenkov
Ice lattice distortion along the deepest section of the Vostok core from X-ray diffraction measurements

Alun Hubbard, Wendy Lawson, Brian Anderson, Richard Hindmarsh, Bryn Hubbard
Evidence for extensive sub-glacial ponding across the tongue of Taylor Glacier, Antarctica

Yoshinori Iizuka, Morimasa Takata, Shuji Fujita, Takeo Hondoh,, Yoshiyuki Fujii
Short-term fluctuations of soluble ions in the last glacial period of the Dome Fuji ice core

T.H. Jacka, W.F. Budd, A. Holder
A further assessment of surface temperature changes at stations in the antarctic and southern ocean - 1949 to 2002

Hans-Werner Jacobi, Bright Kwakye-Awuah, Otto Schrems
Photochemical destruction of H2O2 and HCHO in snow

Ian Joughin,David Vaughan
Marine ice beneath the Filchner Ronne ice shelf: a comparison of estimated thickness distributions

Marzena Kaczmarska, Lars Karlöf, Elisabeth Isaksson, Jan-Gunnar Winther, Fred Godtliebsen, Coen Hofstede, Michiel Van Den Broeke, Roderik Van De Wal, Niels Gundestrup
Dating a coastal ice core using ECM, DEP and oxygen isotopes

Lars Kaleschke, Georg Heygster
Remote sensing of frost flowers and their role in tropospheric chemistry

Susan Kaspari, Paul Andrew Mayewski, Sharon Sneed, Mike Handley
West Antarctic climate reconstruction based on the 2001–2002 U.S. ITASE ice cores

Kawamura, T., Jeffries, M.O., Tison, J.-L., Krouse, H.R.
Superimposed ice formation in summer on Ross Sea pack ice floes

Mika Kohno, Yoshiyuki Fujii and Takafumi Hirata
Chemical composition of volcanic glasses in visible tephra layers found in an ice core from Dome Fuji, Antarctica

Gwendolyn J.-M. C. Leysinger Vieli, Martin J. Siegert, Richard Hindmarsh, Antony J. Payne
Reconstructing ice sheet accumulation rates at Ridge B, East Antarctica

O. Magand, M. Frezzotti, M. Pourchet, B. Stenni, L. Genoni, M. Fily
Climate variability along latitudinal and longitudinal transepts in east antarctica

Marino Federica, Maggi Valter, Delmonte Barbara, Ghermandi Grazia, Petit Jean Robert
Atmospheric dust elemental composition (si, fe, ti) of the last 220kyrs from the EPICA ice core (Dome C, Antarctica).

C. Martín, F. Navarro, J. Otero, M.L. Cuadrado, M.I. Corcuera
Three-dimensional modelling of the dynamics of Johnsons glacier (Livingston Island, Antarctica)

Paul Andrew Mayewski, Kirk Maasch, Vin Morgan, Tas Van Ommen, Ian Goodwin
A 700 year record of the antarctic oscillation and implications for understanding the global climate system

Alison J. McMorrow, Mark A. J. Curran, Tas D. Van Ommen, Vin Morgan
Ultra high resolution seasonality of trace ion species and oxygen isotope ratios over four annual cycles

Min Song, David M. Cole, Ian Baker
Initial experiments on the effect of particles at grain boundaries on the anelasticity and creep behavior of granular ice

Michele Motta, Luigi Motta
Distribution and modality of melting processes on Terra Nova Bay coast's local glaciers

Klaus Neumann, W. Berry Lyons, John C. Priscu, David J. Desmarais
The carbon isotopic composition of dissolved inorganic carbon in perennially ice-covered Antarctic lakes: searching for a biogenic signature.

J Oerlemans
The Antarctic ice sheet in different climates: results from simple modelling

H. Oerter, W. Graf, H. Meyer, F. Wilhelms
Epica ice core dronning maud land: first results from stable isotope measurements

Luca Placidi, Sérgio H. Faria, Kolumban Hutter
On the role of grain growth, recrystallization and polygonization in a continuum theory for anisotropic ice sheets

Veijo Allan Pohjola, Jim Hedfors and Per Holmlund
Investigation of the balance flux in the small outlet glacier Bonnevie-Svendsenbreen, Heimefrontfjella Range, Dronning Maud Land, Antarctica.

Lee Pruett, Karl Kreutz, Moire Wadleigh, Paul Mayewski, Andrei Kurbatov
Sulfur isotopic measurements from a West Antarctic ice core: implications for sulfate source and transport

Dahe Qin, Cunde Xiao, Ian Allison, Bian Lingen, Ming Yan, Ren Jiawe
Snow surface height variations on the Antarctic ice sheet in Princess Elizabeth Land, Antarctica: one year of data from an automatic weather station

Wolfgang Rack, Helmut Rott
Pattern of retreat and disintegration of Larsen B ice shelf, Antarctic Peninsula

R. Raffi, B. Stenni, O. Flora, S. Polesello , M. Camusso
Growing processes of an inland Antarctic ice wedge (Mesa Range, northern Victoria Land)

Rankin Andrew,Eric Wolff, Robert Mulvaney
A reinterpretation of sea salt records in Greenland and Antarctic ice cores

Frank Rau, Ricardo Jaña, Hernán De Angelis, Jorge Arigony Neto, Fabian Mauz, Steffen Vogt, Pedro Skvarca, Helmut Saurer, Hermann Gossmann
Variations of glacier frontal positions on the northern Antarctic Peninsula

Frederique Remy, Benoit Legresy, Cedric Lanseau, Muriel Llubes
Subglacial hydrological networks in antarctica and their impact on ice flow

Ursula Rick, Mary Albert

Relationships between snow microstructure and permeability near a potential deep drilling site in West Antarctica

Ren Jiawen, Sun Junying, Qin Dahe
Preliminary results of snow-pits study in the hinterland along the Zhongshan-Dome A traverse route, Antarctica

E. Rignot, R. Thomas, G. Casassa, E. Frederick, S. Gogineni, P. Kanagaratnam, W. Krabill, A. Rivera, R. Russell, J. Sonntag, R. Swift, C. Teitel, J. Yungel.
Revised estimation of the mass balance of the glaciers draining into the Amundsen Sea sector of west antarctica using data from the 2002 NASA/CECS airborne campaign.

D.M. Rippin, J.L. Bamber, M.J. Siegert, D.G. Vaughan, H.F.J. Corr
Basal topography and ice flow in the Bailey/Slessor region of East Antarctica

G. Rotschky, W. Rack, H. Oerter,
Microwave backscattering and snow pack properties in Dronning Maud Land, Antarctica

G. Royston-Bishop, M. Tranter, M. J. Siegert, V. Lee and P. D. Bates
Is Lake Vostok in chemical and physical steady-state?

U. Ruth, R. Mulvaney, D. Wagenbach, H. Oerter, H. Pulz, W. Graf, G. Littot and T. Mccormack
Comprehensive 1000-year climatic history from an intermediate ice core from the Berkner Island South Dome

Fuyuki Saito and Ayako Abe-Ouchi
Thermal structure of Dome Fuji and East Queen Maud Land, Antarctica, simulated by a three-dimensional ice sheet model

Andrey N. Salamatin, Elena A. Tsiganova, Vladimir Ya. Lipenkov, Jean Robert Petit
Vostok (Antarctica) ice-core time scale from datings of different origins

C. Salvi, G. Salvi, B. Stenni, A. Brambati
Paleoenvironmental aspects in the Ross Sea during the last 15 ky BP: a comparison between sediment and ice cores

Elisabeth Schlosser, Carleen H. Reijmer, Hans Oerter
The influence of origin of precipitation on the $\delta^{18}O$ - T relationship at Neumayer Station, Ekströmisen, Antarctica

Anna Sinisalo, Aslak Grinsted, John Moore, Roderik Van De Wal, Jari Vehviläinen
On the age determination of surface blue ice in Scharffenbergbotnen, Antarctica

Pedro Skvarca, Hernán De Angelis, Evgeniy Ermolin
Mass balance studies on Glaciar Bahía del Diablo, Vega Island, Antarctic Peninsula.

Pedro Skvarca, Hernán De Angelis, Andrés F. Zakrajsek
Dynamics, mass-balance and climatic conditions over Larsen B ice shelf, Antarctic peninsula, prior to its collapse

Claudio Smiraglia, Michele Motta, Giorgio Vassena, Guglielmina Diolaiuti
Dry calving processes at the ice cliff of an Antarctic local glacier: the study case of Strandline Glacier (northern Victoria land, Antarctica)

Barbara T. Smith, Tas D. van Ommen and Mark A.J. Curran
Methane sulphoric acid movement in solid ice cores

Vandy Blue Spikes, Steven Arcone, Gordon Hamilton, Paul Mayewski, Daniel Dixon, Susan Kaspari
Spatial and temporal variability in West Antarctic snow accumulation rates

Bernhard Stauffer
The Dome Concordia deep ice core: dreams and justified expectations.

Ralf Stosius, Ute C. Herzfeld
Geostatistical methods for combination of radar altimeter data and SAR data applied to Lambert Glacier / Amery Ice Shelf

M. Takata, Y. Iizuka, T. Hondoh, S. Fujita, Y. Fujii and H. Shoji
Stratigraphy analysis of Dome Fuji Antarctic ice core using optical scanner

R. H. Thomas, E. Rignot
Force-balance analysis of Pine Island Glacier suggests cause for recent acceleration

Kawamura, T., Jeffries, M.O., Tison, J.-L., Krouse, H.R.
Superimposed ice formation in summer on Ross Sea pack ice floes

R. Traversi, C. Barbante, V. Gaspari I. Fattori, O. Largiuni, L. Magaldi, R. Udisti
Aluminium and iron record for the last 28kyrs derived from the Antarctic EDC96 ice core using new CFA methods

R. Udisti, S. Becagli, R. Traversi, E. Wolff, M. De Angelis, M.E. Hansson, J.P. Steffensen, J. Schwander
Time shift and sensitivity to climate changes of environmental markers during the last glacial-interglacial transition as recorded at Dome C (East Antarctica).

R. Udisti, S. Becagli, S. Benassai, I. Fattori, M.

Innocenti, A. Migliori, R. Traversi
Atmosphere – snow interaction by a comparison between aerosol and uppermost snow layers composition at Dome C (East Antarctica)

P. Vallelonga, C. Barbante, G. Cozzi, K. Van de Velde, J.-P. Candelone, V.I. Morgan, C.F. Boutron, K.J.R. Rosman
Determination of heavy metals concentrations in snow and ice from Law Dome, Antarctica, by inductively coupled plasma sector field mass spectrometry (ICP-SFMS)

Michiel R. van den Broeke, Nicole van Lipzig
Sensitivity of antarctic temperature and accumulation to the Antarctic oscillation

Tas D. Van Ommen, Vin Morgan, Mark A. J. Curran
Deglacial changes in palaeoaccumulation at Law Dome

L. Vittuari, C. Vincent, M. Frezzotti, S. Gandolfi, F. Mancini and A. Capra
Space geodesy as a tool for ice surface deformation at Dome C site and between Terra Nova Bay and Dome C (East Antarctica)

Weili Wang, Li Jun, Jay Zwally
Study of the effect of the variation in anisotropic flow properties on the ice-sheet surface elevation change

Dale P. Winebrenner, Eric J. Steig, David P. Schneider
Temporal co-variation of surface and microwave brightness temperatures in antarctica, with implications for the observation of surface temperature variability using satellite data

Cunde Xiao, Jiawen Ren, Dahe Qin, Ian Allison, Zhongqin Li
Meteorological and glaciological evidences for climatic differences between the eastern and western sides of Lambert Glacier basin, Antarctica

NEW E-MAIL ADDRESSES AND FAX NUMBER FOR THE IGS

The International Glaciological Society has changed its e-mail addresses and fax number. Each member of staff has his/her e-mail address so it is possible to contact them directly.

The official e-mail address of the IGS is now :

igsoc@igsoc.org

This is the address you use to make initial contact and contact us on matters of a general nature. This mailbox is monitored by the Secretary General and his assistant. When you submit a paper for publication in the Journal of Glaciology it is possible to use the above address or the address

journal@igsoc.org

which is dedicated to matters relating to paper submission and subsequent correspondence. This mailbox is monitored by everybody in the IGS office.

For matters relating to Annals of Glaciology we have

annals@igsoc.org

which is dedicated to matters relating to paper submission for the Annals and subsequent correspondence. This mailbox is monitored by all the production staff.

In addition, each member of staff has her/his own e-mail address and those can be used for specific matters for which communication has already been established or to contact individual members of staff on a specific matter. These are:

linda@igsoc.org
for Linda Gorman, assistant to the Secretary General

christine@igsoc.org
for Christine Butler, Production Manager

craig@igsoc.org
for Craig Baxter, production, web and databases

ann@igsoc.org
for Ann Leeding, typesetting

magnus@igsoc.org
for Magnús Már Magnússon, Secretary General

These mailboxes are monitored only by their owners.

The official fax number of the IGS has now been changed to

+44 (0)1223 354 931.

We, the IGS staff, hope that this will make communication more direct and productive.

IGS STAFF CHANGES

Last June the IGS appointed Christine Butler as a production assistant. Christine has several years experience in the publishing industry and has already proven her worth for the IGS. She is a graduate from the University of St. Andrews with an honours degree in English language and literature. She spent the month of July with Simon Ommanney learning about IGS production. In January 2004 she became our new Production Manager. Christine works part time.

In November the IGS hired Craig Baxter as a production assistant. He has an honours degree in Zoology from the University of Sheffield and a Masters degree in Playwriting from the University of Birmingham. He is also very experienced in the publishing industry, having worked for nine years for the journals *Reproduction* and *Human Fertility.* Craig, who has experience in computers and computer databases, has already updated the society's databases and installed some new ones. He will be taking over the management of the IGS web page in due course. He also works part time.

We have also brought out of retirement a former IGS employee, Joan Keating. Joan has now resumed her role as a typesetter for the *Journal* and *Annals.* She works one day a week.

We hope that these staff changes will speed up production and diversify the responsibilities within the IGS office.

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MEMBERS' CONTACT ADDRESSES AND E-MAILS

The IGS office is planning to use e-mail much more in future and thus we need to update our membership database. Could all members and everyone who receives ICE, please send your current contact address for regular mailings, a phone and fax number if available and your current e-mail address to igsoc@igsoc.org and put "CONTACT DETAILS" in the subject line. Please also indicate how you would like to receive your e-mails, i.e. as "HTML", "Rich Text" or "Plain Text".

Let me stress here that we never give out our mailing list to anyone.

We recently sent out almost 900 e-mails requesting "Nominations for IGS council elections 2004", 79 of which did not reach their destination for one reason or other. So if you have not received this mailing recently, please let us know as soon as possible.

IGS BRITISH BRANCH ANNUAL MEETING 2004

Department of Geography, University of Sheffield
8 – 9th September 2004

FIRST CIRCULAR

The 29th annual meeting of the British Branch of the International Glaciological Society will be held at the University of Sheffield on Wednesday 8th and Thursday 9th September 2004. The first circular is simply to inform the wider community of the dates. A more detailed circular regarding presentations, accommodation and registration will be sent out in the near future. A web site will soon be made available with regular updates at:

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http://www.shef.ac.uk/geography/igs2004.

In the meantime, if you have any queries, contact Andy Hodson (igs2004@sheffield.ac.uk or 0114 222 7950). Please inform any interested colleagues or new postgraduates of the dates of the Sheffield meeting if they are not on our mailing list (and ask them to e-mail us to receive future postings).

INTERNATIONAL SYMPOSIUM ON ICE AND WATER INTERACTIONS: PROCESSES ACROSS THE PHASE BOUNDARY

Portland State University, Portland, Oregon, U.S.A.
26–30 July 2004

CO-SPONSORED BY

Department of Geology, Portland State University
U.S. National Science Foundation
U.S. Geological Survey

SECOND CIRCULAR

The International Glaciological Society will hold an International Symposium on Ice–Water–Ice: Processes Across the Phase Boundary, in 2004. The symposium will be held at Portland State University, Portland, Oregon, U.S.A. with registration on 10 July, and sessions from 26–30 July.

SYMPOSIUM ORGANIZATION
Magnús Már Magnússon (Secretary General, International Glaciological Society)

LOCAL ARRANGEMENTS COMMITTEE
Christina Hulbe (Chair), Andrew Fountain, Carolyn Driedger, Laurie Padman, Joseph Walder

EDITORIAL BOARD
Douglas R. MacAyeal (Chief Scientific Editor), Gwenn Flowers, Anne Nolin, Peter Jansson, Jesse Johnson, Martin Sharp, Kees van der Veen, Joseph Walder, John Wettlaufer

INFORMATION ABOUT THE SYMPOSIUM MAY BE OBTAINED FROM:

Christina Hulbe or Andrew Fountain
Department of Geology, Portland State University P.O. Box 751, Portland Or 97207 USA
email: iwi04@pdx.edu web:http://glaciers.pdx.edu/iwi04 fax:+[1] 503-725-3025

OR

International Glaciological Society, Scott Polar Research Institute
Lensfield Road, Cambridge CB2 1ER, U.K.
tel:+ [44] (0)1223 355 974 fax:+ [44] (0)1223 354 931 e-mail:igsoc@igsoc.org web: http://www.igsoc.org/symposia/

PARTICIPATION
A registration form and instructions for arranging accommodation in Portland are contained within this circular and can also be found at the symposium website. The registration form and accompanying payment should be returned by 24 April 2004. There is a surcharge for late registration. The registration fee includes organizing costs, a set of abstracts, the icebreaker, coffee breaks, breakfast during two poster sessions, a mid-week excursion and banquet, and a copy of the *Annals of Glaciology*. The accompanying person's programme is described briefly in this circular.

Registration fees	**UK £**	**US$**
Participant (IGS member)	230	400
Participant (not IGS member)	260	450
Student and retired IGS member	100	225
Accompanying person aged 21 or over	70	120
Pre-symposium brewpub tour aged 21 and over	9	15
Post-symposium field trip (estimate)	220	375
Late registration surcharge (after 24 April)	50	85

Registration refunds will be made according to date of notification. Cancellations made before 24 May 2004 will receive a full refund. Cancellations received between 24 May and 10 July will be eligible for partial refund. After 10 July it may not be possible to make any refund.

THEME

Interactions between water and ice span a wide range of topics, from some of the fundamental problems in glaciology to the daily lives of people who depend on alpine watersheds. This symposium will be devoted to the macro and micro interactions between ice and water, providing new avenues for discussion across the phase boundary. For example, investigations of basal water-drainage systems in glaciers have an affinity with studies of subglacial melting and freezing processes, both of which are in turn connected to studies of glacier and ice-sheet flow motion, in both modern and paleo-environments; glaciologists, hydrologists and biologists can share knowledge regarding the timing and rate of melt and meltwater discharge and its downstream effects; and similarities and differences between glacier and ice-shelf calving processes can be explored.

TOPICS

The suggested topics include:

1. Glacier and ice-sheet hydrology
2. Snow/water interactions
3. Calving glacier and ice-shelf processes
4. Effects of water on glacier and ice-heet flow
5. Water, ice and ecology
6. Lake and river ice
7. Physics of ice and water

PROGRAMME

Oral presentations will be held on four full days on the Portland State University campus. It is anticipated that poster presentations will also make an important contribution to the proceedings. Poster sessions, accompanied by breakfast, will be held at the meeting hotel site, near the Portland State University campus. The third circular, with detailed programme, will be sent to all registered participants.

The Society's Annual General and Council meetings will take place during the symposium. Other special meetings are encouraged. Please contact the organizing committee by the end of February, 2004 to arrange a meeting room and time.

PUBLICATION

Selected papers from the symposium will be published by the Society in the *Annals of Glaciology*. All papers (including those based on posters) will be refereed and edited according to the Society's regular standards before being accepted for publication.

PAPERS

(1) SUBMISSION OF ABSTRACTS

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

LAST DATE FOR RECEIPT OF ABSTRACTS: 16 FEBRUARY 2004

Final versions of papers accepted for publication should not exceed five printed pages in the *Annals of Glaciology*. Extra pages will be charged at the rate of UK £90 *(about US$145)* per page. Papers with colour figures will accrue page charges, at the colour rate of UK £150 *(about US$250)*, for all pages. Honouring page charges (also £90 per page) for the first five pages is encouraged.

Abstracts may be submitted via the Symposium website (http://glacier.pdx.edu/iwi04 *available 2 January 2004*), as plain text in email (iwi04@pdx.edu *available 2 January 2004*), or on diskette via regular airmail to Christina Hulbe, Department of Geology, Portland State University, P.O. Box 751, Portland OR 97207. Abstracts submitted via mail and diskette should include the title, author names and author affiliations at the top of the page, not on a separate sheet, and should indicate which topic the abstract intends to address and whether oral or poster presentation is preferred.

(2) SELECTION OF ABSTRACTS

Each abstract will be assessed on its scientific quality and relevance to the Symposium theme. Authors whose abstracts are accepted will be invited to make either an oral or poster presentation at the Symposium and submit a paper for publication in the *Annals of Glaciology* (included in the ISI Science Citation Index®). First or corresponding authors will be advised by 15 March 2004 of the acceptance or otherwise; other authors will not be informed separately. Authors who have not received notification by that date should contact the IGS office in Cambridge in case their abstract was not received. Acceptance of an abstract means that the paper based on it should be submitted to the *Annals of Glaciology* and not to another publication. Note: abstracts alone will not be published in the *Annals of Glaciology*.

(3) DISTRIBUTION OF ABSTRACTS
A set of the accepted abstracts will be provided to participants upon registration on 22 August 2004.

(4) SUBMISSION OF PAPERS AND PUBLICATION
Manuscripts may be submitted electronically or by regular airmail. Electronic submissions may be made via the IGS website (also linked via the Symposium website). Authors who submit manuscripts electronically must follow the same format guidelines as authors who submit printed copies. Manuscripts must be submitted as pdf's (portable document format). Authors who submit in other electronic formats will be asked to re-submit either a pdf or to send paper copies via surface mail. Authors who wish to submit paper copies of their manuscripts should send FOUR copies of each paper, doubled-spaced with wide margins, to the Secretary General, International Glaciological Society, Scott Polar Research Institute, Lensfield Road, Cambridge CB2 1ER, U.K., by 17 May 2004. ALL AUTHORS ARE EXPECTED TO ADHERE TO THIS DEADLINE. Papers should be prepared in accordance with the instructions sent to authors with the abstract acceptance notification. Papers will be refereed according to the usual standards of the Society before being accepted for publication. Final papers, based on presentations at the Symposium, which have been submitted and accepted by the Editorial Board following review, will be published in English in the *Annals of Glaciology* (Vol. 40). Final, revised versions of papers, diskettes and original art work must be submitted by 7 September 2004. Timely publication of the *Annals of Glaciology* will depend upon strict adherence to deadlines.

LAST DATE FOR RECEIPT OF PAPERS: 17 May 2004

LAST DATE FOR RECEIPT OF FINAL PAPERS: 7 SEPTEMBER 2004

EXCURSIONS

1. Pre-symposium craft brew tour
The Pacific Northwest led the revival of craft brewing in America and the Portland area is now home to more than 70 brewpubs and microbreweries. On Sunday, 25 July, we will study the revival in a short field course. The day will begin at 10:00 am, with a trip up the Columbia River Gorge to Hood River for a tour of the Full Sail Brewery and lunch at a local brewpub. From there, we will work our way back through Portland, visiting several more brewpubs, returning in time for the pre-symposium icebreaker. The brewpub tour fee, US$15, covers transportation only and may be paid on the day of the tour. Registration for the tour will continue until 1 July 2004 but places on the tour are limited so please register early.

2. Mid-week field trip and banquet
A mid-week field trip will take meeting participants and accompanying persons to Mount Hood, a glacierized volcano east of Portland. Two options are available. The primary field trip will investigate characteristics of the many diamicts found on Mount Hood (debris avalanches, lahars, pyroclastic flows, and glacial tills), ending with a short hike to the terminus of Eliot Glacier. A second field trip, for those who seek a more physically challenging mid-week break, will hike the Cooper Spur trail above Eliot Glacier. Both groups will end their field trip at the Edgefield Inn, where the Symposium banquet will take place. Remember you're in Portland: casual is how we live.

3. Post-symposium tour
A five-day rough and ready post-symposium tour to central Oregon and the eastern Oregon high lava plains. Two of four travel nights will be spent at the Field Station inside the Malheur National Wildlife Refuge. Stops will include sites of recent volcanism, Steens Mountain, a fault-block range in the western reach of the Great Basin that supported large valley glaciers during the Pleistocene; Abert Rim, a 65-km long fault scarp rising 600 m above Abert Lake; Diamond Craters; Fort Rock, a tuff ring with wave-cut terraces; and the John Day fossil beds. More information will be available at the meeting website and will be sent to registered trip participants. Registration for the post-symposium tour must be made by 24 April 2004. The minimum and maximum number of registrants are 15 and 25, respectively, so please register early. Important notes: Accommodation at Malheur Field Station will be in simple cabins, and participants must bring sleeping bags. Eastern Oregon is high desert, with temperature commonly near 35°C during the day but dropping to near 15°C at night. The anticipated cost, for double occupancy during two nights in motels, is $375 per person. The single occupancy cost would be about $465.

ACCOMPANYING PERSON'S PROGRAMME
An accompanying person's programme is also planned. The programme includes the Symposium icebreaker, weekday tours of Portland, the Columbia River Gorge, and the Willamette Valley wine country, the mid-week field trip, and the banquet. Registration for this programme should accompany the main participant's registration, although late registrations will be accepted if possible.

WEATHER
July is Portland's sunniest month, though light rain is always a welcome possibility. Temperatures are typically warm but can range from 10° to 27°C, with occasional excursions to the mid-30s.

ACCOMMODATION AND TRANSPORTATION
A block of rooms has been reserved at the Doubletree Hotel, 310 SW Lincoln, Portland OR 97201. Online access to hotel registration will be available at the meeting website. Registration by FAX is also possible, details will be provided at the website. The room rate is $85 single/double and $15 for each additional person, plus local lodging taxes. A deposit of one night is required to reserve each room. A limited number of rooms are available at a reduced scholarship rate of $67 single/double. Requests for the scholarship rate must be made in advance, via a form to be made available at the meeting website.
Hotel reservations should be made at the time of meeting registration. This time frame is especially important for students and registrants from developing nations, who may wish to take advantage of the scholarship room programme.

The Doubletree is a 0.6 km walk from the Symposium site. Transportation details and maps will be available at the meeting website.

VISA
International travellers should be aware of recent legal changes regarding the non-immigrant visa process and entry–exit procedures. As we understand the new regulations, all travellers must visit a U.S. embassy or consulate to complete visa application forms. The new process will probably require more time than was needed in the past. Please plan ahead. More information is available at: http://www.UnitedStatesVisas.gov

IMPORTANT DATES

Abstracts due	16 February 2004
Notification of acceptance	15 March 2004
Pre-registration due (symposium and tours)	24 April 2004
Papers due	17 May 2004
Limit for full refund	24 May 2004
Limit for partial refund	24 June 2004
Pre-symposium brewpub tour, icebreaker	25 July 2004
Conference starts	26 July 2004
Post-symposium tour starts	31 July 2004
Final revised papers	7 September 2004
Abstracts due	13 February 2004

REGISTRATION FORM

Family Name: _____

First Name: _____

Address: _____

_____

Tel: _____ Fax: _____ E-mail: _____

Accompanied by:

Name: _____ Age (if under 21) _____

Name: _____ Age (if under 21) _____

REGISTRATION FEES	£	£
Participant (member of the IGS)	230	___
Participant (not a member of the IGS)	260	___
Student or retired IGS member	100	___
Accompanying person aged 21 or over	70	___
Late registration surcharge (after 24 April)	50	___
TOTAL REGISTRATION FEES		___

ACCOMMODATION
Please book directly with the hotel as soon as possible via the symposium website or by faxing or mailing the enclosed hotel booking form to Doubletree Hotel, 310 SW Lincoln, Portland OR 97201 USA. Please also fax/mail a copy to the Local Organising Committee so they can follow up on registrations.

Payment of registration fee, in pounds sterling drawn on a UK bank, may be made by cheque to:

INTERNATIONAL GLACIOLOGICAL SOCIETY

or by Access/Eurocard/MasterCard or VISA/Delta

Card No.															Expires				

Name on card:_____

Signature: _____

Payment may also be made to: National Westminster Bank plc, Account no: 54770084, 56 St. Andrew's Street, Cambridge CB2 3DA, UK (any Bank or Transfer charges must be included).

Mail to: Secretary General, International Glaciological Society, Scott Polar Research Institute, Lensfield Road, Cambridge CB2 1ER, UK

If payment made after 24 April 2004, add £50 for each person

Excursions
To assist in planning it is important that you express your interest at registration – and no later than 24 April 2004

Minimum 15 participants is required for the post-symposium tour
I want to participate in excursion:

1. Pre-symposium craft brew tour ☐

2. Five days post-conference excursion to central Oregon ☐

INTERNATIONAL SYMPOSIUM ON ARCTIC GLACIOLOGY

Geilo, Norway, 23–27 August 2004

CO-SPONSORED BY

INTERNATIONAL ARCTIC SCIENCE COMMITTEE (IASC)
WORKING GROUP ON ARCTIC GLACIOLOGY

SECOND CIRCULAR

The International Glaciological Society and the International Arctic Science Committee, Working Group on Arctic Glaciology will hold an International Symposium on Arctic Glaciology in Geilo, Norway at the end of August 2004. Registration and ice breaker on Sunday 22 August, and sessions from 23–27 August.

SYMPOSIUM ORGANIZATION
Magnús Már Magnússon (Secretary General, International Glaciological Society)

LOCAL ARRANGEMENTS COMMITTEE
Jon Ove Hagen (chair), Elisabeth Isaksson, Jack Kohler, Kjetil Melvold, Rune Engeset

EDITORIAL BOARD
Julian Dowdeswell (Chief Editor), Ian Willis (Assistant Chief Editor), Dorthe Dahl Jensen, Andrey Glazovskiy, Will Harrison, Elisabeth Isaksson, Jacek Jania, Tavi Murray, Hans Oerlemans, Niels Reeh

INFORMATION ABOUT THE SYMPOSIUM MAY BE OBTAINED FROM:
International Glaciological Society, Scott Polar Research Institute,
Lensfield Road, Cambridge CB2 1ER, U.K.
Tel: + [44] (0)1223 355 974 Fax: + [44] (0)1223 336 543
E-mail: igsoc@igsoc.org
Web: http://www.igsoc.org/symposia/
http://npolar.no/igs-geilo/

PARTICIPATION
This circular includes forms for registration and accommodation. The registration form and accompanying payment should be returned before 29 May 2004. There will be a £50 surcharge for late registration. The participant's registration fee covers organisation costs, a set of abstracts, the icebreaker party, the banquet, the mid-week excursion, and a copy of the *Annals of Glaciology*. The accompanying person's registration fee includes organisation costs, the icebreaker, the banquet, and the mid-week excursion. It will be possible to organize additional trips through the local tourist office. There is an extra administration charge of £30 for participants who are not members of the International Glaciological Society.

Registration fees	**UK £**
Participant (IGS member)	230
Participant (not IGS member)	260
Student and retired IGS members	100
Accompanying person aged 18 or over	50
Late registration surcharge (after 29 May)	50

Refunds on registration fees will be made on a sliding scale, according to date of receipt of notification up to 7 August 2004. After that date it may be impossible to make any refund. See registration 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
Approximately two-thirds of the Earth's small glaciers and ice caps are located in the Arctic, in addition to the 1.7 million km^2 Greenland Ice Sheet. The enhanced climate warming predicted for the Arctic is likely to have important consequences for the mass-balance and dynamics of Arctic ice masses; accelerating melting has been observed in some parts of the Arctic already, providing a significant contribution to observed global sea-level rise. Cores from Arctic ice masses are also a key source of high-resolution palaeoclimatic information. Understanding the flow-behaviour of these ice masses is also important both to modelling future cryospheric responses to climate change and to interpreting ice-core records. The understanding of the past, present and likely future responses of Arctic ice masses to climate change is the key aim of this conference. Approaches using and integrating field observations, remote sensing and modelling are welcomed.

TOPICS
The suggested topics include:

1. Climate records from Arctic ice cores
2. Quaternary (Pleistocene and Holocene) history of Arctic glaciers
3. Glaciers and greenhouse warming: future response, fresh-water flux and sea-level response
4. Mass balance of glaciers and ice caps
5. State and balance of the Greenland Ice Sheet
6. Modelling
7. Remote sensing
8. Dynamics, surging glacier

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

PUBLICATION
Selected papers from the symposium will be published by the Society in the *Annals of Glaciology*. All papers (including those based on posters) will be refereed and edited according to the Society's regular standards before being accepted for publication.

PAPERS

(1) SUBMISSION OF ABSTRACTS
Participants who want to contribute to the Symposium should submit an abstract of their proposed presentation. This abstract must contain sufficient detail to enable us to judge its scientific merit and relevance. 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, names and address of author(s) at the top of the abstract, not on a separate sheet. Indicate at the bottom which specific topic(s) 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 their paper on this topic should not exceed 5 printed pages in the *Annals*; extra pages will be charged at the rate of £90 per page. Honouring page charges (also £90 per page) for the first five pages is encouraged. Send abstracts by e-mail, fax or regular mail to: Secretary General, International Glaciological Society, Scott Polar Research Institute, Lensfield Road, Cambridge CB2 1ER, U.K.

LAST DATE FOR RECEIPT OF ABSTRACTS: 16 FEBRUARY 2004

(2) SELECTION OF ABSTRACTS
Each abstract will be assessed on its scientific quality and relevance to the topics of the Symposium. Authors whose abstracts are accepted will be invited to make either an oral or poster presentation at the Symposium and submit a paper for publication in the *Annals of Glaciology* (included in the ISI Science Citation Index®). First or corresponding authors will be advised in late March 2004 of the acceptance or otherwise; other authors will not be informed separately. Authors who have not received notification by 10 April 2004 should contact the IGS office in Cambridge in case their abstract was not received. Acceptance of an abstract means that the paper based on it should be submitted to the *Annals of Glaciology* and not to another publication. Note: abstracts alone will not be published in the *Annals of Glaciology*.

(3) DISTRIBUTION OF ABSTRACTS
A set of the accepted abstracts will be provided to participants upon registration on 22 August 2004.

(4) SUBMISSION OF PAPERS AND PUBLICATION
FOUR copies of each paper, doubled-spaced with wide margins, should be sent to the Secretary General, International Glaciological Society, Scott Polar Research Institute, Lensfield Road, Cambridge CB2 1ER, U.K., by 21 June 2004. ALL AUTHORS ARE EXPECTED TO ADHERE TO THIS DEADLINE. Papers should be prepared in accordance with the instructions sent to authors with the abstract acceptance notification. Papers will be refereed according to the usual standards of the Society before being accepted for publication. Final papers, based on presentations at the Symposium, which have been submitted and accepted by the Editorial Board following review, will be published in English in the *Annals of Glaciology*. Final, revised versions of papers, diskettes and original art work must be submitted by 4 October 2004. Speedy publication of the *Annals of Glaciology* will depend upon strict adherence to deadlines.

LAST DATE FOR RECEIPT OF PAPERS: 21 June 2004

EXCURSIONS

1. Mid-week excursion Hardangerjøkulen

On Wednesday a half day – excursion to Hardangerjøkulen will be arranged; Geilo-Finse by train (35 min), easy walk from Finse railway station to the outlet glaciers Midtdalsbreen and Blåisen, visit to the automatic weather station on the glacier. In total ca. 5 hours walk. Travel and food cost is included in registration fee.

2. Post-conference excursion – Norway

Three days excursion to the glaciers in western Norway by bus and foot.
Day 1. Geilo-Fjærland, visit glacier fronts and the Norwegian Glacier Museum.
Day 2. Jostedalen-Nigardsbreen, outlet glaciers from Jostedalsbreen.
Day 3. Jotunheimen, Storbreen glacier forefield, Juvflya, periglacial forms,
bus to Lom–Otta – Oslo.
Total cost ca. 350 €

3. Pre-conference excursion – Svalbard glaciers Both excursions have been cancelled due to lack of interest

TRAVEL AND ACCOMMODATION

The symposium will be arranged in Geilo, a winter sports village along the railroad between Oslo and Bergen, easily accessible from both Oslo and Bergen by train (see: www.nsb.no) or by bus or car. We will stay in a nice conference hotel: Bardøla hotel (www.bardola.no). The prices for the hotel per day will range from 120 € (£85) (single room), 100 € (£70) (double room), 75-90 € (£50-60) (5-6 beds very high standard cabins with all facilities). *The prices include all meals and coffee-breaks.* The accommodation can be paid directly to the hotel during the conference. There will also be an option for cheaper accommodation on camp-sites, but then with individual food arrangements. Day-price for all meals at the hotel is then 36 € (£25).

IMPORTANT DATES

Svalbard excursions	31 January 2004
Abstracts due	16 February 2004
Notification of acceptance	10 April 2004
Pre-registration deadline	29 May 2004
Papers due	21 June 2004
Accommodation-booking deadline	29 May 2004
Deadline for full refund	5 July 2004
Deadline for refund	7 August 2004
Registration for conference	22 August 2004
Conference starts	23 August 2004
Final revised papers	4 October 2004

REGISTRATION FORM

Family Name: _____

First Name: _____

Address: _____

_____

Tel: _____ Fax: _____ E-mail: _____

Accompanied by:

Name: _____ Age (if under 18) ____

Name: _____ Age (if under 18) ____

REGISTRATION FEES	£	£
Participant (member of the IGS)	230	___
Participant (not a member of the IGS)	260	___
Student or retired IGS member	100	___
Accompanying person aged 18 or over	50	___
Late registration surcharge (after 29 May)	50	___
TOTAL REGISTRATION FEES		___

ACCOMMODATION

Please indicate the type of accommodation required:

Single room ☐ Double room ☐ Twin room (shared) ☐ Cabin ☐ Camping/others ☐

Payment of registration fee, in pounds sterling drawn on a UK bank, may be made by cheque to:

INTERNATIONAL GLACIOLOGICAL SOCIETY

or by Access/Eurocard/MasterCard or VISA/Delta

Card No.															Expires				

Name on card:_____

Signature: _____

Payment may also be made to: National Westminster Bank plc, Account no: 54770084, 56 St Andrew's Street, Cambridge CB2 3DA, UK (any Bank or Transfer charges must be included).

Mail to: Secretary General, International Glaciological Society, Scott Polar Research Institute, Lensfield Road, Cambridge CB2 1ER, UK

If payment made after 29 May 2004, add £50 for each person

Excursions.
To assist in planning it is important that you express your interest at registration – and no later than 31 January 2004. Participants for the Svalbard excursions will be contacted directly for more information and payment after 31 January.
Minimum 15 participants is required for both Svalbard excursions

I want to participate in excursion:

1. Three days post-conference excursion in western Norway		☐
2. Pre conference excursion to Svalbard – glaciers, by ship to Hornsund	**CANCELLED**	☐
3. Pre-conference excursion to Svalbard – glacial geology, Ny-Ålesund	**CANCELLED**	☐

INTERNATIONAL SYMPOSIUM ON HIGH-ELEVATION GLACIERS AND CLIMATE RECORDS

Lanzhou, China 5–9 September 2005

CO-SPONSORED BY

National Natural Science Foundation of China
Chinese Academy of Sciences
China Meteorological Administration

FIRST CIRCULAR

The International Glaciological Society will hold an International Symposium on High-Elevation Glaciers and Climate Records in 2005. The symposium will be held in Lanzhou, China, with registration on 4 September and sessions from 5–9 September 2005.

THEME
High-elevation glaciers are widely distributed in the world, not only at low and middle latitudes but also in the polar regions. Even on the ice sheets in polar regions, some ice cores have been drilled at quite high elevation. Snow cover is another important process in high-elevation regions. Glacial variations, snow cover and glacial records are very important

in the study of climatic changes, water resources and disasters in high-elevation regions. This symposium will focus on glacier variations, processes and their consequences, snow cover and related processes, and climate records from glaciers.

TOPICS

The suggested topics include:

1. Climate and environment records from ice cores
2. Glacier variations
3. Glacial deposits and climate change
4. Interaction between snow/ice and atmosphere
5. Glacier physics
6. Glacio-hydrological processes
7. Glacier mass balance and modelling
8. Snow cover and related process

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

PUBLICATION
Selected papers from the symposium will be published by the Society in the *Annals of Glaciology*. All papers (including those based on posters) will be refereed and edited according to the Society's regular standards before being accepted for publication.

ACCOMMODATION
Details will be given in the Second Circular.

FURTHER INFORMATION
If you wish to attend the symposium please return the attached form as soon as possible. The Second Circular will give information about accommodation, the general programme, and preparation of abstracts and final papers. Copies of the Second Circular will be sent to those who return the attached reply form. Members of the International Glaciological Society will automatically receive one.

SYMPOSIUM ORGANIZATION
Magnús Már Magnússon (International Glaciological Society)

CHIEF SCIENTIFIC EDITORS
Lonnie Thompson and Ellen Mosley-Thompson

LOCAL ARRANGEMENTS COMMITTEE
Qin Dahe (Chairman), Shi Yafeng, Li Jijun, Yao Tandong, Ren Jiawen

INTERNATIONAL SYMPOSIUM ON SEA ICE

Dunedin, New Zealand 5–9 December 2005

CO-SPONSORED BY

University of Otago
Royal Society of New Zealand

FIRST CIRCULAR

The International Glaciological Society will hold an International Symposium on Sea Ice in 2005. The symposium will be held in Dunedin, New Zealand, with registration on 4 December and sessions from 5–9 December 2005.

THEME
The sea ice of the Arctic and Antarctic Seas exerts a major impact on the regional oceans and atmosphere, concomitantly affecting global climate and modifying the global oceans. It also strongly influences the ecology of the polar oceans. Through remote sensing, fieldwork and modelling, often with a multidisciplinary flavour, scientists are well placed to make significant progress over the next two decades in our understanding of this vital constituent of the geosphere and biosphere at all scales. Succeeding the very successful 'International Symposium on Sea Ice and its Interactions', held in Fairbanks, Alaska during June 2000, the overarching goal of this symposium is to promote interdisciplinary discussion of the geophysics of sea ice and its interactions with the ocean, atmosphere and biosphere.

TOPICS
The suggested topics include:

1. Sea ice and climate
2. Sea-ice growth and decay
3. Sea-ice morphology, motion and deformation
4. Large scale sea-ice processes
5. Atmosphere–ice–ocean interactions
6. Interactions between sea ice and ice shelves
7. Sea-ice ecology and habitat
8. Sea-ice modelling

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

PUBLICATION
Selected papers from the symposium will be published by the Society in the *Annals of Glaciology*. All papers (including those based on posters) will be refereed and edited according to the Society's regular standards before being accepted for publication.

ACCOMMODATION
Details will be given in the Second Circular.

FURTHER INFORMATION
If you wish to attend the symposium please return the attached form as soon as possible. The Second Circular will give information about accommodation, the general programme, and preparation of abstracts and final papers. Copies of the Second Circular will be sent to those who return the attached reply form. Members of the International Glaciological Society will automatically receive one.

SYMPOSIUM ORGANIZATION
Magnús Már Magnússon (International Glaciological Society)

SCIENCE STEERING AND EDITORIAL COMMITTEE
Pat Langhorne and Vernon Squire (Chief Scientific Editors), Martin O. Jeffries, Ian Allison, Gerhard Dieckmann, Hajo Eicken, Jean-Louis Tison, Tony Worby, Enrico Zambianchi, Christian H. Fritsen, Matti.Lepparanta, Donald Perovich, Kunio Shirasawa, Stan Jacobs, Mike Williams, Adrian Jenkins, Stein Sandven, Joey Comiso, Jamie Morison, Alexander Makshtas, Michelle Johnston, Stephen Jones, Ruth Preller, Stephen Ackley.

LOCAL ARRANGEMENTS COMMITTEE
Vernon Squire and Pat Langhorne (co-Chairs), Blair Fitzharris, Harry Keys, Russell Frew, Tim Haskell, Mike Williams.

SYMPOSIUM ON HIGH-ELEVATION GLACIERS AND CLIMATE RECORDS

Lanzhou, China, 5–9 September 2005

Family Name: _____

First Name(s): _____

Address: _____

_____

_____

Tel: _____ Fax: _____

E-mail: _____

I hope to participate in the Symposium in September 2005 ☐

I expect to submit an abstract ☐

My abstract will be most closely related to the following topic(s): _____

_____

I am interested in an accompanying person's programme ☐

SYMPOSIUM ON SEA ICE

Dunedin, New Zealand, 5–9 December 2005

Family Name: _____

First Name(s): _____

Address: _____

_____

_____

Tel: _____Fax: _____

E-mail: _____

I hope to participate in the Symposium in December 2005 ☐

I expect to submit an abstract ☐

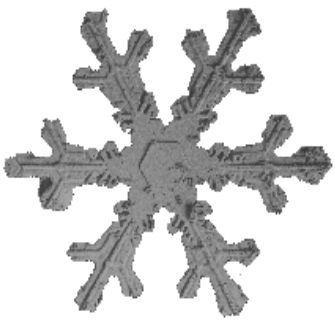
My abstract will be most closely related to the following topic(s): _____

_____

I am interested in an accompanying person's programme ☐

PLEASE RETURN AS SOON AS POSSIBLE TO:

Secretary General, International Glaciological Society,
Scott Polar Research Institute, Lensfield Road, Cambridge, CB2 1ER, UK. Tel: +44 (0)1223 355 974 Fax: +44 (0)1223 354 931 E-mail: igsoc@igsoc.org eb: http://www.igsoc.org



BOOKS RECEIVED

R S Williams Jr. and J G Ferrigno *eds.* 2002. *Glaciers of North America. Satellite image atlas of glaciers of the world.* USGS Professional paper 1386-J. 405 pp. (ISBN 0-607-98290-X)

J Dowdeswell and M Hambrey. 2002. *Islands of the Arctic.* Cambridge University Press. 288 pp. (ISBN 0-521-81333-6, £ 25)

G Kaser and H Osmaston. 2002. *Tropical glaciers.* Cambridge University Press. xx + 207 pp. map. (International Hydrology Series) (ISBN 0-521-63333-8, £ 75/US$ 110)

D N Thomas, ed. 2003. *Sea Ice. An introduction to its physics, chemistry, biology and geology.* Blackwell publishing, Oxford. 416 pp. (ISBN 0-632-05808-0 (hardback) £89.50)

M Phillips, S M Springman and L U Arenson, eds. 2003. *Permafrost.* Proceedings of the eighth international conference on permafrost, 21-25 July 2003, Zurich, Switzerland. AA Balkema Publishers. Lisse, Netherlands1380 pp. (ISBN 90-5809-582-7. 2 vols. EUR 425/US$467.50)

A P Lisitzin. 2003. *Sea-ice and iceberg sedimentation in the ocean: recent and past.* Springer-Verlag, Heidelberg. 564 pp., including 332 figures and 121 tables. (ISBN 35-4067-965-0 (hardcover) £140)

W O Field and C S Brown. 2004. *With a camera in my hands: William O. Field, pioneer glaciologist.* University of Alaska Press. 208 pp., 363 b&w photos and maps. (ISBN 1-889963-46-1 (cloth) US$ 59.95; ISBN 1-889963-47-X (paperback) US$ 29.95).

RECENT MEETINGS (of other organisations)

Workshop on Improving the Monitoring of Global Glacier Recession

Worldwide recession of most mountain glaciers over the last half-century or longer is well known. Recent evidence suggests an acceleration of glacier mass loss in several key regions, such as high mountains in tropical areas, the European Alps, Alaska or central Asia..It is imperative for strategies of climate change detection but also for of ice contributions to global sea level rise and of future water resources from glacierized basins, that a more comprehensive evaluation be made of glacier changes. Since 1990, the value of glaciers as a long-term climatic indicator, especially for mountain regions of the world has been recognized by the IPCC (2001).

The Second Adequacy Report on Global Observations for the UN Framework Convention on Climate Change (UN FCCC) to be held in summer 2003 (see http://www.wmo.ch/web/gcos/gcos&unfccc.htm) has reaffirmed the importance of glacier observations. It is estimated that there over 160,000 glaciers worldwide. During 24 years of coordinated international effort, 44 % of these ice bodies have been inventoried, and valuable information has been collected about their characteristics. The urgent need to repeat such detailed inventories for analyzing representative trends in time,and to upgrade continuously and complete the current World Glacier Inventory, clearly indicate the necessity for a new coordinated approach. The recent availability of high resolution Landsat-7, and ASTER images, in particular, together with new methods for automated analysis based on GIS techniques in digital inventories of glaciers in European Alps, the former Soviet Union and in China (**http://nsidc.org/data/glims/**), affords one avenue to a potential solution for assessing global glacier recession. With this aim in mind, forty glacier specialists from ten nations participated in a three-Day Workshop convened in Boulder, Colorado, 16-18 March, 2003. In addition to invited talks, three working groups addressed: The assessment of GCOS variables for glaciers;
World Glacier Inventories; and glacier mapping. The main conclusions reached were:

- Remote Sensing and Field scientists should immediately begin to combine efforts to provide world glacier monitoring and inventory. We have a well designed monitoring strategy that is integrated to include the multiple levels of the ways we monitor glacier via remote sensing and field measurements.
- Periodic assessment of the monitoring strategy itself is required.
- Determination of the quality of measurements, error estimates, and verification of measurements needs to be a part of all programs.
- Cross training of field scientists and remote sensing scientists needs to be undertaken, especially in the developing world..
- Historical and modern measurements of glacier fluctuations are available that could take the time series from the Little Ice Age to the present if proxy data are integrated with the modern field and remotely sensed data.

Recommended Actions:

1. Identify the location and outline (area) of all glaciers worldwide at present complete/upgrade and repeat existing inventories and maps, and fill 'gap' regions. For glacier outline maps this should ideally be based on satellite images for speed and consistency. Mapping efforts should transcend political boundaries.
2. Scan available field maps including the 1:1 million glacier maps of Canada and put them on the Web at NSIDC and scan them
3, Immediately identify especially important glaciers and map them first. Importance should be defined in terms of specific applications, including sea level change, climate signals, impact on humans (water resources, natural hazards)
4. Develop standard definitions of parameters: location of ice divides, length, etc. (GLIMS is producing an illustrated dictionary of glacier parameters).
5. Give highest priority to directly measured quantities (outlines, DEMs), versus derived data such as ELA
6. Establish methods of standardized automation in image analysis to produce glacier maps.
7. Develop a systematic approach to quality assessment of glacier measurements derived from remote sensing data (first priority: geometric correction and second priority radiometric calibration). Standardization document is currently being compiled (M Bishop). A quality assessment should be input into all glacier databases.for global assessment studies, highest quality data should be used whenever possible for analysis.
8. Mapping efforts should incorporate remote sensing, GIS, field data, and numerical modeling, as appropriate. Glacier maps should be used as information for the assessment of temporal glacier changes.
9. Credit should be given to data providers and citation standards should be implemented for map data.
10. The glaciological community should ensure continuity of satellite measurements suitable for glacier mapping;. spatial resolution of 5 m (to be further analyzed) is desired for glacier mapping. Ideally, annual coverage of the world's glaciers at the end of the melt season should be acquired. Field measurements remain essential for the proper interpretation and evaluation of information derived from satellite data.
11. Coordination and data management costs need to be provided.

The Workshop was sponsored by seven programs of the U.S. National Science Foundation (Office of Hydrology, Atmospheric Sciences, Geology and Paleontology, Office of Polar Programs, and International Programs) and organized through the Cooperative Institute for Research in Environmental Sciences and the National Snow and Ice Data Center, University of Colorado at Boulder.

Coordinator: ROGER G. BARRY, University of Colorado, Boulder. Working Group Chairs: WILFRIED HAEBERLI. University of Zurich, Switzerland, JEFF KARGEL, USGS, Flagstaff, AZ, DOROTHY HALL, NASA GSFC, and GREG SCHARFEN, NSIDC, University of Colorado, Boulder.

Workshop Participants: Todd P.Albert, CIRES; Vladimir Aizen, University of Idaho; Anthony Arendt, University of Alaska, Richard Armstrong, NSIDC; Andrew Barrett,NSIDC; Roger G. Barry,NSIDC; Michael P. Bishop, University of Omaha; Francisca Bown,Universidad de Chile; Graham Cogley, Trent University, Ontario; Jean-Pierre Dedieu, LGGE, Grenoble; Mark Dyurgerov, INSTAAR; Florence Fetterer, NSIDC; Andrew Fountain, Portland State University; Wilfried Haeberli, University of Zurich;Jon Ove Hagen, University of Oslo; Dorothy K. Hall, NASA GSFC; Jeff Kargel, USGS, Flagstaff,AZ; Siri Jodha Singh Khalsa, CIRES; Tatiana Khromova, Institute of Geography, Moscow; Hester Jiskoot, University of Lethbridge;Rajesh Kumar, J. Nehru University, New Delhi; Giovanna Lorenzin, National Mapping Division, Geoscience, Australia; William Manley, INSTAAR; Alexander Machado, NSIDC; Mark F. Meier, INSTAAR; Bruce Molnia, USGS; Gennady Nosenko, Institute of Geography, Moscow; Simon Ommanney,IGS; Harold Pranger, National Parks Service; Bruce Raup, NSIDC; Gregory Scharfen, NSIDC; Martin Sharp, University of Alberta; Zachary Smith, Tufts University; Konrad Steffen, CIRES; Dennis Trabant, USGS, Anchorage,AK; Ronald L. Weaver, NSIDC; Richie Williams, USGS, Reston,VA, Li Xin, CAREERI, Lanzhou.

Acknowledgements: The workshop was provided by NSF (EAR-0307144) through a grant to Roger Barry. The responsible Program Manager was Dr. Douglas James (GEO/EAR) with funds contributed by Drs. Jane Dionne (OPP), H. Richard Lane (GEO/EAR), Cassandra Dudka (NSF International), Julie Palais (OPP), and David Verado (GEO/ATM) thanks are due to Kathy Zellers, CIRES for meeting logistics.

10th International Conference on the Physics and Chemistry of Ice

The Proceedings of the 10th International Conference on the Physics and Chemistry of Ice, held in St. John's last year, 2002, is now published as a special issue of the Canadian Journal of Physics, Vol. 81, No. 1/2, Jan/Feb 2003, available from the National Research Council of Canada, see http://cjp.nrc.ca .

NEWS

OBITUARY

B. Lyle Hansen (1916 –2003)

Bernard Lyle Hansen, a pioneer scientist in glaciology and geophysics, passed away in Grand Island, Nebraska on August 1, 2003 at the age of 87. He was born on July 7 1916 in Providence, Utah. Lyle was a physicist, engineer, inventor, researcher and author. He received his BSc degree in physics from Brigham Young University in 1940. Following graduation, he went to work with the Instrument Division of the U.S. Weather Bureau, first as an instrument engineer and physicist, and later as Director of the Bureau's Central Sierra Snow Laboratory in Soda Springs, California (1947–1949). As a Research Associate at the University of Minnesota in 1949, Lyle assisted Henri Bader in establishing the newly formed Snow, Ice and Permafrost Research Establishment (SIPRE). In 1951, he moved with SIPRE to Wilmette, Illinois, as head of the Technical Services Branch. In 1961, he moved to Hanover, New Hampshire where SIPRE joined with the Arctic Construction and Frost Effects Laboratory (ACFEL) to form the Cold Regions Research and Engineering Laboratory (CRREL). He was the Head of the Technical Services Division until his retirement in 1973.

Since the early 1950s, Lyle spent numerous field seasons in either Antarctica or Greenland. During this period, he was instrumental in the design and development of instruments and equipment for: the determination of the physical properties of snow, ice and frozen ground including borehole logging and ice sheet dynamics; the geophysical applications of infrared radiation; and deep core drilling in ice. He participated in the first borehole drilling at Little America on the Ross Ice Shelf in 1958. He then headed the CRREL deep drilling program whose crowning achievement was the first ever penetration of the Greenland Ice Sheet in 1966 and the Antarctic Ice Sheet in 1968 for which he received national and international acclaim. He received the Army's decoration for Exceptional Civilian Service and the Research and Development Achievement Award in 1967.

In further recognition of his expertise and contributions to cold regions research and engineering, particularly deep ice core drilling, he was awarded the Seligman Crystal in 1972 by the International Glaciological Society.

After retirement from CRREL, he joined Polar Ice Coring Office (PICO) at the University of Nebraska where he served as a Research Associate and Consultant and, later, as Research Associate with the University's Snow & Ice Research Group. He developed instruments and conducted fieldwork in Antarctica and Greenland into the 1990's. During this time he participated in the surveys of the deep ice boreholes at Camp Century and Dye-3, Greenland, and Byrd Station, Antarctica and the first penetration of the Ross Ice Shelf by a flame jet drill in 1977. He was instrumental in the development of a thermal probe for in-situ sampling of ice sheet parameters.

He mentored numerous scientists and engineers throughout his career. He received a PhD Honoris causa from the University of Bern, Switzerland, in 1978. He maintained memberships in the American Meteorological Society, American Geophysical Union, International Glaciological Society, New York Academy of Sciences, and Sigma Xi.

Lyle's determination, perseverance, and dedication were legendary. His impact upon the glaciological and geophysical community will be felt for years to come.

He was preceded in death by his wife, Mary (Robinsen) Hansen and is survived by a son Bernard Charles, a grandson B. Lyle Jr. and a sister, Ruth Keeton.

Herbert T. Ueda

AWARDS

Retired U.S. Geological Survey (USGS) research hydrologist Austin Post has been honored with an honorary doctor of sciences degree for his contributions to the field of glaciology. Post received the Richard C. Hubley Crystal in 1990 for his pioneering analysis of aerial photography to study the dynamics of glaciers. His work has led to better understanding of glacial surges, calving and the stability of tidewater glaciers for which he was recognized with the Meritorious Service Award from the USGS in 1984. His body of work is used as the basis for ongoing studies in glaciology at UAF's Geophysical Institute and around the world. After more than 20 years documenting glaciers for the USGS and the University of Washington, Post is

credited with one of the most extensive photograph collections of glaciers in the world as well as predicting the retreat of Alaska's Columbia glacier and potential hazards in shipping lanes due to ice flows. He has produced several publications and technical reports, including the book "Glacier Ice," which he co-authored with Edward R. LaChapelle. After the Exxon Valdez oil spill in 1989, he helped establish the Iceberg Monitoring Project in Prince William Sound, a two-year project funded by the Regional Citizens' Advisory Council to obtain time-lapse photography of ice leaving Columbia Glacier and causing hazards in nearby shipping lanes. Icebergs are thought to have played a role in the spill as the Exxon Valdez had shifted course to avoid them and subsequently ran aground on Bligh Reef dumping 11 million gallons of oil into the sound.

John Glen, a long time editor of the *Journal of Glaciology*, has been awarded Honorary Life Membership of the European Association of Science Editors (EASE). Glen feels that since he learned his editing with the *Journal* and Gerald Seligman, this honour also redounds back on them.

FUTURE MEETINGS (of other organisations)

11TH INTERNATIONAL CONFERENCE AND FIELD TRIP ON LANDSLIDES

Norway, 1–10 September 2005

The International Conference and Field Trip on Landslides (ICFL) was founded by members of the Japanese Landslide Society and the International Landslide Research Group. The aim is to provide a favourable environment for scientists, engineers and planners concerned with landslides to meet in the field to discuss and exchange ideas about landslide processes, investigations and monitoring.

Previous meetings have been held in Japan, USA, Australia/New Zealand, Switzerland. Austria, Italy, Czechoslovakia, Spain, England and Poland.

The intention for the arrangement of the 11th ICFL is to concentrate on the major types of landslides and avalanches that affect human life in Norway.

We also want to pay attention to how landslide hazard is identified and protective measures are planned and constructed. The field trips and meetings give the participants an excellent opportunity to discuss and exchange ideas on practical aspects of slides and protective measures.

Norway is known for its long and narrow fjords with mountain sides leading directly into the sea. A considerable part of the slides in Norway thus occurs in the most scenic areas of the country. The 11th ICFL takes advantages of this, and the field trips are located to some of these spectacular regions.

Further information will be found in the conference home page:

www.ivt.ntnu.no/ICFL05

e-mail: icfl05@ivt.ntnu.no

18TH INTERNATIONAL FORUM FOR RESEARCH INTO ICE SHELF PROCESSES (FRISP)

AWI's Biological Institute, 5–7 October 2004

We welcome presentations on all aspects of ice shelf research, including, but not limited to:

· formation, flow and disintegration of ice shelves;· response of ice shelves to past, present and future climate variability; · surface and basal mass balance of ice shelves; · mass transport across the grounding line; · ocean circulation and water transformation beneath ice shelves; · impact of ice shelves on the global ocean; · ice shelves of Greenland; · climate records from on or near current or former ice shelves; · iceberg drift, melting, and decay.

Further information about FRISP, including reports from previous workshops can be found at

http://www.gfi.uib.no/frisp/

Details of the meeting, including on-line registration and information on accommodation and travel to Helgoland can be found at:

http://www.awi-bremerhaven.de/Workshops/FRISP-04

WORKSHOP ON"MOUNTAIN GLACIERS AND SOCIETY:PERCEPTION, SCIENCE, IMPACTS AND POLICY"

Wengen, Switzerland, 6–8 October, 2004

The three-day meeting will consist of a number of keynote papers to set the pace of each Workshop session, supporting contributions, and discussion sessions.
Contributions based on the following themes are therefore invited:
* impacts of physical changes
* changes in hazards in response to glacier changes
* monitoring and modelling
* human perception of glacial retreat and advance and its relation to identity
* responses to changes in glaciers, including changes in configuration and also intensity and frequency of natural hazards

Additional subtopics and relevant information on:

www.unifr.ch/geoscience/geographie/EVENTS/Wengen/04/Wengen2004.html

WORKSHOP ON EOS SNOW AND ICE PRODUCTS

The First Workshop on EOS Snow and Ice Products will be held near Goddard Space Flight Center in Greenbelt, Maryland, on November 16-17, 2004. The intent of the workshop is to bring together current and potential users of EOS snow and ice standard products from the Moderate-Resolution Imaging Spectroradiometer (MODIS), Advanced Microwave Scanning Radiometer - EOS (AMSR-E), Ice, Cloud and land Elevation Satellite (ICESat), Enhanced Thematic Mapper Plus (ETM+) and Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) sensors. The themes of the workshop center on the snow and ice products and results, including validation results; integration of EOS snow and ice products into models; production of climate data records; and discussion of improvements to data access and availability. Presentations by data producers will be made, and demonstrations dealing with the acquisition and use of the products will be provided by the National Snow and Ice Data Center (NSIDC) and the Goddard Distributed Active Archive Centers (DAACs). All users of EOS data are invited to present posters on their snow- and ice-related results. There will be ample time during the workshop for discussions relative to the workshop themes. If interested, please contact Dorothy Hall at NASA/GSFC at Dorothy.K.Hall@nasa.gov, or Marilyn Kaminski at NSIDC marilynk@nsidc.org.

GLACIOLOGICAL DIARY

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2004

9–11 June 2004
61st Eastern Snow Conference, Portland, Maine, USA
Susan Taylor, Program Chair, Cold Regions Research and Engineering Laboratory, Hanover, NH 03755, USA
Tel: 603-646-4239 Fax: 603-646-4785
E-mail: Susan.Taylor@erdc.usace.army.mil
Web: http://www.easternsnow.org

6–9 July 2004
Second symposium on Mass Balance of Andean Glaciers, Huaraz, Peru
UR GreatIce, IRD, Maison des Sciences de l.Eau, 911, Avenue Agropolis, BP 64501, 34394, Montpellier Cedex, France
Email: huaraz2004@msem.univ-montp2.fr
Web: http://www.mpl.ird.fr/hydrologie/greatice/

26–30 July 2004
** International Symposium on Ice and Water Interactions: Processes Across the Phase Boundary, Portland State University, Portland, Oregon, U.S.A.
Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, UK Web: http://www.igsoc.org/symposia/

26–28 July 2004
SCAR Open Science Conference: Antarctica and the Southern Ocean in the Global System, Bremen, Germany
XXVIII SCAR and COMNAP XVI Meeting
Secretariat, Alfred Wegener Institute for Polar and Marine Research, Columbusstraße, 27568 Bremerhaven, Germany
Email: secretary@scar28.org
Web: http://www.scar28.org/

23–27 August 2004
** International Symposium on Arctic Glaciology, Geilo, Norway
Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, UK
Web: http://www.igsoc.org/symposia/

1–10 September 2004
The 11th International Conference And Field Trip On Landslides. Kåre Senneset, www.ivt.ntnu.no/ICFL05
e-mail: icfl05@ivt.ntnu.no

8–9 September 2004
IGS British Branch Annual Meeting, Department of Geography, University of Sheffield. Andy Hodson,Department of Geography, University of Sheffield, Sheffield, UK. (Tel [44] 114 222 7950: a.j.hodson@sheffield.ac.uk; http://www.shef.ac.uk/geography/igs2004

16–18 September 2004
International Workshop on Antarctic Peninsula Climate Variability, Cambridge, UK
Mrs K M Salisbury, British Antarctic Survey, High Cross, Madingley Road, Cambridge CB3 0ET, UK
Email: kms@bas.ac.uk
Web: http://www.antarctica.ac.uk/met/AP2004/

5–7 October 2004
18th International Forum For Research Into Ice Shelf Processes (Frisp), AWI's Biological Institute, Adrian Jenkins, a.jenkins@bas.ac.uk
Web:http://www.awi-bremerhaven.de/Workshops/FRISP-04

6–8 October 2004
Workshop On"Mountain Glaciers And Society: Perception, Science, Impacts And Policy" Wengen, Switzerland, Javier G. Corripio, Javier.Corripio@ethz.ch
Web:www.unifr.ch/geoscience/geographie/EVENTS/Wengen/04/Wengen2004.html

16–17 November 2004
Workshop on EOS Snow and Ice Products. Goddard Space Flight Center in Greenbelt, Maryland, Dorothy Hall at NASA/GSFC Dorothy.K.Hall@nasa.gov, Marilyn Kaminski at NSIDC marilynk@nsidc.org.

2005

23–27 August 2005
* Conference on Glacial Sedimentary Processes and Products, Aberystwyth, United Kingdom
Centre for Glaciology, Institute of Geography and Earth Sciences, University of Wales, Aberystwyth SY23 3DB, United Kingdom
Email: Michael Hambrey mjh@aber.ac.uk, Neil Glasser nfg@aber.ac.uk, Bryn Hubbard byh@aber.ac.uk

1–10 September 2005
The 11th International Conference and Field Trip on Landslides (CFL), Norway
Email: icfl05@ivt.ntnu.no
Web: www.ivt.ntnu.no/ICFL05

5–9 September 2005
** International Symposium on High-elevation Glaciers and Climate Records, Lanzhou, People's Republic of China
Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, UK
Web: http://www.igsoc.org/symposia/

10–14 October 2005
Third International Conference on the Oceanography of the Ross Sea, Antarctica, Venice, Italy
Jane Frankenfield Zanin, CNR-ISMAR (Istituto di Scienze Marine), San Polo 1364, 30125 Venezia, Italy
Email: jane.frankenfield@ve.ismar.cnr.it

5–9 December 2005
** International Symposium on Sea Ice, New Zealand
Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, UK
Web: http://www.igsoc.org/symposia/

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ICE

Editor: M.M. Magnússon (Secretary General)

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