

**NEWS BULLETIN
OF THE INTERNATIONAL
GLACIOLOGICAL
SOCIETY**



Ice

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Cover picture: A leeward glacier cave under the terminus at Totenkopf Kees in the Hohe Tauern Range, Eastern Alps. An ice layer up to 0.5 m thick, originating from meltwater running on the basal rock surface, refroze and was folded by the slow ice movement. This process must have taken place over some years.
Photo: Heinz Slupetzky[©].

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

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From the Editor

Dear IGS member

1 January 2010 will be another milestone for the IGS. We go live with our online paper submission system. The gestation period has been very long but finally it is here. It has not been our topmost priority as the present submission system has worked quite well. But now it is time to take the plunge and join the 21st century on this front as well. On the recommendation of the Publication Committee we chose a system called EJPress. It should be familiar to most of you, as it is the same system used by JGR. When you first register, please do so carefully as it will make things run smoothly in the future and it will greatly help us in making this an efficient system. We have seen an ever-increasing number of paper submissions over the last few years; in fact we have broken our previous record every year since 2006 and 2009 is on the right track.

We will be using separate systems for the *Journal* and the *Annals*. They are almost identical, with the exception that, since the *Annals* is a thematic journal, you will have to submit an abstract beforehand to ensure that it is within the scope of that particular *Annals*. During the abstract submission process you will be given an abstract number and, if your abstract is accepted, you will be required to enter this number at the beginning of the paper submission process. Once the abstract number has been entered the procedure is identical to the one used for the *Journal*.

Ideally you should submit a PDF but the system should be able to cope with most word

processing programs, in particular, Microsoft Word, LaTeX and WordPerfect. There is a slight bug in the system relating to WordPerfect: you must use the US English dictionary. Hopefully this will be fixed in the near future. The formatting requirements are unchanged: one single column file containing the text and all figures and tables.

Good luck with the new IGS online submission system and we look forward to receiving yet another record number of submissions in 2010.

I would like to add that if you are, for whatever reason, unable to make use of this new system, you will of course still be able to submit your paper 'the old-fashioned way'.

On another note, our online membership renewal system should now be fully operational. I would like to ask you to please renew as soon as possible, as we will be sending out the first *Journal* issue of 2010 in late February. If you have not renewed your membership we will not ship a copy to you. Once you renew we will send you all the issues published so far but it is very uneconomical to send the issues out individually. We have an agreement with a shipping company to take the whole print run and mail it out and that is done much more cheaply than if we were to do it individually. It is a very inefficient use of your membership fee to do so. So please renew your membership promptly using our online system if you can.

Magnús Már Magnússon
Secretary General



International Glaciological Society

ANNUAL GENERAL MEETING 2009

*Minutes of the Annual General Meeting of the International Glaciological Society
Thursday 30 July at 13:40, Room 002 in the Newcastle Business School and School of Law Building,
Manor Buildings, City Campus East, Northumbria University, Newcastle upon Tyne, UK*

The President, Dr Eric Brun, was in the Chair.

34 persons from 10 countries were present of whom 30 were IGS members.

1. The previous AGM's minutes

The Minutes of the last Annual General Meeting, published in ICE, 2008, No 147–148, p. 17–20, were approved on a motion by D. Drewry, seconded by F. Pattyn and signed by the President.

2. The President's report

The President gave the following report for 2008–2009:

Dear members, Ladies and Gentlemen

The International Glaciological Society has completed its 73rd year. It's a great honour for me to chair for the first time an Annual General Meeting and present a report on the Society's activities and status for the past year.

I have the pleasure of starting this report by highlighting the increasing success of the *Journal of Glaciology*. For a few years now, we have experienced an important increase in the number of submitted and published papers. In order to alleviate some of the build-up of accepted papers, it was decided to publish a fifth issue in 2008. Taking into account this trend, Council decided to move up to six issues per year. In spite of this 50% increase in publications, we have maintained our prompt publication of the *Journal*, while preserving its very high quality.

At the present time, the first four issues of 2009 have been published and the fifth issue is well advanced.

There are many reasons for such success: the reduction in the time between the submission and the publication of papers; the rapid online access to the *Journal* and the systematic announcement of new issues via the Cryolist; the increasing worldwide attention paid to the interactions between cryosphere and climate and the increasing reputation of the *Journal of Glaciology*, which was awarded the 2007 ALPSP Best Scientific *Journal* prize. On behalf of all IGS members, I would like to express my warmest thanks to those who have built this success: the Chief Editor, the Editorial Board and the Publications Committee,

the Secretary General, the Production Manager and the IGS Staff in Cambridge. The challenge remains to ensure that the Society's publications, especially the *Journal*, are seen as the BEST place to publish.

Additionally, the online submission of papers should be implemented within the next few months.

Volume 50 of the *Annals* is also well on track. We are due to publish four issues in 2009 and we have now published three of those, *Annals* 50(50), 50(51) and 50(52). *Annals* 50(53) is close to completion as well. Volume 51 will start very soon. Undoubtedly, the production of the *Annals* profits by the modernization of the publication processes, too. However, there are still some uncertainties on the outcome of the new *Annals* editorial policy. We have now submitted the first two issues to Thompson ISI with the request to introduce it into the Science Citation Index.

For several years now, our Secretary General has modernized the administrative, production and management systems. A new stage has begun in 2009 with the purchase and implementation of a new Membership Management software. It is clear that will substantially help in the running of the Society and simplify many tasks within the office. In his report, the Membership Manager has highlighted the benefits to be expected from the modernization of membership management. I will come back later to the important issue of Membership.

Staff issues

The SG has informed Council of the staffing changes that have taken place during the past year. Including people hired on a temporary basis to help with the management software and get the membership in order, the present IGS staff amounts to approximately two full-time positions in production, two positions in administration and one and a half positions in membership/subscriptions.

To spread the load and maintain the flow of *Journal* and *Annals* papers, the IGS office has also a team of freelance copy editors who specialise in maths and/or TeX editing.

I got the chance to visit the IGS headquarters last October in Cambridge and I share the opinion of the Secretary General, who considers that his

team is functioning well and that the morale of the staff is high and enthusiastic.

The organization of Symposia remains a very important activity for our Society.

The IGS sponsored the Limerick symposium on 'Dynamics in Glaciology' in August 2008. In all we received 75 abstracts. The symposium was very interesting and enjoyable. Andrew Fowler acted as the Chief Editor and the chairman of the LOC. A group of 15 participants went on a post-symposium tour of western Ireland.

The first IGS symposium to be held in India took place in April 2009. The 'International Symposium on Snow and Avalanches' was much enjoyed by all participants. In all we had 175 participants, 40 of whom were foreigners. The local organization was superb and we are hoping to be able to have another symposium in India before too long. We are now anxiously waiting for papers to be accepted so we can start publishing *Annals* volume 51. Perry Bartelt and Jürg Schweizer are the Chief Editors.

The present 'International Symposium on Glaciology in the International Polar Year' at the University of Northumbria has been going very well with John Woodward as head of the LOC and Hilmar Gudmundsson as the Chief Editor. Both of them have done a splendid job and we have enjoyed very interesting sessions. The only snag we encountered was that the online registration only worked intermittently. But the 'Event Manager module' itself of our new membership software has worked very well and will only get better and make things much easier for future symposia.

The first circulars for the 'International Symposium on Sea Ice in the Physical and Biochemical System' (Tromsø, May–June 2010), 'Snow Ice and Humanity in a Changing Climate' (Sapporo, June 2010) and 'Earth's Disappearing Ice; Drivers, Responses and Impacts' (Ohio, August 2010) have been posted on the web and will be sent out with ICE 149, due to be mailed out this week.

In addition we are working on symposia in San Diego (2011), Helsinki (2012), Alaska (2012), Australia (2013) and Alberta, Canada (2013–14). There is even a rumour of the next Sea Ice Symposium taking place in Australia in 2015. Other possibilities are a symposium in Argentina in 2011 and an Ice Core Science meeting in 2011 or 2012.

The Council discussed the treasurer's report and examined the IGS accounts. The Society's finances are still in fairly good shape but there is still room for improvement in the way the Society operates. We ran a slight profit in 2008 (around £1000) which is smaller than in 2007 and 2006. It is important for the IGS to maintain our income as well as operate carefully and efficiently to minimize our costs.

Council and the SG are particularly concerned by the decrease in the IGS membership, which began several years ago. It's partially due to the lack of traceability regarding subscription payments. The new membership management software should considerably help on that aspect and 2009 should be better than 2008. Nevertheless, Council is very concerned about the situation and has appointed a task force to study the present situation and propose different options to recover our waning membership.

Awards

And finally I would like to end this report by announcing that Council decided to award Paul Andrew Mayewski a Seligman Crystal for his outstanding contribution to glaciology.

Paul Andrew Mayewski is a world leader in the use of ice core records to document climate change. He has been leader of more than 50 expeditions to remote regions such as: Antarctica, the Arctic, Himalayas, Tibetan Plateau, Tierra del Fuego. He has been a keynote speaker at more than 300 events, and has enjoyed extensive media coverage, including a popular climate change book (*The Ice Chronicles*, with F. White). He has over 150 highly collaborative publications in refereed journals, with over 6,500 citations. His honours include

- Medal for Excellence in Antarctic Research;
- Honorary Doctorate, Stockholm University;
- Fellow, American Geophysical Union;
- Fellow, American Society for the Advancement of Science.

Thanks for your attention

Eric Brun

The Secretary General invited members to discuss the President's report.

Frank Pattyn asked what measures might be taken to increase membership in future. The President outlined past IGS office inefficiencies and explained that these problems had now been eradicated; he also outlined new proposals to change/reduce membership fees, which are currently under consideration. Increasing the membership is his main aim during his Presidency. The SG asked all members present to encourage younger or student colleagues to join the society.

Jo Jacka asked when Paul Mayewski would be awarded the Seligman Crystal; this will be announced shortly.

R. Mottram proposed, and R. Hock seconded, that the President's report be accepted. This was carried unanimously.

3. The Treasurer's report

The Secretary General, on behalf of the treasurer Dr I.C. Willis, presented the following report with the Financial Statements for the year ended 31 December 2008.

The state of the Society's finances is best summarized by considering the changes from 1 January 2008 to 31 December 2008, as shown on page 10 of the accounts. In the table, the Restricted Fund is money earmarked specifically for costs associated with the Seligman Crystal. The Unrestricted Funds is everything else. [Note that in previous years' accounts, this was further divided in this summary table into Accumulated Fund (associated with running the *Journal*) and Designated Fund (associated with running Symposia and the *Annals*) but these have been amalgamated in this year's summary table although they are separated in the detailed notes below].

Restricted Funds: increased very slightly from £8245 to £8993 as a consequence of a donation and accrued interest of £969, offset against the cost of manufacturing a Seligman crystal of £221.

Unrestricted Funds: decreased slightly by £5,585 from £571,834 to £566,249 showing that the income to IGS, largely from membership, sales of the *Journal* and *Annals*, page charges and symposia attendance, roughly matched expenditure associated with *Journal* and *Annals* printing and publication, and associated office support, and office support for activities related to running Symposia.

Total: The Society made a slight loss of £4,837 in 2008 compared to a net profit of £11,327 in 2007 and a profit of £29,799 in 2006

In more detail, income is itemized in notes 2–5, pages 13–15 and expenditure is listed in notes 6–9, pages 16 & 17.

Income:

Note 2. Voluntary income dropped from £4,385 to £1,931 despite a small increase in donations due to a decrease in royalties.

Note 3. Investment income increased from £11,750 to £29,986 due to the transfer of monies from an old low interest account into a new higher interest account. We can expect this to reduce significantly next year as interest rates have come down substantially.

Note 5. Here, Accumulated Fund is associated with *Journal* activity, Designated Fund with *Annals* and Symposia.

Membership dues increased significantly compared with 2007 from £16,741 to £48,080. This is largely thanks to the efforts of Trevor Mar-

gereson, who was employed part-time during the year to improve the membership database and chase up members who had not paid their dues (often through no fault of their own but because of poor membership invoicing procedures in previous years). Thank you to members who responded positively to Trevor's e-mails.

Journal sales were down slightly by £12,456 (2007–8) compared to a drop of £11,413 (2006–7) and a rise of £15,753 the year before (2005–6). Sales of *Journal* reprints by authors who do not pay page charges rose slightly this year by £127 to £225. This is still a small income reflecting authors choosing not to receive reprints (presumably because of the rise of the pdf). Page charge income increased by £21,695 (2007–8) compared to a drop of £18,659 (2006–7). As with membership dues above, this partly reflects improvement in the processing of invoices compared to last year but also reflects increased income associated with the *Journal* moving from four to five issues per year.

Income from sales of *Annals* is healthy. The constant income of £5732 against *Annals* 50(51), (52) and (53) reflects the fact that we are now offering *Annals* as a complete subscription and that the past few *Annals* are of very similar size. This is also a part of our effort to convince Thomson ISI that the *Annals* is a scientific journal that you subscribe to rather than a book series. Income from page charges for *Annals* (i.e. Volumes 47–49) is typically less than in the previous year (i.e. Volumes 44–46) because volumes 44–46 were big (1114pp in total versus 47–49 (576pp)).

Expenditure:

Notes 6 & 7. Here, the Designated Fund is further divided into 'Annals', 'Publications' and 'Future *Annals* Volumes', although the distinction is rather meaningless since there is hardly anything within the first two categories.

Note 6. The direct costs associated with editing, printing, publishing and distributing the *Journal* and *Annals* decreased by £9,513 (2007–8) compared to a decrease of £34,860 (2006–7) and a decrease of £12,269 (2005–6). This reflects largely the reduced printing costs compared to previous years. Proof reading and editorial costs have increased compared to last year, reflecting the greater number of articles published.

Note 7. The support costs associated with *Journal*, *Annals* and Symposium activity have increased substantially by £77,793 from £155,164 in 2007 to £232,957 in 2008. The big hikes are associated with: (1) Office rental, but this is the first such increase for 5 years; (2) Symposia; and (3) wages and salaries. Symposia costs are higher because

we in fact only organized one symposium in 2007 (Moscow) whereas in 2008 we organized two. In addition, income from the 2007 Moscow symposium did not materialize in 2008 as expected. Hopefully it will in 2009. Further, Council decided to separate the finances of symposia and the *Annals*, with income relating to the *Annals*, which in previous years has offset the cost of the symposia, not taken into account when symposia finances are considered. This is in line with the separation of *Annals* and symposia in the ongoing effort to have the *Annals* reintroduced into the Thomson ISI. The increase in wages and salaries is primarily due to hiring of staff to clean up existing data and implement the new membership database system. The other big increase in this section is associated with writing off bad debts, to the tune of £25,063. As mentioned above, the society is making progress in obtaining income from aged debtors but we have taken the decision to write off around £19,000 of bad debts that date back beyond the introduction of the new SAGE accounting software in 2004. The remaining £6,000 or so of written off bad debts is actually an accounting anomaly and represents money that the society received from aged debtors that was counted as income for the 2008 financial year rather than a credit against carried forward debts. As note 16 on p. 20 shows, the total debts for the year amounts to £110,481 and this should remain a concern to the society. The introduction of a new membership management system integrated with the accounting software this year should hopefully reduce this problem in future years. Meanwhile, continued effort must be made to chase up bad debts, some of which extend back to 2004.

Note 7. Governance costs associated with running the Society as a Charity have remained stable.

Summary

The Society's finances are still in fairly good shape but there is still room for improvement in the way the Society operates. We ran a small deficit in 2008 (<1% of total funds) compared to a small profit in 2007 (~2% of total funds) and a bigger profit in 2006 (~5.5% of total funds). It is important for us to maintain our inputs as well as operate carefully and efficiently to minimize our costs.

On the outputs side, we are continuing to benefit from reductions in the cost of printing the *Journal* and *Annals*. However, we must ensure that the increased expenditure in wages associated with producing more volumes of the *Journal* in particular is offset against increased income from page charges and sales to libraries. Priority must be given to continue to chase up aged debtors, although things are improving on this front. As Note 16 shows, debtors in 2008 owed the

Society £110,481, down from £126,212 in 2007 (and £162,755 in 2006). Magnus is to be congratulated on improving these figures and encouraged and supported to go further. The new management database and online payment system for members/libraries/agents is gradually being implemented and should be fully functional by the end of 2009. This should help considerably reducing the number of debtors in any one year and will hopefully avoid us having to write off tens of thousands of pounds worth of debt in the future.

On the input side, the apparent drop in revenue from libraries, etc. for the *Journal* and for *Annals* should be of some cause for concern. Similarly, we should be aiming to increase membership still further. Increased income from page charges is to be welcomed and we should remain grateful for authors who are able to support the Society in this way. But it would be good to see an increase in library, etc. subscriptions to the publications so that page charges to authors might be able to be lowered in future.

Ian C. Willis, Treasurer

The Secretary General invited members to discuss the Treasurer's report.

J. Detterman commented on membership dues not collected by IGS and asked to pay by direct debit in future. MMM explained the new procedures in place to avoid this problem happening again and said direct debit payments would be possible in future under the new membership system.

T.H. Jacka proposed, and C. Bentley seconded, that the Treasurer's report and the draft accounts be accepted and he, the President and the Secretary General be authorized to sign off the accounts on behalf of Council. This was carried unanimously.

4. Election of auditors for 2009 accounts

The Secretary General proposed that the Society retain the same auditors as previous years as the 2009 accounts will be complicated because of the dual bookkeeping due to the new membership software. The present auditors are familiar with the accounts of the Society which would minimize the effort needed to complete the 2009 audit.

On a motion from the Secretary General, R. Bind-schadler and I. Evans seconded, that Messrs Peters Elworthy and Moore of Cambridge be elected auditors for the 2009 accounts. This was carried unanimously.

5. Elections to Council

After circulation to members of the Society of the Council's suggested list of nominees for 2009–2012, no further nominations were received, and the following members were therefore elected unanimously.

Vice Presidents: Christina Hulbe (US)

Treasurer: Ian C Willis (UK)

Elective Members:

Gwenn Flowers (Canada)

Jacqueline A. Richter-Menge (US)

Rob Massom (Australia)

Werner F Kuhs (Germany)

The appointment of the new IGS officers and Council members was confirmed by the AGM.

6. Other business

There was a general discussion about donating IGS back issues to worthy recipients in, for example, small institutes and Third World countries.

N. Glasser asked about the online submission system and the timescale was discussed.

The AGM was adjourned 14:45 on a motion from F. Pattyn seconded by T.H. Jacka.

JOURNAL OF GLACIOLOGY

Papers accepted for publication between 6 July 2009 and 2 December 2009. The papers are listed in alphabetical order by first author. Some of these papers have already been published.

Mauro Werder, Alexandre Loye, Martin Funk
Dye tracing a jokulhlaup I: subglacial water transit speed and water storage mechanism

Mauro Werder, Martin Funk
Dye tracing A jokulhlaup II: testing a jokulhlaup model against flow speeds inferred from measurements

Robert S Fausto, Andreas P Ahlstrøm, Dirk Van As, Sigfús J Johnsen, Peter L Langen, Konrad Steffen
Improving surface boundary conditions with focus on coupling snow densification and meltwater retention in large-scale ice sheet models of Greenland

Anne M Le Brocq, Anthony J Payne, Martin J Siegert, Richard B Alley
A subglacial water flow model for West Antarctica

Toshiyuki Kawamura, Toshihiro Ozeki, Hiroyuki Wakabayashi, Minoru Koarai
Unique lake ice phenomena observed in Lake Inawashiro, Japan: spray ice and ice balls

Cecilie Rolstad, Anne Chapuis, Richard Norland
Electromagnetic interference in ground-based interferometric radar data from Kronebreen calving front due to multipath scattering and variations in tide-water sea levels

Martin P Lüthi
Transient response of idealized glaciers to climate variations

Charles W Holland, Sridhar Anandakrishnan
Sub-glacial seismic reflection strategies when source amplitude and medium attenuation are poorly known

Sasha P Carter, Donald D Blankenship, Duncan A Young, John W Holt
Using radar-sounding data to identify the distribution and sources of subglacial water: application to Dome C, East Antarctica

Akiko Sakai, Kouichi Nishimura, Tsutomu Kadota, Nozomu Takeuchi
Onset of calving at supraglacial lakes on debris-covered glaciers of the Nepal Himalayas

Guangjian Wu, Tandong Yao, Baiqing Xu, Lide Tian, Chenglong Zhang, Xuelei Zhang
Volume-size distribution of microparticles in ice cores from the Tibetan Plateau

Katie L Grant, Chris R Stokes, Ian S Evans
Identification and characteristics of surge-type glaciers on Novaya Zemlya, Russian Arctic

Hardy B Granberg, Patrick Cliche, Olli-Pekka Mattila, Eija Kanto, Matti Leppäranta
A snow sensor experiment in Dronning Maud Land, Antarctica

Daniel A Miller, Edward E Adams
A Microstructural dry snow metamorphism model for kinetic growth

Susanne Schmidt, Marcus Nüsser
Fluctuations of Raikot Glacier during the last 70 years: a case study from the Nanga Parbat Massif, Northern Pakistan

Neil S Arnold, W Gareth Rees
Effects of digital elevation model spatial resolution on distributed calculations of solar radiation loading in a High Arctic glacier

M Sigl, Tm Jenk, T Kellerhals, S Szidat, Heinz W Gäggeler, L Wacker, Hans-Arno Synal, C BOUTRON, Carlo Barbante, Jacopo Gabrieli, Margit Schwikowski
Towards radiocarbon dating of ice cores

Martin Truffer, Roman J Motyka, Michael Hekkers, Ian M Howat, Matt A King
Terminus dynamics at an advancing glacier: Taku Glacier, Alaska

Daniel J Breton, Gordon S Hamilton
Instruments and Methods: Design, optimization
and calibration of an automated density gauge for
firn and ice cores

Nicole E. Spaulding Debra A Meese Ian Baker
Paul A Mayewski Gordon S Hamilton
A new technique for firn grain size measurement
using SEM image analysis

Rachel W Obbard, Gregory Troderman, Ian Baker
Imaging brine pockets and pore space in sea ice
using micro X-ray computed tomography

Ingrid Reiweiger, Jürg Schweizer, Jurg Dual,
Hans Jürgen Herrmann
Modelling snow failure with a fibre bundle model

Kai Rasmus
A thermo-hydrodynamic modelling study of an
idealized low elevation blue ice area in Antarctica

Tara Moran, Shawn J Marshall
The effects of meltwater percolation on the
seasonal isotopic signals in an Arctic snowpack

Brian Anderson, Andrew Mackintosh,
Dorothea Stumm, Laurel A George, Tim Kerr,
Alexandra Winter-Billington, Sean J Fitzsimons
Climate sensitivity of a high-precipitation glacier
in New Zealand

Jeffrey L Kavanaugh, Peter L Moore
A peak-capturing measurement circuit for detecting
and recording short-duration glacial signals

Duncan Quincey, Luke Copland, Christoph Mayer,
Michael Bishop, Adrian J Luckman, Marco Belò
Ice velocity and climate variations for the Baltoro
Glacier, Pakistan

Vena W Chu, Laurence C Smith,
Asa K Rennermalm, Richard R Forster,
Jason E Box, Niels Reeh
Sediment plume response to surface melting and
supraglacial lake drainages on the Greenland Ice
Sheet

Christian Vincent, Samuel Auclair,
Emmanuel Le Meur
Outburst flood hazard for glacier-dammed
Rochemelon lake (France)

Carlos A Cárdenas, Martin Jenett,
Klaus Shünemann, Jürgen Winkelmann
Sub ice topography in Patriot Hills, first results of
a newly developed high resolution FMCW Radar
System

Laetitia De Paoli, Gwenn E Flowers
Dynamics of a small surge-type glacier investigated
using 1-D geophysical inversion

Carl Egede Bøggild, Richard Brandt,
Kendrick J Brown, Stephen G Warren
The ablation zone in northeast Greenland: ice
types, albedos, and impurities

Yong Zhang, Koji Fujita, Shiyin Liu, Qiao Liu,
Xin Wang
Multi-decadal ice velocity and elevation changes
on a monsoonal maritime glacier: Hailuoguo
Glacier, China

Marco Möller, Christoph Schneider
Calibration of glacier volume-area relations from
surface extent fluctuations and application to
future glacier change

John D Paden, Torry Akins, David Dunson,
Chris Allen, Sivaprasad Gogineni
Ice sheet bed 3-D tomography

ANNALS OF GLACIOLOGY 50(53)

The following papers have been selected for publication in Annals of Glaciology 50(53) (thematic issue on World Glacier Inventory), edited by Roger Braithwaite and Simon Ommanney

Atsumu Ohmura
Completing the World Glacier Inventory

Ersi Kang, Chaohai Liu, Zichu Xie, Xin Li,
Yongping Shen
Assessment of glacier water resource based on the
Glacier Inventory of China

Lindsey Nicholson, Jorge Marín, David Lopez,
Antoine Rabatel, Francisca Bown, Andrés Rivera
Glacier inventory of the upper Huasco valley,
Norte Chico, Chile: glacier characteristics, glacier
change and comparison to central Chile

M.S. Moussavi, M.J. Valadan Zoej, F. Vaziri,
M.R. Sahebi, Y. Rezaei
A new glacier inventory of Iran

Hester Jiskoot, Colleen J. Curran, Leslee Shenton,
Dez L. Tessler
Changes in Clemenceau Icefield Group glaciers,
Canadian Rocky Mountains, related to hypsometry,
fragmentation and slope-area-aspect

Frank Paul, Roger G Barry, J Graham Cogley,
H Frey, Wilfried Haeblerli, Atsumu Ohmura,
Simon Ommanney, Bruce H Raup,
Andrés Rivera, Michael Zemp
Recommendations for the compilation of glacier
inventory data from digital sources

Roger J Braithwaite, Sarah C B Raper
Estimating equilibrium line altitude (ELA) from
glacier inventory data.

Annals 50(53) is now complete

ANNALS OF GLACIOLOGY 51(54)

The following papers have been selected for publication in Annals of Glaciology 51(54) (thematic issue on Snow and Avalanches), edited by Perry Bartelt and Jürg Schweizer

Rakesh Kaur, Anil V Kulkarni, Bajrang Chaudhary
Using Resourcesat-1 data for determination of
snow cover and snow-line altitude, Baspa basin,
India

Thierry Faug, Benoit Chanut, Rémi Beguin,
Mohamed Naaim, Emmanuel Thibert, Djebbar
Baroudi
A simple analytical model for snow avalanche
induced pressure on obstacles

Luca Egli, Tobias Jonas, Jean-Marie Bettens
A virtual network for estimating daily new snow
water equivalent and snow depth in the Swiss
Alps

P.K. Srivastava, Puneet Mahajan,
Pramod Kumar Satyawali, Vinod Kumar
Observation of temperature gradient metamorphism
and simulation of linear elastic properties of snow
using computer microtomography

K Srinivasan, Ajay Kumar, Jyoti Verma,
Ashwagosh Ganju
Statistical downscaling of MM5 model output to
better assess avalanche threats

Pramod Kumar Satyawali, Martin Schneebeli
Spatial scales of snow texture as indicator for
snow class

Jagdish Chandra Kapil, Chandrika Prasher,
Prem Datt, Pramod Kumar Satyawali
Growth of melt-freeze clusters and formation of
impeding layers to water flow in snow irradiated
by a sun simulator under controlled laboratory
conditions

Emmanuel Thibert, Djebbar Baroudi
Impact energy of an avalanche on a structure

Martin Kern, Perry A. Bartelt, Betty Sovilla
Velocity profile inversion in dense avalanche
flow

Cora Shea, Bruce Jamieson
Star: an efficient and comparably accurate snow
point-sampling method

Peter Höller, Reinhard Fromm
Quantification of the hand hardness test

Guillaume Chambon, Mohamed Naaim
Scaling relationships for constant-volume snow
avalanches

Mohamed Naaïm, Thierry Faug,
Florence Naaïm-Bouvet, Nicolas Eckert
Return period events calculation and passive
defence structure design at Taconnaz avalanche
path (France)

Florence Naaïm-Bouvet, Mohamed Naaïm,
Hervé Bellot
Back analysis of drifting snow measurements over
an instrumented mountainous site

V.D. Mishra, J.K. Sharma, Manjeet Singh,
Mahavir Singh, Kamal Kant Singh
Qualitative and quantitative review of different
topographic analysis methods for Western Hima-
laya using AWiFS and MODIS satellite imagery –
validation

Laura Bakermans, Bruce Jamieson,
Jürg Schweizer, Pascal Hägeli
Using stability tests and regional avalanche danger
to estimate the local avalanche danger

S.K. Singh, Anil V. Kulkarni, Bajrang S. Chaudhary
Hyperspectral analysis of snow reflectance to
understand the effects of contamination and grain size

Anil V. Kulkarni, B.P. Rathore, Sushil K. Singh
Distribution of seasonal snow cover in Central
and Western Himalaya

Perry A. Bartelt, Othmar Buser
Frictional relaxation in avalanches

M.S. Shekhar, Sanjeev Kumar, Harish Chand,
K. Srinivasan, Ashwagosha Ganju
Climate change studies over Western Himalayan
region

Jürg Schweizer, J. Bruce Jamieson
Snowpack tests for assessing snow-slope
instability

More papers for *Annals* 51(54) will be published
in the next issue.

ANNALS OF GLACIOLOGY 51(55)

The following papers have been selected for publication in Annals of Glaciology 51(55) (thematic issue on Glaciology in the International Polar Year), edited by G. Hilmar Gudmundsson

Shin Sugiyama, Hiroyuki Enomoto, Shuji Fujita,
Kotaro Fukui, Fumio Nakazawa, Per E J Holmlund
Dielectric permittivity of snow measured along the
route traversed in the Japanese-Swedish Antarctic
Expedition 2007/2008

Karsten Müller, Anna Katarina Sinisalo,
Helgard Anschütz, Svein-Erik Hamran,
Jon Ove M Hagen, Joseph R McConnell,
Daniel Pasteris
An 860 km surface mass balance profile on the
East Antarctic Plateau derived by GPR

Ian S Evans, Nicholas J Cox
Climatogenic north-south asymmetry of local
glaciers in Spitsbergen and other parts of the
Arctic

Angelika Humbert, D Gross, R Müller,
Matthias Braun, Roderik S W van de Wal,
Michiel R van den Broeke, David G Vaughan,
Willem Jan van de Berg
Deformation and failure of the ice bridge on
Wilkins Ice Shelf, Antarctica

Anne Chapuis, Cecilie Rolstad, Richard Norland
Interpretation of amplitude data from a ground-
based radar in combination with terrestrial photo-
grammetry and visual observations for calving
monitoring of Kronebreen, Svalbard

Fuyuki Saito, Ayako Abe-Ouchi
Modelled response of the volume and thickness
of the Antarctic ice sheet to the advance of the
grounded area

Bas de Boer, Roderik S W van de Wal,
Richard Bintanja, LJ Lourens, E Tuenter
Cenozoic global ice volume and temperature
simulations with 1-D ice-sheet models forced by
benthic ^{18}O records

Andrés Rivera, Rodrigo Zamora, Camilo Rada,
Jonathan Walton, Stuart Proctor
Glaciological investigations on Union Glacier,
Ellsworth Mountains, West Antarctica

Angelika Humbert
The temperature regime of the Fimbul Ice Shelf,
Antarctica

Norbert Blindow, Sonja Suckro, Martin Rückamp,
Matthias Braun, Marion Schindler, Birgit Breuer,
Matthias Saurer, Jefferson C Simões, Manfred Lange
Geometry and status of the King Georg Island ice
cap, South Shetland Islands, Antarctica

Julian Bt Scott, Andy M Smith,
Robert G Bingham, David G Vaughan
Crevasses triggered on Pine Island Glacier by
drilling through an exceptional melt layer

John Hulth, Cecilie Rolstad, Karoline Trondsen,
Ragnhild Wedøe Rødby
Surface mass and energy balance of S/orbreen,
Jan Mayen, 2008

Martin Rückamp, Norbert Blindow, Sonja Suckro,
Matthias Braun, Angelika Humbert
Dynamics of the ice cap on King George Island,
Antarctica - Field measurements and numerical
simulations

Jens Wendt, Andrés Rivera, A Wendt,
Francisca Bown, Rodrigo Zamora, Gino Casassa,
C Bravo

Recent ice surface elevation changes of Fleming
glacier in response to the removal of Wordie ice
shelf, Antarctic Peninsula.

More papers for *Annals* 51(55) will be published
in the next issue.



Notes from the Production Team

Papers submitted in TeX

In the previous issue of *ICE*, we asked all TeX authors to: name individual figure files with both the manuscript number and the figure number (e.g. '09J137Fig01.eps' or '54A012Fig03'); submit a figure as a single file rather than one made up of several different elements (i.e. combine the files for '54A077Fig1a', '54A077Fig1b'.... '54A077Fig1z' into a single '54A077Fig1.eps' file); send a pdf version of your final accepted paper along with your text, bibliographic and figure files; and avoid making alterations to 'igs.cls' or any of the distributed styles (downloadable from <http://www.igsoc.org/production/igs-v2.00-distrib.zip>),

as we always use our versions of these files rather than yours.

In addition to these requests, if importing black and white raster graphic files (e.g. tifs, jpegs) into an eps file, please ensure that they are in greyscale rather than colour (RGB or CMYK) mode before you start. Please also use a design program to create your figures if possible; please do not use matplotlib.

Thank you

Craig Baxter
IGS Production

The Enchanter of Manali

Snow-can RUSHDOWN*

ABSTRACT. A long time ago in a place far, far away... snow was plentiful in the high countries, and glaciers were advancing worldwide. Snows were particularly heavy in the Himalaya, the great arc of mountains that formed the northern border of the empire of Akbar, son of Humayan. To Akbar, snow was more than an enchantment to provoke scientific discussions, snow was an essential part of hydro-logical and ecological Earth that gave life to agriculture in the *Panj āb* (the land of the five waters). Akbar was particularly concerned about the ever-increasing pressure of changing climate, as the Earth was then beginning to plunge headlong into the *Chhotti-Baraff-Ka-Samay* (Little Ice Age). Accordingly, Akbar asked his trusted scientist, the Mahārāja of Manali and the court of wise people of the *Snow and Avalanche Study Establishment* (SASE), to call together a meeting of scientists from around the world to discuss all things known about snow. This is the true story of the *International Symposium on Snow and Avalanches*, held in Manali, *Hindustan* (to be called *India* four centuries later).

If there is a knower of snows here, fetch him: There's a strange snow on the mountain side, her way of moving is like no mortal thing, but of a breath-like, powdery form, and she threatens to run down on a destructive path. (Mirza Ghalib, translated by D. MacAyeal.)

Dharma is better than Artha, and Artha is better than Kama. Artha is naturally practised by the directors of scientific laboratories, for the livelihoods of scientists depend on it. Kama is practised by snow scientists, because they love their work. Dharma is achieved by those who devise shelters that protect people and traffic from avalanche danger. (Kama Sutra, translated by D. MacAyeal.)

Scene 1: A traveller from far-away Europe, Magnús, arrives in Manali

In the day's last light, the shiny snowy mountain sides above the science-place called SASE looked like a sea of shimmery silver embedded with bright diamonds. There on the valley floor was the shimmery golden thread of the *Beas* River. This river was once called the *Hyphasis* by the ancient Greek legions who refused to cross it when *Alexander III* of Macedon extolled them to extend their conquest into *Hindustan*. This river also fed the *Sapta Sindhu*, the sacred seven rivers, of the *Rigveda*.

The traveler rode in a bullock-cart marked with the banner-of-passage provided by the *Kṣatriya*, Colonel *Rajesh Seth*, who was the giver of boundless hospitality and ensurer of security

in these lands. The traveller wore a colorful vest atop his *dhotis* that was bespeckled with the azure ink of leaky pens, and his lapel bore the blue color of a precious lapis lazuli pin lettered with 'IGS'. He claimed to be an emissary of an ancient learned society concerned with *Glac-i-ology* that was established in the land of Queen Elizabeth (Elizabeth? First or second? It does not matter for this story). This traveler to the science-place called SASE was *Magnús* of *Ice-i-stan*, descendant of the great *Magnús Khan*, and progenitor of the



Fig. 1. The *Magnús* (right), son of *Magnús Akbar* (the great) of *Ice-i-stan*, arrives in Manali, and receives auspicious symbols of good will including a *bindi* (dot on forehead) said to strengthen concentration and enhance the *sixth chakra* (*ajna*) the seat of concealed wisdom. The *Sahib* on left wears lapel medals signifying great accomplishment in the attendance of IGS symposia over many years.

*Born in Mumbai, India, and author of nine previous novels, including *Midnight's Flowlaw*.



Fig. 2. The Mahārāja's Colonel, a reincarnation of a bull elephant, was responsible for satisfying all needs of conference attendees, and arranged a caravan to the base of the Rohtang Pass to see the sights of the Dhundi Snow Research Station.

man called *Magnússon* who, four centuries later, would become the Secretary General of the IGS.

The *Magnús* had come to Hindustan with two purposes, first, to attend the *durbār* of scientific wise people called by Akbar himself, and second, to deliver a magical secret so divine that it could only be heard by the *Rajput* of snow science, the *Mahārāja* of Manali himself.

Scene 2: The Magnús is awestruck by the pagentry of the Mahārāja's court (SASE)

The *Magnús* quickly found that the scientists of Hindustan were awe-inspiring, because their stories were better, their papers more numerous and dramatic, their field work more energetic and precise, and, most of all, because they somehow managed to thrive in a land where everyday traffic on the streets was more chaotic than a raging avalanche.

The opening of the great gathering of snow scientists was made festive by a troupe of *Himachali* dancers who performed the *Kayang Mala*, the garland dance, to the deep-noted sounds of their long trumpets. The place of lectures, the *Diwan-i-Khas*, was scented by the petals of thousands of marigolds and was named after the rare mountain rose of Himalaya, the *Saichen*. A luscious feast was produced for the *Baraff Tootna* (ice breaker) in the



Fig. 3. The caravan on the mid-week symposium tour proceeds up the valley of the Beas River (the river at which the armies of Alexander the Great refused to go further, and one of the five waters that makes the Punjab verdant).

hall of the Mahārāja's great military men. The food was plentiful and exquisite, including *Kashmiri Biryani* and *Rogan Josh* of intricate flavours and *Kheer* so sweet it would generate pleasant dreams for those whose travels brought them across many time zones. The food was enjoyed amidst the enchanting rhythms and poetic verses of Sumander Khan and his troupe of *Rajasthani* musicians who had travelled to Manali after being in the New World, where they had played many concerts in the *Diwan-i-Carnegie* of New York. A further musical extravaganza was held on Thursday evening when Gosh Babu delivered a modernistic interpretation of the old traditional sounds on an instrument he had created himself.

On the middle day of the great gathering, the Mahārāja of Manali commanded his efficient and trusted *Kṣatriya Colonel*, *Rajesh Seth*, to amass a large caravan capable of transporting the raucous mob of wise snow scientists, along with their *lackeys* (graduate students) and laptops, across the harsh mountain roadways to the distant snow-research palace called *Dhundi Station*. This station was the special shrine where the inner workings of snow were discerned by snow-whisperers, and it was located at the base of the high and rugged *Rhotang Pass* that joined the Kulu Valley to the moon-scape of the Spiti and Ladhak valleys. Along the way, an engineering marvel was beheld by the caravan, as they stopped to inspect a tunnel over which terrible avalanches would pass, leaving future travellers unharmed. On reaching the *Dhundi*, a great magical feat was performed, as an entire mountain-load of snow was compelled to avalanche down a chute festooned with instruments used to advise the Mahārāja on the conditions that influenced safe passage across the mountainous roads of his realm.



Fig. 4. From Russia with love, comes Sergey Sokratov to receive auspicious offerings of peace and compassion from the Buddhist Gumpa near Manali.

Scene 3: The Magnús is amazed by the lectures given by the nine jewels of snow science

During the great meeting, the *Magnús* was impressed by the lectures of the *Navratnas*, the 9 Jewels, of snow science, who were known far and wide as the greatest of all glaciologists:

1. The first *Navratna* to lecture in the *Diwan-i-Khas*, in the *Saichen* auditorium, was Sivaprasad Gogineni, an ice-whisperer who lived as a humble man during the day, but at night flew in strange silver birds that had mighty eyes which shot invisible rays downward so as to see beneath the surface of things by the ray's reflection. This first jewel of snow science could count layers in snowcaps and find farmer's goats that had fallen to the bottoms of ice crevasses.
2. And then there was *M.R. Bhutiyani*, a cutter of stones from Jaipur who fashioned beautiful carpets out of dust and snow that adorned the sides of mountains, and thereby changed their albedo to better alay the Mahārāja's concern about the *Chhotti-Baraff-Ka-Samay* (Little Ice Age).
3. Several of the nine jewels of snow science came from distant colonies of the new world and from city-states of Europe. These included the wise *Boyar* from *Mockva*, *Sokratov*, who carried a scale so precise that he could tell which snow flakes were reincarnations of droplets from a warm, tropical environment, and which had cycled from a brutish, heavy life in the far North.

4. There was the indomitable diviner of the Swiss Alps, *Schneebeli*, and his enchantment was a fierce, but righteous, sword that he called the *SnowMicroPen (SMP) penetrometer*. With this instrument, it was said, the 4th Jewel of snow science could discern the most subtle, and secret-most intentions of a field of snow to the *Kama* of rapid downhill motion.
5. Lest the world be seen as only a precise, careful working with no room for natural intervention, the 5th Jewel was a man of Scottish ilk, *McClung*, who boasted the crass workings of the *Rutchblock* – a method of snow-monument excavation that was later to be tested and rejected by the artisans who built the *Taj*.
6. There was the 6th Jewel, but he did not count as precious, as he was the *Sahib Bay-Waqoof*, the central clown of foolishness, *Mac-A-yeal* who hailed from the land of smelly onions (Chicago).
7. The 7th Jewel was the just governor and keeper of SASE's treasury, the great *R.N. Sarwade*. As the *Kama Sutra* advised, *Artha* is best practised by directors of laboratories, for they are most practised at pulling together material and intellectual resources to produce milestone scientific conferences.
8. There was the 8th Jewel, *Pant* who soared in gossamer *Aerostats* (magic balloons) festooned with cameras to amuse the snow scientists by showing them what a hawk could see from high above the snows.
9. And finally, there was the 9th Jewel, a great organizer of caravans, a builder of campsites and maker of great merriment and comfort, the chief of the Mahārāja's security, the *Kṣatriya Colonel*, who had once lived a formerlife as a bull elephant, but was now devoted to the capture of the *Sahib Bay-Waqoof*, whose elusiveness and sudden departures would otherwise mean that IGS council meetings would be held without a proper clown (shudder to think!).

All of these Jewels of snow science were there, and all gave talks; however, the time eventually came for the Mahārāja to ask the *Magnús* about the special secret.

The Magnús reveals his secret

After many nights and many days feasting and partaking of the cool fragrances of valley vegetation surrounding the great science-place in Manali, the Mahārāja became suspicious of the foreign traveller *Magnús*. Was he simply a herald that brought scientists together each year to hear each other's songs of merriment? Was he just a *hounder*

of dues to those whose journal subscriptions had lapsed? Or was he a conjuror of great power who had enchantment beyond that of any of the great wise snow scientists gathered at SASE?

The Mahārāja of Manali: ‘*Magnús*, I am amused by your presence and by the efficiency which you have lent to my people in the organization of this great meeting. But, my patience grows thin, tell us your secret, your specialsecret so divine that no ears can hear it save my own, or I will sentence you to labours as a foreign-born (and thus incompetent) taxi driver in the crowded streets of Delhi!’

With a flourish of great politeness, the *Magnús* bowed low, almost tipping his *Himachali* chapeau from the top of his head, and he began to speak.

Magnús: ‘*Ṣaḥīb*, I have met a Brahmin named *Jürg Schweizer* from Davos, the beautiful city of the *League of 10 Jurisdictions*, who sees far into the future of IGS meetings. He has told me of things to come – to come 20 generations in the future, to come in April of 2009, to be precise. – Here is what I learned.

‘In April of 2009, almost 400 years into the future, *Ṣaḥīb*, there shall be a **better** meeting of snow scientists, a meeting not of 9 Jewels of snow science, but of more than 100 Jewels whose wisdom and research power will amuse and advise wise citizens from around the world. Open your ears, for I shall now tell you what the Brahmin, *Jürg*, said about this future *symposium*:

Impressions ISSA 2009

1. Great hospitality.

Many thanks for a wonderful experience.

2. Ruggedness of the Himalayan range.

3. Challenge SASE is facing with avalanche and snow forecasting for these ranges.

Avalanche forecasting for this vast area will

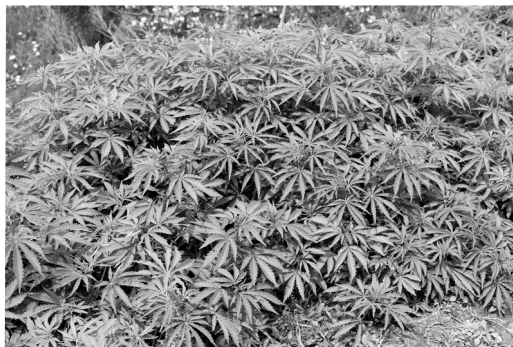


Fig. 5. The vegetation surrounding the symposium site was particularly verdant and tempting.



Fig. 6. Here comes the snow, here comes the snow... An instrumented avalanche on the avalanche chute of the Dundhe Snow Research Station of SASE.

obviously rely on weather parameters as SASE is far away from the location where forecasts apply (i.e. office-based forecasting). We have seen excellent attempts to downscale output from meteorological models combined with remote sensing data to the local conditions where the decisions need to be made. Still, precipitation is the least accurate parameter. Then, even with advanced forecasting tools, the decisions need to be made by experienced local forecasters who know their conditions and their terrain.



Fig. 7. Onnie Järvinen, snow scientist from Finland, finds walking around the hillsides surrounding Manali to be particularly energizing.



Fig. 8. Perry Bartelt, co-chief editor of the *Annals of Glaciology* (Issue 51(54)), enjoys crisp, attentive service as he enjoys a lunch of massala chicken tikka with Jim McElvaine.

4. We need observations for the models and for local decision making.

We have realised in the last couple years that the way we do our observations affects the results we get (Heisenberg has figured that out some time earlier). Still most of our observations methods are destructive. However, we have seen great progress in the application of the radar technology. And, there are the first attempts to not only retrieve quantitative (binary) snow cover information, but also qualitative information on, e.g., the properties of the snow cover surface. A novel destructive measuring method has been introduced about 10 years ago: the SnowMicroPen (SMP). It is very impressive how that instrument has found its application around the world for a variety of studies from the Himalayas to the poles.



Fig. 9. Porters (graduate students and early career snow scientists) prepare to carry the Sahib (second from left) to 3500 m above sea level on the mid-week symposium tour.



Fig. 10. Musicians from Rajasthan entertain the symposium delegates at the opening icebreaker.

5. Appreciation of the Microscale.

Many phenomena, including avalanche formation, have their roots at the microscale (and depend on the properties of ice). Combining computer tomography (μ CT) and numerical modelling techniques has significantly improved our understanding of snow metamorphism, heat transfer, etc. More of that! In avalanche formation we have a debate in the last 1–2 years: shear vs collapse and we have seen two presentations that shed some light on that issue. It is quite clear that, due to the highly porous nature of snow, any failure will result in structural damage which will manifest itself as collapse. The collapse is a source of gravitational energy that might well be available for fracture propagation. So clearly it is shear and then collapse. Whereas in Europe and North America much research is devoted to the artificial triggering of avalanches, largely because the majority of avalanche fatalities are recreationists, natural release is probably more a concern in the Himalayas, and one contribution has considered triggering of snow avalanche by earthquakes.

6. The merging of of brilliance (e.g., model development) with passion (application) for the avalanche phenomena.

It is best when brilliance meets application/passion.

7. Inability to make precise prediction.

When forecasting large destructive avalanche we deal with rare extreme events, within the tails of the distribution. Consequently, forecasting becomes very difficult to say the least. There was one very interesting proposal: dynamic avalanche hazard map. But, an avalanche hazard map is an avalanche hazard



Fig. 11. The Diwan-i-Khas (Saichen Auditorium) decked out in flowers and with a backdrop of verdant Himalayan hillsides at the start of the symposium.

map..., i.e., an avalanche hazard cannot change from one day to another. Avalanche hazard maps tell where not to build a house. But, providing local forecasters with real data specific to their problem, not just downscaling the regional danger, that is the intriguing feat. To conclude, we are all keen to come back in particular to see the progress on the Rhotang tunnel project and see the planned avalanche defence structures at work.'

The Mahārāja of Manali: (Upon regaining his consciousness, as if having been put to sleep by the soporific effects of the 9 lectures heard previously, the Mahārāja of Manali looked alarmed and cried out.) 'This secret is wonderful! This news about the future ensures that the heavenly spheres shall be well ordered, that the Nine Schools of snow-flake geometry shall remain intact and that the Sixteen Predicaments of Avalanche Dynamics and the Eighteen Steps to Snow Crystal Metamorphosis, and the Forty-two Unresolved Glaciological Issues will continue to be amusing puzzles! To honour your secret, I shall conjure a magic spell that will so enchant the participants of the 2009 meeting (many years into the future), that they shall long for a return to the place that shall be called *India* well after the 2009 conference is complete! I proclaim that there shall be many



Fig. 12. The *Magnús* (background) sits at ease with the IGS President, Eric Brun, and with the conference *Sahib Bay-Waqoof* (official fool), Doug MacAyeal, overlooking the Beas River Valley above Manali.

more meetings in India even after the 2009 meeting is nothing more than a poem in volume 54 of the *Annals of Glaciology*!

And with that, Mahārāja of Manali thanked his people for organizing such a great meeting, dismissed the wise people to begin their home-ward travel, and allowed the *Magnús* safe passage to visit the *Fatepur Sikri* on his Bullock-cart (but that is another story, with another secret that shall be revealed after the next IGS meeting in India).

Doug MacAyeal

REPORT FROM THE NORTHUMBRIA SYMPOSIUM

The International Symposium on Glaciology in the International Polar Year
Northumbria University, Newcastle, UK, 27–31 July

The English have a phrase, 'it's grim up north', which expresses the generally held southern view that everything in the north of England is grubby, uncouth and tough. It is, perhaps, actually a phrase devised by northerners to discourage too many unwelcome visits from southern softies, but it has persisted and tainted many views of our northern cities. Attendees of the International Symposium on Glaciology in the International Polar Year, at Northumbria University in Newcastle, were treated to an entirely different experience of the north. Newcastle presented itself as a cosmopolitan city, providing high-quality conference facilities and memorable cultural experiences. This was a truly excellent symposium, with wide-ranging talks and an abundance of exciting science.

The symposium was opened by Charlie Bentley, who reminded us of the extraordinary achievements of scientists during the 1957 IGY, establishing modern Antarctic glaciology and framing many of the problems with which we are still grappling today. Appropriately, this was followed by Andy Smith's efforts to use some of Charlie's measurements as a basis against which ice-sheet change could be measured. Over the following days we heard about a great deal of exciting and

surprising science conducted under the umbrella of IPY. For me, highlights included a glimpse of the extraordinary alpine topography that lies beneath the ice in Antarctica around Dome A, fresh results from the Japanese–Swedish Antarctic Expedition 2007/08 and a detailed description of the extraordinary disintegration of Wilkins Ice Shelf during the austral summer of 2008/09.

It is true that, for no clear reason, the emphasis of the attendees and presentations in this symposium was strongly Antarctic, but Arctic and alpine glaciers were also represented. I was particularly impressed by the talk given by Anne Chapuis, who described the impressive results of study that required sitting with a notebook in front of Kronebreen logging calving events for days on end; adequate proof that tenacity and determination are not yet lost in glaciology.

Similarly, the studies of contemporary glaciers were seasoned with a series of glacio-geological discussions led by Peter Barrett's thought provoking keynote on glacial history in Antarctica. This session also included a newcomer to IGS, John Smellie, whose studies of glacio-volcanism on the Antarctic Peninsula have provided a fascinating view of surprisingly stable glacial conditions over 7 million years.

It would be amiss of me not to mention the excellent cultural programme that was prepared by the local organisers, John Woodward and Colleen Carr. These included a trip to Alnwick, a beautiful Northumbrian village boasting fabulous formal gardens and a medieval castle. The castle was familiar



Fig. 1. Charlie Bentley giving the opening address.



Fig. 2. John Woodward and Colleen Carr welcome delegates.



Fig. 3. Poster session at Alnwick Castle gardens.



Fig. 4. There was plenty of animated discussion during coffee breaks.

to many as it was used as a set during the filming of recent Harry Potter films. The gardens were also the venue for poster sessions. For me, a particular highlight, a very stylish touch, came with the slow realization that the string quartet that played to us during the barbeque supper had abandoned their classical repertoire and begun to play arrangements of seventies and eighties pop and punk classics. 'Anarchy in the UK' never sounded like that, and never sounded so good, before!

The UK Polar Network was extremely active during the symposium. They hosted a panel discussion on career opportunities for the Association of Polar Early-Career Scientists that was well

attended and produced lively debate. And outside the symposium itself, UKPN ran 'Meet the Scientist' sessions at the Centre for Life, a local science museum in Newcastle.

On a personal note, I was pleased to meet again Jürgen Determann, who was an influential modeller of ice-shelf dynamics and oceanography but has for many years now been working in a commercial company. Jürgen attended with the symposium's youngest participant, his daughter, who has not yet decided if her own future lies in glaciology. (Come on in, the water's lovely!)

Similarly, the holding of the conference dinner in the stands of the famous St James's Park,



Fig. 5. Group photo.



Fig. 6. Ian's not too sure about Tamsin's dinner outfit at St James's Park.

home ground of Newcastle United football team, which included a tour of the stadium, was inspired. Tamsin Gray, a long-standing Newcastle United supporter, was especially resplendent in the team's famous black and white striped strip.

On a more serious note, this was an enormously enjoyable symposium, at which the organization was flawless and the science highly stimulating. The oral sessions benefited enormously from the 20 minutes allocated to each talk. For me, this made for much more informative and insightful presentations than those given at the breakneck rate required to fit into the 15-minute, or shorter, slot that is becoming the norm at so many meetings.

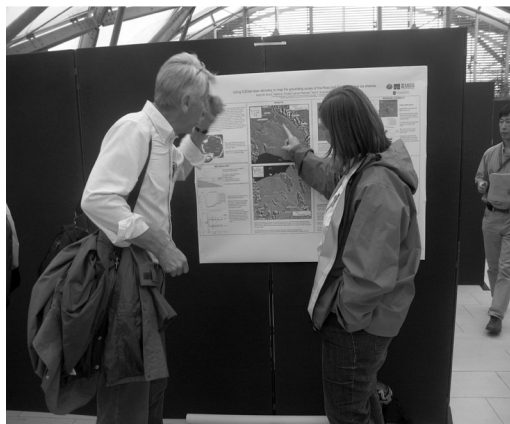


Fig. 7. Bindschadler on the receiving end of some explanations from Kelly Brunt.

The IPY was a unifying thread throughout the symposium, and it is a testament to IPY that so many new programmes and collaborations have emerged in the past couple of years. The symposium closed with a reflective keynote from Bob Bindschadler, who did so much to make the IPY happen. The general discussion focussed on the achievements of IPY and where we might go next. The consensus was clear: we have enjoyed IPY, and it has shown such obvious benefits to scientific collaboration and outreach that we really shouldn't have to wait 50 years for the next!

David G. Vaughan

UK POLAR NETWORK AT IGS IPY SYMPOSIUM

NORTHUMBRIA UNIVERSITY, 26–31 JULY 2009

UKPN organised a variety of events in conjunction with the IGS IPY Symposium.

First up were a series of outreach sessions at Newcastle Centre for Life (3 × 2 hour sessions on Tuesday, Wednesday and Thursday) arranged by Tamsin Gray (BAS):

'What are you going to study when all the ice melts?' asked 10-year-old Riley.

This was but one of a host of questions facing conference delegates Alison Cook, Ed King, Leanne Wake, Katie Grant, Atsuhiko Moto, Natalie Robinson and Rebecca Rixon, who all took a few hours out to take part in a public 'Meet the Scientist' session. Also on hand were UK Polar Network members Jennifer Hall, Sian Henley, Libby Jones and Tamsin Gray.

Dressing up in polar clothing was by far the most popular activity and some visitors took it to the extreme, donning the entire contents of a BAS kit bag and then proceeding to complete 20 star jumps!

A selection of finest field rations was also on display and visitors were asked to come up with innovative yet nutritious menus that could keep hard working field scientists satisfied. Suggestions included chocolate-dipped sardines and chocolate spaghetti, as well as the more controversial blubber nuggets, seal pizza and krill cocktail!

Visitors were also given the chance to chat (by phone) to members of the current wintering teams at Halley and Rothera research stations and select which job they would most like to do at an imaginary Antarctic base (with Marine Biologist and Pilot coming out on top).



The mentoring session in full swing.

It was a lot of fun and I hope we can run similar sessions at other science centres in the future. Many thanks to all the volunteers who helped make these sessions a success.

Secondly, UKPN hosted an APECS Mentoring Session on the Tuesday evening organized by Sian Henley with Libby Jones. The aim of the mentoring session was to provide an opportunity for early career scientists to discuss polar science with

and seek careers advice from those best placed to provide the answers. This event was a roaring success!

The invited panel of polar experts was made up of Professor Martin Siegert from the University of Edinburgh, Professor Frank Pattyn from l'Université Libre de Bruxelles, Dr John Woodward from the University of Northumbria and Professor David Vaughan and Miss Alison Cook from the British Antarctic Survey. The panel were insightful and entertaining and provided informative answers to some excellent questions from the audience. The event was attended by around 40 polar early career scientists from all over the world.

Following the mentoring session, approximately 30 people proceeded to an excellent local restaurant, the Flatbread Café, for some excellent food and an opportunity for networking with others from around the world.

UKPN would like to thank the IGS for allowing us to run these events in conjunction with the symposium, and extend particular thanks to Magnús Már Magnússon, John Woodward and Colleen Carr for helping us to organize everything.

Tamsin Gray, Sian Henley, Libby Jones and Jennifer Hall

SELIGMAN CRYSTAL FOR PAUL ANDREW MAYEWSKI

Paul Andrew Mayewski is a world leader in the use of ice core records to document climate change. He has been leader of more than 50 expeditions to remote regions such as: Antarctica, the Arctic, Himalayas, Tibetan Plateau, Tierra del Fuego. He has been a keynote speaker at more than 300 events, and has enjoyed extensive media coverage, including a popular climate change book (*The Ice Chronicles*, with F. White). He has over 150 highly collaborative publications in refereed journals, with over 6,500 citations. His honours include

Medal for Excellence in Antarctic Research
Honorary Doctorate, Stockholm University
Fellow, American Geophysical Union
Fellow, American Society for the Advancement of Science.

Pat Langhorne

for the Awards Committee of the International Glaciological Society



CITATION FOR PAUL MAYEWSKI

November 2009

Paul Andrew Mayewski is a world leader in the use of ice core records to document climate change, variations in atmospheric chemistry through time and on the historic influence that human activity has had on the chemistry of our atmosphere. He has contributed to the understanding of how the chemistry of the global atmosphere is influenced by the burning of fossil fuels and biomass, and by natural events such as volcanic eruptions. Using ice cores records, he has explored the behaviour of massive and rapid changes in climate and pioneered the calibration of proxy and instrumental records for purposes of developing longer climate data bases from which to understand climate change. He has evolved an integrated understanding of the multiple controls on climate and the unique role of human impact.

Professor Mayewski was an undergraduate student at the State University of New York at Buffalo. He received his PhD in 1973 from the Institute of Polar Studies at Ohio State University. Since then, his research has taken him all over the world and he has been leader of more than 50 expeditions to remote regions such as Antarctica, the Arctic, Ladakh in the Indian Himalayas, the Tibetan Plateau, Tierra del Fuego, China and Iceland. Major projects in which he has had a key role include GISP2 (Greenland Ice Sheet Project 2, 25 American institutions); ITASE (International Trans Antarctic Scientific Expedition, 21 nations); and CADIP (Central Asian Deep Ice Coring, 7 nations). His travels have led to strong collaborative activities with numerous international institutions (e.g. the Chinese Academy of Sciences, the Nepalese Department of Hydrology and Meteorology).

Professor Mayewski's reputation has led to invitations to speak at more than 300 events. He is widely published in the scientific literature, with more than 150 highly collaborative publications including numerous in high profile journals such as *Nature* and *Science*. His body of work has been

cited more than 6500 times. For this contribution he has already received several awards: he is a recipient of the inaugural Medal for Excellence in Antarctic Research. He has been awarded an honorary PhD from Stockholm University in Sweden. He is a Fellow of the American Geophysical Union, a Fellow and citation winner in the Explorers Club. Mayewski Peak in Antarctica bears his name.

In addition to his scientific prowess, Professor Mayewski has proved himself to be an outstanding scientific manager, and his positive attitude and years of hard work, creativity and perseverance have contributed to the success of the scientific challenges involved in the drilling of deep ice cores. His other science administrative responsibilities include being founder and Director of the Climate Change Research Center of the University of New Hampshire. In addition he has served on several National Academy of Sciences committees (e.g. the US Global Change Research Program, Arctic Natural Sciences, Human Dimensions of Climate Change) as well as being a member of international committees, such as International Geosphere Biosphere Program, and Scientific Committee for Antarctic Research.

Professor Mayewski has enjoyed extensive media coverage, and has written a popular climate change book (*The Ice Chronicles*, with F. White). His expeditionary and scientific achievements have been highlighted in several hundred popular articles and interviews including, for example: *Boston Globe*, *Harper's Magazine*, the *New York Times*, the *Los Angeles Times*, *Good Morning America*, National Public Radio's *Fresh Air* and several NOVA and BBC productions. He has fostered public understanding of climate change issues by forming links with several museums (e.g., Museum of Science, Boston and the American Museum of Natural History NYC).

The Awards Committee was unanimous in selecting Paul Andrew Mayewski, Director and Professor, Climate Change Institute, University of Maine, USA, as the recipient of the 2009 Seligman Crystal.

Meetings of other societies

66th Annual Eastern Snow Conference, 9–11 June 2009

The Eastern Snow Conference (ESC) is a joint Canadian/US organisation founded in the 1940s originally with members from eastern North America. Today, our members come mostly from North America as well as from Europe (e.g. the UK, France, Germany and Turkey) and south east Asia (e.g. Japan and China). Our current membership includes scientists, engineers, snow surveyors, technicians, professors, students and professionals involved in snow operations and maintenance. Typically held over two days, the ESC gives delegates a chance to discuss snow and ice research ideas through formal presentations and informal discussion. It is usually held in late May or early June.

The 2009 ESC was held at Niagara-on-the-Lake, Ontario, Canada and hosted 67 attendees. The Conference theme was 'The changing cryosphere: tracking and understanding changes in snow and ice'. There were 29 high quality oral presentations in seven non-concurrent sessions entitled 'Glaciers', 'Trends in snow cover and accumulation', 'Remote sensing of snow', 'Sea ice', 'Winter storms and observations', 'Measurement' and 'Models'. In addition there was an interactive poster session, 'Observing, monitoring and modeling snow and ice', in which 28 excellent posters were presented.

An important element of the ESC is its informality and its strong encouragement of student participation. The Wiesnet Award is given to the



Fig. 1 Si Chen receiving the Wiesnet Award.

best student paper, while the Campbell Scientific (Canada) award is given to students registered at a Canadian higher education who demonstrate innovative technical expertise in data collection. In addition, the David Miller Award is presented for the best student poster presentation. This year the Wiesnet Award was presented to Si Chen of Dartmouth College and the David Miller Award to Iliyana Dobрева of Texas A&M University. On a lighter note, the Annual Sno Foo award this year was presented to Rob Hellstrom of Bridgewater State College; the Sno Foo award is presented to a distinguished snow scientist who, in striving for excellence in snow research, contributes to an event of notable humor.



Fig. 2 Twenty-nine interesting talks were presented.

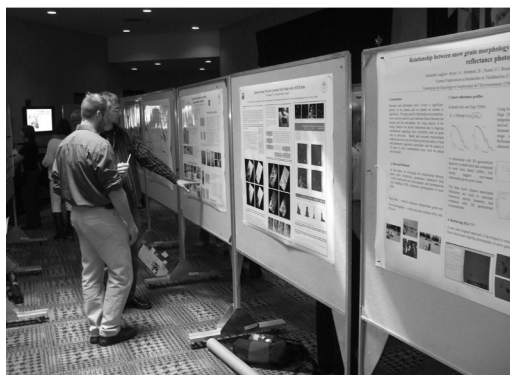


Fig. 3 An almost equal number of exciting posters were on display during the meeting



Fig. 4 The proprietor of the vineyard gave a very informative talk on the trials and tribulations of wine growing.

A highlight of the meeting was the conference banquet and the post banquet talk. This year, the banquet was heralded by a trip to Featherstone Winery on the Niagara Escarpment at the end of the first full day. Delegates learned the basics of wine growing and wine tasting from a niche



Fig. 5 ... followed by some light refreshments.

organic wine growing establishment in the Niagara region. After the tour, the banquet was held at the conference hotel and this year's post banquet talk was entitled 'Abode of snow; a critical look at glacier change and the Himalayan Cryosphere' and was given by Professor (Emeritus) Ken Hewitt from Wilfrid Laurier University. The presentation illustrated the unusual nature of western Himalayan glacier dynamics in high mountain environments.

Next year's meeting will be held at Jiminy Peak Mountain Resort, Hancock, MA and will take place between 8 and 10 June 2010. I strongly encourage you to consider attending this stimulating, engaging and entertaining meeting. If you have students engaged in snow and ice research, this is an excellent venue for them to interact with snow and ice researchers.



Fig. 6 The post-banquet talk was given this year by Professor Ken Hewitt.

Richard Kelly

President of the Eastern Snow Conference, 2009–2010, and 2009 Conference Chair

More information can be found at <http://www.easternsnow.org>

UK Polar Network Career Skills Workshops

UKPN ARCTIC MARINE SCIENCE WORKSHOP

The second UKPN career skills workshop, organised by Dr Claudia Halsband-Lenk (PML) and Angelika Renner (BAS/UEA), took place on 12–13 October 2009. Kindly hosted by Plymouth Marine Laboratory (PML), the event saw 33 early career researchers from the UK, Norway, Iceland, France, Greece, and even Uruguay come together at the Royal Plymouth Corinthian Yacht Club for two days of lectures, discussions, and practical workshops centred around Arctic marine sciences. Fifteen senior scientists and mentors from six institutions and organisations provided their time and offered excellent talks and advice.

After introductions to PML, UKPN and APECS, Dr Warwick Vincent, director of the Centre d'études nordiques (CEN) at Laval University in Québec, presented the keynote lecture about climate change and ecosystem collapse in high Arctic Canada. Other speakers included Dr Cynan Ellis-Evans, who introduced the NERC Arctic Office, Dr Steve Rowland (University of Plymouth), and Mike Kendall (PML), among others. A different view of the changing Arctic environment was presented by Antony Jinman, polar explorer, who introduced his education work with students on Baffin Island.

The morning talks were followed by breakout sessions in the afternoon. In small groups, the early career researchers had the opportunity to discuss topics such as education and outreach in schools or how to get funded with the mentors. More hands on sessions included the analysis of a sea ice proxy in Arctic sediments and a tour around PML and the mesocosm experimental facilities.

On Monday evening, the early career re-



Arctic Marine Science Workshop – group photo

searchers were joined by Dr Steve de Mora (CEO of PML), Dr Vincent, Antony Jinman, Dr Simon Belt (University of Plymouth) and other mentors on board the Spirit of Plymouth for a cruise on Plymouth Sound. An excellent opportunity for more in depth conversations and networking amongst the participants and with the mentors! Tuesday evening saw everybody gathering at PML for the poster presentations. Many excellent posters were on display, and congratulations go to Dr Birgit Obermueller for winning the first prize, and Helena Reinardy and Teresa Silva for runner up prizes!

A truly successful event was made possible thanks to the support from many sides. We thank all the speakers and mentors for their help, time and effort, and our sponsors – NERC, PML, BAS, and the IPY IPO – for financial support.

UKPN CRYOSPHERIC SCIENCES WORKSHOP

As a terrific conclusion to the UKPN Career Skills Workshop series, the Cryospheric Sciences Workshop took place 4–6 November at the University of Sheffield and was organized by Nanna Karlsson (Hull, BAS), Allen Pope (SPRI), and Jen Hall (Sheffield). Over 40 PhD and Masters students and 18 presenters and mentors came together to discuss the Cryospheric Sciences. Participants hailed from all over the UK and countries including Canada, Portugal, Poland, France, and Germany.

The keynote talk on a career in science was delivered by Professor Liz Morris, OBE (SPRI). Technical sessions included Glacial Remote

Sensing, Mass Balance Studies, Snow Science, Ice Core Studies, and Sedimentology, development talks were given on Data Management (Dr Nathan Cunningham, BAS) and graduate resources (Dr Vicky Willett, Vitae), panel discussions were held on the subjects of Career Development, Paper Publishing (Magnús Magnússon, IGS), and Grant Writing, and Dr Ian Rutt (Swansea) taught a practical on computer ice sheet modelling. In addition, an entire afternoon session was dedicated to Education and Outreach concerning the Polar regions, including talks by Alex Gaffikin (Natural History Museum) and Liz Pasteur (International Polar Foundation).



Cryospheric Sciences Workshop – computer modelling practical

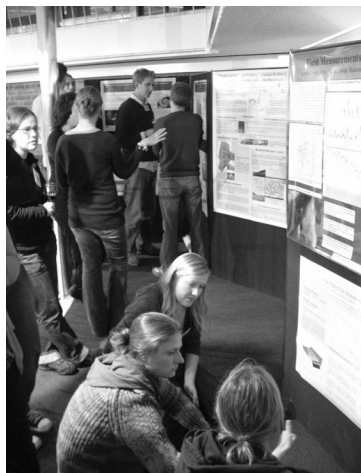
All workshop participants were requested to present a poster of their recent or projected research. Over a reception and a conference dinner, this research sparked valuable conversations and productive discussions between workshop attendees. Congratulations go to first prize winner Aisling Dolan (Leeds) and runners up Martin O’Leary (SPRI) and Heather Channon (QMUL).

In sum, the workshop was a huge success. Even before all of the sessions, talks, posters, and discussion, there were almost 100 applications for spots at the event. Due to such an overwhelming response, the UKPN is hoping to be able to run similar events in the future.

We would like to take the opportunity to thanks all of the participants and presenters who made this event as enjoyable as it was. Particular recognition must go to our sponsors – the Natural Environment Research Council, International Polar Year International Programme Office, the Royal Astronomical Society, the University of Sheffield, the International Glaciological Society, The Remote Sensing



Cryospheric Sciences Workshop – career discussion



Cryospheric Sciences Workshop – poster session

and Photogrammetry Society, the British Antarctic Survey, and the Scott Polar Research Institute – for making this event financially possible.

ABOUT THE UKPN

The UK Polar Network (UKPN) was formed in April 2007 as part of the International Polar Year, and makes up the UK branch of APECS (Association of Polar Early Career Scientists). The UKPN has three main aims:



1. to provide networking opportunities for early career polar researchers,
2. to promote polar issues to a wider audience through education and outreach, and
3. to provide information about polar issues via newsletters and a dedicated website.

There are currently over 200 UKPN members at all early career stages ranging from undergraduate to beginning faculty, including an enthusiastic management committee, all of whom are involved in various fields of polar research. UKPN members have been actively involved in encouraging polar research at many levels, organizing education and outreach events, holding network days, and hosting one-off career advice sessions or social networking events.

For more photos from these workshops, more information about the UKPN, and how to get involved in future UKPN events, please check out our website at www.polarnetwork.org

Angelika Renner and Allen Pope, UKPN



Future meetings of other societies

International Summer School in Glaciology

University of Alaska, Fairbanks and McCarthy, Alaska

7–17 June 2010

Overview

An international summer school in glaciology will be organized by the University of Alaska, Fairbanks (UAF) from 7–17 June 2010. The school will provide a comprehensive overview of the physics of glaciers and current research frontiers in glaciology with focus on quantitative glaciology, modeling and remote sensing. The course will be open to 25–30 graduate students from around the world targeting primarily early-stage PhD students who perform glacier-related research. It will be taught by faculty of UAF's glaciology group and several invited guest lecturers from outside Alaska.

Course content

Key topics to be covered include, but are not limited to: remote sensing in glaciology; glacier mass balance and meteorology; response of glaciers to climate change; glacier dynamics, surging and tidewater glaciers, ice streams; ice-ocean interactions; and ice-sheet modeling. The course will consist of lectures, exercises, computer projects and field excursions.

Course location

The course will be held over 8 days in McCarthy, a small village in south central Alaska in immediate vicinity to 5000 km² glaciers originating in the Wrangell Mountains (up to 5000 m a.s.l.). It will end in Fairbanks with a 1-day workshop on 'Snow, ice, permafrost and water in a warming Arctic'.

Photos by Tim Bartholomaeus



The village of McCarthy.

Costs

Students will be expected to cover their travel to and from Fairbanks. Some student assistance may be available. In addition students need to pay a course fee of approx. \$100–200 which includes accommodation in Fairbanks and McCarthy, full board in McCarthy, return transport from Fairbanks to McCarthy and course material.

Course Sponsors

- * International Arctic Research Center (IARC), University of Alaska, Fairbanks (UAF)
- * International Arctic Science Committee (IASC)
- * NASA
- * International Glaciological Society (IGS)
- * Geophysical Institute (GI), University of Alaska, Fairbanks

Applications

Application must be sent to Regine Hock (regine@gi.alaska.edu) before 1 February 2010. For details see <http://www.gi.alaska.edu/snowice/glaciers/>

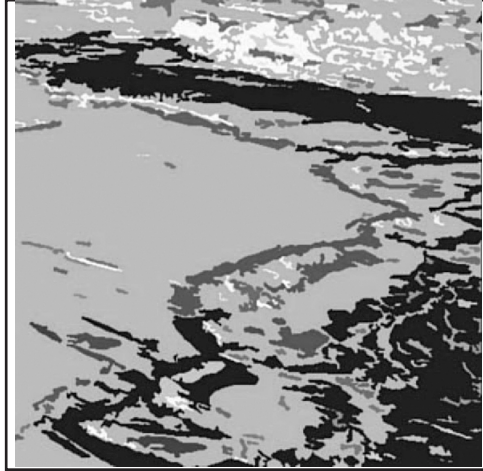


Glaciers around McCarthy.

INTERNATIONAL GLACIOLOGICAL SOCIETY

INTERNATIONAL SYMPOSIUM ON SEA ICE IN THE PHYSICAL AND BIOGEOCHEMICAL SYSTEM

*Tromsø, Norway
31 May–4 June 2010*



CO-SPONSORED BY:

Norwegian Polar Institute
Centre for Ice, Climate & Ecosystems (ICE)

and the

University of Tromsø

SECOND CIRCULAR

June 2009

<http://www.igs2010.org>

Registered Charity

INTERNATIONAL SYMPOSIUM ON SEA ICE

The International Glaciological Society will hold an International Symposium on Sea Ice in 2010. The symposium will be held in Tromsø, Norway from 31 May to 4 June 2010. This will be the third IGS symposium dedicated to sea ice research; the previous ones were held in 2000 and 2005.

Theme

Sea ice is a relatively fragile part of the Earth system, capable of undergoing changes much faster than many Earth surfaces. It is also important for the understanding of a wide range of subjects, from climate, to biodiversity, to society and culture. Given the recent completion of the IPY and the ongoing changes to sea ice in some regions, this symposium will present a timely opportunity for participants interested in all fields related to sea ice to meet. The suggested topics are intentionally interdisciplinary, including physical, biological, chemical, and socio-economic research on sea ice.

Topics

1. **Sea ice in the regional and global climate system**, including: atmosphere-ice-ocean interactions, feedbacks, large-scale observations, Arctic vs. Antarctic, climate model simulations, dynamics, conditions in the past
2. **The role of sea ice in polar ecosystems**, including: marine mammals, birds, fish, copepods, microorganisms, algae, bacteria
3. **Physical properties of sea ice**, including: growth and decay of sea ice, bulk properties, in-situ measurements, microphysics, models, lab experiments, theoretical approaches
4. **Biogeochemistry and physics of sea ice**, including: brine composition, nutrients, oil and pollutants, iron, carbon and oxygen cycling, gas exchange, dissolved organic matter, black carbon
5. **Sea ice thickness, drift and large-scale circulation**, including: in-situ measurements, remote sensing, and numerical modelling of ice thickness, concentration, drift, and mechanics
6. **Snow on sea ice**, including: snow thickness and processes, melt ponds, atmosphere-snow interaction, gas exchange, effects on remote sensing
7. **Social, economic and political importance of sea ice**, including: indigenous and local societies in a changing climate, shipping and economical use of the Arctic, use of local and indigenous knowledge
8. **Sea ice research beyond the IPY**, including: international and interdisciplinary studies, legacy of IPY, observational systems, public outreach, education

Sessions

Oral sessions will be held over five days, from Monday morning until noon on Friday, often with two parallel sessions, in order to try to accommodate all interested participants. Oral presentations will be allocated 20 minutes, of which 15 minutes should be used for the presentation, allowing 5 minutes for discussion and a timely handover to the next presenter.

Poster sessions will be organised on Tuesday and Thursday afternoons to present, view, and discuss posters. The poster display area will be open throughout the conference, and posters may be displayed for approximately 24 hours before and after the organised sessions.

Meeting rooms will be available on both Sunday and Friday afternoons for participants who may wish to arrange small break-out meetings. Please contact the organisers (igs2010@npolar.no) to book a meeting room. Such meetings will be in the Polar Environmental Centre, near the city centre.

Scientific steering and local organizing committee

Sebastian Gerland (Chair), Fred Godtliebse, Geir Gotaas, Mats Granskog, Stephen Hudson, Nalân Koç, Marte Lundberg, Marcel Nicolaus, Christina A. Pedersen, Keguang Wang, Tordis Villinger, Paul Wassmann

Participation

Scientists from all fields related to sea ice are encouraged to participate in the symposium. Sea ice research is inherently interdisciplinary, and we hope this symposium will foster collaborations that lead to innovative and exciting new research directions.

A registration form is available at the back of this circular, but online registration through the websites is preferred. Registration and accompanying payment are both due by 24 February 2010; there is a surcharge for late registration. The registration fee includes a set of abstracts, the icebreaker reception, coffee breaks, lunches, the mid-week excursion, the symposium dinner and a copy of the *Annals of Glaciology*.

Registration fees

All fees are in Pounds Sterling, GBP

Participant (IGS member)	£350
Participant (non-member)	£400
Student	£175
Accompanying person (adult)	£200
Accompanying person (<18)	£160
Accompanying person (<12)	Free
Late registration fee	£50

Accompanying person

The accompanying persons' registration fee (£200 for 18 and over; £160 for ages 12–17; under 12 free) includes the icebreaker, the mid-week excursion and the symposium dinner.

Venue

The symposium will be held at the University of Tromsø. At nearly 70° N, Tromsø is the largest city in northern Norway, a major research and education centre, a busy port and the northernmost city in the world that has over 50,000 inhabitants. The modern campus lies just north of the city centre; public buses run to the campus frequently throughout the day, and all participants will receive a bus pass for the week, which is also good for recreational travel around the city. Most of the recommended hotels are near or in the compact city centre, where there are many restaurants, cafés and bars. The symposium will be held in early June, while Tromsø is enjoying the midnight sun. The late-spring weather in Tromsø can be variable, so participants should plan for a variety of weather; the average high and low temperatures for the days of the conference are 11° and 4.5°C, but conditions can vary from near freezing with rain to sunshine and over 20°C. There is more information about Tromsø at www.destinasjontromso.no/english.

Travel to Tromsø

The Tromsø Langnes Airport is about a 10-minute drive from the city centre, which can be reached by taxi or the airport bus. Both SAS and Norwegian airlines operate several flights per day between Oslo and Tromsø. Norwegian also flies direct between London Gatwick and Tromsø on Tuesdays and Saturdays. Some scheduled flights also operate between Tromsø and other cities in Norway, Sweden, Latvia, and Russia, but the schedules vary seasonally.

Tromsø cannot be reached directly by train, but the Swedish rail network operates trains to Narvik, Norway, and there are regular buses from Narvik to Tromsø, approximately a four-hour ride. Additional information is on the symposium website.

Accommodation

Block bookings have been arranged at several hotels in Tromsø for the symposium period. Accommodations are available at hotels ranging in price from budget to higher-end, and include in apartments and cottages. To take advantage of the block bookings, please reserve rooms by 17 March (some hotels may fill up before then). Most hotels are in the city centre; buses to the campus venue stop near all hotels. A list of all available accommodation as well as information about each location is available on the conference website, where booking instructions are also provided.

Social programme

The icebreaker reception will be on Sunday evening at the Polar Environmental Centre, home to the Norwegian Polar Institute and other research institutions.

Tuesday evening a public lecture will be held at a popular bar in the city centre. The talk will likely be in Norwegian, but participants are encouraged to attend for socialising afterwards.

Wednesday afternoon and evening are reserved for excursions, with the following options: (1) a guided hiking trip in the region, (2) a charter sightseeing and fishing trip in the sound, (3) a sightseeing tour by bus, ferry, and Hurtigruten ship (see photo below). More information is on the website www.igs2010.org.

The symposium dinner – a barbecue focused on local foods – will be held on Thursday evening on Sommarøy, a beautiful small island about a 1-hour drive from Tromsø. The trip there and back (by different routes) provides a great view of northern Norwegian scenery.

Abstracts

Participants who would like to contribute to the Symposium should submit an abstract of their proposed presentation. This abstract must contain sufficient detail for evaluation by the Scientific Steering Committee. There is a link from the symposium website with instructions for uploading abstracts and contact information. Authors may indicate a preference for an oral or poster presentation, but the number of oral presentations is limited by time.

DEADLINE FOR SUBMISSION OF
ABSTRACTS IS 4 DECEMBER 2009

Each abstract will be assessed on its scientific quality and relevance to the symposium. Corresponding authors will be notified by 1 February 2010 regarding abstract acceptance.

Thematic publication

The Council of the IGS has decided to publish an *Annals of Glaciology* issue with a sea ice theme. A first call for papers will be made in November 2009. Papers may be submitted for this issue regardless of whether the author participates in the symposium. Deadline for manuscript submission is 22 March 2010. Papers should be submitted through the IGS system and will be refereed according to the Society's normal standards before a publication decision is made. Every effort will be made to complete the reviews before the symposium so the associate editor and authors can discuss revisions during the symposium week. When submitting abstracts to the symposium, you will be asked to indicate whether you intend to submit a paper for the *Annals* volume, so that reviewers may be sought in advance. Papers submitted for consideration in the *Annals* may not be submitted to another publication.

Editorial committee

The following is the current list of editors for the *Annals* volume; additional editors may be added on the website.

Mats Granskog (Chief Editor), Jody Deming*, Hajo Eicken*, Rolf Gradinger, Pat Langhorne, Andy Mahoney*, Thorsten Markus, Rob Massom, Kunio Shirasawa, Lars Henrik Smedsrud, Julianne Stroeve*, Matthew Sturm*, Jean-Louis Tison*, Timo Vihma
 * also giving an invited keynote talk

Post-symposium travel

Participants may choose to combine this meeting with the IPY conference in Oslo the following week (www.ipy-osc.no). Various travel options for the weekend in between are possible, including travelling south on the Hurtigruten coastal steamer. This coastal route is known as a breathtaking way to take in Norway's coastal scenery. More details about the travel options are on the conference website.

Contacts for further information

Further information is available at www.igs2010.org, where updates will be posted, as necessary. General inquiries should be sent to igs2010@npolar.no

Magnús Már Magnússon

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 Polar Environmental Centre,
 9296 Tromsø, Norway
 Tel: +47 7775 0554
 Fax: +47 7775 0501
 Email: igs2010@npolar.no
 Web: <http://www.igs2010.org>

Registration by mail

Though we strongly prefer registration through the website, it can also be done by filling in and returning the back page of this circular. If payment by credit card is not possible, contact IGS to arrange for a bank transfer. Payments made after 24 February must include the additional £50 late-registration fee. When completed, please send the form to Magnús Már Magnússon, at the address above.

Dates and deadlines

Abstract submission by	4 December 2009
Notification of acceptance by	1 February 2010
Late-registration fee after	24 February 2010
Hotel reservation deadline	17 March 2010
Manuscript submission by	22 March 2010
Deadline for refund	12 April 2010
Registration and Icebreaker	30 May 2010
Conference begins	31 May 2010
Final revised papers submitted	19 July 2010



INTERNATIONAL SYMPOSIUM ON SEA ICE IN THE PHYSICAL AND BIOGEOCHEMICAL SYSTEM

Tromsø, Norway 31 May–4 June 2010

REGISTRATION FORM

Register online at www.igsoc.org/symposia

Family Name: _____

Given Name(s): _____

Address: _____

Tel: _____ Fax: _____

E-mail: _____

Accompanied by:

Name: _____ Age (if under 18) _____

Name: _____ Age (if under 18) _____

Dietary requirements (vegetarian, pescetarian, gluten, lactose, etc.)

Excursion preference: ☐ Hiking ☐ Fishing ☐ Hurtigruten sightseeing

Registration fees (British pounds)

Participant (IGS member) £350 (€400, \$575)

Participant (not IGS member) £400 (€450, \$675)

Student £175 (€200, \$290)

Accompanying person (18+/12–17) £200/£160 (€230/€185, \$330/\$265)

Late registration surcharge (after 24 February 2010) £50 (€60, \$85)

TOTAL REGISTRATION FEES £_____

Payment of registration fee by Access/Eurocard/MasterCard or VISA/Delta

Card number

Expiration / CVV (last 3 numbers on signature strip)

Name of card holder as shown on card: _____

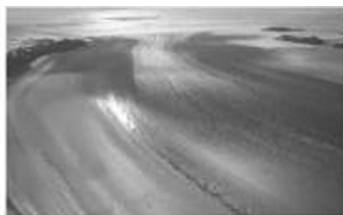
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INTERNATIONAL GLACIOLOGICAL SOCIETY

**INTERNATIONAL SYMPOSIUM ON
EARTH'S DISAPPEARING ICE:
DRIVERS, RESPONSES AND IMPACTS**

*Byrd Polar Research Center, The Ohio State University
Columbus, Ohio 43210, USA
15–20 August 2010*



SPONSORED BY:

Byrd Polar Research Center
Climate, Water & Carbon Program
The Ohio State University

FIRST CIRCULAR

June 2009

<http://www.igsoc.org/symposia/>
http://bprc.osu.edu/workshops/igs_2010/

Registered Charity

The International Glaciological Society will hold an International Symposium on 'Earth's Disappearing Ice' in 2010. The symposium will be held in Columbus, Ohio, USA, from 15 to 20 August 2010.

THEME

One of the most visible indicators of climate change is the response of Earth's ice cover. Over the second half of the 20th century alpine glaciers worldwide retreated. Satellite observations over the last two decades reveal rapid changes in many outlet glaciers that drain large sections of the Greenland and Antarctic ice sheets. Ice-shelf disintegration is becoming more frequent with consequences for the discharge of land-based ice to the oceans. The extent of summer sea ice on the Arctic Ocean is declining and the possibility of ice-free summer conditions well before the end of the century is not outside the realm of possibility. This symposium will focus on the drivers for such changes, the potential feedback and responses of the climate system to these changes and the likely impact that might be expected in response to the ongoing large-scale deglaciation of the planet. An additional goal of the conference is to identify major gaps in our scientific understanding, observational databases, modeling approaches and the need for enhanced human capital and fiscal resources to advance our predictive capability.

TOPICS

1. Sea ice extent and thickness changes in the Arctic and Antarctic, focusing on the different driving mechanisms, responses in the Arctic versus the Antarctic, potential impact on the ocean-atmosphere system, regional climate variability, polar ecosystems, human systems and infrastructure.
2. Tidewater glacier dynamics, iceberg calving and sedimentation dynamics, including observations and parameterizations of calving from floating and grounded termini, the role of sedimentation in grounding line stability, and interactions between ice-marginal processes and glacier speed.
3. Ice shelf dynamics, including the preconditioning and eventual mechanisms by which breakup occurs, impacts of breakup on the ocean-atmosphere system and adjacent land-based ice, limitations to ice-shelf break-up suggested by past ice-sheet and ice-shelf configurations, and break-up scenarios under other climate regimes suggested by paleo-oceanographic and glacial geologic inference.
4. Ice streams and outlet glacier dynamics, including observations and modeling to elucidate the key mechanisms controlling flow and discharge with particular emphasis on subglacial processes.

5. Glacier and ice-sheet mass balance, including a global inventory and assessments, atmospheric and oceanic forcing, response to large-scale modes of climate variability, observational methods, modeling approaches and predictions, up-scaling, partitioning into climatic and dynamic mass balance components, key unknowns, critical observations and limitations to progress.
6. Alpine glaciers (at all latitudes), including observations, driving mechanisms, modeling, impact on associated watersheds and associated societal impact. Special emphasis on alpine glacier changes in regions where traditional forms of glaciological survey are limited and that may be especially vulnerable to climate change (such as the Himalayas and South American Andes).
7. Records of past glacier changes, including proxy histories that elucidate key drivers, responses and response rates.

ABSTRACT AND PAPER PUBLICATION

Participants wishing to present a paper at the workshop are required to submit an abstract. A pre-print of submitted abstracts will be provided for all participants at the symposium.

The Council of the International Glaciological Society has decided to publish a thematic issue of the *Annals of Glaciology* on topics consistent with the Symposium themes. Although the final volume title is yet to be determined, participants are encouraged to submit manuscripts for this volume.

SYMPOSIUM ORGANIZATION

Magnús Már Magnússon (International Glaciological Society)

SCIENCE STEERING AND EDITORIAL COMMITTEE

Kees van der Veen, Chief Editor (U. Kansas), Gudfinna Adalgeirsdottir (Danish Meteorological Institute), Jason Box (Ohio State Univ.), Adrian Jenkins (British Antarctic Survey), Ian Joughin (U. of Washington), Nina Kirchner (Stockholm U.), Doug MacAyeal (U. of Chicago), Ellen Mosley-Thompson (Ohio State U.), Tad Pfeffer (U. of Colorado), Stephen Price (Los Alamos National Lab.), Leigh Stearns (U. Kansas), Lonnie Thompson (Ohio State U.), Slawek Tulaczyk (U. California Santa Cruz), Dirk van As (Geological Survey of Denmark and Greenland)

LOCAL ORGANIZING COMMITTEE

Ellen Mosley-Thompson (Chair), Michele Cook, Lynn Everett, David Elliot, Paolo Gabrielli, Ian Howat, Lynn Lay, Garry McKenzie and Lonnie Thompson

ADDITIONAL ACTIVITIES

A half-day mid-week excursion will be organized to explore some of Ohio's glacial geology as well as its rich and diverse cultural history. Details will be forthcoming.

FURTHER INFORMATION

If you wish to attend the symposium please return the attached form as soon as possible. The Second Circular will give further information about

accommodation, the general scientific program, additional activities, 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. Information will be updated on the conference website, <http://www.igsoc.org/symposia/2010/ohio/> and http://bprc.osu.edu/workshops/igs_2010/ as it becomes available.

INTERNATIONAL SYMPOSIUM ON EARTH'S DISAPPEARING ICE COVER

Columbus, Ohio, USA, 15–20 August 2010

Family Name: _____

Given Name(s): _____

Address: _____

Tel: _____ Fax: _____

E-mail: _____

☐ I hope to participate in the Symposium in August 2010

☐ I expect to submit an abstract

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

☐ I would be interested in the midweek tour.

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 Web: <http://www.igsoc.org>

Obituary: Niels Reeh



Our dear friend and colleague, the Danish glaciologist Niels Reeh, died on 26 May 2009, at the age of 69, losing a long battle against cancer.

Niels Reeh was highly regarded for his contributions to glaciology, specifically through his rigorous combination of numerical modelling and field observations. By training, Niels Reeh was a civil engineer, with an interest in polar problems from the start. In 1966 he began his work on the application of beam mechanics to floating glaciers and ice shelves and throughout his life, Niels retained a strong interest in modelling glacier dynamics. In the early 1980s Niels developed a 3-D model for ice sheets and later a more advanced flow-line model. Niels also

took part in the early ice core drilling efforts in Greenland and later pioneered the concept of retrieving similar records from the surface of the ice-sheet margin. Mass balance of glaciers and ice sheets was another theme in Niels's research, with a number of important contributions and insights still used when teaching the subject to students. Niels developed elegant models for ablation and snow densification, notable for their applicability in large-scale ice-sheet models, and studied the impact of climate change on ice sheets and glaciers. Niels also took his interest in ice dynamics and mass balance into remote sensing and worked successfully on methods to utilize radar and laser data from airborne surveys and satellites in glaciology.

Niels Reeh was an exceptional scientist who inspired generations of glaciologists, young and old alike, while always retaining a remarkable modesty. His personal integrity is legendary. Niels worked most of his career without the security of a fixed position, in order to never compromise his scientific and personal ideals. Believing in whatever he did with all his heart was what mattered. Niels Reeh's tall and lean figure took part in a great number of field campaigns, notably in Greenland and Canada, tirelessly unlocking the secrets of the ice even after he had fallen ill. Niels was never interested in medals and honours, but was nevertheless crowned 'King of Paakitsoq' by his field companions on his 20-year field anniversary at this pivotal site on the West Greenland ice-sheet margin. The sturdy tinfoiled cardboard 'crown' produced in the field as a respectful prank was worth more to him than any official acknowledgement could ever be, and he proudly kept it in his office to the end. Niels Reeh will be missed by family, friends and colleagues, but will continue to inspire through the scientific and personal legacy he left behind.

A ceremony for Niels Reeh was held in Næstved, Denmark, on 30 May 2009.

Andreas Peter Ahlstrøm



Glaciological diary

** IGS sponsored

* IGS co-sponsored

2009

1–4 June 2009

2030 NORTH: A National Planning Conference

Ottawa, Ontario, Canada

Website: <http://www.2030north.carc.org/>

1–5 June 2009

Training School on ‘Glacial Isostatic Adjustment Modelling’

Website: <http://www.cost-es0701.gcparcs.com/index.php/activities/training->

3 June 2009

ARCUS 2009 Annual Council Forum Meeting Arctic Research Consortium of the United States

Website: http://www.arcus.org/annual_meetings/2009/

Contact: Kristina Creek [creek@arcus.org]

3–5 June 2009

2nd CAPP Workshop: Carbon Pools in Permafrost Regions

Contact: Peter Kuhry [peter.kuhry@natgeo.su.se]

6–11 June 2009

66th annual Eastern Snow Conference Niagara on the Lake, Ontario, Canada

6–11 June 2009

Mechanisms of Quaternary Climate Change: Stability of Warm Phases in the Past and in the Future

A ESF-FWF-LFUI Conference

Obergurgl, Austria

Contact Ms. Jean Kelly, Conference Officer:

jkelly@esf.org

Website: <http://www.esf.org/conferences/09285>

8–10 June 2009

High mountain glaciers and challenges caused by climate change

Tromsø, Norway

Website: <http://hmg.npolar.no/en/>

9–11 June 2009

3rd Symposium on the Impacts of an Ice-Diminishing Arctic on Naval and Maritime Operations

US Naval Academy, Annapolis, MD

Website: <http://www.star.nesdis.noaa.gov/star/IceSymposium2009.php>

Contact: Pablo Clemente-Colón [Pablo.

Clemente-Colon@natic.noaa.gov], US
National Ice Center

10–12 June 2009

16th International Symposium on Polar Sciences

Incheon, South Korea

Website: <http://symposium.kopri.re.kr/>

Contact: Sung-Hyun Park [shpark314@kopri.re.kr]
or Siek Rhee [http://rhee@kopri.re.kr]

6–7 and 8–11 July 2009

PAGES (Past Global Changes) Young Scientists Meeting and Open Science Meeting ‘Retrospective views on our planet’s future’

Corvallis, Oregon, USA

See meeting website

6–11 July 2009

7th International Conference on Geomorphology (ANZIAG)

Melbourne, Australia

Contact: geomorphology2009@tourhosts.com.au

16–17 July 2009

International Collaboration in Arctic System Modeling

University of Quebec, Montreal, Canada

19–29 July 2009 (Cryospheric sessions 20–24 July)

‘Our Warming Planet’ IAMAS, IAPSO, IACS joint assembly

Montréal, Canada

Contact: montreal2009@nrc-cnrc.gc.ca

27–31 July 2009

****International Symposium on Glaciology in the International Polar Year**

Newcastle, UK

Contact: John Woodward; john.woodward@unn.ac.uk

Secretary General, International Glaciological Society

2–7 August 2009

Ecological Society of America Annual Meeting

Ecological Contributions to the International Polar Year: High Latitude Ecosystem Ecology in an Era of Global Change

Albuquerque, NM, USA

Contact: Paul Stoy [pstoy@staffmail.ac.uk] or
Ed Rastetter [erastetter@mbf.edu]

5–7 August 2009

4th Annual Meeting in The Dynamics of Complex Systems: Viewing the World from a New Perspective

Fairbanks, AK, USA

Contact: Karina Possenti [fycss@uaf.edu]

11–14 August 2009

Joint Conference of the 5th International Symposium on the Tibetan Plateau and the 24th Himalaya–Karakorum–Tibet Workshop

Beijing, China

25–27 August 2009

Nuuk Climate Days

Workshop: The Arctic Freshwater Budget

Workshop: Changes of the Greenland

Cryosphere

Nuuk, Greenland

Contact: Jens Hesselbjerg Christensen [jhc@dmi.dk], Danish Climate Centre

Contact: Rene Forsberg [rf@space.dtu.dk], DTU-Space

26–28 August 2009

WHISPERS: 1st Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing

Grenoble, France

2–3 September 2009

***34th Annual Meeting of the British Branch of the International Glaciological Society**

Sheffield, UK

Website: <http://www.sheffield.ac.uk/igs2009>

Contact: Organising Committee at igs2009@sheffield.ac.uk

6–11 September 2009

Joint International Association of Hydrological Sciences (IAHS) & International Association of Hydrogeologists (IAH) convention: 8th IAHS Scientific Assembly & 37th IAH Congress

Hyderabad, India

Website: <http://www.appliedhydrology.org/iahs>

7–9 September 2009

Symposium on Mechanics of Natural Solids (i.e. soil, rock, ice and snow)

Horto, Greece

Website: <http://sg1-c813.uibk.ac.at/igt/horto2009/>

8–19 September 2009

Karthauss 2009 summer course on 'ICE SHEETS AND GLACIERS IN THE CLIMATE SYSTEM'

Karthauss, Italy

Website: http://www.phys.uu.nl/~wwwimau/education/summer_school/

14–16 September 2009

Arctic Science Conference

'Impact of Environment on Human Health: Interdisciplinary Science and Education'

Juneau, Alaska

Website: <http://www.arcticaaas.org/>

23 September 2009

On Thin Ice – Climate Change and Arctic Security in the 21st Century

Copenhagen, Denmark

Website: <http://www.difms.dk/arctic>

Contact: Louise Hedegaard (Tel: +45-3915-1285)

24 September 2009

Workshop on the USA National Phenology Network:

A practical tool for research, management, and education in the face of climate change

Anchorage, Alaska, USA

Contact: Mark Shasby [shasby@usgs.gov] Tel: +1 907-786-7065 or

Kat Wheeler [kjwheeler@usgs.gov]

27 September–2 October 2009

International Snow Science Workshop, ISSW

Davos, Switzerland

Website: <http://www.issw2008.com/>

29–30 September 2009

17th Annual Northern Contaminants Program Results Workshop

Ottawa, Ontario, Canada

Website: <http://www.ainc-inac.gc.ca/nth/ct/ncp/invit-eng.asp>

Registration at <http://tinyurl.com/ns7eyz>

30 September–1 October 2009

Program for Arctic Regional Climate Assessment (PARCA) 2009 meeting

Seattle, Washington, USA

Website: http://bigice.apl.washington.edu/news_meetings.html

Contact Ian Joughin [ian@apl.washington.edu] now if you plan to attend

30 September–4 October 2009

Workshop: Synthesizing International Understanding of Changes in the Arctic Hydrological System

Beijer Institute Stockholm, Sweden

Contact: Jonathan Pundsack [jonathan.pundsack@unh.edu]

1–3 October 2009

International Forum for Research into Ice Shelf Processes (FRISP)/

West Antarctic Ice Sheet Initiative (WAIS) Joint Workshop

Pack Forest Conference Center, WA, USA

Contact: Adrian Jenkins [ajen@bas.ac.uk]

7–10 October 2009

Polar Science and the Chemistry of Climate Change

Northeast Regional Meeting, American Chemical Society

Hartford, Connecticut

Website: <http://membership.acs.org/N/nerm/>

Contact: Kathy Gorski [kmgorski@concentric.net]

12–13 October 2009

UK Polar Network Arctic Marine Sciences Workshop

Plymouth, UK

Website: http://www.polarnetwork.org/new/index.php?option=com_content&view=article&id=93&Itemid=88

Contact: Claudia Halsband-Lenk [clau1@pml.ac.uk]

or Angelika Renner [angelika.renner@polarnetwork.org]

23–24 October 2009

Northwest Glaciologists' Meeting

Vancouver, BC, Canada

Website: <http://www.sfu.ca/~gflowers/nwg2009>

Contact: Gwenn Flowers [gflowers@sfu.ca] or Christian Schoof [cschoof@eos.ubc.ca]

28–31 October 2009

Environments, Movements, Narratives in the Circumpolar North

Rovaniemi, Finland

Website: <http://www.arcticcentre.org/?Deptid=28867>

Contact: Karl Mertens [karlmertens@u.boisestate.edu]

27–31 October 2009

International Colloquium – Climate Change in Magellan and Antarctic Regions: Evidence and Challenge for the Future

Punta Arenas, Chile

Website: <http://www.umag.cl/cambioclimatico/en>

29–31 October 2009

***Nordic Branch meeting of the International Glaciological Society**

Höfn in Hornafjörður, Iceland

Contact: Sverrir Guðmundsson, Helgi Björnsson, Tómas Jóhannesson at nigs2009@vedur.is

Website: <http://www.raunvis.hi.is/NIGS-09/>

3–5 November 2009

Northern Governance Policy Research Conference

Yellowknife, Northwest Territories, Canada

Website:

Contact: Stephanie Irlbacher-Fox [stephaniefox@theedge.ca]

4–6 November 2009

UK Polar Network Cryospheric Science Workshop

University of Sheffield, UK

Website: http://www.polarnetwork.org/new/index.php?option=com_content&view=article&id=88&Itemid=87

Contact: cryoworkshop@polarnetwork.org

7–9 November 2009

Arctic in Rapid Transition Initiation Workshop

International Arctic Research Center
Fairbanks, Alaska

Website: <http://www.aosb.org/art.html>

Contact: Carolyn Wegner [cwegner@ifm-geomar.de]

10–12 November 2009

Acqua Alta: International Conference and Exhibition on Consequences of Climate Change and Flood Protection

Hamburg, Germany

Website: <http://www.acqua-alta.de/>

10–13 November 2009

International Workshop on Glacier Hazards, Permafrost Hazards and GLOFs in Mountain Areas: Processes, Assessment, Prevention, Mitigation

Vienna, Austria

Website: <http://www.geo.uio.no/remotesensing/gaphaz/>

13–14 November 2009

17th Arctic Conference of the Institute of Arctic and Alpine Research (INSTAAR)

Boulder, CO, USA

Website: <http://instaar.colorado.edu/ArcticConference>

Contact: Craig Lee [craig.lee@colorado.edu] or John Hoffercker [John.Hoffercker@colorado.edu]

30 November–3 December 2009

Antarctic Treaty Summit: Science – Policy Interactions in International Governance

Smithsonian Institution, Washington, DC

Website: <http://www.atsummit50.aq/>

Contact: Michael Lang [Langm@si.edu]

4–8 December 2009

IPY International Early Career Researcher Symposium

Victoria, BC, Canada

Website: <http://www.apecs.is/victoria09>

Contact: Amy Wiita [cinzaresearch@alaska.net]

14 December 2009

Second Annual Open Meeting: International Study of Arctic Change

San Francisco, CA, USA

Website: <http://www.arcticchange.org/>

Contact: Maribeth Murray [murray@arcticchange.org]

2010

5–8 January 2010

Quaternary Research Association (QRA) – Annual Discussion Meeting

Sea-Level Changes: the Science of a Changing World

Durham, UK

Website: <http://www.geography.dur.ac.uk/conf/sealevelchanges>

Contact: Sarah Woodroffe [s.a.woodroffe@durham.ac.uk]

18–22 January 2010

2010 Alaska Marine Science Symposium

Anchorage, Alaska, USA

Website: <http://www.alaskamarinescience.org/>

Contact: Carolyn Rosner [carolyn.rosner@nprb.org]

24 January–3 February 2010

Marine Biodiversity Under Change Workshop

For PhD students interested in the pan-Arctic region – registration at the Arctic Frontiers conference also required.

Tromsø, Norway

Website: <http://tinyurl.com/ARCTOS-wkshp>

Contact: Matias Langgaard Madsen [matias.madsen@uit.no]

27–29 January 2010

Arctic Frontiers 2010

Tromsø, Norway

Website: <http://www.arcticfrontiers.com/>

Contact: Arntraut Götsch [arntraut.gotsch@akvaplan.niva.no]

1–3 February 2010

***International Glaciological Conference Ice and Climate Change: A View from the South**

Valdivia, Chile

Website: <http://www.cecs.cl/VICC2010/>

Contact: Claudia Flores [vicc2010@cecs.cl]

1–3 February 2010

Polar Climate and Environmental Change in the Last Millennium

Torun, Poland

Website: <http://www.zklim.umk.pl/nowa/polarna> – for information in English, please click on the ‘english_torun-1-circular.doc’ link

Contact: Rajmund Przybylak [rp11@umk.pl] or Andrzej Arazny [andy@umk.pl]

21–24 February 2010

Western Regional Science Association 49th Annual Meeting: Remote Regions/Northern Development sessions

Sedona, Arizona

Website: <http://www.u.arizona.edu/~plane/wrsa.html>

Contact: Lee Huskey [aflh@uaa.alaska.edu]

22–26 February 2010

Climate Change Impacts On the Bering Sea and Related Polar Seas:

From Observation to Prediction

American Geophysical Union Ocean

Sciences Meeting

Portland, Oregon

Contact: Rodger Harvey [harvey@cbl.umces.edu] or

Michael F. Sigler [mike.sigler@noaa.gov]

9–10 March 2010

2010 Alaska Weather Symposium

University of Alaska Fairbanks, Fairbanks, Alaska

Website: <http://weather.arsc.edu/Events/AWS10/>

Contact: Don Morton [morton@arsc.edu]

10–12 March 2010

40th Annual International Arctic Workshop

Winter Park Mountain Lodge, Colorado

Website: <http://instaar.colorado.edu/AW>

Contact: ArcticWS@colorado.edu

13–20 March 2010

Dissertations Initiative for the Advancement of Climate Change Research

(an interdisciplinary climate change research symposium)

Mesa, Arizona

Website: <http://www.disscrs.org/>

Contact: organisers [info@disscrs.org]

15–17 March 2010

AGU Chapman Conference on the Exploration and Study of Antarctic Subglacial Aquatic Environments

Baltimore, Maryland, USA

Website: <http://www.agu.org/meetings/chapman/2010/ccall/>

16–19 March 2010

2010 State of the Arctic Conference

Miami, Florida

Website: <http://soa.arcus.org/>

Contact: Helen V. Wiggins [helen@arcus.org] or (for questions about abstract submission)

Judy Fahnestock [judy@arcus.org]

25–26 March 2010

The 14th Alpine Glaciology Meeting

Milan, Italy

Website to be announced

14–18 April 2010

Annual Meeting of the Association of American Geographers

Washington, DC, USA

Sessions (co) sponsored by the Cryosphere Specialty Group include: State and Fate of Frozen Ground and Periglacial Environments; Glaciers & changing environments; Land, Ocean, and Atmosphere in a Changing Arctic; Hydroclimatology; Re-exploring the North
Website: <http://www.igsoc.org/www.aag.org/>

28–30 April 2010

Workshop on Cold Regions Hydrology

Innsbruck, Austria

Organized by the Network of Climate and Cryosphere Research at the University of Innsbruck, the European Space Agency (ESA) and ENVEO IT

The Climate and Cryosphere (CliC) Programme of WCRP and ICSIH-IAHS are scientific co-sponsors

Website: <http://www.congrex.nl/10c06/>

2–7 May 2010

EGU General Assembly

Session ‘Modeling the Spatial Dynamics of Permafrost and Seasonally Frozen Ground at Diverse Scales (CR4.2)’

Vienna, Austria

Website: <http://meetingorganizer.copernicus.org/EGU2010/session/2662>

Contact: Stephan Gruber [stephan.gruber@geo.uzh.ch]

31 May–4 June 2010

International Glaciological Symposium: Ice and Snow in the Climatic System

Kazan, Russia

Website (address to be announced) will open on 15 December 2009

31 May–4 June 2010

****International Symposium on Sea Ice in the Physical and Biogeochemical System**

Tromsø, Norway

Contact: Secretary General, International Glaciological Society

4–11 June 2010

4th International Workshop on Ice Caves

Obertraun, Austria

Workshop theme: meteorology, glaciology and paleoclimatology in ice caves

Website: <http://www.iwic2010.info/>

E-mail: office@iwic2010.info

13–17 June 2010

Third European Conference on Permafrost (EUCOPP2010)

Longyearbyen, Svalbard

Website: <http://www.eucop2010.no/>

5–11 June 2010

4th International Workshop on Ice Caves (IWIC-IV)

Obertraun, Austria

Website: <http://www.iwic2010.info/>

Contact: office@iwic2010.info

8–10 June 2010

67th Eastern Snow Conference: Here today gone tomorrow, the Eastern North America Cryosphere

Jiminy Peak Mountain Resort, Hancock, MA USA

Website: http://www.easternsnow.org/annual_meeting.html

Contact: Mauri Pelto [mspelto@nichols.edu]

14–18 June 2010

The 20th IAHR International Symposium on Ice

Lahti, Finland

Website: http://www.geo.physics.helsinki.fi/IAHR2010/IAHR2010_2.html

21–24 June 2010

24th international Forum for Research into Ice Shelf Processes (FRISP)

Evangelisches Bildungszentrum, Bad

Bederkesa, Germany

Website: <http://www.gfi.uib.no/forskning/frisp/>

Contact: Adrian Jenkins [ajen@bas.ac.uk]

21–25 June 2010

****International Symposium on Snow, Ice and Humanity in a Changing Climate**

Sapporo, Japan

Contact: Secretary General, International Glaciological Society

3–6 August 2010

4th SCAR Open Science Conference: Witness to the Past and Guide to the Future

Buenos Aires, Argentina

A session titled ‘An interdisciplinary approach to understanding Antarctic ice shelf disintegration: controls and consequences of rapid environmental change’ will be convened by Eugene Domack [edomack@hamilton.edu] and Amy Leventer [aleventer@colgate.edu]

Further details available soon on SCAR website (<http://www.scar.org/>)

12–14 August 2010

**Cryospheric Changes and Influence –
Cryospheric Issues in Regional Sustainable
Development**

International Joint Conference by the CliC and IACS

Lijiang, Yunnan Province, China

Website: <http://www.casnw.net/>

Contact: Xie Aihong [xieaih@lzb.ac.cn]

16–20 August 2010

****International Symposium on Earth's
Disappearing Ice: Drivers, Responses
and Impacts: A celebration of the 50th
Anniversary of Byrd Polar Research Center**

Byrd Center, Ohio State University, USA

Contact: Secretary General, International
Glaciological Society

5–10 September 2010

**12th International Conference on the Physics
and Chemistry of Ice**

Sapporo, Japan

Contact: Chairperson Yoshinori Furukawa
(Hokkaido University)

Website: [http://www.lowtem.hokudai.ac.jp/
PCI-2010/](http://www.lowtem.hokudai.ac.jp/PCI-2010/)

14–25 September 2010

**Karthus course on Ice Sheets and Glaciers
in the Climate System**

Karthus, Italy

Website: [http://www.phys.uu.nl/~wwwwimau/
education/summer_school](http://www.phys.uu.nl/~wwwwimau/education/summer_school) (coming soon)

20–23 September 2010

**HydroPredict'2010
2nd International Interdisciplinary
Conference on Predictions for Hydrology,
Ecology, and Water Resources Management:
Changes and Hazards caused by Direct
Human Interventions and Climate Change**

Prague, Czech Republic

Website: [http://www.natur.cuni.cz/
hydropredict2010/](http://www.natur.cuni.cz/hydropredict2010/)

20–24 September 2010

**11th International Circumpolar Remote
Sensing Symposium**

Cambridge, UK

Website: [http://alaska.usgs.gov/science/
geography/CRSS2010/](http://alaska.usgs.gov/science/geography/CRSS2010/)

27–30 September 2010

**Remote Sensing in Hydrology 2010
Symposium**

Jackson Hole, Wyoming, USA

Website: [http://www.remotesensinghydrology.
org/](http://www.remotesensinghydrology.org/)

Contact: Christopher Neale (VP ICRS)
[christopher.neale@usu.edu]

8–9 October 2010

Northwest Glaciologists Meeting 2010

University of Alaska Fairbanks, Fairbanks,
Alaska, USA

Further details to be announced. Please note
that the date agreed on at the 2009 meeting
has had to be changed

2011

29 March–2 April 2011

Arctic Science Summit Week 2011

Coex Center, Seoul, South Korea

ASSW 2011 will have an integrated Science
Symposium covering the theme: 'The Arctic:
The New Frontier of Global Science'. Further
details to be announced

5–10 June 2011

**International Symposium on Interactions of
Ice Sheets and Glaciers with the Ocean**

Scripps Institution of Oceanography, La Jolla,
California, USA

Contact: Secretary General, International
Glaciological Society

27 June–8 July 2011

**International Union of Geodesy and
Geophysics**

IUGG XXV General Assembly

**Earth on the Edge: Science for a Sustainable
Planet**

Melbourne, Australia

Website: [http://www.iugg.org/
assemblies/2011melbourne/](http://www.iugg.org/assemblies/2011melbourne/)

Contact: Regine Hock (Regine.hock@
gi.alaska.edu)

2012

June 2012

**International Symposium on seasonal snow
and ice**

Helsinki, Finland

Contact: Secretary General, International
Glaciological Society

25–29 June 2012

**International Symposium on Glaciers and Ice
Sheets in a Warming Climate**

Fairbanks, Alaska, USA

Contact: Secretary General, International
Glaciological Society

Late summer 2012

**International Symposium on Ice Core
Science**

Location to be determined

Contact: Secretary General, International
Glaciological Society



New members

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b.deboer@uu.nl

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laurencedyke@hotmail.com

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University of Oslo, PO Box 1047, Blindern,
0316 Oslo, Norway
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