



IACS

International Association
of Cryospheric Sciences

<http://www.cryosphericciences.org>

Quadrennial Report – 2015-2018

Introduction

The International Association of Cryospheric Sciences (IACS) is the eighth and youngest Association of the International Union of Geodesy and Geophysics (IUGG). IACS is concerned with snow and ice science, and it provides expert advice on cryospheric issues to governmental and non-governmental organisations. Most snow and ice research within IUGG was previously covered within the International Commission on Snow and Ice (ICSI), a commission of the International Association of Hydrological Sciences (IAHS). The IUGG Council voted to establish IACS at the IUGG General Assembly in Perugia, Italy in 2007. This is hence the third Quadrennial report of IACS as an independent Association, the first having covered the period from 2007-2010, and the second from 2011-2014.

The objectives of IACS are to:

- promote studies of cryospheric subsystems of the Earth solar systems,
- encourage research in the above subjects by members of the cryospheric community, national and international institutions and programmes, and individual countries through collaboration and international co-ordination,
- provide an opportunity on an international basis for discussion and publication of the results of the above research,
- promote education and public awareness on the cryosphere, and
- facilitate the standardisation of measurement or collection of data on cryospheric systems and of the analysis, archiving and publication of such data.

ADMINISTRATION

Administration

The business of IACS is managed by a Bureau of elected officers. Members of the present Bureau were elected at the Plenary Administrative Session in Prague in 2015 and has mostly remained stable during the last quadrennium. The officers have been President (Charles Fierz until February 2017 whence he became immediate Past-President), President-Elect (Regine Hock – until February 2017 whence she became President), Secretary General (Andrew Mackintosh, New Zealand), three Vice-Presidents (Olga Solomina, Russia, replaced by Stanislav Kutuzov, Russia in May 2018; Xiao, Cunde, China, and Ian Allison, Australia) and the heads of five disciplinary Divisions (Glaciers and Ice Sheets, Liss Marie Andreassen, Norway; Snow and Avalanches, Ethan Greene, USA; Marine and Freshwater Ice, Hirouyuki Enomoto, Japan; Planetary and Other Ices of the Solar System, Christine Schott Hvidberg, Denmark; and Cryosphere, Atmosphere and Climate, Valérie Masson-Delmotte, France, deputised by Anais Orsi, France). The President, President Elect/Immediate Past President, and Secretary General make up the IACS Executive

(EC). Most internal business of the Association and interaction with other scientific agencies is conducted by email. In addition, the EC conducts monthly teleconferences, which bureau members are invited to join. The Bureau meets in person once per year. Bureau meetings (BM) during this quadrennium were held in Prague, Czech Republic (BM11), by Video conference BM12), in Christchurch, New Zealand (BM13), and Davos Switzerland/and by videoconference (BM14). Minutes of these meetings are available on the IACS website, www.cryosphericosciences.org. A plenary meeting with the IACS stakeholders, and the cryospheric science community, was held in Prague in 2015, while an Open Bureau Meeting was held in Wellington in 2017.

The current four-year term of most Bureau members finishes in July 2019, and a “nominating panel” of members independent of the Bureau (Ralf Greve, Japan, Barbara Stenni, Italy and Samuel Morrin, France) was established in November 2018 to identify suitable candidates for election to the Bureau. The nominating panel’s role is to ensure that candidates for the IACS Bureau provide a good coverage of world regions and cryospheric disciplines. The new slate of candidates will be circulated to National Committees at least three months prior to its Plenary Administrative Session, to be held in Montreal on Friday July 12th, 2019.

ACTIVITIES

IACS Individual Membership

In 2017, IACS established free individual membership. We now have 500 members who have signed up in under two years. We hope that individual membership is helping to create a stronger community around IACS, promoting its activities and its relationship with IUGG and its other seven constituent associations. Specifically, IACS members receive regular information about IACS activities and opportunities, and are eligible to engage in IACS activities and bodies. This includes the possibility of receiving IACS sponsorship and financial support for workshops, training schools, and other IACS-sponsored activities, as well as for the IACS early-career scientist prize (if members qualify). More information about IACS membership can be found [here](#). Everybody is welcome to join, including members of other IUGG associations.

New IACS website, Twitter account, and home for our archives

In early 2019, IACS launched a completely redesigned website <https://cryosphericosciences.org>, culminating from months of work. Hosted by the World Glacier Monitoring Service in Zurich, the new website is both more functional, modern and aesthetically pleasing, and we invite you to explore it. The website also displays IACS Twitter feed, from the IACS Twitter handle launched in September 2017. See <https://twitter.com/iacscopy>. Together, the website and twitter presence are helping to connect IACS to a larger community of engaged scholars and the public.

IACS bureau members working on Intergovernmental Panel on Climate Change report

Since October 2017, a team of six IACS officers, present and past, have been writing the Intergovernmental Panel on Climate Change Special Report on the Oceans and Cryosphere in a Changing Climate, which will be published towards the end of 2019. IACS officers attended four Lead Author meetings (in Nadi, Fiji, October 2017, Quito, Ecuador,

February 2018, Lanzhou, China, July 2018, Kazan, Russia in February 2019), and spent many intense months writing the report as part of the larger international team. The roles that IACS officers have played are as follows; IACS Head of Division IV Valerie Masson Delmotte is Co-Chair of IPCC Working Group I. IACS President Regine Hock is Coordinating Lead Author of Chapter 2 'High Mountain Regions'. IACS Secretary General Andrew Mackintosh is Lead Author of Chapter 3 'Polar Regions'. IACS Division III head Hiroyuki Enomoto is Lead Author of Chapter 1 'Framing and Context of the Report'. IACS Vice President Xiao Cunde is Review Editor for Chapter 3 'Polar Regions'. Former IACS President Georg Kaser is Review Editor for Chapter 2 'High Mountain Regions'.

Working and Standing Groups

IACS facilitates the transfer of research methods and explores new avenues in cryospheric science through Standing Groups and Working Groups devoted to a theme or subject and composed of experts in the particular field of study. Here is a summary of IACS Working Group Activity during the last four years.

- The MICROSNOW Working Group (2012-2016) held a series of very useful workshops and scientific intercomparison exercises. For more information, see [here](#).
- The Randolph Glacier Inventory and infrastructure for glacier monitoring Working Group (2014-2019) was the first to provide a globally comprehensive glacier inventory; in 2017, it released version 6.0 of its database (<https://doi.org/10.7265/N5-RGI-60>).
- The IACS Working Group on Glacier ice thickness estimation (2014-2019) has been very successful, and has just had its second scientific output published in the leading journal [Nature Geoscience](#).
- The IACS Working Group on Debris Covered Glaciers was established in late 2018, and will extend until 2022. The aim of this group is to advance our understanding of how debris impacts glacier response to climate at the local, regional, and global scale. This is a necessary precursor to accurately represent debris-covered glaciers in models of regional runoff and sea-level change projections.

The current Standing Groups (SG) are the *Joint Commission on Volcano-Ice Interactions* (with the International Association of Volcanology and Chemistry of the Earth's Interior - IAVCEI), *Glacier and Permafrost Hazards in Mountains* ([GAPHAZ](#), a joint SG with the International Permafrost Association IPA), and the *Steering Committee of the Global Terrestrial Network for Glaciers* (GTN-G). GAPHAZ also links IACS to the IUGG Union Commission on GeoRisk (M. Krautblatter is our representative). For a recent high-profile GAPHAZ output, please see their 2018 [Nature Geoscience paper](#) about a catastrophic glacier collapse in Tibet.

International Symposium on the Cryosphere in a Changing Climate, Wellington, NZ

IACS held its 2017 scientific assembly from 12th-17th February 2017 in Wellington, New Zealand. This meeting brought together three of the leading international associations focusing on the cryosphere; the International Association of Cryospheric Sciences (IACS), the International Glaciological Society (IGS) and the World Climate Research Programme

Climate and Cryosphere Project (WCRP CliC). This conference was held at Victoria University of Wellington, Andrew Mackintosh's home institution. Andrew chaired the Local Organising Committee while Ian Allison chaired the Scientific Steering Committee. Around 250 delegates from ~30 countries attended this conference. IACS provided travel grants to allow more than 15 early career scientists and scientists from developing countries to attend this meeting. Attendees included senior and chief editors of the journals *Nature* and *Nature Climate Change* respectively. About 30 delegates also attended the pre- and post-conference field trips to Tongariro and Aoraki/Mt Cook National Parks. Overall, this conference was a major success.

Other meetings and symposia sponsored by IACS

IACS supports events that are of interest to the cryospheric community. Our contributions are either to cover part of the travel costs of attendees (early career scientists and scientists from developing countries) or towards IACS awards for scientists in these categories. Below we list the meetings or events that we have sponsored between 2014-18.

1. International Glaciology Society *International Symposium on Glaciology in High Mountain Asia*, 1-6 March 2015, Kathmandu Nepal.
2. First *APECS World Summit: The Future of Polar Research*, Sofia, Bulgaria, 6-8 June 2015.
3. 1st *Snow Science Winter School*, Sodankylä, Finland, 8-14 February 2015.
4. 2nd *Snow Science Winter School*, Preda, Switzerland, 14-20 February 2016.
5. World Glacier Monitoring Service *Training Course for Glacier Mass Balance Measurements and Analysis*, Bolivia, 10-16 July 2016.
6. *International Summer School in Glaciology*, McCarthy, AK, USA, June 2016.
7. 6th International Conference on Mars Polar Science and Exploration, Reykjavik, Iceland, 5-9 September 2016.
8. *International Glacial Seismology Training School*, 11-17 June 2017, Fort Collins, CO, USA.
9. Past Antarctic Ice Sheet Dynamics (PAIS) conference, September 10-15, 2017, Trieste, Italy.
10. *International Workshop on Cryospheric Change and Sustainable Development*, 1-2 August 2017, Lanzhou, China.
11. *From entering the field to taking the helm; perspectives of women in polar research*. Panel Discussion at Polar2018 Meeting in Davos (15-26 June 2018).
12. *International Summer School in Glaciology*, McCarthy Alaska from June 5-15, 2018
13. *International Workshop on Cryospheric Changes and their Regional and Global Impacts*, Dunhuang China, from July 31 - August 1, 2018.
14. *4th Nordic Workshop on Cosmogenic Nuclides; Landscape development and geohazards*. 4-6 June 2018, Norway.
15. *4th Snow Science Winter School* at Col du Lautaret, France, from 11-17 February 2018.

IACS early career scientist award

The IACS early career scientist award was initiated in 2016. This award is presented at bi-annual scientific assemblies (IACS, and IUGG General Assemblies). Information about the 2016 awardees can be found [here](#). The next round of awards will be made in time for the 2019 Montreal IUGG General Assembly (deadline March 1st, 2019).

FUTURE ACTIVITIES AND ANNOUNCEMENTS

27th IUGG General Assembly, Montreal

IACS is looking forward to participating in the GA in Montreal, where we will support around 30 cryosphere-related symposia including many joint with other IUGG associations. All IACS bureau positions (except for President) will be renewed, we will hold the IACS dinner known as *Festa Cryospherica*, and the winner of the IACS Early Career prize will be announced.

IACS have begun planning for a joint meeting with IAMAS and IAPSO (MOCA-21) to be held in the Northern Hemisphere summer in Busan, South Korea.