



IUGG



IACS

International Association  
of Cryospheric Sciences

<http://www.cryosphericciences.org>

## 2021 IACS annual report

### INTRODUCTION

The International Association for Cryospheric Sciences (IACS) is the Association of the International Union of Geodesy and Geophysics (IUGG) concerned with snow and ice science and provides expert advice on cryospheric issues to governmental and non-governmental organisations. The objectives of IACS are to:

- promote studies of cryospheric subsystems of the Earth and solar system;
- 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 coordination;
- 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;
- promote and support diversity, inclusion and equality within the field of cryospheric science, including but not limited to career stage, gender, racial and ethnic identities, and geographic origin.

### ADMINISTRATION

In the absence of an in-person assembly in 2021 (following the cancellation of BACO-21), the IACS Annual Bureau Meeting (6 and 13 September) and Open Plenary Meeting (17 November) were held online. The plenary meeting included reports from all of the IACS Working Groups, Standing Groups and Joint Commissions, and presentations were recorded for the benefit of IACS members who could not attend. We have found that repeating these online meetings twice to suit different time zones is an efficient and inclusive way to conduct IACS business while reducing carbon footprint.

To run the day-to-day business of IACS, an Executive Committee (EC) consisting of the President, Secretary General and President Elect holds regular teleconferences, in which all Bureau members are welcome to join.

Liss Andreassen succeeded Regine Hock as IACS President at the end of the Annual Bureau Meeting on 13 September 2021.

The IACS Terms of Reference were modified by Bureau action to clarify the structure of IACS joint bodies in collaboration with organizations outside IUGG. One such joint body was established in 2021: the Joint Body on the Status of Mountain Snow Cover with the Mountain Research Initiative and the WMO Global Cryosphere Watch.

## ACTIVITIES

### IACS communications

The IACS homepage (<https://cryosphericssciences.org/>) is hosted at the World Glacier Monitoring Service in Zurich and is linked to twitter account @iacscryo (<https://twitter.com/iacscryo>). IACS newsletters feature announcements and reports of IACS activities (<https://cryosphericssciences.org/newsletter/>). Three newsletters were published in 2021.

### IACS resolutions

An action plan (<https://cryosphericssciences.org/about/resolutions/>) was approved at the IACS Annual Bureau Meeting on 6 September 2022 to implement IUGG Resolution 1: “Reducing the carbon footprint by the research community”. Among other measures, the plan regulates IACS business travel by air. A summary of the IACS action plan was published in the IUGG Electronic Journal Volume 21, No. 10 (October 2021).

### IACS 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. The currently active IACS Working Groups are:

- Randolph Glacier Inventory and its role in future glacier monitoring and GLIMS (2020-2023) has the objective of automating the process of generating digital glacier outlines to support research in glacier mass balance and contributions to sea level rise.
- Regional Assessments of Glacier Mass Change (RAGMAC, 2019-2023) brings together the research community that is assessing regional glacier mass changes from various observation technologies to come up with a new consensus estimate of global glacier mass changes and related uncertainties.
- Debris Covered Glaciers (2018-2022) aims to advance our ability to map debris thickness, to identify the level of model complexity required to estimate sub-debris melt, and to coordinate knowledge exchange.

RAGMAC produced a Frontiers in Earth Sciences Research Topic “Observational Assessments of Glacier Mass Changes at Regional and Global Level” with an editorial and 11 research articles (<https://www.frontiersin.org/research-topics/9957>).

The IACS/IPA Standing Group on Glacier and Permafrost Hazards in High Mountains (GAPHAZ) aims to:

- improve international scientific communication on glacier and permafrost hazards;
- compile knowledge related to glacier and permafrost hazards in high mountains;
- work towards greater transfer of information and improved communication between the scientific and governmental communities;
- signpost sources of advice to international and national agencies, responsible authorities and private companies;
- act as a focal point for information for international media during relevant crises.

A GAPHAZ community effort on reconstruction of the 7 February 2021 Chamoli, India, landslide and flooding disaster resulted in a Science publication with 53 authors (<https://www.science.org/doi/10.1126/science.abh4455>).

IACS is part of the Global Terrestrial Network for Glaciers (GTN-G) Steering Committee. GTN-G is a framework for internationally coordinated monitoring of glaciers jointly run by the

US National Snow and Ice Data Center, the Global Land Ice Measurements from Space initiative, and the World Glacier Monitoring Service.

### IACS Joint Commissions

Joint Commissions with other IUGG Associations aim to foster collaboration and coordination on topics of overlapping interests. IACS currently has three Joint Commissions:

- IACS-IAG Joint Commission on Cryospheric Deformation
- IACS-IAPSO Joint Commission on Ice-Ocean Interactions
- IACS-IAVCEI Joint Commission on Volcano-Ice Interactions.

Cooperation between IACS and IAVCEI was revitalised in 2021 by new leadership for the Joint Commission on Volcano-Ice Interactions after a period of inactivity. IACS worked with the Ice-Ocean Interactions and Volcano-Ice Interactions commissions to develop their Terms of Reference during 2021.

### Co-sponsored events and activities

IACS supports events that are of interest to the cryospheric community. Our contributions typically cover part of the travel costs for early career scientists and scientists from developing countries attending cryosphere related events, or IACS awards for scientists in these categories. Funding requests must be submitted for deadlines on 1 February, 1 June and 1 October and at least two months prior to the event that is to be supported. Proposers are informed of decisions approximately two weeks after the deadline. No requests were received in 2021 due to international pandemic travel restrictions, but two events with funding held over from 2020 went ahead:

- Third Annual Meeting of the Chilean Cryosphere Society (SOChiCri), online, 18-19 March 2021
- Juneau Icefield Research Program 2021, Alaska

To replace the cancelled BACO-21 IACS-IAMAS-IAPSO assembly, the three Associations ran an online seminar series with invited speakers and early career award winners over the same period (19-23 July 2021). IACS organized the registration and the meeting platform. Recorded presentations can be viewed at <https://www.youtube.com/channel/UCP3bCxu-NlqllNmeoHgGxEQ/videos>

### Awards

The IACS Early-Career awards for 2021 went to David Bigelow (Simon Fraser University, Canada) and Giulia Mazzotti (WSL Institute for Snow and Avalanche Research, Switzerland). This prize is awarded every two years to two early career scientists who have published the best scientific papers on cryospheric subjects as assessed by an independent evaluation committee.

IACS Immediate Past President Regine Hock received the International Glaciological Society Richardson medal at the IGS Nordic Branch meeting on 5 November 2021, and has been awarded the European Geophysical Union Julia and Johannes Weertman Medal for 2022.

### Obituaries

Lowell Allan (Al) Rasmussen passed away on February 13, 2021, in Seattle, Washington, at age 83. Al was deeply involved in the development of the widely used glossary of mass balance terms published in 2011 - a major outcome from the IACS working group on "Mass

balance terminology and methods". His tireless input and fastidious care for detail were instrumental to the quality of the publication.

## FUTURE ACTIVITIES AND ANNOUNCEMENTS

The Standing Group on Glacier and Permafrost Hazards in High Mountains (GAPHAZ) and the Joint Body on the Status of Mountain Snow Cover will run focus sessions at the International Mountain Conference, 11-15 September 2022.

The Secretary General is representing IACS on the steering committee for the fourth International Conference on Arctic Research Planning (Boulder, USA, 2025).



The IACS Bureau.

Back row, l-r: Minghu Ding, Andrew Mackintosh, Anaïs Orsi, Takenobu Toyota.

Front row, l-r: Charles Fierz, Christine Schøtt Hvidberg, Regine Hock, Gwenn Flowers (on screen), Liss Andreassen, Richard Essery.

Inset, l-r: Marie Dumont, Alex Fraser, Stanislav Kutuzov, Sophie Nowicki, Lauren Vargo.