IASC Bulletin 2016

IASC 2016
BULLETIN

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INTERNATIONAL ARCTIC SCIENCE COMMITTEE
Telegrafenberg A43, DE - 14473 Potsdam, Germany
www.iasc.info

INTERNATIONAL ARCTIC SCIENCE COMMITTEE

[IASC] · INTERNATIONAL ARCTIC SCIENCE COMMITTEE

The International Arctic Science Committee (IASC) is a non-governmental, international scientific organization. IASC's mission is to encourage and facilitate cooperation in all aspects of Arctic research, in all countries engaged in Arctic research and in all areas of the Arctic region. Overall, IASC promotes and supports leading-edge multi-disciplinary research in order to foster a greater scientific understanding of the Arctic region and its role in the Earth system.

TO ACHIEVE THIS MISSION IASC:

- Initiates, coordinates and promotes scientific activities at a circumarctic or international level;
- Provides mechanisms and instruments to support science development;
- Provides objective and independent scientific advice on issues of science in the Arctic and communicates scientific information to the public;
- Seeks to ensure that scientific data and information from the Arctic are safeguarded, freely exchangeable and accessible;
- Promotes international access to all geographic areas and the sharing of knowledge, logistics and other resources;
- Provides for the freedom and ethical conduct of science;
- Promotes and involves the next generation of scientists working in the Arctic; and
- Promotes bipolar cooperation through interaction with relevant science organizations.

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[IASC] · STRUCTURE

Representatives of national scientific organizations from all 23 member countries form the IASC Council. The President of IASC is elected by Council, which also elects 4 Vice-Presidents to serve on the Executive Committee. Council usually meets once a year during the Arctic Science Summit Week (ASSW). The IASC Executive Committee operates as a board of directors and manages the activities of IASC between Council meetings. The Chair is the President of IASC.

The IASC Secretariat implements decisions of the Executive Committee and Council, manages IASC finances, conducts outreach activities and maintains international communication.

IASC MEMBER COUNTRIES

Austria	Austrian Polar Research Institute (APRI)	www.polarresearch.at
Canada	Polar Knowledge Canada	www.polarcom.gc.ca
China	Chinese Arctic and Antarctic Administration	www.chinare.gov.cn
Czech Republic	Czech Centre for Polar Research	http://polar.prf.jcu.cz
Denmark/ Greenland	The Agency for Science, Technology and Innovation	www.ufm.dk
Finland	Delegation of the Finnish Academies of Science and Letters	www.tsv.fi/international/ akatemiat/
France	Institut Polaire Français	www.institut-polaire.fr
Germany	Deutsche Forschungsgemeinschaft	www.dfg.de
Iceland	RANNÍS, The Icelandic Centre for Research	www.rannis.is
India	National Centre for Antarctic and Ocean Research (NCAOR)	www.ncaor.gov.in
Italy	National Research Council of Italy	www.cnr.it
Japan	Science Council of Japan, National Institute of Polar Research	www.nipr.ac.jp
The Netherlands	Netherlands Organization for Scientific Research	www.nwo.nl
Norway	The Research Council of Norway	www.forskningsradet.no
Poland	Polish Academy of Sciences, Committee on Polar Research	www.kbp.pan.pl
Portugal	Portuguese Foundation for Science and Technology	www.fct.pt/
Russia	The Russian Academy of Sciences	www.ras.ru
Republic of Korea	Korea National Committee on Polar Research	www.kopri.re.kr
Spain	Comité Polar Español	www.micinn.es
Sweden	The Swedish Research Council	www.vr.se
Switzerland	Swiss Committee on Polar Research	www.polar-research.ch
United Kingdom	Natural Environment Research Council	www.nerc.ac.uk
USA	Polar Research Board	http://dels.nas.edu/prb/

PHOTO: ELLORIE MCKNIGHT
Midwinter icicles hanging from a pressure ridge on Kluane Lake (Yukon Territory, Canada)

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[IMPRINT]

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COVERPHOTO: LUCA BRACALI
Geographic North Pole: Luca Bracali, an Italian explorer and travel reporter, skiing the last degree to the pole.

[CONTENT]

[PREFACE]

We are pleased once again to present our Bulletin which chronicles the events of the past year, both in words and photographs. The Bulletin and other news from IASC can also be accessed on our website.

The IASC year can really be said to run from one Arctic Science Summit Week (ASSW) to the next, since that is the main gathering of the IASC Council and the occasion for electing new members to the Executive Committee. The new ExCom that was elected at the ASSW2014 has therefore served its first year.

The ASSW2015 was held in April in Toyama, Japan together with the final ICARP III session and ISAR-4 – The Fourth International Symposium on the Arctic Research. The Science Council of Japan was the local organizer and all involved ensured that the entire week's events ran perfectly. This was a significant gathering for Arctic scientists and nearly 700 participants from 27 countries were registered. We were most honored to be able to welcome Her Imperial Highness Princess Takamado to open the Week and were delighted to experience her genuine interest in and knowledge of polar science. In addition an Open Day for the public during a sunny Sunday attracted an audience of 650 interested members of the public, a record which will be hard to beat! A Toyama Conference Statement – "Integrating Arctic Research: A Roadmap for the Future" – was produced and can be found on the IASC website at http://icarp.iasc.info/news/30-assw-2015-toyama-conference-statement. The final results of the ICARP III process will be presented at the ASSW2016 in Fairbanks, Alaska.

IASC also celebrated its 25th anniversary during the ASSW in Toyama and the book "25 Years of International Arctic Research Cooperation" was launched at an event where previous presidents and the first executive secretary were gathered for a discussion session. The anniversary book, which is also available on the IASC website, can be thoroughly recommended as an interesting summary of the

development of international relations and science cooperation concerning the Arctic during the past 25 years. With roots back to the 1st International Polar Year (IPY) in 1882-83 and up to the increasing opportunities of USSR president Gorbachovs period of glasnost and perestroika during the 1980s, IASC emerged to help to facilitate the growing spirit of international cooperation in Arctic science. A large and distinguished number of authors, who were all personally involved in the processes during these years, has contributed articles each from their own experience and point of view and the sum of the whole is well worth reading. Background documents and a filmed collection of interviews with key persons are also to be found on the IASC website.

The beginning of 2015 saw yet another expansion of IASC as Portugal became the 23rd member country. The small secretariat in Potsdam continues to bear the main task of organization and outreach on behalf of IASC, and in addition the idea of spreading the secretariat work over several countries has proved a great success. This particularly benefits assistance for the five Working Groups and support has been given from officers based in Korea, Japan, Canada and Poland. In addition the IASC Fellowship Program engages early career scientists in the activities of the Working Groups, producing mutual benefit for both parties. The Fellowship Program is a great opportunity for the selected early career scientists to integrate with the Working Group that covers their discipline and to obtain a network for their future career. The number of applications (96 in 2015) is expected to grow as the program becomes even more well-known.

Interaction with the Scientific Committee on Antarctic Research (SCAR) continues to be prioritized and current discussions include the further development of plans for a joint scientific conference to be held in Switzerland in 2018. The first joint conference with SCAR was held in St Petersburg, Russia in 2008 and attracted over 1400 attendees.

Following the program of regular reviews of the functioning and activities of IASC that were previously carried out in 1996 and 2006, the IASC Council appointed in 2014 an international group of experts to carry out a review of progress for the 2006-2016 period, including progress in implementing the recommendations of the 2006 Review Committee, and to recommend strategies for the future. Information was gathered both from archives and not least from questionnaires which were circulated to the wider Arctic scientific community, as well as to representatives of IASC stakeholders. The results of the review and the suggestions for future strategy will be discussed at the Council meeting in March 2016. In addition to this the Executive Committee has held its own discussions regarding the future strategy that they think that IASC should follow.

As the whole face of the Arctic seems to be changing drastically under the influence of climate change, we are confident that IASC still has a major role to play in the scientific community where changes and effects are proven and mitigation possibilities are discussed.

Susan Barr | IASC President

PHOTO: LUCA BRACALI
A polar explorer during a training session before the attempt to reach the geographic North Pole (Resolute Bay, Canada).

PHOTO: FLORENCIA MAZZA
A close-up of moss in the tundra near Barrow, Alaska

1. IASC Internal Development

» 1 IASC Internal Development

IASC Organization

The International Arctic Science Committee (IASC) is a non-governmental organization that encourages and facilitates cooperation in all aspects of Arctic research, in all countries engaged in Arctic research, and in all areas of the Arctic region. To fulfill its mission, IASC promotes and supports leading-edge multidisciplinary research in order to foster a greater scientific understanding of the Arctic region and its role in the Earth system. IASC was established in 1990 and began operations in 1991. It currently comprises 23 member countries. IASC member organizations are national science organizations that cover all fields of Arctic research.

Country	Organization	Representative
Austria	Austrian Polar Research Institute	Wolfgang Schöner
Canada	Polar Knowledge Canada	David Hik
China	Chinese Arctic and Antarctic Administration	Huigen Yang, Vice-President
Czech Republic	Centre for Polar Ecology	Josef Elster
Denmark/Greenland	Agency for Science, Technology and Innovation	Naja Mikkelsen, Vice-President
Finland	Delegation of the Finnish Academies of Science and Letters	Kari Laine
France	Institut Polaire Français	Yves Frenot
Germany	Deutsche Forschungsgemeinschaft	Karin Lochte
Iceland	RANNÍS, The Icelandic Centre for Research	Thorsteinn Gunnarsson
India	National Centre for Antarctic and Ocean Research	Sivaramakrishnan Rajan
Italy	National Research Council	Carlo Barbante
Japan	Science Council of Japan	Tetsuo Ohata
The Netherlands	The Netherlands Organization for Scientific Research	Peter Jordan
Norway	The Research Council of Norway	Susan Barr, President
Poland	Polish Academy of Sciences, Committee on Polar Research	Jacek Jania
Portugal	Portuguese Foundation for Science and Technology	João Canario
Russia	The Russian Academy of Sciences	Vladimir Pavlenko, Vice-President
Republic of Korea	Korean National Committee on Polar Research	Yeadong Kim
Spain	Comité Polar Español	Manuel Catalan
Sweden	The Swedish Research Council	Magnus Friberg
Switzerland	Swiss Committee on Polar Research	Martin Schneebeli
United Kingdom	Natural Environment Research Council	Henry Burgess
USA	Polar Research Board	Larry Hinzman, Vice-President

TABLE: An overview of all IASC Council members, including the countries and organizations they represent.

IASC Council

The IASC Council is comprised of representatives from national scientific organizations from all IASC member countries. The IASC Council meets once a year during Arctic Science Summit Week (ASSW). Council members provide input regarding a wide range of scientific and technical knowledge and provide access to a large number of scientists and administrators through their national committees.

The IASC Council is responsible for:

- Developing policies and guidelines for cooperative Arctic research;
- Establishing Working Groups (WGs) that address and act on timely topics in Arctic science;
- Recommending, in cooperation with the WGs, implementation plans for IASC programs and activities;
- Making decisions regarding the participation of national scientific organizations from non-Arctic countries; and,
- Organizing Arctic science conferences.

PHOTO: IASC SECRETARIAT
The IASC Council Meeting at ASSW 2015 in Toyama, Japan.

PHOTO: ALLEN POPE
One of the permanent camps of the Juneau Icefield Research Program, nestled on a ridge between the Lemon Creek Glaciers and the Ptarmigan Glacier, Juneau Icefield, Alaska.

IASC Executive Committee

The IASC Executive Committee operates as a board of directors and manages IASC's activities between Council meetings. The Executive Committee consists of five elected officials: the President, four Vice-Presidents, and the Executive Secretary.

The current IASC Executive Committee members are:

Susan Barr, President

Vladimir I. Pavlenko, Vice-President

Huigen Yang, Vice President

Larry Hinzman, Vice-President

Naja Mikkelsen, Vice-President

Volker Rachold, IASC Executive Secretary

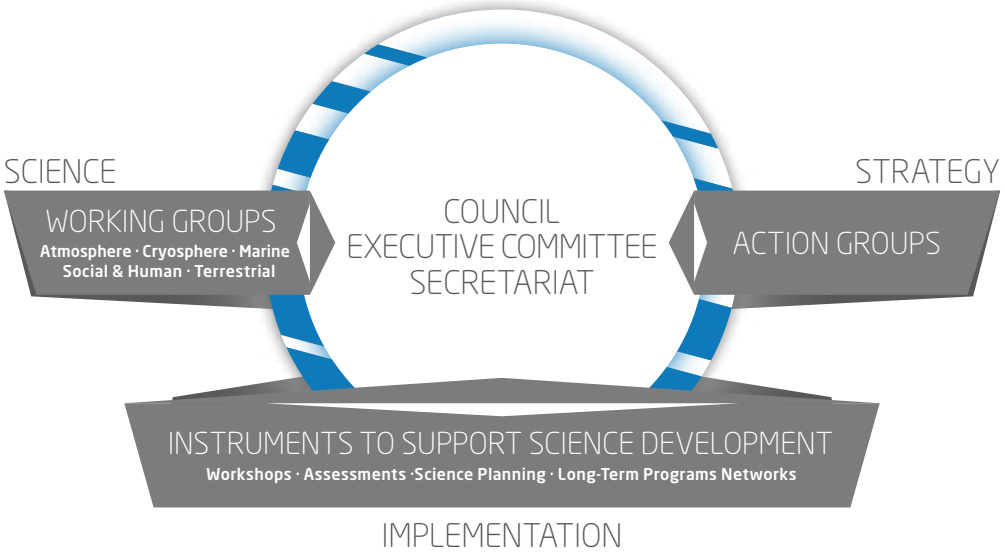

PHOTO: IASC SECRETARIAT
IASC ExCom meeting 2015 in Hangzhou, China. From left to right: Tian Wenjia, Naja Mikkelsen, Vladimir I. Pavlenko, Huigen Yang, Heike Midleja, Volker Rachold, Susan Barr, David Hik (not on photo: Larry Hinzman

FIGURE:
Diagram representing key elements of the IASC organizational structure

Secretariat

The IASC Secretariat is responsible for the daily operations of IASC including:

- Communicating with Council members;
- Communicating with other organizations including the Arctic Council and its subsidiary bodies and the International Council for Science (ICSU);
- Publishing the IASC Bulletin and IASC material as required;
- Providing support for the IASC Working Groups;
- Maintaining the IASC website, preparing the IASC newsletter Progress, and facilitating outreach; and,
- Administering IASC finances.

In the past two years, the IASC Secretariat has received growing international support from IASC member countries, especially considering the support for the growing number of activities undertaken by the IASC Working Groups and early career development.

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Support for the IASC Working Groups (WG) is provided by:

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Contact: yoo.kyung.lee@iasc.info

Tetsuo Sueyoshi, IASC Officer, hosted by the Japanese National Institute of Polar Research (NIPR)
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Susan File, IASC Officer, hosted by the Canadian Polar Commission (CPC)
Contact: susan.file@polarcom.gc.ca

IASC Fellowship & Early Career Support:

Maja Lisowska, affiliated with the Polish Centre for Polar Studies and the Polish Polar Consortium.
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IASC Review

The IASC Founding Articles call for a regular review of the organization. The first review was undertaken in 1996 and the second in 2006. At its meeting in 2014, the IASC Council decided that ten years after the second review and after the completion of the Third International Conference on Arctic Research Planning (ICARP III), it would be timely to conduct another review of IASC.

An international group of experts of international renown with a broad understanding of Arctic research and policy was appointed to serve on the IASC Review Committee. The expertise of the members covers the whole spectrum of IASC´s activities, considering geographical, age and gender balance. The Committee was appointed after Arctic Science Summit Week (ASSW) 2015 with a 1-year mandate until ASSW 2016.

Membership of the IASC Review Committee

- Colin Summerhayes, Scott Polar Research Institute, UK (Chair)
- Gunn-Britt Retter, Saami Council, Norway
- Penelope Wagner, Norwegian Meteorological Institute, Norway
- Craig Tweedie, The University of Texas at El Paso, USA
- Hong Kum Lee, Korea Polar Research Institute, Korea
- Tatiana Vlasova, Russian Academy of Science, Russia
- Nate Bauer, International Arctic Research Center, Fairbanks, USA (Secretary)

The overall tasks for the Review Committee are to evaluate IASC´s activities over the 10-year period 2006-2015 and to recommend strategies for the future. The review applies to the organization as a whole and includes the evaluation of IASC´s various groups and initiatives. It is based on both the assessments of the committee members and on consultations with the Arctic science community.

A face-to-face meeting of the group was organized in September 2015 and an interim report was presented to the IASC Executive Committee in November. The final report will be submitted to the IASC Council at ASSW in Fairbanks.

PHOTO: IASC SECRETARIAT
IASC Review Committee Meeting, Potsdam (Germany), 21-23 September 2015. From left to right: Volker Rachold, Nate Bauer, Gunn-Britt Retter, Penelope Wagner, Hong Kum Lee, Tatiana Vlasova, Colin Summerhayes, Craig Tweedie.

PHOTO: ALLEN POPE
Juneau Icefield Research Program participants up in the air, overlooking the Taku Glacier, Juneau Icefield, Alaska.

Portugal:

IASC's 23rd Member Country

IASC Council welcomed Portugal as the 23rd IASC member country at Arctic Science Summit Week 2015. Portugal is represented in IASC through the Portuguese Foundation for Science and Technology, with João Canario serving as the IASC Council member.

New Member Country: Portugal

Portugal has a rich history of science, discovery and exploration. In 1468, Bartolomeu Dias was the first European to navigate the cold austral waters, reaching the Cape of Good Hope, and in November 1520, Fernão Magalhães questioned if the "Terra Australis" existed. João Vaz Corte-Real, one of the distinguished navigators of the 15th and 16th century, discovered Newfoundland (Canada) in 1472, reaching America 20 years before Columbus. Later, according to the French diplomat, the Seigneur de la Madeleine, the Portuguese navigator David Melgueiro accomplished a voyage on board the Dutch galleon „Padre Eterno" that began on the 14th of March 1660 in Tanegashima (Japan), crossing the strait of Bering, Svalbard, hugging the coasts of Scotland and Ireland, and ending up in the Netherlands, where he changed vessels to finally get to Oporto in 1662. This feat is, however, not fully confirmed.

During the 20th century, Portugal has been involved in Polar research, both in the Arctic and in the Antarctic, in collaboration with various international polar partners, particularly after the International Polar Year 2007/2008 (IPY). During IPY and with the support of the Fundação para Ciência e a Tecnologia (FCT), Portugal's national scientific agency, a national polar strategy was implemented. During these initial years, Portugal became a member of the Scientific Committee for Antarctic Research in 2006, the European Polar Board in 2007, and in 2010, Portugal signed the Antarctic Treaty.

The legacy of the Portuguese IPY was the creation of the Polar Office of the FCT in 2011 and the consolidation of the Portuguese Polar Program (PROPOLAR), which had been implemented during IPY.

PHOTO: IASC SECRETARIAT
Portugal joins IASC as its 23rd member country. From left to right: Susan Barr (IASC President), João Canario and Volker Rachold (IASC Executive Secretary)

FIGURE 1:
João Vaz Corte-Real (1420-1496), the first Portuguese to sail into boreal waters and the discoverer of Newfoundland (Picture from the 19th Century)

#01

#02

PROPOLAR is the organization responsible for the implementation of the national polar research strategy. It is coordinated by five research centers from four Portuguese universities and works directly with the Polar Office of FCT. The aims of PROPOLAR are to:

- Implement the national polar strategy;
- Represent Portugal in International Polar Organizations;
- Provide and facilitate the access of Portuguese researchers to Polar regions;
- Promote international cooperation;
- Open annual national calls for logistical support to conduct research in the Arctic and Antarctic; and,
- Coordinate mobility grants for young researchers.

PROPOLAR includes an education and outreach program and works in cooperation with the Association of Polar Early Career Scientists (APECS Portugal) and Polar Educators International (PEI).

Since 2013, PROPOLAR has been particularly involved in promoting Arctic research and in this year, for the first time, a national call for Arctic research projects was launched, with a significant increase in the number of funded projects in the most recent 2015 call. The main areas of research include marine, terrestrial, cryosphere and atmosphere sciences. Interdisciplinary research has been conducted mostly on terrestrial permafrost environments, as well as on the effects of climate change on marine areas and organisms.

With the increase of Arctic research, the admission of Portugal to the Forum of Arctic Research Operators in 2014 and to the International Arctic Science Committee in 2015 were significant milestones in the recent history of Portuguese Polar research, and the community remains actively involved in these organizations.

For more information about PROPOLAR, please visit: http://www.propolar.org

#03

PHOTOS: JOÃO CANÁRIO

#01 - Professor Gonçalo Vieira, coordinator of the Portuguese Polar Program (PROPOLAR).

#02 - Fresh snow sampling in the Arctic for contaminant analysis under Canada's Northern Contaminants Program (NCP). Collaborative work between Environment Canada and the universities of Ottawa and Lisbon (CQE/IST)

#03 - UAV mapping of thaw lakes and peatlands in the Canadian sub-arctic (Kuujjuarapik, Northern Quebec) in a cooperative project between the universities of Lisbon and Laval (CEN) in August 2015.

International Science Initiative in the Russian Arctic (ISIRA)

IASC launched ISIRA in 1993 as a Russian and international initiative to assist and promote scientific cooperation in the Russian Arctic. Initially, ISIRA aimed to identify potential partners and funding opportunities for bilateral and international science initiatives and promote the Russian Arctic as an outstanding laboratory for both natural, human and social sciences. ISIRA is organized as an international group that advises the IASC Executive Committee. The group is composed of representatives of key Russian science institutions and representatives from participating IASC member countries. Secretarial support is provided by IASC.

ISIRA aims to support science and sustainable development in the Russian Arctic by: a) Initiating planning of multinational research programs that address specific issues in the Russian Arctic; b) Providing a forum for linking ongoing or planned bilateral projects; c) Facilitating improved scientific access to the Russian Arctic; and, d) Advising on funding and organizing the implementation of research projects.

ISIRA meetings are usually held on an annual basis during Arctic Science Summit Week (ASSW). During these meetings, reports on international science activities and initiatives in the Russian Arctic are provided by national members of the group. Along with the comprehensive national inventories of past, ongoing and planned international and bilateral science projects and initiatives in the Russian Arctic, up-to-date information on policies, regulations and logistics to support scientific access to the region is also provided by group members. To ensure capacity building within ISIRA, Russian and international young scientists have been financially supported by IASC to to ensure their involvement in recent meetings and group

PHOTO: IASC SECRETARIAT
The ISIRA meeting during ASSW 2015 in Toyama, Japan.

discussions, and to enable them to present their scientific work.

The past 2 meetings of the group were highlighted with some important successes. The first open meeting of ISIRA took place in Helsinki, Finland during ASSW 2014. It brought together more than 50 attendees, including group members and young scientists. The meeting at ASSW 2015 in Toyama, Japan, included discussions of the future activities of the group and was attended by about 30 participants from 9 countries. To help fulfill its missions and goals, as part of the ICARP III process, ISIRA has prepared a list of major priorities in research planning within the Russian Arctic, which will require joint government, scientific and individual effort. This list can also inform ISIRA plans for the near future.

Recently, the ISIRA Group, with support from the IASC Secretariat, has launched the publication of an IASC Progress in Russian to promote and highlight IASC's activities within the Russian science community. The new website for ISIRA was also developed in December 2015.

For more information on ISIRA, please visit:
www.isira.ru

Contact:
Arkady Tishkov (Chair)
tishkov@biodat.ru

Yulia Zaika (IASC Fellow)
yzaika@inbox.ru

PHOTO: THOMAS OPEL
Spring expedition 2013, Lena-Delta: the first scientist-team in the new Samoylov-Station. Here, AWI permafrost scientists are on their way with the Skidoo.

PHOTO: ILYA ABRAMOV

A Nenet reindeer herder busy with woodwork in the village of Laborovaya, taken while studying ethnic traditions under Nenet reindeer nomads of the Russian North (Polar Ural region, Russia).

2. IASC Working Groups

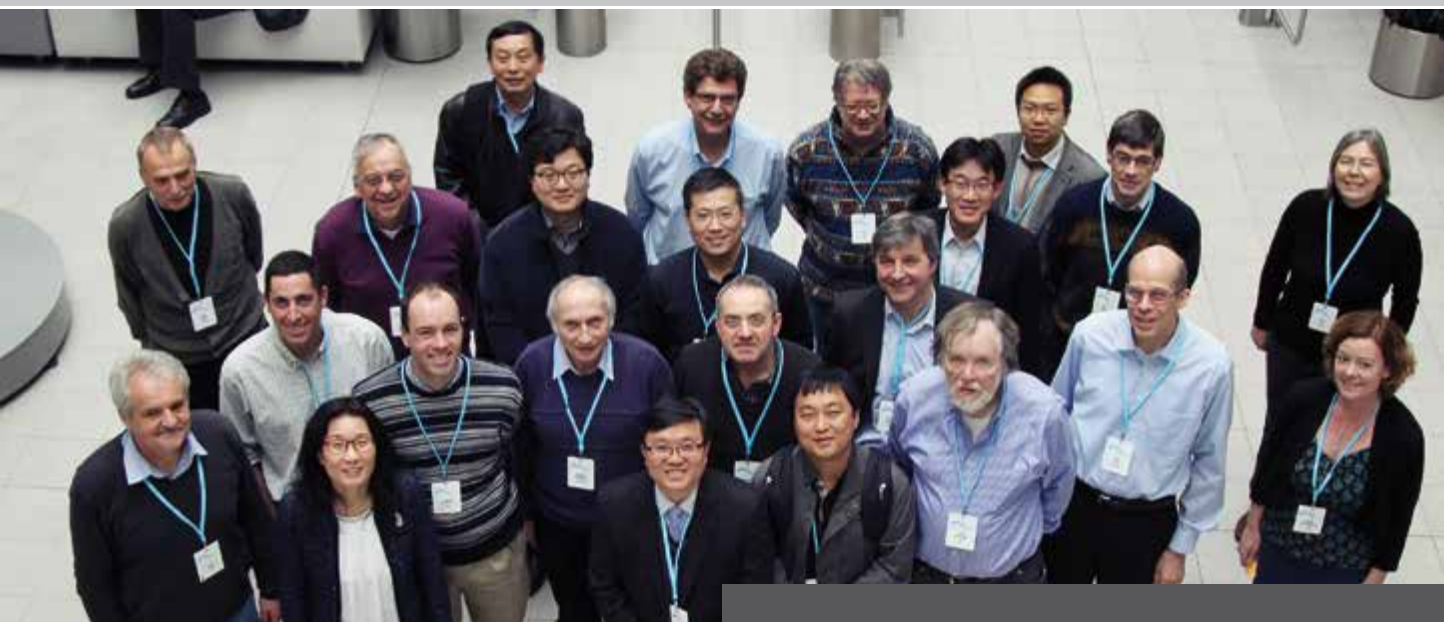
» 2 IASC Working Groups

Encouraging and supporting science-led international programs

IASC is engaged in all fields of Arctic research. Its main scientific working bodies consist of five Working Groups (WGs): Atmosphere, Cryosphere, Marine, Social & Human and Terrestrial. The primary function of the WGs is to encourage and support science-led international programs by offering opportunities for planning and coordination, and by facilitating communication and access to facilities. Each WG is composed of up to two scientists from each IASC member country, appointed by the national adhering bodies (i.e., the IASC member organizations).

The WG members are experts in their field that have an international reputation and are from different scientific disciplines so that the full range of Arctic research is represented within the WGs. Though the WGs are disciplinary, they also address crosscutting science questions by initiating activities that involve at least three WGs.

PHOTO: ALLEN POPE
Moss campion on the Juneau Icefield, Alaska.



Atmosphere Working Group (AWG)

Membership

Thomas Spengler - Norway, Chair | **Kathy Law** - France, Vice Chair | **Halldor Bjornsson** - Iceland, Vice Chair
John Cassano - USA, Vice Chair | **James Overland** - USA, Past Chair

Harald Rieder - Austria | **Leopold Haimberger** - Austria | **Claude Labine** - Canada | **Ding Minghu** - China
Kamil Laska - Czech Republic | **Henrik Skov** - Denmark | **Timo Vihma** - Finland | **Eila Lehmus** - Finland
Klaus Dethloff - Germany | **Günther Heinemann** - Germany | **Gudrun Nina Peterson** - Iceland
Suresh Babu - India | **Nuncio Murukesh** - India | **Vito Vitale** - Italy | **Jun Inoue** - Japan | **Hiroshi Tanaka** - Japan
Young Jun Yoon - Korea | **Seong-Joong Kim** - Korea | **Peter van Velthoven** - NL | **Kjetil Tørseth** - Norway
Rajmund Przybylak - Poland | **Ewa Łupikasza** - Poland | **Daniele Bortoli** - Portugal | **Alexander P. Makshtas** - Russia
Boris Vladimirovich Kozelov - Russia | **Angel Frutos Baraja** - Spain | **Michael Tjernström** - Sweden
Jo Browse - IASC Fellow | **Paul Zieger** - IASC Fellow

AWG Secretariat: **Yoo Kyung Lee** - Korea

Scientific Foci:

- Arctic mid latitude weather linkages (linked to the Year of Polar Prediction)
- Arctic air pollution
- Data recovery

PHOTO: IASC SECRETARIAT
Group photo of the Atmosphere WG at ASSW 2014 in Helsinki, Finland.

Recent Activities

Arctic Air Pollution Workshop

When: 3-5 February, 2015 | Where: Boulder, USA

The Arctic Air Pollution Workshop was held in Boulder, Colorado from February 3rd to 5th, 2015 with more than 30 members of the research community, representing research institutes from Asia, Europe and North America to discuss future directions for internationally coordinated Arctic air pollution research over the next 10 years. The workshop set future directions in Arctic air pollution research and defined outstanding science questions related to air pollution emissions and their impacts on regional air quality, ecosystems (deposition) & climate. A final synthesis round concluded that a new international Arctic Air Pollution initiative would add substantial value and serve to raise the profile of this issue in the international arena. It would also improve our understanding about impacts of emissions on air quality, climate and ecosystems.

Scientific Highlights:

- Improved understanding of the relative roles of local versus remote sources of Arctic air pollution emissions and their response to past and future Arctic and global change, relative to natural emissions;
- Improved understanding of long-range transport, pollutant processing, scavenging, wet/dry deposition processes and improved representation in models;
- Improved understanding of current and projected impacts of emerging local Arctic pollution sources;
- Improved connectivity with Arctic communities and engagement in citizen science initiatives to increase sampling network, improve knowledge exchange and increase the relevancy of new knowledge. Similar discussions were had about improved connectivity with industry and the regulatory community.
- Extensive and sustained vertical sampling well-co-ordinated with surface-based sites, and targeted at improved process understanding, especially in poorly sampled locations or time periods (e.g. polar night).

Contact: **Kathy Law** · Kathy.Law@latmos.ipsl.fr

Dynamics of Atmosphere-Ice-Ocean Interactions in the High-Latitudes

When: 23-27 March, 2015 | Where: Rosendal, Norway

The Dynamics of Atmosphere-Ice-Ocean Interactions in the High Latitudes Workshop was held from March 23rd to 27th, 2015 in Rosendal, Norway. The workshop was organized into four main themes: polar predictability: state of the art and challenges ahead; the coupled atmosphere-ocean-ice system: current understanding and processes; extreme events in the Polar Regions: dynamics and characteristics; and the polar climate: large scale circulation and interaction with mid-latitudes. The workshop aimed to synthesize a fundamental understanding and description of small-scale processes in the coupled atmosphere-ocean-ice climate system at high latitudes in order to assess and reduce bias and uncertainties in weather prediction and climate models. The workshop featured breakout group discussion on the afternoon of the 26th, where participants were grouped into the following three themes: Year of Polar Prediction (YOPP),

Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAiC) and Large-scale processes (LSP).

Scientific Highlights:

- Discussed the definition of an extreme event and the difference between extreme and high-impact weather, considering not only strong wind events, but also sudden warming events, fog, avalanches, as well as extreme events in the ocean, such as abrupt changes in the ocean convection or in the biological components of the Arctic environment.
- Discussed how observational systems should be designed, considering what kind of device, and what spatial and temporal resolution is needed in order to deal with large fluxes in ocean-atmosphere during the fall season, summer cyclones and melt onset in spring.
- Illustrated that advanced diagnostics in operational numerical weather or mediumrange prediction systems can be implemented. This would be made possible by improving understanding of the genesis of polar lows using the adjoint model.
- Discussed the shortcomings and advantages in observation and modelling, considering topics such as Arctic Amplification (AA), latent heat transport, CMIP5 and CMIP3 time series, and NWP models.

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Arctic Climate Change and Mid-Latitude Weather Extremes

When: 16-17 April, 2015 | Where: Vienna, Austria

From April 16th to 17th, during the European Geophysical Union (EGU) General meeting in Vienna, a session was organized to discuss Northern Hemisphere extreme weather events, entitled "Atmospheric circulation, Arctic climate change, and to debate the links between these phenomena". With a number of extreme weather events in the Northern Hemisphere mid-latitudes during the past decade, much attention is focused on mid-latitude atmospheric circulation, especially planetary waves and the polar jet stream. There is an ongoing debate on whether these changes are related, and also whether they may be influenced by Arctic climate change.

Rather than reaching a conclusion regarding linkages between Arctic climate change and mid-latitude weather extremes, the session attained the goal of fostering a scientific debate on the issue, with the many presentations and posters highlighting the complexity of the climate system and the fact that the atmospheric circulation is affected by various factors, of which Arctic climate change is but one.

Scientific Highlights:

- Evidence of climate models showing a strong consensus on stationary wave response in global warming scenario stimulations was presented, which has implications for dry/wet hydroclimate change across North America and Europe, such as wetting on the west coast of the USA, drying in the southwest USA, drying in the eastern Mediterranean and also on Arctic amplification. However, the forcing driving this stationary wave response was not Arctic change per se.

- Evidence was presented for a multi-link chain linking North Atlantic Oscillation to Pacific variability through sea ice and El Nino Southern Oscillation variability. While connections between processes involving such a multi-link chain may appear tenuous, this talk served as a reminder that the system under study is complex with many inter-connected processes.
- A study was presented on the question of a hiatus in global temperatures and especially whether the data sparsity in the Arctic is responsible for some of the regional warming being missed in global summaries of temperature. It related the hiatus to data gaps in the Arctic. Interestingly enough, this was countered with the claim that the hiatus was due to a lack of warming at low latitudes (and especially processes in the Equatorial Pacific). The fact that such an important topic was debated in this way reinforced the importance of maintaining good observation systems, especially in the Arctic.

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Polar Climate and Environmental Change in the Last Millennium

When: 24-26 August 2015 | Where: Torun, Poland

With the success of the 1st International Conference 'Polar climate and environmental change in the last millennium' which was organized in Torun, Poland, from February 1-3, 2010, it was decided that this kind of conference should take place periodically, every 5 years. Thus, from August 24-26, 2015 the 2nd international 'Polar climate' conference was also held in Torun, Poland.

Like the previous Conference, the main objective of the 2nd Conference was to summarize the state of the art of climate and environmental changes in the Polar Regions. Key-note speakers included 8 well-known specialists in fields of sea ice, glaciology, permafrost, climatology and paleoclimatology, terrestrial and ocean ecosystems, climate modelling, and crowd-sourcing methods (e.g. to present state of Old Weather project). All in all, the conference served to present scientific achievements and to identify gaps in the field of historical climatology of the Polar Regions based on early meteorological observations, history, dendroclimatology, paleolimnology, geophysics, geomorphology and other sources.

Scientific Highlights:

- "Modeling of Arctic climate" gave a picture about modern methods of investigation on climate change.
- "Glaciers and ice-sea history" examined a vast area of marine ice topics.
- "Dynamics of permafrost" discussed mountain permafrost in Canada and permafrost in general.
- Findings on the changing contribution of snow in the hydrological regime of Hudson Bay were presented.

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PHOTO: LUCA BRACALI

Built in 2009 by the Italian CNR team, the Amundsen-Nobile Climate Change Tower with its 18 floors and its 34 meters is the Arctic´s tallest tower. 2 scientists are busy studying the chemical-physical parameters in the low troposphere (Ny Alesund, Svalbard islands, Norway).

Cryosphere Working Group (CWG)

Membership:

Francisco Navarro - Spain, Chair | **Jon Ove Hagen** - Norway, Vice Chair | **Walter Meier** - USA, Vice Chair
Martin Sharp - Canada, Past Chair

Annett Bartsch - Austria | **Wolfgang Schöner** - Austria | **Sun Bo** - China | **Jan Kavan** - Czech Republic
René Forsberg - Denmark | **Signe Bech Andersen** - Denmark | **Jari Haapala** - Finland | **Pentti Kujala** - Finland
Michel Fily - France | **Hugues Lantuit** - Germany | **Lars Kaleschke** - Germany | **Gudfinna Adalgeirsdottir** - Iceland
Thorsteinn Thorsteinsson - Iceland | **Parmanand Sharma** - India | **Hiroyuki Enomoto** - Japan
Shin Sugiyama - Japan | **Hyun Cheol Kim** - Korea | **Soon Do Hur** - Korea | **Carleen Tijm-Reijmer** - NL
Elisabeth Isaksson - Norway | **Jacek Jania** - Poland | **Krzysztof Migala** - Poland | **Gonçalo Vieira** - Portugal
Dmitry Drozdov - Russia | **Sergei Verkulich** - Russia | **Pedro Elosegui** - Spain | **Veijo Pohjola** - Sweden
Martin Lüthi - Switzerland | **Martin Schneebeli** - Switzerland | **Julian Dowdeswell** - UK | **Elizabeth Hunke** - USA
Elena Kuznetsova - IASC Fellow | **Robert Way** - IASC Fellow | **Louis-Philippe Roy** - IASC Fellow
Alek Petty - IASC Fellow

CWG Secretariat: **Tetsuo Sueyoshi** - Japan

Scientific Foci:

- Sea-ice boundary layer dynamics
- Permafrost
- Tidewater glacier dynamics

PHOTO: IASC SECRETARIAT
Group photo of the Cryosphere WG at ASSW 2014 in Helsinki, Finland.

Recent Activities

Workshop on "Quantifying Albedo Feedbacks and Their Role in the Mass Balance of the Arctic Terrestrial Cryosphere"

When: 21-23 September, 2014 | Where: Bristol, UK

The goals of this workshop were to articulate scientific priorities and a research agenda related to the topic "Quantifying Albedo Feedbacks and their Role in the Mass Balance of the Arctic Terrestrial Cryosphere" and to formulate these in a way that would allow them to be presented at the Toyama Symposium and incorporated into the ICARP III products, which will include a "consensus statement identifying the most important Arctic research needs for the next decade".

Having 24 participants, the workshop started with six plenary presentations to provide an initial basis for discussion, followed by a brainstorming session. From the breakout groups and open discussion, issues are arisen on: albedo measurements, temporal evolution of albedo, impacts of mineral impurities and black carbon on snow/ice albedo, biological impacts on cryospheric albedo.

Scientific Highlights:

- The workshop covered a range of issues related to albedo feedbacks. It identified important and urgent needs in observation and modeling, to promote a further understanding on roles of feedbacks in the mass balance of terrestrial cryosphere.
- As inputs for ICARP III, 10 scientific questions are identified and shared with the participants. This list includes the recent history of albedo changes, variability in the sensitivity of albedo to climate forcing, availability of albedo measurements in the Arctic, calibration/validation of satellite measurements, adequate characterization of snow packs for albedo modeling purposes, modeling of glacier and lake-ice albedo, biological effects on the albedos of snow, firn, glacier ice etc., effects of organic/inorganic particulates and living organisms, terrestrial component modeling in climate models.

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http://icarp.iasc.info/theme-1-climate-system-and-transformations#nn_sliders-scrollto_3

Multiple workshops related to the Ice Sheet Mass Balance and Sea Level (ISMASS) initiative

The Ice Sheet Mass Balance and Sea level (ISMASS) group is an international and interdisciplinary self-governing expert group that works across the spectrum of relevant ice-sheet mass balance disciplines, and is currently sponsored by SCAR, IASC and CliC. Further information on this bipolar cooperation can be found in Chapter 6 under IASC Partnerships.

The goals of ISMASS are to promote research on the estimation of the mass balance of ice sheets and its contribution to sea level, to facilitate the coordination among the different international efforts focused on this field of research, to propose directions for future research in this area, to integrate the observations and modeling efforts, as well as the distribution and archiving of the corresponding data, to attract a new generation of scientists into this field of research, and to contribute to the diffusion, to society and policy makers, of the current scientific knowledge and the main achievements in this field of science.

Along these purposes, multiple workshops were hosted/co-hosted during 2014 and also in 2015:

- Workshop on ice-sheet future projections, 26 August 2014, Auckland, New Zealand
- Workshop on constraining uncertainty in Greenland surface mass balance models, 19-20 May 2015 at the University of Sheffield, UK
- Workshop on glacio-isotatic rebound modeling, 26-29 May, 2015, University of Alaska Fairbanks Geophysical Institute, USA
- The marine ice sheet model intercomparison project meeting, 16 August, 2015, Churchill College, UK
- Follow-up workshop of ice-sheet projections (Auckland), as part of the AGU Chapman Conference through the Ice Sheet Mass Balance Inter-comparison Exercise (IMBIE).

The objective is to stimulate the ice-sheet community to improve methods and agree on common frameworks for future projections, and a range of issues on ice sheet mass balance modeling and future projections have been discussed.

Scientific Highlights:

- It was decided that a new marine ice sheet model intercomparison project was needed to assess the impacts of dynamic ice sheet responses to ground line retreat. The Marine Ice Sheet Model Intercomparison Project (MISMIP) was launched to test ice sheet models on how to cope with grounding line retreat due to basal melting under the shelf and loss of buttressing.
- There is still very significant disagreement in the amounts of snowfall and meltwater runoff simulated by the different surface mass balance (SMB) models, and so we aim to reconcile model differences through a more thorough and detailed comparison of output from the different models than has previously been undertaken. The workshop also addressed the important question of where there are gaps in information from weather stations and ice-core data which are crucial for validating SMB models over Greenland (from Sheffield WS, 19-20 May 2015).
- The design of three MIPs were presented in the workshop: the third Marine Ice Sheet MIP (MISMIP+), the second Ice Shelf Ocean MIP (ISOMIP+) and the first Marine Ice Sheet Ocean MIP (MISOMIP1). The workshop unfolded in four sessions: 1. Experimental Design, 2. Logistics for Participation, 3. Remaining Design Questions (a. Which basal friction law should be used in MISMIP+?, b. How should dynamic calving be handled (if at all) in each MIP?, c. To what extent should MISOMIP1 ask participants to submit results in a common configuration?), 4. Future Directions presented possible next steps for each MIP (from Churchill College WS, 16 August, 2015.)

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1st European Snow Science Winter School 2015

When: 8-14 February 2015 | Where: Sodankylä, Finland

Snow is a key component of the cryosphere. Snow grain size (microstructure) of snow is relevant to most physical properties of the snowpack, as albedo, radiative transfer of microwaves, thermal conductivity, trafficability and air permeability. Responding to the recommendation from a recent workshop (Snow Grain Size Intercomparison Workshop 2014), underlined the need to teach modern techniques of snow microstructure characterization to a wider community, especially to graduate and post-graduate scientists. An improved quantification of snow properties is highly relevant to understand the changing arctic snowpack.

In this workshop, state-of-the-art snow measurement techniques were taught, both direct and indirect methods that were developed and are being used by different groups. The focus of this workshop was on field measurements, combined with theoretical lessons in the classroom. Field measurements were done in small groups of 3-4 students. Each group of students prepared a report describing the methods, results and interpretation. The course corresponds to 3 ETCS-Points.

Scientific Highlights:

- 27 scientists, selected from 54 applications (4 Post-Docs, 19 PhD-students, 4 MSc) participated in a training course for modern snow observation techniques.
- The topics covered are: snow deposition, metamorphism and settling, microstructure of snow and mathematical representation, physical properties of snow, optical properties of snow, snow measurement methods: traditional and modern, Snow-pack and land-surface modeling, snow climatology and hydrology, aspects of field safety and field organization.
- Post-workshop responses were very positive. The 2nd Snow Science Winter School will also be held in Preda and Davos, Switzerland in 14-20 February 2016.

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http://microdice.eu/activities/past/1st-european-snow-science-winter-school-8-14-february-2015-sodankyla-finland/

Workshop "Ilulissat Climate Days"

When: 2-5 June 2015 | Where: Ilulissat, Denmark

Cryosphere changes in Greenland and the Arctic are spectacular manifestations of global climate change, and have made Greenland quite a "hotbed" for international science in recent years. The "Ilulissat Climate Days" was aimed to give a status of current changes in the Greenland cryosphere (ice sheet, icecaps, glaciers, and sea ice changes), especially in order to report and discuss the rapid changes of the last few years, as seen from a variety of in-situ, airborne and remote sensing data, as well as understanding the processes of the rapid changes. The meeting was also intended to provide an opportunity for local and regional stakeholders to get updated information on the current changes, and many representatives of

the Greenland parliament and government bodies, as well as local people from Ilulissat, participated at various stages of the conference.

The Ilulissat Climate Days was a follow up the highly successful Nuuk Climate Days 2009, and at the same time served as the final conference of SVALI (Stability and Variations of Arctic Land Ice), a Nordic Council of Ministers Center of Excellence research project, focusing on changes and glaciological processes across all Nordic ice caps (Scandinavia, Svalbard, Iceland as well as Greenland). Several stakeholders and media people from the Nordic countries participated in this activity as well.

Overall a total of 179 participants was registered for the Ilulissat Climate Days, with a good mix of young scientists (Ph.D. students and postdocs), experienced researchers, stakeholders and politicians, including several officials from the European Space Agency as well.

Scientific Highlights:

- The workshop consists of sessions on "Cryosphere changes: Observations and Impact on Society", "Climate Change and Society", "Greenland, Arctic and Antarctic Ice Cap Changes", "Space Measurement of Cryosphere Changes", "Observations and Models", as well as the special conference "Stability and Variations of Arctic Land Ice".
- The main message from the presentations was that the Greenland and Arctic ice sheet changes are increasing, with melt regions moving further north, and sea ice is thinning with shorter ice-covered periods along the Greenland coasts. Process understanding of the changes are linked to meteorology, glacier hydrology, snow melt and albedo is improving, but the pace of future changes is still highly dependent on changes in future climate and the associated dynamic effects, and it is crucial to monitor current changes closely to have faith in models of future melt.

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PHOTO: MAREK KASPRZAK
Early morning view on the Wilczekodden cape in Hornsund fjord, Wedel-Jarlsberg Land, Svalbard.

Marine Working Group (MWG)

Membership:

Bert Rudels - Finland, Chair | **Jinping Zhao** - China, Vice Chair | **Lee Cooper** - USA, Vice Chair

Gerhard Herndl - Austria | **Humfrey Melling** - Canada | **Oleg Ditrich** - Czech Republic
Morten Holtegaard Nielsen - Denmark | **Naja Mikkelsen** - Denmark | **Kari Strand** - Finland
Heidi Kassens - Germany | **Michiel Rutgers Van Der Loeff** - Germany | **Gudrun Marteinsdottir** - Iceland
Steingrimur Jónsson - Iceland | **K.P. Krishnan** - India | **Stefano Aliani** - Italy | **Hajime Yamaguchi** - Japan
Koji Shimada - Japan | **Baek Min Kim** - Korea | **Sung-Ho Kang** - Korea | **Anita Buma** - NL
Marit Reigstad - Norway | **Randi Ingvaldsen** - Norway | **Monika Kędra** - Poland
Waldemar Walczowski - Poland | **Teresa Cabrita** - Portugal | **Sergey Viktorovich Pisarev** - Russia
Franscisco Gordillo - Spain | **Miquel Canals** - Spain | **Pauline S. Leijonmalm** - Sweden | **Jeremy Wilkinson** - UK
Sheldon Bacon - UK | **Mary-Louise Timmermans** - USA | **Kristina Brown** - IASC Fellow
Emily Choy - IASC Fellow | **Paul Suprenand** - IASC Fellow | **Allison Fong** - IASC Fellow

AWG Secretariat: **Yoo Kyung Lee** - Korea

Scientific Foci:

- Predicting and understanding rapid changes to the Arctic Ocean System
- Understanding biological and ecosystem processes in the Arctic and Sub-arctic seas
- Understanding sea ice structure dynamics and the Arctic System
- Understanding geochemical processes in the Arctic and Sub-arctic seas
- Enhancing and improving access to the paleo record of the Arctic Ocean through scientific Arctic drilling

PHOTO: IASC SECRETARIAT
Group photo of the Marine WG at ASSW 2014 in Helsinki, Finland.

Recent Activities

Big Black Box: Marine Ecological Processes during the Polar Night

When: 18-23 January 2015 | Where: Tromsø, Norway

The workshop "Big Black Box: Marine Ecological Processes during the Polar Night" was held in Tromsø, Norway, on January 19-20 at UiT, The Arctic University of Norway, organized in conjunction with and as part of the annual Arctic Frontiers conference in Tromsø, 18-23 January 2015, entitled "Climate and Energy" (http://www.arcticfrontiers.com/).

The main objectives for this workshop were to

1) develop a white paper summarizing existing knowledge on winter ecology in the Arctic,
2) to identify the most critical knowledge gaps and
3) to discuss ideas for a new international initiative/ program on polar night ecology.

For the first two objectives, the discussion focused on ecological processes at the base of the marine food web, including the sympagic, pelagic and benthic realms, and covered all organisms from bacteria and protists, to invertebrates to fish.

For the 3rd objective, several ongoing, new and planned projects were presented during the workshop, including suggestions for contributions to the international MOSAiC program. So far, MOSAiC primarily focuses on physical processes, but as part of the Big Black Box initiative we participated in commenting on the MOSAiC science plan and suggested including more biological aspects into the program (http://www.mosaicobservatory.org/). MOSAiC submitted a proposal using RV Polarstern for a year-round study in the Arctic Ocean, which would provide an ideal opportunity for studying ecological processes during winter.

Scientific Highlights:

- Discussed species active during winter: small zooplankton size fractions (e.g. Oithona Microcalanus spp., Pseudocalanus spp.), which need to be studied in greater detail as information on them is limited year round, copepods, which actively feed and reproduce in January-February in Kongsfjorden (high numbers of nauplii found mid-winter) but at a lower level than during spring and Calanus, which ascends already in November in Svalbard fjords and are active before the primary production starts.
- Discussed recent polar night studies on zooplankton ecology (e.g., see Daase et al. 2014; Webster et al. 2015) which demonstrated that marine zooplankton are not necessarily quiescent during the polar night.
- Discussed the need for studies of polar night physiology and energy use combined with knowledge of behavior and life cycle strategies as this will improve understanding of the trade-offs inherent in the annual routines of polar zooplankton as well as the role of the polar night in shaping the timing of activities also at other times of the year.
- Agreed that the boundary layers sea ice - sea water, and sea water - sea floor, as well as any stratification of the water column would potentially be places for food/organisms to concentrate in winter.

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Atmosphere-ocean-ice interactions and aspects related to a future, seasonally ice-free Arctic Ocean

When: 28-29 April 2015 | Where: Toyama, Japan

"Atmosphere-ocean-ice interactions and aspects related to a future, seasonally ice-free Arctic Ocean" was a session featured in the Fourth International Symposium on Arctic Research (ISAR-4) and the Third International Conference on Arctic Research Planning (ICARP III) during the 2015 Arctic Science Summit Week (ASSW) in Toyama Japan, from April 28-29.

The first sub-session addressed the energy exchange between the Arctic and lower latitudes, the different energy budgets in the Arctic as well as the effects of aerosols in an Arctic with reduced ice cover. The second sub-session was devoted to smaller scale observational studies of heat exchange between ice, ocean and atmosphere in the marginal ice zone and in the high Arctic, using aircraft, autonomous gliders and icebreakers. The third sub-session was mostly on atmospheric processes with three talks addressing respectively the creation, the characteristics and the climatology of Polar lows in the Nordic Seas and in the Japan Sea.

The next sub-session addressed the freshwater balance and the stratification of the Arctic Ocean, the transfer of freshwater between solid and liquid phase, and how it varies seasonally and over longer periods. The final sub-session presented studies on the effects of different forcing, wind or buoyancy, on Arctic Ocean circulation.

Scientific Highlights:

- The possible effects of increased aerosol release connected with a reduced ice cover on the radiative forcing were discussed and found to be smaller than expected due to increased liquid precipitation.
- The atmospheric boundary layer over Svalbard, in Storfjorden as well as north of Svalbard was investigated by aircraft and a study of ocean variability in the marginal ice zone in the western Arctic using gliders was reported.
- The circulation and the effects of the Atlantic water on the hydrography of the Arctic Ocean were described, concentrating on eddies in the Arctic Ocean and their importance for the large-scale circulation, an example of which is how the halocline can be maintained.

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Ecosystem Studies of Sub-Arctic Seas (ESSAS) Annual Science Meeting (ASM) Symposium, "The Role of Ice in the Sea"

When: 15-17 June 2015 | Where: Washington, USA

The 2015 Ecosystem Studies of Sub-Arctic Seas (ESSAS) Annual Science Meeting (ASM) Symposium was co-hosted by the School of Aquatic and Fishery Sciences and the University of Washington from June 15-17, 2015. As the meeting's primary topic was "the Role of Ice in the Sea," four themes were explored during the Symposium: humans, ice and the sea in the Subarctic and Arctic Past, the role of sea ice in the Arctic and Subarctic, the ecological role of tidewater glaciers, and social scientific investigations of changing sea ice conditions.

The "Humans, Ice and the Sea in the Sub-arctic and Arctic Past" session provided a historical framework for the consideration of contemporary ecological dynamics surrounding subarctic and Arctic ice and marine ecology including human integration in the evolution of these systems. The largest session, "The Role of Sea Ice in the Arctic and Subarctic," focused on the multiple roles of sea ice in the Arctic and the Sub-Arctic seas, including its effects on the physical and biological structure of these regions, which shapes their food webs from plankton to fish, birds, and mammals. The extent and nature of sea ice in the Arctic has been rapidly changing, affecting air-ice-sea fluxes with both regional and global consequences. "The Ecological Role of Tidewater Glaciers" session explored the role of tidewater glaciers in marine ecosystems, including the fjords of Alaska, Greenland, and Svalbard. The "Social Scientific Investigations of Changing Sea Ice Conditions" session promoted interaction among social scientists and also provided insights to natural scientists on how their research can best contribute to a better understanding of the importance of sea ice dynamics for resource users and communities in a wider social and economic context.

Scientific Highlights:

• Presentations explored the use of marine sediment records to elucidate large-scale changes in ocean temperature, sea ice cover, and ocean productivity since the last glacial, including its impacts on the migrations and settlement patterns of early people as inferred from archaeological evidence.

- Sea ice influences biogeochemical processes including the flux of CO2 into the ocean, leading to increasing acidification. Ice algae make up a significant portion of the primary production, especially in the high Arctic, where changes in the extent of first year versus multi-year ice may be altering their role. Changes in the timing of the melting of the sea ice also influence when ice algae become available to zooplankton in spring.
- The presence of sea ice impacts commercial, recreational, and subsistence harvesters through numerous avenues. The nature of the marine food web is significantly impacted by sea ice, so that future declines in sea ice may change the resources available to different communities, potentially altering the mix, spatial distribution, and abundance of species present.
- The ways fishers and hunters respond to changes may influence the species they pursue and the ecosystem as a whole. In addition, those responses will affect and be affected by a range of social and economic factors, likely creating a complex webs of interactions rather than simple and predictable responses to changes in sea ice.

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http://www.imr.no/essas/2015_essas_annual_science_meeting/en

5th Polar Marine Diatom Workshop

When: 19-24 July 2015 | Where: Salamanca, Spain

The Polar Marine Diatom Workshops (PMDW) originated from the need for a forum that would incite exchange of taxonomic skills and associated new techniques as well as providing an excellent training ground for students to receive guidance from experienced diatomists. Since 2005, the workshop has become a successful biannual event, bringing polar diatomists together for exchange of new ideas, sharing of recent results/data and fostering future collaborations enabling researchers from around the world to produce quality science. The 5th Polar Marine Diatom Workshop was held on July 19-24, in Salamanca, Spain. This workshop featured microscope sessions with equal emphasis on Neogene and Quaternary as in the past, but a special emphasis was devoted to Holocene Climatic optimum and the degalciation, addressing biostratigraphic, taxonomic, paleoceanographic and paleoclimatic issues. A special session was dedicated to the shadow's diatoms, those that live at the lower photic zone and are a good indicator of water column stratification (Rhizosolenia spp.)

Overall, the workshop succeeded in achieving the following aims:

1) in transferring sound taxonomic skills and exchanging knowledge relative to modern and fossil diatom records of polar regions,

2) in engaging the international marine phytoplankton and paleontological communities and raise the research profile and opportunity for ongoing training of students and researchers and 3) in bringing about opportunities for project development and student exchange between laboratories, focusing on recent developments or ongoing enigma in the field.

Scientific Highlights:

- Discussed the development of more complete biostratigraphic proxies and of robust proxies for paleoceanography.
- Discussed evolution of sea-ice communities and sea-ice extent and timing of climatic events in the Polar Regions.
- Discussed the building of biogeochemical coupled ocean-atmospheric dynamic models that aim to include species ecology, abundance and biomass data.

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PHOTO: FLORENCIA MAZZA
Pulling in nets used to collect fish and invertebrates from the Chukchi coast, Alaska.

Social and Human WG (SHWG)

Membership:

Peter Schweitzer - Austria, Chair | **Gail Fondahl** - Canada, Chair | **Peter Sköld** - Sweden, Vice Chair
Hiroki Takakura - Japan, Vice Chair | **Peter Schweitzer** - Austria, Past Chair

Gertrude Eilmsteiner-Saxinger - Austria | **Xu Shijie** - China | **Yang Lei** - China | **Ludek Broz** - Czech Republic
Pelle Tejsner - Denmark | **Robert Chr. Thomsen** - Denmark | **Arja Rautio** - Finland | **Lassi Heininen** - Finland
Béatrice Collignon - France | **Sylvie Blangy** - France | **Alexander Proelss** - Germany | **Joachim O. Habeck** - Germany
Gisli Palsson - Iceland | **Joan Nymand Larsen** - Iceland | **Dhurjati Majumdar** - India | **Akiho Shibata** - Japan
Dongmin Jin - Korea | **Peter Jordan** - NL | **Gunhild H. Gjorv** - Norway | **Halvor Dannevig** - Norway
Michał Luszczuk - Poland | **Ryszard Czarny** - Poland | **Andrei Golovnev** - Russia | **Andrey Podoplekin** - Russia
Elena Conde - Spain | **Michael Bravo** - UK | **Andrey Petrov** - USA | **Sven D. Haakanson** - USA
Candice Lys - IASC Fellow | **Malgorzata Smieszek** - IASC Fellow | **Andrian Vlakhov** - IASC Fellow
Justiina Dahl - IASC Fellow

SHWG Secretariat: **Susan File** - Canada

Scientific Foci:

- Arctic residents and change**
- Histories, perceptions and representations of the Arctic **
- Securities, governance and law **
- Natural resource(s)/ use/ exploitation and development: past, present, future
- Human health and well-being

PHOTO: IASC SECRETARIAT
Group photo of the Social and Human WG at ASSW 2015 in Toyama, Japan.

** denotes a priority within the scientific foci

Recent Activities

Improved Health Knowledge in the Arctic

When: 8-12 June 2015 | Where: Oulu, Finland

The SHWG supported a workshop during the 16th International Congress on Circumpolar Health to discuss obstacles to sustainable and long-term health monitoring in the Arctic and explore options for improved data collection and construction. Key messages from the workshop included the following:

- Common health statistics such as life expectancy or mortality rates do not provide a sufficient understanding of health status.
- With a range of different methods and terminology in use in each country, it can be difficult to compare quality of life, marginalization, discrimination, mental health, and living conditions across the Arctic regions.
- There is a need to improve the inclusion of quantitative ethnic information pertaining to individuals in the Arctic in official health registers and statistics to better understand the health status of Arctic peoples and support sustainable indigenous cultures.

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Special Session on "Resources, Quality of Life and Sustainable Development in the Arctic"

When: 17-22 August 2015 | Where: Moscow, Russia

A special session on "Resources, Quality of Life and Sustainable Development in the Arctic" was convened at the International Geographical Union (IGU) Regional Conference in August 2015. The session featured papers that examined the connection between the use of natural resources and human wellbeing in the Arctic in the context of sustainable development in different regional and institutional contexts. Key messages from the special session include the following:

- Sustainable development in the Arctic must be understood and addressed from interdisciplinary perspectives that incorporate approaches, methodologies and data from both the natural and social sciences.
- Comparative studies (between regions and across time) are of high importance and relevance in the Arctic.
- Urban issues in the Arctic, including urban sustainability, are significant and require further examination across the circumpolar region.
- There is a need for knowledge synthesis regarding sustainable development in the Arctic.
- Development of sustainable development indicators is one of the research priorities for the near future.

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Building Arctic Resilience Workshops

When: 16-18 October 2015 | Where: Reykjavik, Iceland
When: May or June 2016 | Where: Tromsø, Norway

This initiative aims to build sustainable and resilient Arctic institutions to better cope with challenges arising from globalization. The SHWG will support early career researcher participation in a workshop in October 2015 in Reykjavik, Iceland to discuss the state of the globalized Arctic and its implications. Support will also be provided for another workshop in May/ June 2016 in Inari, Finland and Tromsø, Norway to discuss new research methods.

Key messages from the workshop in October 2015 in Reykjavik, Iceland include the following:

- An important precondition for fossil fuel-based development is to redefine cultural heritage, including indigenous/ local (environmental) knowledge, and 'paradiplomacy,' as part of 'industrial civilization'. This should also include 'resilience', in which institutions are capable of learning and fixing problems as they emerge.
- There are multiple actors, including extremely important non-state local and regional ones (e.g., the scientific community), directly affected by the results of regional and global processes in the Arctic. It is important to consider: (1) how the voices of different communities are being heard, or not heard, in public and political discussions; (2) how the various stakeholders participate in the building of Arctic futures; and, (3) how this in turn influences other actors in the region.
- It is important to maintain and further develop the interplay between science and politics, that between scientific knowledge and Indigenous / local knowledge, as well as the interplay between material and immaterial things and values. This supports and promotes high political stability in the Arctic, which is beneficial for science and academia.

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Adaptation Options in the Barents Region - Synthesis and Feedback Workshop

When: 13-14 January 2016 | Where: Bodø, Norway

This synthesis and feedback workshop will be convened to present, discuss and synthesize published research on adaptation in the Barents region, while ensuring processes for co-production of knowledge between the scientific community and users. It will in turn inform a chapter regarding adaptation options in the Arctic Monitoring and Assessment Programme's assessment on Adaptation Actions for a Changing Arctic – Part C (AACA-C).

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http://www.amap.no/adaptation-actions-for-a-changing-arctic-part-c

Infrastructure in the Arctic as a Social and Ecological Challenge

When: 15-16 January 2016 | Where: Vienna, Austria

Physical infrastructure in the Arctic, including for settlements, industry, and transportation, often results in serious impacts on the fragile ecosystems of the North, some of which have been addressed by the ICARP III initiative Rapid Arctic Transitions due to Infrastructure and Climate Change (RATIC). The social and human impacts of infrastructure, however, require better understanding. This workshop will combine existing Arctic discourses and initiatives with non-Arctic perspectives to explore social and human impacts and better integrate social and ecological perspectives in the study of Arctic infrastructures.

Contact: **Peter Schweitzer** · peter.schweitzer@univie.ac.at

Gender Asymmetry in Northern Communities: Building a Research Network for the Nordic Countries, Baltics and Russia (NOR-GA)

When: 25-28 January 2016 | Where: Küstrinchen near Lychen, Germany

In the indigenous and rural areas of the Nordic Countries, the Baltics and the Far North of Russia, there is a widely shared feeling that female and male identities and life-ways are increasingly out of pace with each other. This pilot project consists of a workshop to develop a research agenda and toolkit to address gender-related social concerns in the indigenous and rural areas of the Nordic Countries, the Baltics and the Far North of Russia.

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A European Arctic Policy: The Role of EU Non-Arctic Member States

When: May 2016 | Where: Madrid, Spain

With a focus on the role played by European non-Arctic Member States in designing a regional Arctic policy, this conference will tentatively take place in Spain in May 2016. It will explore the following five key issues: the European Union (EU) in the Arctic Council; European decision-making power and influence in a changing Arctic; Arctic sustainable development; the European economic crisis; and the EU and the protection of Arctic Indigenous Peoples.

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10th Siberian Studies Conference: Passion for Life: Emotions and Feelings in the North and Siberia

When: 24-26 October 2016 | Where: Museum of Ethnography and Anthropology [Kuntskamera], St. Petersburg, Russia, Russia

Support will be provided for early career researchers to participate in this conference with the goal of increasing the interest of early career scholars in Siberian anthropology and related studies and providing mentoring and networking opportunities for new scholars.

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PHOTO: ILYA ABRAMOV
Little Nenet boy of the local reindeer nomads near Laborovaya village, Polar Ural region, Russia.

Terrestrial Working Group (TWG)

Membership:

Ingibjorg Svala Jonsdottir - Iceland, Chair | **Josef Elster** - Czech Republic, Vice Chair | **Phil Wookey** - UK, Vice Chair

Andreas Richter - Austria | **Birgit Sattler** - Austria | **Warwick F. Vincent** - Canada | **Luo Wei** - China
Mads Forchhammer - Denmark | **Torben Christensen** - Denmark | **Antero Järvinen** - Finland
Otso Suominen - Finland | **Thierry Boulinier** - France | **Dirk Wagner** - Germany | **Karsten Piepjohn** - Germany
Jon S. Olafsson - Iceland | **Manish Tiwari** - India | **Ratan Kar** - India | **Atsuko Sugimoto** - Japan
Takayuki Nakatsubo - Japan | **Yoo Kyung Lee** - Korea | **Jelte Rozema** - NL | **Inger Greve Alsos** - Norway
Piotr Glowacki - Poland | **Wieslaw Ziaja** - Poland | **João Canário** - Portugal | **Olga L'vovna Makarova** - Russia
Alexander Makarov - Russia | **Benjamin Vinegla Pérez** - Spain | **Daniel Sanchez-Mata** - Spain
Victoria Pease - Sweden | **Donald A. (Skip) Walker** - USA | **Vladimir Romanovsky** - USA | **Josefine Lenz** - IASC Fellow
Noemi Boulanger Lapointe - IASC Fellow | **Jeffrey Ross** - IASC Fellow | **Scott Zolkos** - IASC Fellow

TWG Secretariat: **Yoo Kyung Lee** - Korea

Scientific Foci:

- Improving knowledge at multiple spatial scales of the current state of Arctic terrestrial geosystems and ecosystems
- Determining terrestrial and freshwater environmental and biosphere processes thatamplify or moderate climate warming
- Understanding the interactions of species and their environment, and the biology of life in extreme environments
- Observation of changes in Arctic geo- and biodiversity
- Development of high spatial resolution models of terrestrial geosystem and eco-system change
- Determining the role of connectivity in the functioning of arctic terrestrial systems, including connections within the Arctic and the global system

PHOTO: IASC SECRETARIAT
Group photo of the Terrestrial WG at ASSW 2014 in Helsinki, Finland.

Recent Activities

Arctic Freshwater Ecosystems Workshop

When: 23-30 April 2015 | Where: Toyama, Japan

Climate change and variability are affecting freshwater systems within the Arctic and subarctic. As water integrates and propagates effects across the Arctic, these transformations will have a profound effect on both society and environment, also beyond the Arctic.

Held on April 28th in Toyama, Japan during the 3rd International Conference on Arctic Research Planning (ICARP III) (April 23-30), "Arctic Freshwater Ecosystems" workshop was a contribution to the Arctic Freshwater Synthesis (AFS), a joint project between the World Climate Research Programme's (WCRP) Climate and the Cryosphere Project (CliC), the International Arctic Science Committee (IASC), and the Arctic Council's Arctic Monitoring and Assessment Program (AMAP).

This symposium-workshop focused on how major Arctic freshwater sources, fluxes and storage components are being modified, including: atmospheric and river transport, precipitation-evaporation-permafrost/soil moisture regimes, glacier and ice cap mass balances, sea-ice formation and dynamics, and marine exchanges including oceanic storage and release of low-salinity water.

The session included a broad range of topics, including biogeochemical processes, water and nutrient fluxes, and biotic communities. The session underscored the importance of Arctic lakes and rivers as integrators of atmospheric and terrestrial processes, as conduits to the near-shore marine environments under a changing climate, and as vital resources for northern communities.

Scientific Highlights:

- This workshop allowed the exchange of key results concerning the Arctic freshwater system, and collated information on current studies on the biodiversity and ecosystem function of Arctic and sub arctic freshwater ecosystems.
- Identified the need for multi-component numerical models to predict changes in freshwater ecosystems under future climate scenarios and the ability to predict and understand natural variability as distinct from that induced by climate change.
- Identified and discussed the importance of accurate predictions of future changes in freshwater quantity and quality for water resource managers in northern communities and also effects on infrastructure and hydrohazards.

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http://www.climate-cryosphere.org/activities/targeted/afs

6th International Conference on Polar & Alpine Microbiology

Partners: IASC Cryosphere WG

When: 6-9 September 2015 | Where: Ceske Budejovice, Czech Republic

Climate changes that were observed and documented over the last decades brought polar and alpine areas to the center of attention of the general public and international science community, including microbiologists. Understanding the processes occurring across polar and alpine environments

requires a coordinated effort over space and time to capture the naturally high variability associated with Polar and Alpine Regions.

Continuing the series of highly successful meetings previously held in Rovaniemi in 2004 (Finland), Innsbruck in 2006 (Austria), Banff in 2008 (Canada), in Ljubljana 2011 (Slovenia) and Big Sky in 2013 (USA), the 6th international conference on Polar and Alpine Microbiology was held in Ceske Budejovice, Czech Republic from September 6-9, bringing together the scientific community for discourse on the latest in all aspects of cold-living microorganisms and their role in polar and alpine environments.). It was also an opportunity to share ideas and build research collaborations addressing the latest developments in microbiology in polar and alpine habitats.

Scientific Highlights:

- A study conducted field and laboratory experiments in soils from Raisduoddar, Norway and furthered understanding of the links between grazers and microbial responses to global change. The results indicated that reindeer mediated changes in the soil chemical composition and microclimate have a profound influence on the structure and functional adaptation of soil microbial communities. This role of large grazers may be a key mechanism determining the impact of warming in carbon fluxes in the tundra.
- One study showed a clear succession of microbial communities with age where communities in soils previously overridden by the ice (strongly represented by members of the Betaproteobacteria such as the genus Thiobacillus) are important colonizers of new exposed soils up to 5 years after glacier retreat. Thereafter, presence of typical soil communities such as Acidobacteria and certain members of Actinobacteria and Alphaproteobacteria (e.g. Sphingopyxis) become more prevalent.

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2nd GTN-P National Correspondents Workshop

Partners: IASC Cryosphere WG | When: 19-20 September 2015 | Where: Quebec, Canada

The Global Terrestrial Network on Permafrost (GTN-P) is the observing network for permafrost sponsored by Global Climate Observing System (GCOS) and the Global Terrestrial Observing System (GTOS) and managed by the International Permafrost Association (IPA). It monitors the two Essential Climate Variables (ECVs) permafrost temperature and active layer thickness through more than 1000 boreholes and nearly 240 active layer grids globally located in all permafrost regions. GTN-P has gained considerable visibility in the broad science community in providing the baseline against which models are validated globally and incorporated in climate assessments.

The 2nd GTN-P workshop was held on September 19-20, as part of the 7th Canadian Permafrost Conference 2015 in Quebec, with the workshop's main focus on the GTN-P data quality control and the development of a specific plan to prepare the first GTN-P bi-annual report

on the thermal state and the international monitoring quality of the Earth's permafrost areas. Further, the workshop addressed the meaning and role of GTN-P at the 11th International Conference on Permafrost that will be held in Potsdam, Germany in June, 2016.

Scientific Highlights:

- An international body of experts involved in permafrost research from the GTN-P EC and Data Management Group with the National Correspondents of GTN-P assessed the international monitoring quality of the Earth's permafrost areas by addressing the GTN-P data quality control and the spatial site-distribution on the planet.

- The workshop clearly defined (1) a specific plan of the first GTN-P bi-annual report on the thermal state and (2) the international monitoring quality of the Earth's permafrost areas as well as (3) the meaning and role of GTN-P.

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GTN-P Home Page: **http://gtnp.arcticportal.org/**
Info Page for Workshop: **http://gtnp.arcticportal.org/index.php/8-news/115-news-gtnp-workshop**

Catalysts for Treeline Expansion under Global Change Workshop

When: 9-12 October 2015 | Where: Perth, Scotland

Predicting the distribution of future species under climate change is one of the greatest scientific challenges we currently face. Often, scientists try to address this challenge by looking at the direct links between climate and species distributions; however, the effects of non-climatic factors, such as disturbance and species interactions, can sometimes override climate effects. Recent studies have shown mixed responses of treeline ecosystems to global climate change. Along with treeline advance with warmer temperatures, treeline retractions or no response have also been detected. In the latter two cases, non-climatic factors or indirect climate effects (such as disturbance) likely outweigh the direct effects of climate change on tree species distributions. The main goal of this workshop is to collate common datasets and integrate current findings with the established scientific literature in order to address the question of disturbance as a catalyst of global change impacts in treeline ecosystems. This workshop will be held in October 9-12 in Perth, Scotland.

Scientific Highlights:

- Synthesize the current state of knowledge on disturbance as a catalyst for treeline ecosystem change
- Synthesize and summarize data collected through the Global Treeline Range Expansion Experiment (G-TREE).
- Identify the next research priorities and form a research framework for future initiatives in treeline ecosystem research

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Permafrost Carbon Network

When: 14 – 16 December 2014 | Where: San Francisco, USA)

The IPCC Working Group 1 Fifth Assessment Report highlighted the cryosphere as a major source of uncertainty in global climate projections. One of the most significant knowledge gaps related to cryosphere is the impact of thawing permafrost on the global carbon cycle. The magnitude and timing of the positive feedback between the warming climate and additional emission of greenhouse gases into the atmosphere from natural sources and particularly from thawing permafrost is unknown. The Permafrost Carbon Network framework organized a series of meetings and workshops that bring together scientists from the international permafrost science community to synthesize data on permafrost carbon.

This upcoming meeting will bring together network participants that have been leading syntheses in the last four years and continue to be engaged in new synthesis activities planned over the next couple of years. This workshop is also a key event in engaging new participants to start new synthesis activities that have been identified in previous meetings based on missing gaps and important research areas.

The new research areas focus around a) analysis of permafrost carbon feedback and permafrost physical representation in the context of CMIP6 activities, b) carbon pool estimates in Yedoma, c) radiocarbon dating and carbon cycling in permafrost, and d) methane hydrates in permafrost regions.

This meeting took place during the American Geophysical Union Fall Meeting in December 14-18, 2015 in San Francisco.

Scientific Highlights:

- Discuss circumpolar datasets that link terrestrial ecosystems (boreal forest, tundra, peatlands) with the cryosphere.
- Advance model development by exploring possible benchmarking tools (e.g. planning of possible proposals) that can be provided by field and lab based scientists and finalizing model output from the Permafrost Carbon Model Intercomparison Project that estimates the permafrost carbon climate feedback for this century and beyond.

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PHOTO: FLORENCIA MAZZA
Scientists set up their instruments, studying biogeochemical cycling in transitional environments between land-aquatic-ocean systems in the Arctic.

PHOTO: THIERRY BOULINIER

Black-legged kittiwakes (Rissa tridactyla) on their cliff nests on the island of Hornøya, Eastern Finnmark, Norway. Long-term monitoring of the populations of this widespread arctic seabird species tells us about how populations respond to environmental changes.

3. IASC Networks

» 3 IASC Networks

IASC's mission is to encourage and facilitate cooperation in all aspects of Arctic research, in all countries engaged in Arctic research, and in all areas of the Arctic region. One way in which IASC fosters the development of thematic groups is by supporting and endorsing networks. IASC networks, which are international, address specific scientific issues on a circumarctic scale and strive to involve early career scientists. Networks may be established by IASC or may apply for affiliation with IASC. Once accepted as an IASC network, they may use the IASC logo.

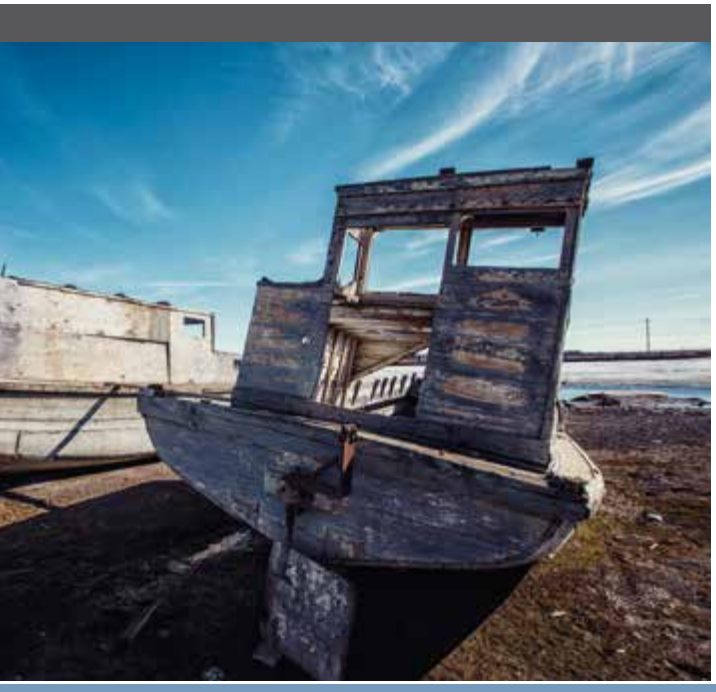

PHOTO: FLORENCIA MAZZA
Old seal hunting boats abandoned in town on the Chukchi Coast.

Arctic Coastal Dynamics (ACD)

The Arctic Coastal Dynamics (ACD) project started in 1999 as an initiative of the International Permafrost Association (IPA), http://ipa.arcticportal.org/, and the International Arctic Science Committee (IASC). ACD quickly developed a vibrant international community of scientists carrying out research in the Arctic. Significant contributions to International Conferences on Arctic Research Planning (ICARPs), http://icarp.iasc.info/, to the International Polar Year (IPY) and to Arctic Observing (SAON, http://www.arcticobserving.org/, AOS, http://www.arcticobservingsummit.org/) were among the international contributions of this group. The State of the Arctic Coast report in 2012 provided a recent transdisciplinary overview of changes in the arctic coastal zone. Since then the Circumpolar Arctic Coastal Community Observatory network (CACCON, http://caccon.org/) has initiated an international and transdisciplinary effort to link communities and scientists through knowledge hubs along the arctic coastline. In this context, the

ACD project brings together researchers who focus on the geomorphological dynamics of arctic coasts and contributes to initiatives that integrate across disciplines and stakeholder groups.

The year 2016 marks the beginning of a new phase of activity, initiated by a group of young researchers and beginning with the meeting described below. We welcome the participation of new researchers and groups in the project.

Highlights:

ACD Website gets an upgrade

The ACD website has undergone a re-design making major improvements to both usability and available content. Its new home is at arcticcoast.info. In addition to a new aesthetic, the website now makes a number of ACD products available for online viewing and download. These include the State of the Arctic Coast 2010 report, past workshop proceedings, newsletters, and the ACD database (Lantuit et al. 2012, http://link.springer.com/article/10.1007%2Fs12237-010-9362-6). Upcoming activities and relevant events are listed. Additional content and functionality suitable for specialists, and the broader public, such as blogs, FAQs, maps, and graphics, will be added continually. We envision an interactive website with extensive social media integration that will become THE arctic coastal research forum for exchanging ideas and knowledge regarding arctic coasts.

ACD Arctic Coastal Photos: An open invitation to contribute!

ACD invites contributions to a publically available arctic coastal photo repository. This key resource will consist of thematic and geographic galleries of coastal imagery, complete with author, locality, and geographic information. This image library will a valuable tool for polar coastal geomorphologists, enabling them to easily explore the diversity of physical processes and landforms across different coastal systems. New imagery will be posted on the new ACD site continuously. User contributions can be submitted via a Flickr group called Arctic Coasts Image Gallery (https://www.flickr.com/groups/arcticcoasts/). We also solicit and welcome contributions by email (acd@awi.de). Photographs must have the following information, either integrated in the EXIF header (preferable) or accompanying the photo by email: author, a descriptive title, location name, tags, a description of the photo (describing geomorphologic features and processes, for example), and geographic coordinates.

Upcoming 1-day meeting: Coastal Permafrost in Transition

Researchers are invited to participate in a one-day side meeting on Arctic Coastal Permafrost in Transition (CPiT) on Sunday, June 19, prior to the 11th International Conference on Permafrost (ICOP2016, www.icop2016.org), in Potsdam, Germany. The CPiT meeting seeks to energize and connect the coastal scientific community through the legacy of the IPA-sponsored Arctic Coastal Dynamics group (ACD, an IASC network and LOICZ-affiliated project). Goals will be set for the next phase of ACD and international research efforts on polar coastal dynamics, with a focus on physical processes, will be coordinated. Specific objectives of the this one-day meeting are to:

- unite researchers from diverse geographic backgrounds and career stages
- explore future research and data needs
- solicit suggestions from participants regarding next steps for ACD
- identify funding sources for future networking opportunities

If you plan to attend, please register here: **https://goo.gl/3Sa8zg by February 11, 2016.**

Arctic Freshwater System Synthesis (AFS) Network

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ACDwebsite: **www.arcticcoast.info**

There is increasing scientific and societal recognition that changes to the Arctic freshwater systems have produced, and could produce even greater, changes to the Arctic environment, society and economy. A healthy environment and a balanced socio-economic structure are of special importance to northern residents. Changes in these systems affect not only the Arctic but also other areas and these impacts will have consequences at a global level.

To address such concerns, the Arctic Freshwater Synthesis has produced a circum-Arctic review of the sources, fluxes, storage and effects of changes in freshwater resources to be used by the scientific community. The review is currently also being used to develop policy recommendations for local, regional and national governments.

The AFS has been structured around five major components: atmosphere, ocean, terrestrial hydrology, terrestrial ecology and resources, with modeling as a sixth cross-cutting component. The AFS has scientific and financial support from the World Climate Research Program's Climate and Cryosphere Project (CliC), the International Arctic Science Committee (IASC), the Arctic Council's Arctic Monitoring and Assessment Program (AMAP), the Norwegian Ministry of Foreign Affairs and the Norwegian Ministry of Climate and Environment.

Publication plans for the AFS include a layman's report, tailored towards a wide audience, that is currently in production. This report is based on the core scientific results, which are currently being published as a suite of review papers in a special issue of the journal JGR

Biogeosciences. Final versions of all papers have been submitted in the summer of 2015, with some papers currently in review and others already accepted and available online. The latter includes the introduction and summary papers, which introduce the AFS and highlight a number of key findings.

In April 2015, results from some components of the synthesis, as well as from the summary paper, were presented at the session "The Arctic System: changes and effects with emphasis on freshwater ecosystems" of the ASSW and ICARP III conference in Toyama, Japan.

Results from the synthesis are currently also integrated in the work preparing for an update of the Snow, Water, Ice, and Permafrost in the Arctic (SWIPA) report, which will serve as knowledge input to the Adaptation Actions for a Changing Arctic (AACA) process.

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AFS website: **http://www.climate-cryosphere.org/activities/targeted/afs**

Arctic in Rapid Transition (ART) Network

ART is a pan-Arctic scientific Network developed and steered by early career scientists, which aims to study the impact of environmental changes on the Arctic marine ecosystem. ART is focused on bridging time-scales by incorporating paleo-studies with modern observations and modelling, science disciplines, and geographic regions to better understand past and present response of Arctic marine ecosystems to sea ice transitions and climate change and improve our predictive capability of future scenarios. Initially endorsed by the IASC Marine Working Group, ART became an official IASC Network in 2013.

The ART cruise TRANSSIZ (Transitions in the Arctic Seasonal Sea Ice Zone) took place on the German vessel R/V Polarstern, starting in Bremerhaven on May 19th and ending in Longyearbyen on June 28th, 2015 (cruise leader: ART member Ilka Peeken, AWI, Germany). The work on this cruise focused on ecological and biogeochemical early spring process studies from the shelf to the basins of the European Arctic margin in order to link past and present sea-ice transitions, and improve reconstructions of productivity, sea ice and ocean circulation across the last glacial cycles. Some groups also used the transit to the research area to study meridional variability of trace gases, algae species and nutrients from temperate regions of the North Atlantic and into the ice-covered Arctic Ocean by using the surface online water system.

Some of the targeted research areas were revised during the expedition as a result of severe ice conditions that were further amplified by significant snow cover on the ice which prevented the Polarstern in reaching some of the areas around 20°E and 30°E. Overall, eight sea ice process studies were carried out. During these stations, the ship was anchored for up to 36 hours at the drifting ice floe. The sea ice physics team studied the properties of the ice and the snow as well as optical properties of sea ice by deploying a remotely operated vehicle. Current and mixing processes were studied by the oceanographic team using an Acoustic Doppler Current Profiler (ADCP) and a microstructure probe. In order to study the chemical and biological variables of sea ice and geological proxies from sea ice, several ice cores were drilled

and processed on board. A short time mooring (24h) was deployed under the ice with sample collectors between 30 and 200m. The mooring was further used to incubate in situ production samples. The under-ice water was also measured with a hand-held CTD and water samples were taken. While the ship was anchored at the ice floe, and in parallel to the work on the ice, oceanographic, chemical, pelagic, benthic and geological sampling of the water column and sediments were carried out using CTD/ Rosette, Compact Optical Profiling System, Underwater Video Profiler, in situ pumps, plankton nets, box corer and a TV-Multicorer. Trolled nets were used to sample the under ice and the intermediate fauna. Three cross slope hydrographic transects were performed which were combined with towed net sampling. Geological sampling at 6 sites, mainly on the Yermak Plateau, was conducted using box and gravity corers. The entire program was substituted with sea ice thickness measurements with the helicopter operating an EM-Bird system along the cruise track, when weather permitted. The cruise concluded with a bathymetric survey at the southern Yermak Plateau. Overall, the cruise was a great success, with most of the major research aims fulfilled.

A second initiative of the ART team included the participation of a small group of 5 people in the „TransArc II" (Trans-Arctic survey of the Arctic Ocean in transition) Expedition on the vessel R/V Polarstern from the 17th of August until the 15th of October. The main emphasis was to study the biodiversity and biomass of sea ice biota in the Transpolar Drift and the pathways of freshwater, particulate and dissolved matter and the possible response to climate variations.

The ART Special Issue on "Interdisciplinary and multi-scale approaches to understanding and modeling the Arctic in Rapid Transition" as a long-term outcome of the ART-APECS Science Workshop 2012 in Sopot, Poland, is targeted for publication as part of the peer-reviewed journal Polar Research by the beginning of 2016.

In cooperation with APECS and the European Institute for Marine Studies (IUEM, Brest, France), ART organized the international science workshop "Integrating spatial and temporal scales in the changing Arctic System: towards future research priorities" (ISTAS) in October 21-24, 2014 in Brest, France. During parallel sessions, trends and variability in the Arctic marine and coastal systems were reviewed over various

PHOTO: LUCA BRACALI
Resolute Bay, Canada, North-west passage: a polar explorer testing a new waterproof suit.

spatial and temporal scales in order to better understand the presently changing Arctic system as a whole. 76 participants from thirteen different countries presented recent results of their ongoing research, which fed into comprehensive discussions on future Arctic research priorities during the second half of the workshop. Seven priority papers summarizing future directions of Arctic marine, coastal, and law research from an international early and mid-career scientists' perspective were the main outcome of the second ART workshop. The priority papers were one of the ART network's contributions to the ICARP III conference in Toyama, Japan in April 2015, fostering an improved understanding of the presently changing Arctic system as a whole in future Arctic research. The papers were distributed as printouts during ASSW 2015 and ICARP III meetings in Toyama, Japan, and are available online (http://www.iarc.uaf.edu/art/background/publications).

During ASSW 2015, ART convened the session "Arctic in Rapid Transition - future research directions from the perspective of early career scientists". The goal of this session was to integrate studies from various Arctic research fields in order to better understand the changing Arctic system beyond its regional variability and across multiple timescales. The session ended with a fruitful discussion on future research directions and priorities from the perspective of early career scientists.

During the EGU General Assembly 2016, ART will convene a session "Arctic Ocean and Cryosphere in Rapid Transition". The goal of this session is to integrate multidisciplinary studies on different time scales from various Arctic research fields including sea ice dynamics, oceanography, land-ocean interaction, ecosystem studies, and Arctic law. The ART network will submit an IASC cross-cutting proposal in mid-2016 for a science conference co-organization at Arctic Frontiers 2017 titled "Arctic in Rapid Transition".

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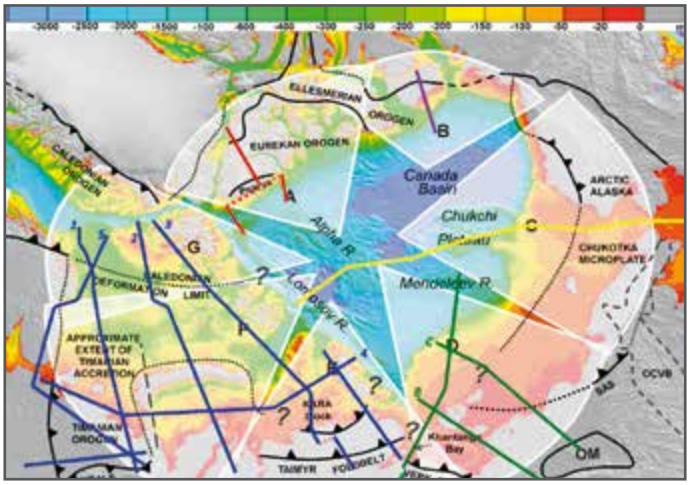
ART website: **http://www.iarc.uaf.edu/ART**

Circum-Arctic Lithosphere Evolution (CALE) Network

Circum-Arctic Lithosphere Evolution (CALE) is a multinational and multi-disciplinary research program investigating important questions associated with understanding circum-Arctic lithosphere evolution. The CALE project was launched in 2011 and concludes at the end of 2015. CALE consists of seven regional teams consisting of on-shore geologists and off-shore geophysicists. Each team meets on an individual basis annually, and once a year all teams join together for a project meeting. For more details please visit the website: www.CALE.geo.su.se.



2015 Highlights

- The final CALE project meeting was held in September 2015 on Svalbard.
- A 2nd-Phase of CALE is being planned for 2016-2020.

Important 2015 publications

Klitzke et al., 2015. A lithosphere-scale structural model of the Barents Sea and Kara Sea region. Solid Earth 6, 153-172. doi:10.5194/se-6-153-2015

Pease, V., Kuzmichev, A., Danukalova, M.K.. Late Paleozoic zircon provenance of the New Siberian Islands and implications for late Creataceous Arctic reconstructions. Journal of the Geological Society (London), doi:10.1144/jgs2014-064, 2015.

W. Zhang et al., 2015. Provenance characteristics and regional implications of Neoproterozoic Timanian-margin successions of Northern Norway. Precambrian Research, 268,153-167.

X. Zhang et al., 2015. Reconstruction of tectonic events on the northern Eurasia margin of the Arctic, from U-Pb detrital zircon provenance investigations of late Paleozoic to Mesozoic sandstones in southern Taimyr Peninsula. Geological Society of America Bulletin. doi:10.1130/B31241.1

Future activities & developments

- Special volume of Tectonophysics with 17 contributions is in preparation for December 2015.
- Final project Geological Society Special Publication planned for 2016, with over 20 contributions. This special volume will present the main crust-lithosphere transects of the project.

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FIGURE:
The CALE project regional teams and crust-lithosphere transect locations

International Network for Terrestrial Research and Monitoring in the Arctic (INTERACT)

INTERACT is a development of SCANNET, an EU project started in 2000 that brought together research stations in the North Atlantic Region. INTERACT received an infrastructure award from the EU's Framework 7 infrastructure program in 2010. At that time, 33 research stations were members, but by 2015, membership grew to 77 stations operated by 19 countries. INTERACT research stations are located in all of the Arctic countries and in many neighboring northern countries. In 2014, INTERACT stations together hosted over 5,000 researchers and 76 individual environmental networks.

INTERACT is building capacity for research, monitoring and education at national, regional and global scales. It works with many international organizations and is also highly visible in political circles. It brings station managers together to share information and data and to promote interoperability of measurements. It also increases researcher mobility, funding over 500 researchers to visit all Arctic countries with additional awards from Canada and the US. It is also developing new technology and methodology in environmental research and data processing. This large and innovative network ensures active participation to address environmental challenges of both local and global significance.

Products within the 2010-2015 phase include a catalogue of Arctic and northern research stations, a book on management and planning of research stations, an outreach and educational book "Stories of Arctic Science" and a mass outreach video course on the "Changing Arctic" – all available on INTERACT's website (http://www.eu-interact.org/). A report listing research and monitoring activities at INTERACT stations since the year 2000 is currently at an advanced stage of development. Additional products include an energy exchange measuring station network operating at multiple sites (representing a partial ICOS device) and a GIS system for managing applications for visiting scientists to stations and capturing the metadata from their research.

INTERACT is currently working on an application for HORIZON 2020 within the 2016 - 2017 work program on European Research Infrastructures (call: INFRAIA-01-2016-2017). It is also cooperating with the European Polar Board to produce a catalogue of Research stations, planes and ships operated in both the Arctic and Antarctic by member states. To secure the long-term sustainability of INTERACT and to recognize its pan-Arctic membership, INTERACT is currently seeking to develop a foundation.

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Network on Arctic Glaciology (NAG)

The IASC Network on Arctic Glaciology aims to make a significant contribution to assessments of the impact of climate change in the Arctic region. The focus is on the effect of glaciers on sea-level change and on the fresh water input into fjords and embayments. The Network works by initiating scientific programs and facilitating international cooperation between glaciologists and climate modelers.

In order to facilitate international cooperation, the Network organizes an annual "Workshop on the Dynamics and Mass Budget of Arctic Glaciers", which includes the Network's annual open forum meeting. In 2015, the annual workshop took place in Obergurgl, Austria from 23 - 25 March. The meeting focused on topics related primarily to Arctic glaciology and climatology, linking climate change through changes in the ocean and atmosphere to changes in the dynamics and mass budget of Arctic glaciers. A diverse array of topics was presented at this workshop, which provided a multidisciplinary perspective on glaciology.

In terms of on-going activities, the work by the Network and the IASC Cryosphere Working Group that began in 2012 to develop an on-going research and training program on tidewater glacier research continues. A very successful workshop titled "Glacier and Ice-stream Calving – Observations and Modeling" was held in June 2014 in Grenoble, France. A review paper on tidewater glacier dynamics is currently in progress. Furthermore, work to update existing mass balance records that started during the "Mass balance of Arctic Glaciers and Ice sheets in relation to the Climate and Sea level changes" (MAGICS) project in 1996 has been initiated. The data now available on the Network website will be updated accordingly.

PHOTO: W. VAN PELT
Servicing a weather station on Nordenskiöldbreen, Svalbard

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NAG website: http://www.projects.science.uu.nl/iceclimate/iasc-nag/index.html

Polar Archaeology Network (PAN)

The Polar Archaeology Network (PAN) is an international organization dedicated to issues pertaining to archaeology in the Arctic, Subarctic, and Subantarctic. Its main goals are:

1) Protection of cultural heritage;
2) Promotion and support of research, particularly through the expansion of international networks and cooperation;
3) Meaningful integration of archaeology with communities; and,
4) Dissemination of research results in both scholarly and popular forums.

PAN has been engaged in several activities over the last twelve months. In May 2015, PAN formally participated in the Canadian Archaeological Association (CAA) annual meeting in St. John's, Newfoundland, and organized sessions on diverse themes, including the impacts of modern climate change on the archaeological record, and analysis of past climate-culture interactions across the Arctic. PAN also held a full general meeting to discuss policy and future initiatives.

The second session on culture-climate interactions forms part of a larger initiative supported by IASC, which aims to strengthen collaboration between environmental scientists and archaeologists and improve understandings of long-term cultural responses to Arctic climate change. The initiative is led by Peter Jordan (University of Groningen), Max Friesen (University of Toronto) and Mary-Louise Timmermans (Yale University). Efforts are now underway to publish papers as a thematic journal issue; the insights raised will form the basis of a policy paper examining the wider relevance of long-term climate adaption research in the Arctic.

PAN also held steering committee elections in 2015. Peter Jordan takes over from Max Friesen,

PHOTO: MAX FRIESEN
Archaeologists map a Late Dorset longhouse, ca. 1000 AD, on Victoria Island in the central Canadian Arctic.

who steps down as Chair, but remains on the committee to provide continuity. Peter Dawson replaces Maribeth Murray as Deputy Chair, and Atilio Francisco J. Zangrando also joins the committee. Ulla Odgaard remains as PAN Secretary.

In the coming year PAN will be taking steps to improve communication and integration with the main IASC structures, in particular, the activities of the Social and Human Working Group. PAN will also be launching an annual newsletter to improve research collaboration and dissemination efforts, and will also seek to expand its membership and engage more effectively with Russian archaeologists and environmental scientists.

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Palaeo-Arctic Spatial and Temporal Gateways (PAST Gateways) Network

‚PAST Gateways' (Palaeo-Arctic Spatial and Temporal Gateways) is an IASC endorsed network research program, the scientific goal of which is to understand Arctic environmental change during the period preceding instrumental records and across decadal to millennial timescales. The focus of the six year program is on the nature and significance of Arctic gateways, both spatial and temporal, with an emphasis on the transitions between major Late Cenozoic climate events such as interglacials to full glacials and full glacial to deglacial states, as well as more recent Holocene fluctuations. There are four major themes to the program: (1) Growth and decay of Arctic Ice Sheets; (2) Arctic sea-ice and ocean changes, (3) Non-glaciated Arctic environments and (4) Holocene Arctic environmental change. It is interdisciplinary in nature and seeks to bring together field scientists and numerical modelers to advance understanding about Arctic climate change. The network involves scientists from across Europe, Russia, Canada and the USA, and is led by a Steering Committee comprising members from participating countries.

The Third PAST Gateways International Conference and Workshop was held in Potsdam Germany, from May 18–22, 2015. The conference consisted of 2½ days of scientific presentations and discussions, and as well as a full-day field-trip to the Quaternary landscapes surrounding Potsdam, which were shaped by the last advance of the Scandinavian Ice Sheet. Seventy six delegates from Europe, Russia, Canada and the USA attended the meeting including 24 Early Career Researchers (ECRs) and 52 Experienced Researchers. The ECRs were also involved in the planning and organization of the conference and five ECRs were selected as co-chairs of scientific sessions. There were thirty one oral and thirty seven poster presentations given, including four keynote presentations: Lev Tarasov (Memorial University, Canada) 'The last Northern Hemisphere deglaciation: missing ice, data/model challenges and opportunities'; Volker Rachold (IASC) Future Priorities for Arctic Research; Julian Murton (University of Sussex, UK),' Permafrost history and environmental change at the margin of Beringia and the Laurentide Ice Sheet, Tuktoyaktuk coastlands, western Arctic Canada'; and Marit-

PHOTO: PAST GATEWAYS
Participants of the Third PAST Gateways conference and workshop held in Potsdam, 18-22 May 2015.

Solveig Seidenkrantz (Aarhus University, Denmark) 'Variability of late Holocene ocean and atmosphere circulation in the Labrador Sea and North Atlantic region'. Best poster prizes were awarded to Henry Patton (University of Tromsø, Norway) for his poster on "Numerically modelling the growth and collapse of the Barents Sea ice sheet" and to Juliane Wolter (Alfred Wegener Institute, Potsdam, Germany) for her poster entitled "Thermokarst lake history and stable tundra vegetation since the 18th century in a Low Arctic setting, Yukon Territory, Canada". Funds from IASC contributed to supporting the participation of ECRs at the meeting. A range of presentations and discussion emphasized the interconnectedness and importance of a multi-disciplinary, integrated approach to Arctic palaeoclimate. A special issue of the international journal Quaternary Science Reviews comprising papers related to the Second PAST Gateways conference in 2014 meeting will be published in 2016. The Fourth PAST Gateways International Conference and Workshop will be held in Trondheim, Norway from May 23-27, 2016.

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PAST Gateways website:
http:// www.geol.lu.se/pastgateways/

PHOTO: LUCA BRACALI
A polar explorer waiting to start his last degree skiing to reach the geographic North Pole.

4. Arctic Science Summit Week 2015

» 4 Arctic Science Summit Week 2015

Arctic Science Summit Week (ASSW) 2015 was held on 23-30 April at the Toyama International Conference Center in Toyama, Japan and brought together more than 700 international scientists, students, policy makers, research managers, Indigenous Peoples and others interested in developing, prioritizing and coordinating plans for future Arctic research. It was arranged under the auspices of IASC and co-organized by the Science Council of Japan.

In addition to the business meetings of the ASSW partner organizations, which were held during the first three days of the week (23-25 April), a joint 4-day science symposium of the 3rd International Conference on Arctic Research Planning (ICARP III) and the 4th International Symposium on Arctic Research (ISAR-4) was arranged in the second half of the week (27-30 April).

A public lecture entitled "Arctic came to Toyama!", including presentations from IASC President Susan Barr, geophysicist Shun Akasofu and photographer Naoki Ishikawa, was arranged on 26 April and attracted nearly 500 attendees, including people from the nearby prefectures.

http://www.assw2015.org/

PHOTO: ALLEN POPE
Students on the Juneau Icefield Research Program return back to camp after a long day digging mass balance pits (Juneau Icefield, Alaska).

ICARP III / ISAR-4 Opening Session

The opening session of the ICARP III / ISAR-4 Symposium included welcoming remarks from several dignitaries.

Among them were the Honorary Chairperson of ASSW 2015, Her Imperial Highness Princess Takamado of Japan, who attended the opening and spoke of her hopes for Arctic research. Also, a message from the Japanese Prime Minister Shinzo Abe was presented.

Additional opening statements were made by the State Minister for Education, Culture, Sports, Science and Technology (MEXT), the President of the Science Council of Japan, the Governor of the Toyama Prefecture, the President of IASC and on behalf of the Ministry of the Foreign Affairs and the Parliamentary League of Arctic Frontier Study.

The Chair and Vice-Chair of the Local Organizing Committee officially opened the symposium and the scientific program began with the first keynote presentation.

Toyama Conference Statement

The Toyama Conference was a critical step in the ICARP III process involving hundreds of scientists from 27 countries working to im-prove our understanding of the consequences of changes taking place in the Arctic region, and their connection to global environmental, economic and social processes. The Toyama Conference Statement, which highlights several overarching messages that emerged during the Conference, was presented in the closing ceremony:

- Changes in the Arctic are challenging our understanding of their consequences and our ability to provide knowledge for decision-makers.
- There needs to be a greater sense of urgency among decision-makers and awareness by the general public regarding the global importance of changes taking place in the Arctic.
- It is critical to anticipate changes in the Arctic rather than respond to them, but to do this requires sustained observations and improved understanding of local, regional and global

PHOTO: GÜNTHER HEINEMANN
Kazuyuki Shiraishi, Chair of the Local Organizing Committee, opening the conference
IASC President Susan Barr during the opening session

processes. These research challenges must be addressed in a coordinated and timely manner to ensure sustainable development and resilient Arctic communities and ecosystems.

- The rapidly changing Arctic initiates changes that cascade through the global system impacting weather, commerce and ecosystems in the more temperate regions. Linkages across disciplines, scales, and diverse knowledge systems must be addressed in future research activities.
- Understanding the vulnerability and resilience of Arctic environments and societies requires increased international scientific cooperation, including contributions from non-Arctic states.
- More effective use must be made of local and traditional knowledge by engaging northern and Indigenous communities in setting priorities, the co-design and co-production of research, and the dissemination of this knowledge by ensuring appropriate access to research data and results.
- It is essential to build long-term human capacity to support relevant observations and research among scientists, decision-makers and Arctic residents, including Indigenous Peoples, through education and effective public engagement, and by adopting shared principles to guide research activities.
- New markets for Arctic resources and associated activities, including trade, tourism and transportation, will likely emerge faster than the necessary infrastructures on land and sea. Sustainable infrastructure development and innovation to strengthen the resilience of Arctic communities requires a collaborative approach involving scientists, communities, governments, and industry.

PHOTO: ALEXEY PAVLOV
ICARP III Chair David Hik presenting the Toyama Conference Statement

PHOTO: GÜNTHER HEINEMANN
ISAR-4 Chair Atsoku Sugimoto presenting the concluding remarks

25th Anniversary of IASC

IASC´s 25th Anniversary in 2015 presented the opportunity to summarize and review IASC´s contributions and recognize those that have been instrumental in its founding, development and growth.

Celebrating the 25th Anniversary, a panel discussion, including former IASC Presidents, Vice-Presidents and others who had contributed substantially to shaping IASC during the last 25 years, was convened as part of the opening session. The panel started with an introduction of the book "IASC after 25 Years - A Quarter of a Century of International Arctic Research Cooperation", presented by the Executive Secretary Volker Rachold, followed by a panel discussion. The discussions were moderated by Sara Bowden, former Executive Secretary of the Arctic Ocean Sciences Board (AOSB) and Executive Officer of IASC, and included statements from

- Odd Rogne, Executive Secretary, 1991 - 2005;
- Louwrens Hacquebord, Council Member, 1992 - today (IASC Vice President 2000-2008);
- Anders Karlqvist, Regional Board Member, 1991-2008 (Chair 1991-1994, 1996-1997);
- Byong-Kwon Park, Council Member, 2002 - today (IASC Vice President 2004-2012);
- Vladimir Pavlenko, Council Member, 2001 - today (Vice President 2014-);
- Kristján Kristjánsson, Council Member, 1999 - 2010 (President 2006-2010, Vice President 2002-2006).

IASC Award for Service

In light of the 25th Anniversary, IASC decided to – for first the time – present a special IASC Award for Service, recognizing "25 Years of Vision, Dedication and Advancement of Arctic Science". The IASC Award for Service was presented to IASC´s former Executive Secretary Odd Rogne, who had been instrumental in the founding process of the organization in the late 1980s and making IASC a leading science organization for the Arctic.

PHOTO: GÜNTHER HEINEMANN
Sara Bowden moderating the IASC History Panel

PHOTO: GÜNTHER HEINEMANN
Odd Rogne, former IASC Executive Secretary, receiving the IASC Award for Service

Indigenous Participants

Working with people who live in or near the Arctic and building constructive relationships between producers and users of knowledge are key elements of ICARP III. In that respect, the involvement of indigenous participants in the ICARP III process is of particular importance. To ensure indigenous participation in ASSW and in the ICARP III Symposium, IASC has been cooperating closely with the Arctic Council Indigenous People Secretariat (IPS).

Four of the Arctic Council´s Permanent Participants were represented at the ICARP III Symposium, namely Aleut International Association (AIA), Inuit Circumpolar Council (ICC), Russian Association of Indigenous Peoples of the North (RAIPON) and Saami Council. One of the ASSW keynote presentations was given by Gunn-Britt Retter, Head of Arctic- and Environmental Unit of Saami Council, and several science sessions of the ICARP III Symposium benefitted from indigenous contributions.

Upcoming ASSWs 2016 - 2018

ASSW 2016, Fairbanks (USA)

The ASSW 2016 week will be held in Fairbanks (USA) on 12-18 March 2016 and consists of several separate but related activities to strengthen international collaborations and networks across disciplines and facilitate communication across different groups, including academia, government agencies, local communities, industry, non-governmental organizations and other Arctic stakeholders.

https://assw2016.org/

PHOTO: IASC SECRETARIAT
Idigenous participation during ASSW: left to right Sten Lund, Sharon Edmunds-Potvin, Alona Yefimenko, Gunn-Britt Retter, Janni Staffansson, Liza Marie Mack, Carl Christian Olsen, Larisa Abriutina and Najaaraq Paniula

ASSW 2017, Prague (Czech Republic)

The ASSW 2017 will be hosted by the Czech Republic and held in Prague on 1-7 April 2017. The overall theme of the Science Symposium will be "The Circumpolar Arctic: Dynamic Biome in Global Change".

http://www.assw2017.eu/

ASSW 2018, Davos (Switzerland)

The ASSW 2018 will be held in conjunction with "POLAR 2018" in Davos (Switzerland) on 15-27 June 2018. POLAR 2018 is a joint Open Science Conference of IASC and the Scientific Committee on Antarctic Research (SCAR) and will also include the IASC and SCAR Business Meetings.

http://www.polar2018.org/

PHOTO: FLORENCIA MAZZA
An old abandoned Arctic Hotel in town (Barrow, Alaska).

PHOTO: FLORENCIA MAZZA
Arctic Poppy in the tundra near Barrow, Alaska

5. Data and Observations

» 5 Data and Observations

Arctic Data Committee (ADC)

The IASC-SAON Arctic Data Committee (ADC, http://arcticdc.org) was formed in November of 2014. The overarching purpose of the ADC is to promote and facilitate international collaboration towards the goal of free, ethically open, sustained and timely access to Arctic data through useful, usable, and interoperable systems. To achieve ADC goals and objectives, committee members work with researchers and other stakeholders to establish a set of work packages that will address key priorities and result in tangible outcomes over a short time frame.

The ADC held its second annual meeting on October 26th and 27th, 2015 in conjunction with the Second Polar Data Forum (PDF II). More than twenty national representatives and corresponding members gathered to discuss Arctic data opportunities and issues, review existing and develop new work packages, and finalize the ADC Terms of Reference and operational procedures. The first results of a foundational

PHOTO: PETER PULSIFER
Members of the Arctic Data Committee and the SCAR Standing Committee on Antarctic Data Management meet on October 27th, 2015 to discuss common interests.

work package focused on identifying Arctic data resources were presented and a second year work plan confirmed (see http://arcticdc.org/products/data-ecosystem-map). An ADC sub-group is working towards the establishment of an international recommendation on common metadata elements that can be used to describe and share data across many polar data centers. This will support the development of a "single window" approach to data discovery, reducing the need for researchers to access multiple catalogues to find relevant data. A revised Terms of Reference document and operational framework was developed and will be adopted following review by the IASC and SAON executives. As part of this process, two vice chairs were nominated and confirmed (Marten Tacoma, Netherlands; Stein Tronstad, Norway) to support the Chair.

For the first time, the ADC met with members of the Scientific Committee on Antarctic Research's Standing Committee on Antarctic Data Management (SCAR SCADM). Both committee memberships agreed that there would be great advantage in coordinating key efforts and sharing resources. To this end, a Memorandum of Cooperation between the groups is being developed and will be in place early in 2016.

ADC members actively contributed to the PDF II. More than 110 people gathered at the University of Waterloo, Canada to share knowledge and address challenges. Data managers, scientists, funding program managers, Indigenous People and their representatives, students and others from more than ten nations shared their knowledge experience and ideas on how to make polar data more useful and valuable in solving global problems. See http://www.polar-data-forum.org/ for the Second Polar Data Forum Communiqué.

ADC website: **http://arcticdc.org**

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The Sustaining Arctic Observing Networks (SAON)

The purpose of the Sustaining Arctic Observing Networks (SAON) is to support and strengthen the development of multinational engagement for sustained and coordinated pan-Arctic observing and data sharing. SAON has been established on the initiative of the Arctic Council and IASC.

AMAP (Arctic Monitoring and Assessment Program) has nominated Christine Daae Olseng from the Norwegian Research Council as Chair of SAON, and Larry Hinzman from University of Alaska has been nominated by IASC as the Vice-Chair.

In 2014 SAON established two committees. The Arctic Data Committee (ADC) has defined these key priorities:

- Documenting and understanding the Arctic data management ecosystem
- Identifying and promoting common metadata elements
- Engaging in data citation and publication movement
- Promoting interoperability through action – interoperability experiment

Peter Pulsifer from the US National Snow and Ice Data Center is the chair of the ADC, and the Committee last met in October 2015 in Waterloo, Ontario, Canada.

http://arcticdc.org

The projects (in progress) for the SAON Committee on Observations and Networks (CON) are:

- Atmospheric observations initiative
- EU PolarNet
- CBM atlas
- USGCRP - Indicators
- Inventory of AC WG projects

CON will meet next time in March 2016 in Fairbanks, Alaska. Lisa Loseto from Fisheries and Oceans, Canada is the chair of the Committee.

http://www.arcticobserving.org/images/pdf/Board_meetings/teleconf_10JUN2015/SAON_CON_June2015_V2.pdf

Members of the SAON Board are the Arctic states, the Permanent Participants and Working Groups of the Arctic Council, non-Arctic states and regional and international organizations with an interest in the Arctic. The SAON Executive Committee is responsible for overall governance issues and meets approx. once a month. The USA represents the Arctic countries in the Committee, while ICC (Inuit Circumpolar Council) is the member for the AC Permanent Participants. The AMAP and IASC Secretariats contribute resources to the SAON Secretariat.

SAON is involved in the organization of the Polar Data Forum (http://www.polar-data-forum.org) and the Arctic Observing Summit (http://www.arcticobservingsummit.org).

SAON website: **http://www.arcticobserving.org**

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Arctic Observing Summit (AOS)

The Arctic Observing Summit (AOS, www.arcticobservingsummit.org) is a high-level, biennial summit that aims to provide community-driven, science-based guidance for the design, implementation, coordination and sustained long-term operation of an international network of Arctic observing systems that serves a wide spectrum of needs. The AOS provides a platform to address urgent and broadly recognized needs of Arctic observing across all components of the Arctic system, and serves as a forum for coordination and exchange between academia, government agencies, local communities, industry, tribal and non-governmental organizations and other Arctic stakeholders. It is co-sponsored by the International Study of Arctic Change (ISAC) and the International Arctic Scientific Committee and is a designated task of the Arctic Council's Sustaining Arctic Observing Networks (SAON) initiative. The upcoming AOS 2016 will be held 15-18 March in Fairbanks, Alaska, in conjunction with the Arctic Science Summit Week 2016 (assw2016.org) and Arctic Council Senior Arctic Officials (SAO) and Working Group meetings.

The design, development, implementation and sustained operation of an adaptive, relevant and responsive Arctic observing system requires the expertise and input from everyone affected by, or interested in, observing activities, applications and derived products. In order to inform discussions at the AOS 2016, close to 80 white papers and short statements have been contributed by the research community and stakeholders. These papers serve to highlight important data, management, or logistical needs or gaps, explore emerging opportunities, address a current challenge, present new initiatives or technology that can contribute to Arctic observing (including global programs), or review ongoing observing activities or issues that are relevant for the development, application,

operation, or support of a sustained Arctic observing network. Papers and discussions at AOS 2016 address six core themes identified as key topics at the previous two summits in 2013 and 2014:

1) International and national strategies for sustained support of long-term Arctic observing

2) Technology and innovation for sustained Arctic observations

3) Contributions of the Private Sector and Industry to sustained Arctic observations

4) Actor and Stakeholder engagement and needs in sustained Arctic observations

5) Arctic Observations in the context of Global Observing initiatives

6) Interfacing Traditional Knowledge, Community-based Monitoring and Scientific Methods for sustained Arctic observations

Each of these themes is associated with a Working Group with international membership to help guide presentations, discussions at the summit and development of a synthesis document and action plan. In addition, the summit will address overarching topics that have been identified as high priorities, such as data management and communication.

The six thematic Working Groups address high priorities and issues of immediate concern. For example, Working Group 1 (Strategies for sustained support) has broad participation from different funding agencies and organizations supporting long-term observations in the Arctic and attracted close to 20 white papers that lay out different approaches for sustaining observations. The discourse within the Working Group and the broader community will help drive discussions and recommendations at AOS 2016. By holding the summit in conjunction with Arctic Council meetings, we expect significant exchange of ideas between the broad range of experts and decision-makers represented at these meetings on how to implement strategies towards coordinated multi-national support.

Along the same lines, the theme focused on stakeholder engagement has identified a pan-Arctic review of current and best practices with respect to community emergency response and action plans in the context of threats from rapid Arctic environmental

PHOTO: ALLEN POPE
Snow camp during the Juneau Icefield Research Program 2012, Alaska.

change as a key topic. The group seeks to identify potential synergies between emergency response and hazard mitigation at the community level on the one hand and sustained observations of Arctic environmental change and potential hazards on the other. Discussion across the broader network of Arctic and non-Arctic nations can then help identify priorities for observations that address both key scientific research questions and community-level priorities.

Specific products and outcomes from AOS 2016 include a shared vision for Arctic observing system priorities and implementation strategies, with white papers, synthesis documents, recommendations and action plans reflecting the state of knowledge and next steps. The summit organizers will craft specific findings and recommendations aimed at policy makers, identifying key goals, implementation pathways and points of engagement. The white papers, published online at www.arcticobservingsummit.org, with a subset to be published as part of a special volume (see http://arctic.journalhosting.ucalgary.ca/arctic/index.php/arctic/issue/view/281 for white paper publications from the AOS 2013) will serve as a coordination framework and reference point for future work. Ideally, the close intertwining between ASSW, AOS and SAO meetings will help foster specific action down the line in response to summit recommendations and proposed action plans.

AOSwebsite: **www.arcticobservingsummit.org**

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PHOTO: LOUISE BEVERIDGE
Drilling of permafrost cores in Arcitc tundra on Herschel Island, Canada.

PHOTO: FLORENCIA MAZZA
Wetsuits used by the Florida International University (FIU) crew, drying after a day of data collection (Barrow, Alaska).

6. Partnerships

» 6 Partnerships

With the goals to develop and stimulate shared initiatives that are of high interest to the broader Arctic research community, to make better use of limited financial resources and to avoid a duplication of efforts, IASC strives for close cooperation with other groups interested in Arctic research. Today, IASC maintains an excellent relationship with many other polar and global science organizations.

IASC is an accredited observer of the Arctic Council since its inception, and in this function, IASC is in a position to provide independent scientific advice to the main political body for the Arctic. IASC is supporting the work of the Arctic Council, its Working Groups and Permanent Participants by providing scientific expertise from its members, including those from non-Arctic countries. IASC´s contributions have resulted in a number of very successful joint ventures.

As an International Scientific Associate of the overarching non-governmental science organization the International Council for Science (ICSU), IASC is well-connected within the broader ICSU family. In particular, cooperation with its Antarctic sister organization, the Scientific Committee on Antarctic Research (SCAR), resulted in various bipolar science initiatives.

An excellent example of such bipolar cooperation is the Expert Group on Ice Sheet Mass Balance and Sea Level (ISMASS), which is co-sponsored by the World Climate Research Program (WCRP) Climate and Cryosphere Project (CliC), SCAR and IASC.

Ice Sheet Mass Balance and Sea level (ISMASS)

The Ice Sheet Mass Balance and Sea level (ISMASS) group is an international and interdisciplinary self-governing expert group that works across the spectrum of relevant ice-sheet mass balance disciplines, and is currently sponsored by SCAR, IASC and CliC. The goals of ISMASS are to promote research on the estimation of ice-sheet mass balance and its contribution to sea-level change; facilitate coordination among the different international efforts focused on this field of research; propose directions for future research in this area; integrate observations and modeling efforts as well as the distribution and archiving of the corresponding data; attract a new

generation of scientists into this field of research; and, contribute to the dissemination to society and policymakers of the current knowledge and the main achievements in this field of science.

Activities carried out by ISMASS during 2015 included a meeting on "Constraining Uncertainty in Greenland Ice Sheet surface mass balance model output and in situ validation" that was organized by Ed Hanna in Sheffield on 19-20 May 2015 (http://www.climate-cryosphere.org/activities/groups/ismass/meetings/1270-uncertainty-greenland-ice-sheet-models), and sponsored by WCRP-CliC and co-sponsored by ISMASS. The meeting focused on (i) prompting more comprehensive spatial comparisons between surface mass balance (SMB) model output from the several different modeling approaches, and (ii) discussing how major discrepancies between Greenland Ice Sheet SMB model estimates can be better reconciled through the improved use and implementation of in situ validation observations, including weather stations, ice radar and shallow ice cores.

An ISMASS workshop on marine ice sheet model and ocean model coupling was held in Cambridge on 16 August 2015. Logistics were organized by Cat Ritz, Francisco Navarro and Frank Pattyn (ISMASS) and local support was provided by Hilmar Gudmundsson (British Antarctic Survey). The content of the workshop was organized by Xylar Asay-Davis (Potsdam Institute for Climate Impact Research) and Steph Cornford (University of Bristol). The workshop focused on presenting the design of three model inter-comparisons (MIPs): the third Marine Ice Sheet MIP (MISMIP+), the second Ice Shelf-Ocean MIP (ISOMIP+) and the first Marine Ice Sheet-Ocean MIP (MISOMIP1). The workshop unfolded in four sessions: experimental design, logistics for participation, remaining design questions and future directions. About 40 participants from around the world attended the workshop. Four early career

PHOTO: ANTOINE KIES
Helicopter-borne radio-echo sounding over Hansbreen, southern Spitsbergen, Svalbard.

scientists received travel grants from IASC. Further info can be found at http://www.climate-cryosphere.org/activities/groups/ismass/meetings/mismips-cambridge.

Activities planned for 2016 include a major model intercomparison initiative on West Antarctic Glacier-Ocean Models (linked with the MISOMIP-ISOMIP initiative), which will have its second meeting in May 2016 at the New York University Campus in Abu Dhabi, United Arab Emirates (organized by David Holland). This is a CliC and ISMASS endorsed initiative.

Finally, two important events are planned within the frames of the SCAR Open Science Conference in Malaysia, August 2016: 1) a mini symposium co-organized by ISMASS and three big SCAR Scientific Research Programs (SERCE, PAIS and AntClim21), entitled "The Antarctic ice sheet from past 2 future", with convenors Catherine Ritz, Frank Pattyn (ISMASS), Terry Wilson, Pippa Whitehouse (SERCE), Nancy Bertler (AntCLIM21) and Carlota Escutia (PAIS); and 2) a thematic session on "Glaciers and ice sheet mass balance", with convenors Frank Pattyn and Catherine Ritz (ISMASS), Grzegorz Rachlewicz (Adam Mickiewicz University, Poland) and Kiya Riverman (Penn State University).

The ISMASS Steering Committee is currently chaired by Catherine Ritz and composed of Frank Pattyn (representing SCAR), Francisco Navarro (representing IASC), Edward Hanna (representing WCRP-CliC), Elyn Enderlin (representing APECS), Dan Dixon, Xavier Fettweis, David Holland, Andrew Shepherd and Pippa Whitehouse.

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http://www.climate-cryosphere.org/activities/groups/ismass

PHOTO: FRANCISCO NAVARRO
Snow probing on Austfonna, Svalbard

PHOTO: PAULINE SNOEIJS LEIJONMALM
Orientation during the 2012 Arctic expedition with icebreaker Oden.

7. Capacity Building

7 Capacity Building

IASC recognizes that the next generation of researchers will be faced with increasingly critical challenges due to the impacts of climate change on the Polar Regions and their global significance. IASC therefore believes that it is of great importance to foster young researchers and promote and involve early career scientists working in the Arctic by:

- Striving for representation of early career researchers within IASC;
- Providing endorsement, support and dissemination of information on activities, projects and requests for participation; and,
- Providing travel grants to early career scientists for select conferences.

With these instruments, IASC aims to include more early career researchers in the organization of workshops, science planning activities and research programs. Last year, over 100 early career scientists received IASC travel stipends to attend and participate in conferences or workshops.

PHOTO: IASC SECRETARIAT
Recipients of the IASC Fellowship Award during ASSW 2015 in Toyama, Japan. From left to right: Volker Rachold (IASC Executive Secretary), Paul Suprenand, Emily Choy, Kristina Brown, Louis-Philippe Roy, Elena Kuznetsova, Robert Way, Josefine Lenz, Malgorzata Smieszek, Andrian Vlakhov, Jo Browse, Susan Barr (IASC President)

IASC Fellowship Program

Table IASC Fellows

WORKING GROUP	2014	2015	2016
Atmosphere WG	-	Jo Browse	Paul Zieger
Cryoshere WG	Elena Kuznetsova · Louis-Philippe Roy	Robert Way	Alek Petty
Marine WG	Emily Choy · Paul Suprenand	Kristina Brown	Allison Fong
Social & Human WG	Candice Lys · Małgorzata Śmieszek	Andrian Vlakhov	Justiina Dahl
Terrestrial WG	Jeffrey Ross · Noemie Boulanger-Lapointe	Josefine Lenz	Scott Zolkos
International Science Initiative in the Russian Arctic (ISIRA)		Yulia Zaika	Yulia Zaika

TABLE 1:
Recipients of the IASC Fellowship Award

During ASSW 2015 in Toyama, Japan, the Fellows actively participated in WG meetings. Most of them also presented their research during the Science Symposium. Following ASSW 2015, the Fellows have been actively involved in several conferences and workshops. Andrian Vlakhov (SHWG) co-organized the Arctic-FROST Annual Meeting, 15-17 August 2015, St Petersburg, Russia where Elena Kuznetsova (CWG) participated as an Early Career Scholar. Josefine Lenz (TWG) was invited to give a talk during the Arctic Discussion Series (29 June 2015, Potsdam, Germany). She also co-organized the Global Terrestrial Network for Permafrost (GTN-P) workshop, Québec, Canada 19-20 September 2015 where Louis-Philippe Roy (CWG) was a National Correspondent for Canada. As a result of the workshop, it was decided to include Young National Correspondents in GTN-P. Josefine Lenz will be the first Young National Correspondent for Germany. Further on, Elena Kuznetsova participated in the Polar Data Forum II held in Waterloo, Canada on 27-27 October 2015. Paul Suprenand (MWG), who is currently a member of the Association of Polar Early Career Scientists (APECS) Council, presented his research to scientists and indigenous community members of Alaska's North Slope Borough and at the Integrated Marine Biogeochemistry & Ecosystem Research (IMBER) meeting IMBIZO IV in Trieste, Italy.

Upcoming events include a joint IASC/SCAR meeting in February 2016, Potsdam, Germany, where Josefine Lenz will participate, and the Arctic Observing Summit 2016 in Fairbanks, Alaska, where Elena Kuznetsova, Emily Choy (MWG), Małgorzata Smieszek (SHWG) and Paul Suprenand were invited to thematic committees. Paul Suprenand has been invited to co-convene the IMBER ecological modelling workshop, ClimECO5, in Natal, Brazil.

Based on discussions in Toyama, and subsequent input from the IASC Fellows and the IASC WG Chairs,

PHOTO: ELENA KUZNETSOVA
IASC Fellows Josefine Lenz, Elena Kuznetsova, Robert Way and Louis-Philippe Roy presenting their permafrost research at the GEOQuébec 2015 in Canada.

the Terms of Reference for the IASC Fellowship Program have been improved. The changes include a possibility of prolonged involvement of the Fellows (up to 2 additional years, without financial support) based on an agreement between a Fellow and the WG Steering Group, a more active role of the WG Steering Group in the selection process of new Fellows, and a stronger focus for the Fellows on cross-cutting activities. The following two cross-cutting initiatives led by IASC Fellows were selected for IASC funding:

A half-day Symposium to be held at ASSW 2016 „Do we speak the same language of science?", led by Malgorzata Smieszek (SHWG), with the aim of strengthening the communication and dialogue among representatives of humanities, social and natural sciences, which will advance the development of crosscutting initiatives among IASC WGs.

An international workshop „Community based Research - Do`s and Don`ts in Arctic Science", led by Josefine Lenz (TWG), with involvement from the CWG Fellows: Elena Kuznetsova, Louis-Philippe Roy

PHOTO: ALLEN POPE
Students on the Juneau Icefield Research Program ski back to camp (Juneau Icefield, Alaska).

and Robert Way (to be arranged in conjunction with the International Conference on Permafrost, June 2016, Potsdam), which will facilitate an exchange among Early Career Researchers of various fields of research and Indigenous Peoples' spokespersons to discuss permafrost research with and in northern communities.

The upcoming meeting of IASC Fellows at ASSW 2016 in Fairbanks, Alaska will include newly-selected 2016/2017 Fellows.

"The IASC Fellowship program gave me the possibility to establish myself early in my career. Only half a year after becoming an IASC Fellow, my scientific network has grown, I got involved in various science management related activities and was able to make a name for myself among well experienced researchers." Josefine Lenz (TWG).

Overview of supported early career scientists

Big Black Box Workshop

Tromsø, January 2015

NAME	INSTITUTION	COUNTRY
A. Cleary	University of Rhode Island	USA
M. Marquardt	University Centre in Svalbard	Norway

Arctic Air Pollution Workshop

Boulder, February 2015

NAME	INSTITUTION	COUNTRY
J. Backman	Finnish Meteorological Institute	Finnland
J. Burkhart	University of Toronto	Canada
M. Lund	CICERO	Norway

IASC Network on Arctic Glaciology (NAG) Annual Meeting & Workshop on the Dynamics and Mass Budget of Arctic Glaciers

Obergurgl, March 2015

NAME	INSTITUTION	COUNTRY
P. Christiansen	University of Copenhagen	Denmark
B. Hynek	Zentralanstalt für Meteorologie und Geodynamik	Austria
C. Mortimer	University of Alberta	Canada
M. Petlicki	Institute of Geophysics, Polish Academy of Sciences	Poland
A. Roth	University of Alaska Fairbanks	USA
A. Rutishauser	University of Alberta	Canada
J. Ryan	Aberystwyth University	UK
N. Schaffer	University of Ottawa	Canada
S. Schiavone	Université de Franche-Comté	France
L. Thomson	University of Ottawa	Canada
W. van Wychen	University of Ottawa	Canada
A. White	University of Ottawa	Canada

Workshop on Dynamics of Atmosphere-Ice-Ocean Interactions in High Latitudes

Rosendal, March 2015

NAME	INSTITUTION	COUNTRY
D. Chechin	Obukhov Institute of Atmospheric Physics	Russia
A. DuVivier	CIRES, University of Colorado Boulder	USA
C. Fairless	University of Manchester	UK
S. Kohnemann	University of Trier	Germany
F. Massonnet	Université Catholique de Louvain	Spain
K. McCusker	Canadian Centre for Climate Modelling and Analysis, University of Victoria	Canada
F. Ogawa	Geophysical Institute, University of Bergen	Japan
A. Tetzlaff	Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research	Germany

Session: Arctic Climate Change and Mid-Latitude Weather Phenomena at the European Geosciences Union (EGU) General Assembly

Vienna, April 2015

NAME	INSTITUTION	COUNTRY
M. Akperov	A.M. Obukhov Institute of Atmospheric Physics, Russian Academy of Sciences	Russia
C. Andin	University of Uppsala	Sweden

Arctic Science Summit Week (ASSW)

Toyama, April 2015

NAME	INSTITUTION	COUNTRY
J. Lenz	Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research	Germany
J. Browse	University of Leeds	UK
A. Vlakhov	European University at St. Petersburg	Russia
R. Way	University of Ottawa	Canada
E. Choy	University of Manitoba	Canada
E. Kutznetsova	The Norwegian University of Science and Technology	Norway
K. Brown	Woods Hole Oceanographic Institution	USA
L.-P. Roy	Yukon Research Center	Canada
M. Smieszek	Arctic Centre, University of Lapland	Finland
P. Suprenand	University of South Florida	USA

International Science Initiative in the Russian Arctic (ISIRA) Meeting at the Arctic Science Summit Week (ASSW)

Toyama, April 2015

NAME	INSTITUTION	COUNTRY
M. Ivanov	Lomonosov Moscow State University	Russia
A. Medvedev	Institute of Geography, Russian Academy of Sciences	Russia
Y. Zaika	Lomonosov Moscow State University	Russia
G. Kraev	Center of Forest Ecology and Productivity, Russian Academy of Sciences	Russia

Arctic Freshwater Ecosystems Workshop at the Third International Conference on Arctic Research Planning (ICARP III)

Toyama, April 2015

NAME	INSTITUTION	COUNTRY
P. Bégin	Université Laval	Canada
P. Blaen	University of Birmingham	UK
D. Tashyreva	University of South Bohemia	Czech Republic
D. Velazquez	Universidad Autonoma de Madrid	Spain

Session: Linkage between Arctic Climate Change and Mid-Latitude Weather Extremes at the Third International Conference on Arctic Research Planning (ICARPIII)

Toyama, April 2015

NAME	INSTITUTION	COUNTRY
R. Hall	University of Sheffield	UK

Symposium: Climate Change Past and Present: Implications for Arctic Archaeology at the Canadian Archaeological Association (CAA) Annual Meeting

St. John's, Newfoundland, April/May 2015

NAME	INSTITUTION	COUNTRY
A. E. Lennert	Greenland Institute of Natural Resources	Greenland

Illulisat Climate Days „Changes of the Greenland Cryosphere"

Greenland, June 2015

NAME	INSTITUTION	COUNTRY
J. Alvarez	Erasmus University Rotterdam	The Netherlands
M. Lorentz	Greenland Climate Research Centre	Greenland
D. Medrzycka	University of Ottawa	Canada
S. Mernild	Centro de Estudios Científicos	Chile
D. Porter	Lamont Doherty Earth Observatory	USA

ESSAS Annual Science Meeting (ASM) Symposium, "The Role of Ice in the Sea"

Seattle, June 2015

NAME	INSTITUTION	COUNTRY
M. Cape	Woods Hole Oceanographic Institution	USA
K. Kunz	Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research	Germany
A. Nowak	University of Sheffield	UK

Workshop on Improved Health Knowledge in the Arctic: The Question of Missing Data

Oulu, June 2015

NAME	INSTITUTION	COUNTRY
T. Pettersen	Sàmi University College	Norway

5th Polar Marine Diatom Workshop

Salamanca, July 2015

NAME	INSTITUTION	COUNTRY
K. Abe	Yamagata University	Japan
B. Caissie	Iowa State University	USA
G. Fragoso	University of Southampton	UK
U. Hoff	University of Tromsø	Norway
I. Kryukova	P.P. Shirshov Institute of Oceanology	Russia
I. Percopo	Stazione Zoologica Anton Dalton	Italy
N. Sokolova	Baltic Federal University	Russia
Z. Stroynowski	Instituto Português do Mar e da Atmosfera	Portugal
J. Williams	Cardiff University	UK

MOSAiC – Building a Process-Level Understanding of the New Arctic

Potsdam, July 2015

NAME	INSTITUTION	COUNTRY
G. de Boer	University of Colorado	USA

Session: "Resources, Quality of Life and Sustainable Development in the Arctic" at the International Geographical Union (IGU) Regional Conference

Moscow, August 2015

NAME	INSTITUTION	COUNTRY
S. Agafonova	Lomonosov Moscow State University	Russia
E. Antonov	Lomonosov Moscow State University	Russia
E. Denisov	Lomonosov Moscow State University	Russia
E. Francis	University of Northern Iowa	USA
J. Loginova	The University of Melbourn	Australia
V. Lyakhov	Oslo School of Architecture	Norway

2nd International Conference on „Polar Climate and Environmental Change in the Last Millennium"

Torun, August 2015

NAME	INSTITUTION	COUNTRY
E. Demaniuk	Centre for Polar Studies, University of Silesia	Poland
K. Kuksa	St. Petersburg State University	Russia
O. Shakhtarova	Institute of Biology Komi Scientific Centre Ural Division, Russian Academy of Sciences	Russia
B. Sharma	University of Northern British Columbia	Canada

2nd GTN-P National Correspondents Workshop

Quebec City, September 2015

NAME	INSTITUTION	COUNTRY
I. Hartmeyer	alpS - Centre for Climate Change Adaptation	Austria
P. Pogliotti	ARPA Valle d'Aosta	Italy
Y. Rumyantseva	Institute of Earth Cryosphere, Russian Academy of Sciences	Russia
S. Weege	Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research	Germany

Catalysts for Treeline Expansion under Global Change Workshop

Scotland, October 2015

NAME	INSTITUTION	COUNTRY
A. Cansler	University of Washington	USA
E. Frei	University of British Columbia	Canada
R. Hewitt	University of Arizona	USA
A. Johnson	United States Forest Service	USA
D. Kambo	Queens University	Canada
A. Trant	University of Victoria	Canada
J. Varner	University of Utah	USA
S. Venn	Australian National University	Australia

Engaging Cultural Heritage when Building Resilience at the Third Annual Trans Arctic Agenda and the 8th NRF Open Assembly

Reykjavik, October 2015

NAME	INSTITUTION	COUNTRY
L. Olsen	Arctic Centre, University of Lapland	Finland
N. Sellheim	University of Lapland	Finland
J. Spence	Carleton University	Canada

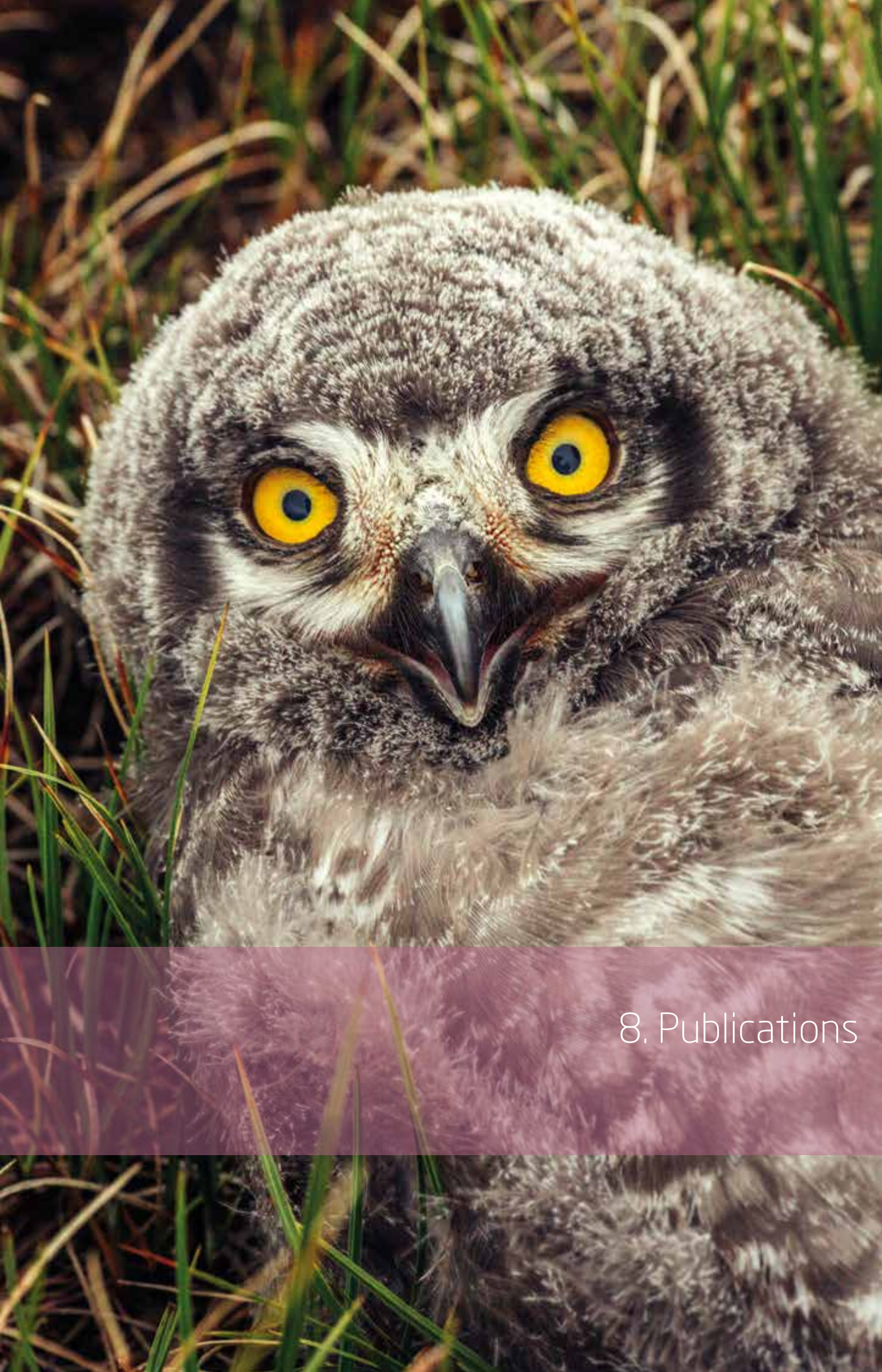
PHOTO: FLORENCIA MAZZA
Local kids bike around the tundra near Barrow, Alaska.

Permafrost Carbon Network (PCN) at the American Geophysical Union (AGU) Fall Meeting

San Fransisco, December 2015

NAME	INSTITUTION	COUNTRY
C. Estop-Aragones M. Loranty	University of Alberta Colgate University	Canada USA

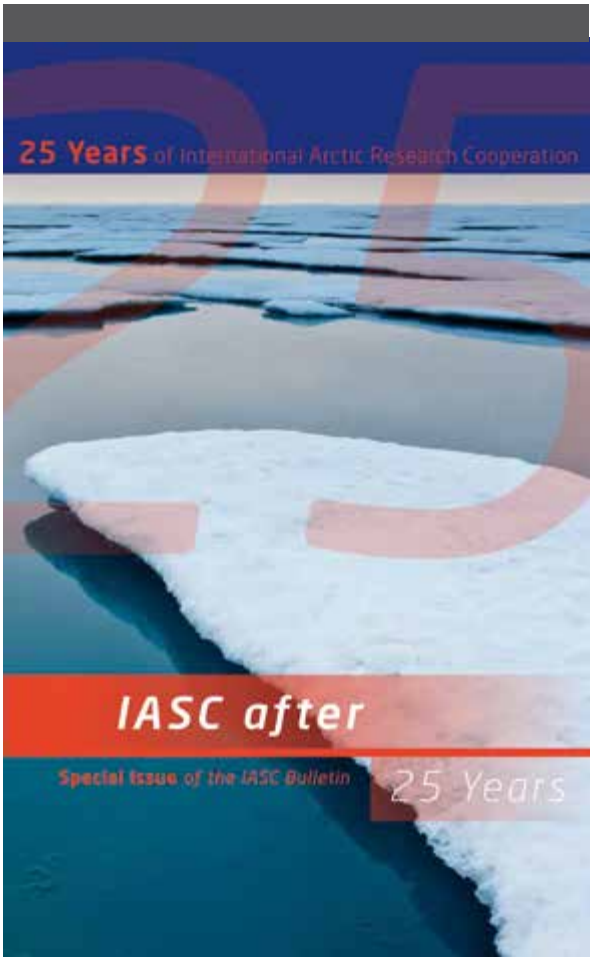
PHOTO: FLORENCIA MAZZA
A 12 days old snowy owl chick in the Arctic tundra (Barrow, Alaska).



8. Publications

» 8 Publications

IASC History Publication



IASC after 25 Years - A Quarter of a Century of International Arctic Research Cooperation

In the context of its 25th anniversary in 2015, IASC presented a comprehensive publication on its history from the planning process in the late 1980s until today. The book compiles and analyzes the history and development of IASC and its initiatives and achievements. It was edited by Odd Rogne, Volker Rachold, Louwrens Hacquebord and Robert Corell and published as a special issue of the IASC Bulletin.

A Briefing Note was published in the Arctic Yearbook: Malgorzata Smieszek (2015) 25 Years of the International Arctic Science Committee (IASC). In: L. Heininen, H. Exner-Pirot, & J. Plouffe. (eds.) Arctic Yearbook 2015. Akureyri, Iceland: Northern Research Forum, p. 437-444. Available from http://www.arcticyearbook.com.

The IASC history publication is complemented by a short film, including interviews with those who were involved in the development of IASC, and a collection of the historical documents. All material is available on the IASC history website: http://iasc25.iasc.info/film.

Arctic Freshwater Synthesis (AFS)

There is increasing scientific and societal recognition that changes to Arctic freshwater systems have produced, and could produce, even greater changes to the Arctic environment, society and economy. A healthy environment and a balanced socio-economic structure are of special importance to northern residents. Changes in these systems affect not only the Arctic but also other areas and these impacts will have consequences at a global level.

To address such concerns, the World Climate Research Program's Climate and Cryosphere (CliC) Project, the International Arctic Science Committee (IASC), and the Arctic Council's Arctic Monitoring and Assessment Program (AMAP) requested an updated scientific assessment of the Arctic Freshwater System (AFS), entitled the Arctic Freshwater Synthesis (AFS_{Σ}).

The AFS_{Σ} is structured around five independent but integrated components: atmosphere, ocean, terrestrial hydrology, terrestrial ecology, resources; and a sixth cross-cutting component, modeling. The review papers produced for each of the six components, together with the introduction chapter, were submitted to the Journal of Geophysical Research (JGR): Biogeosciences and will be published as a Special Issue in 2016. The Summary of the AFS_{Σ} was published in JGR in October 2015.

List of papers included in the Arctic Freshwater Synthesis:

- Prowse, T., A. Bring, J. Mård, E. Carmack, M. Holland, A. Instanes, T. Vihma, and F. J. Wrona (2015), Arctic Freshwater Synthesis: Summary of key emerging issues, J. Geophys. Res. Biogeosci., 120, 1887-1893, doi:10.1002/2015JG003128

- Prowse, T.D., Arctic Freshwater Synthesis: Introduction, submitted to Journal of Geophysical Research: Biogeosciences, 2015

FIGURE: Screenshots of the Film "IASC after 25 years"

- T. Vihma et al., The atmospheric role in the Arctic watercycle: Processes, past and future changes, and their impacts, submitted to Journal of Geophysical Research: Biogeosciences, 2015

- E. Carmack et al., Fresh water and its role in the Arctic Marine System: Sources, disposition, storage, export, and physical and biogeochemical consequences in the Arctic and global oceans, submitted to Journal of Geophysical Research: Biogeosciences, 2015

- A. Bring et al., Arctic terrestrial hydrology: A synthesis of processes, regional effects and research challenges, submitted to Journal of Geophysical Research: Biogeosciences, 2015

- F. J. Wrona et al., Transitions in Arctic ecosystems: Ecological implications of a changing hydrological regime, submitted to Journal of Geophysical Research: Biogeosciences, 2015

- A. Instanes et al., Changes to freshwater systems affecting Arctic infrastructure and natural resources, submitted to Journal of Geophysical Research: Biogeosciences, 2015

- C. Lique et al., Modeling the Arctic Freshwater System and its integration in the global system: Lessons learned and future challenges, submitted to Journal of Geophysical Research: Biogeosciences, 2015

Each of the review papers include recommended future research and aspects of how research needs to be bridged among thematics where the greatest advances are likely to be made (Prowse et al., 2015). One of the key points made in the AFS_{Σ}: Introduction and further developed in the six AFS_{Σ} review papers, is that 'a full understanding of the source, fate, and effect of freshwater components of the full "Arctic" freshwater system can only be achieved through the study of its full freshwater geography, which extends well beyond the classic Arctic Circle definition (Prowse et al., 2015).'

A few scientific highlights emanating from the AFS_{Σ} and emphasized in the AFS_{Σ}: Summary by Prowse et al., 2015:

- An ocean-based definition, which also defined the related terrestrial contributing area (TCA), was used to delimit the Arctic Freshwater Domain (AFD) in the context of the conduct of the AFS_{Σ}.

- Keeping in mind the importance of storm tracks in delivering moisture, the creation of new hydrologic regimes as a result of other altered freshwater fluxes and changes in the cryosphere was also identified. -Since a new Arctic freshwater regime is 'emerging because of the enhanced flux of moisture from an increasingly ice-free ocean to the adjacent nearshore terrestrial environment, changes in another cryospheric component, freshwater ice, could also produce broad-scale changes to the Arctic Freshwater System.'

- Although the final effects on freshwater supply and distribution in the Arctic Freshwater System [...] need to be determined, the higher-latitude terrestrial areas of the AFD are generally becoming more "water rich" (i.e., where water availability meets or exceeds the needs of human development and ecosystem services) (A. Bring et al., submitted manuscript, 2015; C. Lique et al., submitted manuscript, 2015), particularly during winter when, in response to warming, increases in precipitation exceed that for evaporation (T. Vihma et al., submitted manuscript, 2015).

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PHOTO: LUCA BRACALI
Testing a new polar waterproof suit in Resolute Bay, Canada.

Emerging Questions in Arctic Geosciences, a special publication of the Geological Society (London)

The Geosciences, representing the study of the solid earth at time scales longer than human life, are underrepresented in the IASC framework. IASC commissioned the Action Group on Geosciences (AGG) in 2012 to provide strategic advice to the IASC Council and Working Groups on the priorities and longer-term opportunities across the full range of Arctic Geoscience. As a result of the AGG's efforts, a special publication highlighting emerging scientific questions in Arctic Geoscience was developed. This publication is intended to identify existing, and prioritize future, research efforts at national and international level, consistent with IASC's other activities.

This volume is a compilation of review papers that span the range of Geoscience topics in the Arctic arena from tectonics and climate change, to humans & Earth resources. Articles were commissioned by experts to identify emerging questions in these subjects and to place them within the context of contemporary knowledge. The volume will, by providing an up-to-date summary of emerging topics in Arctic research, be an essential introduction for students and researchers new to working in the Arctic, as well as a resource for policy makers and regional stakeholders.

The book is divided into three chapters which include independent contributions on themes that cover the terrestrial and oceanic realms, from hundreds of millions of years to historical timescales:

1. Arctic Tectonics (terrestrial and marine)

- Exploring the Arctic Ocean
- Paleozoic foldbelts of the Arctic
- Mesozoic orogens of the Arctic
- Eurekan deformation in the Arctic – an outline

2. Impact of Arctic climate change

- The Anthropocene: Man´s footprint on the Arctic as revealed by analysis of ice and snow
- Sensitivity of ice sheets

3. Long term perspective on human use of Arctic mineral resources

- Historical perspectives: the European commercial exploitation of Arctic mineral resources after 1500 AD
- Prehistoric uses of circumpolar mineral resources: insights and emerging questions from Arctic Archaeology

By framing the contemporary problems within the state of current knowledge, these eight papers include comprehensive references allowing readers quick access to the background literature. There are also many color figures that can be used for teaching and summaries of the state-of-the-art in these subjects. This information will enable readers to familiarize themselves with the issues of the day and prepare for what is likely to be prominent in the field tomorrow.

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PHOTO: JEAN-BAPTISTE STROBEL
Ornithologists are counting a Brünnich's guillemots' colony at Isfjorden, Svalbard.

9. Annex

» 9 Annex

Annex 1

List of Acronyms and Abbreviations

A

Acronym	Full name
AAA	Astronomy and Astrophysics in Antarctica
AACA	Adaptation Actions for a Changing Arctic
ABC	Arctic Biodiversity Coalition
AC	Arctic Council
ACA	Arctic Change Assessment
ACCE	Antarctic Climate Change and the Environment
ACCESS	Arctic Climate Change Economy and Society
ACCOnet	Arctic Circumpolar Coastal Observatory Network
ACD	Arctic Coastal Dynamics
ACIA	Arctic Climate Impact Assessment
ACSNet	Arctic Climate System Network
ACSYS	Arctic Climate System Study
ADAPT	Arctic Development and Adaptation to Permafrost
ADC	Arctic Data Committee
AFS	Arctic Freshwater System Synthesis
AFWG	Arctic Fisheries Working Group
AGG	Action Group on Geosciences
AGU	American Geophysical Union
AHDR	Arctic Human Development Report

Acronym	Full name
A	
AIA	Aleut International Association
AIDA	Atmospheric Investigations on a Drifting observatory over the Arctic Ocean
AMAP	Arctic Monitoring and Assessment Programme
AnT-ERA	Antarctic Thresholds – Ecosystem Resilience and Adaptation
AntClim21	Antarctic Climate Change in the 21st Century
AntEco	State of the Antarctic Ecosystem
AntETR	Antarctic Ecosystems: Adaptations, Thresholds and Resilience
AOD	Aerosol Optical Depth
AODS	Arctic Ocean Drift Study
AOS	Arctic Observing Summit
AOSB	Arctic Ocean Sciences Board
APECS	Association of Polar Early Career Scientists
APEX	Arctic Palaeoclimate and its Extremes
APRI	Austrian Polar Research Institute
ARCDIV NET	Network for ARCtic Climate and Biological DIVersity Studies
ARCHES	Arctic Hydrology and Earth System Processes
ARCUS	Arctic Research Consortium of the US
ARR	Arctic Resilience Report
ART	Arctic in Rapid Transition
ASI	Arctic Social Indicators
ASSW	Arctic Science Summit Week
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
ATCM	Antarctic Treaty Consultative Meeting
AVA	Arctic Vegetation Archive
AWG	Atmosphere Working Group
AWI	Alfred Wegener Institute for Polar and Marine Research
B	
BEST	Bering Ecosystem Study
BipAG	Bipolar Action Group
C	
C-GTOS	Coastal Global Terrestrial Observing System
CAFF	Conservation of Arctic Flora and Fauna
CALE	Circum-Arctic Lithosphere Evolution
CALM	Circumpolar Active Layer Monitoring
CAML	Census of Antarctic Marine Life
CBMP	Circumpolar Biodiversity Monitoring Program
CCMVal	Climate – chemistry model validation
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CHARS	Canadian High Arctic Research Station
CHRN	Circumpolar Health Research Network
CliC	Climate and Cryosphere Project
CLIVAR	Climate Variability and Predictability Program

Acronym	Full name
C	
CMIP	Coupled Model Intercomparison Project
COMNAP	Council of Managers of National Antarctic Programs
CON	Committee on Observations and Networks
COP15	Fifteenth Conference of Parties
COPES	Coordinated Observation and Prediction of the Earth System
CPC	Canadian Polar Commission
CPE	Comité Polar Español
CryOS	Cryosphere Observing System
CSA	Canadian Space Agency
CSIC	Spanish National Research Council
CVII	Commission on Volcano Ice Interactions
CWG	Cryosphere Working Group
D	
DACA-13	Davos Atmospheric and Cryospheric Assembly 2013
DBO	Distributed Biological Observatory
E	
EAI	Exo-Atmospheric lunar Irradiance
ECORD	European Consortium for Ocean Research Drilling
ECS	Early Career Scientists
ECV	Essential Climate Variables
EEA	European Environmental Agency
EGU	European Geophysical Union
EIWG	Extractive Industries Working Group
EOC	Education, Outreach and Communication
EPB	European Polar Board
ERICON	European Research Icebreaker Consortium
ESA	European Space Association
ESF	European Science Foundation
ESM	Earth System Models
ESRI	European Strategy Forum on Research Infrastructures
ESSAS	Ecosystem Studies of Sub-Arctic Seas
EU	European Union
EUCOP	European Conference on Permafrost
F	
FARO	Forum of Arctic Research Operators
FMI	Finnish Meteorological Institute
FRISP	Forum for Research into Ice Shelf Processes
G	
GAPHAZ	Glacier And Permafrost HAZards in mountains
GCI	Gwich'in Council International
GCM	Global Climate Model
GCOS	Global Climate Observing System

Acronym	Full name
G	
GDEM	Global Digital Elevation Model (GDEM)
GEO	Group on Earth Observations Geological Survey
GEOTOP	Quebec inter-university network on advanced studies and research in geosciences
GEUS	Geological Survey of Denmark and Greenland
GFCS	Global Framework for Climate Services
GGD	Global Geocryological Database
GIA	Glacial Isostatic Adjustment
GIC	Glacier and Ice Cap
GICAC	Glaciers and Ice Cap Assessment Consortium
GIN	Greenland-Iceland-Norwegian seas
GLACIODYN	Dynamic Response of Arctic Glaciers to Global Warming
GLIMS	Global Land Ice Measurements from Space
GOOS	Global Ocean Observing System
GRACE	Gravity Recovery and Climate Experiment
GRASP	The Greenland Analogue Surface System Project
GRISO	Greenland Ice Sheet-Ocean Interactions
GROCE	Greenland Ice Sheet / Ocean Interaction
GSR	Quaternary Science Reviews
GTN-G	Global Terrestrial Network for Glaciers
GTN-P	Global Terrestrial Network on Permafrost
GTOS	Global Terrestrial Observing System
H	
HERMIONE	Hotspot Ecosystem Research and Man's Impact On European Seas
I	
IACS	International Association of Cryospheric Sciences
IAI	International Antarctic Institute
IAMAS	International Association of Meteorology and Atmospheric Sciences
iAOOS	integrated Arctic Ocean Observing System
IAPSO	International Association for the Physical Sciences of the Oceans
IARC	International Arctic Research Center
IASC	International Arctic Science Committee
IASOA	International Arctic System for Observing the Arctic
IASSA	International Arctic Social Sciences Association
IAVCEI	Intern. Association of Volcanology and Chemistry of the Earth's Interior
ICAM	International Continental Arctic Margins
ICARP	International Conference on Arctic Research Planning
ICARPIII	3rd International Conference on Arctic Research Planning
ICC	Inuit Circumpolar Council
ICEHUS	Ice Age Development and Human Settlement in Northern Eurasia
ICEMASS	Response of Arctic Ice Masses to Climate Change
ICES	International Council for the Exploration of the Sea
ICSIH	International Commission on Snow and Ice Hydrology

Acronym	Full name
ICSU	International Council for Science
IG	Initiating Group
IGAC	International Global Atmospheric Chemistry
IGBP	International Geosphere-Biosphere Programme
IGS	International GPS Service
IGY	International Geophysical Year
IHP	International Hydrological Programme
IJCH	International Journal for Circumpolar Health
IMAU	Institute for Marine and Atmospheric research Utrecht
IMBIE	Ice sheet mass balance inter-comparison exercise
INAC	Indian and Northern Affairs Canada
INCHR	International Network for Circumpolar Health Research
INTERACT	Intern. Network for Terrestrial Research and Monitoring in the Arctic
INVEST	New Ventures in Exploring Scientific Targets
IOC	Intergovernmental Oceanographic Commission
IODP	Integrated Ocean Drilling Program
IOPAN	Institute of Oceanology Polish Academy of Sciences
IPA	International Permafrost Association
IPCC	Intergovernmental Panel on Climate Change
IPD	International Polar Decade
IPI	International Polar Initiative
IPPI	International Polar Partnership Initiative
IPS	Arctic Council Indigenous Peoples Secretariat
IPY	International Polar Year
IPY IPO	International Polar Year International Programme Office
ISAC	International Study of Arctic Change
ISAR 3	3rd International Symposium on Arctic Research
ISIRA	International Science Initiative in the Russian Arctic
ISMASS	Ice Sheet Mass Balance and Sea Level
ISTAS	Integrating Spatial and Temporal Scales in the Changing Arctic System
ITEX	International Tundra Experiment
IUEM	European Institute for Marine Studies
IUGG	International Union of Geodesy and Geophysics
J	
JC	Joint Committee
JSC	Joint Scientific Committee
K	
KOPRI	Korea Polar Research Institute
L	
LAII	Land-Atmosphere-Ice Interactions
LANDSAT	Series of Earth-observing satellite missions jointly managed by NASA and the U.S.
LGGE	Laboratoire de Glaciology et Géophysique de L'environnement

Acronym	Full name
L	
LGM	Last Glacial Maximum
LoA	Letter of Agreement
LOICZ	Land-Ocean-Interactions in the Coastal Zone
LOMROG	Lomonosov Ridge off Greenland expedition
M	
MAGICS	Mass balance of Arctic Glaciers and Ice sheets in relation to the Climate and Sea level changes
MARUM	Centre for Marine Environmental Sciences
MOCA	Meltwater routing and Ocean-Cryosphere-Atmosphere response project
MOSAiC	Multidisciplinary drifting Observatory for the Study of Arctic Climate
MoU	Memorandum of Understanding
MWG	Marine Working Group
N	
NAG	Network on Arctic Glaciology
NCAOR	National Centre for Antarctic and Ocean Research
NcoE	Nordic Centre of Excellence
NERC	National Environment Research Council
NERI	National Environmental Research Institute
NPI	Norwegian Polar Institute
NRB	Northern Research Basins
NRC	National Research Council
NSF	National Science Foundation
NWP	Numerical Weather Prediction
NySMAC	Ny-Ålesund Science Managers Committee
O	
OGS	National Institute of Oceanography and Experimental Geophysics
OSC	Open Science Conference
OSL	Optically stimulated luminescence
P	
PACE	Past and Future Change of the Antarctic Environment
PAG	Pacific Arctic Group
PAIS	Past Antarctic Ice Sheet Dynamics
PAN	Polar Archeology Network
PAR	Pacific Arctic Region
PAST Gateways	Palaeo-Arctic Spatial and Temporal Gateways
PCSP	Polar Continental Shelf Program
PDF II	Second Polar Data Forum
PEI	Polar Educators International
PI	Principal Investigator
PIC	Polar Information Commons
PICES	The North Pacific Marine Science Organization
POLENET	Polar Earth Observing Network
PONAM	Polar North Atlantic Margin

Acronym	Full name
P	
PROMICE	Programme for Monitoring of the Greenland Ice Sheet
PYRN	Permafrost Young Researchers Network
Q	
QUEEN	Quaternary Environment of the Eurasian North
R	
R/V	Research Vessel
RANNIS	Icelandic Center for Research
RATIC	Rapid Arctic Transitions due to Infrastructure and Climate Change
RCM	Regional Climate Model
RCN	Research Coordination Network
RINK	Respons af Indlandsisen til Naturlige Klimaændringer
RRS	Royal Research ship
RSL	Relative sea-level
S	
SAC	State of the Arctic Coast
SAI	Stefansson Arctic Institute
SAON	Sustaining Arctic Observing Networks
SCAR	Scientific Committee on Antarctic Research
SCICOM	Science Committee of ICES
SCOR	Scientific Committee on Oceanic Research
SDWG	Sustainable Development Working Group
SEARCH	Study of Environmental Arctic Change
SEI	Stockholm Environment Institute
SERCE	Solid Earth Response and influence on Cryosphere Evolution
SG	Steering Group
SHARE	Social Sciences and Humanities Antarctic Research Exchange
SHWG	Social and Human Working Group
SIOS	Svalbard Integrated Arctic Earth Observing System
SOOS	Southern Ocean Observing System
SPARC	Stratospheric Processes And their Role in Climate
SPICE	Space-borne Measurements of Arctic Glaciers and Implications for Sea Level
SRC	Stockholm Resilience Centre
SRP	Scientific Research Programme
SSG	Scientific Steering Group
SVALI	Stability and Variations of Arctic Land Ice
SWIPA	Snow, Water, Ice and Permafrost in the Arctic
T	
THAW	THermokarst Aquatic Ecosystem
THORPEX	The Observing System Research and Predictability Experiment
TICOP	Tenth International Conference on Permafrost
TRANSSIZ	Transitions in the Seasonal Sea Ice Zone
TSP	Thermal State of Permafrost
TWG	Terrestrial Working Group

Acronym	Full name
U	
UAF	University of Alaska Fairbanks
UArctic	University of the Arctic
UNCLOS	United Nations Convention on the Law of the Sea
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNIS	The University Centre in Svalbard
W	
WCC-3	Third World Climate Conference
WCRP	World Climate Research Program
WCRP/CliC	World Climate Research Program/ Climate and Cryosphere Project
WG	Working Group
WGMS	World Glacier Monitoring Service
WMO	World Meteorological Organization
WWF	World Wildlife Fund