IASC Bulletin 2013

IASC 2013
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. The IASC 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 21 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

Canada	Canadian Polar Commission	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.fi.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 Organisation 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.polish.polar.pan.pl
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	www.dels.nas.edu/prb/

PHOTO: ED STOCKARD
Clean science requires tyvek suits. Two science techs at summit have been out sampling snow at Summit Station, Greenland. It is a tough and sometimes extremely chilling job and these techs are dedicated to the task.

IASC 2013

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[IMPRINT]

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COVERPHOTO: MICHAEL HARDWOOD
Alert, Nunavut: Polar wolf and Inukshuk at a stopover during the PAMARCMiP (Polar Airborne Measurements and Arctic Regional Climate Model Simulation Project) study.

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[PREFACE]

Each year the International Arctic Science Committee (IASC) compiles and presents this Bulletin, providing an overview of the diverse activities conducted and sponsored by IASC. In addition to an annual report of new and continuing initiatives, the Bulletin also presents updates regarding prospects for future activities.

In 2012 the Czech Republic and India joined the IASC family, bringing the total membership to twenty-one countries engaged in all aspects of Arctic scientific activities. As a non-governmental body, IASC works closely with scientists from countries and organizations around the world to facilitate global interest and participation in Arctic research.

This 2013 IASC Bulletin clearly shows that two years after their formation, the five IASC Working Groups (WGs) - Terrestrial, Cryosphere, Marine, Atmosphere and Social & Human - have become IASC´s scientific core elements. An impressive number of cutting-edge activities have been initiated by the WGs in cooperation with IASC´s partner organizations. The WGs have promoted a variety of system-scale activities within IASC and also encouraged interactions by developing cross-cutting activities that engage at least three of the WGs.

Actions Groups, providing strategic advice to the IASC Council, have become an important instrument for developing long-term activities and addressing urgent needs. Two new Action Groups were established last year. The Action Group on Geosciences will address concerns that geological research is underrepresented in the current WG structure, and the Data Policy Group will reinforce IASC's commitment to robust data management by developing a data policy for IASC supported activities.

As an accredited observer of the Arctic Council, IASC is supporting the work of the Arctic Council, its Working Groups and Permanent Participants by providing scientific expertise from all its members, including the non-Arctic countries. IASC´s contributions to the activities of the Arctic Council resulted in a number of very successful joint activities, such as the Arctic Climate Impact Assessment (ACIA) and the Snow, Water, Ice and Permafrost in the Arctic (SWIPA) report. The most significant ongoing collaborative activity is the Sustaining Arctic Observing Networks (SAON). Last year, IASC and the Arctic Council jointly established a Board and an Executive Committee overseeing the development of SAON, which to date includes more than 20 tasks. One of these tasks involves convening the first Arctic Observing Summit (AOS) in April/May 2013 and the second AOS in conjunction with the Arctic Science Summit Week (ASSW) 2014 in Finland.

In April last year, more than 3,000 participants attended the third and final conference of the International Polar Year (IPY), entitled "From Knowledge to Action", to present the latest findings and to discuss solutions for addressing the challenges faced in the Polar Region. IASC was deeply involved in the development and implementation of the IPY from the very beginning and also substantially contributed to the final IPY Conference. In the closing ceremony, IASC, together with its southern hemisphere partner, the Scientific Committee on Antarctic Research (SCAR) and the Association of Polar Early Career Scientists (APECS), received the IPY torch, indicating that these three organizations are now assuming responsibility for securing the IPY legacies.

To address the emerging challenges identified within the IPY, a new and novel framework for long-term cooperation between the stakeholders with mandate and interest in the Polar Regions, provisionally entitled "International Polar Initiative" (IPI), has been proposed. IASC is co-chairing an International Steering Group, currently developing the concept for this long-term initiative and linkages to the International Council for Science´s (ICSU) "Future Earth" program. The overall goal of the IPI is to optimize and better coordinate existing resources and facilities and to develop mechanisms for concerted investments in areas where activities are lacking.

IASC will celebrate its 25th anniversary in 2015, which presents the opportunity to summarize and review IASC´s contributions and recognize those that have been instrumental in its founding, development and growth. IASC Council decided that this anniversary would be held in conjunction with a third International Conference on Arctic Research Planning (ICARP III) during the ASSW 2015 in Japan. Over the past two decades, IASC has been organizing forward-looking conferences focused on international perspectives for advancing Arctic research cooperation and ICARP III will provide a timely opportunity to further the development of cross-cutting, inter- and trans-disciplinary initiatives, and engage IASC's partners in future collaborative activities building on past experiences. ICARP III is a specific area of cooperation in the agreement between IASC and the International Arctic Social Science Association (IASSA) and University of the Arctic (UArctic). Preliminary plans for ICARP III will be presented at the ASSW 2013 to seek research community input and to secure further membership for an ICARP III Steering Committee from IASC partner organizations.

Many have contributed to the successful development of IASC during the past year and we would like to thank everyone involved for supporting IASC, especially the Chairs and members of IASC's Working Groups and Action Groups.

David Hik | IASC President
Volker Rachold | IASC Executive Secretary

PHOTO: ANDREW REED WELLER
Taking a break during the Northern Alaska Landscape History Project in the remote reaches of the National Petroleum Reserve of Alaska.

PHOTO: COLE MOSZYNSKI
Unknown seed pods (possibly Tufted Saxifrage) backlit by the arctic sun, during a sea ice-based study in Resolute Passage, NU, Canada.

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 multi-disciplinary 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, began operations in 1991, and today comprises 21 member countries. The IASC member organizations are national science organizations covering all fields of arctic research.

IASC Council

Representatives of national scientific organizations from all IASC member countries form the IASC Council that meets once a year during the Arctic Science Summit Week (ASSW). The Council members ensure an input of 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 has the responsibility to:

- Develop policies and guidelines for cooperative arctic research;
- Establish Working Groups (WGs) that address and act on timely topics in arctic science;
- Recommend, in cooperation with the WGs, implementation plans for IASC programs and activities;
- Decide on the participation of national scientific organizations from the non-arctic countries; and
- Organize arctic science conferences.

IASC Executive Committee

The 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 and four Vice-Presidents, and the Executive Secretary.

The current IASC Executive Committee members are:

David Hik, President
Huigen Yang, Vice President
Jacqueline Grebmeier, Vice-President
Susan Barr, Vice-President
Naja Mikkelsen, Vice-President
Volker Rachold, IASC Executive Secretary

Elections

The IASC Council, during its April 2012 meeting, elected the Chinese Council Member Huigen Yang, replacing Byong-Kwon Park from Korea, as the new IASC Vice President and member of the IASC Executive Commitee.

Country	Organization	Representative
Canada	Canadian Polar Commission	David Hik, President
China	Chinese Arctic and Antarctic Administration	Huigen Yang, Vice-President
Czech Republic	Czech Centre for Polar Research	Josef Elster
Denmark/Greenland	The 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 (NCAOR)	Sivaramakrishnan Rajan
Italy	National Research Council of Italy	Carlo Barbante
Japan	Science Council of Japan	Tetsuo Ohata
The Netherlands	Netherlands Organisation for Scientific Research	Louwrens Hacquebord
Norway	The Research Council of Norway	Susan Barr, Vice-President
Poland	Polish Academy of Sciences, Committee on Polar Research	Jacek Jania
Russia	The Russian Academy of Sciences	Vladimir I. Pavlenko
Republic of Korea	Korea National Committee on Polar Research	Byong-Kwon Park, Vice-President
Spain	Comité Polar Español	Manuel Catalan
Sweden	The Swedish Research Council	Magnus Friberg
Switzerland	Swiss Committee on Polar Research	Martin Luethi
United Kingdom	Natural Environment Research Council	Cynan Ellis-Evans
USA	Polar Research Board	Jackie Grebmeier, Vice-President

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

PHOTO: The IASC Council Meeting at ASSW 2012 in Montréal, Canada.

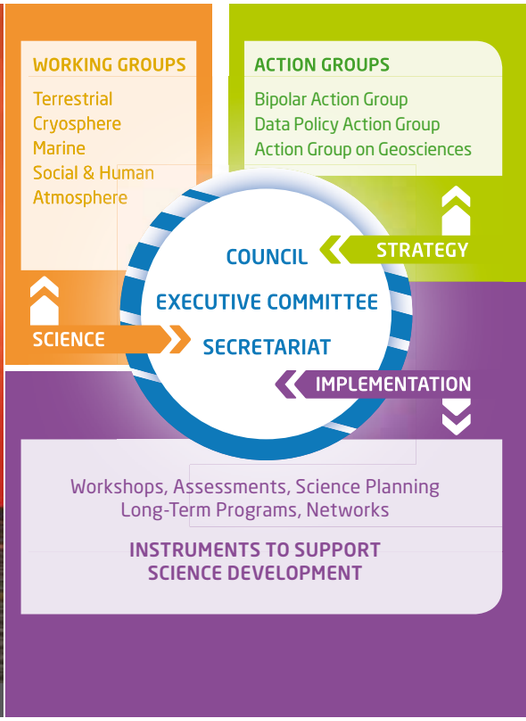

FIGURE: Diagram representing key elements of the IASC organizational structure.

IASC 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);
- Publication of the IASC Bulletin and IASC material as required;
- Maintaining the IASC website, preparing the IASC newsletter Progress, and in general facilitating outreach; and
- Administration of IASC finances.

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News from the IASC Secretariat:

Mare Pit, Executive Officer of the Secretariat in Potsdam, Germany, on maternity leave, has been replaced by Ursula Heidbach, who will be in charge of outreach and communication in the Secretariat. From Korea, Yoo Kyung Lee replaced Sara Bowden as the Executive Officer of the IASC Working Groups.

New IASC Member Country: India

India´s scientific endeavors in the Arctic

India began its scientific endeavors in the Arctic in 2007 when a team of five scientists visited the International Arctic Research Facilities at Ny-Ålesund to initiate studies in the fields of Arctic microbiology, atmospheric sciences and geology. Following the success of this initial step, the Ministry of Earth Sciences of the Government of India embarked on a long-term program of regular scientific activities in the Arctic in the frontier realms of polar biology, glaciology and earth and atmospheric sciences. To date, 117 scientists from 18 national institutions, organizations and universities have participated in the Indian Arctic Program, which is being coordinated and implemented by the National Centre for Antarctic and Ocean Research (NCAOR), the Goa-based R&D Wing of the Ministry.

The focus areas of research by the Indian scientists at Ny-Ålesund are confined to some of the frontier areas of polar sciences of special relevance to the Arctic realm, such as glaciology, atmospheric science, biology and climate change.

To facilitate the Indian activities, NCAOR has leased a station building at Ny-Ålesund to serve as India's Research Base in the Arctic. This station building christened "Himadri" was inaugurated by Mr. Kapil Sibal, then Minister of Earth Sciences, on the 1 July 2008 in the distinguished presence of H. E. Ms. Tora Aasland, Minister of Research and Higher Education (Norway), Anette Schavan, Minister of Science (Germany) and several scientists and policy makers from Norway and elsewhere involved in the Ny-Ålesund activities. The

PHOTO:
India´s station building at Ny-Ålesund.

station has adequate living and workspace for a total of 8 scientists.

On the above occasion, a Memorandum of Understanding was also signed between NCAOR and the Norwegian Polar Institute (NPI) for scientific co-operation and collaborative research in the following fields:

- Geological mapping and allied earth science studies
- Long-term monitoring of the Kongsfjorden system of Ny-Ålesund
- Biogeochemistry of sea-ice ecosystems
- Atmospheric physics and chemistry
- Glaciological studies
- Paleoclimatology

A comprehensive long-term science plan of research activities by Indian scientists in the Arctic has been developed by the Centre. The science plan was unveiled and presented by NCAOR at the 29th Meeting of the Ny-Ålesund Science Managers Committee (NySMAC) in 2008. India is also an associate partner in the Svalbard Integrated Arctic Earth Observing System (SIOS).

In the coming months, Indian scientists plan to install a suite of state-of-the-art instrumentation on Svalbard directed at monitoring the precipitation as well as understanding the role of aerosol and precursor gases in direct radiative forcing. In addition, a multi-sensor ocean-atmosphere mooring system is planned in the Kongsfjorden, as a part of India's contribution to the flagship program for Ny-Ålesund.

Written by

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New IASC Member Country: the Czech Republic

Present Czech Research and Education Activities in the Arctic

The recently published Arctic Climate Impact Assessment (ACIA) presents detailed information of the significant contemporary changes in regional variability and trends of the climate and ecosystems in the Arctic, with important coupling and feedback mechanisms to the global climate system. The present Czech multidisciplinary research program is exploring the diversity of both climates and ecosystems, across landscapes within the central Svalbard region by integrating existing and new intensive measurements of key biological and physical variables and processes at multiple circum-Arctic observational sites.

Since 2007, the Czech Republic has regularly participated in several programs which were prepared under the auspices of the International Polar Year (IPY 2007 – 2008). One of them, arctic climate and biological diversity, an interdisciplinary (biology and climatology) research project, was proposed as a part of the Network for ARCtic Climate and Biological DIVersity Studies (ARCDIV NET). The main aim of the project was to explore the diversity of both climate and ecosystems among landscapes within the arctic region. The Czech research team (represented by three institutions – the University of South Bohemia in České Budějovice, the Institute of Botany, the Academy of Sciences of the Czech Republic and the Masaryk University in Brno) participated in this research initiative. The Czech research team has established a small temporary research station in the central part of Svalbard (Isfjord, Billefjorden, Petuniabukta).

The following subjects were studied:

- Investigate biological variability – diversity - productivity parameters, as modified by abiotic parameters, at the same habitat sites;
- Investigate climate variability, as modified by physical processes in the atmo- pedo- hydro-cryosphere, at several different scales;
- Connect the physical - biological variability within landscapes to both regional and hemispheric climate circulation, with the help of mathematical models.

In 2008, the Czech Republic established the Czech Centre for Polar Research. On the basis of this action, arctic and antarctic research initiatives were introduced into the research infrastructure of the Czech Republic. On the basis of these activities, a new research project is being supported by the Czech Government: „CzechPolar – Construction and Operational Expenses". The aim of the proposed project is the construction and operation of a Czech arctic research station in Svalbard (University of South Bohemia in České Budějovice - http://polar.prf.jcu.cz).

The University of South Bohemia, Faculty of Science, has established the department "Centre for Polar Ecology". The Centre is responsible for the operation and educational activities in arctic ecology. At present, Centre workers, with the help of University leaders, are negotiating with Norwegian representatives concerning the location and technical solution of the research station.

Since 2011, the Centre for Polar Ecology, Faculty of Science, University of South Bohemia, under the auspice of the project "Development of pedagogical conditions and teacher teams focused on performance of university course in polar ecology and life in extreme environments" has organized a Polar Ecology course, in which each year 26 Czech graduate students participate. The field part of the course is held in the above mentioned temporary research station. The Polar Ecology course is bringing information about the ecological functioning and biodiversity of both polar regions. A week of lectures covers the following topics: climatology, glaciology, geology, geomorphology, hydrology, limnology, microbiology, phycology, botany, plant physiology, zoology and parasitology.

The Czech research and university education activities are connected with the Svalbard Integrated Arctic

PHOTO:
The Czech research team on Svalbard.

Earth System (SIOS) and the International Network for Terrestrial Research and Monitoring in the Arctic (INTERACT) programs. The Czech Republic is an associate partner in both programs with plans to be a member of these international research activities. In 2012, the Czech Republic, through the University of South Bohemia in České Budějovice, became a member of the International Arctic Science Committee. Czech researchers and students are prepared to participate in various international research projects across the Arctic. The introduced research and educational projects are preparing conditions for long-term ecological research in the Arctic and simultaneously for accreditation of polar ecology courses into the university education in the Czech Republic.

Written by

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IASC´s 25th Anniversary

including the 3rd International Conference on Arctic Research Planning (ICARP III) to be held as part of the Arctic Science Summit Week (ASSW) 2015

Over the past two decades, IASC has been organizing forward-looking conferences focused on international and interdisciplinary perspectives for advancing Arctic research cooperation and applications of Arctic knowledge.

In 2015, it will have been 10 years since the 2nd International Conference on Arctic Research Planning (ICARP II in 2005) and 20 years since the first ICARP in 1995. ICARP II was an important part of the lead-up towards the International Polar Year 2007-2008, which now is concluded. ICARP III will provide a timely opportunity to further the development of cross-cutting, inter-disciplinary and trans-disciplinary initiatives, and engage IASC's partners in future collaborative activities building on past experiences. It will present a framework to identify Arctic science priorities for the next decade, to coordinate Arctic research agendas, and to inform policy makers, people who live in or near the Arctic and the global community who have growing concerns about the changing Arctic environment and its impact on the planet. ICARP III is a specific area of cooperation in the agreement between IASC and the International Arctic Social Science Association (IASSA) and University of the Arctic (UArctic), and the initial planning for ICARP III has also considered the development of other initiatives such as the International Polar Initiative (IPI). The preliminary plans for ICARP III will be presented at the ASSW 2013 to seek research community input and to secure further membership for the ICARP III Steering Committee from IASC partner organizations.

Also, IASC will celebrate its 25th anniversary in 2015. The IASC Council agreed that the anniversary celebration should by held in conjunction with ICARP III during the ASSW 2015 in Japan. The anniversary presents the opportunity to review IASC contributions and recognize those who have been instrumental in its founding, development and growth. A publication on the History of IASC, including a special issue of the IASC Bulletin and supporting documents, such as historical documents and photos and short interviews of key people involved in the development of IASC, will be presented. An editorial team, led by IASC´s former Executive Secretary Odd Rogne and including Louwrens Hacquebord, Robert Corell and Volker Rachold, has been formed.

The IASC planning period (1986-1990) was an icebreaker for circum-arctic cooperation. These innovative discussions were closely watched by governmental officials both in northern countries and other countries having a serious interest in the Arctic. Wording in the IASC planning papers found its way into President Gorbachev's Murmansk speech (1987), a speech that changed the Soviet Arctic policy fundamentally. Months later, the same contents are found in the communiqué from the Gorbachev-Reagan Summit Meeting (Reykjavik, June 1987). The IASC planning process served as a stimulus for initiating circum-arctic thinking in other Arctic organizations, and especially for circum-arctic governmental collaboration.

This history will also cover how an international organization was formed and developed based on some simple 'Founding Articles', how IASC changed over time, and some of its initiatives and achievements.

PHOTO: JOSEF ELSTER
Polar Ecology Course (Svalbard): microbiology.

PHOTO: JOSEF ELSTER
Polar Ecology course (Svalbard): field work with Czech graduate students

PHOTO: ANDREA SPOLAOR
Stunning skies in a Svalbard Moraine between NY-Alesund and the glaciers of Kongsvegen and Holtedhal-Fonna.

2. IASC Working Groups

» 2 IASC Working Groups

The core elements of IASC are its Working Groups (WGs). IASC WGs identify and formulate science plans, research priorities, encourage science-led programs, promote future generations of arctic scientists and act as scientific advisory boards to the Council. In 2010 the IASC Council established five WGs: Terrestrial, Marine, Atmosphere, Social and Human Sciences and Cryosphere.

The first combined IASC WGs Workshop was held in Potsdam, Germany in January 2011 and brought together all the members of the five WGs. During three intense days of discussion each of the WGs selected a Chair and members for their respective Steering Group, summarized the state of research in their field, discussed gaps in research, and identified priority areas for short and longer-term attention. They also worked together to identify emerging crosscutting issues, which span the interests of several WGs.

In the following paragraphs the IASC WGs present an overview of their foci, their 2012 activities and plans for the upcoming year.

PHOTO: JACOB SIEVERS
Instruments to monitor Atmospheric CO_2 exchange are being set up on the sea-ice during a sea-ice campaign in North East Greenland (Daneborg). The experiment was conducted by the Greenland Climate Research Centre and the University of Manitoba. The overall goal was to investigate CO_2 and energy exchange in an active Polynia.

Atmosphere Working Group

Steering Group

Jim Overland, Chair, USA
Michael Tjernström, Vice Chair, Sweden
Hiroshi Tanaka, Vice Chair, Japan

Working Group Members

Suresh Babu, India
Angel Frutos Baraja, Spain
Halldor Bjornsson, Iceland
John Cassano, USA
Klaus Dethloff, Germany
Guenther Heinemann, Germany
Claude Labine, Canada
Kamil Laska, Czech Republic
Kathy Law, France
Bian Lingen, China
Lasse Makkonen, Finland
Nuncio Murukesh, India
Tadeusz Niedźwiedź, Poland
Gudrun Nina Petersen, Iceland
Rajmund Przybylak, Poland
Kaoru Sato, Japan
Anna Sjöblom, Norway
Henrik Skov, Denmark
Kjetil Tørseth, Norway
Timo Vihma, Finland
Vito Vitale, Italy
Young Jun Yoon, Korea
Seong-Joong Kim, Korea

Scope

The geographic scope of the Atmosphere Working Group (AWG) is the Arctic but also includes the Arctic´s responses to global change processes (Arctic amplification) and impacts of Arctic changes on the northern hemisphere atmospheric circulation.

The scientific scope of the Atmosphere Working Group includes any scientific research towards understanding and prediction of Arctic change, including the fate of perennial sea ice and the global atmospheric consequences of its disappearance. This includes past climate states, investigation of Arctic processes across data sets and approaches, and climate model projections of the future.

Scientific Priorities

During its inaugural meeting in Potsdam in January 2011, the AWG decided to focus its efforts upon two scientific priorities.

The first of these is for the AWG to engage fully with the World Climate Research Program (WCRP) to develop a program on Polar climate predictability. Polar climate predictability is an issue of growing concern particularly as it becomes clear that Arctic amplification has an impact on lower latitudes. IASC, together with WCRP, can play a leading role in bringing the international community together to address issues related to decadal and multi-decadal prediction.

The second scientific priority is to initiate the planning and design a long-term, international, observational ice camp observatory in order to provide much needed observations to support regional and global climate model simulations.

In addition, the AWG is providing support for historical data retrieval and reanalysis and organization of a session at the IPY Montreal Conference in collaboration with the Human and Social WG on public perception of Arctic change.

Activities

The AWG is working to develop a science plan for multi-year comprehensive measurements, extending from the ocean through the sea-ice and into the atmosphere, in the central Arctic Basin, to improve modeling of Arctic climate and weather conditions,

and for prediction of future Arctic sea-ice cover. Following up on a September 2011 workshop entitled **Drifting Observatory on the Arctic Sea and Regional and Global Climate Model Simulations (AIDA-RCM)** the AWG, with support from the Cryosphere Working Group (CWG) and MWG, sponsored a second workshop to further develop the underlying scientific justification for a long-term, internationally supported drifting sea ice observatory.

The workshop, entitled **Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAiC)** was held in Boulder, CO on June 27-29, 2012. Prior to the workshop a white paper to outline the objectives and timeline for such an observatory was developed. Participants agreed to begin the drafting of a science and implementation plan for an observatory, develop a website to support their efforts and hold a follow-up workshop in 2013.

Secondly, The AWG with support from WCRP, sponsored a workshop in April 2012 entitled **IASC/WCRP Polar Climate Predictability Workshop**. The following issues were identified as priority frontier questions to be addressed in any future initiative:

- Why are the climates at the two poles changing so differently to each other (with the Arctic changing rapidly, and the Antarctic unevenly), and to global climate?
- Why is the rate of Arctic change at the edge (or beyond) the distribution of model estimates, with observations on average exceeding the model rate of change? And why is the situation essentially the opposite in the Antarctic?
- Do the ongoing amplified changes in the Arctic have an influence on extremes in the Arctic?
- How predictable is Arctic climate?

A second workshop was held in Seattle in October on **Arctic Climate Predictability** co-sponsored by Arctic Monitoring and Assessment Program (AMAP) and a third workshop will be held in Tokyo, Japan just prior to the Third International Symposium on Arctic Research (ISAR 3).

The AWG, in close cooperation with the Human and Social WG, hosted a session at the IPY Montreal Science Conference on **Public Perception of Arctic Change**, specifically focusing on the question of "why is the public becoming more skeptical about climate change even as evidence to the contrary mounts?"

In addition, the AWG is supporting the development of an international Arctic historical data retrieval and reanalysis effort and has endorsed the activities of the International Arctic System for Observing the Arctic (IASOA) program.

http://www.iasc.info/index.php/home/groups/working-groups/atmosphere

PHOTO: ANDREW REED WELLER
Water is used to melt frozen mud and expose organic material during the Northern Alaska Landscape History Project in the remote reaches of the National Petroleum Reserve of Alaska.

Cryosphere Working Group

Steering Group

Martin Sharp, Chair, Canada
Tetsuo Ohata, Vice Chair, Japan (until Jan. 2013)
Pedro Elosegui, Vice Chair, Spain
Julian Dowdeswell, Vice Chair, UK

Working Group Members

Signe Bech Andersen, Denmark
Helgi Björnsson, Iceland
Sun Bo, China
Arun Chaturvedi, India
Georgia Destouni, Sweden
Hiroyuki Enomoto, Japan
Michel Fily, France
Rene Forsberg, Denmark
Jon Ove Hagen, Norway
Hans-Wolfgang Hubberten, Germany
Elizabeth Hunke, USA
Soon Do Hur, Korea
Jacek Jania, Poland
Jan Kavan, Czech Republic
Jack Kohler, Norway
Pentti Kujala, Finland
Peter Lemke, Germany
Matti Lepparanta, Finland
Martin Luethi, Switzerland
Walt Meier, USA
Krzysztof Migala, Poland
Francisco Navarro, Spain
Francesca Pellicciotti, Switzerland
Parmanand Sharma, India
Shin Sugiyama, Japan (as of Feb. 2013)
Carleen Tijm-Reijmer, The Netherlands
Thorsteinn Thorsteinsson, Iceland

Scope

The geographic scope of the Cryosphere Working Group (CWG) is those areas of the Arctic and contiguous areas of the sub-Arctic where one or more element of the cryosphere (including the Greenland ice sheet, mountain glaciers, ice caps, icebergs, sea ice, snow cover and snowfall, permafrost and seasonally frozen ground, and lake- or river-ice) plays an important role in surface-climate interactions and/or the fresh water budget. It includes the Arctic Ocean and surrounding seas, Alaska, Canada's northern Territories, Greenland, Iceland, Svalbard and the Russian Arctic archipelagos, and parts of Canada, Scandinavia, and northern Russia that lie polewards of the southern limit of discontinuous permafrost.

The scientific scope of the Cryosphere Working Group includes any scientific or engineering research relating to the Arctic and sub-Arctic cryosphere, including its interactions with the climate, oceans, and biosphere.

Scientific Priorities

During its inaugural meeting in Potsdam in January 2011, the CWG decided to focus its efforts upon three major scientific priorities.

- Sea-ice boundary layer dynamics, particularly as they relate to biogeochemical exchanges and polar amplification.
- Permafrost, including support of activities being undertaken by the International Permafrost Association.
- Tidewater glacier dynamics and response to climate change, with a focus on methods for studying these issues. This activity is intended to have a large early career scientist and training component.

Activities

The CWG sponsored a workshop entitled **Ice at the Interface: Atmosphere-Ice-Ocean Boundary Layer Processes and Their Role in Polar Change** in Boulder, Colorado on 25-27 June 2012, which was additionally funded as an IASC cross-cutting initiative.

The Ice Sheet Mass Balance and Sea Level (ISMASS) 2012 workshop was held in Portland, OR on 14 July 2012 focusing on the mass balance of ice-sheets and their contribution to sea level changes and was co-sponsored by IASC, Scientific Committee on Antarctic Research (SCAR) and various partner organizations.

http://www.climate-cryosphere.org/en/events/2012/ISMASS/Home.html.

In May 2012, the CWG supported the **Vulnerability of Permafrost Carbon Workshop.** (see TWG)

The CWG is a partner to the AWG-led **Multi-disciplinary drifting Observatory for the Study of the Arctic Climate (MOSAiC)** activity. MOSAiC held a workshop for organizing and defining the scientific needs and to begin producing science and implementation plans in Boulder, Colorado on 27-29 June 2012.

A major accomplishment of 2012 for the CWG was the successful implementation of a **Workshop on Studies of Tidewater Glaciers** held aboard the Polish R/V Horyzont II from August 26-31, 2012. Understanding of glacier calving processes are important for glacier mass balance estimates and thus for global sea level rise and for deglacierization of large areas in the Arctic. Proper use of remote sensing data and modeling of tidewater glaciers need in situ validation and continuous monitoring of tidewater glaciers. The purpose of the workshop was to train early career scientists in field and remote sensing studies of tidewater glaciers. The workshop met its three major goals: (a) to present recent results from studies of Svalbard (and other) tidewater glaciers during scientific sessions; (b) to share experience, application of new techniques and obtained results directly in the field by visiting key tidewater glaciers in Spitsbergen; and (c) to discuss a potential international program of coordinated field and remote sensing observations of calving glaciers in the Arctic.

In November, the CWG again partnered with the International Permafrost Association (IPA) in support of the Global Terrestrial Network on Permafrost (GTN-P). IPA hosted a meeting in Hamburg, Germany which was a follow-up to the joint IASC-SCAR-IPA GTN-P workshop held in November 2011 in Potsdam, Germany. The meeting served as a kick-off for the newly assigned Executive Committee of GTN-P to initiate the next important steps to establish a completely functional governing and working body of GTN-P. Additionally the workshop aimed to: 1) develop a clear timeline of GTN-P activities and deliverables for the next two years; 2) reach a final decision on the GTN-P data structure as well as metadata format, to guarantee quick and consistent proceeding in data management work; and 3) plan and organize a bigger workshop in spring 2013 in which the CWG and TWG will be highly involved.

http://www.iasc.info/index.php/home/groups/working-groups/cryosphere

Marine Working Group

Steering Group

Bert Rudels, Chair, Finland
Rolf Gradinger, Vice Chair, USA
Jinping Zhao, Vice Chair, China
Savithri Narayanan, Past Chair, Canada

Working Group Members

Stefano Aliani, Italy
Leif Anderson, Sweden
Sheldon Bacon, UK
Miquel Canals, Spain
Hein de Baar, The Netherlands
Oleg Ditrich, Czech Republic
Francisco Gordillo, Spain
Steingrimur Jonsson, Iceland
Sung-Ho Kang, Korea
Heidi Kassens, Germany
Michael Klages, Germany
K.P. Krishnan, India
Gudrun Marteinsdottir, Iceland
Naja Mikkelsen, Denmark
Morten Hotegaard Nielsen, Denmark
Sergey Priamikov, Russia
Marit Reigstad, Norway
Harald Loeng, Norway
(as of Feb. 2013: Randi Ingvaldsen, Norway)
Koji Shimada, Japan
Kari Strand, Finland
Mary Louise Timmermans, USA
Jan Marcin Weslawski, Poland
Jeremy Wilkinson, UK
Hajime Yamaguchi, Japan

Scope

The geographic scope of the Marine Working Group (MWG) is the Arctic Ocean and the Subarctic Seas. The scientific scope of the Marine Working Group includes, but is not limited to any marine natural science or engineering research.

PHOTO: JAKOB SIEVERS
Sea-ice campaign in North East Greenland (Daneborg): A pool has been cut in the ice to investigate polynia-effects, such as frost-flowers, in detail.

Scientific Priorities

The Arctic Ocean Sciences Board (AOSB) / MWG of IASC has been active for the past 25 years. Therefore, their priorities and activities are ongoing and well-established. However, the membership expanded considerably when AOSB merged with IASC in 2009 and the meeting in Potsdam in January 2011 offered the first opportunity for the new and expanded membership to meet. Since their terms of reference were already agreed upon, the group focused first and foremost on discussion and approval of its five-year strategy (priority areas of research), secondly on its ongoing activities, and lastly on development of cross-cutting initiatives that could be undertaken with other IASC WGs.

The Scientific focus of the MWG is on predicting and understanding rapid changes to the Arctic Ocean system and the priorities include:

» Understanding the circulation and physical processes in the Arctic and sub-arctic seas

» Understanding sea ice structure dynamics and the Arctic system

» Understanding biological and ecosystem processes in the Arctic and Sub-arctic seas

» Understanding geochemical processes in the Arctic and Sub-arctic seas

» Improving access to the geological record of the Arctic Ocean

Activities

The MWG was active in 2012 implementing existing activities and initiating new ones.

The most important activity for the MWG in 2012 was the further development of the **Arctic in Rapid Transitions (ART) program**. During 2012, the ART Steering Group (SG) held two workshops to develop a science proposal and also hosted its first science conference in Sopot, Poland. The first workshop was held **in Bremerhaven, Germany on 29 February to 1 March** at the Alfred Wegener Institute for Polar and Marine Research (AWI). The main objective of the meeting was to design a focused collaboration for a full expedition proposal for the German RV "Polarstern" in 2015 dedicated to "Transitions in the Seasonal Sea Ice Zone (TRANSSIZ)" in the European Arctic Ocean within the framework of ART. The draft proposal suggested three legs focusing on ecological and biogeochemical studies on seasonal transitions (winter-spring, fall-winter) in the Eurasian Arctic Ocean. The main objectives were to complement summer data sets and advance biological/biogeochemical process studies and modeling, calibrate algorithms used in remote sensing and proxies used to interpret sea ice and ocean circulation changes in the geologic past. The North-American members of the ART Executive Committee planned a complementary US-led expedition in the North-American Arctic (Beaufort, Chukchi and towards the deep Canada Basin).

The second ART meeting was held in **Copenhagen, Denmark** and brought together the ART Executive Committee to finalize the TRANSSIZ proposal. This meeting was co-sponsored by the Geological Survey of Denmark and Greenland (GEUS), Denmark, University of Tromsø, Norway, AWI (Germany).

The final ART activity for 2012 was the very successful **4-day science workshop** co-sponsored by the MWG, IASC and Association of Polar Early Career Scientists (APECS). The workshop addressed the challenge of integrating modeling and observations in order to identify linkages and feedbacks between atmosphere-ice-ocean forcings and biogeochemical processes that are key to ecosystem function, land-ocean interactions and to the productive capacity of the Arctic Ocean.

The MWG supported the creation of the **Arctic System Climate Network (ACSNet)** which grew out of the integrated Arctic Ocean Observing System (iAOOS) project of AOSB/MWG. The ACSNet, established in June 2011, aims through the coordination and networking of existing or emerging fieldwork to implement an intensive cross-disciplinary study of the role of the polar seas in climate. In particular special reference is made to the Western Arctic as a site of demonstrable global importance and to the research questions identified as of key importance by the 2011 iAOOS plan of the MWG. The essential aim of ACSNet is to devise a common space-time framework for individual research projects arguing for the combining of disparate efforts to form an intensive, international and multidisciplinary research effort initially with its focus on the Greater Canada Basin and its marginal ice zone, later on a pan-Arctic scale. The introductory meeting of ACSNet was held during the International Polar Year (IPY) 2012 Conference in Montréal, Quebec on 23 April 2012. The meeting was attended by Arctic researchers and program managers with interest in the ACSNet goal of fostering interdisciplinary and international collaborations in field research in the Western Arctic in the coming years. A broad overview was given of the potential participating field programs, and an activity timeline for ACSNet was discussed. Approximately 20 field programs spanning a range of observational efforts to understand the Arctic atmosphere, ice, ocean system were presented and discussed. The broad time line for ACSNet activities includes a main field effort in 2014 - 2015 and a synthesis effort in 2015 - 2016.

In 2011, ICES and IASC signed a Letter of Agreement to cooperate. **In November 2012, International Council for the Exploration of the Sea (ICES) held its annual Science Conference on September 17-21 in Bergen, Norway** and MWG was invited to co-host two of the sessions, both dealing with the Arctic. The first session, co-chaired by Dr. Loeng and Dr. Bogi Hansen,

PHOTO: IÑIGO GARCIA ZARANDONA
Frozen harbor in Longyearbyen in late April, Spitsbergen (Svalbard).

focused on the Arctic and North Atlantic from a climate change perspective. The second session, co-chaired by ICES/ The North Pacific Marine Science Organization (PICES)/ Ecosystem Studies of Sub-Arctic Seas (ESSAS) and MWG examined the influence of subarctic inflows on the physical conditions and biology in the Arctic basin and shelves, as well as the role of fluxes of water from the Arctic basin onto the surrounding shallow shelves and into the subarctic.

The MWG continues its participation in the **Pacific Arctic Group (PAG)-led Distributed Biological Observatory (DBO). Plans are underway to host a workshop in Seattle in February** to discuss and explore international data-sharing issues. The DBO now has three years of field data which can make a valuable contribution to a better understanding of how ecosystems are changing in the study areas.

Two new activities were planned. The MWG, recognizing the need to better coordinate international data efforts formed a small sub-group to investigate how the MWG might add to the **international dialogue on data access and accessibility issues**. The sub-group planned to meet first by teleconference to define its objectives and goals and met again prior to the Arctic Science Summit Week (ASSW) 2013.

A second activity relates to gas hydrates. This initiative starts with a **Gas Hydrates workshop in the first week of March 2013**. The workshop focusses on the occurrence and stability of gas hydrates in the marine Arctic realm – particularly seen in the perspective of a global warming scenario. The workshop gathers specialists and research groups for a three-day workshop and the overall goal of the workshop is to formulate a draft of a Pan Arctic gas hydrate drilling proposal.

http://www.iasc.info/index.php/home/groups/working-groups/marineaosb

Social and Human Sciences Working Group

Steering Group

Peter Schweitzer, Chair, USA
Sylvie Blangy, Vice Chair, France
Gail Fondahl, Vice Chair, Canada
Louwrens Hacquebord, Past Chair, The Netherlands

Working Group Members

Michael Bravo, UK
Ludek Broz, Czech Republic
Ryszard Czarny, Poland
Lone Dirckinck-Holmfeld, Denmark
Philippe Geslin, Switzerland
Sven Haakanson, USA
Joachim Habeck, Germany
Alf Hakon Hoel, Norway
(as of Feb. 2013: Halvor Dannevig, Norway)
Gunhild Hoogensen Gjørv, Norway
Dongmin Jin, Korea
Joan Nymand Larsen, Iceland
D. Majumdar, India
Gisli Palsson, Iceland
Arja Rautio, Finland
Peter Skold, Sweden
Hiroki Takakura, Japan
Long Wie, China

Scope

The scientific scope of the Social und Human Sciences Working Group (SHWG) includes all aspects of social sciences and humanities research in the Arctic, as well as their connections with other IASC WGs. The actual work of the SHWG is determined by a dynamic list of scientific focus areas.

The geographic scope of the SHWG is the Arctic as defined in the map accompanying the Arctic Human Development Report (AHDR). The geographic scope can be extended south where it is appropriate for an understanding of arctic social and human processes.

Scientific Priorities

The SHWG members agreed upon the following list of scientific foci. It is to be expected that this list will be reviewed at least at every second WG meeting. If needed, priorities can be adjusted between meetings if a majority of WG members approve the change.

- Indigenous peoples and change: adaptation and cultural and power dynamics
- Exploitation of natural resources: past, present, future
- Histories and methodologies of arctic sciences and arts
- Perceptions and representations of the Arctic
- Human health and well-being
- Security, international law and cooperation

Crosscutting themes

Based on the scientific foci, the following list of cross-cutting issues was adopted. The list is based on WG needs as well as on opportunities provided by the focus areas of other working groups. The list of cross-cutting issues is as dynamic as the list of scientific foci; its development and refinement will depend on actual cross-working group interactions.

- Human health, wellbeing and ecosystem change
- Collaborative community research on climate change
- Competing forms of resource use in a changing environment
- People and coastal processes
- Perceptions and representations of arctic science

PHOTO: RANE WILLERSLEV
The Chukchi Festival in Achaivayam, Kamchatka

Activities

At its annual meeting at the ASSW 2012, the SHWG discussed joint initiatives and interactions with representatives of the Arctic Council Sustainable Development Working Group (SDWG), the International Arctic Social Sciences Association (IASSA) and the International Network for Circumpolar Health Research (INCHR).

The SHWG contributed to the workshop on **"Responding to Arctic Environmental Change"** which was organized by the International Study of Arctic Change (ISAC) on 30 January - 1 February in Kingston (Canada). The workshop was held in the run-up to the IPY 2012 Montreal Conference "From Knowledge to Action" and focused on translating scientific knowledge into a research agenda for action.

At the IPY 2012 Montreal Conference, the SHWG organized and supported a session on **"Public Perception of Arctic Change"** jointly with the Atmosphere WG. The session was chaired by Peter Schweitzer and Jim Overland. Polar science faces a strange conundrum: while recent years (and the fourth IPY in particular) have brought massive advances in understanding the polar systems, popular understanding of these processes seems to be diminishing. In light of tremendous changes threatening the state of the system in the Arctic and elsewhere, misperceptions and representations of polar climate science become a matter of concern for society at large. Given the critical role media and politics play in that field, representatives from these arenas were part of the session as well as academics. The latter groups included climate scientists, historians of science, as well as social scientists trying to understand the current situation.

The SHWG reconfirmed its commitment to support the **"Arctic Human Development Report (AHDR II)"** and earmarked funds for WG members to participate in AHDR author meetings. An update of the ongoing work, including IASC and IASSA reports, was presented at the meeting of the Arctic Council SDWG in Reykjavik (Island) on September 17-19, 2012.

A community-based workshop focused on local ecosystem changes and adaptations is in preparation. The SHWG will collaborate with the community and local industry in planning and conducting this workshop.

The SHWG also supported a **"CircumArctic Rangifer Monitoring and Assessment (CARMA)" workshop** on the global status of migratory tundra Rangifer held in Vancouver (Canada) on 4-6 December 2012. The CARMA workshop is one of IASC´s cross-cutting activities.

A major 2012 activity of the SHWG was the workshop **"Between Discourses and Modernities: Histories and Methodologies of Arctic Social Sciences, Humanities and Arts"** which was held in Umeå (Sweden) on 13-14 December 2012. This workshop was in conjunction with the opening of an Arctic Research Centre at Umeå University. The objective of this workshop was to highlight one of the prioritized research items of the SHWG and to identify the challenges and problems of the research field outside natural sciences and technology. With a self-reflexive approach, the intent was to address questions that are needed for an improved understanding of the position and direction of this research. Furthermore, informal discussions were intended to build a firmer foundation for future interdisciplinary, community-based collaboration, and international research collaborations.

http://www.iasc.info/index.php/home/groups/working-groups/socialahuman

Terrestrial Working Group

Steering Group

Terry Callaghan, Chair, Sweden
Benjamin Viñegla Pérez, Vice Chair, Spain
Warwick F. Vincent, Vice Chair, Canada
Torben Christensen, Vice Chair, Denmark

Working Group Members

Inger Greve Alsos, Norway
Thierry Boulinier, France
Stephen Coulson, Norway
Josef Elster, Czech Republic
Mads Forchhammer, Denmark
Piotr Glowacki, Poland
Antero Järvinen, Finland
Ingibjorg Jonsdottir, Iceland
Ratan Kar, India
Yoo Kyung Lee, Korea
Vanessa Lougheed, USA
Daniel Sanchez Mata, Spain
Takayuki Nakatsubo, Japan
Jon Olafsson, Iceland
Eva-Maria Pfeiffer, Germany
Karsten Piepjohn, Germany
Jelte Rozema, The Netherlands
Atsuko Sugimoto, Japan
Manish Tiwari, India
Donald A. Walker, USA
Luo Wei, China
Philip Wookey, UK
Wiesław Ziaja, Poland

Scope

The scientific scope of the Terrestrial Working Group (TWG) includes any scientific research on arctic terrestrial and freshwater environments, landscapes and biota, and their responses to, and interactions with, other components of the Earth system. The remit encompasses the dynamics of the arctic system; past, present and future.

Geographically, the main area of interest of the IASC TWG encompasses lands and fresh water within the area north of the latitudinal treeline with arctic climate and arctic vegetation. Several adjacent areas are included where highly relevant for certain disciplines and projects (a) boreal oceanic tundra (e.g. the Aleutian Islands, North Atlantic islands), (b) alpine tundra that is continuous with the arctic tundra (e.g. the central highlands of Iceland, the Scandes Mountains, the Polar Urals), (c) the forest tundra, and (d) drainage basins to the south that connect with freshwater and marine areas of the Arctic.

Scientific Priorities

- Estimating past changes in arctic geo- and biodiversity, measuring current change and predicting future changes
- Determining the net effect of the terrestrial and freshwater environmental and biosphere's processes that amplify or moderate climate warming
- Developing high spatial resolution models of terrestrial geosystems and ecosystem change, and other tools that can be used by arctic stakeholders for adaptation strategies and sustainable management of natural resources and ecosystem services
- Developing unifying concepts, fundamental theories and computer models of the interactions among species, interactions between species and their environment, and the biology of life in extreme environments
- Determining the role of connectivity in the functioning of arctic terrestrial systems, including connections within the arctic and the global system

Crosscutting

Understanding the major issues within the wide disciplinary and geographical scope of the TWG requires interaction with other WGs. The initial priority activities developed by the TWG would benefit form interactions with all the WGs.

Activities

Jointly with the Cryosphere WG, the TWG supported the lead/co-lead meeting of the **"Vulnerability of Permafrost Carbon Research Coordination Network (RCN)"** which took place in St. Pete Beach, Florida (USA) on May 17-18, 2012 (www.biology.ufl.edu/permafrostcarbon/).

The purpose of the meeting of the leadership was to review initial drafts of synthesis products and to identify remaining gaps for future cross-group synthesis opportunities. Short presentations by working group leads/co-leads on current progress were followed by feedback and discussion with the whole group. Remaining gaps were identified and a plan was developed to communicate these to the broader science community, both within and outside of the network, in order to inform members and to get new scientists involved in synthesis activities. Following this workshop, leads/co-leads updated working group scoping documents and initiated new synthesis activities/opportunities by engaging additional RCN members. These new opportunities were key aspects at the annual RCN meeting at AGU in December 2, 2012.

The TWG also supported a **"CircumArctic Rangifer Monitoring and Assessment (CARMA)"** workshop on the global status of migratory tundra Rangifer held in Vancouver (Canada) on 4-6 December, 2012. The CARMA workshop was one of IASC's cross-cutting activities.

Following its meeting in Montreal, the TWG agreed to organize and support the following three workshops which were held early 2013:

Global Change, Arctic Hydrology and Earth System Processes Workshop during October/November 2013 in Sheffield (UK):

The workshop will address the role of changing hydrology and active layer moisture regimes for ecosystems, biogeochemical and biophysical processes in the arctic terrestrial realm (including surface waters), which so far has been overlooked relative to the much clearer emphasis on climate warming as a key driver of change.

This scoping exercise will bring together a small group of experts in a two-stage workshop to review the current state of knowledge on arctic hydrological change, to identify research gaps, and to horizon-scan based on best available predictions of change in the arctic terrestrial realm.

Shaping Forces of Biodiversity in the Arctic Workshop during January 2013 in Reykjavik (Iceland):

The aim of the initiative is to explore the feasibility of designing a coherent framework for addressing the shaping forces of biodiversity in the Arctic. Such a framework would contribute to an Arctic biodiversity coalition by building on existing Arctic biodiversity documentation and monitoring initiatives. The first step of the initiative is to bring together a few people, representing a broad organismal and theoretical expertise, to draft the framework. On the basis of the outcome, the group suggests the next steps in designing a final framework.

International Arctic Vegetation Database Workshop during April 2013 in Krakow (Poland):

This workshop brings a few key members of the international community of Arctic vegetation scientists together for the First International Arctic Vegetation Database Workshop.

http://www.iasc.info/index.php/home/groups/working-groups/terrestrial

PHOTO: GIA DESTOUNI
Kangerlussuaq, Greenland: The Greenland Analogue Surface System Project (GRASP) research group in action, sampling water from the active layer in the foreground.

PHOTO: ANDREW REED WELLER
Northern Alaska Landscape History Project: camp on the Utokok river during a fieldtrip into the remote reaches of the National Petroleum Reserve of Alaska.

Cross-Cutting Initiatives

IASC Council, at its meeting at the Arctic Science Summit 2011, decided to allocate funds for cross-cutting activities, that are supported by at least three of the five IASC Working Groups. The objective of this WG-spanning program is to promote system-scale activities within IASC and to encourage the WGs to explore activities, which should be of interest to three or more of the WGs. Because the IASC WGs are set up along disciplinary lines, it is possible that their activities will be focused only on one or two disciplines. While this is to be expected, IASC wishes to promote cross-cutting themes and encourage interaction between the working groups.

Activities

Workshop on Ice at the Interface: „Atmosphere-Ice-Ocean Boundary Layer Processes and Their Role in Polar Change“

Boulder (USA), 25-27 June 2012

The atmosphere-ocean boundary layer in which sea ice resides includes many complex processes that require a more realistic treatment in Global Climate Models (GCMs), particularly as models move toward full earth system descriptions. The primary purpose of the workshop was to define and discuss such coupled processes from observational and modeling points of view, including insight from both the Arctic and Antarctic systems. The workshop met each of its overarching goals, including fostering collaboration among experimentalists, theorists and modelers, proposing modeling strategies, and ascertaining data availability and needs. Several scientific themes emerged from the workshop, such as the importance of episodic or extreme event, precipitation, stratification above and below the ice, and the marginal ice zone, whose seasonal Arctic migrations now traverse more territory than in the past. The workshop received additional support from the Cryosphere WG.

Joint ART-APECS Science Workshop “Overcoming challenges of observation to model integration in marine ecosystem response to sea ice transitions”,

Sopot (Poland), 23-26 October:

The 4-day science workshop was co-sponsored by the MWG, IASC and APECS. The workshop addressed the challenge of integrating modeling and observations in order to identify linkages and feedbacks between atmosphere-ice-ocean forcings and biogeochemical processes that are key to ecosystem function, land-ocean interactions and to the productive capacity of the Arctic Ocean. The workshop revolved around the “past-present-future“ axis of ART, meaning that key themes will include geographic integration and comparative assessments of driving forces in contrasting ecosystems, how to advance present day scenarios and projecting tools based on the knowledge of paleo-records, and the development of ecosystem indicators and models. The major outcome of the workshop is a suite of inter-disciplinary scientific papers lead by early- and mid- career scientists with the support of senior scientists. (see the detailed article under Chapter 8: CapacityBuilding)

CircumArctic Rangifer Monitoring and Assessment (CARMA) Workshop,

Vancouver (Canada), 4-6 December 2012:

The CARMA workshop on the global status of migratory tundra Rangifer included academics, aboriginal representatives, co-management group members, climate specialists and agency biologists and managers. The objectives of the meeting were 1) to better assess the mechanisms behind the recent declines in Rangifer, 2) to share management experiences over the last decade to deal with these declines and 3) based on these discussions, to recommend monitoring indicators and management actions that should be employed through future cycles of abundance of migratory tundra Rangifer.

The workshop is consistent with the scope and foci of IASC´s SHWG and TWG, which both provided additional support.

http://iasc.info/home/groups/working-groups/cross-cutting

PHOTO: AGATA WEYDMANN
On the way to Hornsund during a scooter trip from Longyearbyen to the Polish Polar Station in Hornsund (Spitsbergen).

PHOTO: DON PEROVICH
Crew members of the US. Coast Guard Icebreaker Healy are surveying ice condition on a floe in the Chukchi Sea.

3. IASC Action Groups

» 3 IASC Action Groups

IASC Action Groups (AGs) provide strategic advice to the Council and Working Groups (WGs) on both long-term activities and urgent needs. They are dynamic groups that act within a limited timeframe of two years.

The Second SCAR-IASC Bipolar Action Group (BipAG II)

The Scientific Committee on Antarctic Research (SCAR) and IASC are the major international scientific organizations with a focus on the Polar Regions. The Polar Regions are critical areas of the Earth, influencing ocean currents and regional weather patterns as well as hosting a unique biodiversity. Due to the effects of climate change, parts of these regions are now the focus of the most rapid environmental changes seen anywhere on the planet and contributing to global issues such as sea-level rise and greenhouse gas emissions. IASC and SCAR therefore have significant roles in organizing the vitally important science needed to understand what is happening in the Arctic and Antarctic and what it may mean for the rest of the world.

Both Polar Regions are cold and remote and share many common features (large ice sheets, extensive sea-ice in winter) but equally also show very many differences. Comparisons of the Polar Regions or research involving both the Arctic and Antarctica is termed bipolar science. This offers unique opportunities to better understand what is happening in these regions and how they impact on the rest of the world. This is particularly relevant in an Earth System Science context. The Executive Committees of SCAR and IASC created a SCAR-IASC Bipolar Action Group (BipAG) that operated for two years (2008-2010) followed by a second BipAG for 2011 to 2012. The existence of a BipAG ensures that there is a group looking at opportunities for bipolar science, with the purpose of providing annual reports to the SCAR and IASC Executive Committees and recommending which bipolar activities should be adopted by the organizations. The recommendations include not only science ideas but also opportunities for developing the next generation of polar scientists, suggestions for more effective science coordination and data management and ideas for better communicating the importance of the Polar Regions for Planet Earth. The BipAG reports are available at http://www.iasc.info/index.php/home/groups/action-groups.

http://iasc.info/home/groups/action-groups/bipolar-action-group

Membership	Country of Residence	Area of Expertise
Cynan Ellis-Evans - Chair	UK	Biology
Francisco Navarro	Spain	Ice sheets
Detlef Damaske	Germany	Geology
Sung-Ho Kang	Korea	Marine
Alexander Klepikov	Russia	Oceanography / Climate
Thamban Meloth	India	Ice cores
Gail A. Fondahl	Canada	Social Sciences
Mark Parsons	USA	Data
Angelika Renner	Norway	APECS
Jenny Baeseman	Norway	CliC Director
Volker Rachold (ex officio)	Germany	IASC Executive Secretary
Mike Sparrow (ex officio)	UK	SCAR Executive Director

PHOTO: CARLOS FURTADO
Brazilian veterinary Angela Pessanha is admiring a Southern Elephant Seal pup on Elephant Island at Antarctica.

PHOTO: 2nd Meeting of the SCAR/IASC Bipolar Action Group on Science Cooperation (BipAG II)
From left to right / top row: Jenny Baeseman, Mark Parsons, Francisco Navarro, Volker Rachold, Detlef Damaske, Cynan Ellis-Evans
bottom row: Mike Sparrow, Thamban Meloth, Sung-Ho Kang, Gail A. Fondahl, Angelika Renner

The Ice-Sheet Mass balance and sea level (ISMASS) 2012 Workshop

(A major activity initiated by BipAG II)

The ISMASS 2012 Workshop was held on 14 July 2012 in Portland, Oregon, USA, under the auspices of the XXXII SCAR and Open Science Conference. More than 60 participants from all five continents attended the workshop, which was co-sponsored/supported by SCAR, IASC, the World Climate Research Program (WCRP) Climate and Cryosphere (CliC) Project, the International Council of Scientific Unions (ICSU), the International Glaciological Society (IGS), the International Association of Cryospheric Sciences (IACS) and the Association of Polar Early Career Scientists (APECS). A substantial ICSU grant, complemented by contributions from the other sponsors, allowed funding the participation of many young researchers and eight invited lecturers. The latter were Erik Ivins (JPL, Caltech, USA), Ben Smith (Univ. Washington, USA), Pippa Whitehouse (Durham Univ., UK), Jay Zwally (NASA, USA), Catherine Ritz (LGGE, Grenoble, France), Slawek Tulaczyk (Univ. California Santa Cruz, USA), Catia Domingues (ACE CRC, AU) and Robert Nicholls (Univ. Southampton, UK).

The workshop was organized by the ISMASS Interim Steering Committee, formed of Francisco Navarro (appointed by IASC), Frank Pattyn (appointed by SCAR) and Edward Hanna (appointed by WCRP).

Among the main objectives of the workshop were:

1) the assessment of the current knowledge of the contribution of the Antarctic and Greenland Ice Sheets to global and regional sea-level rise (SLR), with a focus on quantifying the uncertainties, and on understanding and resolving the current discrepancies among the estimates from different observational and modeling methods;

2) the analysis of how model-based predictions of ice-sheet discharge contributions to sea-level changes can be improved, with an emphasis on identifying the main shortcomings of the currently available models and suggesting improvements for the next generation of ice-sheet models.

The workshop was organized as a series of invited lectures on the above topics and closely related ones, followed by three round-tables (Ice-sheet mass balance from remote sensing, and Glacial Isostatic Adjustment (GIA); Modeling of ice-sheet dynamics; Contributions from thermal expansion of oceans, and impacts of sea level rise (SLR)), and ended with an open discussion on organizational aspects of the ISMASS expert group.

A review paper and a report are being prepared that will include the main scientific outcomes of the workshop. A summary of the main outcomes, the invited lecture abstracts and videos of the entire sessions can be found at the workshop website:

http://www.climate-cryosphere.org/en/events/2012/ISMASS/Results.html

Among the outcomes, it became apparent that recent efforts and inter-comparison experiments have led to an improved convergence of the estimates of ice-sheet mass balance determined using the three satellite geodetic techniques of altimetry, interferometry, and gravimetry, though some discrepancies still remain. A consensus was reached that new post-glacial rebound (PGR) models tested and evaluated against geodetic GPS data, lead to significant downwards revision in PGR and Gravity Recovery and Climate Experiment (GRACE) gravimetric satellite estimates of mass loss. Furthermore, since the 2007 Intergovernmental Panel on Climate Change (IPCC) report, ice sheet models have been improved beyond the commonly used Shallow-Ice Approximation. An advance in the numerical schemes has been accompanied by improved model representation of the complex interactions of the ice-sheet with its bed, atmosphere and ocean. However, there is still much room for improvement, especially regarding linking together all the model components in a 3D prognostic fashion.

Among the organizational aspects, it was agreed that ISMASS should continue to focus on ice-sheets and, rather than including glaciers and ice caps in its focus of interest, strengthen the co-operation with the existing groups dealing with them (IACS, Global Land Ice Measurements from Space (GLIMS), …). Similarly, rather than creating focus groups under ISMASS, it was preferred to strengthen the co-operation with, and to serve as a liaison among, the many already existing groups/programs (Ice Sheet Mass Balance Inter-comparison Exercise (IMBIE), IACS, GLIMS, Forum for Research into Ice Shelf Processes (FRISP), Solid Earth Response and influence on Cryosphere Evolution / Polar Earth Observing Network (SERCE/POLENET), Antarctic Climate Change in the 21st Century (AntClim21), Past Antarctic Ice Sheet Dynamics (PAIS), ...). It was also agreed, after some debate, that it is not the role of ISMASS to generate updates of cryospheric contributions to SLR in between successive IPCC reports. Other subjects of discussion were the interest of extending the ISMASS expert group to the World Climate Research Program (WCRP), the need to redefine the terms of reference of ISMASS and the need to appoint a new Steering Committee and Chair, a process that is now underway.

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ISMASS Interim Steering Committee

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PHOTO: ANDREAS PETER AHLSTROM, Geological Survey of Denmark and Greenland (GEUS)
PROMICE station on the Greenland Ice Sheet near Scoresbysund, East Greenland

Action Group on Geosciences

Membership	Country of Residence	Area of Expertise
Carlo Barbante -Chair	Italy	Geogeochemisty, Paleoclimate
Benoit Beauchamp	Canada	Sedimentology
Bernie Coakley	USA	Marine Geology
Mikhail Grigoriev	Russia	Geocryology/Geomorphology/Permafrost
Naja Mikkelsen	Denmark	Marine Geology
Victoria Pease	Sweden	Tectonic Evolution
Karsten Piepjohn	Germany	Hardrock Geology
Volker Rachold - Secretary	Germany	Permafrost

The five Working Groups (WG) Terrestrial, Cryosphere, Marine, Atmosphere and Social & Human are IASC´s scientific core elements. The overall responsibilities of these WGs are to identify and formulate scientific content and foci, act as scientific advisory boards to the IASC Council and to assist IASC in the implementation of its science mission. The WGs are designed to cover the full breadth of Arctic research, but two years after their formation it became apparent that geological research is underrepresented in the current WG structure. To address this issue, IASC Council agreed to form an Action Group on Geosciences (AGG) with the terms of reference to provide strategic advice to the IASC Council and WGs on both long-term opportunities and priorities in the field of Geoscience research in a broader sense. Since geosciences embrace a wide variety of scientific disciplines, emphasis is given to the overarching aspects of research.

AGG will particularly address emerging research questions in the field of: (i) Arctic solid-earth geoscience, including Arctic tectonic evolution and the exploration of the ridge systems; (ii) sedimentary records and climatic and environmental history obtained from marine and lake sediments, ice cores and permafrost deposits (iii) geologic and geochemical processes especially related to the stability of permafrost and of gas hydrate deposits known to underlie the continental slopes of the Arctic Ocean Basin; (iv) seismic risk of the Arctic regions.

The AGG is chaired by Carlo Barbante (University of Venice, Italy) and reports to IASC Council on emerging fields in Arctic geosciences, in order to better address, coordinate and prioritize the research efforts at national and international level.

http://iasc.info/home/groups/action-groups/action-group-on-geosciences

Photo: IASC Action Group on Geosciences Meeting, Feb. 2013, Potsdam.
From left to right: Carlo Barbante, Karsten Piepjohn, Victoria Pease, Mikhail Grigoriev, Naja Mikkelsen, Volker Rachold

Data Policy Action Group

Membership	Country of Residence	Affiliation
Mark Parsons- Chair	USA	National Snow and Ice Data Center
Hironori Yabuki	Japan	Japan Agency for Marine-Earth Science and Technology
Arkady Tishkov	Russia	Institute of Geography, Russian Academy of Sciences
Peter Pulsifer	Canada	National Snow and Ice Data Center
Robert Huber	Germany	PANGAEA Data Publisher for Earth & Environmental Science
Volker Rachold	Germany	IASC

IASC has strongly supported the International Polar Year (IPY) Data Policy, with its emphasis on ensuring security, accessibility and free exchange of relevant data that both support current research and leave lasting legacy. The IPY policy provided initial guidance for achieving this objective, but post-IPY there is still a need to continue supporting, creating and sustaining Arctic data management resources.

Although IASC has been involved in several data management activities, for example Sustaining Arctic Observing Systems (SAON) and the Polar Information Commons (PIC), IASC has not yet considered a formal data policy. Such a policy would establish a commitment to best practice in relation to repository management and related aspects of Arctic data systems.

To reinforce IASC's commitment to robust data management and sharing activities, IASC Council decided to from a small advisory group of external experts and interested Council members that would develop and recommend a data policy, including steps toward implementation of the policy that would provide guidance for IASC supported activities.

The IASC Data Policy Group will be chaired by Mark Parsons (US National Snow and Ice Data Center), who previously served as a co-chair of the IPY Data Subcommittee.

http://iasc.info/home/groups/action-groups/data-policy-action-group

Photo: IASC Data Policy Group Meeting, Potsdam
From left to right: Peter Pulsifer, Mark Parsons, Volker Rachold, Arkady Tishkov and Robert Huber

PHOTO: CHRISTIAN LETTNER
A „hydrophobic" moss on Zackenberg mountain, Northeast Greenland.

4. IASC Networks

» 4 IASC Networks

IASC Networks are IASC-endorsed, thematic groups with a specific scientific mission enhanced by affiliation with IASC. IASC Networks are international, address specific scientific issues on a circum-arctic scale and strive to involve early career scientists. IASC Networks do not have an annual budget from IASC, but they are entitled to apply for IASC workshop and early career scientist funding. Networks may be created by IASC or may apply for affiliation with IASC. Once accepted as IASC networks, they carry the IASC logo.

Palaeo-Arctic Spatial and Temporal Gateways (PAST Gateways)

‚PAST Gateways' is a network research program which started in 2012. The scientific goal of the program 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 three major themes to the program: (1) Growth and decay of Arctic Ice Sheets; (2) Arctic sea-ice and ocean changes, and (3) Non-glaciated Arctic environments and permafrost. 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 lead by a Steering Committee of members from participating countries. PAST Gateways follows on from the previous network program of ‚PONAM' (Polar North Atlantic Margins), ‚QUEEN' (Quaternary Environment of the Eurasian North) and, most recently, ‚APEX' (Arctic Palaeoclimate and its Extremes). Each year it will bring together scientists in a multidisciplinary International Meeting to discuss recent research and improvements in the understanding of Arctic environmental change. The first meeting takes place in St. Petersburg, Russia, in spring 2013.

Some recent highlights related to research carried out by participants in the program include advances in understanding the history of Greenland Ice Sheet outlet glaciers from the Last Glacial Maximum to Holocene. In particular, in SE and West Greenland, onshore investigations from glacial geomorphology and cosmogenic nuclide surface exposure dating and offshore investigations using marine geology and geophysics have sought to untangle climatic versus non-climatic influences on the ongoing erratic behavior of the Greenland Ice Sheet. These include scientists from the USA (Universities of Buffalo and Colorado), Denmark (Denmark and Greenland Geological Survey) and the UK (Durham University; University of Cambridge). Recent discoveries include identifying the rapid response of Jakobshavn Isbræ to very brief (decades-long) cold-snaps that punctuated otherwise warming climate around 8000 and 9000 years ago; determining the maximum extent of Jakobshavn Isbræ and Uummannaq ice stream at the Last Glacial Maximum (LGM) and the timing and dynamics of their subsequent retreat; marine geological studies of the response of SE Greenland outlet glaciers to climate variability in the last century; geochemical and sedimentological studies of west Greenland trough mouth fans; and Late Holocene relative sea level history of SW and west Greenland using isolation basin and salt marsh stratigraphies.

During 2011-2012 there was a significant cooperation between Spanish, Italian and Norwegian researchers working on the glacial history of the Svalbard margin and western Barents Sea. The research involved exploitation of multibeam, high-resolution seismic data and sediment cores from two research cruises that took place on board the R.V. Hespérides in 2007 and R.V. OGS Explora in 2008 on the Storfjorden Trough and Trough Mouth Fan, off south Svalbard. Results provided a detailed Quaternary history of the area and highlighted spatial and temporal variability in ice stream dynamics of the Western Barents Sea. For 2013 there is a cruise planned with the R.V. Hespérides to complement further aspects of previous cruises in the same area as well as to understand gas emissions from subseafloor sediments into the ocean and atmosphere. The Institute of Marine Sciences of the Spanish National Research Council (CSIC) is also involved together with the Centre for Marine Environmental Sciences (MARUM, Germany), National Institute of Oceanography and Experimental Geophysics (OGS, Italy), University of Tromsø (Norway) and the Geological Survey of Denmark is organizing a cruise with the R/V Maria S. Merian to use the MeBo seafloor drill rig to obtain 80 m long sediment cores from the Western Barents Sea to understand the glaciation history of the area. Researchers from Sweden (Lund University) and Norway (Norwegian University of Life Sciences) have continued terrestrially based, glacial geological research and Optically-Stimulated Luminescence (OSL)/comosgenic nuclide surface exposure dating to reconstruct Svalbard glacial history.

PHOTO: JASON BRINER
Greenland Ice Sheet margin on Nuussuaq Peninsula, western Greenland

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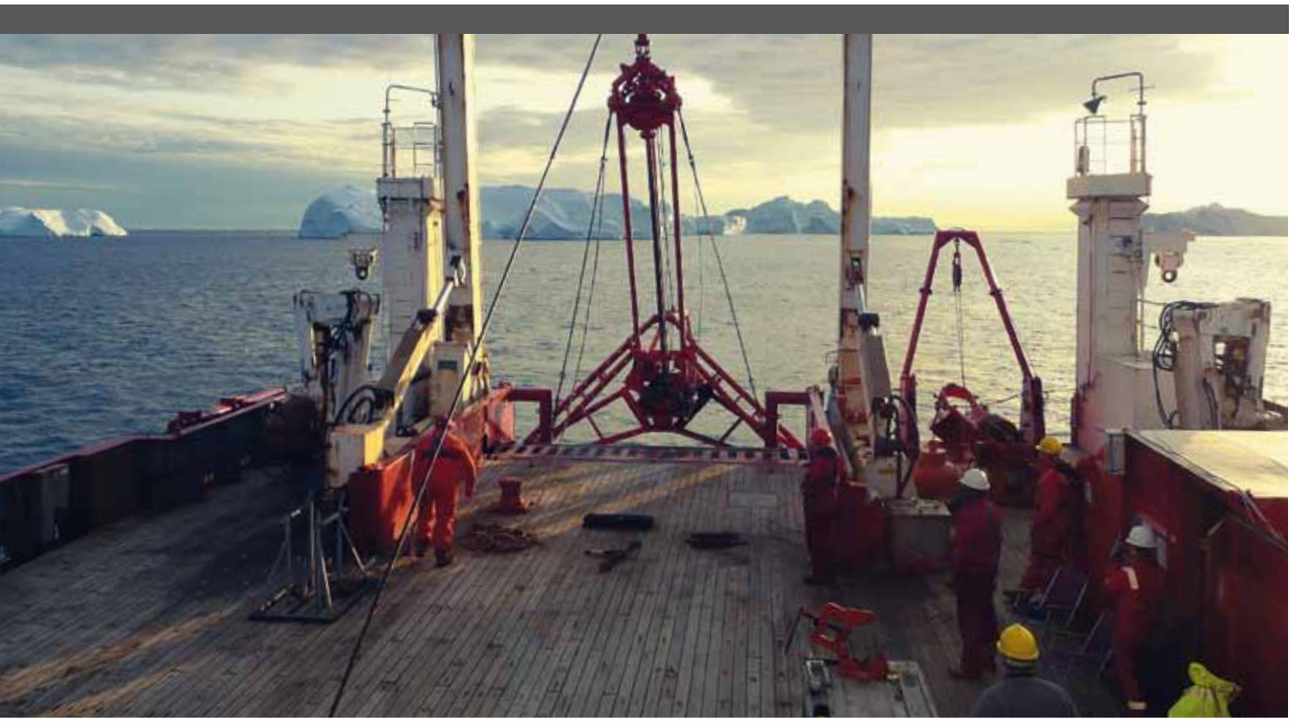

PHOTO: COLM O'COFAIGH
Coring seafloor sediments in Disko Bay, West Greenland during cruise JR175 of the RRS James Clark Ross.

Polar Archeology Network (PAN)

The Polar Archaeology Network (PAN) is an international group dedicated to issues impacting archaeology in the Arctic, Subarctic, and Subantarctic. Its main goals are 1) the protection of cultural heritage; 2) the promotion and support of research, particularly through the expansion of international networks and cooperation; 3) the meaningful integration of archaeology with communities; and 4) the dissemination of research results in both scholarly and popular forums.

This past year was a transitional period for PAN. The initial steering committee, in place since PAN's founding in 2008, finished their term and a new slate was elected in March of 2012. The initial steering committee leadership, consisting of Hans Peter Blankholm (Norway, chair), Maribeth Murray (USA, deputy chair), and Bjarne Grønnow (Denmark, secretary), was very successful in establishing a working structure, building membership, establishing working groups, and engaging in many other activities. Their tenure was capped off by a highly successful workshop in February of 2011 focused on the dominant issue in Polar archaeology today: climate change impacts on the archaeological record.

The first formal activity of 2012 was a joint presentation by the past and present executive at the International Polar Year Conference 2012 in Montreal. The paper, entitled "Ancient and Urgent: Climate Change Impacts on the Arctic Archaeological Record" was intended to emphasize the severity of potential destruction of archaeological sites in a forum that attracted policy makers and the media.

The new PAN steering committee has begun to map out activities for the next 2-3 years, including the following initiatives:

- **Early Career Researchers**. Though PAN already includes a number of early career researchers, we will seek to broaden their involvement and incorporate them in a more formal way into the executive and planning process.
- **Working Groups.** Currently, PAN has two working groups: "Global Climate Change and the Polar Archaeological Record" and "Operational Methodology Development Group: Predictive Modeling and Threat Assessment Matrices". However, we envision the activities of formal working groups as a primary means through which PAN goals are met. Thus, we will encourage the creation of new working groups, potentially relating to issues such as "Archaeological Education and Public Outreach", and "Meaningful Community Involvement in the Planning, Operation, and Interpretation of Polar Archaeology".
- **Maintaining the Pace of Research beyond the International Polar Year (IPY).** The IPY saw a spike in the volume of archaeological research, with an expansion of fieldwork and networking activities. However, this has been followed in many cases by a return to patchy and small-scale funding and more local levels of planning and interaction in Polar archaeology. We will work to identify strategies to ensure that Polar archaeology is maintained and strengthened, despite the difficulties inherent in fostering interaction within the relatively small and scattered group of existing Polar researchers.
- **Workshop on Climate Change Impacts.** Because of its centrality to PAN's mission, we will organize and seek funding for a follow-up to the successful 2011 workshop on climate change impacts on the Polar archaeological record.
- **Organizational Workshop.** The PAN constitution calls for a planning workshop to be held after its first years of existence, to evaluate the network and discuss PAN's future organization

and activities. This workshop may be held in conjunction with the climate change workshop mentioned above.

» **Promotion of PAN Objectives in the Broader Sphere.** Perhaps most broadly, PAN will continue to attempt to place heritage resources on the agenda at higher political and policy-making levels. Polar archaeologists understand that they live in a world of often competing priorities, including critical social, environmental, and infrastructure needs. However, we seek to insert heritage resources into relevant conversations, given their irreplaceable nature and the documented destruction of the Polar archaeological record.

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PHOTO: M. FRIESEN
Inuit elders and archaeologists discuss a Thule Inuit winter dwelling on Victoria Island, Nunavut, dating to about 1400 AD.

Network on Arctic Glaciology (NAG)

The Network on Arctic Glaciology (NAG) is a group of scientists with interests in the dynamics and mass budget of Arctic glaciers and their response to climate change. The network organizes the annual workshop on the dynamics and mass budget of Arctic glaciers that includes the annual network meeting. It is furthermore involved in the organization of summer schools and workshops, such as the "Field workshop on the study of tidewater glaciers" that was held on the r/v „Horizont II" in the fjords of Svalbard from 26-31 August, 2012.

NAG members have played a prominent role in recent international Arctic initiatives such as in writing the chapter on Mountain Glaciers and Ice Caps in the report on Snow, Water, Ice and Permafrost in the Arctic (SWIPA) that was commissioned by the Arctic Council and was published in April 2012. NAG also initiated the International Polar Year program, Glaciodyn, and several field experiments initiated for Glaciodyn continue today and form the basis for new international projects such as the Nordic Top-Level Research Initiative SVALI (Stability and Variations of Arctic Land Ice). NAG members are also at the core of GICAC (Glaciers and Ice Caps Assessment Consortium), an ad hoc group convened to undertake research in support of the lead authors for the Cryosphere and Sea Level chapters of the 5th Intergovernmental Panel on Climate Change (IPCC) Assessment Report.

Support for the NAG related activities comes from, among others, IASC directly and through its Cryosphere Working Group (CWG).

NAG Meetings

The 2012 workshop on the Dynamics and Mass Budget of Arctic Glaciers including the annual meeting of the network was held in Zieleniec, Poland, and organized by Krzysztof Miga_a. The meeting attracted 57 participants from 19 countries and spanned three days in which 25 presentations were given and 20 posters presented. The meeting provided ample time for discussion of both the presentations and the future focus areas of the group. The attendees found it a very productive meeting. IASC provided support for the attendance of early career scientists at the meeting. The 2013 meeting was held in February in Obergurgl, Austria.

Progress

An important problem identified by the IPCC and addressed by the NAG has been to quantify the calving flux from marine-terminating glaciers in order to improve the estimate of the contribution of glaciers and ice caps worldwide to sea-level change. This has resulted in collaborative fieldwork, and the collaborative development and deployment of equipment, e.g. the new radar system developed by network members from Russia and Spain and deployed on Svalbard involving network members from Norway, the United Kingdom, Poland, Denmark, Russia, Spain, Finland, Iceland and Sweden.

In recent years, more emphasis has been put on educating young scientists, resulting in more budget becoming available for support of early career scientists. In combination with the interest in calving of marine terminating glaciers, NAG members organized the Field Workshop on Studies of Tidewater Glaciers, held on the r/v „Horizont II" in the fjords of Svalbard from 26-31 August, 2012.

The idea to organize a workshop on Arctic tidewater glaciers on Svalbard was proposed during a CWG Meeting and developed further by the special session on tidewater glaciers research in the Arctic during the annual network meeting in Zieleniec, Poland (2012). The purpose of the workshop was to combine presentations on recent advancements in studies of tidewater glaciers in the Arctic and elsewhere with discussions on the application of different field and

remote sensing methods directly on or close to such glaciers. Demonstration of field techniques and training in use of them was a significant element of the meeting. There were 24 participants comprising of 10 senior scientists and 14 early career scientists from 8 countries. The number of participants was limited due to the capacity of the ship r/v „Horizont II". During sessions at the University Center in Svalbard (UNIS) in Longyearbyen and field sessions in Hornsund the number of participants reached 30. The workshop was finished by a panel discussion on the most crucial directions of further studies of tidewater glaciers in the Arctic and suggested rudiments of collaborative international programs.

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PHOTO: BEATA LASKOWSKA
NAG workshop participants in front of Hansbreen, Svalbard.

Publications

Books of extended abstracts from the Annual NAG meetings have been produced for each year from 2006 to 2010. PDF versions of these reports can be downloaded from: www.iasc-nag.org. Hard copies of books published prior to 2008 are available on request from the secretariat of the Institute for Marine and Atmospheric research Utrecht (IMAU): imau@uu.nl. The books of extended abstracts published from the 2009 workshop is available from the Geological Survey of Denmark and Greenland (GEUS, geus@geus.dk).

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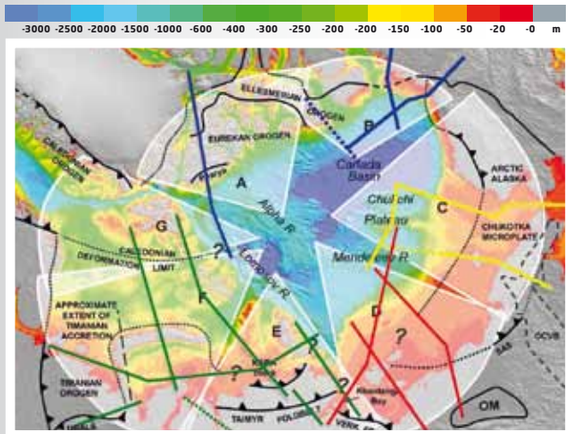
Circum-Arctic Lithosphere Evolution (CALE)

The CALE scientific network on Circum-Arctic Lithosphere Evolution is a multinational and multi-disciplinary research program investigating important questions associated with understanding circum-Arctic lithosphere evolution. The CALE project officially launched in 2011 and runs through 2015. It includes scientists from 11 different countries. For more information please visit the website: www.CALE.geo.su.se

CALE held its second International Workshop in late April 2012 in Vienna, Austria, in conjunction with the International conference of the European Geosciences Union (EGU). The CALE workshop is an annual full-day event in which team leaders, team members and industry sponsors meet to exchange scientific developments, to consolidate and integrate scientific results, and to discuss scientific progress and technological developments. The workshop is also a forum for building stronger connections between

PHOTO: VICTORIA PEASE
CALE team members performing geological fieldwork in the Russian Arctic.



scientists and sponsors. The team leaders use this opportunity to assess the state of existing scientific deliverables and to integrate/define deliverables for the coming year. A major deliverable for CALE in 2012 was the presentation of regional 2D transects (Fig. 1) along which the integration of geology and geophysics would be made in preparation for the 3D synthesis expected at the project's end.

One of the challenges for CALE is the integration of results across team boundaries. Cross-team fertilization was highlighted at the workshop with the identification of expertise needed in all teams and across team boundaries. Numerical modeling and the Geographical Information System (GIS) were identified as natural bridges for CALE teams and funding within the project has been ear-marked especially to address these subjects. The ultimate goal, of course, is to combine team results into an integrated whole. Circum-Arctic outcomes from these efforts are expected towards the end of the project (near 2014-2015).

Six of the seven CALE Teams held regional meetings during 2012. There was a 'super-group' meeting at Stockholm University, Sweden, in February 2012 which combined the three Barents Sea and Kara Sea teams. In May 2012 the Canadian Arctic and North Greenland teams met in Calgary, Canada, in association with the annual meeting of the Canadian Society of Petroleum Geology. The Bering Strait team met at Stanford University, USA, and the Laptev Team met in Germany, both towards the end of 2012.

All CALE Teams performed field and laboratory work in 2012. Land-based work for both geologists and geophysicists was performed in Arctic Russia and Arctic Canada. Marine geophysics was also performed in the Beaufort, Chukchi and Barents Seas. Older seismic data from the Laptev Sea is being reprocessed.

First-stage sponsorship for the CALE network came from IASC and the International Lithosphere Program (ILP). Second-stage support is from ExxonMobil (ESSO), BP International, and StatOil. CALE is now in its third-stage of funding, which is intended for 'targeted science' and includes support from Chevron from 2012. With this funding, CALE's Teams submit science proposals to CALE's Scientific Steering Committee, who prioritizes the proposals based on overall cost, potential scientific impact, relevance to the program, and ability to achieve a result within the duration of the CALE program. In 2012, a one-year post-doc was awarded to a young researcher for advancement of knowledge on Arctic magmatism, a topic which is shared between the North Greenland/Ellesmere and Bering Strait Teams.

In 2013, there will be a second 'targeted science' award in the CALE network, in addition to the third annual CALE Workshop in December 2013 in association with the American Geophysical Union's international conference in San Francisco, California, USA. There will be a session proposal on Arctic Lithosphere by CALE at the American Geophysical Union (AGU) to profile the program's scientific achievements and promote a CALE special publication with the Geological Society (of London).

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FIGURE: CALE transects - 2012 and beyond:
A map of the circum-Arctic in the Eocene (c. 55 million years ago) showing the CALE teams and the 2D transects.

Arctic Climate System Network (ACSnet)

The introductory meeting of ACSNet was held during the IPY 2012 Conference in Montreal, Quebec on 23 April 2012. The meeting was attended by Arctic researchers and program managers with interest in the ACSNet goal of fostering interdisciplinary and international collaborations in field research in the Western Arctic in the coming years. A broad overview was given of the potential participating field programs, and an activity timeline for ACSNet was discussed. Approximately 20 field programs spanning a range of observational efforts to understand the Arctic atmosphere, ice, ocean system were presented and discussed. The broad time line for ACSNet activities includes a main field effort in 2014 - 2015 and a synthesis effort in 2015 - 2016. We anticipate planning workshops and meetings before the main field phase.

ACSNet funds were used for three early-career scientists (Sylvia Cole, Woods Hole Oceanographic Institution (WHOI), Shelley Knuth, University of Colorado (CU-Boulder) and Alice Orlich, University of Alaska Fairbanks (UAF)) to attend and present their research at the IPY 2012 Conference, and to participate in the ACSNet introductory meeting. Each expressed that they benefited by being exposed to new Arctic observing technologies, novel research approaches, and interactions with scientists and early-career colleagues from around the world. They further noted that it was particularly helpful for them to engage in an open discussion on future Arctic fieldwork and gain exposure to a wide range of research taking place in the Arctic. Shelley Knuth (The Cooperative Institute for Research in Environmental Sciences and the Department of Atmospheric and Oceanic Sciences, University of Colorado, Boulder) has since joined the ACSNet coordinating committee, and will provide valuable contributions from the perspective of an early-career scientist.

One immediate action item for ACSNet is to update its web presence. This involves a reworking of the old website to make it more user-friendly and to include a consolidation of projects and investigators. The UK Arctic Office has kindly offered to provide support for development of the ACSNet site, and the ACSNet coordinating committee is working with Dr. Cynan Ellis-Evans (head of the National Environment Research Council (NERC) Arctic Office, British Antarctic Survey) to this end.

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Arctic Coastal Dynamics (ACD)

The Arctic Coastal Dynamics (ACD) project was originally conceived by the late Steve Solomon, for whom a memorial appeared in the IASC Bulletin 2012, at the Seventh International Permafrost Conference in Yellowknife, Canada in 1998 together with Jerry Brown and Hans-Wolfgang Hubberten. As such, ACD has always had roots and a shared community in the International Permafrost Association (IPA). Its mission has been to bring together researchers working across disciplines in the circumpolar Arctic coastal zone in order to coordinate efforts and develop products relevant to Arctic system sciences. Annual workshops began the next year, growing each year in size and attracting the interest of a circumpolar community of researchers working in the coastal zone. Under the leadership of Volker Rachold at the Alfred Wegener Institute for Polar and Marine Research in Potsdam, Germany (AWI), ACD became a project of IASC and was later affiliated with the Land-Oceans Interactions in the Coastal Zone (LOICZ) project. Coinciding with the Second International Conference on Arctic Research Planning (ICARP II), its focus expanded from geomorphological dynamics to include biodiversity and socio-economics, leading in the former case to the formation of an independent group (ACBio). In 2006, leadership passed to Nicole Couture at McGill University, Montreal, Canada, and Paul Overduin at AWI. Under their leadership, ACD led the IPYcluster of coastal observatory projects and contributed to international efforts to co-ordinate monitoring in the Arctic (the Sustained Arctic Observatory Network, SAON). With the support of the European Space Agency (ESA), these initiatives have resulted in the accumulation of satellite imagery at ACD key sites, a network of over forty coastal monitoring sites. Major ACD accomplishments have been the creation of the circumpolar coastal database (Lantuit et al., 2011) and the completion of the State of the Arctic Coast Report (Forbes et al., 2011), which had its inception at a joint ACD-IASC-LOICZ workshop in Tromso, Norway in 2007. The State of the Arctic Report was jointly sponsored by IASC, LOICZ, the Arctic Monitoring and Assessment Program (AMAP) and the IPA and submitted to the Arctic Council. It is a review of the state of the art understanding of both physical processes in the arctic coastal zone as well as socio-ecological systems. Specific recommendations for an integrated approach to the interactions within this system, and for the establishment and expansion of monitoring capacity led to the design of future research directions.

The ACD Legacy and Outlook

Since advancing to IASC Network status in 2006, ACD has been transformed. Networking within the community has decreased as a result of the cessation of annual meetings, although coastal science in the Arctic is more relevant than ever. Drilling and marine transport are becoming commonplace in both the North American and Eurasian sectors, raising concerns about the capacity to associated potential management and disaster response challenges. Numerous international scientific ocean drilling projects have entered the pre-proposal stage for drilling on the arctic shelf. In 2012, resource exploration was opened in the Laptev Sea and exploration for the establishment of national marine boundaries continues. The dramatic changes to sea ice extent and duration show no signs of reversing, and may already be changing coastal morphodynamics to an unprecedented degree. The ACD coastal database, described in a paper published in 2011 (Lantuit et al. 2011), provides the first assessment of coastal dynamics at a circum-Arctic scale and provides a snapshot at the beginning of the 21st century. In this paper, the database itself is described, and coastal dynamics at a circumpolar and regional scale are described. What emerges is a need to understand how shifting environmental forcing factors will affect arctic coastal dynamics at different spatial scales, from the local to regional to synoptic, to determine what factors control coastal response to change at each scale and to collect the data required to assess the current trajectory of change. For example, the ecosystem services provided within the High Arctic's rocky coastal zone differ greatly from those in a continental and unconsolidated coastline setting affected by ice-rich permafrost. The effects of disturbances to these systems will be different and require different adaptation strategies. "New" shelf ecosystems may arrive before we have a chance to establish baselines, one of the goals of continued efforts to establish a sustained arctic observing system. One of the main challenges facing coastal research in the Arctic is to create and maintain monitoring capabilities that will permit us to detect changes in this sensitive region. An appropriate response to these challenges can benefit from ACD's legacy, which includes specific recommendations made in the State of the Arctic Coast Report (Forbes et al. 2011).

The report presents a detailed snapshot of our current understanding of the Arctic coast, including the biophysical and socio-ecological realms. The coast is the interface between the terrestrial and marine realms, supports a rich biodiversity, and provides habitat, transportation and cultural resources for humans. Interfaces between ecotones are most conducive to foster diversity but react sensitively to environmental change. Most Arctic residents live on the coast and many derive their livelihood from marine resources, so that human activity will necessarily be affected by change. The coast is a region exposed to natural hazards and is particularly sensitive to climate change; it is thus a high priority for change detection and awareness. Providing sufficient observational data and expert knowledge on which to base appropriate and effective adaptation strategies remains a major challenge in the north, one which science can address.

The State of the Arctic Coast Report recommended the dedication of a formal organization and financial resources to the establishment of a circumpolar observatory network in the coastal zone as an offshoot of ACD and its IPY activities, which were formalized in the IPY project Arctic Circumpolar

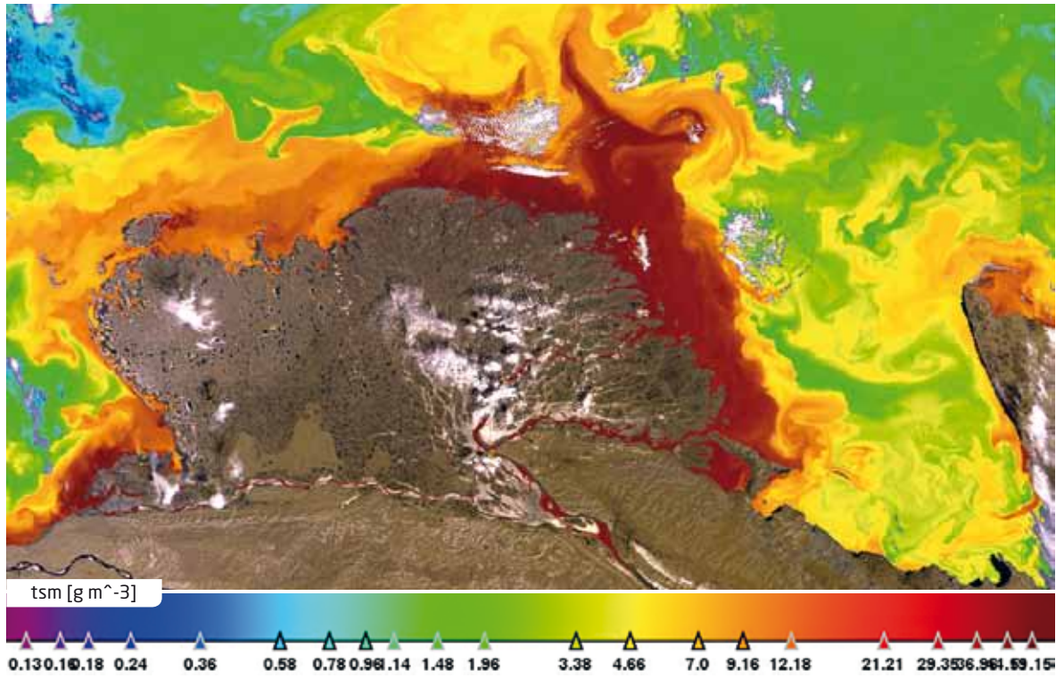

FIGURE:
Distribution of suspended particulate matter in and around the Lena Delta. Captured by the Medium Resolution Imaging Spectrometer MERIS on board ENVISAT (European Space Association ESA) on Aug. 19, 2005. Data were corrected for influence of the atmosphere to determine the water reflectance, from which the scattering and absorption coefficients were derived using a neural network algorithm, and then converted into concentrations.

Coastal Observatory Network (ACCOnet). Monitoring activities can benefit from ACCOnet but should be designed with appropriate resources:

- an inventory of existing stations, actors, and networks in the field should be created and updated.
- common mapping tool(s) should be established as a circumpolar "language" for data.
- government agency support must be solicited to allocate resources for coastal monitoring.
- effective communication of coastal issues in the Arctic is a prerequisite to recognition of the need for agency resources.
- coastal communities represent an important source of demand and potential capacity to support monitoring efforts and must be integrated in any monitoring effort.

A modular approach to building a network of sites and monitoring capabilities could capitalize on support from national agencies, research funding bodies, academic and community-based initiatives. Representatives of IASC, IPA and LOICZ met at the IPY conference in Montréal, Canada in April 2012 to begin planning the co-ordination of future Arctic coastal research activities. ACD supports this process, which will continue to develop plans for future activities based on the outcomes of the State of the Arctic Coast Report.

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PHOTO: JAKOB SIEVERS
The R/V Lance while anchored to sea-ice during an ice-breaker cruise to (81N,1E) to conduct measurements on the sea-ice.

5. International Science Initiatives

» 5 International Science Initiatives

To promote Arctic science at a global level, IASC is involved in science planning and the initiation and development of international initiatives from major research programs to thematic workshops. Although IASC is not a funding organization, it does make its connections, expertise, and secretarial support available for selected international science initiatives. Initiatives are usually carried out in cooperation with other arctic and international organizations.

Sustaining Arctic Observing Networks (SAON)

Sustaining Arctic Observing Networks (SAON) is a process that was initiated during the International Polar Year. The purpose of SAON is to support and strengthen the development of multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems. SAON promotes the vision of well-defined observing networks that enable users to have access to free, open and high quality data that will realize pan-Arctic and global value-added services and provide societal benefits. IASC has supported the development of SAON since 2007, and currently provides Secretariat support, representation on the SAON Executive Committee and Board, and the IASC President is SAON vice-chair.

IASC hosted the second meeting of the SAON Board in Potsdam, 1-2 October 2012. The meeting was attended by representatives of eight Arctic Council member countries, the Inuit Circumpolar Council, the SAON Secretariat sponsors (AMAP and IASC), five non-arctic countries (Germany, Italy, Japan, South Korea, Poland), nine SAON Task Leaders, and several partner organizations (GEO, EEA, WMO).

SAON has approved 23 Tasks that are responsible for leading specific observing and data integration activities, and brief reports were provided at the Board meeting. Funding continues to be a challenge for some Tasks, but most are sufficiently resourced by the countries leading these various efforts. The Board also discussed establishing a SAON strategy paper. This document, still in development, will provide SAON with a strategic plan that aligns various SAON Tasks and activities with longer-term objectives consistent with the SAON vision. The SAON Secretariat has also been developing tools on the SAON website. For example, observing activities that have been reported by SAON National Committees have been compiled and digitized (http://www.arcticobserving.org/networks)

The Board also reviewed and approved the SAON Terms of Reference and Rules of Procedure. These documents will be open for comment and revision during periodic reviews of SAON activities. The first review will be conducted later this year. Following the Board meeting, the composition of the SAON Executive Committee was expanded to include Sweden (representing AC members) and ICC (representing AC Permanent Participants). The Board will meet again during the first Arctic Observing Summit (AOS) in Vancouver, Canada in April 2013.

PHOTO: ALLEN POPE
Juneau Icefield Research Program 2012, Alaska

PHOTO: SAON Board Meeting, Potsdam

International Study of Arctic Change (ISAC)

International Study of Arctic Change

The International Study of Arctic Change (ISAC, www.arcticchange.org) is an open-ended, interdisciplinary arctic environmental change research program initiated in the wake of the 2003 Study of Environmental Arctic Change (SEARCH) Open Science meeting. As an IPY legacy of the International Polar Year, ISAC facilitates cooperation and collaboration in international arctic research, and improves integration of stakeholders into the research process. ISAC extends the study of the Arctic from basic science to offer insight into options for solutions to the real world problems that are intrinsic to a changing planet.

ISAC takes an iterative, integrative and pan-arctic approach to advancing the science needed to address arctic environmental change. ISAC seeks to drive forward research objectives that are significant for both science and for society. In pursuit of these goals, ISAC activities lead to new conceptual and organizational frameworks for integrating stakeholders into research planning and execution.

The ISAC Science Program

The ISAC science program is structured around the three concepts of observing, understanding and responding to arctic environmental change. ISAC activities are designed to advance the main components of the program through the implementation of the 2010 ISAC Science Plan. The plan identifies nine key science questions prompted by observed changes in our current understanding of the Arctic System and provides a vision for integrating research among diverse fields and varied users and stakeholders. ISAC activities are directed by the ISAC Science Steering Group (SSG) and facilitated by the ISAC International Program Office (IPO). The IPO is a distributed office with an Executive Director in Fairbanks at the International Arctic Research Center, University of Alaska Fairbanks (UAF), and a Project Manager in Stockholm at the Swedish Polar Research Secretariat. In 2012 the IPO expanded to China with the opening of a Chinese ISAC Secretariat in Qingdao, led by a Secretary General. Major ISAC activities in 2012 and beyond include:

1 Planning and execution of a biennial **Arctic Observing Summit (AOS)** in partnership with the ArcticNet Network of Centres of Excellence Canada, the U.S. Study of Environmental Arctic Change, the European Union Arctic Climate Change Economy and Society (ACCESS) project, and SAON. The AOS is a designated SAON task (SAON Task 12: www.arcticobserving.org/tasks), designed to provide guidance for the design, implementation, coordination and sustained (decades) operation of an international Arctic Observing System. The AOS will be a recurring (biennial) forum for advancing arctic observing activities and improving coordination and optimizing resources. The AOS will engage basic research, mission-oriented, and stakeholder communities with participants from academia, government agencies, arctic communities, industry and non-governmental organizations. AOS activities will occur within the framework of state-of-the-art arctic science and, in collaboration with SAON, will include the identification and pursuit of specific tasks designed to improve network performance for a full spectrum of applications, from climate research to the delivery of useful products that serve a broad spectrum of needs and stakeholder groups. The first AOS is planned for late spring 2013.

2 An ongoing series of **Responding to Arctic Environmental Change (RtoC)** workshops. The first RtoC workshop was held in January 2012 at Queen's University in Kingston, Canada. The workshop brought together an international group of researchers and members of stakeholder groups including indigenous peoples, NGO's and government and intergovernmental agencies. This workshop resulted in an agreed definition of RtoC, a new research agenda for action, a reference framework for developing research and learning approaches to responding to change, and recommendations for a series of implementation activities that will bring researchers and stakeholders together in a meaningful way at multiple points of entry into the research process from the beginning (research design) to the end (dissemination of usable information). A workshop report and Summary Report for Policy Makers is available at www.arcticchange.org.

3 The **Arctic Ocean Drift Study (AODS)**. One mandate of ISAC is to assist with the coordination among national programs and projects for joint planning of research. To this end, ISAC is a science partner and a coordinating entity for a developing Arctic Ocean Drift Study (AODS) led by the University of Manitoba, a partner in the ArcticNet Network of Centres of Excellence Canada. The AODS is planned as a multi-nation study utilizing the CGC Amundsen. The first planning workshop, hosted by the University of Manitoba, took place 16-17 July 2012. Participants represented Canada, Denmark, France, Japan, Korea, Russia, the UK and the USA. Participants discussed development of the AODS Science Plan, and developed a project timeline and strategies

PHOTO: RANE WILLERSLEV
During the Chukchi Festival in Achaivayam, Kamchatka.

for international cooperation. The workshop was successful in garnering international support for the AODS and defining scientific and logistical routes to achieve project goals. Through collaborative initiatives like the AODS, ISAC is facilitating international efforts to improve understanding of how the arctic system functions.

4 ISAC Foresight Planning. ISAC is now engaged in the development of a ten-year strategic plan using a Foresight Planning Approach (FPA) This is modeled after recent foresight exercises undertaken by the International Council for Science (ICSU). It is an approach that is especially adaptable to international, iterative and interdisciplinary programs such as ISAC. The FPA will engage a broad spectrum of the Arctic research community, including existing ISAC partners.

Other Activities

The ISAC Science Steering group meets annually in early January. In 2012 the Ocean University of China in Qingdao, China hosted the SSG meeting. In 2013 the meeting is held in Tokyo in conjunction with the 3rd International Symposium on Arctic Research, 14-17 January 2013. In addition, ISAC holds an annual Town Hall meeting at the annual conference of the American Geophysical Union in San Francisco, USA in December. In 2012 the topic of the Town Hall was the AOS. For more information about ISAC, ISAC publications, and upcoming activities please visit us on the web at www.arcticchange.org

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International Polar Initiative (IPI)

The Polar Regions of the world are undergoing fast and dramatic transformations that impact their environment, economy and the life of local residents. These changes are anticipated to increase in the decades to come and result in significant global implications. The current lack of sustainable polar observations and, as a result, of comprehensive information services, in case of the Arctic, is an impediment for the economic and human development of the North and for adaptation of this region to changing climate and environmental conditions. Many activities of the recently concluded International Polar Year 2007-2008 (IPY) resulted in significant advances in polar observations, research and practical applications of knowledge for the benefit of mankind. It is therefore important to preserve these achievements as an IPY legacy and to use them as the starting point for addressing the challenges posed by the processes occurring in the Polar Regions.

A World Meteorological Organization (WMO)-Roshydromet workshop held in Saint Petersburg, Russian Federation, in April 2011 proposed a consultative process, in which representatives of the main international organizations and agencies with interest in Polar Regions, acting as experts and members of a Steering Group, would impartially analyze the needs of and issues in the Polar Regions and a consensus-based means of addressing them. The Workshop Co-Chairs, David Hik and Jan-Gunnar Winther, became the Co-Chairs of this Steering Group.

The main conclusion of the consultations conducted by the Group in 2011-2012 is that the magnitude and interdependence of the polar challenges and their interdisciplinary nature call for a coordinated, resourceful and informed response from international and national stakeholders with mandate and interest in polar activities. Inaction will lead to serious consequences for current and future generations. To effectively address the challenges and efficiently use the available resources, the Group proposes a cooperation framework provisionally entitled "International Polar Initiative" (IPI). Under the Framework, a common IPI Implementation Plan should be prepared for the development of observing systems, research, services, related education and outreach, and practical applications of scientific knowledge in the Polar Regions. The IPI would optimize the use of existing resources and identify areas where new investments in polar activities are necessary for environmental protection, sustainable development of the regions, and for addressing existing and emerging societal needs. Existing polar programs and infrastructure, including the legacy of the recently concluded IPY 2007-2008, will provide initial building blocks for IPI. If endorsed, the IPI Framework Agreement will create a platform enabling efficient cooperative response to existing and future challenges, and, if successfully implemented, the IPI Implementation Plan will turn existing polar activities into a coordinated series of highly productive interagency initiatives to address the identified challenges.

Some time will be needed for developing the IPI Implementation Plan and secure commitments and resources for its implementation. This period when IPI gains momentum should not lead to a slow down of the on-going deployment of already proposed and endorsed observing systems, research, and other continuing relevant activities. Support to important existing polar activities that need to be sustained and further developed should be considered at the very early stage of the plan development. IASC has been very instrumental in supporting the development of the IPI idea.

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PHOTO: KOPRI
First cruise of ARAON to the Arctic Chukchi sea.

PHOTO: ANDREW TEDSTONE
Leverett Glacier, southwest Greenland: Sling loading supplies for the ice-margin camp.

6. Relationship to other Organizations

» 6 Relationship to other Organizations

International Association of Cryospheric Sciences (IACS)

IACS

International Association of Cryospheric Sciences

IASC has worked towards strengthening its relationship with other polar and global organization through the years. The goal is to develop and stimulate shared initiatives that are of high priority for the broader arctic research community. Different organizations are strong recurring partners in promoting arctic and bi-polar science. Organizations highlighted in this chapter include: the International Association of Cryospheric Sciences (IACS), the International Arctic Social Sciences Association (IASSA), the International Council for the Exploration of the Sea (ICES), the International Network for Circumpolar Health Research (INCHR), the International Permafrost Association (IPA), the Pacific Arctic Group (PAG), the Scientific Committee on Antarctic Research (SCAR) and the World Climate Research Program/ Climate and Cryosphere Project (WCRP/CliC).

The International Association of Cryospheric Sciences (IACS) is a relatively young player among the many scientific organizations dealing with Cryospheric sciences. Relative because although it has only existed as an IUGG Association since 2007, its roots go back to 1894 when the International Geological Congress established the „Commission Internationale des Glaciers". The eight Associations of the International Union of Geodesy and Geophysics (IUGG), including for the first time IACS, participated in the IUGG General Assembly 2011 in Melbourne. Altogether about 3600 participants attended the General Assembly and, although the number of IACS delegates and of IACS-led symposia was smaller than those of the larger well-established Associations, the scientific standard was generally very high. There the IACS accredited Delegates elected the new Bureau of the Association: 11 scientists from over the world dedicated to the advancement of the Association (see www.cryophericsciences.org/officers.html).

IACS has a slim and flexible organizational structure that can accommodate many ideas and allow many ways to serve the community. Standing and Working Groups, established from time to time by the IACS Bureau, form the backbone of the scientific organization. These are groups of like-minded scientists brought together to achieve specific tasks, which might not have been possible if they were working in isolation. The resulting collaborations are international and of broad scientific interest. Since 2007, IACS Working Groups have developed "The International Classification of Seasonal Snow on the Ground" and the "Glossary of Glacier Mass Balance and Related Terms" (http://www.cryosphericsciences.org/products.html). Both documents have been published by the International Hydrological Program of UNESCO and have been or will be translated into several other languages. The IACS Bureau proposed to the IUGG Council a formal Resolution urging all snow and ice scientists, practitioners, and scientists from related disciplines to adopt these new schemes as standards. The IUGG Council adopted the Resolution that can be consulted on the IUGG website (in English) at http://iugg.org/resolutions and (in French) at http://iugg.org/resolutions/fr. A Working Group on "Flow law for polycrystalline ice" and the recently approved Working Group "From quantitative stratigraphy to microstructure-based modelling of snow" are currently active.

The "GTN-G Steering Committee" is a newly installed Standing Group designed to advise the World Glacier Monitoring Service (WGMS) and its partners in their current and future work. The two other Standing Groups are run in partnership with either another IUGG Association (Commission on Volcano Ice Interactions [CVII] jointly with the International Association of Volcanology and Chemistry of the Earth's Interior [IAVCEI]) or another cryospheric organization (Glacier And Permafrost HAZards in mountains [GAPHAZ] jointly with the International Permafrost Association [IPA]).

Indeed, IACS liaises with many other organizations and often participates actively in their activities. Being part of the International Council of Science (ICSU) family, IACS signed its first Letter of Agreement with IASC and SCAR in 2008. Among other activities, this resulted in the joint organization of a two-day Symposium held September 2011 in Siena, Italy, to consider the legacy of the International Polar Year 2007-2008 and any unaddressed aspects of polar science within the context of the ICSU Grand Challenges. IACS is looking forward to continuing this fruitful collaboration with these two Polar organizations.

Another important way to promote cryospheric sciences is by sponsoring Early Career Scientists. IACS strongly supports the Association of Polar Early Career Scientists (APECS) and an Early Career Science Workshop will be held prior to the Davos Atmospheric and Cryospheric Assembly (DACA-13). DACA-13 is a joint Scientific Assembly of IACS and the International Association of Meteorology and Atmospheric Sciences (IAMAS), July 8-12 2013, with the theme Air, Ice & Process Interactions. This will include an IACS focus on the mountain cryosphere.

The IACS Bureau very much welcomes ideas, suggestions, and comments from the scientific community. This is the best way to fulfil our objectives for the benefit of all Cryospheric sciences.

Written by:
Charles Fierz | IACS, President Elect

PHOTO: A. MACKINTOSH
Looking South from the Gornergrat, Switzerland, 3 100 m above sea level. From East to West: Liskamm (4527 m), Castor (4087 m), and Pollux (4092 m); Grenzgletscher, Zwillings Gletscher, Schwärze Gletscher, and Breithorn Gletscher.

International Arctic Social Sciences Association (IASSA)

There is an increasing recognition of the importance of Arctic social sciences and humanities in understanding the changing dynamics of the Arctic/Circumpolar North, as globalization, climate change, and other forces increasingly influence the North, and as the pace of social, cultural, economic and political transformation accelerates. This was evident in, inter alia, the much expanded presences of Arctic social sciences in the International Polar Year (IPY) 2007-08. IASSA was founded in 1990, to promote the participation of social scientist and humanities scholars in international Arctic research. It also seeks to represent Arctic social scientists and humanities scholars, to provide a mechanism to connect these scholars and facilitate their collaboration, and to advance communication and collaboration between researchers and indigenous northerners. IASSA's membership is open to anyone who has an interest in Arctic social sciences or humanities. For more information please see http://www.iassa.org

Upcoming Congress: ICASS VIII (2014)

The principal activity of IASSA is convening a triannual International Congress of Arctic Social Sciences (ICASS). ICASS VIII will take place 22-26 May 2014, at the University of Northern British Columbia, in Prince George, BC, Canada. This is the foremost gathering of Arctic social scientists and humanities scholars. The topic of the next Congress will be 'Northern Sustainabilities', with an inclusive understanding of that phrase, to encompass various types (cultural, economic, environmental) and understandings/definitions of the concept. More information on ICASS VIII, and on previous congresses, can be found at http://www.iassa.org/meetings.

Arctic Human Development Report (AHDR) II (2011-2014) - Update

Work on the Arctic Human Development Report (AHDR), reported on first in IASC Bulletin 2011, is proceeding. As noted there, the purpose of the AHDR-II is to provide a follow-up to the initial Arctic Human Development Report (2004), an assessment and synthesis of trends and new issues of critical import to Circumpolar human development. This will provide the Arctic Council information on which to base policy decisions. As well, the report will likely find wide usage in post-secondary education, as did AHDR-I. The goal is to publish AHDR-II in mid-2014.

Draft outlines of the chapters were completed this summer, and made available for review by the Sustainable Development Working Group (SDWG) of the Arctic Council. Joan Nymand Larsen reported on AHDR-II to the SDWG at their September meeting in September 2012, as well as offering a half-day presentation just prior to that meeting. First order drafts of chapters will be ready for review in December 2012. Please contact Joan Nymand Larsen, AHDR Lead (jnl@unak.is), or Gail Fondahl, co-lead (gail.fondahl@unbc.ca) if interested in reviewing chapter drafts or receiving more information on this project. We anticipate reporting on many of the chapters at the Arctic Sciences Summit Week 2013 in Krakow this coming April. The IASC Social & Human Working Group has provided support to this project.

Written by:

Gail Fondahl | IASSA, President

www.iassa.org

International Council for the Exploration of the Sea (ICES)

Several longstanding international groups are active in Arctic science, in particular the Arctic Council and its six working groups and IASC.

The International Council for the Exploration of the Sea (ICES) is already involved in partnerships with IASC and the Arctic Monitoring and Assessment Program (AMAP) (Arctic Council) and has an Arctic Fisheries Working Group (AFWG). Some ICES assessment groups focus on subarctic fish stocks in the Barents Sea, around Iceland and East Greenland, and some widely distributed and straddling stocks. The annual ICES Report on Ocean Climate and the biannually published ICES Zooplankton Report also cover subarctic waters.

In March 2012, the Science Committee of ICES (SCICOM) was requested to initiate the science development of an integrated and focused activity on Arctic issues by ICES leadership. We compiled an overview of the research activities carried out by the ICES countries. Most submitted their national activities as well as contributions to international cooperative programs, reflecting a very comprehensive overview of the work in the Arctic and sub-arctic Atlantic Ocean.

The Arctic marine environment will undergo major changes in the coming decades due to on-going climate change and increases in human activities. The ecological changes may be complex, including changes in productivity, losses and gains of individual species, and changes in food web structure.

International partners should be engaged in cooperation and sharing of data, observational platforms, and intellectual resources to enable more rapid and comprehensive attainment of science and ecosystem-based management goals. Conservation, management, and use of ocean and coastal resources are based on sound science and support healthy, productive, and resilient ecosystems and communities. Resilient and healthy Arctic communities and economies will be facilitated by improved geospatial infrastructure, safe navigation, oil spill response readiness, and climate change adaption strategies. Accurate, quantitative, daily to decadal predictions of sea ice are needed to support safe operations and ecosystem stewardship. Improved baseline observations and understanding

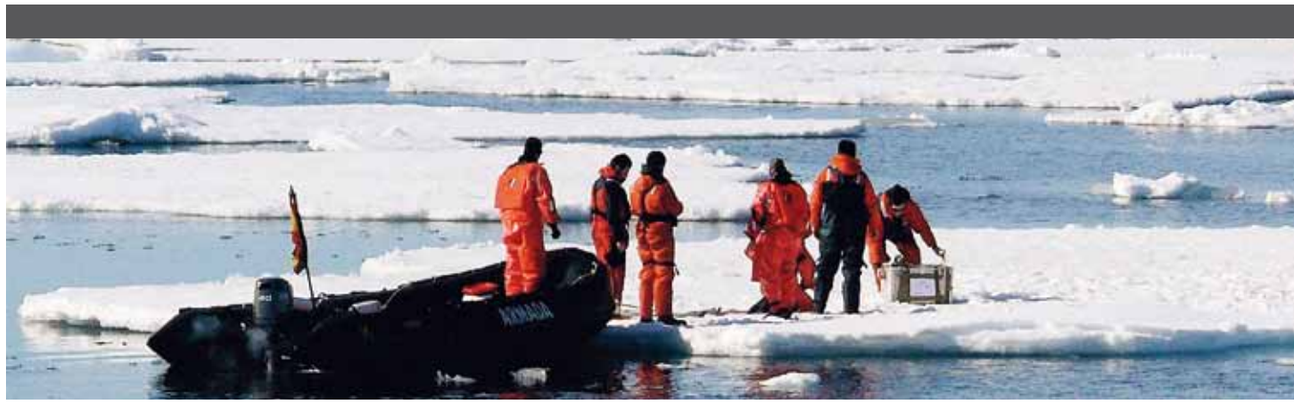

PHOTO: PEDRO ECHEVESTE
Sampling sea ice during an oceanographical cruise in the Arctic Ocean (78°44'N - 2°58'E).

of Arctic climate and ecosystems will reduce uncertainty in assessing and predicting impacts caused by a changing Arctic. Advanced, accurate weather forecasts and warnings are needed to ensure society can prepare for and respond appropriately to weather-related events.

The eight member states of the Arctic Council consider the Arctic, including offshore areas within their respective Exclusive Economic Zone (EEZ), to be domestic jurisdiction (unlike Antarctica). The question of jurisdiction is a sensitive topic. Once the United Nations Convention on the Law of the Sea (UNCLOS) process is completed to establish the extent of national jurisdiction, only a small region at the center of the Arctic Ocean is expected to remain beyond national jurisdiction.

At the 100th statutory meeting of ICES in October it was agreed that the new ICES Science Plan, which will be in effect from the end of 2013, should reflect an increased interest of ICES in Arctic issues. The Science Committee has also been mandated to promote science activities in Arctic waters.

ICES also wishes to consider how it might connect with the existing circumpolar bodies, especially the Arctic Council and IASC, and contribute to the Arctic research arena. While being aware of the sensitivities regarding the Arctic region, ICES believes it has much to offer in the form of collaborative opportunities and partnerships. This would reduce the risk of duplication, overlap, or overstretched resources and ensure that any new initiatives are well coordinated with existing ones. Arctic scientists have a long history of collaboration due to the costs of working in the north, difficult working environment, and limited platforms.

Written by:

Adi Kellermann | ICES, Head of Science Program

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International Network for Circumpolar Health Research (INCHR)

INCHR

INCHR was founded in 2005. It links researchers, trainees and those who support health research in the circumpolar countries. Its objectives are:

1 to conduct, sponsor, and promote research programs and projects investigating the patterns, determinants and impact of health conditions among circumpolar peoples and the strategies for improving their health;

2 to support research training at all levels and increase capacity for circumpolar health research in communities, service delivery agencies and higher educational institutions;

3 to facilitate exchange, communication and dissemination of research data;

4 to strengthen the health information system in the circumpolar region.

There are some 70 members in the Network, from all the circumpolar countries. The Network holds annual scientific conferences. In 2011 it was held in Oulu, Finland, and in 2012 it was held in conjunction with the 15th International Congress of Circumpolar Health in Fairbanks, Alaska. The Network supports the publication of the International Journal for Circumpolar Health (IJCH), formerly known as Arctic Medical Research which has been in existence since 1972. In January 2012, IJCH became a completely online journal under the editorship of Prof. Kue Young.

Since 2010, the Network has provided graduate students with travel fellowships to participate in the annual Summer Institute in Circumpolar Health Research. Summer Institutes were held in Copenhagen in 2010 and in Oulu in 2011.

In 2011, INCHR signed a letter of agreement with IASC, pledging mutual support in furthering the cause of Arctic Science. INCHR is well positioned to represent the voice of the health sciences in such international scientific forums. We look forward to participating fully in IASC activities in the coming years.

2012 is a momentous year for INCHR as the members recognized the need for consolidating the diverse circumpolar health groups with overlapping membership yet competing for the same sources of support. As a first step, INCHR voted to merge with the International Association of Circumpolar Health Publishers based in Oulu. The officers of the new organization, to be known as Circumpolar Health Research Network [CHRN] are:

- **President**: Peter Bjerregaard, Copenhagen, Denmark
- **Vice-President**: Susan Chatwood, Yellowknife, Canada
- **Secretary**: Christina Larsen, Copenhagen, Denmark
- **Treasurer**: Bert Boyer, Fairbanks, United States
- **Board members**: Rhonda Johnson (Anchorage), Laurie Chan (Ottawa), Jim Berner (Anchorage), Arja Rautio (Oulu), Jon Odland (Tromsø), Pam Orr (Winnipeg), Eric Dewailly (Quebec), Gert Mulvad (Nuuk)

We wish the new executive and board all the best in moving the Network in new directions in the future.

Written by:

Kue Young | INCHR, Past President

http://www.inchr.com

International Permafrost Association (IPA)

Scientific and public policy interest in permafrost, its distribution and dynamics has never been greater. While loss of sea ice cover and enhanced Greenland glacier melt are some of the most identifiable effects of climate warming in the Arctic, permafrost thaw and subsequent potential release of carbon into the atmosphere are of critical importance in relation to the impact of changes in the Arctic environment on the rest of the globe.

This increased awareness and interest in permafrost-related research was evident at several conferences during 2012, including the IPY conference in April in Montréal, where permafrost sessions attracted high attendance by researchers from outside the traditional community. An increased number of permafrost-related press releases are further proof of the growing interest of decision-makers and the media.

PHOTO: The new IPA Executive Committee (EC) .

To foster this development and to satisfy the general public interest, the IPA strengthened its efforts at outreach during 2012 through the creation of a Standing Committee on Outreach and Education. Its tasks are the explanation and promotion of permafrost-related topics for all audiences and to provide materials and tools for educational activities.

Tenth International Conference on Permafrost

The Tenth International Conference on Permafrost, TICOP, held from 25th – 29th of June in Salekhard, in the Yamal-Nenets autonomous District in Russia, was the major gathering for permafrost researchers in 2012. More than 500 participants from over 25 countries attended the conference to exchange the newest results in permafrost research and engineering.

Many fruitful discussions and meetings took place besides the daily conference program and helped to foster existing collaborations as well as to create new joint projects. Thanks to the generous support of the government of the Yamal-Nenets autonomous District, 150 young permafrost researchers from a wide range of countries were able to join the meeting, give presentations and co-chair sessions. In addition, a special pre-conference workshop with academic presentations and career advice by senior researchers was organized by the Permafrost Young Researchers Network (PYRN).

The IPA Council met twice during the conference and elected a new Executive Committee (EC) which will manage the IPA until 2016. The President is Antoni Lewkowicz (Canada), the two Vice-Presidents are Hanne Christiansen (Norway) and Vladimir Romanovsky (USA) and the members are Hugues Lantuit (Germany), Lothar Schrott (Austria), Dmitry Sergeev (Russia) and Ma Wei (China). Inga May, who had been working in the IPA Secretariat since February 2012, was officially confirmed in the position of Executive Director by the Council.

Among other decisions taken by Council were the choices for the next Regional Conference on Permafrost (Évora, Portugal in 2014) and the Eleventh International Conference on Permafrost (Potsdam, Germany in 2016).

Global Terrestrial Network on Permafrost (GTN-P)

GTN-P aims to monitor and coordinate the collection of borehole ground temperature and active layer thickness data across the Arctic, Antarctic and mountainous regions where permafrost occurs, and to make these data freely available and highly accessible for research and education.

Significant progress was made towards constructing a professional and semi-operational setup of the database following the very successful GTN-P user requirement workshop held in November 2011 in Potsdam, co-sponsored by IASC and its Cryosphere Working Group (CWG). A follow-up meeting with database managers in Copenhagen in February 2012 delivered the essential technical input to implement the desired database. The core group met again in June to assign an Executive Committee and to create a stable governance structure. The outcomes of these meetings laid the foundation to carry on with the practical implementation of the database. This work is now almost finished and was mainly realized by the Arctic Portal, based in Akureyri. Personnel to create and maintain the database are supported by the EU funded project Page21, which is embedded in GTN-P. The remaining difficulties of implementing the database were discussed and resolved during a meeting in Iceland in September of a small group of scientists and technicians. The first datasets were available on the website for download at the end of October. The final meeting of 2012 took place in Hamburg in November and brought together the Executive Committee as well as observers to discuss next steps and to plan a larger workshop in spring 2013. This workshop will serve to introduce the database to all involved persons and to clarify the submission and download process.

Cooperation with other organizations

In 2012 the IPA signed two memoranda of understanding, both to nurture the outreach activities and to encourage capacity building. One is with the University of the Arctic (UArctic) and the other with the Association of Early Polar Career Scientists (APECS) and the Permafrost Young Researchers Network (PYRN).

Outlook for 2013

For 2013 the IPA plans to build upon the structural changes that were introduced in the last two years that are permitting the development of funded Action Groups. The implementation and advance of the GTN-P initiative will be a major focus, as will facilitating the study of the role of changing permafrost conditions in terms of the carbon cycle. The IPA plans to maintain its position as the pre-eminent international organization focusing on permafrost science and engineering and their implications for policy-makers, industry and the general public.

Written by:

Inga May | IPA, Executive Director

http://ipa.arcticportal.org/

PHOTO:
The Tenth International Conference on Permafrost, TICOP.

PHOTO:
The first-fish-celebration at the TICOP in Salekhard, Russia.

Pacific Arctic Group (PAG)

The Pacific Arctic Group (PAG) is an informal association of individuals and organizations that share an interest in scientific research related to the Pacific sector of the Arctic. Originally formed as an element of IASC, the PAG now operates independently but keeps in close contact with the IASC. For the past few years, the PAG has focused on ship-based research in the Bering, Beaufort and Chukchi Seas and in the central Arctic Basins. Through connections created among PAG participants, space has been provided to foreign visitors on many national cruises, and data and information have been shared and used to prepare joint publications. Recently, the PAG developed a shared interest in studying physical variability and change and estimating the ecosystem response. The PAG created the Distributed Biological Observatory (DBO) as the organizing framework for this research. Beginning in 2010 and continuing through 2012, research cruises organized by PAG members included making a core set of measurements (see Table 1) at agreed station locations (see Figure 1). Figure 2 shows the high level of effort expended in 2012 for field-work.

The PAG has agreed to establish two teams of technical experts, one focusing on physics and chemistry, and another focused on biology, that will work over the next few years to organize the data from a number of research cruises and prepare analyses and reports based on the multinational data set. Workshops, co-sponsored by IASC, are planned for early 2013 to begin data analysis.

In the United States, the DBO has been endorsed by the National Science and Technology Council and the National Ocean Council. The DBO and involvement of the PAG are specifically included in the newest planning documents from these two organizations. Internationally, the DBO sites are included in the Arctic Council's Circumpolar Biodiversity Monitoring Program Marine Monitoring Plan. Additionally, PAG members have submitted a task description to the Sustaining Arctic Observing Networks (SAON) Board focused on the DBO and the PAG's effort to achieve an international approach to long-term observations in the Pacific sector of the Arctic. At its meeting in October 2012, the SAON Board agreed that this effort will be a formal task under SAON.

Written by:

John Calder | PAG, Past Chairman

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Core standardized ship-based sampling:

- CTD
- Chlorophyll
- Nutrients
- Ice algae/Phytoplankton (size, biomass and composition)
- Zooplankton (size, biomass and composition)
- Benthos (size, biomass and composition)
- Seabird (standard transects, no additional shiptime)
- Marine mammal observations (no additional ship time)

TABLE 1:
Core standardized ship-based sampling

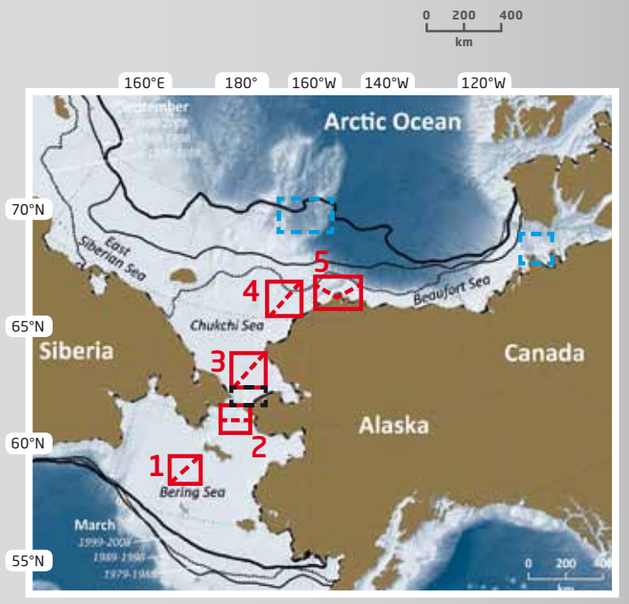

FIGURE 1:
Location of current (red) and future (blue) DBO target areas.

VESSEL	COUNTRY	PI
Laurier (July) Khromov-Leg 1 (July)	Canada Russia and USA	Vagle Woodgate
Healy (Aug)	USA	Grebmeier
Xue Long (Aug-Sept)	China	He
Khromov-Leg 2 (Aug-Sept)	Russia and USA	Woodgate
Fairweather (July-Aug) CESP (Aug) TBD (Aug)	USA USA USA	TBD/NOAA TBD Napp
Annika Marie (Sept)	USA	Ashjian
Mirai (Sept-Oct)	Japan	Kikuchi
Healy (Oct)	USA	Pickart

FIGURE 2:
Research cruises to DBO target areas in summer 2012.

Scientific Committee on Antarctic Research (SCAR)

The study of Antarctica and the Southern Ocean, and their role in the Earth system, has never been more important as the region experiences change that has global implications. The Antarctic is a "natural laboratory" for scientific research of importance in its own right and impossible to achieve elsewhere on the planet. The Scientific Committee on Antarctic Research (SCAR)'s strategic vision is for a world where the science of the Antarctic and Southern Ocean benefits all, excellence in science is valued and scientific knowledge informs policy making. SCAR's mission is to be the leading non-governmental, international facilitator and advocate of research in and from the Antarctic region, to provide objective and authoritative scientific advice to the Antarctic Treaty and other bodies, and to bring emerging issues to the attention of policy makers.

There are many common scientific interests between IASC and SCAR in the polar regions and much to be gained from developing synergies between both organizations in polar and bipolar research. SCAR and IASC are recognized by the International Council for Science (ICSU) as the main source of information and guidance on polar issues. Both SCAR and IASC also serve as ICSU's Observers to the Intergovernmental Panel on Climate Change (IPCC) to ensure that polar issues are fully considered.

Areas of current and future collaboration include studies related to the cryosphere and to the roles of

the polar regions in the climate system. As an example of the former, on the 14th of July in Portland, prior to the SCAR Open Science Conference, a workshop was held on Ice Sheet Mass Balance and Sea Level. This workshop, sponsored by ICSU, SCAR, IASC, World Climate Research Program (WCRP), International GPS Service (IGS), and International Association of Cryospheric Sciences (IACS) with support from Climate and Cryosphere Project (CliC) and Association of Polar Early Career Scientists (APECS), had a number of aims including assessing the current knowledge of the contribution of the Antarctic and Greenland Ice Sheets to global and regional sea level and planning the future of the joint SCAR/IASC Ice Sheet Mass Balance and Sea Level Expert Group. Thanks to APECS and CliC, movies of all the presentations are available from http://www.climate-cryosphere.org/en/events/2012/ISMASS/Results.html

Bipolar cooperation will continue to be explored through the joint Bipolar Advisory Group (BiPAG II, see http://www.scar.org/about/partnerships/iasc/) that is charged with identifying areas for scientific co-operation. IASC and SCAR are also jointly considering how best to preserve and build-on their stewardship responsibilities for the legacies of the IPY in observing systems, data and information management, and mentoring of students and early career scientists. In this regards both SCAR and IASC are core members of the International Polar Initiative (IPI) Concept Note Steering Group (see Chapter 5).

Immediately after the Open Science Conference, at the SCAR Delegates' meeting, all five new SCAR Scientific Research Programs were approved (see http://www.scar.org/researchgroups/progplanning/). These programs will be very much at the forefront of SCAR science over the next 6-8 years and all are considering bipolar linkages. The five new programs are:

- (i) State of the Antarctic Ecosystem (AntEco). Contact: Don Cowan (dcowan@uwc.ac.za)
- (ii) Antarctic Thresholds – Ecosystem Resilience and Adaptation (AnT-ERA). Contact: Julian Gutt (Julian.Gutt@awi.de)
- (iii) Antarctic Climate Change in the 21st Century (AntClim21).Contact: Nancy Bertler (Nancy.Bertler@vuw.ac.nz)
- (iv) Solid Earth Response and Cryosphere Evolution (SERCE). Contact: Terry Wilson (twilson@mps.ohio-state.edu)
- (v) Past Antarctic Ice Sheet Dynamics (PAIS). Contact Carlota Escutia (cescutia@ugr.es)

During the Delegates' Meeting, professor Jerónimo López-Martínez (Spain) was elected as the new SCAR President. SCAR will also have two new Vice-Presidents: Professor Karin Lochte from the AWI in Germany and Professor Bryan Storey from the University of Canterbury, New Zealand. They will join Professors YeaDong Kim (Korea) and Sergio Marenssi (Argentina) as well as Mahlon „Chuck" Kennicutt who will remain on the Executive Committee for two years as Past President. The SCAR Delegates also welcomed Venezuela as the 37th Member Country of SCAR. The full report of the Delegates' meeting is available from: http://www.scar.org/publications/bulletins/Bulletin183.pdf.

A new Powerpoint Presentation, highlighting SCAR's Mission, Goals and new groups is also available from: http://db.tt/tiYMjr1U.

Further details on SCAR groups, activities etc. can be obtained from:

Written by

Mike Sparrow | SCAR, Executive Director

www.scar.org.

https://www.facebook.com/groups/2514526253/

http://www.linkedin.com/groups/Scientific-Committee-on-Antarctic-Research-2090555

World Climate Research Program/ Climate and Cryosphere Project (WCRP/CliC)

The year 2012 was marked for WCRP by analyzing the outcomes of its first Open Science Conference (OSC) held in Denver, USA, on 24-28 October 2011 and self-organizing to address the Grand Challenges for climate science identified by the Extraordinary Session of the WCRP Joint Scientific Committee (JSC) held immediately after the Conference. Following the conclusion of the OSC that "the cryosphere is very rich on scientific challenges", a group of scientists prepared a white paper on prospective research on cryosphere and climate, which was discussed at the 33rd Session of the JSC in Beijing, China, in July 2012.

PHOTO: IÑIGO GARCIA ZARANDONA
Greenland Sea: the summer melt session starts in late May.

Currently, the main motivations for focused research on the cryosphere and climate are related to the prospect of an ice-free Arctic Ocean; the fate of mountain glaciers providing fresh water to hundreds of millions of people worldwide; the strength of positive feedbacks between the warming climate and natural emissions of Greenhouse Gases (GHGs) from the thawing permafrost (both terrestrial and sub-sea); and the role of ice-sheet dynamics in the amplification of Greenland's contribution to global sea-level rise. These issues are getting increasing attention in the international scientific research community and directly relate to societal needs for information about climate change and its impacts. The overarching objective of this Grand Challenge would be to actively promote targeted research activities aimed at substantially improving our understanding of cryospheric processes and feedbacks and our ability to make quantitative initialized predictions and long-term projections of cryospheric quantities and their interactions with the global climate system. The „Climate and Cryosphere" (CliC) project, established as a WCRP core project and co-sponsored by SCAR and IASC will lead these research efforts under the WCRP umbrella.

WCRP, in partnership with IASC, is planning a WCRP Polar Climate Predictability Initiative. Its frontier questions read as follows:

- Why are the climates at the two poles changing so differently from each other (with the Arctic changing rapidly, and the Antarctic unevenly), and to global climate?
- Why is the rate of Arctic change at the edge of (or beyond) the distribution of model estimates, with observations on average exceeding the model rate of change? And why is the situation essentially the opposite in the Antarctic?
- What does high latitude climate change mean for lower latitudes?
- Do the ongoing amplified changes in the Arctic have an influence on extremes in the Arctic?
- How predictable is Arctic climate?
- Is the stability of ice sheets changing? What is the probability of catastrophic ice sheet breakdown in the next few decades?

The questions will be answered through a number of research activities including past polar climate reconstructions and reanalyses, optimizing observational networks, improving climate models and assessing their performance and the degree of confidence that can be placed in them, and a number of focused workshops.

WCRP and CliC cooperation with IASC is strong. Together with SCAR and others we organized an Ice Sheet Mass Balance (ISMASS) workshop as a part of the SCAR Open Science Conference Program in Portland, USA. CliC will provide administrative support to help move these efforts forward. CliC participated in the IASC Cryosphere Working Group-sponsored Tidewater Glacier Workshop in August. As a result, a report on the current state of tidewater glacier research and challenges has been produced, along with an accompanying EOS article. CliC is also providing administrative support for this group to move their efforts forward to produce a catalog of tidewater glaciers, mailing list, web presence and more.

CliC recently received a grant from the Research Council of Norway to host several international bi-polar sea ice workshops. Close collaboration between CliC's Arctic Sea Ice Working Group and members of IASC working groups will be important for the success of these workshops, and follow up activities.

In April 2012, CliC was happy to welcome Dr. Jenny Baeseman as the new Director. Dr. Baeseman has been working with the IASC Community since 2006, when she joined forces with Hugues Lantuit to create the Association of Polar Early Career Scientists, one of the major legacies of the IPY. In July 2012, Heidi Isaksen joined the CliC office as the Administrative Officer.

Under the leadership of the new Director, CliC has recently produced a few new resources that may be of interest to the IASC community:

- Cryosphere Specialist Directory
- Cryosphere Thesis Database (together with APECS and PYRN)
- RSS for Recent Cryosphere Literature
- Cryosphere Projects Catalog
- Cryosphere Community Calendar
- Cryosphere Video Channel
- Cryosphere Podcast Series (available on iTunes)
- … and more are in the works!

Written by
Jenny Baeseman | CliC, Executive Director
Vladimir Ryabinin | WCRP

www.climate-cryosphere.org

PHOTO: ANDREW REED WELLER
Taking notes amongst unnamed mountains above the headwaters of Otuk creek during a fieldtrip into the remote reaches of the National Petroleum Reserve of Alaska.

PHOTO: PIERRE ROUSSEL
IPY Montréal 2012 Banquet - Cirque du Soleil performing.

7. IPY 2012 Montréal Conference "From Knowledge to Action" and Arctic Science Summit Week (ASSW) 2012

» 7 IPY 2012 Montréal Conference "From Knowledge to Action" and Arctic Science Summit Week (ASSW) 2012

The International Polar Year (IPY) 2007/2008, initiated by and organized through the International Council for Science (ICSU) and the World Meteorological Organization (WMO), was the fourth polar year, following those in 1882/1883, 1932/33 and 1957/58. IASC was represented as ex officio member on the ICSU/WMO IPY Joint Committee through its Executive Secretary from the very beginning. In 2008, building on a Letter of Agreement between the two organizations, IASC and the Scientific Committee on Antarctic Research (SCAR) jointly organized the first IPY Conference in St. Petersburg (Russia). It was the largest polar meeting to that date and the first bipolar conference. Consequently, IASC and SCAR became very much involved in the planning of the second IPY conference, the IPY 2010 Oslo Conference, which doubled the number of participants of the St. Petersburg meeting. The Oslo conference marked the formal closure of the IPY 2007/2008 but, recognizing the need to develop collaborative strategies for addressing important issues identified by IPY researchers, the IPY Joint Committee endorsed the third and final conference of the IPY, the IPY 2012 Montréal Conference "From Knowledge to Action". Again, IASC and also SCAR became members of the Conference Steering Committee to help shape the conference program. At the same time, IASC and its partner organizations decided to arrange the Arctic Science Summit Week (ASSW) 2012 in conjunction with the Montréal Conference.

IPY 2012 Conference

The third and last conference of the IPY, the IPY 2012 ´´From Knowledge to Action´´ Conference, held in Montreal (Canada) at the end of April, was a great success. More than 3,000 scientists, policy- and decision-makers, industry representatives and local residents of the circumpolar communities attended the conference to share the knowledge of the Polar Regions, to present the latest findings and to discuss solutions for addressing the challenges the Polar Regions are facing.

IASC substantially contributed to the planning and scientific program of the IPY 2012 Conference and the below summary presents only a few key activities.

IASC Early Career Scientist Travel Stipends

For the IPY 2012 Montréal Conference, IASC awarded twenty travel stipends to early career scientists, enabling many to attend the final IPY conference. The travel funds were awarded in cooperation with the Association for Polar Early Career Scientists (APECS). (see Chapter 8).

Momentum Series - International Polar Initiative

During the IPY Conference in Montreal a series of 4 sessions were held to consider possibilities for sustaining the legacy of IPY. This 'Momentum Series' consisted of four open sessions chaired by a group of individuals who had played various roles in establishing IPY 2007-2008. Each of the Momentum Series sessions summarized lessons learned during IPY and engaged the wider polar community in determining the anticipated major polar issues and science questions for the next 20 years; in identifying requirements for critical monitoring, observation, prediction and data management services; and in discussing mechanisms for strengthening coordination, cooperation and planning for the future of polar research. The significance of capacity building, engagement of polar residents, and education and outreach initiatives were also highlighted.

The Momentum Series introduced the concept paper for the "International Polar Initiative (IPI)" that was prepared in advance of the IPY Conference (see Chapter 5).

Perceptions and representations of polar (climate) science

This IPY 2012 Conference session, which was chaired by James Overland and Peter Schweitzer, addressed the following conundrum: ***while recent years have brought massive advances in understanding the polar systems, popular understanding of these processes seems to be diminishing. In light of tremendous changes threatening the state of the system in the Arctic and Antarctic, misperceptions of polar science are a matter of concern.*** Session participants included media representatives alongside climate and social scientists. While polar science communication certainly has room for improvement, the session did not just "blame" the state of affairs on communication failures. Rather, several of the participants pointed to a lack of receptivity or cultural predisposition as roadblocks to a broader understanding of potential risks and opportunities resulting from climate change. In the end, reframing information so that it is both relevant and non-threatening to the intended audience emerged as one of the recommendations of a stimulating session.

J. Overland and P. Schweitzer (2012) Polarization and Polar Climate. EOS Vol. 93, No. 40, 2 October 2012, page 390.

IASC Medal Award Ceremony

During the Montreal Conference, the IASC Medal 2012 was awarded to Dr. Igor Krupnik for his exceptional contribution to the success of the International Polar Year.

Over his career, Dr. Krupnik has been instrumental in increasing public awareness not only about polar bears and ice, but more importantly about the inhabitants of the north. He was awarded the medal for his role in bridging the gap between social and natural sciences and for his leadership during the International Polar Year.

The medal was presented by the IASC President and the award ceremony was followed by Dr. Krupnik´s medal lecture entitled "Sea Ice as a Cultural 'Scape' – an IPY Legacy".

PHOTO:
Dr. Igor Krupnik was awarded the IASC Medal 2012.

IASC Booth

An IASC Booth, presenting informational roll-ups, IASC yearbooks, brochures and reports was set up in the exhibition area of the conference.

Other Sessions and Side Meetings

IASC was also involved in the following sessions:

- Synopsis of IPY key findings and other recent polar research
- Linking science and policy towards environmentally sustainable development in polar regions
- Polar science goes digital

and side meetings

- Arctic Climate System Network (ACSNet)
- Sustaining Arctic Observing Networks (SAON) Town Hall Meeting

Finally, in the closing ceremony, IASC, together with SCAR and APECS, received the IPY torch (a Norwegian "budstikke"), indicating that these three organizations are now assuming responsibility for securing the IPY legacies.

PHOTO:
Peter Harrison, Chair of the IPY 2012 Montréal Conference, with the IPY "budstikke".

Arctic Science Summit Week 2012

The Arctic Science Summit Week (ASSW) 2012 was held from 19-22 April 2012, immediately preceding the IPY 2012 Montreal Conference. It included business meetings of the Arctic organizations, including the meetings of the IASC Council and Working Groups.

IASC Council Meeting

IASC Council, at its meeting during the ASSW 2012, reviewed the activities of the five IASC Working Groups and highlighted that within only one year they initiated an impressive number of cutting-edge activities. Council also agreed to continue endorsing and sponsoring IASC Networks and adopted Terms of Reference for its networks. Underlining the importance of bipolar research, Council confirmed the value of the synergy with its southern hemisphere counterpart, the SCAR, and acknowledged the report presented by the 2nd SCAR/IASC Bipolar Action Group (BipAG II). Referring to the recommendations of the Bipolar Action Group, Council decided to establish two new Action Groups: (1) to provide advice on possible approaches to better address Arctic terrestrial and marine geological research in the broadest sense of geosciences and (2) to undertake the development of an IASC Data Policy that would provide guidance for IASC supported activities, and reinforce IASC's commitment to data management and sharing activities.

Council also discussed joint activities with the Arctic Council, such as Sustaining Arctic Observing Networks (SAON), Adaptation for a Changing Arctic (AACA) and Arctic Resilience Report (ARR), IASC´s contributions to ICSU and the cooperation with the numerous partner organizations. IASC is committed to maintaining the momentum generated by the IPY and is actively involved in the planning of the International Polar Initiative (IPI). To prepare for an important event, namely the 25th Anniversary of IASC in 2015, Council mandated the Executive Committee to form a Steering Group to advance the planning. The final event of the 25 years of IASC celebration will be held at the Arctic Science Summit Week 2015 and will include a third International Conference on Arctic Research Planning (ICARP III) and the presentation of an IASC history publication.

SCHEDULE OF THE ASSW 2012 (www.assw2012.org)

	19-April	20-April	21-April	22-April
Morning	IASC Marine WG IASC Terrestrial WG	IASC Council	IASC Social WG IASC Atmosphere WG Forum of Arctic Research Operators (FARO)	IASC Cryosphere WG Association of Early Career Scientists (APECS) PAG Business
Afternoon	IASC Marine WG IASC Terrestrial WG	IASC Council	IASC Social WG Pacific Arctic Group (PAG) Science European Polar Board (EPB) International Permafrost Association (IPA)	APECS Council
Evening		Icebreaker Reception	IASC WG Chairs Meeting	

IASC Working Groups

The five IASC Working Groups (Atmosphere, Cryosphere, Marine, Social & Human and Terrestrial) met during the ASSW 2012 and reviewed activities begun in 2011 and planned for several new initiatives. A detailed summary is given in Chapter 2.

Upcoming ASSWs

The ASSW 2013, including a three-day Science Symposium entitled "The Arctic Hub - Regional and Global Perspectives", will be held in Kraków, Poland on 13-19 April 2013.

The ASSW 2014, which will include an Arctic Observing Summit, will be held in Helsinki, Finland on 07-12 April 2014.

The ASSW 2015, including IASC´s 25th Anniversary Celebration and the Third International Conference on Arctic Research Planning (ICARP III) will be held in Japan. (See Chapter 1)

PHOTO: PIERRE ROUSSEL
IPY Montréal 2012 Banquet - Cirque du Soleil performing.

PHOTO: ALLEN POPE
Juneau Icefield Research Program 2012

8. Capacity Building

» 8 Capacity Building

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

- Striving for representation of early career researchers in the organization;
- Providing endorsement, support and dissemination of information on activities, projects and request for participation; and
- Providing travel grants to early career scientists for selected conferences.

With these instruments, IASC aims to include more young researchers from the starting phase in the organization of workshops, science planning activities and research programs. Last year, more than 76 Early Career Scientists received IASC travel stipends to attend conferences or workshops (see table on page 97).

IASC has an official partnership with the Association of Polar Early Career Scientists (APECS) to further the professional development of early career researchers. In a Memorandum of Understanding, IASC and SCAR recognizes APECS as the preeminent organization for young researchers working in the Arctic, Antarctic and cryospheric regions.

PHOTO:
APECS Council Meeting during the IPY 2012 Conference in Montréal.

Association of Polar Early Career Scientists (APECS)

Much like the rest of the Polar Research world, APECS had a transitional and reinvigorating 2012. Highlighted in the middle of the year by extensive participation in the "From Knowledge to Action" IPY 2012 Conference, 2012 was filled with APECS action from start to finish.

Perhaps the biggest change for APECS this year was a transition in the APECS International Directorate. The new Director of APECS is Dr. Alexey Pavlov, an outstanding young scientist from the Arctic and Antarctic Research Institute in St. Petersburg, Russia. Alexey's enthusiasm and energy will help APECS to develop further and motivate young leaders to collaborate and shape the future of polar research.

The APECS membership has seen continued growth in 2012; we have more than 3700 members from 76 countries! This year alone, eight new APECS National Committees were (re-)established: Canada, Oceania (New Zealand/Australia/Tasmania), the Netherlands, Denmark, USA Northeast chapter, Bulgaria, Belgium and Spain. Internationally, APECS organized more than 40 international panels, workshops, and field schools together with our partners and in conjunction with major polar conferences and meetings – including the IPY Montreal conference and in conjunction with the Arctic in Rapid Transition project in Sopot, Poland during October 2012.

One of the major priorities of the APECS leadership this year was to strengthen connections with our partners, including IASC. In addition to a range of new Memoranda of Understanding (with the International Association of Cryospheric Sciences (IACS), Permafrost Young Researchers Network / International Permafrost Association (PYRN/IPA), Arctic Frontiers/Akvaplan-niva, and the High North Academy), APECS members were nominated as representatives in committees and groups such as the Arctic Science Summit Week (ASSW) 2013 Scientific Steering Committee, the International Polar Initiative (IPI) Steering Group, the Scientific Committee on Antarctic Research (SCAR) Standing Scientific Groups and for the SCAR delegates meeting, the International Arctic System for Observing the Atmosphere Knowledge to Action Steering Committee (IASOA KASC), and Arctic Council working group Conservation of the Arctic Flora and Fauna (CAFF). We want to thank all of our partners for making these opportunities possible and for helping to train the next generation of polar scientists!

APECS also focused on upgrading its main platform for communication – the APECS website. APECS not only has a new look, but also new functionality for members to find and connect with each other which we like to call the "Polar Facebook." In addition, we made the structure even easier for our members to navigate. The new set of social networking options helps to connect with other young scientists and colleagues, send messages, find out contact information, create groups to meet, collaborate, initiate discussions, share fieldwork photos/videos, and much more. APECS is committed to maintaining our strong collaboration with IASC and its members for our career development resources, including the Cool Speakers database, field schools listings, funding resources, jobs listings, event calendar, and more.

As always, APECS is organizing many activities online for APECS members worldwide. We have expanded our Research Feature concept which will help to highlight not only research within one discipline, but also interdisciplinary topics such as the International Polar Week, the Svalbard Network, the International Polar Year, the Russian Arctic, and many others in the

coming year. The APECS Education and Outreach committee has been very active in 2011-2012 with the very successful organization of Antarctica Day 2011 and two Polar Weeks in March and September 2012 which are celebrated together with IASC, the Arctic Research Consortium of the US (ARCUS), the newly established Polar Educators International (PEI), and SCAR.

In addition, APECS added to our career development resources by expanding the webinar series and monthly Virtual Poster Sessions on various topics. APECS has continued to bring together new and experienced researchers by pairing APECS member presentations with those of more experienced researchers suggested by IASC and SCAR. More webinars are planned for the coming year with the great support of our new partner – the High North Academy. As always, you can see new and archived content at apecs.is/webinars.

All of the activities organized by APECS would not be possible without our members, mentors, and sponsors. A special thank you goes to the University of Tromsø, the Norwegian Polar Institute and the Research Council of Norway for hosting and supporting the APECS International Directorate in Tromsø. APECS has also begun to invest in its own future by developing the institutional framework and capacity for soliciting and accepting donations to further the APECS mission. For more information please visit http://apecs.is/donate for our funding booklet and http://apecs.is/partners-and-sponsors to see who has joined us. We want to thank all of them for their continuous help and support over the past year and are looking forward to working with you more in the coming years!

For the coming year, APECS is already planning a number of great new activities, including career development workshops and panels, webinar series in partnership with the Fram Center and the High North Academy, Polar Week outreach events, and continued advocacy for building a continuum in polar research. Of particular interest to the IASC community will be the APECS career development workshop paired with Arctic Science Summit Week 2013 – check out the latest at apecs.is/assw2013! APECS is also partnering with IASC and a number of other international polar organizations to coordinate the scheduling and organization of polar events worldwide. Stay up to date on the latest highlights at http://apecs.is and read our full Annual Report at http://apecs.is/2011-2012-report.

Written by:

Allen Pope

and the 2012-2013 APECS Executive Committee

www.apecs.is

Arctic in Rapid Transition (ART)

An emerging network linking time-scales, disciplines and generations to better understand the changing Arctic Ocean

ART is an international scientific network focused on bridging time scales, science disciplines, and geographic regions to better understand the past, present and future response of Arctic marine ecosystems to sea ice transitions and climate change. ART was originally developed with the aim of updating and refreshing the issues raised within the reports of the International Conference on Arctic Research Planning II (ICARP II) to a post-International Polar Year (IPY) perspective. In that way, ART is a product of the ICARP-II Marine Roundtable, an initiative of the former Arctic Ocean Sciences Board (AOSB), now the IASC Marine Working Group. The science and implementation plans of ART were developed during two successful workshops that took place in Fairbanks (USA) and Winnipeg (Canada) and endorsed by the MWG and IASC in 2010 and 2011, respectively. The implementation of ART is following a three-phase approach extending up to 2020 (http://www.iarc.uaf.edu/ART/), with a progression from a networking stage to phases centered on data collection, modeling and synthesis.

The uniqueness of ART in the vast panorama of Arctic scientific networks and programs is arrayed along five original aspects: (1) ART was entirely developed and is led by Early Career Scientists (ECS), with the ongoing support by an advisory board; (2) it is international and aims at integrating knowledge beyond regional specificities; (3) it is inter-disciplinary, fosters data exchange across disciplines and aims at including the human dimension; (4) it has an emphasis on connecting temporal scales from paleo-records, modern observations and predictive modeling; and (5) it stresses the importance of mentoring and knowledge transfer across generations. Those axes are supported by a series of key science questions linking physical forcings, biogeochemical-ecological processes and societal implications that form the core of the ART scientific program.

Within the framework of ART Phase I and with the aim of further developing the organic identity of ART as an interdisciplinary and international network led by ECS, ART joined forces with APECS to organize its first science and training workshop. This event entitled "Overcoming Challenges of Observation to Model Integration in Marine Ecosystem Response to Sea Ice

PHOTO:
Meeting of APECS National Committees during the IPY 2012 Conference in Montréal.

PHOTO:
ART-APECS workshop participants, 22-26 October 2012, Sopot, Poland.

Transitions" took place in Sopot, Poland, at the Institute of Oceanology Polish Academy of Sciences (IOPAN), from 22 to 26 October 2012. The workshop gathered 64 participants (23 PhD students, 25 post-docs and 16 senior scientists) coming from 12 different countries and with very various backgrounds (e.g. modeling, paleo-oceanography, marine ecology, coastal and glacier dynamics, atmospheric sciences, and social sciences). The workshop was primarily supported by a cross-cutting grant from IASC, as well as by funds from the Prince Albert II of Monaco Foundation and from the Polish Academy of Sciences.

The overarching objective of the workshop was to bring together scientists with diverse expertise and levels of experience in order to develop inter-disciplinary research papers. A unique aspect of this activity was to give leadership of the sub-group discussions that led to manuscript planning to ECS. This resulted in the conception of 8 potential papers that would deal with cross-cutting aspects of Arctic marine sciences, ranging from the physical regime over geological and modern time-scales, to the biogeochemical impact of terrigenous delivery, up to the responses of the carbon cycle, food web efficiency, and to the implications for society. In addition to these breakouts, the workshop consisted in a coherent series of training seminars, hands-on practicals, plenary lectures, and poster sessions. Following the philosophy behind ART and APECS, the emphasis of the workshop was thus on the active involvement and mentoring of the emerging scientific generation that is progressively playing an increasing role in Arctic science planning and managing. Such framework is essential to allow for capacity building and empowerment within the large cohort of new Arctic scientists recently trained in the wake of the International Polar Year 2007-2008 and other large-scale Arctic programs that took place over the last decade.

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

Overview of supported Early Career Scientists

NAG Workshop
Poland, January 2012

NAME	INSTITUTION	COUNTRY
S. Cordeau	University of Victoria	Canada
A. M. Espanol	Technical University of Madrid	Spain
A. Ingle	University Edinburgh	UK
E. Welty	University Colorado Boulder	USA
A. Pope	University Cambridge	UK
A. Prominska	Polish Academy of Sciences	Poland
S. Ojha	Nepal Ministry of Energy	Nepal
W. v. Wychen	University Ottawa	Canada

IPY Conference
Montreal, April 2012

R. G. Bertelsen	Aalborg University	Denmark
M. Chevallier	CNRM-GAME, Météo-France/CNRS	France
H. De Haas	University of Groningen	Netherlands
J. Dudek	Jagiellonian University	Poland
P. Echeveste	Mediterranean Institute for Advanced Studies	Spain
J. Fisher	Harvard University	USA
N. Galin	Center for Polar Observation and Modelling	UK
H. Gordon	University of Wisconsin-Madison	USA
M. Heather	University of Jyväskylä	Finland
E. Jantze	Stockholm University	Sweden
D. Kirievskaya	VNIIOkeangeologia	Russia
F. Kruse	University of Groningen	Netherlands
L. Lukes	North Carolina State University	USA
N. Morata	Institut Universitaire Européen de la Mer, LEMAR	France
J. Schmale	Max Planck Institute for Chemistry, IASS Potsdam	Germany
M. Strzelecki	Durham University	UK
J. P. Chaubey	Vikram Sarabhai Space Centre	India
A. Zavadskaya	Lomonosov Moscow State University, Kronotsky Nature Reserve	Russia

ACSNet
Montreal, April 2012

S. Cole	Woods Hole Oceanographic Institution	USA
S. Knuth	University of Colorado Boulder	USA
A. Orlich	International Arctic Research Center	USA

Circum-Arctic Lithosphere Evolution (CALE)
Vienna, April 2012

K. Brumley	Standford University	USA
E. Gottlieb	Standford University	USA

Vulnerability on Permafrost Carbon
Florida, May 2012

NAME	INSTITUTION	COUNTRY
G. Grosse	University of Alaska Fairbanks	USA
C. Koven	Lawrence Berkeley National Laboratory	USA
D. Olefeldt	University of Guelph	Canada
D. Hayes	Oak Ridge National Laboratory	USA
B. Sannel	Stockholm University	Sweden

Atmosphere-Ice-Ocean Boundary Layer Processes and Their Role in Polar Change Boulder, June 2012

J. Bowman	University of Washington	USA
L. Candlish	University of Manitoba	Canada
T. Keitzl	Max Planck Institute of Meteorology	Germany
B. Loose	Woods Hole Oceanographic Institution	USA
T. Valkonen	University of Helsinki	Finland

Field Workshop on Studies of Tidewater Glaciers
Svalbard, August 2012

N. Berrand	British Antarctic Survey	UK
C. Borstad	Jet Propulsion Laboratory	USA
Y. Drocourt	Swansea University	UK
T. Dunse	University of Oslo	Norway
E. Enderlin	Ohio State University	USA
A. Hamilton	University of British Columbia	Canada
C. Mortimer	University of Alberta	Canada
C. Nuth	University of Oslo	Norway
M. Schäfer	University of Lapland	Finland
K. Schild	Dartmouth College	USA
P. Sharma	National Centre for Antarctic and Ocean Research	India
T. Schellenberger	University of Oslo	Norway

ART-APECS Workshop
Sopot, October 2012

NAME	INSTITUTION	COUNTRY
E. Choy	Fisheries and Oceans Canada and the University of Manitoba	Canada
A. Condron	University of Massachusetts Amherst	USA
C. David	Alfred Wegener Institute for Polar and Marine Research	Germany
G. deBoer	CIRES/NOAA ESRL	USA
S. Duerksen	York University	Canada
V. Fofonova	Alfred Wegener Institute for Polar and Marine Research	Germany
A. Forest	Takuvik, Québec-Océan and ArcticNet, Université Laval	Canada
M. Korhonen	Finnish Meteorological Institute	Finland
B. Lange	Alfred Wegener Institute for Polar and Marine Research	Germany
M. Laska	University of Silesia	Poland
M. Miernecki	University of Valencia	Spain
C. Moritz	Institut des Sciences de la Mer - Université du Québec à Rimouski	Canada
M. Moskalik	Department of Polar Research, Institute of Geophysics, Polish Academy of Sciences	Poland
A. Silyakova	Bjerknes Center for Climate Research	Norway
I. Sudakov	University of Utah	USA/Russia
A. Wagner	Alfred Wegener Institute for Polar and Marine Research	Germany
K. Werner	GEOMAR Helmholtz Centre for Ocean Research Kiel	USA/Germany
C. Wood	Clark University	USA

GTN-P Workshop
Hamburg, November 2012

P. Pogliotti	ARPA Valle d'Aosta	Italy

CircumArctic Rangifer Monitoring and Assessment Workshop on the global status of migratory tundra Rangifer (CARMA) Vancouver, December 2012

A. Bali	University Alaska	USA
J. Launspach	University Northern Iowa	USA
J. Steele	University Calgary	Canada
R. Thorarinsdottir	East Iceland Natural History Institute	Iceland

PHOTO: ALLEN POPE
Mass Balance research, Tarfala Station, northern Sweden.

PHOTO: MARTINA SCHÄFER
Reindeer in the sun during glaciological fieldwork near the Polish Polarstation in Hornsind, Svalbard.

List of Acronyms and Abbreviations Bulletin 2013

Acronym	Full name
A	
AACA	Adaptation for a Changing Arctic
ABC	Arctic Biodiversity Coalition
AC	Arctic Council
ACA	Arctic Change Assessment
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
AFWG	Arctic Fisheries Working Group
AGG	Action Group on Geosciences
AGU	American Geophysical Union
AHDR	Arctic Human Development Report
AIDA	Atmospheric Investigations on a Drifting observatory over the Arctic Ocean
AMAP	Arctic Monitoring and Assessment Program
AntClim21	Antarctic Climate Change in the 21st Century
AntEco	State of the Antarctic Ecosystem
AnT-ERA	Antarctic Thresholds – Ecosystem Resilience and Adaptation
AntETR	Antarctic Ecosystems: Adaptations, Thresholds and Resilience
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
ARR	Arctic Resilience Report
ART	Arctic in Rapid Transition
ARCDIV NET	Network for ARCtic Climate and Biological DIVersity Studies
ARCUS	Arctic Research Consortium of the US
ASI	Arctic Social Indicators
ASSW	Arctic Science Summit Week
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
AWI	Alfred Wegener Institute for Polar and Marine Research
B	
BipAG	Bipolar Action Group
C	
CAFF	Conservation of Arctic Flora and Fauna
CALE	Circum-Arctic Lithosphere Evolution

Acronym	Full name
C	
CBMP	Circumpolar Biodiversity Monitoring Program
CHRN	Circumpolar Health Research Network
CliC	Climate and Cryosphere Project
CMIP	Coupled Model Intercomparison Project
CPE	Comité Polar Español
CSIC	Spanish National Research Council
CVII	Commission on Volcano Ice Interactions
D	
DACA-13	Davos Atmospheric and Cryospheric Assembly 2013
DBO	Distributed Biological Observatory
E	
ECORD	European Consortium for Ocean Research Drilling
ECS	Early Career Scientists
ECV	Essential Climate Variables
EGU	European Geophysical Union
EIWG	Extractive Industries Working Group
EOC	Education, Outreach and Communication
EPB	European Polar Board
ESA	European Space Association
ESSAS	Ecosystem Studies of Sub-Arctic Seas
ESF	European Science Foundation
ESM	Earth System Models
F	
FARO	Forum of Arctic Research Operators
FRISP	Forum for Research into Ice Shelf Processes
G	
GAPHAZ	Glacier And Permafrost HAZards in mountains
GCM	Global Climate Model
GCOS	Global Climate Observing System
GDEM	Global Digital Elevation Model (GDEM)
GEUS	Geological Survey of Denmark and Greenland
GIA	Glacial Isostatic Adjustment
GIC	Glacier and Ice Cap
GICAC	Glaciers and Ice Cap Assessment Consortium
GLACIODYN	Dynamic Response of Arctic Glaciers to Global Warming
GLIMS	Global Land Ice Measurements from Space
GRACE	Gravity Recovery and Climate Experiment
GRASP	The Greenland Analogue Surface System Project
GTN-G	Global Terrestrial Network for Glaciers
GTN-P	Global Terrestrial Network on Permafrost
GTOS	Global Terrestrial Observing System
I	
IACS	International Association of Cryospheric Sciences

Acronym	Full name
IAI	International Antarctic Institute
IAMAS	International Association of Meteorology and Atmospheric Sciences
iAOOS	integrated Arctic Ocean Observing System
IASOA	International Arctic System for Observing the Arctic
IASC	International Arctic Science Committee
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
ICASS	International Congress of Arctic Social Sciences
ICES	International Council for the Exploration of the Sea
ICSU	International Council for Science
IGS	International GPS Service
IJCH	International Journal for Circumpolar Health
IMBIE	Ice sheet mass balance inter-comparison exercise
IMAU	Institute for Marine and Atmospheric research Utrecht
INCHR	International Network for Circumpolar Health Research
INTERACT	Intern. Network for Terrestrial Research and Monitoring in the Arctic
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
IPA	International Permafrost Association
IPI	International Polar Initiative
IPY	International Polar Year
IPY IPO	International Polar Year International Programme Office
ISAC	International Study of Arctic Change
ISAR 3	Third International Symposium on Arctic Research
ISMASS	Ice Sheet Mass Balance and Sea Level
IUGG	International Union of Geodesy and Geophysics
J	
JC	Joint Committee
JSC	Joint Scientific Committee
K	
KOPRI	Korea Polar Research Institute
L	
LoA	Letter of Agreement
LOICZ	Land-Ocean-Interactions in the Coastal Zone
M	
MARUM	Centre for Marine Environmental Sciences
MOSAiC	Multidisciplinary drifting Observatory for the Study of Arctic Climate
MoU	Memorandum of Understanding

Acronym	Full name
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
NRC	National Research Council
NSF	National Science Foundation
NWP	Numerical Weather Prediction
NySMAC	Ny-Ålesund Science Managers Committee
OGS	National Institute of Oceanography and Experimental Geophysics
OSC	Open Science Conference
PAG	Pacific Arctic Group
PAIS	Past Antarctic Ice Sheet Dynamics
PAN	Polar Archeology Network
PAST Gateways	Palaeo-Arctic Spatial and Temporal Gateways
PCSP	Polar Continental Shelf Program
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
PYRN	Permafrost Young Researchers Network
QUEEN	Quaternary Environment of the Eurasian North
RCM	Regional Climate Model
RCN	Research Coordination Network
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
SDWG	Sustainable Development Working Group
SEARCH	Study of Environmental Arctic Change
SERCE	Solid Earth Response and influence on Cryosphere Evolution
SG	Steering Group
SIOS	Svalbard Integrated Arctic Earth Observing System
SPARC	Stratospheric Processes And their Role in Climate
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
TICOP	Tenth International Conference on Permafrost
TRANSSIZ	Transitions in the Seasonal Sea Ice Zone
UAF	University of Alaska Fairbanks
UArctic	University of the Arctic
UNCLOS	United Nations Convention on the Law of the Sea
UNIS	The University Centre in Svalbard
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