IASC IN TRANSITION

FACING NEW CHALLENGES IN ARCTIC SCIENCE

OPEN FORUM DISCUSSION

MARCH 25 18.30 -20.00

18.30 OPENING by Kristján Krisjánsson, IASC President

18.45 PRESENTATIONS Scientific Standing Committees

TERRESISTRIAL SYSTEM
Interim Chair: Terry Callaghan

Opportunity for questions and response

CRYOSPHERE SYSTEM
Interim Chair: Martin Sharp

Opprtunity for questions and response

AOSB / MARINE SYSTEM
Interim Chair: Harald Loeng

Opportunity for questions and response

HUMAN & SOCIAL SYSTEM
Interim Chair: Louwrens Hacquebord

Opportunity for questions and response

ATMOSPHERE SYSTEM
Interim Chair: James Overland

Opportunity for questions and response

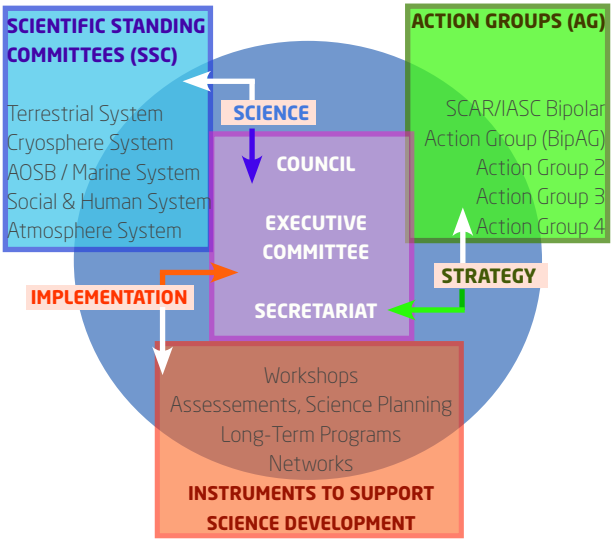
20.00 RECEPTION with drinks & snacks

„A great opportunity lies ahead to implement a strong organizational structure that will lead IASC into the future of arctic research."

Since the founding of IASC, the scientific, environmental, economic and political realities of the North have changed dramatically. New problems and challenges ask for new or improved scientific knowledge. This increased need for knowledge of the arctic region has made international cooperation even more essential. With the commitment, input and support from all its members and the arctic science community, IASC now has the chance to strengthen its position as the leading international organization of scientific expertise in the Arctic.

New IASC structure

The core elements of the new IASC structure are the Scientific Standing Committees (SSCs) and Action Groups (AGs). The SSCs will identify and formulate science plans, act as scientific advisory boards to the IASC Council and will assist IASC in the implementation of its science mission.



We believe that the new structure reflects the more integrative nature of today's polar science. Top scientist from all IASC member countries and ex-officio representatives from arctic organizations will be appointed to the Scientific Standing Committees (SSCs). The structure is designed to facilitate international consultation and cooperation in all aspects of arctic research. In particular, the role and responsibilities of the new committees include:

- Identify priority areas for international research;
- Encourage and support international scientific efforts;
- Encourage means of initiating, coordinating and maintaining long-term observational sytems;
- Address data management issues;
- Ensure interaction with other relevant organizations;
- Develop cross-cutting proposals where appropriate;
- Provide scientific advice to the Council and outside organizations;
- Initiate conferences, workshops and educational events;
- Promote future generations of arctic scientists;
- Encourage the exchange and dissemination of information.

Kristján Kristjánsson, IASC President

TERRESISTRIAL SYSTEM

Interim Chair: Terry Callaghan

The vast landmasses of the Arctic support human habitation and provide many direct and indirect ecosystem services to residents and the global community. The Arctic's rich biodiversity has many uniquely adapted species that are vulnerable to environmental change. Although the Arctic's biota have experienced climate change in the past, recent warming together with fragmentation of habitats, changes in land use, and increases in pollution and ultra-violet B radiation present a new combination of environmental stresses.

Species and ecosystems are already responding to these stresses and are thereby affecting ecosystem services. However, the complicated relationships between different kinds of organism within ecosystems, and their varying relationships to the environment, result in complex responses of species and ecosystems to environmental change through time. This SSC seeks to understand these complex changes and their consequences for ecosystem services.

Scientific Content

The committee will address changes from local scales that are necessary for the planning of adaptation strategies by local residents to changes at global scales that contribute to the need for mitigation. It will encourage a widening of past research that identified ecosystem change by providing the tools for local adaptation, such as high-resolution ecosystem models.

The SSC will capacity build, provide outreach, and expand the knowledge base for local and global assessments of arctic ecosystem responses to environmental change. There is an additional need to develop fundamental and unifying concepts in biology and ecology such as understanding the biological and ecological attributes of species that can survive in the Arctic's extreme environments.

The physical area of interest will encompass lands stretching from the taiga-tundra boundary to the polar deserts and will include life on glaciers and life in permafrost. It will also include the rivers, lakes, ponds and wetlands of the Arctic and the stretches of rivers outside the Arctic that are necessary to understand environmental and ecosystem process within it.

Proposed Scientific Foci

- Estimating past changes in the Arctic's biodiversity using multiple proxies, measuring current and recent changes by survey and monitoring, and projecting future changes by deploying long-term environmental manipulation experiments and developing new "community" computer models;
- Determining the net effect of the terrestrial biosphere's processes that amplify or moderate climate warming;
- Developing high-spatial resolution models of changes in ecosystem structure and function and other tools that arctic residents can use to adapt to environmental change;
- Developing unifying concepts and fundamental theories of the interactions between species, interactions between species and their environment, and the biology of life in extreme environments.

Cross-cutting Issues

- Interactions between the biosphere and the atmosphere;
- Interactions between the cryosphere, hydrology and land and freshwater ecosystems;
- Interactions between ecosystems and resource use by humans;
- Maintenance and development of integrated observing platforms and networks to detect non-linear changes and to test the effectiveness of any future adaptation and mitigation actions.

Potential Collaborators: AMAP, CAFF, SCANNET, IPA, CliC, NSIDC, relevant IPY and past IASC projects, the EU project CAREX.

CRYOSPHERE SYSTEM

Interim Chair: Martin Sharp

Over the past several decades, the Arctic has been one of the most rapidly warming regions of the planet. This warming has had profound effects on the cryosphere, which includes solid precipitation and the sea ice, ice sheets, glaciers, snow cover, permafrost, frozen ground, lake ice and river ice that are found seasonally or perennially throughout the Arctic. These effects include record reductions in arctic summer sea ice extent, the abrupt acceleration of Greenland outlet glaciers, warming of permafrost, and the disintegration of the last floating ice shelves in the Arctic.

Such changes have feedback effects on the arctic climate and its evolution, can substantially modify ocean properties and circulation, marine and terrestrial ecosystems and have significant impacts on arctic populations, infrastructure, and economic activity.

Documenting these changes, predicting how they will evolve in future, and understanding their consequences have become major foci of scientific enquiry that will be targeted by the Cryosphere System SSC.

Scientific Content

The SSC will be concerned with the science and observing systems required to understand the role of the arctic cryosphere in the Earth System. It will promote science targeted at improving the knowledge base required for major climate change assessments such as IPCC, ACIA and SWIPA. It will encourage rapid public dissemination of information about cryosphere change to the scientific community, policy makers, and the general public. The geographic focus will be the Arctic Council nations, the major river basins draining to the Arctic Ocean, and areas north of the southern limit of discontinuous permafrost.

Proposed Scientific Foci

- The cryosphere as an indicator of environmental change;
- The cryosphere as a climate amplifier;
- The role of the cryosphere in the arctic hydrological system;
- Arctic land ice and global sea level;
- Representation of the arctic cryosphere in climate and earth system models;
- Interactions between cryosphere components;
- Biology and biogeochemistry of icy environments;
- Impacts of cryosphere change on human activity in the Arctic.

Cross-cutting Issues

- Maintenance of observing networks and systems, including satellite observations;
- Improving input to climate change assessments and policy making;
- Rapid public dissemination of information about cryosphere change.

Potential Collaborators: CliC, ISAC, DAMOCLES, WMO Global Cryosphere Watch, SCAR ISMASS, IASC-NAG, IPA

AOSB/MARINE SYSTEM
Interim Chair: Harald Loeng

The Marine System SSC is formed from the existing Arctic Ocean Sciences Board (AOSB) and is already highly experienced with supporting multinational and multidisciplinary science and engineering programs. The existing structure provides the committee with a valuable access to a high profile network of expertise in the field of marine research in the Arctic.

Scientific Content

As its IPY flagship program, the integrated Arctic Ocean Observing System (iAOOS) has noted: "We cannot understand arctic change just by studying the Arctic, that change may certainly be imposed on the Arctic Ocean from the subarctic seas". In the tradition of AOSB, the SSC will continue to consider any scientific discipline doing research in the Arctic Ocean and surrounding seas, including Arctic sub-seas.

While there has been a rapid acceleration in ocean observations during the IPY, it will be the priority of the SSC to facilitate a discussion of the important legacy phase observations that should be continued.

Another scientific commitment is to come to a better understanding of the potential extent of high latitude climate change. To improve our ability to plan changing environmental conditions in the Arctic, we need to improve our understanding of and better define the feedbacks between physical drivers, biological production and biogeochemical cycles.

The Arctic in Rapid Transition (ART), as being developed by the ICARP II Marine Roundtable, is a proposed integrative, multi-disciplinary, long-term, pan-Arctic program. It studies changes and feedbacks with respect to the physical characteristics and biogeochemical cycles of the Arctic Ocean and its biological productive capacity in the context of human use.

Proposed Scientific Foci

- The state and future fate of arctic perennial sea ice;
- Commitment to a long-term study of the geological record of the Arctic Ocean;
- The Arctic in Rapid Transition (ART) program to better assess future changes.

Cross-cutting Issues

- Addressing the legacy phase of iAOOS in cooperation with the Cryosphere and Atmosphere SSCs;
- Work closely together with the experts from the Social System, Cryosphere and Terrestrial SSCs to adequately address the issues posed in the ART proposal.

Potential Collaborators: ISAC, Arctic ROOS, Arctic Observing Forum of SAON, IODP, NADP, SCOR.

HUMAN & SOCIAL SYSTEM

Interim Chair: Louwrens Hacquebord

In the last five years, human and social sciences have finally achieved the position in polar research, which they deserve. Although much research in this field had been done previously, ACIA 2005 has increased research endeavor in this field enormously.
For the first time the impact of a warming Arctic was studied not only from a natural sciences perspective but also from that of the Human and Social Sciences. Eight of the eighteen chapters in this report contain information about the impact of a changing Arctic on human activities. In the same period the Arctic Human Development Report (AHDR, 2004) was written to provide a comprehensive knowledge base for the Arctic Council's sustainable development program by providing an assessment of human development in the Arctic.
Based on these two reports, ICARP II (2005) formulated two science plans in this field. This increased interest induced an extra theme in the program of the IPY especially devoted to the human and social sciences in polar areas. It has stimulated this field of research enormously. Several IPY projects carried out under this theme have produced very promising results.

Scientific Content

The Human and Social Systems SSC will elaborate on the two ICARP II science plans named Arctic Economies and Sustainable Development and Indigenous Peoples and Change in the Arctic: Adaptation, Adjustment and Empowerment. Besides these two plans, research in the fields of human and social sciences may play a role in several other science plans in the ICARP II process.

Research in the science plan concerning arctic coastal processes especially has a very clear human dimension. This research plan may very well be a cross cutting issue between Human and Social Systems SSC and AOSB / Marine Systems SSC.
However, studies of the history of the exploration and exploitation of natural resources and of the history of science are missing in the ICARP II program. These aspects are included in the EUROCORES program BOREAS: Histories from the North, environments, movements, and narratives. This EUROCORES program started in 2005 and draws attention to the history of the Arctic. IPY projects such as LASHIPA and Field Stations have elaborated on this aspect. The current geopolitical situation in the north makes this research very relevant and interesting for the Human and Social Systems SSC.

Proposed Scientific Foci

- Indigenous peoples and arctic change: adaptation, adjustment and empowerment;
- Arctic economies and sustainable development;
- The history of the exploration and exploitation of natural resources in the Arctic;
- The history of arctic science.

Cross-cutting Issues

- The human dimension in arctic coastal processes;
- The relation between climate change and communities;
- Sea ice change, resource exploitation, maritime traffic, governance and geopolitical developments.

Potential Collaborators: IAMAP, SDWG, CAFF, PAME, IASSA, ISAC, NABO, PAN.

ATMOSPHERE SYSTEM

Interim Chair: James Overland

One cannot read a newspaper or watch the evening news without hearing new revelations about rapid physical changes occurring in the Arctic and their ecological and social impacts. For a long time the main question has been to what degree these changes resulted from external anthropogenic (CO_2) forcing or were due to natural internal variability in the climate system.

We are now beyond this question as feedback processes within the Arctic have sent its arctic climate system into a new state of reduced summer sea ice extent, extreme increases in autumn air temperatures, and impacts on the larger scale atmospheric general circulation. Unlike large climate swings in lower latitudes, it is unlikely that the Arctic will return to previous conditions. ACIA, ICARP II, IPCC and IPY documents were considered in development of this statement, but the main justification for an ongoing Atmospheric SSC is that arctic changes are occurring so rapidly that not even one-year-old documents are always current.

Scientific Content

The focus of this SSC is the understanding and prediction of arctic change, including the fate of perennial sea ice and the atmospheric consequences of its disappearance.

A first task is to support ongoing observations of arctic climate change, their rapid dissemination, and the dynamic synthesis of these observations through reanalysis products. The question of 'how persistent and unique presently observed arctic changes are', is addressed by consideration of past climate states such as the Holocene warm period, investigation of arctic processes across data sets and approaches, and climate model projections of the future.

How is the Arctic responding to global change processes (arctic amplification) and how will arctic changes impact the northern hemisphere atmospheric circulation? How well can arctic change be predicted on decadal and centennial timescales? How do we downscale climate variability to the regional level? To what extent are mitigation /adaptation strategies possible?

Proposed Scientific Foci

- Encourage support of existing arctic weather stations, new technologies such as AUVs, rapid dissemination of arctic change information, reanalysis activities, and climate modeling;
- Promote analyses of the impact of loss of sea ice on atmospheric circulation relative to existing patterns of natural variability;
- Encourage timely publications on current arctic changes and projections of arctic climate, to be available for the fifth IPCC Assessment Report.

Cross-cutting Issues

- We recommend that the project of Arctic in Rapid Transition (ART) proposed by the AOSB / Marine System SSC is expanded to an IASC cross-cutting theme;
- Promote communication between the arctic climate and arctic policy communities;
- Ensure that new insights into arctic climate are available for investigations of ecological and societal changes.

Potential Collaborators: ISAC, DAMOCLES, SEARCH, AMAP Climate Expert Group, IPCC

ACRONYMS

ACIA	Arctic Climate Impact Assessment
AG	Action Group
AHDR	Arctic Human Development Report
AMAP	Arctic Monitoring and Assessment Program
AOSB	Arctic Ocean Sciences Board
Arctic ROOS	Regional Ocean Observing System
AUV	Autonomous Underwater Vehicles
ART	Arctic in Rapid Transition
BOREAS	Histories from the North - environments, movements, narratives
CAFF	Conservation of Arctic Flora and Fauna
CAREX	Life in Extreme Environments
CliC	Climate and Cryosphere
DAMOCLES	Developing Arctic Modeling and Observing Capabilities for Long-term Environmental Studies
GIIPSY	Global Inter-agency IPY Snapshot Year
IAOOS	Integrated Arctic Ocean Observing System
IASSA	International Arctic Social Sciences Association
ICARP	International Conference on Arctic Research Planning
IGOS	Integrated Global Observing System
IODP	Integrated Ocean Drilling Program
IPA	International Permafrost Association
IPCC	Intergovernmental Panel on Climate Change
IPY	International Polar Year
ISAC	International Study of Arctic Change
ISMASS	Ice sheet mass balance and sea level
LASHIPA	Large-scale historical exploitation of Polar Areas
NABO	North Atlantic Bio-cultural Organization
NADP	National Atmospheric Deposition Program
NAG	Network on Arctic Glaciology
NSIDC	National Snow and Ice Data Center
PAME	Protection of the Arctic Marine Environment
PAN	Polar Archaeology Network
SAON	Sustained Arctic Observing Networks
SCANNET	Circumarctic Network ofTerrestrial Field Bases
SCAR	Scientific Committee on Antarctic Research
SCOR	Scientific Committee on Oceanic Research
SDWG	Sustainable Development Working Group
SEARCH	Study of Environmental Arctic Change
SSC	Scientific Standing Commitee
SWIPA	Snow, Water, Ice and Permafrost in the Arctic
WCRP	World Climate Research Program
WMO	World Meteorological Organization

The mission of the International Arctic Science Committee is to encourage, facilitate and promote leading-edge multi-disciplinary research to foster a greater scientific understanding of the arctic region and its role in the Earth system.

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