



# International Study of Arctic Change

Program History, and Recent and Planned Activities

**SEARCH Science Steering Committee Meeting  
5-6 November 2009, Washington DC**

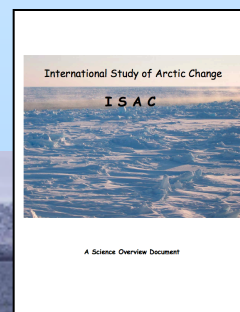
# ISAC Program History

2003 International Arctic Science Committee (IASC)  
<http://www.arcticportal.org/iasc/>

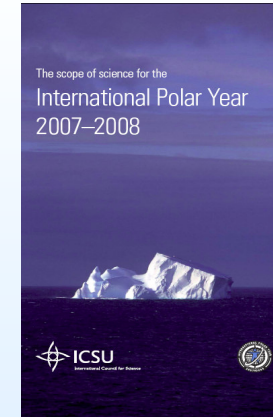
Arctic Ocean Sciences Board (AOSB)  
<http://www.aosb.org/>

2004 Interim Science Planning Group (ISPG) formed.

2006 ISPG publishes ISAC Science Overview Document (SOD).  
[www.arcticchange.org](http://www.arcticchange.org)



# ISAC Program History



- 2006 ISAC endorsed as an IPY project.
- 2007 ISAC Science Steering Group formed and Council members invited.
- 2008 International Program Office activities begin in October.

**SSG Chair :** *Michael Tjernström*, Stockholm U, Sweden  
**SSG Members:** *David Barber*, University of Manitoba  
*Christine Cuyler*, Natural Resources, Greenland  
*Bruce Forbes*, U Lapland, Finland  
*Jean Claude Gascard*, U Pierre et Marie Curie, France  
*Christian Haas*, U Alberta, Canada  
*Gus Shaver*, Woods Hole, USA  
*Peter Schlosser*, Columbia U, USA  
*Koji Shimada*, Tokyo University of Marine Science and Technology  
*John Walsh*, U Alaska Fairbanks, USA  
*Johanna Wandel*, U of Waterloo, Canada  
*Jinping Zhao*, Ocean University, China  
**Executive Director:** *Maribeth Murray*, Swedish Polar Research Secretariat, Sweden

# ISAC Implementation

- ❄ Establish the international program office.
- ❄ Develop the science plan and implementation strategy.
- ❄ Implementation of concrete activities.
- ❄ Expansion of partnerships.



# International Program Office

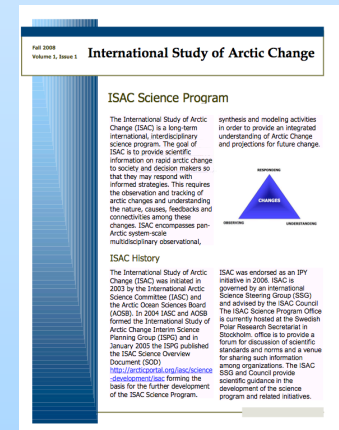
- ❄ Located at the Swedish Polar Research Secretariat (SPRS), Royal Swedish Academy of Sciences.
- ❄ Current support is provided by SPRS and the U.S. National Science Foundation (NSF).
- ❄ Coordinates ISAC activities, builds partnerships in international arctic science, provides information to wide variety of stakeholders, facilitates scientific workshops and planning activities.



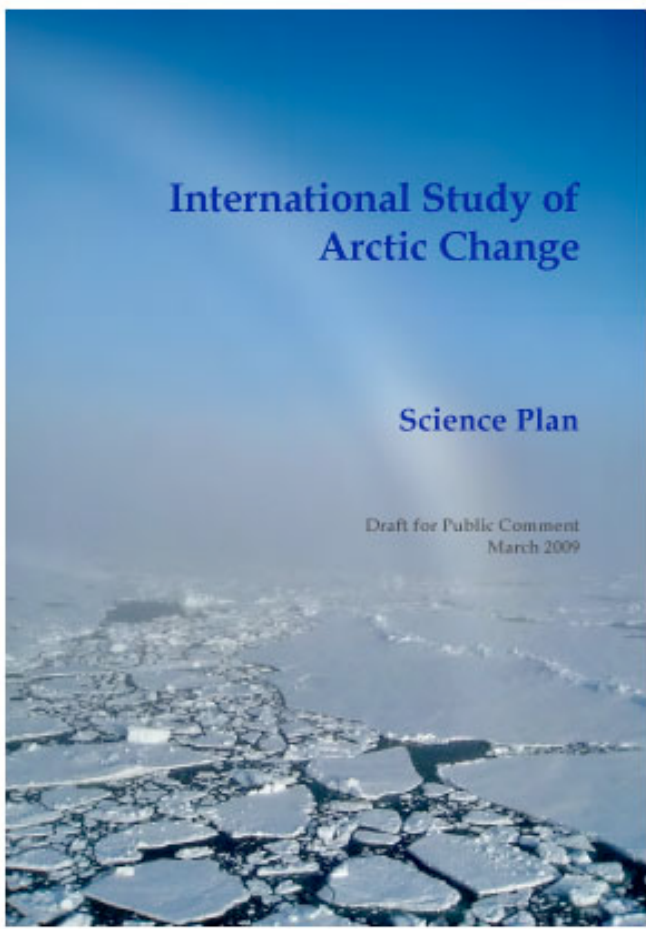
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VETENSKAPSAKADEMIEN  
THE ROYAL SWEDISH ACADEMY OF SCIENCES



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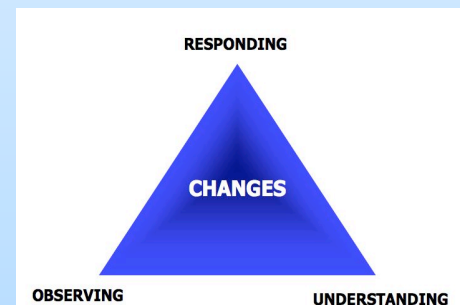
# ISAC Science Plan and Implementation Strategy



- ❄ Draft released for public comment during ASSW 2009.
- ❄ Public comment period from 27 March mid-June 2009.
- ❄ May be downloaded from ISAC website. [www.arcticchange.org](http://www.arcticchange.org)
- ❄ Now in revision to be published with the assistance of IASC.
- ❄ Short summary version for AGU.

# Meeting ISAC Objectives

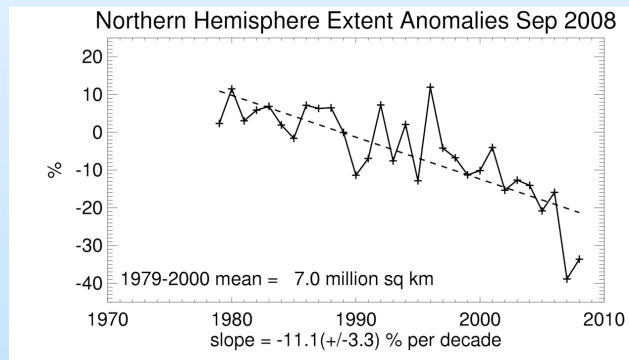
- ❄ The development of an integrated Arctic Observing System covering all domains including the anthroposphere. This is based on existing and new long-term observing sites as well as new observing methods. (observing)
- ❄ Quantification of the anthropogenically driven component arctic change within the context of natural variability. (observing)
- ❄ Understanding the causes of pan-Arctic changes including changes in the human component in the context of global change. (understanding)
- ❄ Projecting future changes in the Arctic System. (understanding)
- ❄ Exploring options for adaptation to and mitigation of arctic change and suggest ways that will lead to a path of sustainable use and development. (responding)
- ❄ Dissemination of data and results from ISAC research to the scientific community, stakeholders and the general public. (cross-cuts observing, understanding, responding)



*The three cornerstones of ISAC – responding to arctic change through understanding and observation.*

# ISAC Components

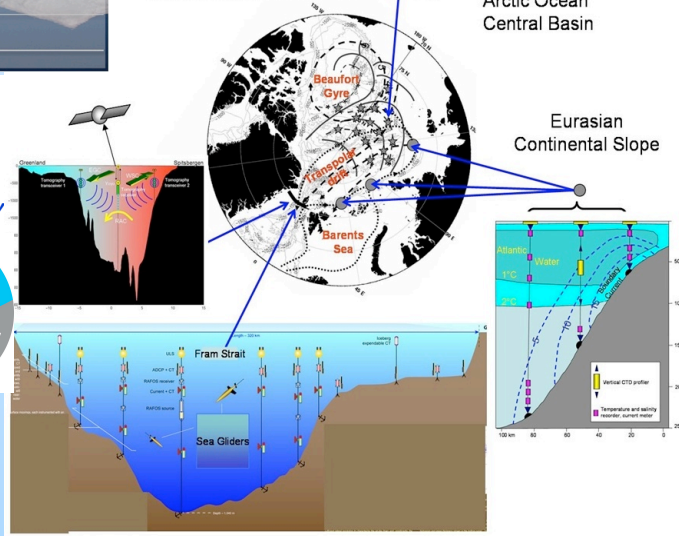
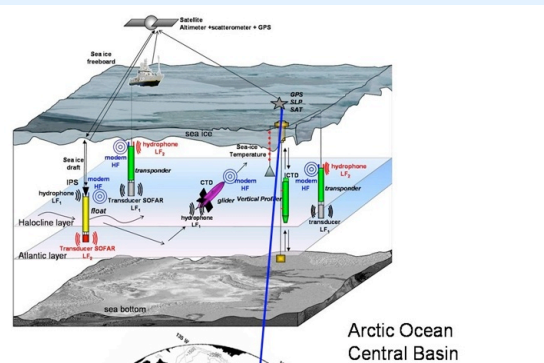
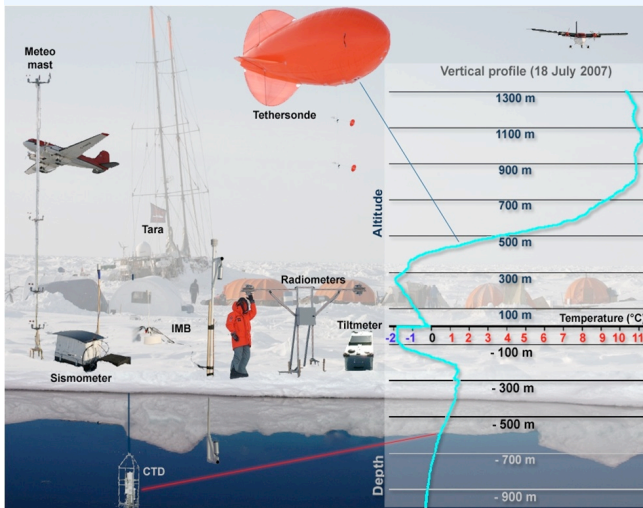
## Observing, Understanding and Responding to Change



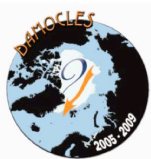
- ❄ Dealing with arctic change is **urgent**.
- ❄ ISAC requires strong **observing**, **understanding** and **responding** to change components in order objectives.
- ❄ Speed of change and the rapid evolution of knowledge require a **flexible approach**.
- ❄ Flexibility ensures continued acquisition of the necessary data and effective **translation of data into useful information** useful for meeting the scientific and societal challenges.



# Pan-Arctic Observing System

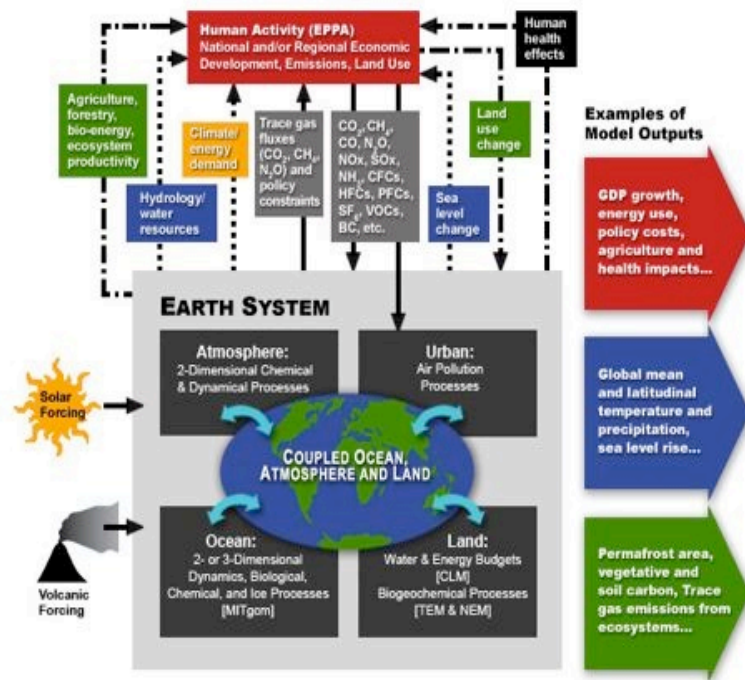


*Illustration of Arctic observing system components that are required to document the critical features of the hydrographic structure and circulation in the Arctic Ocean, as well as their changes.*



- ❄ **Multinational commitment** to long-term, multi-disciplinary, systems-scale observing programs.
- ❄ Recording **past, present, and future** changes.
- ❄ **Sustained** to establish meaningful time series.
- ❄ **Flexible** to respond to changing scientific requirements, new insights and shifting theoretical, methodological, and political frameworks.
- ❄ **Integrated** into an international, integrated pan-Arctic Observing System.

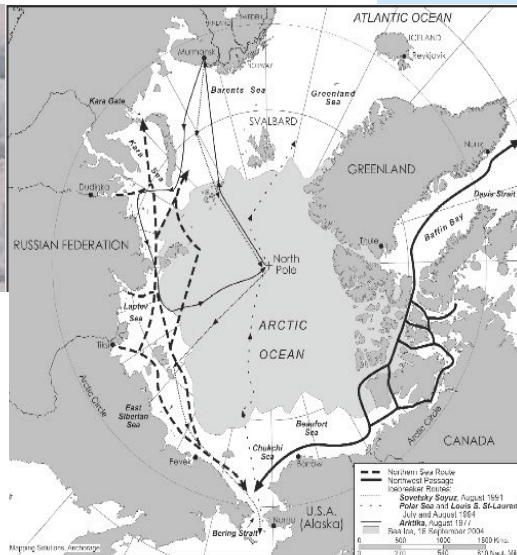
# Understanding Change



Schematic of earth system model. Dotted links await implementation.



Downscaling and targeting specific parameters and regions. Figure 25a. What are projected impacts on other arctic predators as a result of declining polar bear populations? What are plausible scenarios for ship-ice interactions over the next century given improved projections of inter-annual and regional variability in ice conditions and of decreasing summer sea-ice extent?



- ❖ Developed through synthesis of results from the **observing system**, from **process studies**, **studies of system dynamics** and **modeling**.
- ❖ Modeling on several levels - **conceptual to high-resolution** coupled numerical models.
- ❖ **Model improvement** - physical components, ecosystems and the human component.
- ❖ **Useable and relevant** model output.
- ❖ **Upscaling** current data through reanalysis and **downscaling** pan-Arctic models to the regional and local levels.
- ❖ People need **regional/local scale information** on projected **environmental/ecosystem changes**.

# Responding to Change

- ❄ Need to understand **how ecosystems might be structured** and **how they might function** in the near and distant future.
- ❄ Strategies that consider **potential alternatives**.
- ❄ Stakeholder participation in building research that leads to **useful observation and predictive capabilities**.
- ❄ Development of **co-management and risk mitigation strategies, hazard assessments, and planning initiatives**.
- ❄ Access **relevant data in real-time**.
- ❄ Data that is **technologically, linguistically, and culturally accessible**.
- ❄ Assessment for relevance to **place-based interpretation and use**.
- ❄ **Translation and dissemination of good scientific** information to a wide audience.



*In Alaska, important fishing and hunting areas are often managed under state or federal jurisdiction. This sign stands at the Minto Village boat launch, which is within the boundaries of a state game refuge. During prime hunting and fishing seasons, boat launches such as this overflow with tourist activity, and local residents face much competition for, and witness much waste of, the wild food resources on which they depend. Photo: P. Loring*

# Recent Activities

- \* Science Steering Group Meeting, Villefranche sur Mer, September 2009.
  - \* Development of Strategic Plan for the next 18 months
  - \* Revision of Science Plan
  - \* Plan for 4<sup>th</sup> day of SoA
  
- \* Synthesis of Understanding of Hydrological Changes in the Arctic System, Fall 2009, Stockholm. In partnership with NSF Freshwater Initiative and ArcticHydra.
  
- \* Follow-up meeting, 10-11 December, Victoria, Canada to complete report.



# Forthcoming Activities

- \* ISAC Open Science Discussion, AGU Annual Fall Meeting, 2009.
  
- \* State of the Arctic Meeting, 2010. Miami. Joint sponsorship with DAMOCLES and SEARCH and others.
  - \* 4<sup>th</sup> Day – International Cooperation in Arctic Science
  - \* White paper on responding to change
  - \* Report/publication to carry ISAC into the future
  
- \* Responding to Change Workshop (ca. 50 people), Summer/Fall 2010.



# Contact Information

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