



# International Study of Arctic Change

[www.arcticchange.org](http://www.arcticchange.org)

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**Abstract:** This poster presents an overview of the International Study of Arctic Change (ISAC) science program, including recent implementation activities. Efforts at international coordination and cooperation are highlighted. This is part of the developing research agenda that includes observing, understanding and responding to arctic change. Here discussion is focused on responding to change and, in particular, specific needs that might be met by an optimally designed Arctic Observing Network. Plans for an international workshop to further develop the ISAC responding to change component are also outlined.

## Introduction

The International Study of Arctic Change (ISAC) is a long-term, international scientific research program designed to understand the future state of the arctic system under anthropogenic stress. The driving force behind ISAC is the need to provide scientific information on arctic environmental change to inform decision-making and the development of strategies for responding to change. ISAC extends the study of the Arctic from basic science to real world problems on a changing planet. ISAC encompasses pan-Arctic system-scale multidisciplinary observational, synthesis and modeling activities to provide an integrated understanding of arctic change and projections for future change.



## ISAC Components

### Observing

- Design and establish integrated observing systems.

### Understanding

- Analysis of observations, synthesis.
- Modeling, reanalysis, projections.
- Feeds back to observation systems.

### Responding

- Adaptation and mitigation strategies.
- Understanding resilience and vulnerabilities.
- Draws on and feeds back to observations, understanding and projection.



## Recent Activities

From 30-09-09 to 4-10-09, ISAC co-sponsored the “**Synthesizing International Understanding of Changes in the Arctic Hydrological System**” workshop at the Royal Swedish Academy of Science in Stockholm, Sweden. Thirty participants from Canada, Denmark, Finland Germany, Iceland, Russia, Sweden and the USA discussed advances in Arctic research stimulated by consideration of the hydrological cycle as an integrating force uniting atmospheric, oceanic, cyrospheric and terrestrial components of the pan-Arctic. A workshop report will be available in the spring of 2010, and workshop documents and presentations are posted at [www.arcticchange.org](http://www.arcticchange.org).



Workshop participants on the steps of the Royal Swedish Academy of Science in Stockholm.

## Responding to Change

Global Change is clearly underway and the Arctic, as predicted, shows early and amplified environmental change signals. Observations from the past decade document change across all components of the arctic system and the instrumental records from the past several decades further illustrate this.



Arctic sea ice extent for February 2010 was 14.58 million square kilometers (5.63 million square miles). The magenta line shows the 1979 to 2000 median extent for that month. The black cross indicates the geographic North Pole.



The impacts of arctic change are visible in the physical, biological, and built environments. Many aspects of human societies including food systems, socio-economic and political activities, cultural heritage and identity are affected. Dramatic environmental change is co-occurring with changes in population dynamics, expansion of industrial activities, increased (eco)tourism, and increasing and changing connectivity to the lower latitudes among others.



Smoking fish for winter. Photo: P. Loring



Flooding in the Nevtok region of Alaska, October 2006. Photo: D. Atkinson

The research community has devoted much effort to observing and understanding the physical and, to a lesser extent, the biological components of arctic change. However, there is comprehensive strategy for studying the impacts of change. Emphasis has been on assessment of impacts rather than understanding and developing options for adaptation and mitigation.

A comprehensive Responding to Change program, as is proposed in the ISAC Science Plan, must include diverse expertise from the academic and applied research communities, and from stakeholder communities. The composition of research teams must continue to evolve and expand.

Responding to change is already integral to many arctic environmental change research programs; it is described in general terms in numerous programs and plans. However, funding strategies for capacity building, and seamless integration with the observing and understanding activities remain unrealized. Beginning with discussions at the State of the Arctic Conference, and following through over the coming 12 months, the research agenda for responding to change will be developed. For more information on planned activities please contact [info@arcticchange.org](mailto:info@arcticchange.org) or visit us on the web.