Arctic Observing Network (AON)

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Why an AON?

Arctic Environmental System Change: e.g., Sea Ice

Causes
- Atmosphere (clouds & solar radiation, wind, air temperature)
- Ocean

Implications
- Feedbacks to Arctic system (e.g., marine & terrestrial ecosystems, hydrology & cryosphere)
- Global & regional climate
- Indigenous people
- Marine transportation
- Natural resources
- National security

Response
- Adapt • Mitigate
- Each requires Understanding
- Understanding needs Observations
- Observations are for Analysis, Synthesis & Modelling

Source: NASA

Source: NCAR

Models lag observations
1. Is the Arctic system moving to a new state?
2. Is the Arctic system predictable?
3. Do recent and continuing changes reflect natural variability and/or anthropogenic forcing?
4. What is the direction and relative importance of regional feedbacks?
5. How are terrestrial and marine ecosystems and ecosystem services affected by environmental change and human activities?
6. How are cultural and socio-economic systems affected by environmental system changes?
7. What are the most consequential links between the Arctic and global systems?

SEARCH: http://www.arcus.org/search/index.php
AON: Background

- AON is a USG inter-agency program that is an integral part of SEARCH - Study of Environmental Arctic Change.

- In May 2007, IARPC (Inter-agency Arctic Research Policy Committee) directed agency staff to develop AON as part of the implementation of SEARCH and as a lasting legacy of IPY (International Polar Year). NSF and NOAA co-lead this effort.

- AON is a multi-disciplinary effort that encompasses physical, biological and human observations, including local/indigenous knowledge, of the land, ocean and atmosphere.

- SEARCH categories
  - Atmosphere
  - Human Dimensions
  - Hydrology & Cryosphere
  - Palaeo-environment
  - Terrestrial Ecosystem
  - Ocean & Sea Ice
Observing Oceans & Sea Ice

Beaufort Gyre Observatory & Deepest Waters

BSSN

Bering Strait (w/NOAA)

Seasonal Ice Zone

C3O: Canada’s Three Oceans (CDN)

Aerial Hydrographic Surveys

DAMOCLES (EU)

North Pole Environmental Observatory

Switchyard & Seasonal Ice Zone

Ice-Tethered Profilers & Ice Dynamics, Mass Balance and Weather Buoys

Davis Strait

OCAC: Ocean Currents of Arctic Canada (CDN)

DAMOCLES: Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies
Ice-tethered Profiler (ITP)

Shallow, anti-cyclonic eddies

http://www.whoi.edu/page.do?pid=20756
Ice Mass Balance Buoy (IMB)

-2.1 m, Summer 2007

http://imb.crrel.usace.army.mil/
NSF & AON: A Few Essentials

- AON projects will have a scientific rationale as to why the proposed activity, data (including frequency and duration of observations) and geographic location are essential to research that will advance the understanding of Arctic environmental system change.

- AON projects will be informed by the current understanding of Arctic environmental system change and will contribute data essential to Understanding Change research and related activities.

- AON projects will conform to the SEARCH data policy:
  - data will be fully, freely and openly available as quickly as possible after collection and quality control, and
  - metadata, data and documentation will be submitted to an appropriate national archive or repository.
AON Data & Information Management

- Observing (AON)
- Understanding
  - Data Analysis, Data Synthesis & Computer Modelling
- Responding

Data System

- Data analysis tools
- Data products
- Data archive & data discovery tools
- Metadata archive & data discovery tools

Users
  - Research
  - Education
  - Decision
  - Policy

External archives

CADIS
Cooperative Arctic Data & Information Service

http://www.aoncadis.org/
Next Steps

• By the end of FY09, NSF expects to make 32 new awards to support 20 AON projects for a total investment of $44M (+ logistics costs) for the period FY09-FY13.

• There is a need for an observing network/system design to guide future NSF investments in AON. Consequently, prior to the release of an AON design solicitation in summer 2010, the SEARCH science questions and priorities will be re-assessed and network design approaches will be evaluated.


• Continued participation in international efforts to develop a pan-Arctic, multi-nation observing network.
  - Sustained Arctic Observing Network (SAON).
A Little Light Reading

• *Study of Environmental Arctic Change: Plans for Implementation During the International Polar Year and Beyond.* Arctic Research Consortium of the United States (ARCUS), Fairbanks, Alaska, 2005.
  

  
  http://books.nap.edu/openbook.php?record_id=11607

  
