Overview: Study of Environmental Arctic Change (SEARCH) & Arctic Observing Network (AON)

Hajo Eicken (hajo.eicken@gi.alaska.edu)
Chair, SEARCH Science Steering Committee

• Brief introduction to SEARCH context & structure
• SEARCH & AON
• AON coordination & related activities
SEARCH Objectives

The overall objective of SEARCH is to

Understand the nature, extent and future
development of the system-scale change presently
seen in the Arctic.

SEARCH is built around three basic elements:

• Observing Change - Observing Network well underway
• Understanding Change - Modeling & synthesis starting up
• Responding to Change - Needs to be implemented still

www.arcus.org/search/
SEARCH’s Tripartite Approach to Arctic Change

**Understanding**
- Process & scenario modeling
- Prediction

**Responding**
- Adaptation
- Mitigation
- Sustainability
- Decision support
- Education

**Observing**
- AON data & information
- AON design/optimiz’n
- Cross-sector/int’l coordination
What is SEARCH?

• Collaborative scientific program
• Works with academic and government agency scientists to prioritize, plan, conduct, and synthesize research focused on Arctic environmental change
• Guided by Science Steering Committee and several panels and working groups with broad representation of the research community
• **Response of the research community**
  *Arctic change*
SEARCH
Key Documents & Milestones

• 2001 SEARCH Science Plan
• 2003 SEARCH Implementation Strategy Document
• 2005 SEARCH Implementation Workshop Report
• 2008 SEARCH/DAMOCLES Arctic Observation Integration Workshops & Report
• 2009 SEARCH State of the Arctic Observing Network (AON) Workshop & Report
• 2010 Interagency AON Working Group Meeting
• 2012 – in press: SEARCH/ARCSS Understanding Arctic Change Task Force Report
Draft 5-Year Goals

1. Improve Understanding and Prediction of Sea Ice Changes and the Consequences for Ecosystems, Human Activities, and Climate

2. Understand the Consequences of the Loss of Shallow Permafrost on Arctic and Global Systems

3. Improve Predictions of Future Land-Ice Loss and Impacts on Sea Level

4. Analyze Societal and Policy Implications of Arctic Environmental Change
Observing Change Panel

- Co-chaired by Craig Lee & Taneil Uttal
- New members (with a number from federal agencies) joining
- Data Working Group
- Arctic Observing Coordination Workshop (OC co-chaired by John Payne & Don Perovich)
- Leadership of Arctic Observing Summit
Arctic Observing Network (AON)

- Roughly 50 NSF-supported AON projects
- Data dissemination and archival at Coop Arctic Data & Information Service
  http://aoncadis.org

State of AON:
- Scientific community, federal/state/local agencies, stakeholders and general public all with a vision for an Arctic observing system
- Action toward improved networking & coordination underway
Welcome to the Advanced Cooperative Arctic Data and Information Service (ACADIS)

The new Advanced Cooperative Arctic Data and Information Service (ACADIS) is a joint effort by the National Snow and Ice Data Center (NSIDC), the University Corporation for Atmospheric Research (UCAR), UNIDATA, and the National Center for Atmospheric Research (NCAR) to provide data archival, preservation and access for all projects funded by NSF’s Arctic Sciences Program (ARC). ACADIS builds on the CADIS project that supported the Arctic Observing Network (AON). This portal will continue to be a gateway for AON data and is being expanded to include all NSF ARC data.

ACADIS provides a template to assist investigators in developing the Data Management Plan required for all NSF proposals.

To register your data:
- If you are an AON Investigator, please contribute your data and metadata.
- If you are another NSF Arctic investigator not part of AON, please contact support@aoncadis.org

Search for Data

Search for data using variable, principal investigator, discipline, temporal/spatial coverage, and other parameters.

View NSF AON Projects

Each of these options below represents a different way to view the AON project locations (or the location of a component of each project). Click on an icon to view that option in a new window.

MapSurfer shows... All NSF-funded Arctic Observing Network projects with the option of displaying alongside other field projects supported by NCAR.

The AON-CADIS Web Map Viewer shows... the locations of Arctic Observing Network projects with the option of showing other NSF funded work through ARMAP. We suggest you START HERE unless you prefer a full GIS or Google Earth

Google Earth shows... All NSF-funded Arctic Observing Network projects with the option of layering KML-format data files such as sea ice extent.

http://aoncadis.org
AON Design & Implementation (ADI) Task Force

- Evaluate status of AON relative to science questions
- Aid design & adaptation of AON components through rigorous, quantitative approaches
- Synthesize information from current AON & design studies to guide optimization and implementation
- Coordinate between national & international efforts

- Membership: 14 experts representing Arctic (8) and lower-latitude (6) perspectives
- Workshops, community survey (n = 119) & proof-of-concept studies, report in 2012
- Resources and status information available at: http://www.arcus.org/search/aon/
AON Coordination & SEARCH

• Balance & prioritization:
  – Scientific information needs
  – Societal/stakeholder information needs

• Integration
  – Data & models
  – Community-based observations
  – Remote-sensing data

• Coordination
  – Topical: SEARCH Goals (1 & 2)
  – Methods-based: Climate model needs; community-based observations
  – Regional/national
  – International
  – A-CADIS & other data & information centers
SEARCH Arctic Sea Ice Outlook

- International effort to anticipate, track & evaluate Arctic seasonal ice evolution starting in the summer of 2008 with contributions by more than 20 international expert groups
- Regional outlook: Regional ice development important to stakeholders & decision-makers

www.arcus.org/search/seaiceoutlook
NASA IceBridge:
• Climate data records
• Seasonal ice predictions
• Operational guidance?
AON Coordination & SEARCH

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3-D process-resolving
Arctic tundra landscape simulator

Process requirements

- Subsurface
  - Permafrost
  - Ground ice content
  - Active layer
  - Biogeochemistry
- Surface
  - Deformable topography
  - Surface flow and dynamic flow paths
  - Snowpack dynamics
  - Vegetation dynamics
- Near-surface atmosphere
  - Canopy interactions with surface wind, humidity, temperature, and radiation balance
  - Influence of microtopography on snow dynamics
  - Shrub-snow interactions

LIDAR measurements near Barrow

Lidar provided by Craig Tweedie, University of Texas, El Paso

Example 3-D landscape model grids
Arctic LCC 2012 RFP Application Instructions

Overview
The Arctic Landscape Conservation Cooperative (ALCC) has FY 2012 funds to support projects that meet its mission and conservation goals. Priority for this year’s funding will be given to those studies and planning efforts that address information needs identified by the ALCC’s six Technical Working Groups, and by members of the ALCC Steering Committee. The geographic focus of this funding is the entire ALCC.

Note: this document is an abbreviated version of the RFP application instructions. Complete instructions are available on at www.arcticlcc.org/grants/ along with theme-specific project narrative templates at www.arcticlcc.org/grants/templates/.

The ALCC will fund projects that address these themes:

1. Interdisciplinary Study Plan integrating across one or more watersheds in the Alaska portion of the ALCC (up to three awards).
2. Improved Permafrost Baseline Information for the Alaska portion of the Arctic LCC (one award)
3. Thermokarst Monitoring at the Landscape Level: a Feasibility Study (one award)
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Arctic Observing Summit 2013

• Pan-Arctic coordination of observing efforts
• Data sharing & distribution
  – Access & logistics
  – Network design & optimization
• Current planning (led by International Study of Arctic Change – ISAC)
  – Organizing committee (co-led by Craig Lee, Martin Jakobsson, Jinping Zhao) in place
  – Identify core themes & manageable tasks
  – Arctic Council Sustaining Arctic Obs. Networks task
AON Coordination & SEARCH

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• Integrate both into 5-year vision for AON
• Identify ways in which to prioritize
• How to bring stakeholders to the table? Industry & local communities
• Showcase projects
AON Coordination & SEARCH

• Integration
  – Community-based observations
  – Remote-sensing data
  – Data & models

• Network of community-based networks?
  – 1 hour meeting Wednesday Lunch 12.30pm, location TBA
  – Others?
AON Coordination & SEARCH

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• Review climate model information needs
• Observations to inform sea-ice prediction
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- Coordination at flagship sites
  - Barrow region meeting: Wed 4.30pm; location TBA; contact Craig Tweedie & Andy Mahoney
  - Others?
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• Input on action items for Arctic Observing Summit – Craig Lee
AON Coordination & SEARCH

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- Data manager & scientist break-out group meetings