Study of Environmental Arctic Change (SEARCH)

AGU Town Hall | 16 December 2015

- Brendan P. Kelly, SEARCH Executive Director (University of Alaska Fairbanks)
- Jennifer Francis, Sea Ice Action Team Lead (Rutgers University)
- Ted Schuur, Permafrost Action Team Lead (Northern Arizona University)
- Ted Scambos, Land Ice Action Team Lead (National Snow & Ice Data Center)
- Hajo Eicken, Science Steering Committee Past-Chair (University of Alaska Fairbanks)
**SIAT**

**Sea Ice Action Team**

**Mission:** To advance understanding and awareness of the impacts of Arctic sea-ice loss by enabling collaboration, community engagement, and communication.

**The T in SIAT:**

- Henry Huntington (co-lead) – Huntington Consulting
- Jennifer Francis (co-lead) – Rutgers University
- Matt Druckenmiller (science communicator/enabler) – Rutgers & NSIDC
- Larry Hamilton – University of New Hampshire
- Bob Henson – Weather Underground
- Marika Holland – NCAR
- Martin Jeffries – Office of Naval Research
- Brendan Kelly – SEARCH Program
- Don Perovich – Cold Regions Research & Engineering Lab (CRREL)
The A in SIAT:
Inverting the communication pyramid

“Sea Ice Matters”

**What**
- High-level basic info, key graphics, and one-pagers on major sea-ice impacts
- “Hot topics,” key science papers, guest perspectives, science videos
- Data, tools, technical resources

**For whom**
- Media, public, high-schoolers, congressional staffers...
- Science students and journalists, scientists in other fields.
- Arctic physical scientists

**Links to resources and deeper understanding**

Communication <=> Collaboration <=> Engagement
Sea Ice and...

- Arctic Navigation
- Ocean Currents
- Climate Variability
- Your Weather
- Coastal Communities
- Ecosystems
- International Security
- Natural Resources
- Sea Level Rise
- Forecasting and Prediction
- Permafrost
- Environmental Stewardship
- International Relations
Permafrost Action Team
Upcoming Activities

Dr. Ted Schuur
Dr. Christina Schädel
Northern Arizona University
SEARCH
(Study of Environmental Arctic Change)

Sea Ice Action Team

Permafrost Action Team

Document and Understand How Degradation of Near-Surface Permafrost Will Affect Arctic and Global Systems USING SYNTHESIS SCIENCE

Infra structure

Fish, Wildlife
Permafrost Carbon Published Literature

Search Terms in Science Citation Index at Web of Science (ISI)
Permafrost and Carbon in Full Text

Network Goal: Use synthesis science to integrate knowledge ‘under the curve’ and distill findings for decision makers and public

permafrostcarbon.org

Myers and Schädel 2015
Permafrost Action Team

Network Development

- **Science and Action Steering Committee:**
  - *Cathy Wilson (DOE Los Alamos National Lab, NGEE Arctic)*
  - *Erik Kasischke (NASA, ABoVE)*
  - *Dave McGuire (UAF/USGS, PCN)*
  - *Vladimir Romanovsky (UAF, GTN-P)*
  - *Kevin Bjella (CRREL)*
  - *Toni Lewkowicz (U Ottawa, IPA)*
  - *Merritt Turetsky (U Guelph, PCN)*
  - *Dave Schirokauer (Denali NPS)*
  - *Michelle Walvoord (USGS Denver)*
  - *Scott Rupp (UAF, SNAP, Alaska Climate Center)*

**2016** Teleconferences 2-4x per year to solicit input on new and emerging activities; AGU 2016 opportunity for in-person meeting
Permafrost Action Team

Network Development

• **Synthesis Postdoctoral Researcher**
  Funded by USGS Climate Science Center for 2 years (Steve Gray).
  Based at UA Fairbanks / IARC

Focused on Permafrost Impacts

**Theme 2** Infrastructure, or
**Theme 3** Fish/Wildlife/Ecosystem Services

Work with McGuire, Schuur, Eicken, others TBD.
Network: Synthesis Science

Upcoming Hosted Workshops:
• 6th Annual Open Science Meeting of the Permafrost Carbon Network. Held prior to AGU (Sunday Dec 13, 2015). This network meeting draws in new participants and solicits feedback on upcoming synthesis products.
• Methane Synthesis Workshop. (Mar/April 2016, Fairbanks, AK?) This workshop will focus in more detail on four methane synthesis products outlined at Open Science PCN meeting.
• Synthesis Lead Workshop. Held in conjunction with Eleventh International Conference of Permafrost (ICOP), Potsdam, Germany (June 2016). This smaller workshop brings lead / co-lead scientists of synthesis products together for cross-cutting opportunities.

Organized Sessions:
• American Geophysical Union 2015, San Francisco, CA
  Vulnerability of Permafrost Carbon to Climate Change
  (3 oral sessions, 1 poster session, 1 special session)
  Special session a panel discussion with the Permafrost Carbon Network, DOE NGEE Arctic, NASA CARVE, NASA ABoVE
• XI. International Conference on Permafrost 2016, Potsdam, Germany
  Climate Change and the Permafrost Carbon Feedback: Past, Present and Future
Greenland Ice Sheet-Ocean Observing System (GrIOOS) Workshop – December 13-14, Fort Mason, San Francisco
Ocean/Ice Sheet Interactions in Greenland
Impact of the ocean on the ice sheet and of the ice sheet on the ocean and its marine ecosystem
Scientific Priorities

- Greenland Ice Ocean Observing System (GrIOOS)

- Data Compilation and Sharing

- Targeted process studies

- Megasites experiment

Heimbach et al. 2014
Greenland Ice Sheet/Ocean Observing System
GrIOOS

Coordinated long-term glaciological, oceanic and atmospheric data to improve our understanding of, and ability to predict, Greenland Ice Sheet changes and their relation to the ocean, including the marine ecosystem, and the atmosphere.
GrIOOS – Workshop Dec 12-13th San Francisco
Define the design and implementation plan for GrIOOS including
description of key measurements, identification of sites and
instrumentation; integration with existing networks.

ACTION TEAM/Steering Committee
J. Abermann (Asiaq, Greenland),
A. Ahlstrøm (GEUS, DK),
G. Hamilton (U Maine, USA),
P. Heimbach (UT Austin & MIT, USA),
R. Mottram (DMI, DK),
S. Nowicki (NASA Goddard, USA),
T. Scambos (NSIDC, USA),
F. Straneo (WHOI, USA),
D. Sutherland (U Oregon, USA),
M. Truffer (U Alaska, USA)
Bob Bindschadler – SEARCH SSC
Participates:

- ~50 attendees from 7 countries selected by steering committee based on expressions of interests (oceanographers, glaciologists, climate modelers, ice sheet modelers, marine biologists, 1/3 early career)
- NASA and NSF Program Managers
- Greenlandic scientists and government representative
- Co-located with Ice Sheet Modeling Intercomparison Project 6
What have we learned so far?
Measurement, Techniques, Technologies
What data sets exist already?

<table>
<thead>
<tr>
<th>KIND &amp; NAMES OF SYSTEMS</th>
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<tbody>
<tr>
<td>A. EXISTING DATA/SERIES</td>
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<tr>
<td>1. KANGASDUGSUAQ KG</td>
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<td>2. HELHEIM (both??)</td>
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<td>3. GÓTHA (BSFJORD)</td>
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<td>4. KNS</td>
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<tr>
<td>B. ACCESSIBILITY</td>
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<td>5. DEEP</td>
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<td>6. CATCHMENT/MELT</td>
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<td>7. FLOATING ICE TONGUE (PETERMAN + 79°)</td>
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<td>8. NW. GROUPS OF SMALLER FJORDS</td>
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<td>9. DEPTH OF SILL</td>
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<td>10. GEOMETRIC COMPLEXITY</td>
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<td>11. DISTANCE FROM SB</td>
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<td>12. SENSITIVITY (TIME)</td>
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<td>13. N/S/E/W SECTORAL COVERAGE</td>
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What are the essential measurements?
Site selection vote

Winners –

Jacobshavn
Helheim
79N/Zachariasen
Peterman
Rink or Upernavik
Hellheim VE
Jakobshavn
79N/51

Petermann

Rink - value added

Qannaq - Japan

KNS - GINNA seen, needs ice

SE KG - may outlet/ice

Upernavik - may outlet/ice
Report

**End Jan.**: Initial draft by Steering Committee/Chairs

**Early Feb.**: Circulate to Participants & receive feedback

**Early Mar.**: 2nd draft circulated to community

**End April**: Final Publication
Observing Arctic Change

(1) Ongoing process to define & implement a US interagency Arctic observing system

(2) SEARCH perspective summarized in white papers available at SEARCH website: www.arcus.org/search-program/aon/products

(3) Arctic Observing Open Science Meeting, Nov 2015

(4) Arctic Observing Summit 15-18 March 2016
Arctic Observing Open Science Mtg:
Seattle, 17-19 November 2015

• Co-chairs: Craig Lee (UW), Matthew Shupe (CU/NOAA), Cathy Wilson (DOE)
• State of observing science and important findings from NSF-supported AON and other work
• Preliminary conclusions:
  - Bottom-up approach has advanced Arctic observing and synthesis knowledge
  - Need to improve exploitation of research – Transition from results to product development & operations
  - Improved communication & coordination across boundaries happens through grass-roots connections
  - Advances in autonomous observing technologies have transformed approaches to sustained observations
  - International Arctic Observing coordination requires attention
Potential elements of a joint coordination & leveraging approach

(1) Identifying common interests in observational data
(2) Develop framework for defining, prioritizing and parsing of observation activities
(3) Coordinate to delineate roles and responsibilities, increasing efficiency and impacts
(4) Add value to individual observations through systems perspective, optimizing investments
(5) Develop protocol for updating of sustained observation network
(6) Data standards to advance interoperability for data exchange integration
Arctic Observing Summit

- Provide **community-driven, science-based** guidance for the **design, implementation, coordination** and **sustained** long-term (decades) operation of an international network of Arctic observing systems that serves a wide spectrum of needs
- **Forum** for coordination and exchange between **academia, government agencies, local communities, industry, non-governmental organizations and other Arctic stakeholders** involved in or in need of long-term observing activities
- 6 Thematic Working Groups and overarching themes; combination of plenary and breakout group presentations and work sessions
- Roughly 80 white papers from international research community will be posted online in January 2016 in preparation for Summit
- www.arcticobservingsummit.org & assw2016.org