Welcome

ARCUS Arctic Research Seminar Series

“The US Arctic Observing Network – Mobilizing Interagency Observing Actions in an Era of Rapid Change”

21 July 2017

Presented by Sandra Starkweather
NOAA/U.S. Arctic Observing Network

@metaarctic #arcuswebinars
“A key contribution of the AON will be to provide a framework within which existing programs can be linked and supplemented.”
NRC, 2006.
US Arctic Observing

http://www.arcticobservingviewer.org/
US Arctic Observing
US Arctic Observing Network
What would an interagency US AON make possible?

- **Create interoperability** across independent efforts through harmonizing, blending and integration;
- **Address complexity** across systems that don’t care about agency mandates;
- **Engage a diversity** of stakeholders and use case scenarios to maximize the **value** of each observation;
- **Establish vision for future observing and improve international coordination.**
US AON

Backward Problem: Forward Problem

US AON Tasks

- Work across existing networks and programs

AON Framework

- Design the network of the future
How is US AON organized?

US AON and IARPC

Interagency Arctic Research Policy Committee | Executive Director, Martin Jeffries
NSF (Chair), USDA, DOC, DOD, DOE, HHS, DHS, DOI, DOS, DOT, EPA, MMC, NASA, OMB, OSTP, SI

IARPC was created by Congress with the mandate to coordinate Federal Arctic Research.

IARPC produces the Arctic Research Plan to guide these efforts. This diagram depicts the 9 Goals of Arctic Research Plan 2017-2021

16 Research Objectives have strong ties to sustained and networked Arctic observations.
US AON is Sustained Observing

• **US AON Board** [NOAA, NSF, NASA, EPA, DOI, DOE, ONR] is convening to provide guidance on **US AON Tasks** and to advance a strategic **AON Framework**;

• **US AON Exec. Dir.** is directly tasked with fostering **US AON Tasks** and advancing **AON Framework** in coordination with **Agency Researchers** and **Outside Partners**;

• **US AON** works through **IARPC Observing Team (AOSST)** to identify opportunities and to communicate progress.
SAON: US AON Relationship

#1 SAON Review Recommendation (2016): Establish National SAON Committees in all SAON Member Countries

US AON is a response to this recommendation
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Backward Problem

US AON Tasks

Work across existing networks and programs

- Add resources and direction to recommended efforts poised to deliver valuable products & services;
- Advance utilization of design-oriented analysis and coordinate guidance from modeling groups;
- Support data & information discovery and interoperability across agencies.
**US AON Task**: Towards an Operational, Multi-Sensor Sea Ice Thickness (SIT) Product

- **Need**: An operational sea ice thickness product for forecast models has been identified as a critical advancement for *sea ice forecasting*.

![Maps showing the impact of assimilating SIT](image_url)

Assimilating SIT virtually eliminates the forecast bias.

**Chart 1**: Comparison of forecast bias with different assimilation schemes.

- No Assimilation
- SIC ONLY
- SIC & SIT
- SIC & AGE

**Color Legend**:
-1  -0.2  0  0.2  1

**Forecast Bias [m]**

**Courtesy, C. Bitz**
**US AON Task**: Towards an Operational, Multi-Sensor Sea Ice Thickness (SIT) Product

- **Need**: An operational sea ice thickness product for forecast models has been identified as a critical advancement for sea ice forecasting.

- **Challenge**: There is currently no single observing technology that provides comprehensive, real-time sea ice thickness;

(adapted from Meier et al., 2014)
**US AON Task**: Towards an Operational, Multi-Sensor Sea Ice Thickness (SIT) Product

- **Need**: An operational sea ice thickness product for forecast models has been identified as a critical advancement for *sea ice forecasting*.

- **Challenge**: There is currently no single observing technology that provides comprehensive, real-time sea ice thickness;

- **US AON Task Approach**: Assemble an interdisciplinary task team comprised of experts from each technology, model developers and operational ice centers to develop fit-for purpose, multi-sensor product(s).
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Forward Problem

• Define Arctic-Specific Societal Benefits to Weigh Impacts;
• Convene Authoritative Expert Bodies to Assess the Technology (Feasibility) of Observing Systems;
• Identify Essential Variables.

Design the network of the future
Framework for Ocean Observing (GOOS)

Essential Ocean Variables
Framework for Ocean Observing (GOOS)
Essential Ocean Variables
Framework for Ocean Observing (GOOS) Essential Ocean Variables

Led by different authoritative research bodies/networks
Success story for collaborative observing; diverse & utilized
But even a powerful approach can struggle in the Arctic
The Arctic is Different

Societal Benefits

Example from STPI/SAON - Arctic Observing Framework

1. Disaster Preparedness
2. Environmental Quality
3. Food Security
4. Fundamental Understanding of Arctic Systems
5. Human Health
6. Infrastructure and Operations
7. Marine and Coastal Ecosystems and Processes
8. Natural Resources
9. Resilient Communities
10. Sociocultural Services
11. Terrestrial and Freshwater Ecosystems and Processes
12. Weather and Climate

Essential Arctic Variables

Ocean: GOOS, AOOS, IOOS, FAMOS

- GCW, GTN-G, GTN-P, ACIA, CAMP, ALM, PCN, IABP

Ice: GAW, IASOA, DOE-TRIAD, NSF-OPP, NIPCC, CAM, WHAM

- LEO, EYES NORTH, CBMP, TEON, ABOVE, HAM, CAM, TRA, NRCC

- ArcticFROST

Observing Networks, Large Programs

IMPACT

FEASIBILITY
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Backward Problem: Forward Problem

Can we do both?

Can we do both?
Employ “Stratics”
= Strategy + Tactics

- Foster Well-Organized Networks
- Towards Tactical Tasks

Sustain Development of Strategic Vision/Framework Built Upon Core Community Efforts
US AON
Backward Problem: Forward Problem

Nice Tactics! I like it.

Very Strategic. Let’s do it!
AOS 2018 - Davos, Switzerland

Learn More

AOS 2018 - Davos, Switzerland

Arctic Observing Summit 2018 - Save the date!

Learn More

The first synthesis documents to guide AOS discussions have been uploaded here!

AOS 2016 white papers and poster abstracts now available!

AOS 2013 white papers now published online in Arctic Volume 68 (Supp.1) 2015 and as hardcopy.
3 Relevant AGU Sessions

The Role and Impact of a Pan-Arctic Observing Network in Delivering Societal Benefits (PA035)
Description: https://agu.confex.com/agu/fm17/preliminaryview.cgi/Session26759

Foundations for Sustained Arctic Observing: Connecting Observational Networks to Societal Benefit (C012)
Description: https://agu.confex.com/agu/fm17/preliminaryview.cgi/Session27058

Indicators of Arctic Climate Variability and Change (C018)
Description: https://agu.confex.com/agu/fm17/preliminaryview.cgi/Session27233
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Too chaotic? Still have questions?

Email
Sandy.starkweather@noaa.gov

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Thank You!

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  - Sea Ice Outlook reports for 2017: [https://goo.gl/NGqBFU](https://goo.gl/NGqBFU)
  - Opportunities to participate in ARCUS’ Defend Arctic Research campaign: [https://goo.gl/aagB5s](https://goo.gl/aagB5s)

- Please consider becoming an ARCUS member!
  [https://goo.gl/u4662D](https://goo.gl/u4662D)
Value criteria for US AON Tasks

Observations become more **valuable** when more people **use** them.

**ACCESSIBLE | RELEVANT | MULTI-PURPOSE**

*Courtesy Henry Huntington*