## To provide societal benefits across scales, observations of rapid Arctic change best

- Focus on pressing information needs
- Share a framework for broad participation
- Serve different user groups

## **Food Security Working Group guidance**

- ✓ Sustained observations have to be relevant in a decisionmaking context
- ✓ Observations need to adapt to emerging threats

## The RNA CoObs project seeks to

- ✓ Help frame broader questions & information needs
- ✓ Support development of Shared Arctic Variable framework to channel observing into essential measurements
- ✓ Share information about observing asset distribution to inform deployment of observing infrastructure & address Arctic Indigenous communities' questions and concerns
- ✓ Draw on observing system simulations and inverse modeling in ways that incorporate benefits and retain the holistic food security perspective
- Capture requirements to inform observing system engineering design and support interoperability of independent, aligned observing efforts



## A Research Networking Activity to facilitate convergence of independent observing efforts The RNA CoObs Team\*

Observational infrastructure design: How to identify, structure, and design an Arctic observing system? · Challenges: Numerous existing observations from PI-led research, networks, campaigns, and across diverse research areas, and geographic regions . Top-down approach will not work (i.e., from Grand Challenges to a formal design) Needed: Adaptive design approach that can integrate existing observations, identify knowledge gaps specific research topics, and include coupled natural & human systems New systems engineering approach for requirements capture & adaptive design developmen Sustaining Arctic Observing - brings together different perspectives & knowledge systems to inform adaptive, **Arctic Indigenous Communities** Networks (SAON) question-based, queriable Arctic observing architecture Initiative of Arctic Council & requirements based International Arctic Science Committee - informs question-specific observational design · Define & implement Roadmap for - identifies knowledge and spatial gaps for augmented observations Arctic Observing & Data Systems **Food Security Working Group** (ROADS) Cluster A (FSWG) · Facilitate, coordinate & advocate for - Ridge heights, spacin Bathymetric depth coordinated international pan-Arctic · Emerged out of Arctic Observing Summit (AOS) Lead presence Observations & mobilize support to hore-fast? < 100 m resolution thick sustain them within 10km of shore Indigenous Liaison Team Se Thickness Regional & distribution Craig Chythlook (UAF), Margaret Rudolf (UAF), Victoria Buschman (UAF & Sea ice Sea Topical Expert concentrati Community connections: Science & research connections: GINR), International connections: Panels 10 km resolutio with community Facilitates FSWG · Leads focus groups to establish Facilitates international & Indigenous Organizes community Observation shared project vision Indigenous engagement representation SAV Observer Standards · Fosters connections with SAON connections & meetings Drafts research agreements & ROADS process (Advisory & Supports community protocols Example of "Sea ice thickness" as a Shared Arctic Variable (SAV): Information need for ice thickness observations experts in defining · Defines co-production metrics Expert Panels) **Project Coordination Team** observing priorities shared by different user groups (left), but to different observation standards and platforms (Bradley et al., Arctic, Maureen Biermann (UAF) Requirements Framework Team: Hank Loescher, lead: Melissa Genazzio, Mike Stewart (Battelle) Captures science, information, observational & technical design requirements from team & stakeholder activities Sandy Starkweather (NOAA) Works with Indigenous Liaison Team to refine & vet requirements through community & stakeholder processes Develops notional end-to-end observation system design that can be budgeted, resourced & scheduled AINA and AOS Connections Design Development Team: An Nguyen, lead (UTA); Patrick Heimbach (UTA), Alice Bradley (WC). Communication among Bill Manley (CU), Craig Tweedie (UTEP), Will Ambrose (CCU), Cecilia Bitz (UW) project members, sponsors & Queries stakeholder communities to capture societal benefits, public interest, grand challenge questions stakeholders Identifies shared Arctic variables & data products Transition AOS from Assesses current capabilities among existing assets & infrastructures meeting into process under Models temporal & spatially expected signal/noise to optimize system design in time & space SAON Support SAON ROADS & Information Infrastructure Team: Amber Budden, lead (UCSB); Matt Jones (UCSB), WGs · Meeting support, Peter Pulsifer (Carleton U), Scott Rupp (UAF) coordination & reporting Queries stakeholder communities to identify functional requirements for capture & aggregation of observing Guide self-evaluations & data, data quality control, data product design based on user needs & state-of-the-science modeling external assessment · Design information infrastructure to be flexible & adaptable to new requirements Arctic-subpolar Gyre State Estimate (ASTE): Dynamically Reporting to sponsor Implements FAIR data management principles consistent model/data synthesis of the diverse ocean & sea ice observations in the Arctic (Nguyen et al., JAMES, 2021, https://doi.org/10.1029/2020MS002398). For RNA CoObs inverse modeling framework seeks to translate guidance from FSWG. Note sparse distribution of data points in region of

Research Networking Activities for Sustained Coordinated Observations of Arctic Change (RNA CoObs)

Key resources related to this work.

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Financial support by the National Science Foundation (OPP-1936805) and in-kind support by the

National Oceanic and Atmospheric Administration are gratefully acknowledged.



ROADS

Advisory

Panel

(Indigenous

Co-Chair)

Hajo Eicken (UAF)

Project lead, AOS links

Project Coordinator

SAON & US AON links

Maribeth Murray (AINA)