Finn Danielsen
Lisbeth Iversen
Martin Enghoff
Michael K. Poulsen
Peter Voss
Mathilde V. Sørensen

INTAROS

Communities and Environmental Monitoring

- Highlights
- Synthesis

Photo by M. Enghoff

Aims

Enhance community based observing programs for participatory research and capacity-building

Highlights 2019-2020:

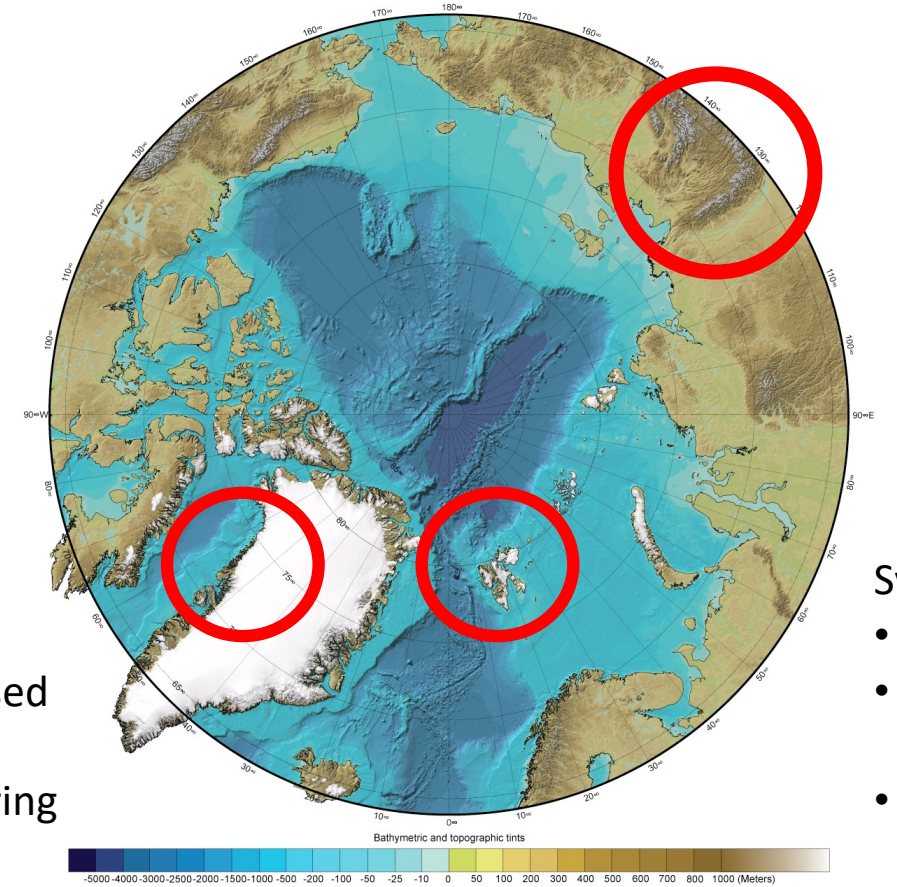
- Piloted programs in Greenland, Svalbard, Yakutia
- Entried CBM datasets into repository
- Strengthened CBM capacity

CBM = Community Based Monitoring

Piloted CBM and CitSc programs with many partners

Yakutia:

- Herder-based monitoring of wildlife resources



Greenland

- Citizen seismology
- Expedition cruise-based observing
- Fisher-based monitoring of natural resources (PISUNA)

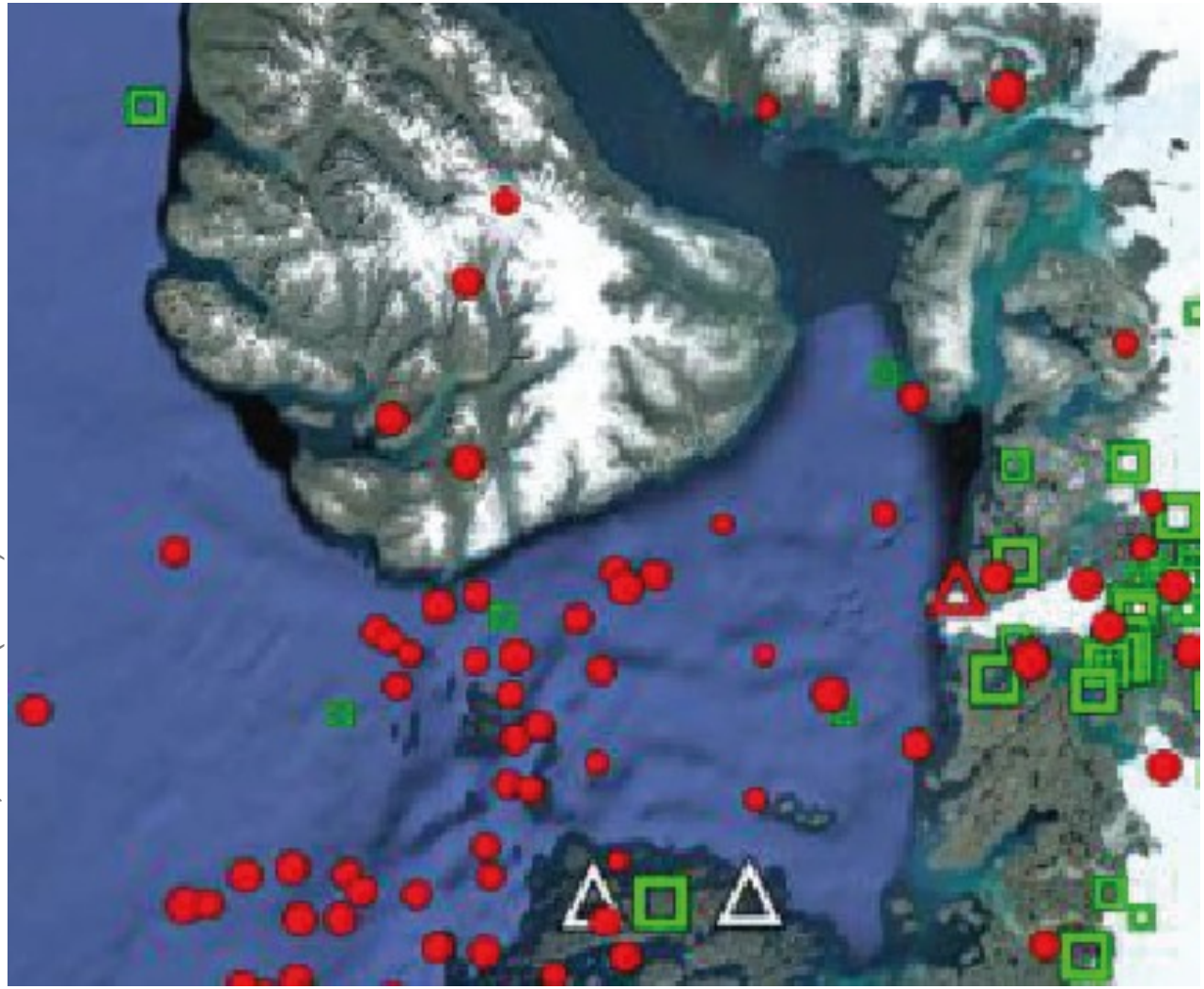
Svalbard

- Citizen seismology
- Expedition cruise-based observing
- Networking for knowledge co-creation


Piloting of citizen seismology
Photo by F. Danielsen


Home seismograph

Disko Bay with earthquakes (red) and tremors from ice (green) 2018- 2019. Triangles: home seismographs.



Jeddi, Z. *et al.* (2020). *Frontiers Earth Science* 8: 139.

Improved detection and data support for understanding seismic events

GEUS

Policy brief

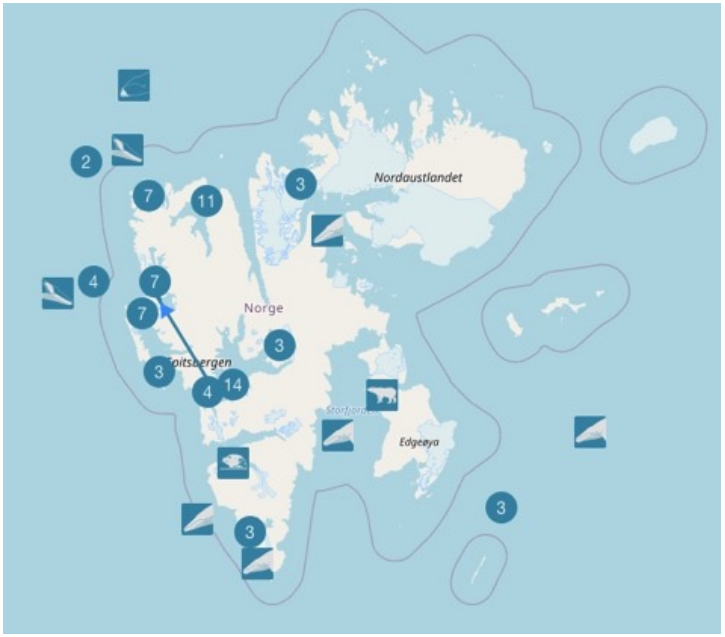
".. 1) The municipal councils should look at whether the critical infrastructure is secured against strong earthquakes, landslides and tidal waves. … 3) The contractors should look at the strength of vibrations that installations can withstand …"

Piloting of expedition cruise-operator based observing

Dialogue workshop w/ cruise operators, scientists, and decision-makers

http://www.intaros.eu/media/1635/2019-report-aeco-workshop-v4.pdf

Example



Happywhale records of marine mammals Svalbard 2019
(81 encounters of 13 species).

Icons: Polar bear, fin whale, humpback whale, bowhead, and harbor seal. The digits indicate numbers of encounters that are too close together to be shown on the map.

	Programs tested			
Low (1-10) Medium (11-100) High (101-1000) Very high (>1000)	eBird	Happy-whale	Secchi Disk	Cloud Obs.
Number of observations	●	●	●	●
Number of locations	●	●	●	●
Number of attributes observed	●	●	●	●
Education and awareness raising potential*	●	●	●	●
Relevance to decision-making*	●	●	●	●

Improved data support for understanding the status of wildlife

Policy brief

"3) Clear lines of communication should be developed…"

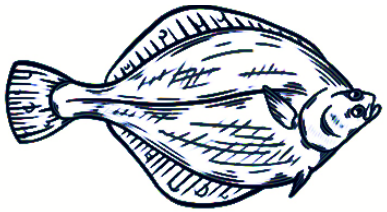
Piloting of fisher-based monitoring in Disko Bay (PISUNA)

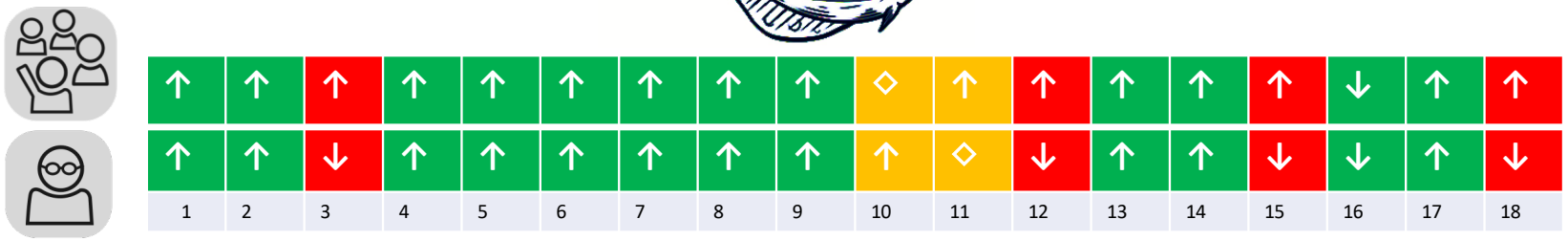
Link: https://eloka-arctic.org/pisuna-net/en

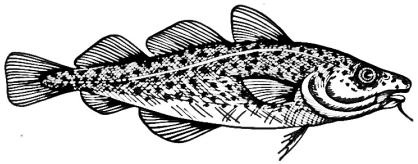
Date	Coordinator	Community	Additional elements noted (legend)	
2019-12	Per Ole Frederiksen	Attu		All details
2019-12	Per Ole Frederiksen	Attu		All details
2019-12	Per Ole Frederiksen	Attu		All details
2019-12	Per Ole Frederiksen	Attu		All details
2019-11	Per Ole Frederiksen	Attu		All details
2019-11	Per Ole Frederiksen	Attu		All details
2019-11	Per Ole Frederiksen	Attu		All details
				All details
				All details
				All details
				All details
				All details
				All details
				All details
				All details
				All details
				All details
				All details
				All details

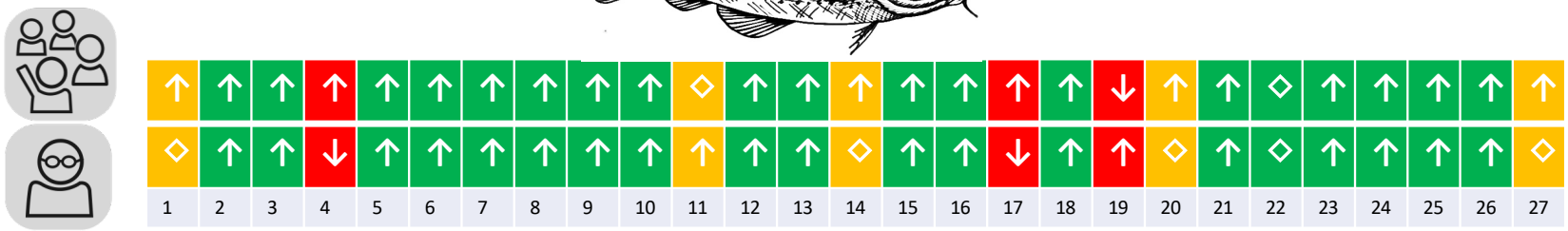
Photo: M. K. Poulsen

Comparison of assessments by fishers with the fisheries statistics









Improved detection and data support for understanding trends in resources

Policy brief

"It is recommended that the inclusion of user knowledge be written into the aims of the new Fisheries Act."

Fisheries statistics data provided by L. Uldall-Jessen, Grønlands Fiskerilicenskontrol. Dataset compiled by S.G. Hansen and used in: Hansen, S.G. (2018). An assessment of community-based monitoring in the Arctic. Copenhagen: NORDECO and Faculty of Science, University of Copenhagen, p.51-53.

Svalbard: Networking for knowledge co-creation and people-based observing

→ **Longyearbyen Community Dialogues**

→ **Svalbard Social Science Initiative**

https://svalbardsocialscience.com/

Improved dialogue for urban planning and CBM

Yakutia: Piloting of herder-based monitoring of wildlife resources

→ A community obtained rights to a traditional fishing ground

Aims

Enhance community based observing programs for participatory research and capacity-building

Highlights 2019-2020:

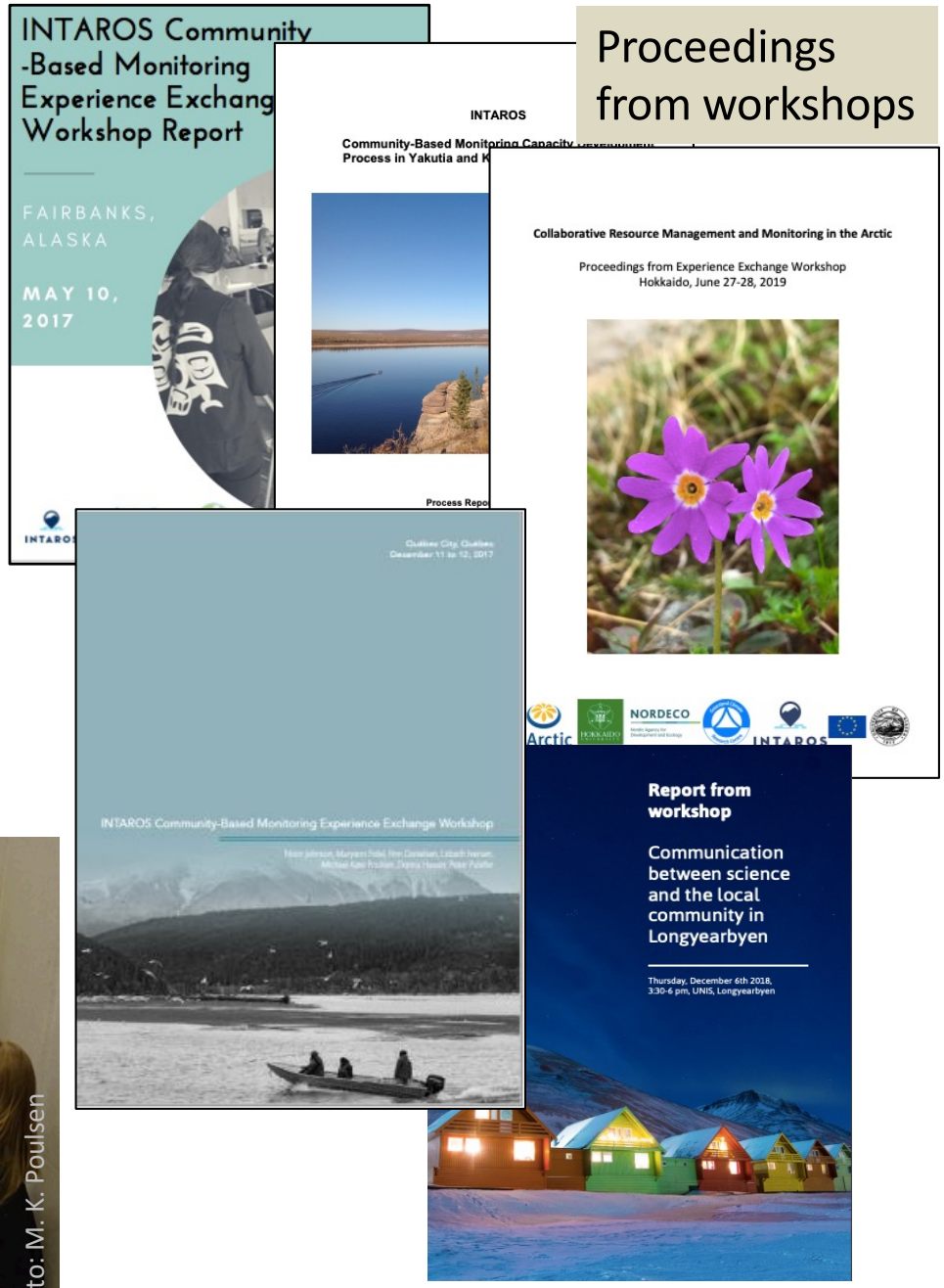
- Piloted programs in Greenland, Svalbard, Yakutia
- **Entried CBM datasets into repository**
- **Strengthened CBM capacity**

Workshop participants:

”Immense value of data sharing …”

”Not all data can or should, be shared. Intellectual property rights, data sovereignty, customary law … must be respected”

Proceedings from workshops

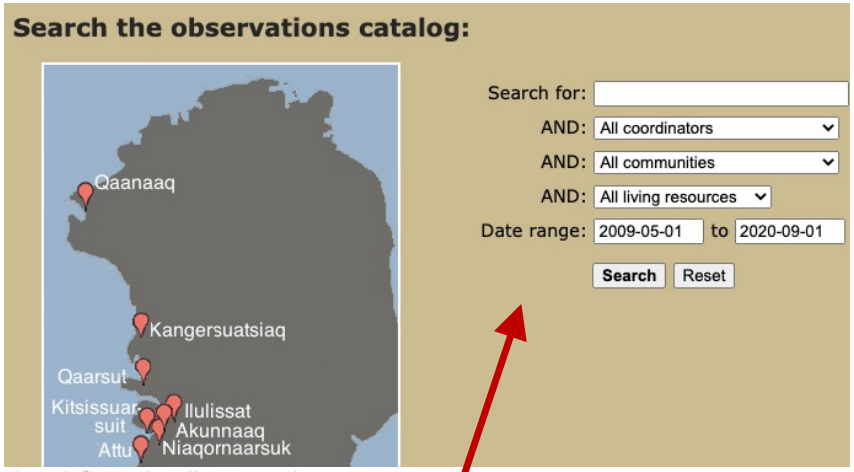


http://www.intaros.eu/
http://eloka-arctic.org/content/reports

Example:

Intaros Data Catalogue
Meta-data about PISUNA

https://eloka-arctic.org/pisuna-net/er



The local natural resource observer program was borne out of a long partnership between local Greenlandic natural resource experts and their communities, government staff and scientific researchers, originally through the Piniakkanik Sumiiffinni Nalunaarsuineq (PISUNA) project.

Data and Resources

PISUNA-net
A searchable, web-based database on observations of living resources in...
Explore

PISUNA_Communities.png
PISUNA Communities, Greenland
Explore

CBM | Greenland | biology | citizen science | community-based mon... | environment | human activities | ocean current | resource use | sea-ice | socio-economics

https://catalog-intaros.nersc.no/

Co-initiated new UArctic Thematic Network

Thematic Networks and Institutes

- Arctic and Northern Governance
- Arctic Boreal Hub
- Arctic Economic Science
- Arctic Engineering
- Arctic Extractive Industries
- Arctic Geology
- Arctic Indigenous Skills
- Arctic Law
- Arctic Lingua
- Arctic Migration
- Arctic Plastic Pollution
- Arctic Safety and Security
- Arctic Sustainable Arts and Design (ASAD)
- Arctic Sustainable Resources and Social Responsibility
- Arctic Telecommunications and Networking
- Arctic WASH
- Arthropods of the Tundra / NeAT
- Circumpolar Archives, Folklore and Ethnography (CAFE)
- **Collaborative Resource Management**
- Commercialization of Science and

Thematic Network on Collaborative Resource Management

Photo by M. Enghoff

The network seeks to develop capacity in collaborative natural resource management and community monitoring in the Arctic.

Overall Goal

Related news

- Three New Thematic Networks established in 2019

See All News

Partner Organizations

- Greenland Institute of Natural Resources
- Hokkaido University
- National Institute of Polar Research
- Nordisk Fond for Miljø og Udvikling
- University of Alaska Fairbanks

Contacts

- Finn Danielsen (Lead)
  Institution: Nordisk Fond for Miljø og Udvikling

See All Partners & Contacts

Related files

- Thematic Network proposal "Collaborative Resource Management"

See All Related

In-service course in Greenland

25 government resource managers (women & men)

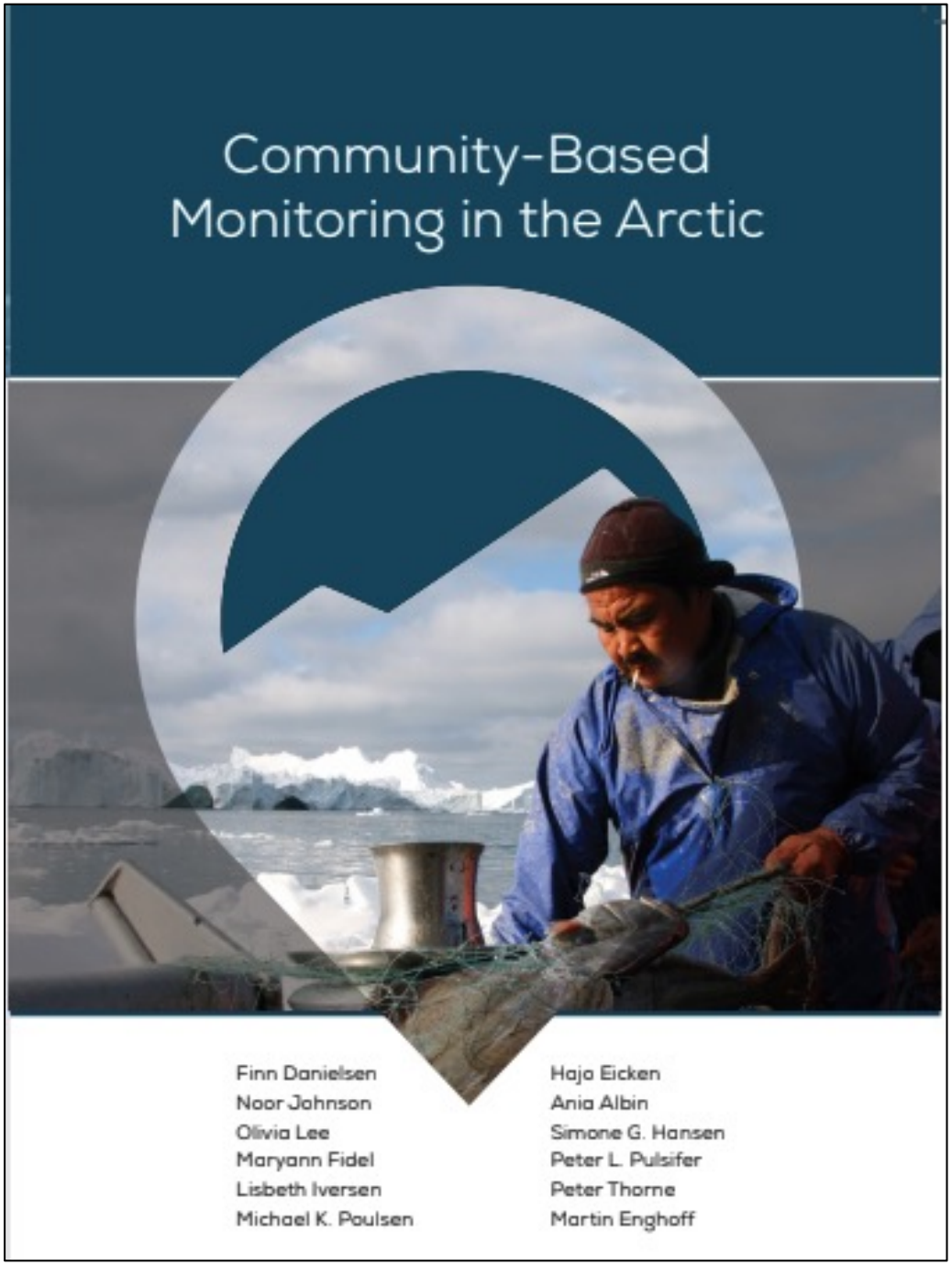
From **all** 5 municipalities of Greenland

Photos and collage: Shuhei Takahashi

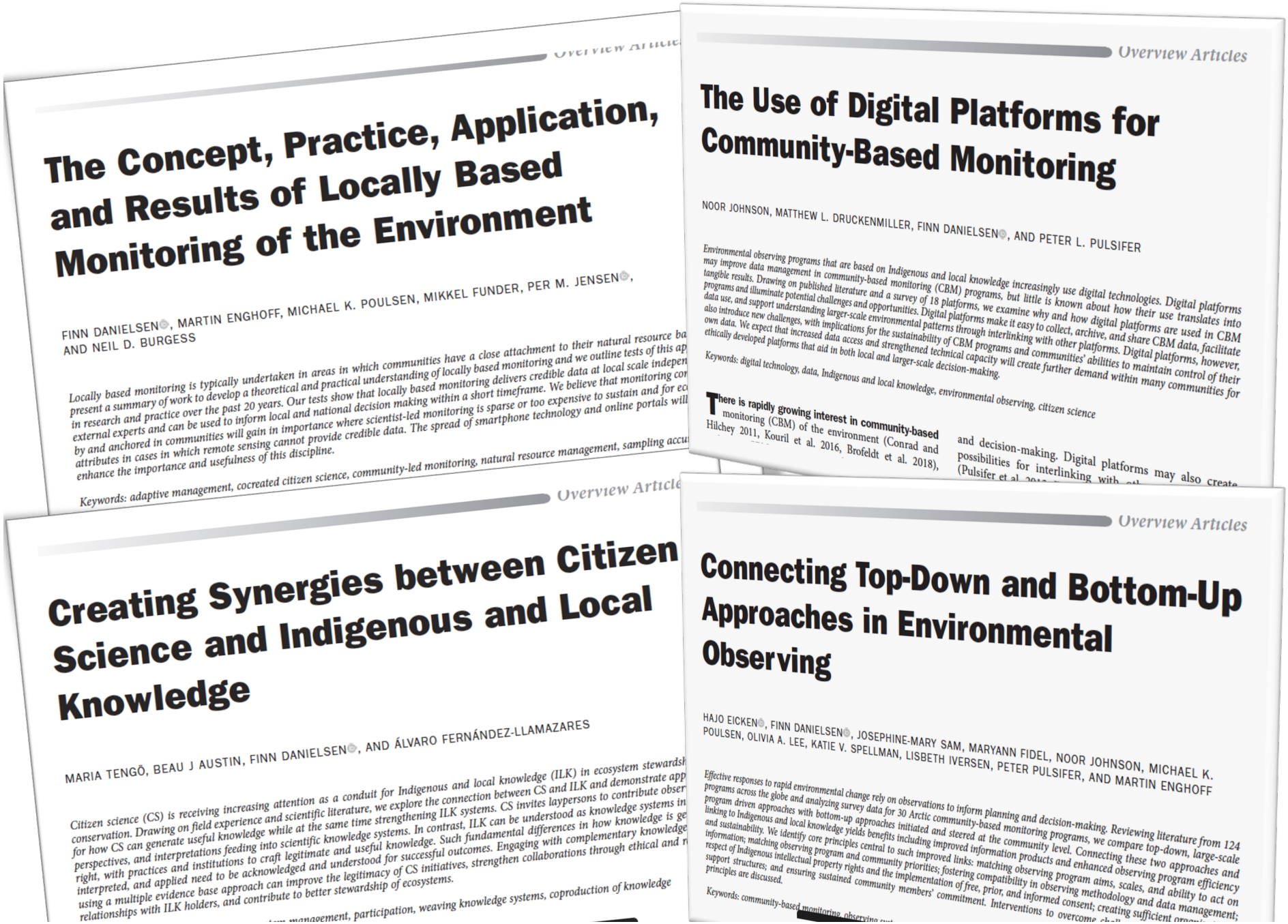
Co-funding:

Example outreach

Monograph: University of Alaska Press
(available March 2021)



Special Section ***BioScience*** on Monitoring May 2021



Overview Articles

The Concept, Practice, Application, and Results of Locally Based Monitoring of the Environment

FINN DANIELSEN, MARTIN ENGHOFF, MICHAEL K. POULSEN, MIKKEL FUNDER, PER M. JENSEN, AND NEIL D. BURGESS

Locally based monitoring is typically undertaken in areas in which communities have a close attachment to their natural resource ba present a summary of work to develop a theoretical and practical understanding of locally based monitoring and we outline tests of this ap in research and practice over the past 20 years. Our tests show that locally based monitoring delivers credible data at local scale indepen external experts and can be used to inform local and national decision making within a short timeframe. We believe that monitoring co by and anchored in communities will gain in importance where scientist-led monitoring is sparse or too expensive to sustain and for ec attributes in cases in which remote sensing cannot provide credible data. The spread of smartphone technology and online portals will enhance the importance and usefulness of this discipline.

Keywords: adaptive management, cocreated citizen science, community-led monitoring, natural resource management, sampling accu

Overview Articles

The Use of Digital Platforms for Community-Based Monitoring

NOOR JOHNSON, MATTHEW L. DRUCKENMILLER, FINN DANIELSEN, AND PETER L. PULSIFER

Environmental observing programs that are based on Indigenous and local knowledge increasingly use digital technologies. Digital platforms may improve data management in community-based monitoring (CBM) programs, but little is known about how their use translates into tangible results. Drawing on published literature and a survey of 18 platforms, we examine why and how digital platforms are used in CBM programs and illuminate potential challenges and opportunities. Digital platforms make it easy to collect, archive, and share CBM data, facilitate data use, and support understanding larger-scale environmental patterns through interlinking with other platforms. Digital platforms, however, also introduce new challenges, with implications for the sustainability of CBM programs and communities' abilities to maintain control of their own data. We expect that increased data access and strengthened technical capacity will create further demand within many communities for ethically developed platforms that aid in both local and larger-scale decision-making.

Keywords: digital technology, data, Indigenous and local knowledge, environmental observing, citizen science

There is rapidly growing interest in community-based monitoring (CBM) of the environment (Conrad and Hilchey 2011, Kouril et al. 2016, Brofeldt et al. 2018), and decision-making. Digital platforms may also create possibilities for interlinking with

Overview Articles

Creating Synergies between Citizen Science and Indigenous and Local Knowledge

MARIA TENGÖ, BEAU J AUSTIN, FINN DANIELSEN, AND ÁLVARO FERNÁNDEZ-LLAMAZARES

Citizen science (CS) is receiving increasing attention as a conduit for Indigenous and local knowledge (ILK) in ecosystem stewardsh conservation. Drawing on field experience and scientific literature, we explore the connection between CS and ILK and demonstrate app for how CS can generate useful knowledge while at the same time strengthening ILK systems. CS invites laypersons to contribute obser perspectives, and interpretations feeding into scientific knowledge systems. In contrast, ILK can be understood as knowledge systems in right, with practices and institutions to craft legitimate and useful knowledge. Such fundamental differences in how knowledge is ge interpreted, and applied need to be acknowledged and understood for successful outcomes. Engaging with complementary knowledge using a multiple evidence base approach can improve the legitimacy of CS initiatives, strengthen collaborations through ethical and r relationships with ILK holders, and contribute to better stewardship of ecosystems.

management, participation, weaving knowledge systems, coproduction of knowledge

Overview Articles

Connecting Top-Down and Bottom-Up Approaches in Environmental Observing

HAJO EICKEN, FINN DANIELSEN, JOSEPHINE-MARY SAM, MARYANN FIDEL, NOOR JOHNSON, MICHAEL K. POULSEN, OLIVIA A. LEE, KATIE V. SPELLMAN, LISBETH IVERSEN, PETER PULSIFER, AND MARTIN ENGHOFF

Effective responses to rapid environmental change rely on observations to inform planning and decision-making. Reviewing literature from 124 programs across the globe and analyzing survey data for 30 Arctic community-based monitoring programs, we compare top-down, large-scale program driven approaches with bottom-up approaches initiated and steered at the community level. Connecting these two approaches and linking to Indigenous and local knowledge yields benefits including improved information products and enhanced observing program efficiency and sustainability. We identify core principles central to such improved links: matching observing program aims, scales, and ability to act on information; matching observing program and community priorities; fostering compatibility in observing methodology and data management; respect of Indigenous intellectual property rights and the implementation of free, prior, and informed consent; creating sufficient organ support structures; and ensuring sustained community members' commitment. Interventions to overcome sha principles are discussed.

Keywords: community-based monitoring, observing sys

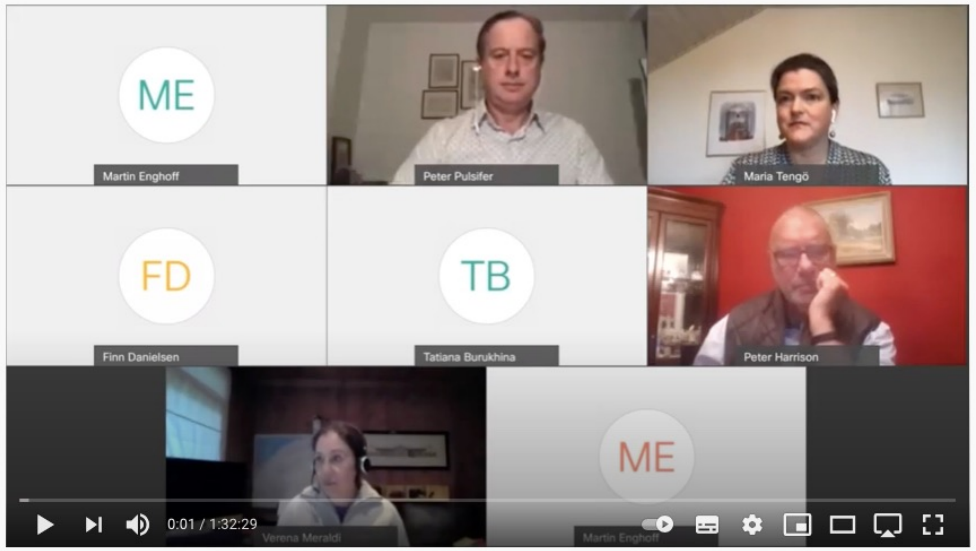
Grand Challenges
in Polar Sciences 2030

Cross-weaving Citizen Observations, Loca
Knowledge and Scientific Research in th Arctic
30
Session C Finn Danielsen, R Pulsifer, Martin Enghoff

Finn Danielsen, NORDECO
Peter Pulsifer, Carleton University
Martin Enghoff, NORDECO
Peter Harrison, Queen's University
PâviâraK Jakobsen, Qeqertalik Municipality and PISUNA
Verena Meraldi, Hurtigruten
Maria Tengö, Stockholm University

Watch Replay Technical Session
Social sciences and humanities

Link: https://youtu.be/IjUTNlw4sIM



Cross-weaving Citizen Observations, Local Knowledge and Scientific Research

Take home message 1/3

- Mobilizing **all** relevant knowledge, observations and data on the Arctic environment will be **transformational**.

- It will bring better understanding that can transform natural and social science research and natural resource management in the Arctic.

- This has great potential to impact the lives of Arctic peoples.

EO4 Grand Challenge Session: https://youtu.be/IjUTNIw4sIM

Take home message 2/3

Key barriers

1. Insufficient respect among scientists
2. Incomplete understanding of how to obtain and use data from different people* and different knowledge systems in mutually beneficial ways
3. Lack of shared protocols enabling cross-weaving, and insufficient dialogue on how to ensure knowledge synthesis
4. Lack of enabling government policies
5. Asymmetric power relationships (incl. finances)

*With varying beliefs, epistemologies, rationalities and cosmologies

Take home message 3/3

Key needs

- Establish an understanding of how to obtain and use data from different people and different knowledge systems
- Develop ways to enable knowledge production across scales
- Improve coordination of research efforts, mobilize all research results for operational contexts
- Develop observing-logistics and research infrastructures for cross-weaving knowledge

EO4 Grand Challenge Session: https://youtu.be/IjUTNIw4sIM

Thank you

Finn Danielsen, dr. scient.
fd@nordeco.dk

Photo by F. Danielsen

INTAROS has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727890