# Theme H: Observing the Arctic

## Abstracts

# ID: 85 - Use and Usability of Data and Information within Arctic Community-Driven Research

**Conveners**

**Noor Johnson** | National Snow and Ice Data Center, University of Colorado Boulder

**Finn Danielsen** | Nordic Foundation for Development and Ecology

**Roberta Glenn** | University of Alaska Fairbanks

**Lisbeth Iversen** | Nansen Environment and Remote Sensing Centre

# A usability framework for community data management: Supporting knowledge mobilization through the Exchange for Local Observations and Knowledge of the Arctic (ELOKA)

Matthew Druckenmiller, National Snow and Ice Data Center, University of Colorado, Boulder, Colorado, USA
Noor Johnson, National Snow and Ice Data Center, University of Colorado, Boulder, Colorado, USA

**Keywords:** Community Data Management, Data Sovereignty, Arctic Observing, Data Usability

The Exchange for Local Observations and Knowledge of the Arctic (ELOKA) partners with Indigenous organizations and researchers to facilitate the collection, preservation, exchange, and use of Indigenous knowledge and community-based observations. Working with partners from across the Arctic, ELOKA ensures that information from community data is preserved while also made discoverable, accessible, and useful for Arctic residents, researchers, managers, and policy makers. This presentation will summarize ELOKA's collaborative efforts to develop a community data management (CDM) system and a framework to assess the use and usefulness of CDM infrastructures. We are convening two thematic working groups to meet over multiple years to co-develop use cases for how data management tools are used by communities and others. The first working group will focus on digital place name atlases as used for educational curriculum, documenting traditional land use, language and cultural preservation, and understanding landscape change within a cultural, place-based context. The second working group will focus on the use of long-term environmental observing datasets collected by community-based monitoring or local observer networks. ELOKA's collaborative effort to develop a usability framework will broadly consider how cross-cultural sharing, storytelling, data sovereignty protocols, and capacity building may strengthen the use and dissemination of community data.

# Bridging Inuit knowledge and academic research to study a shifting marine ecosystem and Arctic Char fisheries in the Canadian High Arctic

Marianne C. Falardeau
Elena M. Bennett
Brent G.T. Else
Aaron T. Fisk
C.J. Mundy
Emily S. Choy
Mohamed M. M. Ahmed
Les N. Harris
Jean-Sébastien Moore

**Keywords:** Bridging Knowledge, Monitoring, Arctic Char, Environmental Change, Marine Ecosystem

Monitoring the biophysical changes that are reshaping the Arctic and understanding their implications for wildlife and communities require transdisciplinary approaches that bridge contrasting and complementary disciplines and ways of knowing. We studied Arctic Char (Salvelinus alpinus) in the Kitikmeot region of Nunavut over a three-decade period by combining interviews with Inuit fishers and Elders and quantitative analyses of climatic and fish proxies (i.e., stable isotopes, condition factor, lipid content). Fish proxies reflected a shifting food web with potential ramifications for fisheries. The isotopic niche position and width of Arctic Char changed through time, which was aligned with climatic changes. We detected earlier dates of ice breakup of over 12 days in some areas. Inuit fishers echoed these findings through observations of changing sea temperature, ice dynamics, and weather patterns. Fish condition was improved in years with earlier ice breakup, and lipid content increased through time. Some fishers also reported that Arctic Char appear to be in better condition in recent years and that meeting their commercial quotas is easier. They provided insights into new species in the region, including Salmon (Oncorhynchus spp.) that may interact with Arctic Char via competition. Overall, the Kitikmeot marine system is changing in dynamic ways, and close partnerships among communities, researchers, and managers, will be essential to monitor and respond to these changes.

# Linking top down and bottom up initiatives and knowledge: Community-based monitoring and co-creation approaches for sustainable urban development in the Arctic

Lisbeth Iversen, NERSC, Bergen and Oslo School of Architecture and Design, Oslo, Norway

**Keywords:** Planning, UN SDGs, Asset Based Community Development (ABCD), Place Leadership , Arctic

I will share and discuss experiences from the EU H2020-supported INTAROS (Integrated Arctic Observing System) Project and ongoing PhD work at Oslo School of Architecture and Design on holistic and proximal approaches to sustainable urban development. I argue that knowledge-based planning and monitoring of the future is required. This will strengthen the societal and economic role of the Arctic and the wellbeing of people. It will also support the EU strategy for the Arctic and related policies. Dealing with both long term planning and knowledge-based safety and risk management are demanding tasks for local communities. There is a need for methods and tools for co-creation and for downscaling and localizing the UN Sustainable Development Goals. This will contribute to strengthen the capacity of scientists, local authorities, business actors and community members, to attain sustainable results and equity, in times of flux and uncertainty. The physical infrastructure, environmental management, relationel welfare and a “care for each other” culture must be seen in a holistic context. This can be achieved through participatory planning and research, co-creation of knowledge, sharing of best practices, as well as through a tailormade Place Leadership and Management Design. New solutions can be found through combining theory and practice from natural science and community based monitoring programs, participatory planning and urban development.

# The Coproduction of Unmanned Aircraft System Solutions in Support of U.S. Arctic Sustainability and Stewardship

Jessica Garron, University of Alaska Fairbanks; Fairbanks, Alaska, USA
Jereme Altendorf, United States Coast Guard, Sector Anchorage; Anchorage, Alaska, USA
John Henry, Native Village of Unalakleet; Unalakleet, Alaska, USA
Margaret Hall, Model Forest Policy Program; Priest Lake, Idaho, USA

**Keywords:** UAS, Knowledge Coproduction, Emergency Response, Infrastructure Assessment

Technology-based solutions to problems associated with climate change, food security, environmental stewardship and emergency response can bolster workforce development opportunities in remote Arctic communities while also meeting the needs of regulatory and response agencies. In Alaska, the United States Coast Guard (USCG) is responsible for the inspection of 380 bulk fuel storage facilities, 347 of which are only accessible by boat or airplane; five of these facilities are located in the hub community of Unalakleet, Alaska, along the Bering Strait. The Native Village of Unalakleet recently completed a feasibility study about using unmanned aircraft systems (UAS) and on-line data tools to support community planning and emergency response activities. Using the results from the feasibility study combined with the mission needs of the USCG in western Alaska, this project was designed to develop UAS pilot teams in the Bering Strait region in support of decision-making about infrastructure status and emergency response activities. This work includes the remote training and certification of 7 UAS pilots in Unalakleet, the coproduction of bulk fuel infrastructure assessment and emergency response UAS protocols, the feasibility of expanding this training program regionally, and the broad dissemination of knowledge gained to other remote Arctic communities. This presentation will highlight the partnerships, methodologies and milestones of this multidisciplinary project.

# Tracking changes in the coastal ecosystem of the Alaskan Arctic through a collaborative network of observers in coastal Indigenous communities

Roberta Glenn
Donna D.W. Hauser
Johsua Jones
Krista Heeringa
Billy Adams
Joe Leavitt
Guy Omnik
Steven Patkotak
Roberta Puya Shaeffer
Carla SimKayotuk
Hajo Eicken

**Keywords:** Sea Ice, Community-Based Observations, Arctic Communities

Arctic Indigenous communities are among the first people to experience and detect changes in the environment given their deep connections to place and integral reliance on traditional subsistence resources. Community-based observing efforts, such as the Alaska Arctic Observatory & Knowledge Hub (AAOKH), provide long-term observations of shifting environmental conditions in coastal Arctic Alaska. AAOKH is an ongoing observing network with the primary goal to provide northern Alaskan communities with the tools, resources, and scientific support to share their expertise and Indigenous Knowledge through observations of changing coastal conditions and associated impacts to their traditional marine resources. AAOKH focuses on tracking environmental observations, creating research partnerships, and building capacity across six coastal communities, extending from Kotzebue to Kaktovik. Observations from local observers provide a broad-scale view of changing coastal sea ice and ocean conditions, and ultimately impacts at the community scale. Here, we share recent themes in these community-based observations from the network of Iñupiat observers spanning the Alaskan Arctic coast. Observers documented abrupt changes in sea ice cover, ocean temperatures, and associated weather patterns. Environmental changes were often linked to food security and impacts to the traditional way of life.

# Connecting Top-Down and Bottom-Up Approaches in Environmental Observing: Lessons for the Arctic and a review of programs across the globe

Hajo Eicken
International Arctic Research Center, University of Alaska Fairbanks, Fairbanks, USA
Finn Danielsen
NORDECO, Copenhagen, Denmark
Josephine-Mary Sam
International Arctic Research Center, University of Alaska Fairbanks, Fairbanks, USA
Maryann Fidel
Yukon River Inter-Tribal Watershed Council, Anchorage, USA
Noor Johnson
National Snow and Ice Data Center, University of Colorado, Boulder, USA
Michael K. Poulsen
NORDECO, Copenhagen, Denmark
Olivia A. Lee
International Arctic Research Center, University of Alaska Fairbanks, Fairbanks, USA
Katie V. Spellman
International Arctic Research Center, University of Alaska Fairbanks, Fairbanks, USA
Lisbeth Iversen
Nansen Environmental and Remote Sensing Center, Bergen, Norway
Peter Pulsifer
Department of Geography and Environmental Studies, Carleton University, Ottawa, Canada
Martin Enghoff
NORDECO, Copenhagen, Denmark

**Keywords:** Community-Driven Monitoring, Global Observing Networks, Indigenous Knowledge, Local Knowledge

Effective responses to rapid environmental change rely on observations to inform planning and decision-making. Reviewing literature from 124 programs across the globe, including the Arctic, and analyzing survey data for 30 Arctic community-based monitoring programs, we compared top-down, large-scale program driven approaches with bottom-up approaches initiated and steered at the community level. Analysis of this information yielded insights into benefits gained from combining both approaches. The study also confirms the important role of Indigenous and Local Knowledge in ensuring observing activities are relevant in decision-making and planning at the local scale. Arctic observing programs are disproportionately represented in the global literature on this topic. Our analysis points to a number of strategies that can help maximize benefits from observing efforts. These include matching observing program aims, scales, and ability to act on information; aligning observing program and community priorities; respect of Indigenous intellectual property rights and implementation of Free, Prior, and Informed Consent; creating sufficient organizational support structures that help sustain community members' commitment.

# Sharing observations of coastal Arctic Alaska in the Alaska Arctic Observatory and Knowledge Hub

Olivia Lee, University of Alaska Fairbanks, Fairbanks USA
Donna Hauser, University of Alaska Fairbanks, Fairbanks USA

**Keywords:** Community Based Observations, Coastal Change, Sea Ice Monitoring

The Alaska Arctic Observatory and Knowledge Hub shares observations of coastal waters, sea ice, wildlife and weather in northern Alaska communities. The focus on providing accessible information to communities using multiple communication methods ensures that information flows back to participating communities, while contributions to a long-term database of observations provides a searchable repository of past observations that also provides protected access to more sensitive information.