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Friday 24 February 2023, 0830 – 1230 Open session – HYBRID Convener: Stein Sandven, NERSC

Nunaaqqit Savaqatigivlugich - Working with Communities: Evolving collaborations around an Alaska Arctic Observatory and Knowledge Hub

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Indigenous Peoples across the Arctic have been monitoring, interpreting, and adapting to environmental change since time immemorial. In recent decades, however, climate change has imposed unprecedented and abrupt changes that affect the land and sea upon which several Indigenous communities rely. Opportunities to meaningfully relate Indigenous and western science in ways that acknowledge both as complimentary ways of knowing, and not to be used to validate the other, are increasingly common but still lacking. Co-created community-based observing programs represent an opportunity to harness the holistic breadth of knowledge in communities with the goal of tracking Arctic change while simultaneously retaining community priorities and local-scale needs. The Alaska Arctic Observatory and Knoweledge Hub (AAOKH) represents a network of Iñupiaq observers from northern Alaska coastal communities working in partnership with academic researchers. Here, we describe our progression to an integrated observing and knowledge hub, through which AAOKH provides several core functions. Core functions involve: tracking environmental changes, communicating Indigenous-led observations of the environment and their meaning, education, creating space for scientific and Indigenous Knowledge exchange, and supporting community-led responses to environmental change. We detail the evolution of AAOKH and our core functions by outlining and discussing specific actions and opportunities that have been used to increase local-scale visibility and accessibility of AAOKH observations and syntheses. We also discuss our ongoing efforts to increasingly shift toward a knowledge co-production framework as we plan to sustain AAOKH into the future.

Engaging youth from Uummannaq Fjord in climate research through sea ice thickness measurements

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To learn about the importance of sea ice for local Inuit communities and improve sea ice thickness models, an interdisciplinary team travelled to Uummannaq Fjord in Greenland in Spring 2022. With a focus on knowledge co-production and engaging meaningfully with the communities, the team collaborated with the Children's Home in Uummannaq (CHU) to measure sea ice thickness. At an earlier visit in Spring 2019, we donated two ice drilling kits to the CHU. With the children we developed and tested an ice drilling manual in Kalaallisut, Danish, and English. In addition, we filmed the children while they showed and explained in their own words how to perform the measurements – with this footage we are in the process of creating a tutorial video for children. Dialogues with the local community led to the idea of creating a Citizen Science program together with the public primary school of Uummannaq.

The school showed interest to measure sea ice thickness as part of their annual theme week in the subject of science and nature. This way, the children could contribute with time series which could be made available in scientific data systems. The idea of this promising program is currently being explored at the Nordland Research Institute.

Creating Connections Between Youth and Nature Through a Community-based Monitoring Project

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This presentation describes the efforts of a community-based monitoring project called,Youth for Arctic Nature (YAN), based in Northwest Iceland. The aim of the project is to create an international connection to other youth groups, scientist and communities for local wildlife monitoring and nature-based educational activities. The YAN project uses a combination of community youth development and place-based pedagogies to help create connections between youth and nature. It uses hands-on learning which may lead to greater empathy and stewardship to youths' natural environment and to their community. There is no doubt that global climate change is a concern for youth, as children and youth in the developing world are among the most vulnerable to its effects. Education can be transformative if people are given chances to acquire it in a fair and equitable manner, and youth have the right to be given opportunities to become aware of local issues that affect them within their own cultural context. These opportunities create a spillover effect, for example learning about local issues leads to learning about global issues and our connections to each other and nature—both a local and global perspective.

Development of community-based observations and citizen science in the Svalbard area

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A prerequisite for good planning and decision-making in the Arctic is access to environmental and climate data of importance to people living and working there. On global scale it is shown that CBM and CS systems can make significant contribution to such observations. This is also the case in the Arctic, which is demonstrated in the Svalbard area. A growing number of tourists become data collectors, observing birds and marine mammals by mobile phone with and internet. Tourists onboard expedition vessels are interested to participate in data collection during the voyages. Therefore, several operators start to include CS programs in their expeditions. For local residents as well as visiting tourists it is important to receive warning about snow avalanches, landslide and other natural hazards, because this is directly affecting their safety. Today individuals travelling around Svalbard can report such incidences to the local authorities and national agencies. Explorers travelling to remote areas of Svalbard have started to collect observations which are part of scientific projects, such as monitoring the upper atmosphere, register polarbears and take water samples under the sea ice for marine ecosystem research. Protection of cultural heritage sites is a particular challenge in Svalbard because the climate warming leads to erosion and decay of many such sites. It is planned to initiate CBM/CS observations as a useful tool for collecting more data on the sites before they are destroyed by climate change. All these initiatives can make valuable contribution to science and for planning and decision-making in the communities

Capacity building for sustainable developments of emergency governance in the Arctic in a comparative perspective

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The Government of Greenland has in January this year issued a report as a response to the June 2017 tsunami incident with severe devastations of the livelihood of local peoples in the Karrat Fjord near the town of Uummannaq in northwest Greenland. In line with IPCC's concern for negative impacts of the shrinking cryosphere on societal security of human settlements and disaster risks to livelihood options in the Arctic (IPCC Special Report on the Ocean and Cryosphere in a Changing Climate, 2019, Summary for Policy, section A.7), the Government of Greenland report suggests establishing a monitoring system in order to be able to warn citizens on immediate dangers in case of new tsunami incidents. This paper aims at supplementing the Government of Greenland report with considerations on how Community-Based Monitoring and Citizen Science can enhance the effectiveness of monitoring processes and warning systems in case of new landslides and potential tsunamis in the Karrat Fjord system. These considerations will be based on the report and on comparative studies of monitoring practices of landslides and avalanches in coastal communities in Svalbard, Norway. The Swiss 'Integrated Risk Management' system, developed by the Swiss Federal Office for Civil Protection, Bern, and other best practices, standards and guidelines will be utilised for inspirations.

Community-based monitoring of coastal risks and hazards in Alaska: A case study contribution to CAPARDUS

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Coastal communities in Alaska are dealing with significant interrelated hazards related to environmental change including loss of sea ice, severe storms, erosion, and harmful algal blooms (HABs). Community-based monitoring (CBM) and observing programs have the potential to improve availability of information for decision-makers to assess and respond to risks and hazards at different scales. CBM programs in Alaska use a variety of sometimes divergent approaches to ensure relevance and support use of their observations, including coordinating and networking with similar projects, adopting either standardized or non-standardized data collection protocols, and working with regional organizations to support broader communication. This presentation will review preliminary findings from a case study contribution to CAPARDUS. Our preliminary findings are based on an archival analysis of 43 documents relating to CBM of coastal hazards and HABs in Alaska as well as 13 interviews with CBM programs in Alaska. We focus on the role of coordination and standardization of observations in relation to the mobilization and use of observational data from these programs to support decision-making. We will also discuss what was learned about balancing the constraints communities face with implementing standard observing protocols with community interests and resources.

An Arctic Practices System (APS) – understanding the needs and potential

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Responding to the challenges of climate change, food security and natural hazards in the Arctic requires trusted observations that are intercomparable. Owing to the scarcity of established instrumented Arctic observation sites, community-based observations and citizen science are becoming essential assets, but consistency of methodologies is needed for observations and other types of shared practices that support meaningful collaborations.

The CAPARDUS Project* is examining how the Ocean Best Practices System (OBPS)[1,2] framework, created under UNESCO IOC, can serve for an Arctic Practices System (APS) with community inputs and experience of the Project team. To determine requirements for the APS, two surveys have been

completed. Almost all respondents, representing various professions and knowledge perspectives , recognized they have practices worth recording and that an APS would be an effective way to share them. In addition, most respondents indicated that they are impacted by standards, but few acknowledge using formally recognized standards.

A pilot APS as part of the OBPS has shown that support for multiple languages and a streamlined submission process is needed. The capabilities for discovery of Arctic practices in the pilot APS are already effective. There is also a recognition that capacity development is an important part of methods sharing. The survey results, community response and evaluations including work with the pilot will be provided in the presentation.)* CAPARDUS receives funding from European Union's Horizon 2020 research and innovation programme under grant agreement No. 869673)

Citizen Science for Human–Animal–Nature Connectedness in Urban and Natural Environments (CATCH)

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In our paper, we will present a planned CATCH project which aims to utilize, evaluate and explore CS as a methodology for actionable sustainability science. We will examine CS´s affordances and challenges for producing research knowledge on health and wellbeing related issues for people and their companion animals living in an urban setting in the circumpolar North. More specifically, we will study experiences of loneliness, human-animal-nature connectedness, and related knowledge through an extended multidisciplinary One Health perspective. We will produce new empirical research knowledge of A) loneliness and its alleviation, B) multifaceted relationality between urban residents and their companion animals, and C) citizens' environmental literacy on signs of climate change, and the ways their human-animal-nature relationalities influence their health and wellbeing. D) We will evaluate how the social-environmental systems are changing the community of Oulu on the edge of the Arctic and the drivers for these changes through our three empirical studies. Overall, research will be conducted by following the "for the people" CS protocol, where data analysis, interpreting results and sharing the results are conducted in close collaboration with citizen scientists. The findings of this study may be used for sustainable and multispecies city planning. We will present the framework of our project with a systematic literature review on the human-animal-nature connectedness and "for the people" CS approach.

Combining citizen-science with micro- and macroplastic research in Iceland

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Ocean Missions is a non-governmental organization that was established in 2019 in Húsavík, Northeast Iceland, which is collecting data on both microplastic pollution in sea surface waters and macroplastic pollution on beaches around the country. They offer two week-long expeditions per year where passengers participate as citizen-scientists, helping collect and analyze microplastic samples from trawls using a low-tech aquatic debris instrument (LADI) and collect data from beach cleanups using the OSPAR protocol. The organization also offers a citizen-science tour in collaboration with North Sailing whale watching in Húsavík to conduct microplastic trawls once per week during the summer, and leads a funded beach cleanup effort in Northeast Iceland. A total of 41 participants have joined the expeditions where 25 microplastic trawls (usually each consisting of three 30-minute trawls) have been conducted from the Northeast to Southwest of the country. Additionally, 33 trawls have been conducted from Húsavík in Skjálfandi Bay between 2021-2022. This effort has resulted in the first information about sea-surface microplastic in Iceland, determining that the most common microplastic types are lines and

fragments, many of which are believed to have originated from fishing gear. Samples from 2019 have undergone spectroscopy analysis which confirmed polypropylene (such as that used for ropes) was the most abundant plastic type. Additionally, over 13000 kg of debris has been collected from beaches and inventoried between 2020-2022; an effort that included over 650 volunteers. 93% of debris was classified as plastic/polystyrene, with the greatest contributors being general plastic pieces (48%) and fishing nets/ropes (21%).

Using citizen science to collect scientific data and increase public awareness of wildlife conservation needs: The case study of The Great Seal Count

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Citizen science has the potential to enhance the ability of collecting important scientific data, including different types of nature monitoring data, such as abundance and distribution of bird, mammal, and plant species. In addition, citizen science can increase public understanding of scientific methodologies and be a tool to improve knowledge and engagement in issues such as nature conservation and climate change. This presentation exemplifies how citizen science can enhance monitoring of sensitive wildlife populations and increase awareness of conservation needs. The Icelandic harbour seal (*Phoca vitulina*) population is considered endangered on the national red list, due to a severe decrease in number over the past decades. Seals are distributed widely around the coastline and monitoring is time consuming and expensive. Increased data collection obtained through citizen science can assist in detecting changes in local abundance and between year differences. A growing interest for seal watching tourism in Iceland pose a threat to the sensitive seal population since disturbance can have physiological and behavioural effects on the animals. However, increased tourism also introduced a potential to conduct the citizens science project, The Great Seal Count, where important data is collected and awareness about seal conservation among visitors and locals increases. Lessons learned and future potentials will be discussed and evaluated from a scientific perspective.

Towards community driven monitoring and management of seabirds in the North Atlantic – The case of Northern fulmar in the Faroe Islands

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In a number of rural communities in the Faroe Islands, seabirds constitute an important source of food and income. The fowling (harvesting) of seabirds targets several species, and one of these is Northern fulmar. Young fulmars are a sought-after speciality food. During a typical season, an estimated 100.000 fulmars are caught and traded over a period of one or two weeks. Previously, the hunting of fulmar was undertaken on a small-scale basis and mainly for subsistence. In recent years, the scale of the hunting has increased and the harvest has become increasingly commercial. There are no oversight or regulations in place. Hunters could play a central role in observing and managing the populations of fulmar and other seabirds.

A potential tool to engage in meaningful dialogue with the hunters, to provide the hunters with a ‘voice’, and to encourage locally-owned management of the seabird resources is Community Based Monitoring (CBM). I describe the current and planned efforts to establish a foundation for constructive interaction between local hunters and the central biodiversity management authorities in the Faroes. The presentation will touch upon key components of maintaining a sustainable seabird harvest, while at the same time further strengthening local appreciation of the importance of sustainable use of our bountiful marine environment.

Long-term data collection on cetaceans in Skjálfandi Bay, Northeast Iceland in collaboration with whale watching tourism

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In 2001, long-term photo-identification, sighting location and animal behaviour data collection began in Skjálfandi Bay, Northeast Iceland by the Húsavík Whale Museum and then, in 2007, the University of Iceland's Húsavík Research Centre. Originally paper logs and handheld GPSs were used, but methods were updated to the use of the SpotterPro app on Ipads in 2014. Data is primarily collected by student interns onboard whale watching vessels. Over the past 20 years this collaboration between the science and tourism sectors has led to the creation of a database that contains more than 1000 individually identifiable humpback whales (*Megaptera novaeangliae*), as well as more than 300 white-beaked dolphins (*Lagenorhynchus albirostris)* over the past 10 years, and more than 50 minke whales (*Balaenoptera acutorostrata*) over the past 8 years. The internship program hosts an average of 20 students per year, allowing them to earn credit and use the data for their bachelor or master's degrees. In addition to this database supporting 5-10 student research projects per year of different sizes and scopes, the data collected has also contributed to scientific findings such as the migration routes of the animals, the abundance of each species in the bay, and the prevalence of entanglement in fishing gear, showing the great value of long-term, collaborative, and low-cost data collection.

Citizen Science Approaches to Monitor Sustainable Development Goals 6 and 11 in Africa

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Africa is the least urbanized but the most rapidly urbanizing region of the world with many cities growing at unprecendented rates amid worse sanitation and living conditions. This paper is part of a survey on the landscape of citizen science projects in Africa and their potential contributions to Sustainable Development Goals (SDGs). In this paper, we focus on SDGs - 6 (WASH) and 11 (Cities) - the most prevalent and intensive issues confronting Africa. It uses online survey approach leveraging designed google forms which were shared to citizen science (CS) projects which are spread across various subregions to investigate their nature including characteristcis, motivation, and purpose; chronological evolution; and sources of funding; as well as common tools and methods. In all, 154 CS projects formed the sample size, and 54 responses were received which results in 53% response rate. Meanwhile, the survey alowed for multiple responses to questions. The paper reveals that 31.1% of CS projects in Africa aims to advance knowledge, 27.7% aims to educate the public, 20.8% aims to ensure infomed policy, 18.9% aims to capture obscure data, and another 7.5% aims for unspecified purposes. The paper further found that the various methods used include 26% - direct observation, 19.3% - participant observation, 18.7% - social surveys, and 16.7% social interviews. The paper reveals a growing number of CS projects in Africa which could contribute to monitoring and reporting SDGs 6 and 11 by filling data gaps. The lack of awareness, absence of database and paucity of funding observed shows the need for regular engagements and interactions to enhance communication, collaborations and partnerships for successful implementation of CS projects in Africa.