

Community-Driven Sea Ice and Ocean Research in the Contrasting Coastal Domains of Hudson Bay (LICENSE # 03 008 19N)

Introduction:

This project is a continuation of community-driven research in Hudson Bay. The research started with the Arctic Eider Society in Sanikiluaq in 2014, expanded to southeast Hudson and James Bay with support from ArcticNet in 2015-2018, and expanded to northwest Hudson Bay communities including Naujaat in 2018. In Naujaat, we work closely with the local HTO who assisted in managing funds and paying Inuit as guides and research technicians. Johnny Tagornak is our primary community partner. He has participated in all the field work conducted by university personnel and received training in many aspects of the field research. In December 2019, Johnny joined the University of Manitoba research personnel at the ArcticNet Annual Scientific Meeting 2019 in Halifax, Nova Scotia. Johnny also is carrying on some monitoring during the COVID-19 pandemic.

Metadata from 2018 and 2019 field campaigns along with raw ocean profile (CTD) data collected by Johnny and other Inuit partners are available on SIKU and the Polar Data Catalogue. Water and sea ice chemistry data are accessible and managed to international standards on the University of Manitoba's CanWIN Data HUB (<http://lwbins-datahub.ad.umanitoba.ca/>).

Summary of 2020 Data Collection:

Field work planned for Naujaat for March-July 2020 were interrupted by the COVID-19 pandemic. A trip to Naujaat was made by Michelle Kamula and University of Manitoba Professor CJ Mundy on March 8-11, 2020 to discuss the proposed research activities with community partners and ensure community awareness and support prior to conducting any further research in the area. They met with the Arviq HTO board members to discuss past research and proposed future research in the marine environment around Naujaat. Past research presented and discussed included ship based work from MV William Kennedy in August 2019, and ongoing community based sea ice and winter oceanographic research that began in 2018. Proposed future work was also discussed and the HTO board expressed support and provided positive feedback for a proposed sea-ice study and oceanographic mooring planned for April-June 2020.

Although the proposed field work involving students and professors from the University of Manitoba was cancelled due to travel restrictions, Johnny Tagornak was able to conduct CTD monitoring of the coastal waters on six dates in June and two dates in September. In the absence of discrete water samples, this CTD dataset provides a valuable snapshot of the water column's salinity and temperature as the last of the sea-ice melted and then summer open-water conditions returned to the area. In addition to sampling, Johnny took part in 3 seminars on how to upload data onto the SIKU platform, and took part in finalizing a Facebook update on his summer field work.

Proposed 2021 Data Collection:

With travel and other restrictions still in place due to COVID-19, we propose continuing the ice-ocean monitoring conducted by our community partner Johnny Tagornak and expanding the scope of his work in February-July 2021. All the proposed components of the study were

discussed with the HTO Board at our meeting on March 9, 2020 but now the approach has been modified to allow the field activities to be conducted solely by Johnny Tagornak and other local guides as required. **No personnel from the University of Manitoba would travel to Naujaat for the 2021 research.**

The proposed research activities include:

1. Continue collecting CTD measurements of the water column and sea ice properties (thickness, snow cover, location of the flaw lead), water samples for water mass tracer analysis, and sea-ice cores for measurements of thickness and compositional analysis.
2. Collect and process water samples for water quality analyses including nutrients, organic matter, and algae pigments (chlorophyll *a*). *This activity was previously conducted by University students and Johnny will receive training (on-line) before beginning this work.*
3. Install instruments to continuously measure properties of the water column under the ice. The instruments will be hung on a line that is attached to the upper surface of the ice and extends down through the water column to the seabed. The instruments will record salinity and temperature at various depths in the water column and possibly currents, and a sensor placed at the bottom will monitor pressure, which can be converted to a tidal cycle. During the meeting in March 2020, the board expressed interest in installing oceanographic instruments that could measure currents, temperature, and salinity throughout the year. The proposed instruments would remain in the water only for February – June 2020 months (the ice-covered season) to ensure easy recovery of the instruments. In January, we will coordinate with the HTO on the mooring design, deployment location, timing, etc.