Non-technical project summary

Amundsen Science

Project Title: Amundsen Science annual expedition onboard the Canadian research icebreaker CCGS *Amundsen*

Research Team: The PI of this project is Anissa Merzouk, Marine Research Coordinator for Amundsen Science. During the expedition, up to 39 scientists and 41 Coast Guard crewmembers are present on the icebreaker at any given time. Participants of the expedition are identified in the planning phase of each field season. A list of participants and their affiliations will be distributed before the start of every annual expedition.

Project Objectives:
The objective of the annual scientific expedition of the Canadian research icebreaker CCGS *Amundsen* is to assess and monitor the changes occurring in the marine ecosystems of the Canadian Arctic in response to climate change. Since 2003, the *Amundsen* has sailed the Canadian Arctic in support of over 45 Canadian and international research programs and dozens of multidisciplinary science teams.

Project Timing: Research conducted from the CCGS *Amundsen* is ongoing since 2003, and is expected to continue in the future (monitoring program). The 2024 *Amundsen* Expedition is scheduled from 14 June to 30 October and is divided into five segments or legs.

Location: The 2024 Amundsen Expedition plan is still being elaborated so the exact timing and locations of the proposed activities listed may change, although the methods employed for data and sample collection remain the same. Similarly for 2025 and 2026, the research programs, scientific objectives and geographic focus will be defined during planning in the months leading to each annual expedition.

Methods:

Shore-based and on-ice sampling activities:

River sampling: The sampling sites will be accessed using the ship's helicopter. Sampling at each river will take approximately one hour. One scientist will wade into the river and collect water sample with a syringe (total volume: 500 mL) and sediment sample with a spatula. The total amount of sediment collected for each river fits in one large Ziploc bag (about 2 liters). All samples will be brought back on the ship, refrigerated or frozen, and analysed in laboratories after the expedition.

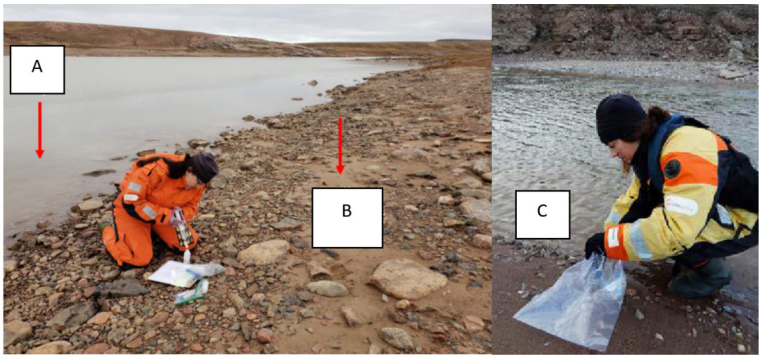


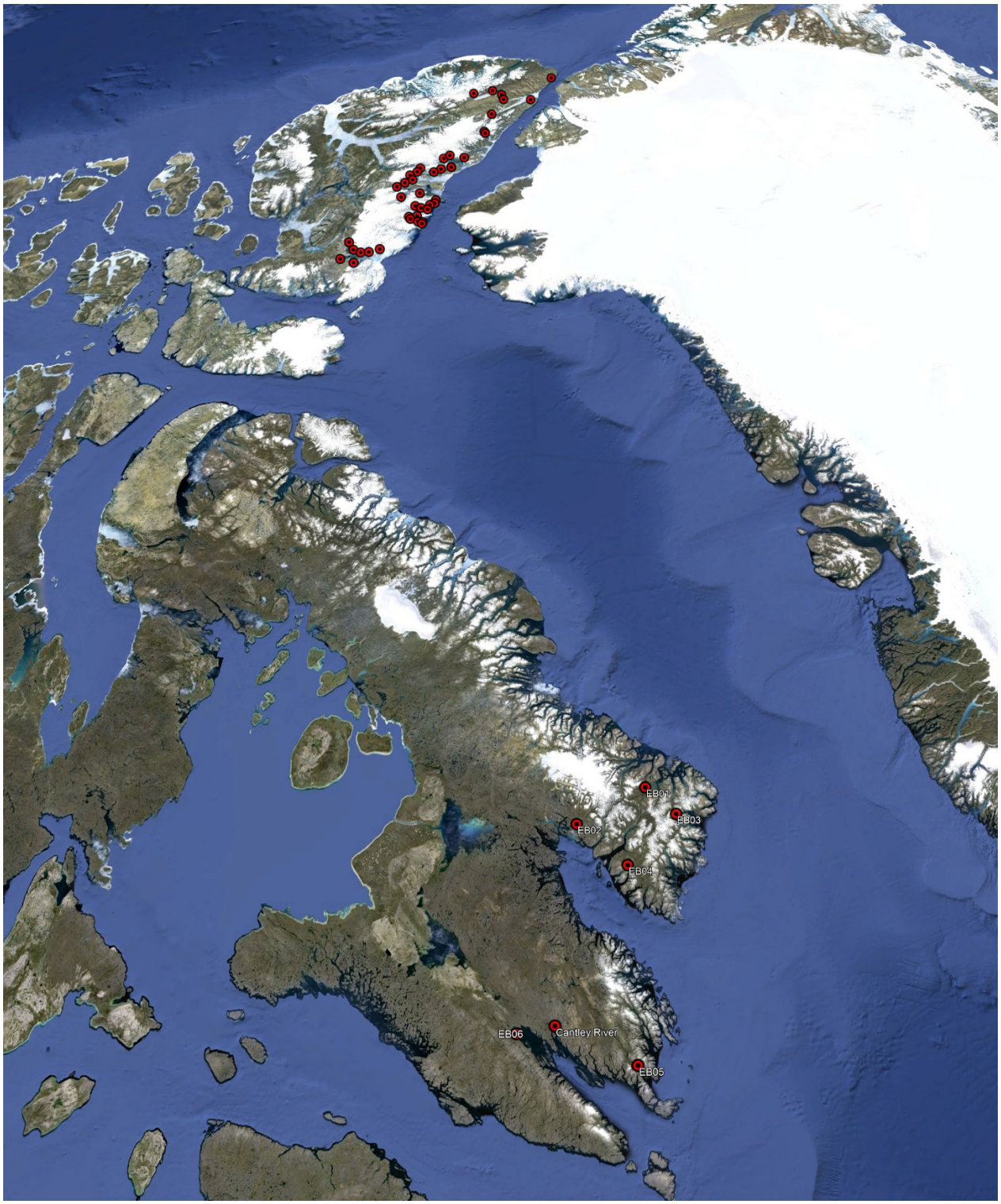
Figure 1: River water sampling (A) and riverbed sediment sampling (B and C).

Ice sampling and surveys: The ship's helicopter will be used to conduct aerial surveys of the outlet glaciers and adjacent ice cap regions. On-ice operations on the glaciers could include ice and meltpond sampling.

Aircraft Access: The sampling sites will be accessed using the ship's helicopter.

Community consultation and Inuit involvement: Research programs coming onboard the CCGS *Amundsen* do conduct their own community consultations. For example, a team from DFO will be visiting Qikiqtarjuaq and Pond Inlet in February regarding marine protected areas and the programs they do from the *Amundsen*. Consultations with the community of Grise Fiord were also conducted in 2023 and led to the employment of two trainees from the community and to a visit of the ship. Another consultation is planned for 2024 regarding operations in Jones Sound and in Quttinirpaaq national park. In addition, we always update the communities about the planning of the expedition and provide summaries of the findings from previous years. We aim to continue our existing collaborations, to build on successes from last years and to strengthen the links with communities. We are also developing more opportunities for the participants of the expedition to learn about Inuit culture and history (trainings, Indigenous library, cultural exchange days, etc.).

Benefits of Research: The multidisciplinary research conducted from the *Amundsen* will provide crucial physical, chemical, and biological oceanographic data to support fisheries management and conservation measures, and to monitor and assess the impacts of climate change on the Canadian Arctic marine environments. Monitoring the water and sediments of Arctic rivers help scientists understand the impacts of climate change on adjacent marine ecosystems. As ice caps, glaciers and permafrost melt, the flow of the rivers changes, along with their contents in contaminants and greenhouse gases, affecting nearby environments, wildlife and communities. After the annual expedition, an array of open access datasets, scientific publications and reports are widely distributed, including to Parks Canada, the local communities and researchers.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EB03
EB02
EB04
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Cantley River
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