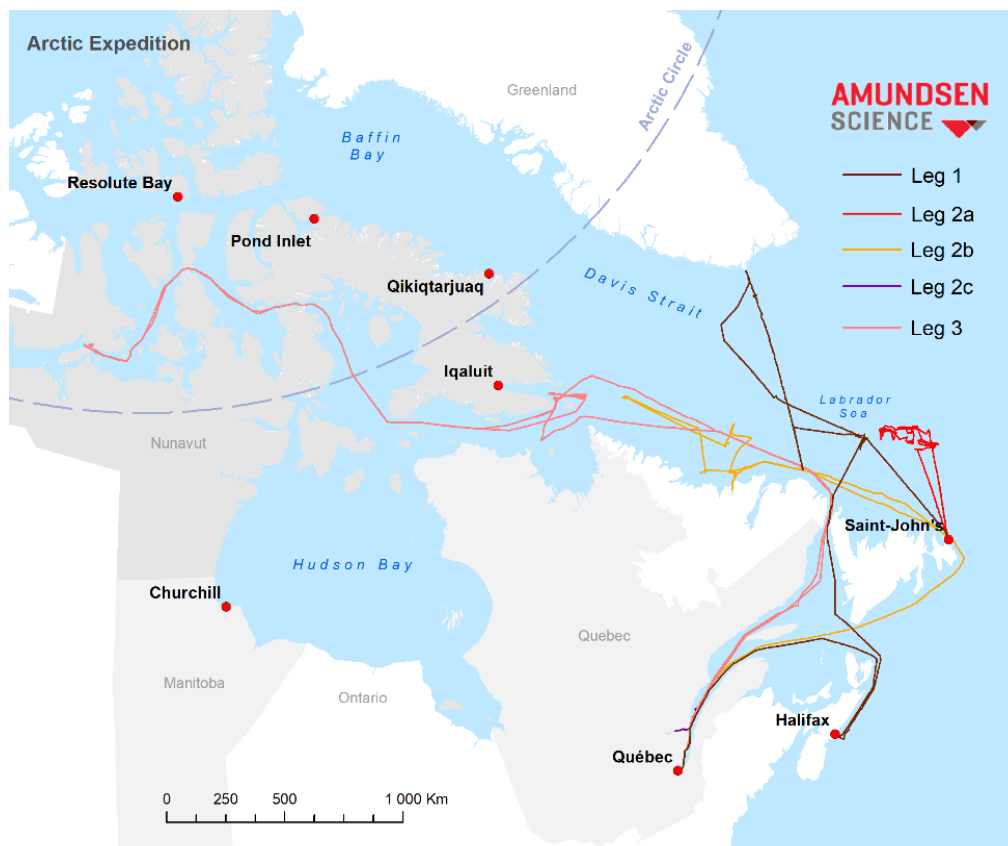


Summary Report

2020 Arctic Expedition onboard the CCGS *Amundsen*

Submitted to the **Nunavut Research Institute**

The 2020 Expedition began on 16 July, when the Canadian research icebreaker CCGS *Amundsen* left Quebec City for its 16th annual mission. The multidisciplinary scientific expedition ran until 27 October and allowed 38 scientists from national research teams to study the marine and coastal environments of the Canadian and Greenlandic Labrador Sea, the Atlantic Ocean and the Canadian Arctic.



The COVID-19 global pandemic greatly impacted the 2020 Expedition. The expedition plan had to be extensively modified and no scientific activities were conducted in the high Arctic. Furthermore, to safeguard northern communities, all crew changes all took place in the south.

High quality research was nevertheless conducted with a much reduced scientific crew onboard the ship. The 2020 Expedition was composed of 3 Legs and supported 5 research programs. The Atlantic Zonal Off-Shelf Monitoring Program (AZOMP) took place during Leg 1. Leg 2 was divided in 3 segments: Leg 2a supported the Natural Resources Canada (NRCan) Marine Spatial Planning, the Integrated Studies and

Ecosystem Characterization Of the Labrador sea Deep ocean (ISECOLD) took place during Leg 2b, and the sea trials of Amundsen Science new Remotely Operated Vehicle (ROV) were conducted during Leg 2c. Finally, an opportunistic Seabed Mapping program took place during Leg 3 as the *Amundsen* performed Canadian Coast Guard duties.

The 2020 *Amundsen* Expedition was successful considering the multiple constraints that affected its planning and realization. The research programs are currently analyzing data acquired during the Expedition. Scientific publications and their outputs are shared on the Amundsen Science [website](#).

Leg 1

Leg 1 took place July 16 – August 13 and supported Fisheries and Oceans’ Atlantic Zonal Off-Shelf Monitoring Program (AZOMP), a monitoring program ongoing since 1990. The Labrador Sea is a key region since it receives and blends warm and cold waters from the Atlantic and Arctic Oceans. The AZOMP time-series of observations along a 880 km-line running from Labrador to Greenland provides a description of physical, chemical, and biological properties in the Labrador Sea during Spring and records how these properties evolve in time and under climate change.

In Leg 1, 174 scientific operations took place along the Labrador to Greenland transect. The sampling activities involved biological sampling and seawater physico-chemical properties to understand the oceanography and ecology of this important subarctic region.

Leg 2a

Leg 2a supported Natural Resources Canada (NRCan) Marine Geoscience & Marine Spatial Planning program, involving seafloor habitats and sediment surveys and deep-sea sampling operations on the Northeast Newfoundland Shelf and Slope. This program aims to better understand the offshore geological resource potential of the region.

Leg 2a took place August 14 – 24, departing from and returning to St. John’s, Newfoundland. Sampling activities consisted of seabed sediments collection using various corers (piston cores, gravity cores, box cores, grabs) and bottom camera imagery. Additionally, extensive seabed bathymetric mapping surveys were carried out. In total, Leg 2a allowed 48 scientific operations to collect sediment cores, high-resolution photographs of deep-sea habitats, biological information and seawater properties, as well as 1800 nautical miles of seafloor cartography.

Leg 2b

The Leg 2b took place August 24 – September 9 and supported the Integrated Studies and Ecosystem Characterization of the Labrador Sea Deep Ocean (ISECOLD) program led by Fisheries and Oceans Canada in collaboration with Dalhousie University, Memorial University, and University of Calgary. The objective of ISECOLD in 2020 was to expand on sampling campaigns conducted since 2017 and characterize deep and coastal environments of the Labrador Sea that feature unique but poorly known habitats. The data collected will also contribute to the establishment of Marine Protected Areas and better fisheries

management on the northeastern coast of Canada. To achieve this, the different components of the ecosystem (seawater, fish, plankton, benthos, sediments, etc.) were sampled through integrated studies at sites spanning from shallow coastal waters to deep offshore basins, providing a global assessment of these unique environments of the Labrador Sea. Overall, the *Amundsen* visited 14 stations for 70 scientific operations, collected bathymetric information while sailing over 5400 nautical miles and allowed the recovery and redeployment of two long-term moorings in Hatton Basin.

Leg 2c

Leg 2c took place September 17 – 22 in the St. Lawrence Estuary and allowed to integrate and test Amundsen Science's new Remotely Operated Vehicle (ROV). The ROV Sea Trials allowed 7 successful deployments of the ROV, 14 push-core samples (containing 11 coral specimens), 534 Go of high-resolution submarine footage, and 3 zooplankton nets. Now successfully tested at sea, the new equipment is now ready for next year's first dives in Arctic waters.

Leg 3

Leg 3 was an opportunistic science leg, taking place September 24 – October 27, and involved partners from the Canadian Hydrographic Service, Amundsen Science and the University of New Brunswick. The primary objective was to perform seafloor mapping surveys and expand hydrographic data coverage in the proposed Low Impact Shipping Corridors of eastern Canada. Scientific operations were affected by bad weather and interrupted by Coast Guard duties during an escort task in Victoria Strait region, but opportunistic surveys took place near Frobisher Bay, Cambridge Bay and during transit.

Overall, Leg 3 allowed for 30 scientific operations and collected bathymetric and hydrographic information while travelling over 12 700 nautical miles.