

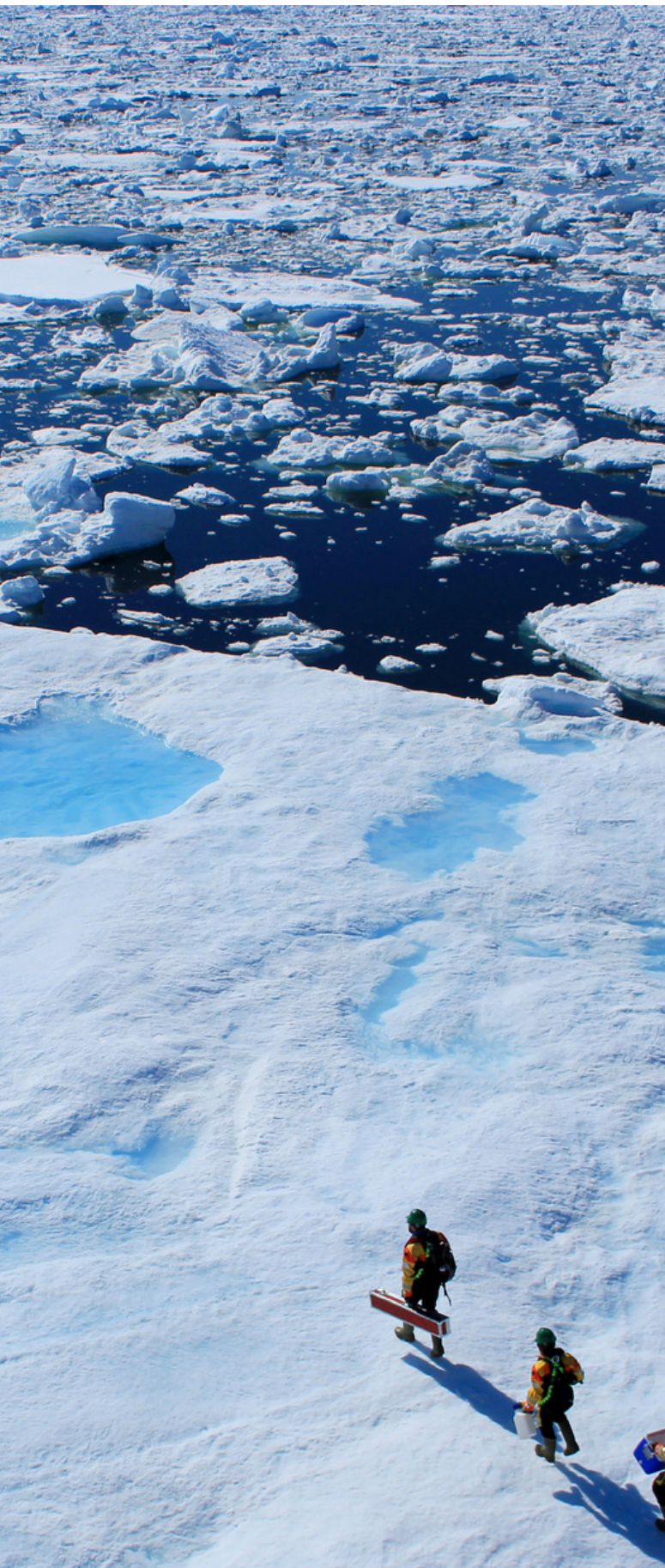


REPORT

EXPEDITION SUMMARY

2022

AMUNDSEN
SCIENCE 



INTRODUCTION

The 2022 Expedition Summary is an overview of the science activities undertaken onboard the CCGS *Amundsen* during the 2022 field season. This document is available in English, French and Inuktitut and targets anyone who wishes to get a general idea of expeditions' objectives and activities, including partners and local communities. A detailed description of the sampling methods and preliminary results is presented in the more exhaustive 2022 Expedition Report, publicly available in English on our [website](#).

Amundsen Science manages the scientific mandate of the research icebreaker CCGS *Amundsen*. We are looking forward to improving the way we share the results of the annual expeditions and support local involvement.

Comments, suggestions and research initiatives are welcome and can be sent to media@as.ulaval.ca.



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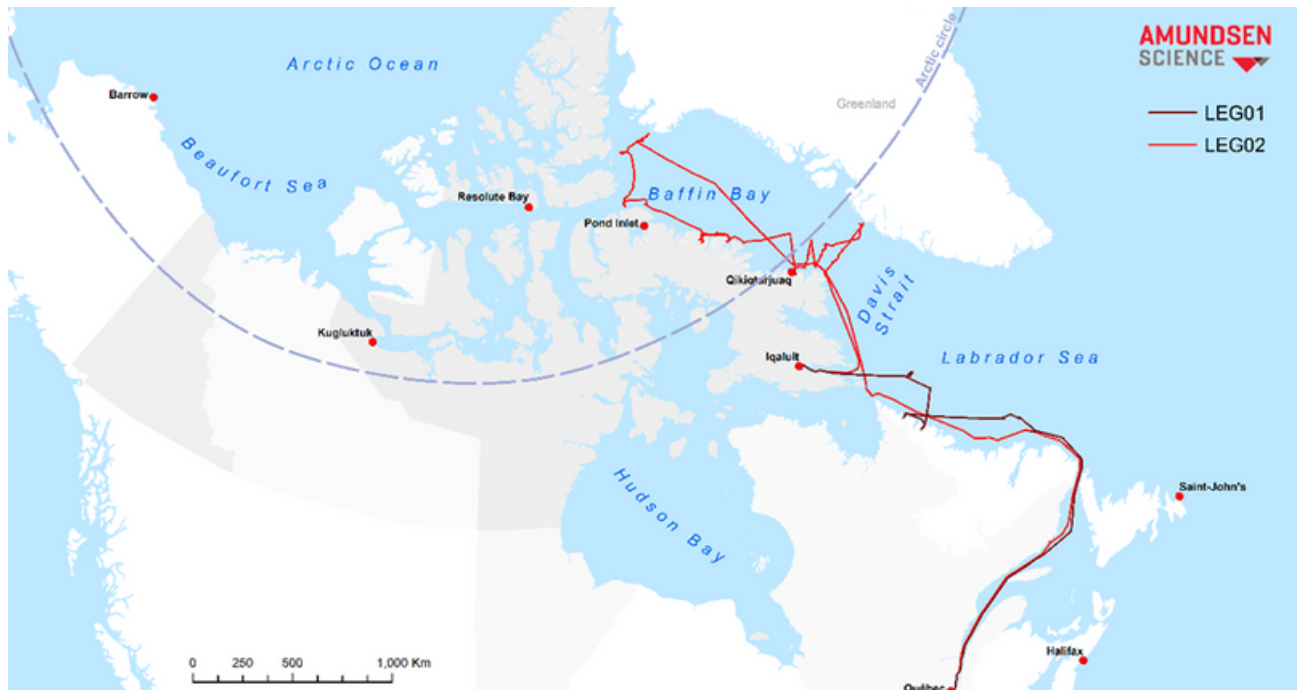
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OVERVIEW

The Canadian research icebreaker *CCGS Amundsen's* 19th Arctic expedition was carried out from September 9 to October 19, 2022.



Although the ship underwent a major dry dock refit spanning more than 10 months prior to the expedition, she was ready for her annual scientific mobilization in August 2022. The *Amundsen* successfully completed a 40-day expedition and travelled over 7290 nautical miles, which is equivalent to the distance between Quebec City and Tokyo, Japan.

A MULTIDISCIPLINARY EXPEDITION

With more than 140 scientists from national and international research teams to study the marine and coastal environments of the Canadian Arctic/Subarctic and Greenlandic waters.

Programs onboard included the Integrated Studies in the Coastal Labrador Ecosystem (ISICLE), the ArcticNet annual marine-based research program, the Knowledge and Ecosystem-Based Approach in Baffin Bay (KEBABB) program, and the Ittaq community-based acoustic monitoring program. Additional ancillary collaborations were part of the programs onboard. From aquatic microorganisms to seabirds to melting glaciers and seabed mapping, numerous aspects of the northern marine environment were studied as part of these programs during this year expedition.

OVERVIEW

AMUNDSEN SCIENCE'S COMMITMENT TO EQUITY, DIVERSITY AND INCLUSION (EDI).

The Amundsen Science's EDI committee consolidated in 2022 has adopted a thorough Action Plan detailing several measures to make the scientific expeditions safe, secure and inclusive. During the last expedition, we implemented a Code of Conduct for all participants, safe contact persons were designated at sea and on land for each leg, and increased efforts were undertaken to reach out and include northern participants and Inuit traditional knowledge in the field research conducted from the *Amundsen*.



2022 EXPEDITION

The **first Leg** of the expedition took place along the Nunatsiavut coast and in the Labrador Sea in support of the Integrated Studies in the Coastal Labrador Ecosystem (ISICLE) program. Also, supporting Inuit-led initiatives including the Imappivut marine spatial planning project (Nunatsiavut government, Fisheries and Oceans Canada, Parks Canada, Natural Resources Canada, Memorial University) was a focus of scientific operations in 2022.

The **second Leg** of the expedition ventured further North in Hudson Strait, Baffin Bay and Lancaster Sound. The two main programs supported during Leg 2 were the ArcticNet annual marine-based research program and the Knowledge and Ecosystem-Based Approach in Baffin Bay (KEBABB) program. An emerging collaboration with the Ittaq Heritage & Research Centre provided the opportunity to support a community-based acoustic monitoring project nearby Clyde River.

TIMELINE

2022 EXPEDITION

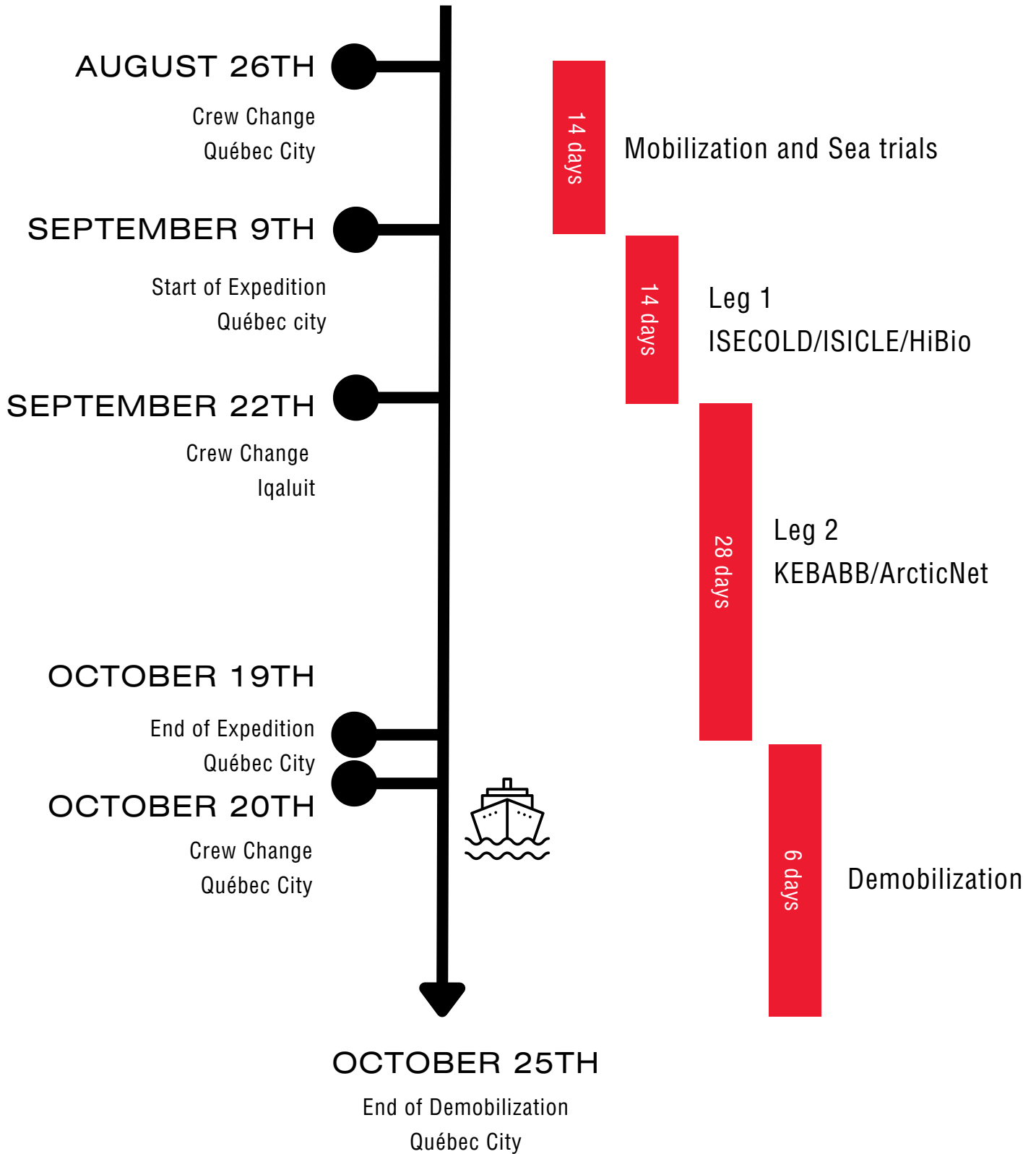
Despite several challenges related to harsh weather and a limited COVID outbreak aboard the vessel, the 2022 *Amundsen* Expedition was overall successful and productive in many aspects. These accomplishments were largely due to the continuous support from the Canadian Coast Guard and northern permitting agencies, but also related to on-board participants' commitment to their research goals and collaborations. The data acquired during the expedition are currently being analyzed and will be used for eventual publications and outreach products, either by Amundsen Science or by individual research teams. Core scientific data acquired by Amundsen Science will be made publicly available on the Polar Data Catalogue, and scientific publications and their outputs will be shared via our newsletter or on our website once published.



In the next sections, you will find a summary of the research activities and programs that took place during the two Legs of the 2022 *Amundsen* Scientific Expedition.

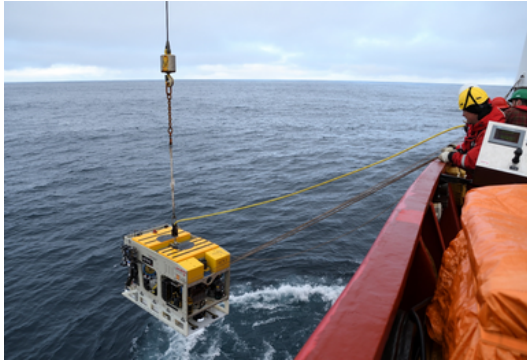
TIMELINE

2022 EXPEDITION



LEG 1

DESCRIPTION OF THE PROGRAMS



The program of Leg 1 of the 2022 *Amundsen Expedition* was designed to build on previous multi-disciplinary missions in the Labrador Sea and Baffin Bay that aimed to characterize sea floor biodiversity in Canada's northern oceans, sensitive habitats from the coast to the deep ocean, and characterization of marine communities.

Amundsen Science's Remotely Operated Vehicle (ROV) ASTRID enables to collect footage of the sea floor, along with sediment, water and wildlife samples.

During this first Leg, Amundsen Science focussed on supporting more Inuit-led initiatives, namely through the Imappivut marine spatial planning project led by the Nunatsiavut Government in collaboration with Fisheries and Oceans Canada, Parks Canada, Natural Resources Canada and Memorial University. One highlight of the expedition was a shore visit of the Hebron fjord located on the Labrador coast of Nunatsiavut. This site was a missionary settlement since the 1700's used for trade and was closed by the government in 1959. The Inuit living there at that time were forcefully relocated to the South, although there is a resettled community living at Hebron fjord today. A family member of one of the Nunatsiavut expedition participants provided a tour of this culturally significant site. The scientists and Coast Guard crew participating to this tour have unanimously voiced their appreciation for this opportunistic visit of Hebron which provided key perspective on the importance of the research undertaken during Leg 1.



Scientific and Coast Guard crew during the shore visit in Hebron, Nunatsiavut, which enabled rich cultural exchanges.

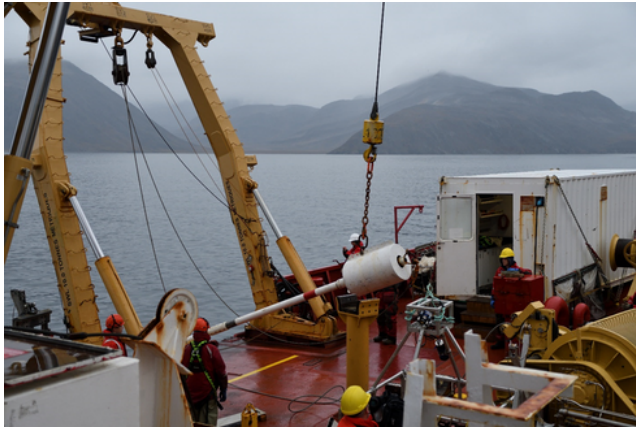


Carla (left) and Michelle (right) during the visit of Hebron.

LEG 1

RESEARCH ACTIVITIES

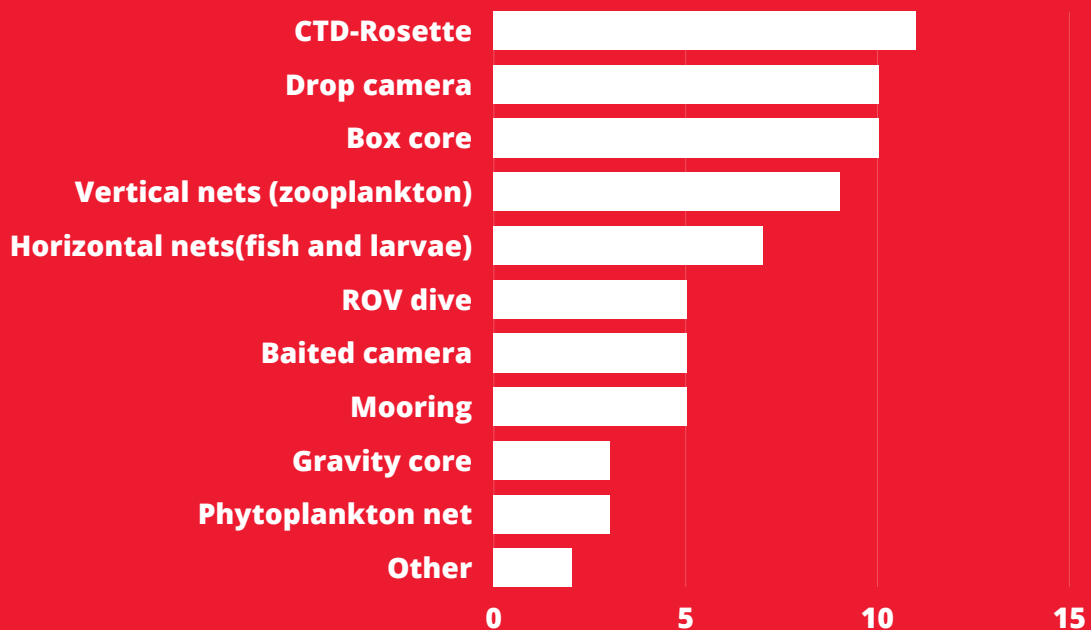
Heavy seas and recurrent harsh weather affected the course of scientific operations during this 12-day Leg.



A gravity core being deployed from the CCGS *Amundsen* to collect sediments from the sea floor. Samples collected are used in palaeoceanographic research studies, which aim at reconstructing the climate and ice/ocean environment of the last few thousand years.

Overall, sediment samples were taken from 2 gravity cores and 10 box cores, water samples were collected through 11 CTD-Rosette casts, 10 drop cameras and 5 baited camera footages were collected, along with the completion of 5 ROV dives, 19 fish, zooplankton and phytoplankton net sampling, and 5 mooring operations.

DISTRIBUTION OF THE 70 OPERATIONS



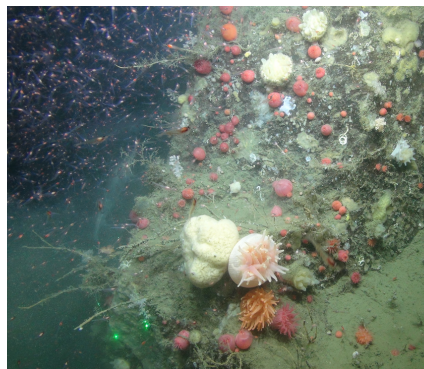
LEG 1

RESEARCH ACTIVITIES



A drop camera is being deployed from the CCGS *Amundsen* in order to collect footage from the sea floor across the Subarctic-Arctic latitudinal gradient.

Finally, over 3217 km² of sea floor were mapped during this Leg, which represents approximately the area of French Polynesia!



Footage of marine life on the sea floor in Joey's Gully region, Labrador Sea, captured with the ROV ASTRID.

LEG 2

DESCRIPTION OF THE PROGRAMS

This 27-day segment supported three major programs: the KEBABB project, led by Fisheries and Oceans Canada and collaborators at the University of Manitoba, Université Laval and Memorial University, a mooring project in collaboration with the Ittaq Heritage & Research Centre and the community of Clyde River, and six ArcticNet sub-projects (NTRAIN, ArcticSeafloor, ArcticFish, Contaminants, Biochemistry, ArcticKelp).



The goal of these programs was to better understand and document the Arctic ecosystems of the region using a variety of complementary approaches, ranging from biogeochemical analyses of organic matter fluxes to population dynamics of Arctic marine species. The total sampling effort reached up to 190 operations at 57 different locations spanning from northern Baffin Bay to Hudson Strait.

(Left) The Beam Trawl is deployed on the sea floor to catch fish and invertebrates. Common species, but also rare specimens, can be occasionally captured.

(Right) A typical catch with the Beam Trawl with species such as shrimps, starfish, sea cucumber and fish.

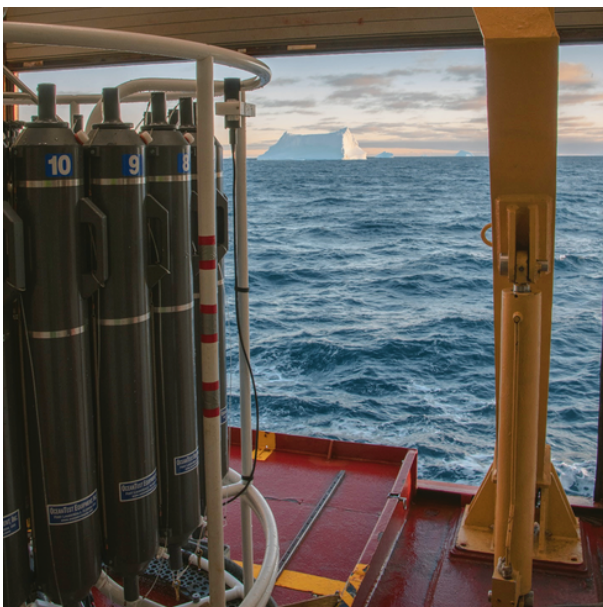
LEG 2

RESEARCH ACTIVITIES



A baited camera is deployed to get footage from the sea floor in order to study hard to reach ecosystems and the animals they comprise.

This second Leg also faced harsh weather and storms that negatively impacted planned scientific activities. However, many operations were successfully undertaken, and opportunistic stations and operations were even added to the original plan.



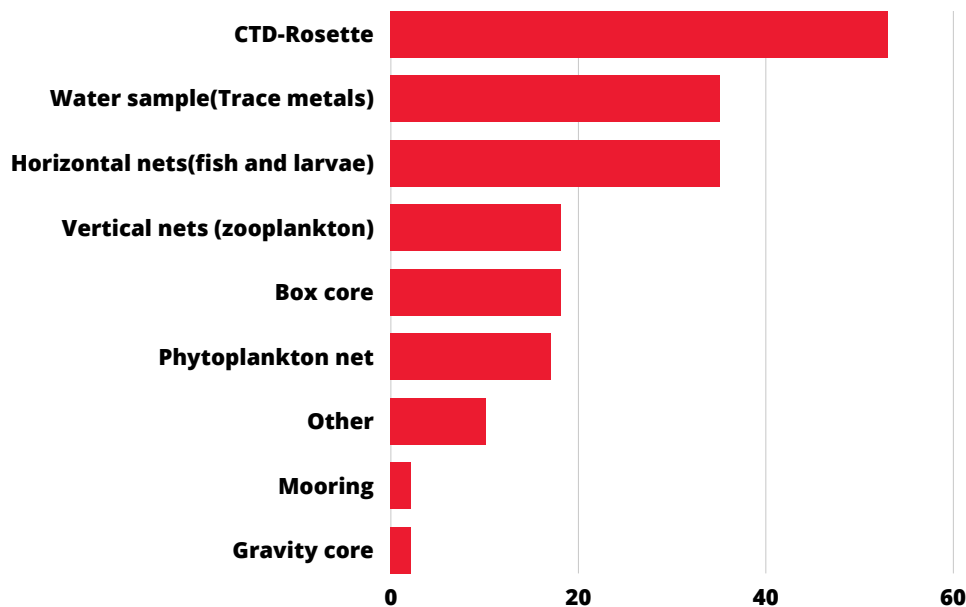
The CTD-Rosette is composed of 24 12-L bottles to collect sea water, along with multiple sensors that feed live-data from the deep ocean to the ship.

LEG 2

RESEARCH ACTIVITIES

Overall, water samples were collected with a CTD-Rosette and for trace metals on 88 occasions, sediments were sampled from the sea floor using 18 box cores and 2 gravity cores, videos of sea bottom habitats were collected at 2 locations with the baited camera, along with over 70 fish, zooplankton and phytoplankton net sampling operations.

DISTRIBUTION OF THE 190 OPERATIONS



In addition, bottom mapping was conducted over 13 315 km², which is approximately the size of the Bahamas!

CONCLUSION

2022 EXPEDITION

Although shorter than in previous years, the 2022 expedition provided to participating scientists, including indigenous researchers, the opportunity to increase their knowledge of the Arctic and Subarctic ecosystems. This was accomplished despite notable challenges, including harsh weather, a tight schedule owing to the preceding dry dock refit, and a limited COVID outbreak aboard the vessel. The expedition could not have been a success without the remarkable support from the Canadian Coast Guard, collaboration from the user programs, and indefatigable efforts from the on-board crew and science participants.

The research activities undertaken onboard the CCGS *Amundsen* in 2022 will allow a better understanding of coastal and marine ecosystems of the Canadian Arctic, help understand how climate change affects fragile marine ecosystems and human health, as well as facilitate locally supported objectives targeting the coastal and offshore Arctic environments.

Mapping conducted throughout the expedition will also increase the safety of upcoming shipping activities. The total seafloor area mapped by the ship in 2022 covered 16 532 km². Researchers and technicians are still analyzing the data collected during the expedition.

Planning is already underway for the 20th *Amundsen* Expedition, which will take place in Summer and Fall 2023. We are thrilled about the science ahead of us in the coming years! Do not hesitate to reach out to media@as.ulaval.ca for any questions or comments about this document or about the *Amundsen* Expeditions.

