AMUNDSEN SCIENCE

2025

EXPEDITION SUMMARY REPORT

INTRODUCTION

The 2025 Expedition Summary is an overview of the scientific activities undertaken on board the CCGS *Amundsen* during the field season. This expedition was planned and coordinated by Amundsen Science in collaboration with the Canadian Coast Guard. It was built to support the implementation of innovative and multidisciplinary research programs addressing some of the most pressing challenges of our time, such as climate change, biodiversity variations and ocean pollution.

This document is available in English, French and in Inuktitut. A detailed description of the sampling methods and preliminary results is presented in the more exhaustive 2025 Expedition Report, available in English on our website: www.amundsenscience.com.

Our organization is looking forward to improving the way we share our activities before, during and after the annual *Amundsen* Expedition and the way we support local involvement. Comments, suggestions and research initiatives are welcome.

Contact us: media@as.ulaval.ca.

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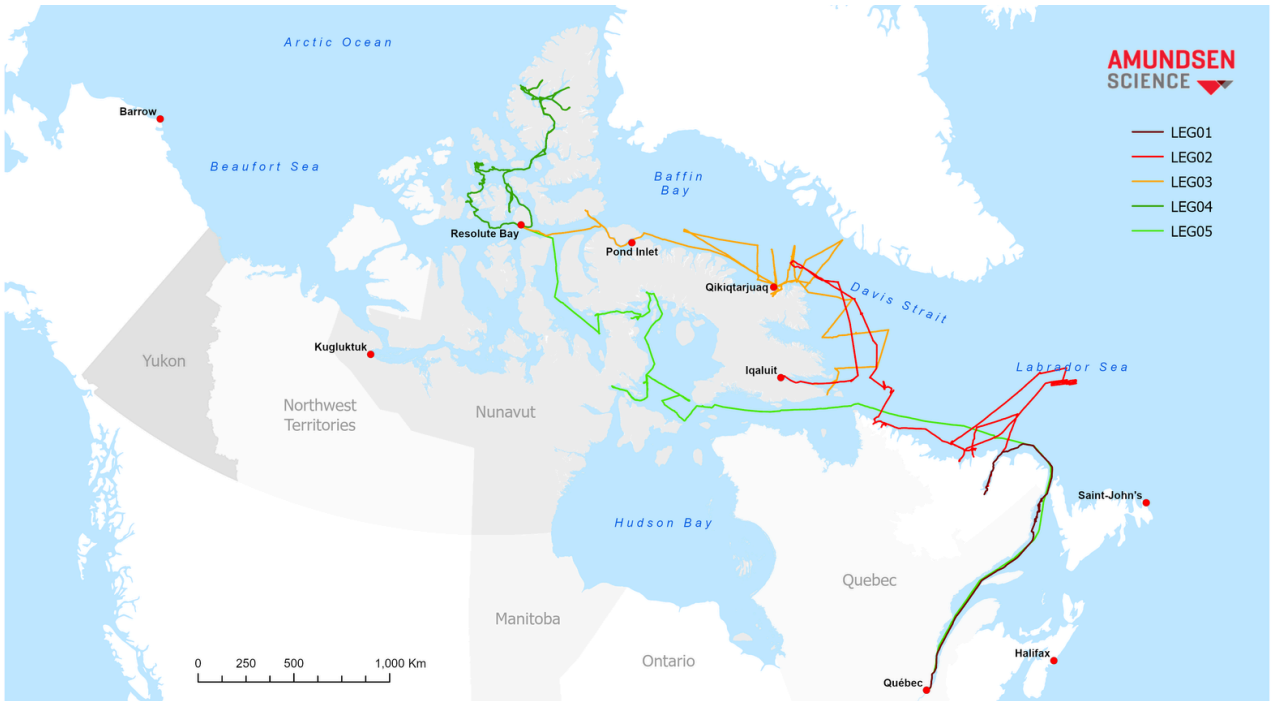
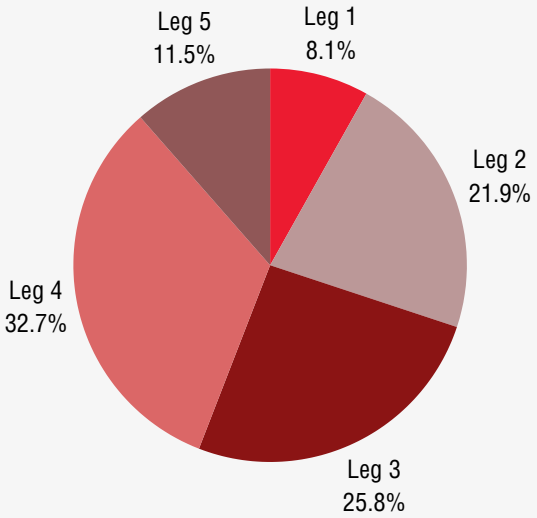
OVERVIEW

On June 27, the Canadian research icebreaker CCGS *Amundsen* set sail from Québec City for its annual expedition to the Arctic Ocean.



After a two-week mobilization period in Québec City, the ship departed for a 14-day Leg in the Gulf of St. Lawrence. This was followed by three 28-day legs, during which the ship travelled from the Labrador Sea to the Tuvaijuittuq Marine Protected Area, passing through Davis Strait, Baffin Bay, Barrow Strait and on the Queen Elizabeth Islands waters. The fifth and final Leg took place over 20 days, mainly in Foxe Basin, before the ship returned to Québec City in October 22nd. Overall, the CCGS *Amundsen* successfully completed a 117-day expedition and travelled 28 458 nautical miles.

More than 160 scientists from national and international research teams boarded the ship to study the marine and coastal environments of the Canadian Arctic.



Working closely with the Canadian Coast Guard, about 930 scientific operations were sucessfully carried out.

TIMELINE

2025 AMUNDSEN EXPEDITION

JUNE 12TH
Start of the Expedition
Québec City

14 days — Leg 1
Mecatina Trough Survey

JULY 10TH
Crew Change
Goose Bay

28 days — Leg 2
Imappivut &
DFO Benthic
Refuges

AUGUST 7TH
Crew Change
Iqaluit

28 days — Leg 3
KEBABB/S & TCA

SEPTEMBER 4TH
Crew Change
Resolute Bay

28 days — Leg 4
Queen Elizabeth
Islands Survey

OCTOBER 2ND
Crew Change
Resolute Bay

20 days — Leg 5
FoxSIPP

OCTOBER 22ND
End of the Expedition
Québec City

LEG 1

DESCRIPTION OF THE PROGRAM

The first Leg of the 2025 *Amundsen* Expedition marked the launch of a new program: the Mecatina Trough Survey, led by Fisheries and Oceans Canada, Memorial University of Newfoundland, and Université du Québec à Rimouski. This exploratory program aims to better understand the unique habitats and ecosystems of the Gulf of St. Lawrence and to collect baseline data from the Mecatina Trough.

Scientists and pilots gathered in the remotely operated vehicle (ROV) control room during a dive.

Located in the northern Gulf of St. Lawrence, the Mecatina Trough is a unique cold-water environment influenced by water from the Labrador shelf, with properties similar to those found in the Arctic. Despite its ecological importance, much remains unknown about the species that live on the seafloor, in the water column, and near the bottom, as well as about how these marine communities are organized and the habitats they occupy. Very limited imagery data are currently available for this region, and little is known about how Arctic water inflow influences the marine ecosystem of this region.

LEG 1

RESEARCH ACTIVITIES

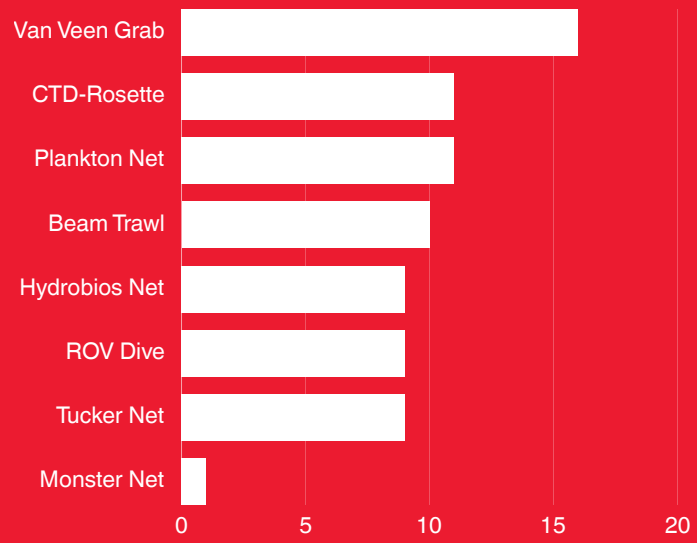
The scientific teams completed nine dives with the remotely operated vehicle (ROV) to explore seafloor communities and habitats. These dives revealed remarkable biodiversity including sponges, corals, anemones, crabs, fish, shrimp, and shellfish. Invertebrate sampling was conducted, resulting in the collection of 40 specimens for taxonomic analysis. Sediment samples were collected using the ROV push cores, while seawater sampling was carried out using two 5-litre Niskin bottles mounted on the ROV. Continuous environmental data were acquired through each dive.

Seabirds and marine mammals were monitored throughout the Leg. The wildlife observers onboard have counted :

2,000 birds from 40 species

11 species of marine mammals

DISTRIBUTION OF THE 76 OPERATIONS



Additional water, plankton, and fish samples were collected to characterize biological productivity, biodiversity, and environmental conditions of the Mecatina Trough.

LEG 2

DESCRIPTION OF THE PROGRAMS

The second Leg of the 2025 *Amundsen* Expedition supported the Nunatsiavut Government's Imappivut marine spatial planning program, as well as Fisheries and Oceans Canada's marine conservation initiatives in the Labrador Sea and Baffin Bay. Together, these recurring research programs focus on collecting the data needed on potential hotspots along the Labrador Coast and in the Davis Strait to support the establishment and management of marine conservation areas in Nunatsiavut and adjacent regions.

Lights and camera being fixed on the frame of the drop camera before the deployment.

The programs also aim to improve knowledge of pelagic fish and plankton in data-poor regions, characterize seafloor habitats and geohazards, and extend long-term oceanographic time series through mooring recoveries. Additional work addressed contaminants, microplastics, and carbon uptake and storage, including carbonate saturation in coral habitats.

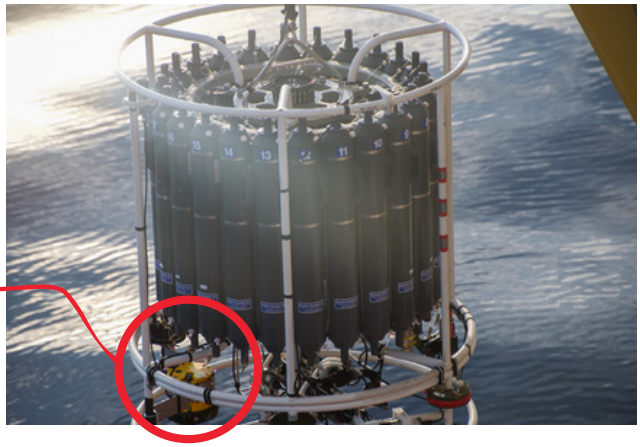
In addition to these scientific objectives, this leg emphasized Inuit-focused research, knowledge co-production, and active participation in Inuit communities, building on approaches developed in previous years.

LEG 2

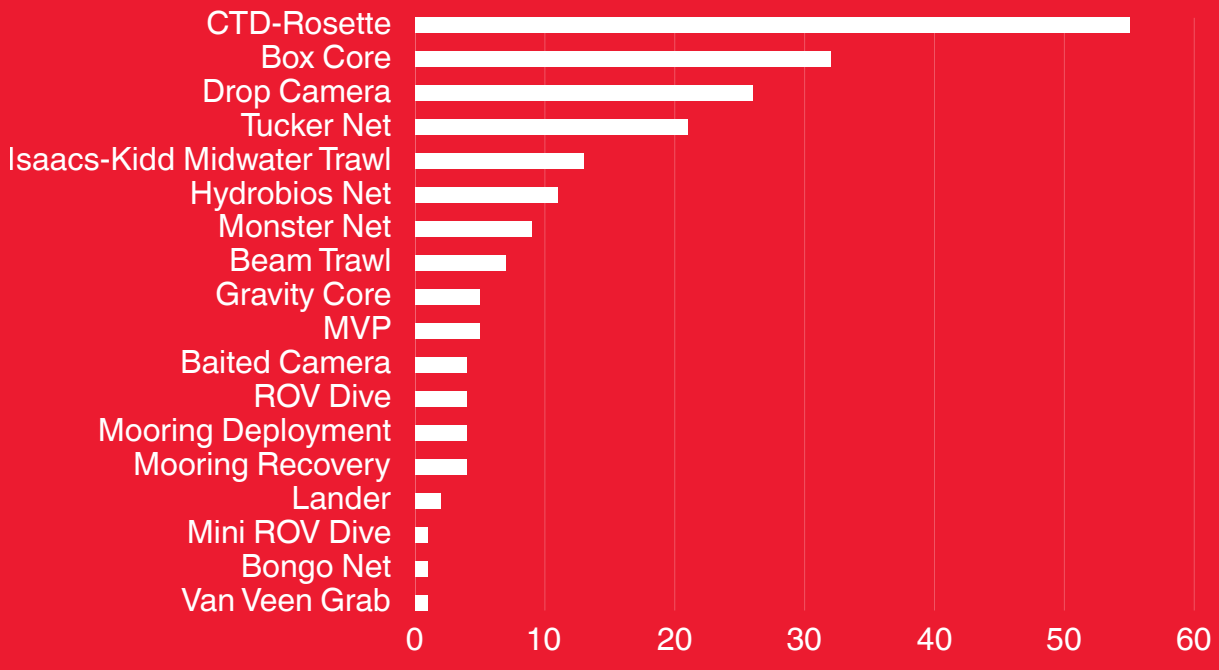
RESEARCH ACTIVITIES

Despite challenging weather, strong currents, and an extensive search and rescue call, 205 scientific operations were successfully completed, including the first ever *Amundsen* stations in Lake Melville, Labrador. The ship then sailed along the Nunatsiavut Coast and Labrador Sea, conducting further dives with the remotely operated vehicle (ROV) and camera surveys at sites such as the Makkovik Hanging Gardens and the Sentinel site. Over a 12-hour period, the CTD-Rosette equipped with an accoustic doppler current profiler was deployed 11 times to identify a window of weaker currents for a successful ROV dive in the Hatton Basin.

Accoustic doppler current profiler



DISTRIBUTION OF THE 205 OPERATIONS

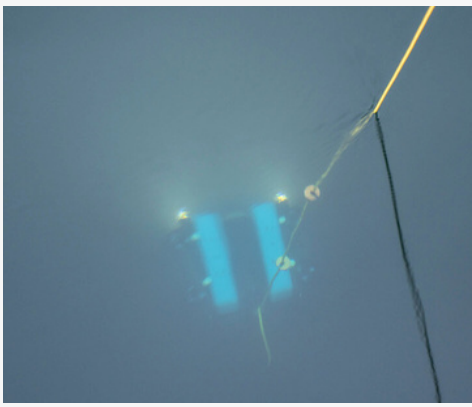


LEG 2

RESEARCH ACTIVITIES

In addition, teams onboard successfully carried out operations with instruments that had been less used in previous years, the moving vessel profiler and the blue mini-ROV, which respectively collected complete oceanographic data along various transects and images of the seafloor and species living in a shallow area of Ramah Bay, Nunatsiavut.

Moving Vessel Profiler



Blue mini-ROV

A social science project on board as a joint project between the Nunatsiavut Government, Amundsen Science and Dalhousie University collected 19 interviews from scientists and science professionals to understand better the perceptions of natural scientists working with Inuit in Nunatsiavut.

A science day in Makkovik organized by the Nunatsiavut Government in collaboration with the community of Makkovik and Amundsen Science on July 16th, brought together community members and scientists to exchange knowledge and stories about the local environment.

LEG 3

DESCRIPTION OF THE PROGRAMS

On August 7th, the third leg began in Iqaluit, supporting returning programs with complementary objectives in terms of science and regions of interest: KEBABB and Transforming Climate Action (TCA). The TCA program aims to better understand the ocean's role in climate change and reducing uncertainty about ocean carbon sequestration in the Arctic.

Instrument recovery from the zodiac in Maktak Fiord.

The KEBABB (Knowledge and Ecosystem-Based Approach in Baffin Bay) program, led by Fisheries and Oceans Canada, investigates the atmosphere–ice–ocean interactions and how climate change affects Arctic marine ecosystems. Since 2019, this program contributes to the development and implementation of an ecosystem-based approach to fisheries management in Baffin Bay.

LEG 3

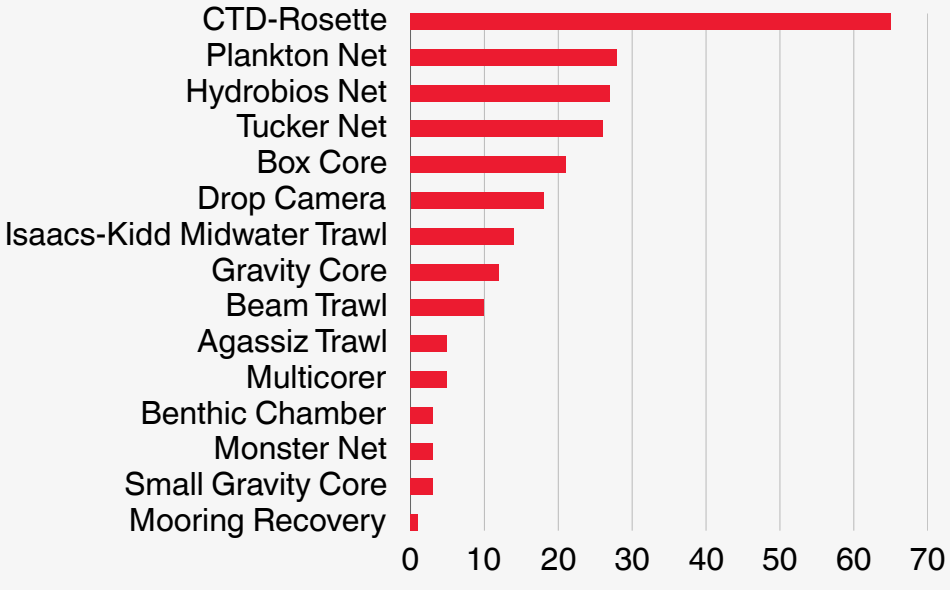
RESEARCH ACTIVITIES

Despite operational challenges, scientists part of the Leg 3 have successfully completed operations of their nine targeted transect lines, sampled two fjord systems, and carried out 227 scientific operations. Building on the 2024 operations, the 2025 TCA program teams mapped and sampled one marine-terminating glacier and one land-terminating glacier situated in fjords south of Qikiqtarjuaq, and completed the first-ever deployment of a benthic chamber in the Arctic aboard the *Amundsen*.

While the CCGS *Amundsen* was operating in fjords close to Qikiqtarjuaq, professionals from the Qikiqtarjuaq Research Centre visited the ship and joined the teams for on-deck operations in nearby waters.

They also recovered one of the longest sediment cores ever collected on the ship — a 7.35-meter core from Coronation Fiord.

DISTRIBUTION OF THE 241 OPERATIONS



Benthic chamber

LEG 4

DESCRIPTION OF THE PROGRAM

The fourth leg brought the *Amundsen* for the first time in the northern waters of the Queen Elizabeth Islands (QEI), addressing what has stood out as an observational gap in our understanding of the Canadian Arctic for years. Co-led by a multidisciplinary scientists from the University of Manitoba and Fisheries and Oceans Canada, the onboard program named the Queen Elizabeth Islands and Tuvaijuittuq Survey aims to complete a synoptic physical, chemical, and biological survey of these northern region waters.

In addition, this exploratory program focuses on the installation of oceanographic moorings to gain a better understanding of seasonal variations of the water masses, and the role of the inflow/outflow, glacier discharge and sea ice growth/melt in modifying the waters.

Deployment of mooring lines equipped with various oceanographic instruments.

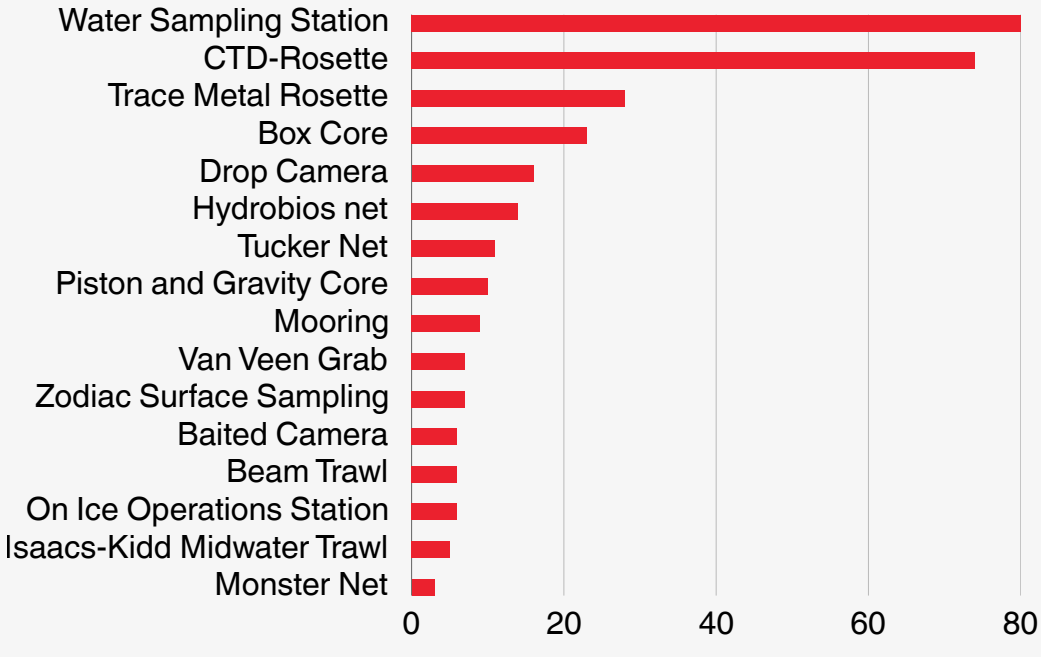
As the area has historically been covered nearly year-round by a multiyear sea ice cover, other important goals of this program are to learn more on the physical characteristics, biogeochemical properties, and radiometric signatures of the remaining glacial ice in the QEI in its various forms (glaciers, ice caps, ice shelves, icebergs, and ice islands), and track the evolution of icebergs and ice islands.

LEG 4

RESEARCH ACTIVITIES

Building on previous work in the Tuvaijuittuq Marine Protected Area (MPA), scientists investigated freshwater pathways, ice–ocean interactions, and changing sea-ice conditions around the Queen Elizabeth Islands. Despite navigating through old and thick ice, the *Amundsen* reached northern straits, fjords, and glaciers, navigating more than 5,000 nautical miles to conduct more than 300 diverse sampling and mapping operations. In close collaboration with the Canadian Coast Guard, the teams sampled six sea-ice stations and three fjords within the Tuvaijuittuq MPA and in the southern areas of the Queen Elizabeth Islands.

DISTRIBUTION OF THE 305 OPERATIONS



LEG 4

RESEARCH ACTIVITIES

During this leg, a survey of the fiords of Otto, Cannon and D'Iberville in the Nansen Sound/ Greely Fiord complex was successfully completed and the marine terminating glaciers in each fjord were sampled.

Scientific teams broke into the Nansen ice plug, worked in the old ice pack of the Edinburgh Sea and Byam Martin Channel and sampled new ice, frost flowers and pancakes ice that were continuously forming around the ship; from 10 cm thick new ice to old ridges up to 7 m thick.

After 28 days of Arctic fieldwork, the leg four concluded on October 2nd in Resolute Bay, where a Science Day was held at the Qarmartalik School.

LEG 5

DESCRIPTION OF THE PROGRAM

The final leg of the expedition began on October 2nd in Resolute Bay, with scientists embarking for 20 days of Arctic and subarctic research.

The leg's main research effort, the FoxSIPP (Foxe Basin Sea Ice Pump) program, investigates the chemistry of deep waters formed annually in the Foxe Basin and flowing into Foxe Channel. The Foxe Basin is a critical transition zone between Arctic and subarctic marine ecosystems. This region, although understudied, is known for an important ventilation process associated with a dense, cold and high salinity water mass. Freshwater inflows, sea ice dynamics and changing oceanographic conditions also influence the nutrient availability and primary productivity.

The Foxe Basin is also influenced by rivers connecting terrestrial and marine systems; through their flow, biological, chemical and geological features of the landscape are imputed into the ocean. As a returning program, the second iteration of the FoxSIPP program aimed to improve estimates of winter uptake of CO_2 and to investigate related carbon system processes in Foxe Basin and from rivers in and around Foxe Basin.

LEG 5

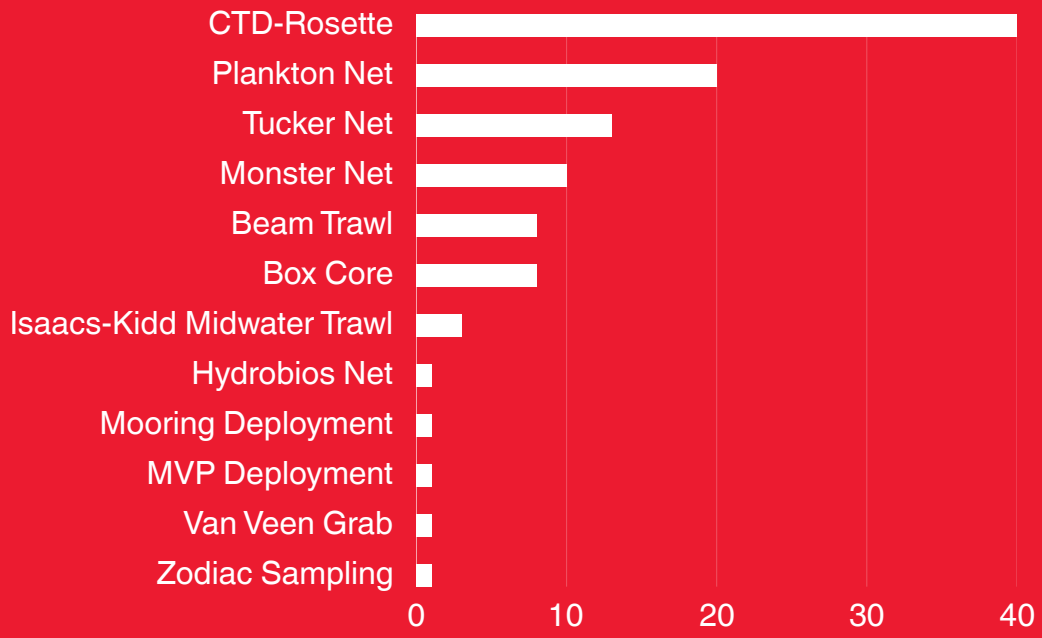
RESEARCH ACTIVITIES

After a few days at sea, the *Amundsen* stopped at Igloolik on October 6th for an organized Science Day, featuring a science fair-style gathering at the community hall, cultural exchanges and a memorable performance by Artcirq, the world's first Inuit Circus troupe, a celebration of creativity, tradition, and science.

Despite the poor visibility conditions and Search and Rescue calls limiting helicopter travel and operations in Foxe Basin, the teams onboard have collected water from five river locations along the route of the cruise. Focussed on carbon chemistry dynamics in the water of the region, they have successfully collected water samples by deploying the CTD-Rosette 40 times. A total of 107 operations were conducted.

Over this 20-day Leg, the CCGS *Amundsen* travelled over 4000 NM in the Gulf of Boothia, Foxe Basin, Foxe Channel and Hudson Strait before sailing back to its home port in Québec City.

DISTRIBUTION OF THE 107 OPERATIONS



COMMUNICATION AND OUTREACH

2025 ACTIVITIES

The 2025 *Amundsen* Expedition was marked by an unprecedented level of communication, education, and outreach activities. Alongside three Science Days organized in northern communities, film crews joined the expedition, a virtual model of the ship was created, and multiple livestream events connected audiences directly with life and research on board.

For the first time in 22 years of scientific expeditions, items featuring illustrations by Inuit artists were offered for sale at the ship's canteen throughout the expedition. This initiative reflected Amundsen Science's and the Canadian Coast Guard's commitment to supporting Inuit art and increasing the visibility of Indigenous artists across the Arctic research community.

VIRTUAL SHIP MODEL

In collaboration with *Live it Earth*, Amundsen Science produced a detailed virtual model of the CCGS *Amundsen* during the first leg of the expedition. Now available on the Amundsen Science website, this immersive tool allows scientists, students, educators, and the general public to explore the research icebreaker and discover key scientific workspaces virtually.

COMMUNICATION AND OUTREACH

2025 ACTIVITIES

DOCUMENTARY INIATIVES

Several filmmaking initiatives were conducted during the expedition, including Beneath the Ice: The Hidden Coral Gardens of Labrador, a collaborative science communication project involving marine researchers, filmmakers, and Labrador Inuit partners. During Leg 2, filmmaker Zachary MacMillan-Kenny recorded 27 interviews and documented key remotely operated vehicle (ROV) dives, capturing rarely seen deep-sea ecosystems off the coast of Nunatsiavut and highlighting the scientific work taking place aboard the ship.

LIVESTREAM BROADCASTS

A collaboration with *Exploring by the Seat of Your Pants* enabled the expedition team to host five live-stream sessions directly from the ship. These interactive broadcasts connected classrooms across Canada with scientists, crew members, and outreach staff, offering virtual ship tours, live demonstrations, and even footage from an ROV dive conducted in Makkovik waters. Together, the series reached more than 2,600 people across Amundsen Science's online platforms.

PODCAST PRODUCTION

The Passages podcast continued aboard the CCGS *Amundsen* with a new season of 15 episodes. The series highlighted the diversity of scientific projects conducted during the expedition, the expertise required to operate large-scale Arctic research missions, and the northern, academic, and artistic collaborations that enrich the program.

Available on

- Spotify
- Youtube

ENGAGEMENT WITH NORTHERN COMMUNITIES

OUTREACH ACTIVITIES AND OUTCOMES

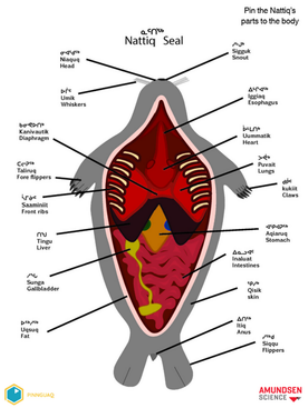
Community engagement remained a central pillar of the 2025 *Amundsen* Expedition, with outreach activities designed to foster dialogue, knowledge exchange, and youth engagement across northern regions. In addition to ship-based outreach, the Northern Research Liaison conducted a spring and fall community tour, visiting Naujaat, Resolute, Iqaluit, Igloolik, Qikiqtarjuaq, and Kinngait to present research updates, share upcoming expedition plans, and strengthen long-term collaborations with local partners and organizations. Ahead of the CCGS *Amundsen* journey at sea and during specific legs, broadcasts on local radio stations were done to Resolute, Kinngait, Naujaat, and Iqaluit as well as on CBC North.

Three Science Day events were organized during the expedition in collaboration with community partners, bringing together students, Elders, local organizations, and scientists. In Makkovik, a Science Day organized with the Nunatsiavut Government welcomed community members for ship tours, science demonstrations, and presentations highlighting research conducted along the Labrador coast. In Resolute Bay, approximately 30 participants took part in a science fair at the Qamartalik School featuring interactive stations on sea ice, food webs, seafloor research, and climate change. The largest event took place in Igloolik, where nearly 300 community members attended science presentations, interactive exhibits, and cultural activities led by visiting scientists and local partners.

ENGAGEMENT WITH NORTHERN COMMUNITIES

OUTREACH ACTIVITIES AND OUTCOMES

To enhance youth participation, several educational tools were distributed, including Science Passports featuring sticker-based activity challenges and northern-themed playing cards designed by Inuk artist Jessica Winters to share Arctic research concepts in an accessible format. These materials were widely used during school activities and community events, helping create lasting engagement beyond the expedition visits.



Community celebrations also played an important role in outreach efforts. In Igloolik, a performance by Artcirq—presented both in the community and aboard the ship—brought together science, culture, and artistic expression, marking the first circus performance ever held on a Canadian Coast Guard vessel and highlighting the importance of integrating cultural initiatives into northern research engagement.

CONCLUSION

2025 AMUNDSEN EXPEDITION

The various operations undertaken on board the CCGS *Amundsen* during this field season and outreach activities of northern community tours were an important part of this year's success. The 2025 *Amundsen* Expedition provided participating scientists and indigenous researchers the opportunity to increase their knowledge of the Arctic and subarctic ecosystems. Overall activities of 2025 will help better understand how climate change affects fragile marine ecosystems and will help facilitate locally supported objectives targeting the coastal and offshore Arctic environments.

The expedition could not have been a success without the remarkable support of the Canadian Coast Guard, collaboration from the user programs, and inexhaustible efforts from the onboard crew and science participants.

Planning is already underway for the 2026 *Amundsen* Expedition, which will take place in the summer and fall 2026. We are thrilled about the science ahead of us! We invite you to visit our website and follow us on social media for the latest updates and news. Do not hesitate to reach out to media@as.ulaval.ca for any questions or comments about this document or about the annual *Amundsen* Expedition.

2025

www.amundsenscience.com

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