

Project Summary

The CCGS *Amundsen* research icebreaker will conduct scientific operations in the Labrador Sea, Baffin Bay, Jones Sound, Nares Strait, the Queen Elizabeth Islands, and Greenlandic waters during its 2026 expedition. Weather permitting, helicopters or zodiacs will be used to access lakes and glaciers along the cruise track.

Sampling of lake water and sediment will facilitate paleoenvironmental reconstruction by tracking post-glacial development, measuring geological changes, and quantifying methane flux to establish a geochronological framework for these shifts. Furthermore, sampling glacier ice and meltwater will enable teams to detect methane sources and determine their formation. These efforts will also include a novel investigation into the methane emissions of Axel Heiberg Island's river systems to better understand their contribution to the regional carbon cycle.

Sampling Activities

The following activities greatly depend on weather conditions. Access to the land with the ship's helicopter or zodiac is an efficient way to reach locations along the cruise track and supports research projects related to water quality, geology, geomorphology and glaciology.

Lake sampling: Lake sediment cores will be taken in triplicates at 3 lakes with a raft, platform and universal corer, which will be dropped by helicopter at the lakes. (Personnel transport by zodiac/helicopter, depending on the site and conditions of the day). Water sample will be collected with a syringe or a small pump (total volume: 5L max). All samples will be brought back on the ship, refrigerated or frozen, and analyzed in laboratories after the expedition. No chemicals will be used on the field, and no waste will be produced. These activities will require the use of small engines. All fuel used for these activities will be transported by the helicopter and brought back on the ship.

Glacier sampling: Field personnel will be dropped by zodiac or helicopter at land-terminating glacier fronts to sample glacial outflows and groundwater, targeting areas with perennial discharge that has already been identified by remote sensing. On-ice operations on the glaciers could include ice and melt water sampling. Ice would be collected with an ice corer, and meltwater would be collected with a syringe, a water bottle or a small pump. While the CCGS *Amundsen* sails in the area, the helicopter could be used to recover an instrument located on Mittie Glacier