Icebreaker Oden first to acquire marine scientific data in the uncharted Victoria Fjord in North Greenland

August 26 2024

Icebreaker Oden outside Stephenson Island entering the Victoria Fjord. Credit: Martin Jakobsson

The GEOEO North of Greenland 2024 Expedition, organized by the

Swedish Polar Research Secretariat aboard the icebreaker Oden, has made history as the first vessel to reach the remote Victoria Fjord in North Greenland.

As the Victoria Fjord's depth is completely unknown, Oden is systematically mapping the way into the fjord using its advanced echosounding system while breaking through the ice. Enroute to the fjord, Oden encountered heavy ice in the Lincoln Sea, but through the experience and competence of the crew, it managed to reach this important objective.

Entering the Victoria Fjord in Northern Greenland. Credit: Martin Jakobsson

View of the C.H. Ostenfeld Glacier. Credit: Martin Jakobsson

The expedition still faces significant challenges in the fjord from large icebergs that are remnants of the collapsed floating ice tongue of the C.H. Ostenfeld Glacier. Data collection has begun for the multidisciplinary scientific research with several primary objectives:

1. Investigating warmer Atlantic waters: From physical oceanographic measurements, determine whether warmer water

of Atlantic origin enters the fjord, potentially impacting the marine melting of C.H. Ostenfeld Glacier.

2. Studying the North Greenland ice sheet: Imaging the structure of the C.H. Ostenfeld Glacier and its underlying bed upstream of its recently collapsed ice tongue by radio-echo sounding. Also, sediment cores will be retrieved to study the long-term evolution of the North Greenland ice sheet.
3. Using robotic vehicles to study melting processes: Investigating melting processes using a suite of small autonomous surface and underwater uncrewed vehicles, close to the ice front where it is too dangerous to bring crewed vessels.
4. Climate studies: Collecting driftwood and shrub samples for growth ring analyses to set regional climate change in a global context.
5. Human impact on ecosystems: Retrieving lake cores and animal remains to genetically study the impact of the first arrival of humans in this remote region.
6. Carbon exchange and nutrient dynamics: Measuring gas fluxes across the ocean-atmosphere interface to investigate whether Victoria Fjord acts as a sink or source for carbon dioxide and methane. Mapping the distribution of key nutrients for ocean lives that regulate carbon exchange.
7. Geological mapping: Geological mapping, rock sampling and imaging deep structures in the crust, to understand the geological evolution of the region and its impact on glacial processes.

"The GEOEO North of Greenland 2024 Expedition will greatly enhance our understanding of this remote and sparsely explored area, with potential implications for global climate studies, future sea-level rise and our general knowledge of the Arctic environment," says Co-Chief Scientists Martin Jakobsson and Nina Kirchner, professors at Stockholm University.