



International Workshop on Arctic Ocean Observation:
Future Collaboration by Research Vessels and Icebreakers
November 17-18, 2023 @ IINO CONFERENCE CENTER, Tokyo, Japan.



Science Session

Norway's experience with and plans for the research icebreaker RV Kronprins Haakon

Arild Sundfjord
Norwegian Polar Institute

The ice breaker RV Kronprins Haakon has now been operative for five years. In this presentation we will look back at some of the experience gained in these first years and, building on what has been learned, look forward into the next 5-10 years.

RV Kronprins Haakon is owned by the Norwegian Polar Institute, operated by the Institute of Marine Research, and used by these two institutions plus UiT The Arctic University of Norway. The annual cruise schedule is negotiated and agreed between these three institutions during the autumn of the preceding year.

In the first five years of operation, a large part of the cruise time has been allocated to the large national project The Nansen Legacy. This is a six-year project focusing on knowledge needs for future management of the northern Barents Sea. The project involves ten Norwegian institutions – the largest universities and the most relevant public and private research institutes. Through the Nansen Legacy project, all partners were given access to the ship and could all take part in the cruise planning. Other national and international partners were also invited on board for complementary studies and have also been valuable partners in sample analysis, like e.g. JAMSTEC. This project has been very important not only through the new observations and knowledge that has been built but also as a catalyst for collaborative research using the RV Kronprins Haakon as a platform. It has been particularly important for the Early Career Researchers who could join cruise planning and cruises and learn from experienced senior scientists from many different fields and institutions. GoNorth is another example of a multi-year national collaborative project with international links; this project's core is to advance our understanding of the evolution of the Arctic Ocean seafloor and geology, with particular focus on the sector north of the Barents Sea and the Fram Strait.

In addition to the Nansen Legacy and GoNorth cruises, the three partners with ship time quotas carry out key long-term monitoring based on ship-borne sampling, sea ice work, moorings and autonomous platforms, covering many aspects of the climate system, environment and ecosystem. The Institute of Marine Research is responsible for Norwegian ecosystem-based monitoring which is crucial to detect early signals of ecosystem change, especially in the arctic areas. The Barents Sea ecosystem survey is one of the world's most comprehensive surveys in terms of spatial coverage, number of ecosystem components covered, and resources used. The



International Workshop on Arctic Ocean Observation:
Future Collaboration by Research Vessels and Icebreakers
November 17-18, 2023 @ IINO CONFERENCE CENTER, Tokyo, Japan.



icebreaker “RV Kronprins Haakon” is crucial for mapping and monitoring in the partly ice-covered areas in the northern Barents Sea and the Arctic Ocean.

Furthermore, national and internationally research projects targeting more specific topics have been carried out. Most of these involve multiple institutions and international partnerships, such as for example the EU Arctic PASSION project which aims to improve the overall international Arctic observing capacity by filling gaps, improving co-ordination and sustainability, and improving data sharing and usefulness for society. Since 2021 NPI has led annual cruises going deep into the Nansen and Amundsen Basin, and in July 2022 the ship reached the North Pole for the first time. This is part of a long-term strategy to fill observation and knowledge gaps in the interior Arctic Ocean, which is now opening up for new human activities as the sea ice cover recedes. There are several other ongoing and new initiatives addressing geology, paleoclimate and sea floor features like hydrothermal vents, as well as cryosphere-oriented projects, in both Polar regions.

As the end of the Nansen Legacy project approaches, a new initiative is being formed; the Future Arctic Ocean project. This project, focusing on the interior Arctic Ocean, will build on the best functional aspects of the Nansen Legacy but also expand in terms of thematic scope and international collaboration. This region is large and difficult to access and work in. Given that it is a very dynamic area with ocean inflows, throughflows and outflows as well as sea ice formation, transport and melt being influenced by the atmosphere and river input, international collaboration is required to understand the ongoing and future changes to the system, both from the climate and ecosystem perspective. We will design this new project initiative primarily to respond to knowledge gaps identified in different international processes, including Arctic Council working groups, ICES/PICES WGICA, IPCC reports and other relevant entities. The goal is to enable Norway to contribute strongly to sustainable management and governance of the Arctic Ocean. To fulfill this ambition, we need to collaborate closely with international partners with similar icebreaker capabilities to ensure that we work towards the same overarching goals. This requires open planning processes to allow optimal resource usage, common practices regarding data sampling, processing and sharing, and ideally, agreed priorities regarding key locations and indicators to prioritize so that we together can better understand the state and evolution of this coupled and inter-connected system. One specific effort could be to set up ECR exchange programs, including on cruises, between the institutions operating long-term programs using the different national research icebreakers.