Breaking ice for science: The legacy of Nansen and the research vessel Kronprins Haakon

"Arven etter Nansen" (The Nansen Legacy) is more than just a research project; it is a continuation of Norway's proud tradition of Arctic exploration and discovery. The project follows in the footsteps of Fridtjof Nansen and seeks to expand our understanding of the Arctic and its ecosystems.

As many as 230 researchers are participating in the project that investigates the consequences of climate change for the Arctic. With the best equipment and the world's most advanced research vessel, FF "Kronprins Haakon", the researchers have carried out a number of scientific cruises in the northern Barents Sea to map and understand changes in the marine ecosystem and how it is affected by human activity.

The frontline of climate change

The Arctic is a rapidly changing region. With temperatures rising nearly four times faster than in other parts of the world, the Arctic is at the forefront of climate change. The changes have some dramatic consequences for the region's ecosystems and wildlife. The Nansen legacy provides researchers with a unique opportunity to study these changes up close.

The Arctic: A region in transition

The aim of the major project The Nansen Legacy, which will end in 2024 after six years, is precisely to understand the effects on the ecosystem of the retreating ice in the northern Barents Sea and in the adjacent deep Arctic Ocean. To understand what is happening in full breadth, The Nansen Legacy takes a holistic approach to the complex relationships between the atmosphere, sea ice, ocean currents, and marine plants and animals.

The researchers have backgrounds from many different scientific disciplines and belong to ten Norwegian universities and research institutions. The project is a historically large investment in Norway and has been essential in securing scientific knowledge for sustainable management of Arctic sea areas also in the future.

Obtaining large amounts of new data

The Nansen legacy represents a new way of structuring research to solve large and challenging tasks.

21 scientific cruises to the northern Barents Sea and the inner Arctic Ocean since 2018 have provided knowledge and insight to understand changes in the marine ecosystem and in the physical impact of the atmosphere, ocean currents and ice conditions.

The cruises also contribute to the testing of new marine technology, and the data material provides a basis for improving wave, weather and ice forecasts in the Arctic. Geological surveys put observations of current conditions in a historical perspective, while numerical models are used to understand how the climate and ecosystem may develop in the future.

In The Nansen Legacy, the Universities of Oslo, Bergen, Trondheim and Tromsø, the University Centre in Svalbard (UNIS), the Institute of Marine Research, the Norwegian Polar Institute and the Norwegian Meteorological Institute, as well as the Nansen Centre (NERSC) and Akvaplan-niva, are collaborating in the Nansen Legacy. The budget is three to a quarter of a billion kroner.

A technological marvel in the ice

The research vessel "Kronprins Haakon" is a technological marvel and a milestone in polar research, designed and

equipped to cope with the harsh conditions in the Arctic. The vessel has been the most important tool for the Nansen Legacy.

With steel plates up to 40 millimeters thick and icebreaker bow in combination with a lot of engine power, the vessel can maintain a steady speed of 3.5 knots (just over 6 km/h) through one meter of massive ice. This makes it possible for scientists to reach areas of the Arctic that have previously been inaccessible.

If conditions become more difficult, the hull is dimensioned so that the vessel can pick up speed, drive into the sea ice and climb onto it, and thus use its weight to break the ice down.

The vessel is also equipped with 15 laboratories that can house most research disciplines. It allows researchers to conduct complex analyses and experiments on board, which is crucial for understanding the rapidly changing conditions in the Arctic.

Another outstanding feature is the vessel's advanced sonar. This provides researchers with detailed information about the seabed, which is important for understanding the geological processes that have influenced the Barents Sea and the Arctic Ocean over time.

The ship can also house a remotely operated submarine (ROV) that can go down to a depth of 6000 meters, thus providing unprecedented access to the deepest parts of the Arctic Ocean, which is crucial for understanding the complex ecosystems found there.

In addition, "Kronprins Haakon" is equipped with a lock of several square meters from the deck and down into the sea. The lock, which is inside a hangar approximately in the middle of the ship, is closed at the top and bottom when not in use. This solution makes it possible to send equipment, such as an ROV, into the water even if the ship is surrounded by sea ice. Both ice and high waves make it challenging to take samples, so this lock has been widely used.

The vessel also has a helicopter deck with an associated hangar, which gives the researchers the opportunity to carry out measurements from the air. This is important in order to understand how climate change affects the Arctic.

All this makes "Kronprins Haakon" an indispensable tool for researchers who study polar areas. With its advanced technology and robust design, it is no exaggeration to say that "Kronprins Haakon" is the world's most advanced research vessel. It is a symbol of Norway's commitment to scientific discovery and our willingness to understand and protect the Arctic.

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