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Norwegian research in Antarctica

The Antarctic continent – as far away from Norway as possible, incredibly vast and mostly untouched. This is a part of the world with the potential to answer important topical questions. How did climate change in the past? How are climate changes in the South and North linked? How do Antarctica's animals survive the extreme conditions, and how will they cope with possible changes? How vulnerable is the Antarctic to environmental pollutants coming from afar through the air, the sea and the ice? These are some of the questions that Norwegian researchers in the Antarctic are striving to answer.

Norwegian research in the Antarctic dates all the way back to the 1920s and the 1930s, when whaling and scientific research were often combined. After World War II the focus on scientific activity grew, and Norwegian Antarctic research experienced two milestones: the Norwegian/British/Swedish Maudheim expedition from 1949 to 1952, and the establishment of Norway Station in Dronning Maud Land (1956-1960), a part of the International Geophysical Year of 1957-1958. Norway also played an active role in establishing the international committee for scientific research in the Antarctic – the Scientific Committee on Antarctic Research (SCAR) – and was also quick off the mark in ratifying the Antarctic Treaty in 1959.

Norwegian scientific expeditions

Norway has arranged several scientific expeditions to the Antarctic since 1976. The Norwegian Antarctic Research Expeditions (NARE) is a framework for expeditions which facilitates all government funded research in the Antarctic. The main aim of NARE is to acquire knowledge and to obtain a deeper understanding of climate change and its causes. The scientific projects generally focus on biology, glaciology, palaeoclimatology (the climate of the past), physical oceanography and environmental monitoring. Most of NARE's activities take place in the southern Atlantic sector of the Antarctic: on the island of Bouvetøya, in the eastern part of the Weddell Sea and in Dronning Maud Land.

The International Polar Year

Launched on 1 March 2007, the current International Polar Year has a duration of two years. During this time scientific resources and funding from over 60 countries is being coordinated in an enormous attempt to strengthen our knowledge of both the Antarctic and the Arctic. The Norwegian Polar Institute plays a central part in the Norwegian International Polar Year arrangements and is also an important partner in international projects.

These are two of the International Polar Year projects which the Norwegian Polar Institute leads in the Antarctic:

- One of the large projects during the International Polar Year is the Norwegian–US Traverse of East Antarctica. The main aim of the project is to examine changes in the thick layer of ice that covers Dronning Maud Land, to gain an understanding of what part the Antarctic plays as far as global sea levels are concerned. When completed in February 2009, the expedition will have covered inner areas of Antarctica where no man has set foot before and will have gathered climate information in areas where none had been previously available.

- In the MEOP project marine mammals are used to explore the world seas from the North to the South. State-of-the-art sensors and transmitters attached to the seals and whales mammals allow researchers to examine both the animals' behaviour and the oceanographic conditions in which they find themselves. Many species spend most of their lives far away from the coast, and are under water much of the time. Polar species, especially those that live in areas where there is sea ice, have been difficult to study until the development of the technology MEOP is now deploying.

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Examples of further Norwegian research

As far as biological scientific research goes, Norway's strategic plan for Antarctic research (2005-2009) has mostly prioritized the distribution, demography and feeding patterns of sea birds and sea mammals:

- Monitoring seals and penguin colonies on Bouvetøya. This work is part of Norwegian Polar Institute's ecological scientific programme. It also acts as part of an international programme which monitors the ecosystem under the Convention on the Conservaton of Antarctic Marine Living Resources (CCAMLR).

The ocean is the key to climate research, and knowledge of ice and thawing is an essential part of this research:

- Measuring the thickness of the ice shelf and seafloor topography under the glacier Fimbulisen. This Norwegian Polar Institute project looks at processes that happen under the ice to provide a better understanding of the link between sea currents along the coast and the ice shelves. The project encompasses a glaciological component.

Pollution can travel far – through the air, the sea and the sea ice – and a lot of it ends up in the polar regions:

- Transport and flow of organic environmental pollutants through the marine eco system in the Norwegian sector of the Antarctic. This Norwegian Polar Institute project examines current pollution levels and will play a part in establishing future monitoring programmes in the Antarctic.

Mapping

The first Norwegian mapping expedition was dispatched to Antarctica in 1936, when large chunks of the continent were photographed from airplanes. The Norwegian Polar Institute is in charge of all topographic mapping of Norwegian claims areas and dependencies in the Antarctic. The main map series is called DML250 (scale 1:250 000).

Dronning Maud Land was geologically mapped for the first time during the Norwegian/British/Swedish Antarctic expedition in 1949-1952. Geological mapping has systematically been carried out during the NARE expeditions for the past 30 years. This has resulted in a series of maps of the natural environment with a scale of 1:100 000, with detailed geological maps and written descriptions. Information on geomorphology, glaciology and biology is included.

A new era

In February 2005 the Norwegian Queen Sonja officially opened an airstrip on the blue ice in Dronning Maud Land. At the same time, the Norwegian station Troll was upgraded to a year-round scientific station. The combination of this and the new airstrip opened up new opportunities for Norwegian research in the Antarctic. Permanent monitoring programmes will be established, and flights are operated for an extended summer season which give more flexible solutions in terms of scientific stays in the Antarctic. Troll is one of very few stations to which it is possible to fly, and it therefore serves as a gateway to the Antarctic for several other nations. The new logistical developments are also beneficial for marine scientific cruises, which can now be carried out independently of the terrestrial research programmes.

This is Antarctica

- 14 million sq. km, which is 40 times larger than Norway
- 98% of the continent is covered by snow and ice
- Contains 90% of the world's ice
- The thickest ice cover measured is 4776 m
- If all the ice in Antarctica were to melt, the global sea level would rise by ca. 70 m
- Lowest temperature recorded: -89.2 C
- A unique and vulnerable wildlife. 45 bird species breed here.
- Little vegetation. Only two flowering species.

The Treaty and NPI

Norway and six other countries have territorial claims in Antarctica – some of which overlap each other. However, questions of sovereignty have been "put on ice" through the Antarctic Treaty (1959), which also prohibits military and nuclear activity on the continent. In this way, the Treaty has dedicated the Antarctic continent to peace and science.

The Norwegian Polar Institute (NPI) is the environmental administrative authority for Bouvetøya, a small ice-covered island just north of the Antarctic Treaty Area, and for Norwegian activity south of the 60th parallel. The NPI is also the Norwegian authorities' principal advisor with respect to implementation of the Environmental Protocol (1991), a diplomatic "sunshine story" wherein 26 countries adopted strict environmental regulations for Antarctica and agreed that there would be no mineral exploration on the continent.

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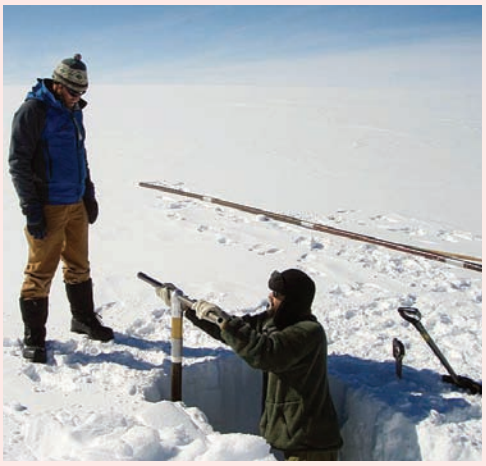
Read about Antarctica
Jan-Gunnar Winther (ed.) 2002: Norwegian Antarctic Research Expedition 2000-2001, Norwegian Polar Institute Report Series 120. The Royal Norwegian Ministry of Foreign Affairs 1998: The Polar Regions. Jan-Gunnar Winther et al. 2008: Norway in the Antarctic. For further information see www.npolar.no and the website of the Norwegian–US Scientic Traverse of East Antarctica at www.traverse.npolar.no and The International Polar Year www.polaryear.no



Drilling an ice core during the Norwegian–US Traverse.

The Traverse goes from Troll to the South Pole and back during two seasons.

A snow bridge in Dronning Maud Land, Antarctica.

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