

Netherlands scientific research in Antarctica

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Although the Dutch have been explorers and whalers around Antarctica since the 17th century, they did not start scientific research there until the 1960s. From 1963 to 1967 three expeditions were made jointly with the Belgians to King Baudouin Station, under the auspices of the newly formed Netherlands Committee on Antarctic Research, a committee of the Netherlands Marine Research Foundation (SOZ). Topics studied included meteorology, oceanography and the ionosphere.

With the prospect of flooding by the sea of the Netherlands, interest in Antarctica increased sharply, and in the '80s a national programme was developed which concentrated on sea-level change, but also included general scientific work devised in an international context. In 1989 a five-year plan was developed, on which a total of 4M guilders (about 2M US\$) was to be spent annually. The Netherlands joined the Antarctic Treaty in 1967 and became an associate member of SCAR in 1987. It became a Consultative Party to the Treaty and a full member of SCAR in 1990, in which year it also made an arrangement with Poland for the joint use of its Arctowski Station on King George Island, a spacious and well-equipped research base with 20 one-person rooms (Programme Plan 1991-92).

Before it had a station of its own, the Netherlands conducted a programme of scientific cooperation with organizations from other countries. It made a major contribution to the Joint Global Ocean Flux Study (JGOFS) organised with SCOR to investigate the role of the Southern Ocean ecosystem in the global carbon and atmospheric carbon dioxide cycle. The Dutch research vessel *Tyro* was among the many engaged, and some 18 Dutch scientists were on board the German *Polarstern* during its EPOS cruises to conduct research on that project. During these cruises the Dutch also made studies of the ocean presence of trace metals (notably iron) as well as investigating the cycling of silica and aluminium. Investigation into the mass balance of the ice sheet has been made with the French under the EC EPOCH project, as well as dating very old ice through meteorites with the Americans and Japanese.

In a project in cooperation with British Antarctic Survey, research is being directed towards the production

and biomass turnover of vegetation both at sea level and below. The influence of salt spray just above high water is being studied, as well as the production of marine algae to a depth of 10 m. The effects on this vegetation of the large concentration of fur seals in the South Orkneys will also be identified by comparison in the Argentine Islands, where influence of fur seals is negligible. In collaboration with Germany a study is being made of the thermal responses of seaweeds in both the Arctic and the Antarctic in order to predict the effect of global heating on polar biota.

Considerable emphasis is given to earth sciences. The Netherlands has been covered three times by ice, causing a variety of glacial effects beneath the surface which can be better understood by a study of the effects on the subsoil of recent movements of glaciers in Antarctica. The glaciological history of the East Antarctic ice sheet is also being observed by investigating past processes in the adjacent marine environment, in conjunction with the German North Victoria Land Expedition (GANOVEX). In the Vestfold Hills investigations are being carried out in conjunction with Australia and the United States into deformation processes that operate in the upper levels of the continental crust, in particular the nucleation and growth of shear zones which determine indirectly the nature of large-scale deformation in the lithosphere.

Since Arctowski Station became available, the Dutch have been studying the environmental conditions required for existence by top predators, namely seabirds, seals and whales, concentrating on the ecology of fulmarine petrels and the pelagic distribution of seabirds and marine mammals. The Australian finding that fish constituted 80% of the diet of petrels near Casey will be compared with the diet of petrels near Arctowski where krill is very abundant. Pollutants absorbed by migrators and resident birds are also being studied to determine the extent of global and local pollution. Another project investigates the distribution of biomass and respiration of micro-organisms.

The principal institutions concerned with research are the Netherlands Institute for Sea Research, the Research Institute for Nature Management, the Geological Survey of the Netherlands, Haarlem, and the Delta Institute of Hydrobiological Research, Yerseke, together with some seven institutes from the universities of Amsterdam, Groningen, Leiden and Utrecht.

Reference

- Stichting Onderzoek der Zee (SOZ). 1991. The Netherlands Antarctic Research Programme Plan 1991-1992. The Hague, SOZ.