

7. August 2003: **Victor disembarks**

Polarstern completes eleven week international deep sea expedition



According to plan, the Polarstern, research ice-breaker of the Alfred Wegener Institute for Polar and Marine Research (AWI), will enter the port of Tromsø, Norway, on August 7th. The aims of the completed expedition were to examine deep sea corals southwest of Ireland, the Hakon Mosby mud volcano northwest of Norway and the AWI "Hausgarten", a long-term deep sea station west of Svalbard in a depth of 2600 metres. Victor 6000, a deep sea remotely operated vehicle (ROV) run by French marine research institute Ifremer, was available to the 150 scientists on board. Victor is equipped with cameras, sampling devices and a grab-arm, can dive to 6000 metres depth and is controlled remotely from the Polarstern.

Fourty years german-french friendship

This concludes an ambitious Arctic expedition. It was carried out in the spirit of the French-German collaboration in marine and polar research agreed between AWI and Ifremer (Institut français de recherche pour l'exploitation de la mer) and was part of a joint campaign marking the fortieth anniversary of the signing of the French-German friendship agreement. With Victor 6000 aboard, scientists were able to sample and photograph areas in the northern North Atlantic and deep Arctic which are of specific interest for Europe, as well as deploying and activating autonomous measuring devices on the sea-floor.

Deep sea corals

After a prolonged period at Brest harbour for the installation of over 120 tonnes of equipment required for running the ROV, the first cruise leg took place in the Porcupine Bight, west of Ireland, in June. Here, at around thousand metres depth, is a section of coral reefs; part of a band which stretches from the Bay of Biscay all the way to the Barents Sea. Approximately sixty percent of these reefs are located in Irish waters. The most important coral in the reefs is called *Lophelia pertusa*. This organism has adapted to the cold and dark environment of the boreal continental shelf and grows in enormous colonies. Coral reefs are actually typical of tropical waters. "How and when reefs appeared in the cool, deep and dark waters of the Porcupine Bight and the Porcupine Bank, and how they continue to thrive today, is an as yet unexplained mystery", says Prof. Joern Thiede, director of the AWI and principle scientist for the first part of the expedition.

Methan bubbles in the sea

The next stop was the Hakon Mosby mud volcano. Here, methane, which supports bacterial life, is vented from the sea floor. Revelations from Victor 6000 included rising methane bubbles. "We've never seen this so directly", commented Prof. Michael Schlueter of AWI, who is studying the phenomenon. Another new observation was the high temperature at the Arctic sea floor: in the centre of the area, altogether about four square kilometres, the temperature at a depth of three metres beneath the sea bed exceeded 25 degrees Celsius. The sea floor around Hakon Mosby has now been mapped (by microbathymetry) to an accuracy of ten centimetres. Prof. Schlueter hopes that a much better understanding of such methane sources will result from this work.

In the garden

The final part of the deep sea expedition took place in the AWI's deep sea "Hausgarten", a long-term research station in 2600 metres depth. Scientists have been observing changes in the communities here with the seasonal rhythms, from year to year and in response to external disturbances for a period of several years. Any global change which may develop will manifest itself strongly in the polar regions and so be measurable at an early stage in these areas. Alongside numerous autonomous devices, experiments are running at the "Hausgarten" to shed light on the unexpectedly high species diversity (biodiversity) found here. For example, various substrate plates, which were deployed four years ago to find how fast such surfaces could be colonised here, were retrieved. The first impression: not much has happened yet. "Apparently very few organisms have colonised the plates", says Dr Michael Klages, principle scientist for this cruise leg, "but we must wait for results from the

laboratory.”

A unique couple

Polarstern and Victor 6000 were abroad in the Arctic together in 1999 and make a modern research infrastructure team which is unique within Europe. During the expedition, Victor 6000 was deployed 23 times, travelling 250 kilometres along the sea floor and diving to depths of between 900 and 2600 metres. Handling the four tonne vehicle, which must be brought back aboard after each deployment, is anything but simple in a high sea. But it was worth it. One device in particular, with a value of around 150 000 Euros plus the scientific data it will provide, could not have been deployed without Victor 6000. “The collaboration with Ifremer”, according to Dr. Klages, “is not only advantageous to the two partners. Together, we can offer European colleagues unique opportunities to apply modern technology in the deep sea, and so remain at the forefront of modern marine research. We are happy to have been able to further strengthen the co-operation with our French colleagues.” More from the expedition.

Continental drift

On the journey from the final research area off Svalbard to Tromsø, Victor 6000 and its trappings were dismantled on board and stowed in containers. They will be carried home to Toulon, the base of Ifremer's manned and autonomous underwater vehicles in France, by a container ship. The Polarstern's next cruise leg begins on Sunday, 10th August. Geophysics and oceanography in the north polar seas and the Fram Strait are on the program. The mechanism by which Greenland separated from Norway 55 million years ago will be researched off the east coast of Greenland. On October 13th, Polarstern will return to Bremerhaven.

Bremerhaven, 7.8.03

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Gasblasen

At hakon mosby volcano methane is swelling from the sea ground. Photo: Victor6000, Ifremer

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