

ANT XXIII/2 Weekly Report No. 7 2nd January - 10 January 2006

On 2nd January shortly after midnight we completed our final station. This was the last station according to our plan and the last station of our regular grid on which our measurements for the Lazarev Sea Krill Study were carried out.

This last station was directly in front of the ice shelf edge between many icebergs with the most varied shapes and structures. In this way we were able to bid farewell to the Antarctic looking once again its most beautiful. Then we set sail for Punta Arenas. So we began the first stage of our journey home, which should end on the morning of the 12th January in that Chilean port.

However along the way once we had reached a depth of 2800 m we deployed the RMT (Rectangular Midwater Trawl) again to catch deep-sea plankton, as was foreseen in the cruise plan. Then, in a night action lasting several hours, this RMT, which we had used for the whole cruise, was exchanged for another with a multiple closing mechanism, which allowed the pair of nets each to catch at three different depths. With this new system we deliberately fished at a depth of 500-700 m where we had observed a strong acoustic backscatter with the zooplankton echosounder almost all the cruise. We had been unable to deploy this net earlier, as the cable connection was not able to withstand the pressures required for deep trawls. The first attempt to use the multi-RMT was not successful, but at a second attempt everything worked without problem. After that we stopped once for a final calibration cast of the CTD. Then it was exactly the time at which we had to head for Punta Arenas without further delay in order to arrive there on time.

Along the way to Punta Arenas after this only such measurements were made as were possible from a steaming ship, such as the ADCP current profiler and the zooplankton echosounder mounted under the ship and the towed CPR plankton recorder. In the meantime we have ceased all measurements having reached the 200-mile economic zone around the Falkland Islands on the morning of 8th January.

With that we have virtually completely fulfilled our comprehensive expedition programme.

We supplied Neumayer-Station punctually and efficiently.

We have, as planned, deployed and recovered fish traps in two different places and made supporting benthic trawls with the Agassiz-Net.

We deployed the RMT five times to catch deep-sea plankton.

We successfully deployed the permanent measurement system MABEL on the sea bottom.

We carried out the physical calibration of the zooplankton echosounder.

We recovered and redeployed three oceanographic moorings.

We completely worked the LAKRIS-Grid with its 85 stations and at each deployed the CTD and, with two exceptions due to bad weather, made the

standard RMT trawl. At almost every other station the multinet was deployed and at every third station a second RMT trawl was made to catch living organisms. At some stations the WP2-net or the so-called bongo net was also deployed.

We have made almost continuous measurements with the ship's ADCP and the zooplankton echosounder and towed the CPR plankton recorder through both crossings of the Circumpolar Current.

We caught alive in a variety of nets sufficient creatures for experiments on board.

We have successfully conducted many and various experiments with the creatures caught.

And while the ship was steaming observations of mammals, birds and ice conditions were made.

Only regarding the depth to which the CTD was lowered at many stations did we have to restrict ourselves. That some sacrifices would have to be made was clear before the cruise even began, too large was the requirement for ship time in relation to the time actually available. However, this time has been extremely effectively used for research.

The overall great success of the cruise is due to many contributions.

My thanks go first to the ship's command: Thank you for the honest collaboration, thank you for the understanding of the needs of the science programme and the willingness to react quickly and flexibly to changed circumstances.

Changes were above all caused by changing weather conditions. That we were able to react to these changes and thereby avoid losing time was thanks to the reliable weather forecasts provided by the meteorologists on board. In addition we also received on board up-to-date charts of the current ice distribution, supplied by the University of Bremen.

That delays could be avoided is also thanks to the men who work largely unseen deep down in the ship making sure that the engines and steering gear always worked. They also ensured that essentials for smooth research work such as electricity, fresh water and also seawater for the laboratories were available and that the other technical facilities of the ship were continuously maintained in good working order. To this the ship's electricians from the company Fielax also contributed.

For all to see was the enthusiasm and energy of the deck crew. Without them we would never have been able to deploy our equipment so quickly and smoothly.

The galley staff kept our strength and morale up with nourishing and tasty food. Without the stewardesses and steward our life on board would have been much less comfortable; above all we would have had to spend time with domestic activities and so had less time for our research.

Thanks to the ship's doctor minor injuries were always quickly treated and infections treated before they could spread and affect others on board.

Last but not least the scientists themselves contributed to the successful and relatively smooth completion of the research programme. This was not only due to their hard work but also to their readiness to respect the needs of others.

Even if we have sufficient grounds to be proud of our achievements together we should not forget that we were also very lucky. Had the forces of nature really conspired against us, there would have been little we could have done, even with a ship as capable and strong as Polarstern, to continue our programme.

The first impression of the data we have collected this cruise is that they will lead to new or deepened understanding of many processes: regarding the origin of the ice-free water over Maud Rise, regarding the heat transport into the Weddell Sea, regarding the transport of zooplankton and regarding the life-cycle of krill. Regarding the dominance of species in the zooplankton community there are signs of a new picture. The textbook view that – depending on ice cover and water temperature – either the krill species *Euphausia superba* or from the salps the species *Salpa thompsoni* dominates, cannot be confirmed from our preliminary results. Amongst the crustaceans it was not *Euphausia superba* but another krill species, which was dominant, and salps were hardly present at all. Instead we found large numbers of gelatinous zooplankton such as jellyfish, ctenophores, as well as siphonophores, and crustaceans such as amphipods and copepods as well as pteropods and arrow worms – in all a considerable biodiversity. That salps were hardly present could be due to the interannual variability of biological processes, or that these creatures had not yet reproduced to reach their maximum numbers this early in the Antarctic summer. Both the possibilities of interannual and of seasonal variability mean that the plentiful or scarce occurrence of a species cannot be interpreted immediately as a sign of climate change. Documenting the seasonal variability is a core aim of our Lazarev Sea Krill Study Programme, within which several cruises in the same sea area at different seasons will be carried out. That climate change could also lead to a change in the species composition of the zooplankton community remains nevertheless a possibility. Whether this is true or not will only become apparent when we have been able to analyse our newly acquired dataset and compare it to the background of datasets already in existence.

Announcement of Birth: Krill Family, Aquarium-Container No. 31, Polarstern, announce the birth of babies during the last week. - Congratulations!

As Author of the Weekly Reports I should like to say goodbye to all our readers and offer you my Best Wishes,

Volker Strass