



Weekly report 3

19 December 2007

New methods of seafloor sampling for Antarctic marine life

While you are preparing for the holiday season, scientists aboard *Polarstern* are expecting a “White Christmas” with a difference...right now, the powerful icebreaker is muscling her way through a serious icefield. Flanked by ice cliffs 30 metres high at the shelf edge, we are preparing to refuel the German station *Neumayer*. Research in Antarctica involves ships, aircraft and permanent stations on the continent. Captain Uwe Pahl says “Close cooperation between logistics personnel and scientists is essential for successful operations in the Antarctic.”

In the last week, traversing difficult ice conditions has required hourly updates from the meteorologists onboard, helicopter surveillance of the ice...and of course, seamanship. Many scientific publications acknowledge “the Captain and crew of *Polarstern*” and indeed, they are an integral part of the research group, developing new technology at sea. Deployment and retrieval of the gear is their special expertise – a lurch in the wrong direction could damage equipment worth thousands of Euros and jeopardise the research program.

Between the logistics, we squeeze in a trawl in 400 metres depth. The trawl is named for its developer, Martin Rauschert, who spent years on *Polarstern* photographing and cataloguing the marine invertebrates of Antarctica. His trawl brings to the surface a live catch in good condition; a sea spider walks precariously on the deck, sea cucumbers dance in the aquarium. The sponges, polychaetes and amphipods from the net will keep the scientists busy for many hours.

Marine life from the trawl is analysed immediately by our biochemists, using the composition of fatty acids and lipids to piece together the jigsaw of “who eats whom”. The molecular biologists on board use DNA barcoding, a method adapted recently to identify the thousands of species of marine life. In conjunction with the painstaking description and naming of species, the sequence of DNA base pairs provides a unique species identifier. Compiling this DNA reference library promises to give us a glimpse of the number of leaves on the “tree of life” in the oceans. How all the branches join together requires research including morphology and embryology – this will take longer to figure out!

As a scientist, I contemplate the thermodynamics of the environment around me: an ocean changing state, from solid to liquid to gas. There are extraordinary marine animals adapted to this environment, such as the Emperor penguins we see every day, feeding around the ship. At another level, I am stunned by the splendour of this part of our planet. Was all nature powerful like this, before we tamed it for the comfort of humankind?

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This is the third of nine reports at weekly intervals during the *Polarstern* voyage ANT-XXIV/2. The following reports will focus on different aspects of the marine life in Antarctica and how the organisms are collected for studies of biodiversity.