ANT XXIV/1, Weekly Report No. 2

05 to 11 November 2007

The second week started with our first zooplankton station! At this station located south of the Canary Islands, the MultiNet sampled a great variety of small organisms, about which our Japanese colleagues were very enthusiastic. They have specialized in the study of very tiny copepods, including species with adults rarely larger than 1 mm in length. Such species are very abundant in the world oceans and – despite their size – play an important role in the pelagic food web.

On 8 November, our first deep tows with the 10-m^2 MOCNESS were obtained. Deployment of the net to 4795 m – only 100 m above the seafloor – required three hours. During the following six hours, the net system sampled the water column in 1000 m steps, with each of four nets filtering 40,000 to 50,000 cubic meters of water. In quick succession, the 1-m^2 MOCNESS was deployed and sampled from 1000m to the surface. Both tows were highly successful and caught many animals in excellent condition for taxonomic identification, experimental work, and photography. Samples are analyzed on board using traditional taxonomic approaches and molecular systematic analysis. Investigators on board worked through most of the night to examine the zooplankton and fish while they were still alive. In the days since the samples were collected, investigators have been busy identifying zooplankton and fish species, and marveling over the diversity of life in the deep-sea. Of course, the number and amount of samples will keep many scientists busy in their labs long after the cruise.

Our research is embedded in an international project, the **C**ensus of **M**arine **Z**ooplankton (CMarZ). CMarZ is a global network of scientists who are working together toward the goal of providing accurate and complete information on zooplankton species diversity, biogeographical distribution, genetic diversity, biomass, and community structure throughout the world oceans by 2010. Currently, about 6,800 zooplankton species have been described; an equal number of new species are thought to await discovery and scientific description. Zooplankton include those animals whose locomotory abilities are insufficient to withstand ocean currents and whose distributions are thus governed by patterns of ocean circulation. Zooplankton comprise a large variety of different organisms: most are small, but individual sizes range from less than a millimeter to giant jellyfish with tentacles several meters in length.

Why is a project like CMarz important? Only a small portion of the world oceans is well studied – the deep sea in particular is largely unexplored – and the ratio of unknown to known species is great. During ANT XXIV/1, the CMarZ team is focusing on deep-sea zooplankton from subtropical and tropical regions. Since species occur in very low abundances at greater depth, we are using specially-designed plankton nets systems. A large **M**ultiple **O**pening/**C**losing **N**et and **E**nvironmental **S**ensing **S**ystem (MOCNESS) with a 10-m^2 opening (MOC-10) has been equipped with 5 small-mesh nets; it is deployed below 1000 m and filters large volumes of water to capture the tiny and rare species living in deep layers. A smaller MOCNESS, with a 1-m^2 opening (MOC-1), and the MultiNet (0.5-m^2 opening) are used for sampling the

upper 1000 m. Each net system is equipped with nine nets which sample discrete layers of the water column. This sampling design provides a detailed quantitative description of species diversity and vertical distribution throughout the water column from bottom to top.

Our team on board the Polarstern includes 26 zooplanktologists from 18 institutions in 11 countries, including Canada, Chile, Germany, Great Britain, Japan, Mexico, New Zealand, Poland, Spain, the Netherlands, and the USA. All are experts on specific zooplankton groups, including crustacean groups (copepods, euphausiids, and ostracods), chaetognaths, and mollusks (gastropods and cephalopods). A fish expert is working on the deep-sea fish also captured in the nets.

Several days ago, we passed through one of the famous Sahara dust events. Trade winds blew sand and dust from the African continent more than 200 miles offshore. In the morning, the Polarstern was completely covered by a thin layer of dust. Tremendous numbers of insects were also carried out to sea. We found on deck numerous beetles, shield bugs, dragon flies, damselflies, grasshoppers, butterflies, and crickets. Even some terrestrial birds were blown offshore and found a very pleasant resting site on the Polarstern – with a full buffet of insects to feed on.

Thoughout the week we have had calm seas and warm tropical weather. On Saturday, we marked the completion of the first half of the cruise, and celebrated the occasion in the evening with a tropical cocktail on the helicopter deck.

With the best regards of all cruise participants,
Sigrid Schiel