METEOR Cruise M157

Mindelo (Cape Verde Islands) – Walvis Bay (Namibia); 04. August – 16. Spetember 2019

3. Weekly Report; 25. August 2019

On the morning of 18 August, 22 colleagues, the rest of the scientific crew of the M157 expedition embarked on METEOR in Walvis Bay. Unfortunately, two colleagues had to cancel their participation at very short notice due to illness and an accident. We wish both of them a good recovery. Fortunately, replacements could be found in both cases, so that all the berths could be filled. As already indicated in one of the previous weekly reports, the handling of the overriding question of the EVAR project requires the participation of very different specialist research areas. Physical oceanography, biology, microbiology, environmental chemistry and geochemistry are represented on this cruise. Based on the current state of knowledge about the central and northern high production area[1] off Namibia, the responsible principle investigators already developed a research strategy when applying for the research project. Accordingly, in the following four weeks investigations will take place along three latitudes (17.5°S, 23°S and 25°S). Of particular interest are the "shallow" areas between 30 and 300m water depth, as this is where the marine life is concentrated and the strongest influences from seasonal fluctuations are to be expected.

Still in the evening the ship left the port of Walvis Bay and reached already 2 hours later the first station near the coast on 23°S. Here the excellent preparatory work during the transits from Mindelo to Walvis Bay for the laboratory setup and the instrumentation proved to be extremely important. In order to get a first impression of the current chemical and physical conditions in the water column, a towed measuring device (the so-called Scanfish) was used and towed along the 23rd degree of latitude up to 75 nautical miles off the coast. At the same time, the ship's sediment acoustic systems were used to explore the internal structure of the sediments on the seabed. On the basis of both information sources the locations were determined where we expect to gain the most knowledge possible. The data set was supplemented by the multiple use of a microstructure probe, which provided high-resolution measurements of the characteristics of the water mass structure.

Due to the excellent interaction of all the scientific groups involved and the entire ship's crew, the first successful sampling of the seabed surface by means of a large box grab could already be carried out in the late evening of 19 August. In rapid succession, the last few days have seen the use of many CTD rosette water samplers, pump CTDs, benthic lander systems, multicorers, grabs and dredges. In addition, long-term measuring systems (mooring) placed on previous expeditions could be salvaged at two stations and one newly deployed. The different needs of the individual investigation devices and methods, as well as the short distances between neighbouring investigation stations (max. 20 nautical miles) required the repeated visiting of the individual stations. In total, measurement data and sample material have so far been obtained with more than 100 instrument operations at a total of 8 individual stations. All equipment, both in the laboratories and on deck, is working perfectly. Initial

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[1] In high production areas, nutrient-rich water masses reach the sea surface through physical processes (wind and ocean currents) and lead to the intensive formation of new biomass (e.g. algae, zooplankton, fish).

difficulties arose only with the sampling of the sediments in the area of the so-called mud belt. Seawards to about 25 nautical miles off the coast, the nature of the sediments is extremely soft, which means that instruments that touch the ground hardly find a footing, making it much more difficult to take samples. In the meantime, however, solutions have been found and initial successes achieved. By Wednesday, 28 August, we will have completed our work as planned at the 23rd latitude and will then set out for the northern section at 17.5°S. In the coming weekly reports some of the newly acquired data sets will certainly be presented briefly. The significance of the results will also be discussed.

Sebastian Beier, Volker Mohrholz, Hans-Joachim Behlke and Michael Zeigert (from the left) recovering a measuring instrument (ADCP) placed on a previous cruise

Chloe Anderson. Matthias Zabel and Florian Scholz (from the left) adapting the Multicorer to the special sediment characteristics of the working area.

The external conditions contributed significantly to the successful start of this expedition. Apart from initially coastal fog and haze fields, mostly cloudless skies at max. 20°C, as well as low wind speeds of 2-3 Btf in the last few days, in addition to sea/fume between 1 m and 2.5 m, many of the work was made much easier. For the coming week, however, increasing and colder southern winds with heights of up to 7-8 Bft and sea/fertilisation of up to 4.5 m are predicted.

All aboard are doing very well. The mood is accordingly. Best greetings from the sea,

Matthias Zabel and the M157 Team