

RV MARIA S. MERIAN

Cruise MSM105

11.01. - 23.02.2022

Walvis Bay - Mindelo

BUSUC II

The Benguela System
under climate change –

Effects of variability in physical forcing
on carbon and oxygen budgets

3rd Weekly Report

24. - 30.01.2022



Over the past few days we have completed station work on the 18°S cut in the northern part of the Namibian Shelf. On the way south, the previously exposed drifting surface mooring was recovered. It performed reliably and was able to collect high-resolution hydrographic data on the surface layer dynamics. Off Walvis Bay, we deployed a sediment trap that will remain in the ocean for the next several months to collect samples. We then continued our cruise to 25°S, where we plan to sample another coastal vertical section. This is also where the drifting mooring was deployed for a second time on Feb. 26.

One of the main focuses of the expedition is the study of bottom-dwelling organisms. Van Veen grab, box corer and dredge were used to collect bottom samples for benthic macrofauna. In water depths up to 500 m at each station 3 van Veen grabs and 1 dredge haul were used for sample the benthic diversity. The material was sieved on-board. Selected key species mainly from the dredge material were stored in small incubation chambers. In addition, we have carried out sampling with multi corer (MUC) at some stations. The gained cores were used for ex-situ incubation experiments to address diverse questions such as quantification of oxygen demand and nutrients uptake in the faunated sediments. In deeper waters (>500 m, down to 2060 m) a single box corer replicate was used to gain quantitative data on macrofauna community.

Very typical for the central mud belt in the oxygen minimum zone (OMZ) off the Namibian coast was a community dominated by the bivalve *Lucinoma capensis* and the gastropod *Nassarius vinctus*. These and other common species were used in experimental setting in the laboratories on board.

In the cooling room we performed incubations with sediment cores and dominant molluscs found in the Namibian shelf sediments. We try to keep the in situ conditions by conducting experiments under nearly constant cooled (10°C) conditions that mimic the near-bottom water temperature using water collected at the benthic boundary layer. The experiments with the OMZ animals are targeted to explore the so far poorly understood relationships between oxygen/nutrients fluxes and macrozoobenthic community structure, symbiotic relationships and dominant molluscs physiological responses to anoxic/oxic and reoxygenation conditions.



*Box corer was used to sample stations between 500 and 2000 m water depth (left). Typical for the central mud belt were the bivalve *Lucinoma capensis*, shells and alive individuals remaining after washing the sediment through a 1 mm sieve (upper right). Crawling on the mud. Although the oxygen content of the near bottom water was below $2 \mu\text{mol.l}^{-1}$ the gastropod species *Nassarius vinctus* was very active (lower right). (Photo: M. Zettler).*

Last but not least we collect a lot of unique data for biodiversity aspects. Some of the species observed appear to be exotic, while others resemble species we have also found in the northern hemisphere.

In the next days we will work on more stations at 25°S , mainly conducting microbiological investigations and observations of climate-relevant gases in the water column.

Despite some days with strong winds, the mood on board is very good and we are looking forward to a new week with interesting work.

Best regards from all participants of the Expedition BUSUC II
Michael Zettler and Volker Mohrholtz
(Leibniz-Institute for Baltic Sea Research Warnemünde)