

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

4. Weekly Report

31.01. - 06.02.2022

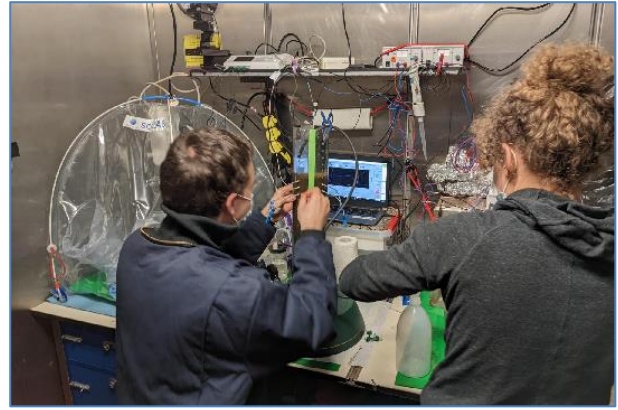


At the beginning of the fourth week of our expedition, we successfully completed station work on the hydrographic section at 25°S. During the transit to our working section at 27°S, the drifter was again deployed to collect more high-resolution data in the surface ocean. We reached our southernmost transect off Possession Island on the evening of February 2. In addition to hydrographic and marine biology surveys, another focus of our cruise is sampling the upper sediment layers of the seafloor.

The extremely high organic matter content in the sediments underlying the Northern Benguela Upwelling System off Namibia is a special geological feature. At a mean water depth of about 80m, the deposited organic material form a mud belt which extends between 20° S and 26° S along the coast. The aim of the geochemical work during our expedition is to sample these sediments for further investigation. Exploration with the on board echo sounding device (Parasound), which penetrates the sediment layers up to 20m, provide first information about the thickness of the mud belt sediments. On the basis of these data, promising stations are selected for the use of the gravity core (GC), a steel pipe carrying a 1.5t weight on top to penetrate deep into the sediment. The GC has already been used successfully in the past weeks along the hydrographic transects at 23°S and 25°S. In total, 9.21m cores were drawn at three stations.

Another device, the multicorer (MUC) is used to obtain samples of the surface sediments. It is equipped with eight core tubes. Additional metal plates at the foot of the device prevent too deep penetration into the very soft sediments. On deck, biologists, microbiologists and geochemists are eagerly awaiting the 50cm long Plexiglas tubes filled with mud to select suitable material for the extraction of DNA samples, incubation experiments and pore water analysis. On board, the sediments are immediately transferred in the 10° C cooling room in order to keep the temperature conditions as well as biological and chemical equilibria of the seabed as constant as possible. In order to obtain pore water from the sediments, finely (0.2µm) perforated filter rods, so-called rhizones, are inserted in pre-drilled holes of the core tubes at 1 cm intervals. Subsequently, the pore water is drawn into a syringe via vacuum. The

concentrations of dissolved nutrients (e.g. phosphate, nitrate and ammonium) and metals (e.g. iron) are already determined in the laboratories on board. Additional samples are preserved for processing on land. The obtained data provide important information on the role of the ocean floor in the Northern Benguela Upwelling System and to what extent the seabed can be regarded as a source or sink for nutrients and trace metals.



Left picture: Michael Kossack, Andreas Wolff, Simon Pörrmann and Antonia Witzleb (from left) hauling in the multicorer with filled core tubes.

Right picture: Jenny Fabian (right) and Michael Kossack (left) extracting pore water with rhizons from a multicorer tube in the cold room of the MARIA S. MERIAN). (Pictures: Christian Meeske, Simon Pörrmann)

During the past two days, strong winds, reaching force 8 at times, hampered the work on deck. However, except for some sampling with the multicorer, our scientific program could be implemented as planned. After finishing the work on the 27°S transect we are heading north again to recover the drifter today. The mood on board is good, and we expect to continue to have good working conditions over the next few days until our port call in Walvis Bay.

Best regards on behalf of all participants,

Michael Kossack and Volker Mohrholz
(Center for Marine Environmental Sciences, Bremen and Leibniz Institute for Baltic Sea Research Warnemünde)