

SO 262: Expedition MANGAN 2018 with RV SONNE

Weekly report No. 3 (16th to 22nd of April 2018)

This week was devoted to the extensive sampling of a site that is planned for a collector components test next year and is located in the north-eastern part of the German license area. Sediment samples to analyse baseline meiofaunal communities and parameters such as organic carbon concentrations and particle size distributions were taken by multicorer at 26 locations within a 4 x 5 kilometer large area around the test site. At four of these multicorer stations, pore waters were also sampled for the geochemical analysis of their metal concentrations. Only very few pore water data exist from the license area so far. These analyses will help us to estimate whether and to what extent metal release from the sediments into the water column during potential future mining is to be expected. Furthermore, the lander for the analysis of scavengers (deep-sea fish, amphipods) was deployed four times. The video material shows a high quantity and diversity of scavengers close to the seafloor. Unfortunately, the dredge has not yet brought up the quantities of nodules that we had hoped for, but nevertheless 1.2 tonnes have been secured for metallurgical testing at pilot plant scale so far.



On Tuesday, a mooring system equipped with a sediment trap, two current meters and turbidity sensors was deployed at 3600 m water depth for the determination of natural particle fluxes in the water column. We are required to retrieve such data by the International Seabed Authority. They form the baseline against which the tolerance of benthic organisms to the input of suspended material during possible future deep-sea mining operations can be assessed. A “Marine snow catcher” to retrieve and analyse suspended particles from the photic zone was deployed twice. Using the video sledge of the BGR, two ten-kilometer-long profiles were obtained for the analysis of manganese nodule coverage and size distribution as well as the diversity of megafaunal organisms. During descent of the video sledge, a shark surprisingly appeared in front of our camera in the oxygen minimum zone (O_2 concentration of 0.05 ml/l) at 200 m water depth. On Friday, a four-meter-long Minke Whale escorted us for several hours. At the moment we are deploying the epibenthic sledge in the “Impact Reference Zone” of the first Working Area. This area will serve to analyse the impacts of possible future mining activities in this region in relation to the “Preservation Reference Zone”, which we will also sample during the next few weeks. In both areas, time series samples for the analysis of benthic faunal communities were taken on a yearly basis between 2013 and 2016, and these are being continued with our sampling strategy this year. In addition to the analyses described above, we are determining the spectral aerosol optical depth of the atmosphere in this region on a daily basis for the Max-Planck-Institute for Meteorology in Hamburg. Hardly any data are available from this region. Because the air is very clear this area i.a. serves as reference for the calibration of NASA satellites for environmental research.

With best regards from the RV SONNE,
Carsten Rühlemann



Photo: Christine Mae Edullantes

Recovery of the dredge after deployment at a water depth of 4100 meters.



Photo: Carsten Rühlemann

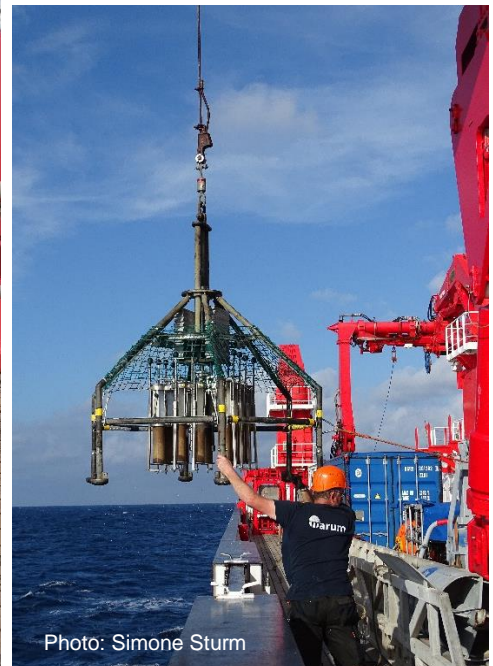


Photo: Simone Sturm

Top: Manganese nodule (12 cm);
Bottom: Recovery of the multicorer.