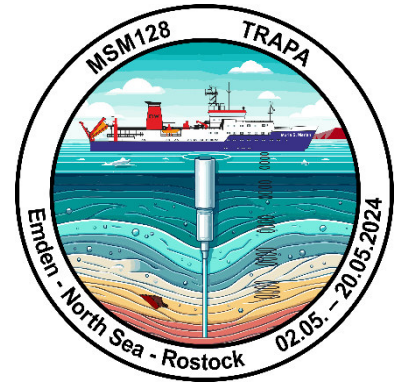


FS MARIA S. MERIAN

Cruise MSM128 (GPF 22-1/051)

02.05.24 – 20.05.24, Emden – Rostock

Weekly Report No. 2, 06.05. – 12.05.2024

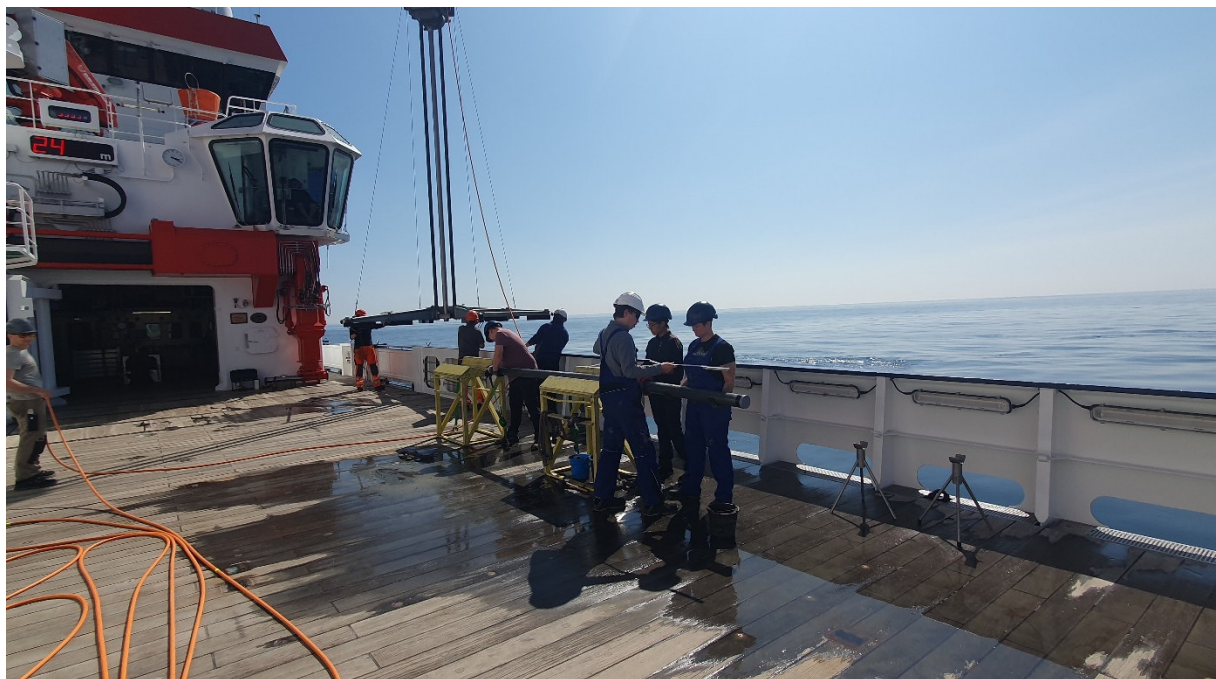


Tracing the Late Pleistocene - Early Holocene landscape of Late Palaeolithic reindeer hunters off the coast of Heligoland (TRAPA)

Weekly Report No. 2

In the second week of the cruise, we continued our alternation of detailed hydroacoustic mapping and geological sampling using a vibrocorer. Since 6 May, we have been recording bathymetric data in parallel to the Parasound with the EM712, as a renewed analysis of the data quality has shown that the systems interfere less than expected.

On the afternoon of 6 May, we successfully took a core in a small elongated depression (MSM128_9). The Parasound profile shows well-stratified sediments there. The lower part of the core contains organic-rich sediments. A first preliminary analysis of the pollen from this core segment indicates a deposition in the early Holocene and thus represents promising material for our research questions. We continued the hydroacoustic measurements afterwards. As some profiles from previous cruises were already available, we had already reached a profile spacing of 200 m in our central working area north of Heligoland, which measures approx. 20 km x 20 km. Before we started to reduce the profile spacing, we recorded some east-west profiles as connecting lines. Since the beginning of the week, we now have a data set that gives us a good insight into the small-scale structures in the working area. The Holocene transgression horizon is generally easy to identify.



Deployment of the vibrocorer in the best weather conditions (Photo: S. Krastel)

In order to sample possible late Pleistocene and early Holocene sedimentary sequences, we took three cores in the north-western part of the working area on 8 May. The hydroacoustic data show different generations of channels below the transgression horizon in this area. Two of the cores were successfully recovered in different channels (MSM128_15 and 16). The third core (MSM128_17) was placed in the background sediments; the vibrocorer also penetrated completely at this position, but we were not able to pull the liner out of the core barrel because too much sand had settled between the liner and the core barrel.

The hydroacoustic measurements continued until the morning of 11 May. On the morning of 11 May, three vibrocores (MSM128_21 -23) were taken. The first two cores targeted the above-mentioned organic-rich layer, which was only sampled in the lowermost section of core MSM128_9 and in the core catcher and thus incompletely. The Parasound data made it possible to identify locations where this layer lies at shallower subsurface depths. An initial visual analysis of the cores shows that this approach was successful and that the layer has now been fully sampled. The third core was taken in a small depression with well-stratified sediments.

So far, a total of eight cores have been successful. The respective core documentation and descriptions revealed a high diversity in layered infills, which show up as reflections in the sediment echosounder data. The drilled layers range from possible glacial dune sands to various event layers, limnic deposits, and presumably Saalian clastic warves. The core logs are supplemented on board by measurements of magnetic susceptibility, electrical conductivity, and the colour spectrum as well as grain size analysis and loss on ignition.

In addition, the palynology applied on board allows a rough chronological classification of sediments with good pollen preservation via the detailed known vegetation history of the neighbouring mainland. This showed that some erratic blocks can probably be assigned to the Eemian - the last warm period 126 - 115,000 years ago.



Examples of core segments. From left to right: gravel layers of the seabed surface; clastic warves; possible layered dune sands with root remnants
Photo: S. Krüger.

In addition, potential lake sediments could also be roughly categorised in terms of deposition time. The preliminary investigation revealed a spectrum reflecting a typical Atlantic mixed oak forest (between about 10,000 and 6,000 BP). The results of two samples in shallower core depth indicate the expected forest development in the Atlantic. At the same time, pollen types that can be assigned to plants from typical heath, beach and marsh communities are increasing. It is therefore likely that this reflects the advance of the coastline.

The combination of geophysical and sedimentological methods leads to a continuous gain of information, on the basis of which new drilling locations will be decided in the search for organic sediments. We will also increase the line spacing of the hydroacoustic grid over the next few days.

Everyone on board continues to be well. The work can be carried out without restrictions due to the unusually calm and fine weather for the North Sea. Despite the intensive work, we (the majority of the scientific crew come from Kiel University) were also able to enjoy watching Holstein Kiel's promotion to the Bundesliga yesterday evening.

With best regards from RV Maria S. Merian

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