

# „Mapping“



2nd Weekly Report, 13.10.–18.10.2020, 014° 35.320'W – 48° 03.362'N  
MSM96 (GPF20-3\_088), 10.10.2020 – 10.11.2020, Emden – Emden

Almost one week into the scientific program of the cruise we already begin to see patterns in the data that seem to support the hypothesis that we want to address here. And that despite many challenges that have kept us improvising over the past week.

Immediately after leaving the national waters of Ireland we began our hydroacoustic mapping program which includes water current data of the upper ca. 500m, seafloor bathymetry (water depth) and the sub-bottom profiling system to look into the upper layers of the seafloor. The route of the vessel was placed in an area where no previous data existed.

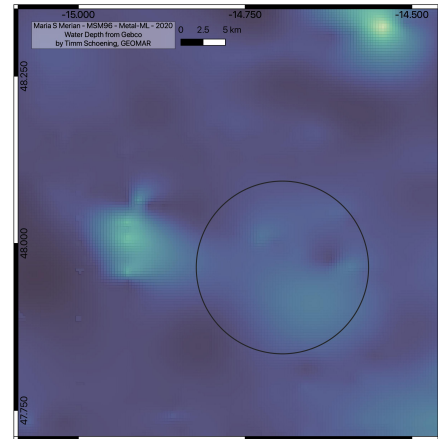
Upon reaching our first working area “PAP” (Porcupine Abyssal Plain, ca. 14°39.776W, 47°58.742N) we continued this mapping task for several additional hours. The goal was to better understand the terrain of the area and to provide high-resolution data for the “General bathymetric chart of the oceans” (<https://www.gebco.net/>).

We had chosen the working area as the satellite-derived data showed some of the hill, valley and plain features that we are looking for. The maps we acquired by the multibeam showed more detail and confirmed that we had chosen an appropriate spot for the following sampling sites.

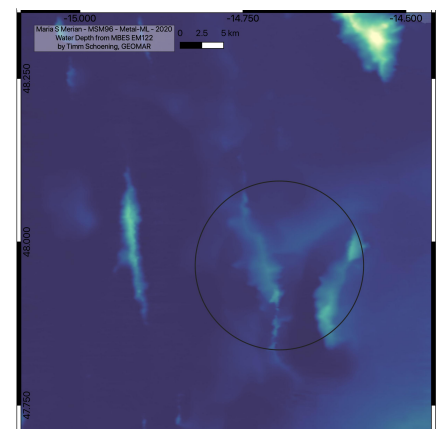
On average, the water depth in the area is about 4800m with one major seamount in the North East rising almost 1000m high above the plains around it. The three parallel ridges in the southern half of the map rise between 300m and 500m and extend about 25km in North-South direction and about 3km in East-West direction.

We classified the depth map by the *Geomorphons* algorithm which provided us with distinct areas for our planned sampling scheme (<https://doi.org/10.1016/j.geomorph.2012.11.005>). The algorithm assigns each part of the map to one of ten distinct types. We are aiming our sampling and observation on three of those terrains: hills (red), plains (grey) and valleys (blue).

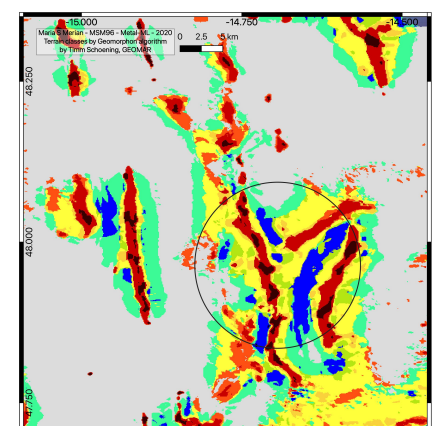
On top of the echo-sounding work for the map, all the other equipment on board has kept the science and ship’s crews busy as well. We have been collecting water samples, sediment samples and have been taking images of the seafloor.



Satellite derived data from Gebco. Two prominent features to the West and the North East of the map can be seen with gently sloping areas in between.



Bathymetry acquired by the multibeam system of RV Maria S. Merian. Especially the bathymetry in our sampling area (black circle) is expressed in more detail.

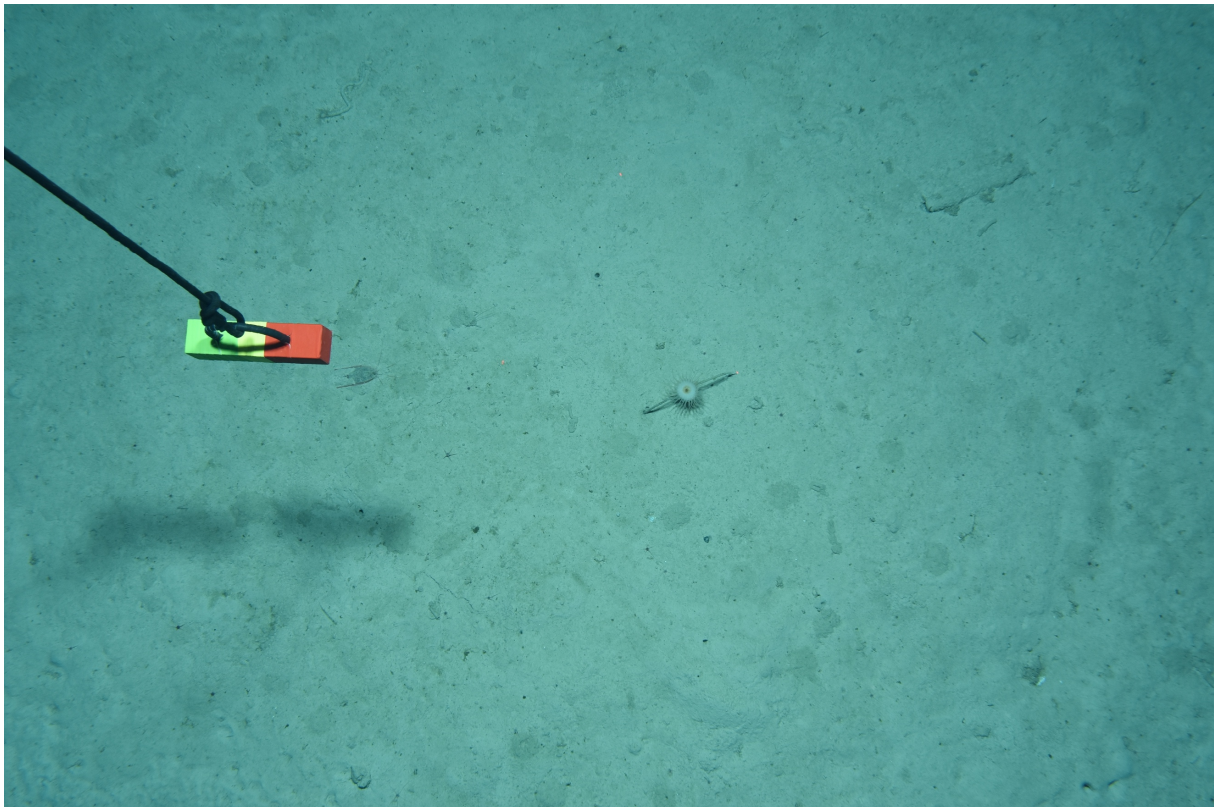


Terrain types as computed by the Geomorphons algorithm.

Anyhow, the planned science program was often challenged in this first week either by technical failures or weather conditions. This means that we had to adjust the work plans frequently to exchange equipment that could not currently be deployed. Despite these delays, we managed to survey two parts of the area by the towed camera platform and sample three sites by the multi-corer. From the – very preliminary – observations and data, we believe that we can already see the subtle differences between terrain types that we hoped to detect. Should the further incoming data underline these observations we could better understand – and quantify – the variability of the geochemical and faunal composition in this first area.

In two or three days we will leave this first area and head out into the Atlantic to repeat the mapping, sampling and observation in two more areas. The combined data on variabilities within one area and between the areas will enable the science community to incorporate that knowledge into process models and predictions.

Fingers crossed that we manage to acquire more of the needed data and that the gear remains intact and the weather remains calm.



*One image that we acquired during a towed camera deployment. It shows a mainly barren seafloor with only an anemone as a prominent feature. On closer look, several brittle stars, tracks and feces by sea cucumbers and many little mounds and burrow holes become visible. The green, yellow & red weight is hanging down from the camera frame and helps keeping a safe distance of two meters above ground.*

Greetings on behalf of the cruise participants,

Dr. Timm Schoening  
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