„Day and night“

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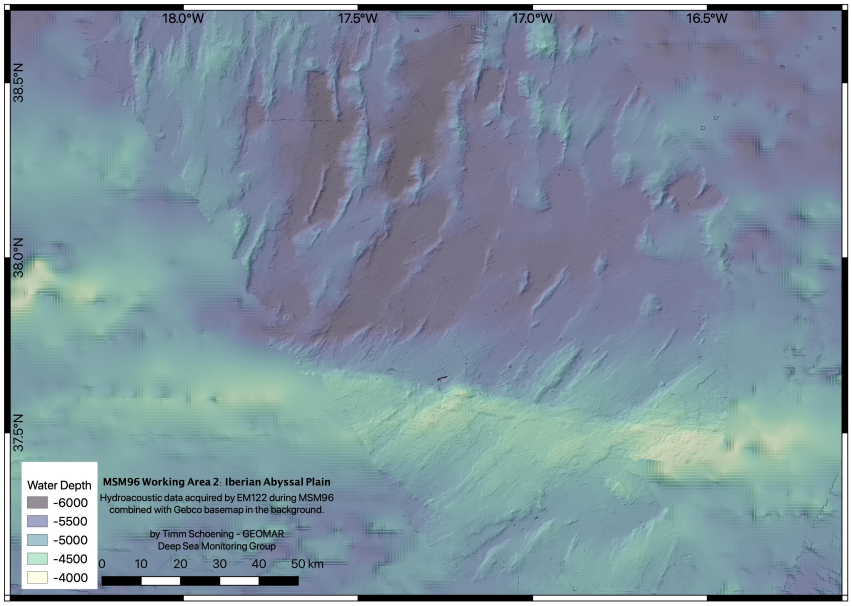
Nineteen days into the science program we are currently finishing the 57th station of this cruise before heading into a night of mapping again. Since leaving the EEZ of Ireland on October 13th, we have already travelled 2950 nautical miles in total (ca. 5460km) within international waters. We deployed the CTD three times to obtain sound velocity profiles. We deployed the OFOS twice to acquire high-resolution imagery of the seabed. And we deployed the Multicorer 26 times and conducted 17 hydroacoustic surveys. The nine stations missing are the ones that represent the challenges of deep-sea research and are those were we were not successful in obtaining samples or data despite our best efforts. Regardless, the acquired data is far beyond the bare minimum we had hoped to acquire only because the ship, the crew and the scientists have been operating day and night.

Due to technical difficulties of the OFOS and the wire – which finally caused us to abandon the imaging efforts altogether, and resort to sampling and mapping only – the upcoming data interpretation will have to based on hydro-acoustic and lab data only. But as many OFOS stations were cut short, the mapping part of this cruise has actually been far more effective than planned. We had aimed to spend 170 hours creating hydro-acoustic maps and have already done more than 280 hours with more to come. The resulting area – most of which has been mapped for free use in science in high resolution for the first time – amounts to 56,000 square kilometers. This is roughly the combined area of Northrine-Westfalia and Hessia or the total area of Croatia. As we sampled and surveyed two target areas of different depths, latitude and distance to continent, we found rather different conditions – as expected and aimed for.

The northern “Porcupine Abyssal Plain” area consists of mainly plain seafloor with slopes less than one degree at a mean depth of ca. 4800 meters. The area is additionally covered by North-South facing ridges, rising up to 600 meters above the plains. One wider seamount feature in the area even rises to 1000 meters above the plain. In this area, the multicorer sampling and porewater analysis revealed suboxic conditions. More geochemical data on Total Organic Carbon content, Dissolved Organic Carbon concentration, Nutrients, Porosity, Trace Metals, especially Rare-Earth-Elements and Neodymium Isotopic composition, – all in the solid phase and pore water – will be measured in the home lab on shore after the cruise.

The southern “Iberian Abyssal Plain” area is located right North of the “Gloria Fracture Zone”. This is the fracture zone separating the European and African plates. The hydro-acoustic map of this area shows narrow and steep valleys in the North-West section, also mainly in a North-South direction as in PAP. Towards the West, wider and up to 6000m deep plains exist and the fracture zone itself lies to



the South which is rising up to 2500m above the plains we sampled. The geochemical analyses on board revealed oxic to suboxic conditions in the area and the same set of analyses as for the PAP area will follow later.

The limited image data of both areas seems to show varying frequencies of fauna with generally the same groups appearing but with apparent differences between deployment sites. Due to the small size of the image dataset, statistically robust image analyses will anyhow not be possible. What we have seen though in these deep and remote parts in the anthropogenic impact by finding litter on the seafloor: mainly plastics, occasionally glass bottles and one yellow barrel that left us a bit worried.

Figure: One of the human impacts we observed (at 4800m depth). A yellow barrel, with a leaking substance but nonetheless covered by fauna. The two red dots on the right side are laser points for scale reference and are placed 49cm apart.

We are now looking forward to the final week of the cruise, completing the sampling and filling the last sample containers while in parallel closing the last gaps in the hydroacoustic maps.

Greetings on behalf of the cruise participants,

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