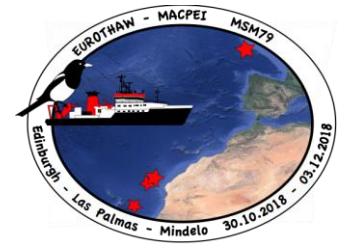


FS Maria S. Merian - MSM79

Weekly Report 1

Edinburgh (UK) - Las Palmas (Gran Canaria) - Mindelo (Kap Verden) 30.10.2018 - 09.11.2018 - 06.12.18



In the early afternoon of 30.10.2018, Maria S. Merian left the harbor area of Edinburgh for a cruise where research activities will focus on “organic carbon” and processes that steer its turnover. This cruise consists of two legs; EUROTHAW (Edinburgh - Las Palmas), which leads us to the Bay of Biscay, and MACPEI (Las Palmas - Mindelo), where research is planned in the Atlantic Ocean off Northwest Africa.

Despite that it is well known that carbon dioxide is an important greenhouse gas affecting our climate and that the ocean plays an important role in the global carbon cycle, many key processes regarding the entry/production, transport, deposition and degradation of organic carbon to and at the ocean floor as well as the carbon re-emission to the atmosphere, are not well understood. One of these processes which we want to study more closely, is the thawing of permafrost soils. This process is currently taking place in large parts of Siberia and northern North America as a result of today's global warming. Thawing permafrost soils can release large amounts of old carbon, much of which enters the ocean via river systems. The impact of this release on marine ecosystems and the processes leading to the degradation and/or deposition of this carbon as well as the effects of this release on the global climate are largely unknown.

A method to obtain better insight into these processes is to study environmental and oceanographic signals that are archived in marine sediments. The goal of the first leg of MSM79 is to obtain high-resolution sediment archives that record the melting of European permafrost at the end of the last ice age approximately 20,000 years before present.

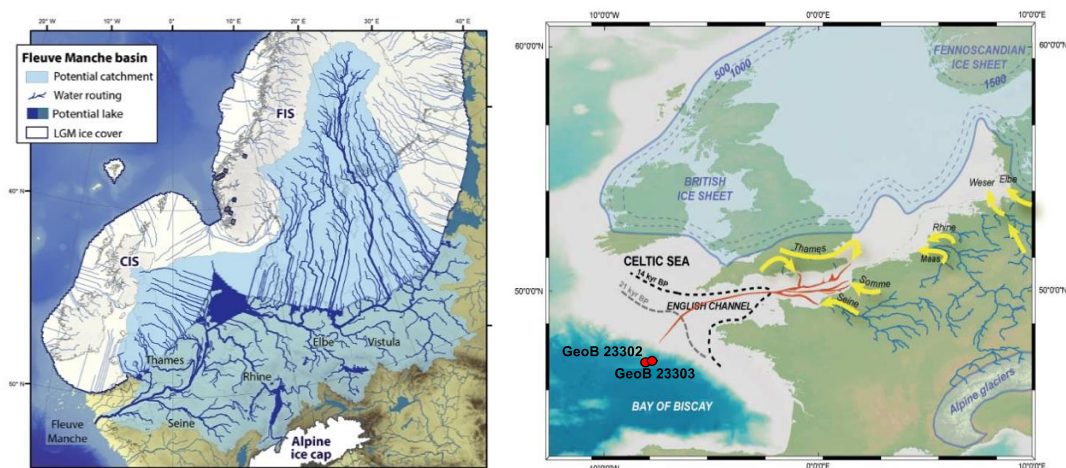


Figure 1. Map of Europa 20.000 years before present. Left: Drainage rivers of the continental ice (Patton et al., 2017), Right: Discharge direction of the Palaeo-river with core positions of MSM79 (after Ménot et al., 2006).

In the last ice age, large parts of Europe were covered by ice sheets, while the non-ice-covered ground was largely permanently frozen (Figure 1). The ice sheets were drained by

a huge river system which discharge waters flowed into the Atlantic Ocean. The river mouth of this palaeo-river was located in today's Bay of Biscay at the entrance of the English Channel.

Additional to meltwater, this palaeo-river also transported large quantities of erosional products. These sediments were deposited on terraces along the continental slope as well as in the deep sea. When permafrost began to thaw at the end of the last ice age, large amounts of old carbon, previously stored in the frozen soils, were released into the ocean.

On the early Friday afternoon of 02.11.2018 Maria S. Merian reached the working area in the Bay of Biscay at the position where the palaeo-river, the so-called "Fleuve Manche" entered the Atlantic Ocean. Completely unexpected and in contrast to its bad reputation, the Bay of Biscay welcomed us in a most friendly way with blue skies, almost no wind and very low swells that gently moved the ship. The friendly welcome was subscribed by many dolphins that jumped around the ship. In other words; ideal sampling conditions.

We happily accepted this welcome and started our research activities by studying the ocean floor morphology and its subsurface sediment with Parasound and Multibeam. After this we successfully deployed multicoring and gravity coring devices and were able to obtain surface sediments and four marine sediment archives at two selected core locations (Figure 2).

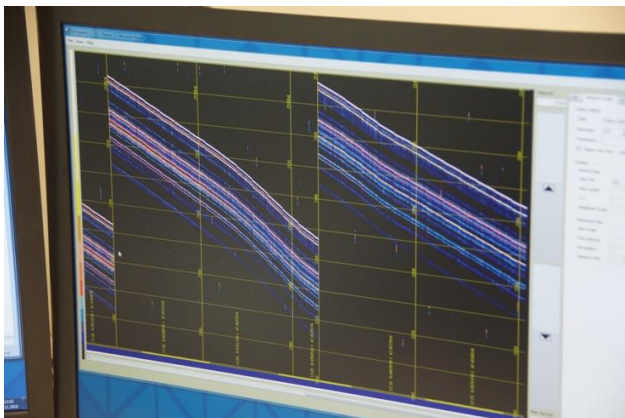


Figure 2. Left, Parasound Profile of the ocean floor in the research area, Right, The recovery of the gravity core GeoB 23303-2.

Due to the excellent cooperation of the researchers from the MARUM (Bremen), the AWI (Bremerhaven) and the Université Lille/CNRS (France) with the crew of the Maria S. Merian, the sampling was completed in the early hours of Saturday morning.

After termination of the research activities we send a goodbye to the Bay of Biscay and started our transit to Las Palmas. There we hope to enter port at the 09.11.2018 to welcome our colleges of the MARUM (Bremen), the AWI (Bremerhaven), the Royal Netherlands Institute of Sea Research (Texel, NL) and The Westminster University (London, UK), that will join us for the second leg of our cruise.

Many greetings from the Atlantic,
On behalf of the scientific team

Karin Zonneveld