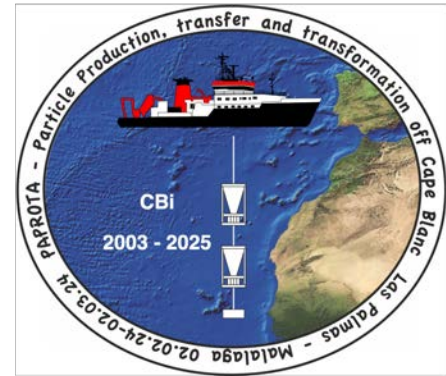


RV. Maria S. Merian
Cruise MSM134 (GPF 23-2_016)
02.02.2025 - 02.03.2025
Las Palmas - Malaga

PAPROTA
Particle Production, Transfer and Transformation
off Cape Blanc

Weekly Report No. 1
02.02.25 - 09.02.25

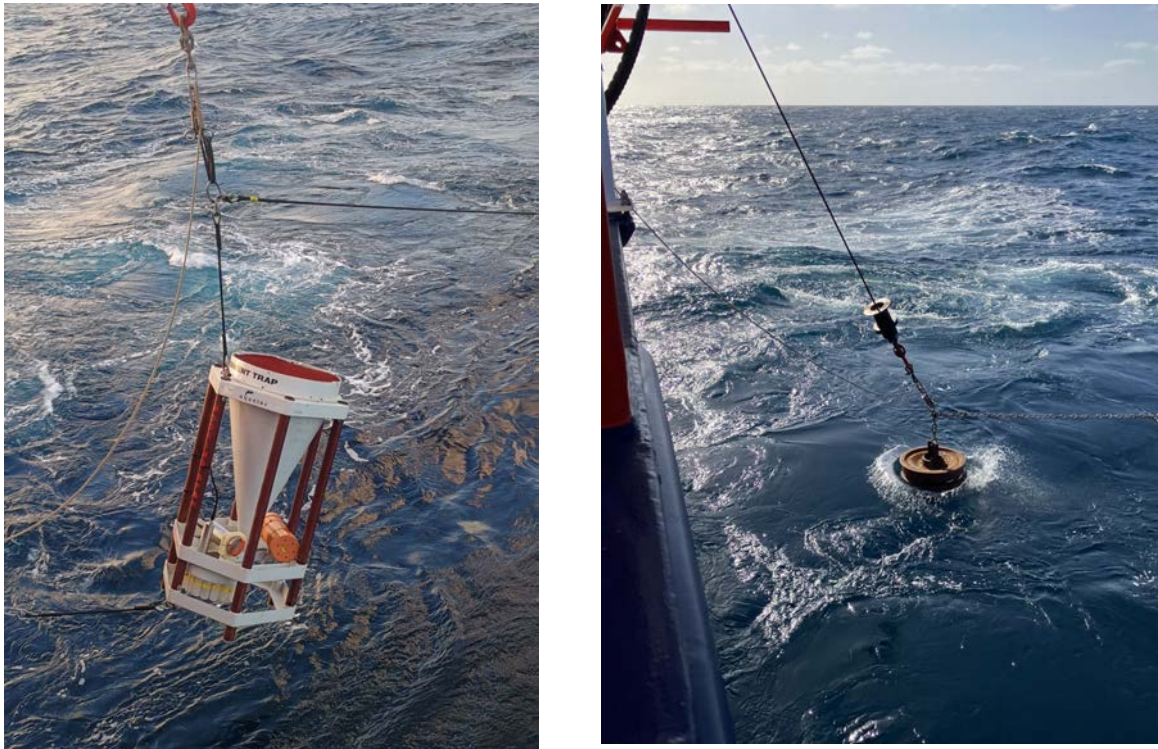


At Sunday morning, the slowly awakening city of Las Palmas waved us goodbye when we left port and headed south towards our research area. Both wind and waves from the back caused very gentle ship movement that had the nice result that the complete scientific crew got very quickly adapted to the “moving” life on board. With Gran Canaria disappearing behind the horizon, preparation of the upcoming sampling and research activities were executed to be ready to immediately start sampling and processing samples when our research area was reached in two days time.

The research activities of the cruise PAPROTA form part of the German Science Foundation financed RECIEVER Unit of the Excellence Cluster "The ocean floor- Earths uncharted interface at the MARUM (University of Bremen). Groups from the University of Bremen, University of Oldenburg and the Alfred-Wegener-Institute in Bremerhaven focus on the production of organic particles by phytoplankton in the upper ocean and the processes that influence and alter the downward carbon flux as well as its composition. We will investigate which particles are being produced, both on species level (which plankton species) as well as molecular level (which complex biomolecules are being formed). We furthermore will investigate the sinking process; hence what particles sink vertical, what horizontal. Furthermore, we will study degradation processes to obtain insight into what particles/molecules are being degraded before reaching deeper waters, what particles degrade in the deep ocean and what on the ocean floor. Focus lies on investigations studying which organic matter particles (POM) and molecules are being degraded by microorganisms and transformed into dissolved organic carbon (DOM) and how DOM behaves in the water column, e.g. how does it react with other DOM, POM and other particles and how does it influence the ocean carbon flux that reaches the sea floor and is being stored in ocean sediments.

Especially the latter receives increasing attention of politics, the general public and industry as one of the so called “potential geo-engineering options” (= intentions to artificially reduce atmospheric CO₂) is to increase storage of carbon in the ocean floor through artificially increasing phytoplankton production. It is clear that this will have major impact on marine ecosystems and oceanic environments and it is therefore of utmost and urgent importance to obtain detailed insight into processes that steer the production and storage of natural produced organic carbon as well as the effects these potential measurements will have on the oceanic ecosystems.

In the early Tuesday morning we reached the first station in our research area in the open ocean about 400 km (216 nm) from the coast off Cape Blanc. This location is unique as cold, nutrient rich water that have upwelled near the coast and have travelled offshore in large meandering filaments, reach here their most offshore position before becoming mixed with the warmer, nutrient poor central Atlantic surface ocean waters. The Location is also unique as it is the location of the worlds most longest continuous monitoring station where sinking particles are being collected with moored sediment traps. At this location the traps are being deployed since the year 1988.

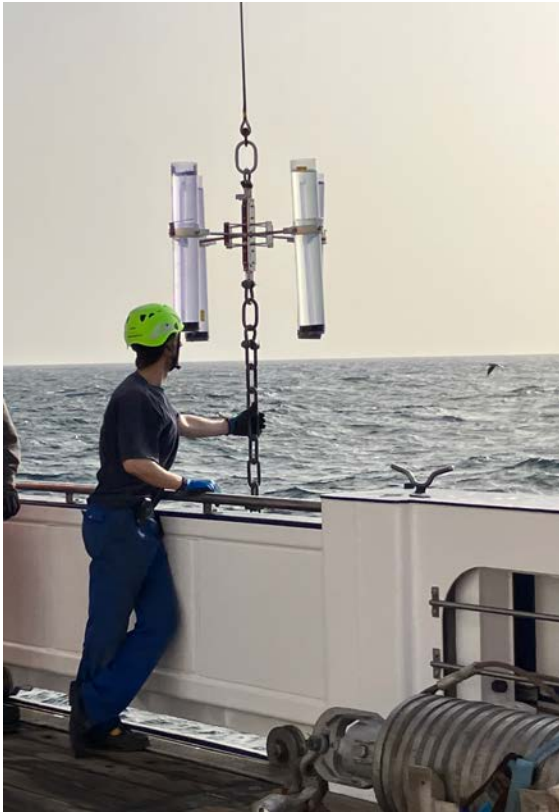


Picture 1. Deployment of mooring CB34 and release of the anchor (photos M. Klann and K. Zonneveld)

Our station work started with the deployment of a multi-net, a device with which plankton was collected at 100m depth intervals. At dawn we started with the recovery of the Mooring CB33 that we had deployed with the dutch research Vessel RV. Pelagia two years ago.

After a successful recovery of CB33 in the afternoon, station work continued in the following days some 10 nm from the CB position. Here we successfully collected large amounts of sea water, suspended sediments from the deep ocean as well as ocean floor sediments by both gravity and multi-coring. These ocean waters and sediments allowed the start of several degradation experiments that study the microorganisms that degrade different complex organic molecules. Furthermore, we investigate what enzymes are being involved in the degradation process, what molecular compounds are being degraded and which compounds are resistant. Focus lies hereby on the degradability of differential polysaccharides (different sugars) and POM consisting of polysaccharide based material such as cysts formed by dinoflagellates. Friday evening, station work at this location was closed by the deployment of the mooring CB34 that will collect particles for another two years.

From now on we will change our focus of research to the more coastal region where at the moment active upwelling intensifies. Here we started our research activities by the deployment of drifting sediment traps that will collect particles exported out of the photic zone. This morning the first trap was set free at the rim of an active upwelling cell and we hope to follow the succession of plankton production and particle export production for the next two weeks.



Picture 2. Deployment of the drifting trap at Sunday morning (Photos K. Zonneveld).

Meanwhile we enjoy the summer weather with air temperatures of about 20°C and little wind. We look forward to the next week, where aim to take a closer look at the processes in the active upwelling cells and offshore flowing filaments of upwelled waters.

on behalf of all cruise participants
met beste groet van de blauwe oceaan

Karin Zonneveld