RV MARIA S. MERIAN – MSM107

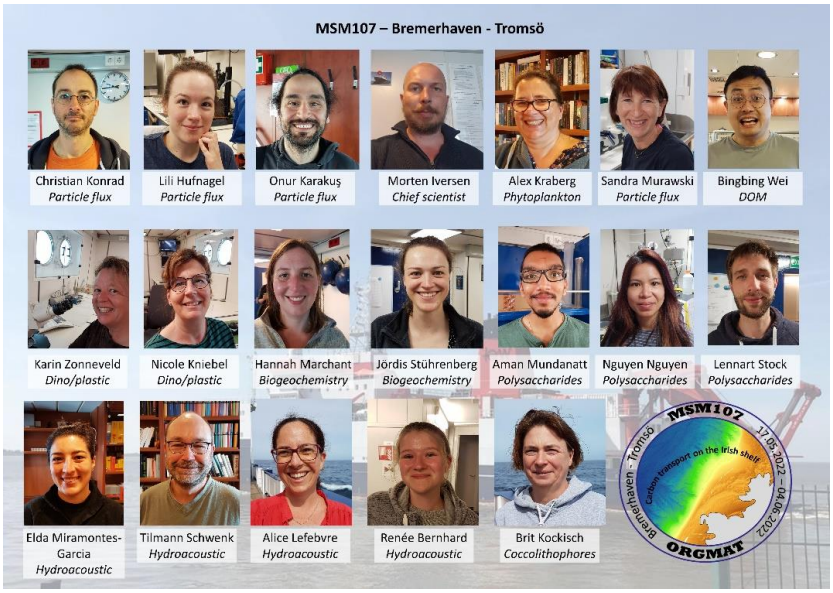
18.05. - 03.06.2022, Bremerhaven - Tromsø

1st Weekly Report (17. - 22.05.2022)

On May 17, researcher from MARUM – Center for Marine Environmental Sciences at the University of Bremen, Max Planck Institute for Marine Microbiology Bremen, ICBM - Institute for Chemistry and Biology of the Marine Environment of the University of Oldenburg, and Alfred Wegener Institute arrived on board the RV MARIA S. MERIAN in the port of Bremerhaven. The equipment arrived shortly after and we spend the time until midday 18 May to prepare the laboratories. At 17:00 on 18 May the pilot left MARIA S MERIAN and we started our journey through the North Sea around the northern part of Scotland towards our research area off northwest Ireland.

The MSM107 is part of MARUM's Cluster of Excellence, *The Ocean Floor – Earth's Uncharted Interface*, where the research unit RECEIVER will study how the ocean take up carbon dioxide from the atmosphere and store it in the deep ocean. The research on MSM107 is part of a larger research project to quantify the contribution from shelf production to deep ocean carbon storage. Recently researchers participating in MSM107 discovered that a substantial fraction of organic carbon that was produced on the coastal shelf off northwest Africa was transported to and stored in the deep ocean. This could be an important mechanism that is mitigating global anthropogenic carbon emissions. However, since the region off Cape Blanc (NW Africa) is an upwelling region, it is unclear if those processes also take place in other regional ocean margins. It is rare that sea-going expeditions include pelagic and benthic work at both the coastal shelfs and the open ocean and as a result it is currently uncharted how important the transport of carbon from productive coastal areas to the deep sea are for carbon storage. During the research expedition MSM107 we will investigate the role of coastal production for deep ocean carbon storage in the northeastern Atlantic Ocean.

The scientific group consists of 19 persons, three technicians, one engineer, eight senior scientists, and seven students. We have 12 females and seven males that are distributed across 11 different nationalities. All scientists were eager to get started and spend the steaming time to calibrate all the equipment.



On Saturday May 21 we arrived at the first station in the research area. The first station started with a secchi-disc deployment at 12:00 to determine the light attenuation through the water column. Hereafter, we deployed a CTD with ADCP to the full water depth (2500 m) in order to obtain a sound velocity profile for the hydroacoustic equipment and to identify the different water masses and the biological and biogeochemical structuring of the water column. We further deployed a plankton net and an in situ camera to quantify plankton and settling aggregates through the water column. The station was followed by a hydroacoustic transect from the open ocean station to the shallow shelf. The hydroacoustic transect helped us to better understand the seafloor typography, current velocities and directions, and the composition of the sediment. The sediment composition is especially important for the research on the shelf, where we are particularly interested in sandy sediments. Sandy sediments can be very efficient for nutrient recycling and during MSM107 we will quantify the rate of nitrogen recycling. Additionally, we know that sandy sediments do not accumulate organic matter, but instead allow lateral advection of organic matter and carbon to the open ocean.

At midnight on Sunday May 22 we arrived at the first shelf station, which had a water depth of 120 m. We carried out all the water column measurements before we sampled the sediment. The water column measurements included primary production, nutrient concentrations, particulate organic matter and particulate dissolved organic matter measurements, plankton composition, quantification and sampling of settling organic aggregates, and microplastic quantification. Once the water column samples were collected we continued with the sediment sampling. These included grabs and multicorer samples for biogeochemical rate measurements, organic composition and microplastic quantifications.

The collaborations between the ship's crew and the scientists is perfect and there is a good mood on the ship.

Best regards from the Irish shelf and all MSM107 participants,

Morten Iversen

MARUM, University of Bremen