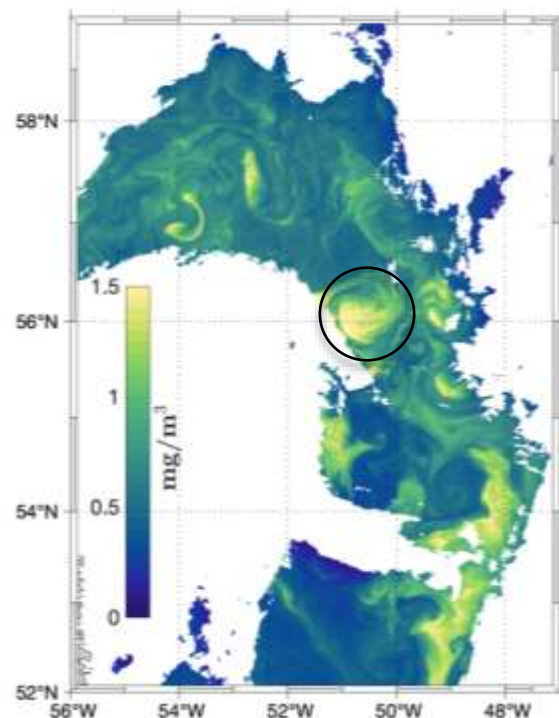




The third week at sea on the R/V MARIA S. MERIAN Expedition MSM129/2 was both busy and highly productive, thanks to the seamless coordination between the crew and scientific team members. After servicing the 53°N observatory in the second week, we successfully recovered three deep moorings on the western Greenland coast. As part of optimizing the mooring array, we redeployed two of these moorings. Additionally, we successfully recovered the time series station K1, which, like the 53°N observatory, has been installed since 1997. The K1 mooring is located in the deep convection patch, where surface waters that cool during winter sink to greater depths (up to 2 km), bringing oxygen- and carbon-rich water to the deep ocean. Hence, the K1 station is critical to understand the characteristics of the water penetrating at deeper depths.

Apart from the mooring operations, the scientific focus turned towards the infancy “adaptive sampling” of oceanic eddies. These structures play a crucial role in the exchange of water masses between the boundary currents and the central Labrador Sea. They are also hotspots of marine productivity. Using daily satellite imagery of sea surface temperature and chlorophyll-a concentration, we pinpointed the locations of three oceanic eddies. Conducting ship transects through these eddies enabled us to accurately identify their centers. Subsequently, we planned further underway sampling to deepen our understanding of their characteristics and dynamics.

We conducted CTD and underway CTD stations both within and outside of the eddies. Additionally, on June 18th, we deployed two electric gliders to continuously sample one particular eddy from the surface down to 1000 meters deep over the coming days. Unfortunately, one glider had to be recovered shortly after deployment. However, we are pleased that the other glider is performing admirably



Satellite imagery of sea surface chlorophyll-a concentration on June 17, 2024. The swirling structures indicate possible eddy structures. Glider and BGC float deployments were done in the encircled eddy. Courtesy of F. Dilmahamad.

and is uncovering interesting features of the eddy. We also deployed a biogeochemical Argo float (BGC-float) within the eddy, as a contribution to the German EuroArgo effort coordinated by the Bundesamt für Seeschifffahrt und Hydrographie in Hamburg. This autonomous float measures temperature, salinity, oxygen and pH, providing data every day during its initial phase of 10 days, before switching to a “normal” sampling mode and providing data every 5 to 10 days. Additionally, the SWOT satellite will provide, within the next 10 days, two high-resolution snapshots of the sea surface state of the eddy. Overall, we anticipate compiling a comprehensive dataset of the eddy, integrating high-resolution underway sampling, autonomous instruments and satellite imagery, enabling us to understand the dynamics of the vertical structure of the feature.



Glider deployment within the anticyclonic eddy in the Labrador Sea (Photo: Stefanie Brechtelsbauer)

To study the dynamics of the surface waters, we also deployed 8 surface drifters from the Helmholtz Zentrum Hereon in the boundary current on the west coast of Greenland. They were deployed at four locations along a transect that crossed the West Greenland coastal current. We will follow the trajectories of the drifters which will help to make instantaneous and time-averaged current effects visible and calculable.

On Saturday 22 June, we had our traditional mid-cruise “Bergfest” and enjoyed some very tasty Flammkuchen, thanks to our two chefs Frank and Matthias. This calm and sunny day was made even more special as we were at our closest point to Greenland,



In a clockwise direction, starting upper left: Iceberg on the west Greenland Coast (Photo: Stefanie Brechtelsbauer), right: drifting ice from the upper mast platform (Photo: Fehmi Dilmahamod), and lower left: pilot whales during mooring deployment (Photo: Stefanie Brechtelsbauer)



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allowing some spectacular views on rifting pieces of ice and icebergs. The weather has been calm and hence no disruption in the proceedings on board, and we hope it stays the same during the last two weeks. In the coming week, we will re-deploy the K1 mooring as well as further our data acquisition by doing more high-resolution transects of identified eddies.

You can track the progress of our cruise, as well as the deployed drifters on the GEOMAR Beluga web portal at <https://beluga.geomar.de/msm129>, as well as reading and listening to the blog of the cruise at <http://www.oceanblogs.org/msm129/>

On behalf of all participants of R/V MARIA S. MERIAN, best regards,
Fehmi Dilmahamod (Co-chiefs scientist MSM129/2)
GEOMAR Helmholtz Centre for Ocean Research Kiel