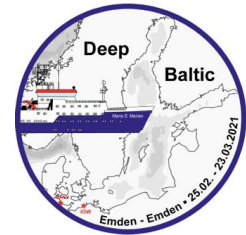




FS MARIA S. MERIAN
MSM 99 (GPF 18-1_097), Emden - Emden
3rd Weekly report, 08.-14.03.2021



Baltic Deep Water Circulation

Having reached the closed ice field in the southern Bay of Bothnia during the night of Sunday to Monday, March 8th, we started sampling on and underneath the ice as planned and continued until yesterday evening, Saturday March 13th. During day time, stable ice floes with a thickness of 30 to 50 cm were targeted to set up ice stations drilling ice cores and sampling the water column with different probes directly from the ice. This included a small ADCP probe, a microstructure sensor and a hand-held CTD in order to the water column to measure continuously for several hours. These measurements were performed at three daily stations on the ice, using small hand or electric winches from a sledge for downward and upward profiles down to depths of approximately 30 to 80 m. In combination, with east-west transects of CTD casts through nights we found proof for an assumed stratification of a cold, oxygen-rich water mass under the sea ice in a depth of 60 to 80 m which expands northwards along the slope of the west coast of Finland. The collected ice cores will be used later for different laboratory analyses of, e.g. salt and nutrient content, biomarkers produced by sea ice algae, and microplastic contamination. In addition, irradiance and reflectance measurements of sunlight were taken along systematic profiles at the stations on the ice to obtain better quantitative data by direct sensor measurements at a distance of about 1 m from the ice surface for darker and lighter areas (e.g. in the case of snow cover). These will later be used to improve the calibration of large-scale satellite measurements.

A team of IOW scientists waters a mini-CTD through an ice core hole. (Foto B. Hentzsch)

While the first two days on the ice were exceptionally successful with regard to sea ice sampling and nighttime CTD profiles, from Wednesday to Friday we had to overcome certain difficulties to continue with our sampling program as planned. Rising southerly winds caused a strong ice drift which resulted in the break-up of the large ice body into smaller and smaller ice floes and further pushing the ice floes northward creating large compressional ice ridges. The latter could only be



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bypassed or crossed by skillful navigation by the nautical crew causing some time loss, nevertheless almost all ice sampling and CTD profiles could be successfully carried out.



An ice core is taken on board for further sampling. (Foto B. Hentzsch)

On Saturday, March 13th, a final day station could be set up on a stable ice floe in the south of the Bothnian Bay with an additional deployment of an ADCP mooring on the sea floor. This device will measure the ocean current of the water column above for one year. Today, Sunday, March 14th, we are

back in the southern Bothnian Sea with temperatures just above 0 degrees Celsius. After defrosting the working deck and the coring devices we executed several geological sampling stations and deployed another ADCP and CTD mooring.

During the last week of cruise MSM99 we will continue our journey southward and finalize the work program with geological and hydrological sampling stations in the Aland Deep and in the eastern Gotland Basin.

Maria S. Merian in and sampling teams on the sea ice. (Foto B. Hentzsch).

Still elated from the impressions and the work results from our ice stations, and further from the possibility to navigate in such an environment with the ice edge research vessel MARIA S. MERIAN, all members of the scientific and ship's crew send greetings to the hopefully already warming North Germany.



Ralph Schneider
(Christian-Albrechts-University Kiel)

14. March 2021