RV Maria S. Merian

Cruise MSM-73

06.04.-22.05.2018

Cádiz – St. John's

3. Weekly Report

16.04.-22.04.2018

The third week began as the second ended: station work was not possible due to weather. The measuring devices installed in the hull of *Maria S. Merian* continued to provide in-depth measurements of near-surface salinity and temperatures as well as the flow velocity in the uppermost 1,000 m of the water column. However, the data quality was reduced by the constant high sea state. Unfortunately, the system brought from Canada to measure the near-surface partial pressure of carbon dioxide (CO_2) in seawater has not been operational since the beginning of the cruise and cannot be repaired with on-board equipment.

We have been on a weathering course since Monday, 16.04.2018, to avoid one of the largest cells of low atmospheric pressure we have encountered in the North Atlantic. Digital maps highlighting shipping traffic in the North Atlantic showed that many ships were like us. The Atlantic Ocean was partially void of ships. Due to this forced break of five days, we were unable to continue our measurement program in the Eastern Atlantic as planned and could neither visit the PIES stations BP-33 and BP-34 nor carry out any CTD/ADCP station work. We circumnavigated the low pressure area on its north side and reached the PIES station BP-12 located on the western side of the Mid-Atlantic Ridge on Thursday, 19.04.2018. Here we recovered the device installed at the sea bottom and will deploy a new one here at the end of the cruise. We continued westwards through the Newfoundland Basin along ~47°N, where during the weekend we recovered two more PIES equipped with an additional currentmeter, called C-PIES (BP-28 and BP-29), and successfully performed an acoustic data transfer on PIES BP-30. Tonight, the night to Monday, 23.04.2018, we will visit PIES stations BP-27 and will recover one out of two remaining PIES.

Meanwhile, we take various water samples on all stations, among others to calibrate the CTD sensors. Furthermore, we measure the content of trace gases in the ocean, which give us information about the origin and age of the water masses. In the course of the cruise we want to compare the measurements at 47°N with respective measurements in the Labrador Sea, where gases such as oxygen, CO_2 and trace gases are introduced from the sea surface into the deep ocean during the formation of Labrador Sea Water.

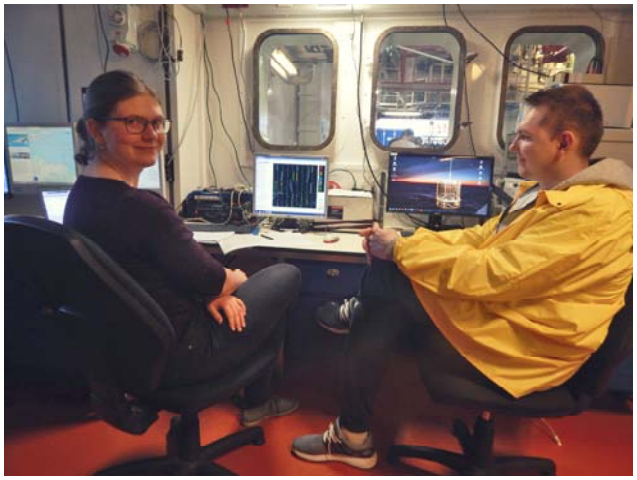
As part of the international Argo program, we already deployed three out of seven Argo floats we brought with us. These are free-falling devices, which sink to a previously set water depth, typically

1000 m. They drift for a few days with the current at depth, then sink to 2000 m depth and finally rise up to the sea surface. The temperature and salinity profile recorded on the way up is sent along with position data via satellite to land stations, from where the trajectory of the Argo float is observed and the data quality is checked. Afterwards, the float goes repeatedly through this cycle of descending, drifting, and ascending. The Federal Republic of Germany, represented by the BSH in Hamburg, participates in this worldwide program, as part of which Argo floats are regularly deployed on scientific cruises and a good spatial distribution of data is ensured.

On behalf of all cruise participants,

J. Oelsmann while taking oxygen samples.

K. Wiegand while deploying the water sampler.



H. Nowitzki & A. Buinyi, two PhD students of the German-Canadian graduate school ArcTrain, while supervising the acoustic data retrieval of PIES BP-30.

A. Schneehorst while checking an Argo float.

Photos: A. Buinyi