

RV Maria S. Merian Cruise MSM-73 06.04.-22.05.2018 Cádiz – St. John's



## 2. Weekly Report 09.04.-15.04.2018

In the beginning of the second week we started our work at the Irish shelf edge. The continental slope here has various notches and spurs. One of these spurs, called Goban Spur, forms a small ridge that extends from the shelf edge into the deep Western European Basin. Last year, here we installed two deep-sea mooring during cruise *MSM-64* with *Maria S. Merian*. The moorings carry scientific instruments at various depths, such as currentmeters, to measure flow strength and direction, as well as sensors for measuring water temperature and salinity. Based on these long-term measurements, we want to determine how variable the boundary current system is on the eastern edge of the Atlantic, and which water masses carrying which properties primarily flow to the north. Knowledge of the composition of the eastern boundary current system is important to understand, which water masses will later flow into the northern North Sea and there affect the local circulation.

Earlier this week, between Monday and Tuesday, 09.-10.04.2018, we started station work at Goban Spur and performed a westward CTD / ADCP section from the shallow shelf edge to the 4500m isobath. The names CTD and ADCP refer to equipment that is deployed from the ship and provides vertical profiles of water mass properties and flow structure. Wednesday and Thursday, 11.-12.04.2018, were all about recovering and redeploying the moorings. After a fairly high swell at the beginning of the week, sea and weather conditions were now ideal for recovering the two mooring EB-1 and EB-3. Within 24 hours we were ready to redeploy both moorings. CTD/ADCP station work continued along the section towards the west. On Friday we reached the position BP-32. Here we wanted to establish communication with an inverted echo-sounder (PIES) that was installed on the sea floor last year. This device repeatedly sends a signal from the ocean bottom to the surface. There the signal is reflected, and the PIES records when it receives its echo. Since the speed of sound in seawater is around 1500 m/s, the signal comes back within a few seconds. The speed of sound, however, depends on the temperature and the salinity. Using the transit time measurements that the PIES has been carrying out since 2017, we can reconstruct time series of temperature and salinity profiles using various assumptions and additional data. If this occurs at two PIES located at different positions, respective data can be used to determine the water transport between the location of these two devices. Friday, the 13th, we reached the PIES position BP-32 and started retrieving the data that the PIES had recorded over the past year. To do so, a hydrophone (a kind of underwater microphone) is placed in the water and the PIES is set via acoustically transmitted commands into a transmission mode. The device itself remains on the seabed, in this case at a depth of about 4500 m. Unfortunately we could not establish any communication with the device. We decided to recover the PIES, which we managed at good sea state conditions late Friday evening, and deploy a new device at the same position. By Saturday, we were able to continue our CTD / ADCP stations along the planned cruise track at approximately 47°/48°N. Shortly before reaching the position of PIES BP-33, however, the worsening weather demanded tribute. A storm system, followed by a second storm, forced us to stop research for the time being and to deviate from the track on a northward course, which costs us valuable time. Only at the beginning of next week will we be able to estimate where the station work will continue. However, the storm does not change our good mood. We all are doing very well, and we are well cared for by the crew of *Maria S. Merian*. We use the forced break to advance the data analysis.

Best wishes on behalf of all cruise participants,

Daguer Luts







Cruise impressions ... Photos M. Köllner, D. Kieke