4. Weekly Report

12.06.-18.06.2017

At the beginning of the week, we still had a lot of headwind and storm events. The wind slowed us so far that we only got ahead with a 6-7 knot ride. We therefore had to remove part of the planned research program at the northwestern Mid-Atlantic Ridge to have the necessary time reserves for the forthcoming work program in the Newfoundland Basin. Instead of heading north-west, we headed westwards along ~47°N to exchange the western components of our instrumental deep-sea observatory *NOAC* in the Newfoundland basin. *NOAC* ("North Atlantic Changes") consists of the deep-sea moorings located at the eastern and western shelf breaks of the Atlantic, as well as the inverted echo-sounders equipped with pressure sensors (PIES). These are installed at the bottom of the deep western and eastern basins along ~47°N. Thus, we are able to capture all relevant flow paths that cross the latitude of ~47°N over the deep basins. In the course of this week, we reached the first three out of five PIES installed in the western basin, read the measured data with the hydrophone and recovered the instruments. They will be replaced later by serviced devices that are equipped with fresh batteries. From the data obtained, we will estimate the strength of the North Atlantic Current (NAC) in this region. This current is considered to be the "hot water heating" for Europe, as the water carried from the warm subtropics reaches far north-east. Our work so far shows that only about one-third of this current flows over the Mid-Atlantic Ridge into the eastern basin of the Atlantic. With 2/3, the greater part of the NAC in the Newfoundland Basin flows locally again southwards and forms a so-called southward recirculation. The various PIES are located in the Newfoundland Basin to allow us capturing the NAC's northward and southward current paths, and to determine the current strength and its variations. Last year we had the PIES BP-27 equipped with an additional currentmeter during the cruise *MSM-53* with RV *Maria*

S. Merian. This device measures the flow velocity approx. 50 m above ground level. These data represent an important reference in order to be able to estimate the uncertainties of the transport calculations from the PIES data. The previous assumption was that the currents close to the bottom strongly diminish compared to the surface. However, a first sighting of the currentmeter data of the recovered PIES *BP-27* shows strong flow fluctuations and northward peak velocities reaching a considerable magnitude at up to 45 cm/s. We have already re-equipped the first PIES with a currentmeter and will carry out similar work on three other devices in the next week. At the weekend, we benefited from a stable atmospheric pressure high, which allowed us to move quickly and to recover the moorings located close to the Flemish Cap in sunny weather. In the night of Monday, an intensive CTD program began. We headed back to the Newfoundland Basin and crossed the boundary current with narrow distances between the stations to record its water mass characteristics. This also gave us the necessary time to read out the measured data of the recovered moorings *BM-22* and *BM-24* and to prepare the devices for a further deployment period. The next week will keep us busy installing all long-term measuring devices again on site and thus to complete the deep-sea observatory *NOAC* again.

On behalf of all cruise participants

Dagmar Kieke

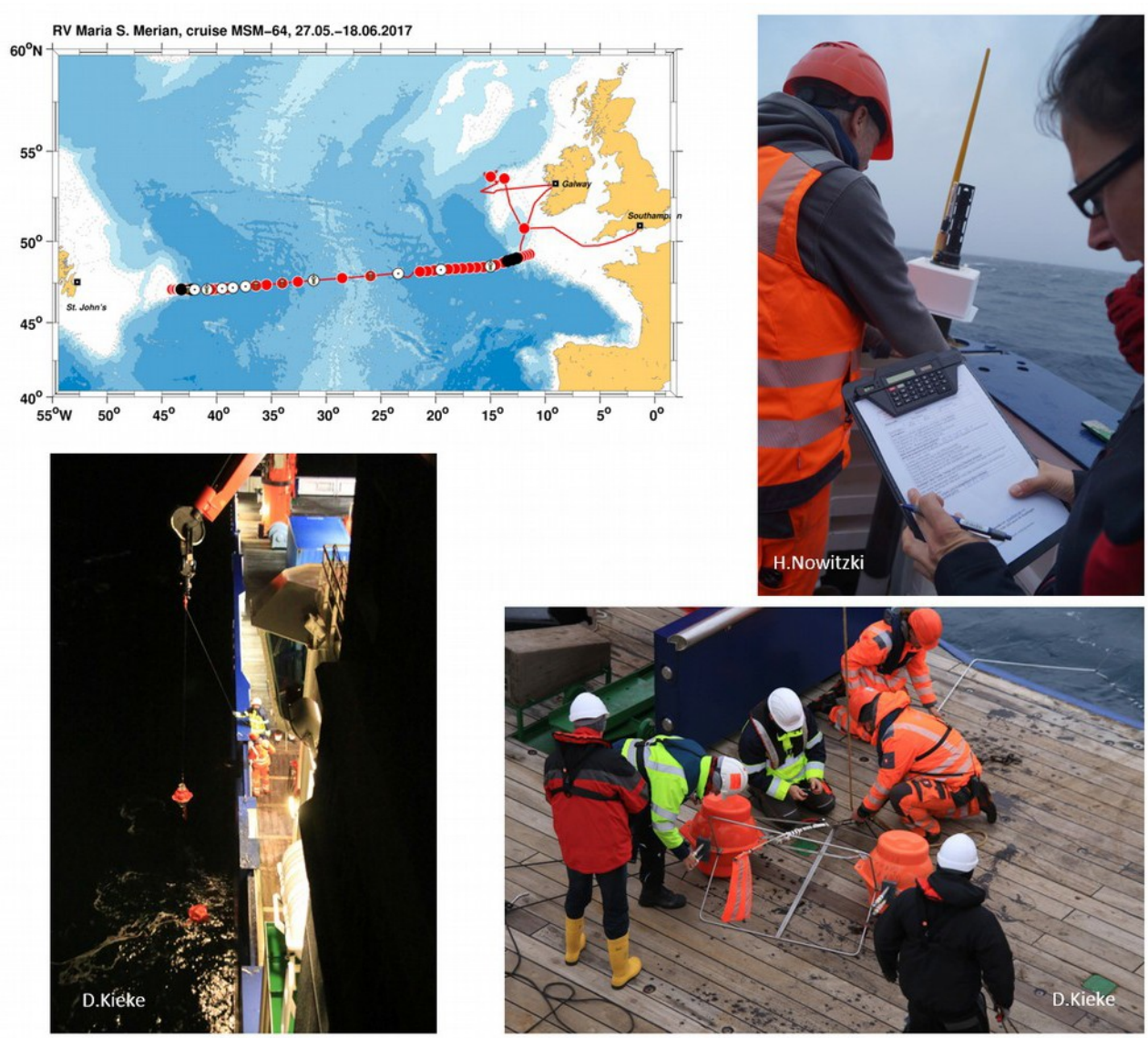

Fig. 1: Present track of cruise MSM-64 during 27 May to 18 June 2017 (top left), deployment of an Argo float (top right), recovery of an inverted echo-sounder equipped with a pressure sensor and a currentmeter (C-PIES BP27, bottom left), dismantling of the top buoy of mooring BM-24/5 (bottom right).