



Water Mass Variability in the Eastern North Atlantic

Manuela Köllner (1), Martin Moritz (1), Birgit Klein (1), Dagmar Kieke (2,3), Holger Klein (1), Monika Rhein (2,3)

(1) Federal Maritime and Hydrographic Agency, Hamburg, Germany (manuela.koellner@bsh.de), (2) Institute of Environmental Physics, Dep. Oceanography, University of Bremen, Bremen, Germany, (3) MARUM - Center for Marine Environmental Sciences, University of Bremen, Bremen, Germany

The Eastern North Atlantic is one of the important source regions for water mass inflow into the North Sea. The inflow of Atlantic Water into the North Sea occurs mainly over its northern border via the Rockall Trough where NAC waters are mixed with waters from the Eastern Boundary Current which is carrying portions of Mediterranean Water northward.

Water mass characteristics in the Rockall Trough depend on the mixing rate between its source waters originating in the subpolar and subtropical gyre. The westward movement of the Subpolar Front leads to stronger northward transports of subtropical gyre water masses. The hydrographic conditions along the North West European Shelf are thus governed by different processes: varying transports and water mass proportions from both gyres, as well as trends within the source water masses. To determine these changes we created time series from Argo Float data between 2000 and 2018 for Sub-polar Mode Water (SPMW), Intermediate Water (IW), upper Labrador Sea Water (uLSW) and deep Labrador Sea Water (dLSW) at defined positions along the North West European Shelf.

The analysis of the upper Labrador Sea Water layer shows low variability and opposing trends at the source regions, and a low variability in the Rockall Trough compared to regions along the Eastern Boundary Current path. The highest variability in the contributions from the two gyres along the Eastern Boundary Current is observed in a broad area around Goban Spur.

Additional mooring observations of hydrographic and transport changes are needed to understand the mixing along the North West European Shelf. For the study of transport fluctuations time series from the NOAC array have been used, which is part of the RACE (Regional circulation and Global change) program (2012-2018) and predecessor programs. These programs have monitored the subpolar gyre in the western basin and provide time series of transports and hydrographic anomalies from moored instruments at the western flank of the Mid Atlantic Ridge (MAR) and within the Eastern Boundary Current at Goban Spur.