



Interaction of MOW and SAIW in the southern Rockall Trough

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The Rockall Trough, west of Ireland, is one pathway by which warm, saline upper waters enter the Nordic Seas as part of the North Atlantic warm-to-cold transformation pipeline. The deep winter mixing here modifies the upper and intermediate water masses, and enables heat release to the atmosphere. The depth of the winter mixing is in part determined by the density structure of the water column, which depends on the presence of different water masses. The water mass structure and circulation in the southern Rockall Trough in 2003-2004 was studied using in situ data from CTD profiles, moorings, and Argo floats.

The intermediate depth level is dominated by the competition between saline Mediterranean Outflow Water (MOW) and fresh, cool Sub-Arctic Intermediate Water (SAIW). Where the two water masses meet, the resulting interleaving produces intense vertical fine structure in the T-S profiles. Large jumps in salinity between consecutive Argo float profiles indicated a relatively sharp front between MOW and SAIW influenced waters. The front was located between our two mooring sites on each side of the southern entrance to the Trough. A large part of the current and T-S variability at these sites was linked to the movement of mesoscale eddies and frontal meanders. Argo float trajectories demonstrated predominantly eastward flow at 1000 m between 52°-54°N, but some westward flow was found just north of this latitude band, crossing the southern flank of Rockall Plateau.

Both MOW and SAIW influenced waters occurred as isolated parcels. Although the salinity at the MOW level generally increased eastward, the strongest MOW signal

was not always found adjacent to the continental slope. This, along with the lack of correlation between northward (along-slope) current velocity and salinity signals at the MOW level, suggests that MOW arrives in this area not only following the continental margin, but also on a more circuitous (western) route.