



Interior pathways of Labrador Sea Water in the North Atlantic from the Argo perspective

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The mean pathways and transports of Labrador Sea Water (LSW) within the southward lower limb of the Atlantic Meridional Overturning Circulation are studied using 12 years (2004-2016) of Argo profiles and subsurface Argo drift data. Consistent with previous studies, our absolute geostrophic velocity estimates show clear evidence for interior pathways of LSW that separate from the western boundary near the Grand Banks and flow eastward and then southward around a large-scale deep anticyclonic gyre in the northern subtropical Atlantic. While most of the LSW exported into the interior recirculates in the Newfoundland Basin (7.3 ± 2.0 Sv), approximately 2.6 ± 0.2 Sv crosses the Mid-Atlantic Ridge (MAR) and flows southward east of the Azores. The latter branch feeds a westward quasi-zonal pathway that recrosses the MAR and returns to the western boundary around 30°N . In addition to the LSW interior pathways, the analysis reveals in new detail a number of other prominent features of the mid-depth North Atlantic circulation, including the Mann Eddy, the Gulf Stream's northern and southern recirculation gyres, and several cyclonic recirculation cells adjacent to the western boundary south of 30°N . Finally, Argo derived isopycnal potential vorticity distribution at $\sigma_2 = 36.88 \text{ kg m}^{-3}$ indicate significant water transformation along the LSW interior pathways in the vicinities of the MAR.