



On the Linkage between Labrador Sea Water Volume and Overturning Circulation in the Labrador Sea

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The linkage between the volume of newly formed Labrador Sea Water (LSW) and overturning in the Labrador Sea is investigated using output from an eddy-resolving ocean general circulation model (OGCM) in order to understand the mechanisms driving overturning variability. Overturning transport is estimated in density space across the western leg (from Labrador to Greenland) of the OSNAP (Overturning in the Subpolar North Atlantic Program) array. We estimate the LSW volume northwest of the OSNAP section in order to understand the impact of local LSW formation on transport across the section. As expected, on interannual timescales, a larger LSW volume in the Labrador Sea, due to intensified atmospheric cooling, correlates with stronger overturning ($r=0.61$) and an enhanced export of LSW ($r=-0.70$). Our results also reveal the inadequacy of using indirect measurements for approximating both the strength of convection and of overturning in the Labrador Sea. We demonstrate the desirability of robust estimates derived from direct monitoring, i.e. from the Argo and OSNAP measurements in the region.