



Basin-Wide Decadal Changes of Labrador Sea Water Observed at 47°/48°N in the North Atlantic

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The repeat hydrography line at 47°/48°N covers the southern subpolar North Atlantic from the Grand Banks in the west to the European shelf break in the east. It crosses the swift western and eastern boundary currents as well as the North Atlantic Current and its recirculating branches. Hydrographic observations from this line merged with data from the historic repeat lines located in the vicinity of 47°/48°N (e.g. WOCE and GOOS lines) allows to gain insight into decadal changes regarding the spreading, characteristics, and spatio-temporal property changes of the water masses forming the deep and cold branch of the Atlantic Meridional Overturning Circulation. With focus on Labrador Sea Water (LSW) we report on hydrographic data collected from ship surveys and Argo profilers complemented with tracer observations and discuss basin-wide changes observed at 47°/48°N over the past almost 2.5 decades (period 1993-2018). Recent observations in the source region of LSW showed that winter time buoyancy forcing over the Labrador Sea increased since winter 2013/14, when the North Atlantic Oscillation went back into a positive state. Resulting from intensified deep convection the coldest and freshest LSW observed since years formed since then. These signatures of cold fresh LSW can be observed at the 47°/48°N-line starting in 2015 and via interior pathways invade the interior of the deep basin, thus increasingly ventilating these regions again.