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Spreading of Labrador Sea Water in the vicinity of the Mid-Atlantic Ridge in the central subpolar North Atlantic

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Due to its contribution to the deep cold return flow of the meridional overturning circulation Labrador Sea Water (LSW) is probably one of the best studied water masses in the world ocean. Knowledge concerning changes in the formation of LSW in the Labrador Sea has been gained from hydrographic and tracer data now spanning several decades. Time series revealing temporal changes of LSW properties in other regions key regions like the Irminger Sea and the Newfoundland Basin reveal the arrival of the different dense and light types of LSW one to two years after formation. These regions adjacent to the formation region of LSW are easily invaded by LSW since the flow is not particularly hindered by topographic obstacles or barriers. However, for entering the eastern basins of the North Atlantic, LSW has to cross the Mid-Atlantic Ridge (MAR) which is facilitated by the existence of several fracture zones.
Based on historical, WOCE, and recent hydrographic data derived from ship surveys and Argo profiles, here, we report on the spreading of LSW in the vicinity of the MAR in the central subpolar North Atlantic. We investigate LSW water mass properties in this region and discuss observed changes in the light of the changing formation history of LSW as well as spatial shifts in the location of the Subpolar Front.