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Labrador Sea Water in the Bay of Biscay: analysis of historical data (1990-2005) and comparisons with recent observations

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LSW distribution in the eastern North Atlantic was observed from a climatological analysis of more than 30,000 hydrographic stations retrieved from the NOAA NODC, ICES, Coriolis and SISMER data centres for the domain bounded by 35°W 38°N - 0°W 55°N, including the Bay of Biscay. The analysis was conducted for the period 1990-2005. Data was quality-controlled and analysed to produce maps of mean temperature and salinity. The present work illustrates the thermohaline changes occurring at the LSW level in the Western European Basin in relation with those occurring at the central Labrador Sea. The most outstanding result was the observation of well-defined warming and salinity increase between 1990-1999 and 2000-2005. These overall increases appeared related to variations in the LSW properties in the central Labrador Sea. The differences in the salinity fields at 1800 m in both periods revealed the spatial impact of the overall reduction of LSW production in the Labrador Sea. It resulted in the weaker penetration of low-salinity anomalies in the Bay of Biscay and off the Iberian Peninsula. Additionally, data from the Spanish Deep Standard Sections Program (SDSS) available since April 2003 including currentmeter arrays with instruments at the LSW level are used to establish comparisons of conditions before and after the arrival of the warm LSW vintages in the eastern North Atlantic and the Bay of Biscay.