



Recent changes in temperature and salinity of the subpolar North Atlantic intermediate and deep waters

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Changes in temperature and salinity of the subpolar North Atlantic water masses are reported on the basis of the CTD data from four repeats of the zonal transatlantic section along 60°N carried out on board the Russian research vessels in 1997, 2002, 2004 and 2006. Changes of the average temperatures and salinities in the water mass layers as well as the changes in the water mass cores are quantified; the layers are defined using the uniform (for each water mass) potential density and salinity limits. The vertical distributions and zonally averaged profiles of temperature and salinity differences between the section repeats are presented to illustrate the full-depth section-wide hydrographic changes.

Substantial warming and salinification of the Labrador Sea Water (LSW), mostly in the Irminger Basin, and Iceland-Scotland Overflow Water (ISOW) occurred throughout the analyzed time period. In the Irminger Basin, temperature and salinity in the layer of the classical deep LSW (dLSW) steadily increased by 0.2–0.35°C and 0.04–0.05. In the Iceland Basin, dLSW became 0.01–0.02 saltier; variations of the dLSW temperature did not exceed 0.1°C. In 1997–2004, the shallow LSW (sLSW) was observed only in the Irminger Basin, while in 2006, this water was detected in the Iceland Basin as well. By 2006 in the Irminger basin, sLSW became ~0.2°C warmer and 0.015–0.02 saltier. Temperature and salinity in the ISOW layer steadily increased by 0.1–0.2°C and 0.015–0.02 both sides of the Reykjanes Ridge. The DSOW temperature and salinity decreased by 0.3–0.4°C and 0.02–0.03 between the 1997 and 2004 observations and sharply increased by ~0.5°C and 0.04–0.05 from 2004 to 2006. Overall, 2006 was the year of the warmest and most saline LSW (both sLSW and dLSW), ISOW and DSOW.