



Temperature and Salinity variability in the north-west Atlantic Ocean over a quarter century

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The evolution of temperature and salinity fields during the last two and half decades in the upper 2 km layer in the 10x10 degree area east off Newfoundland were analysed in this study. This region has a strong influence on the climate system of the whole Northern Atlantic and the Western Europe. The comparison of the historical hydrographic data set for Period 1 (1980-1998, ~12000 stations) and available ARGO profiling float data for Period 2 (1998-2004, ~3600 profiles) were analysed. The average position of the sub polar frontal zone transects the region from the southwest to northeast corner (40-50 deg N; 40-50 deg E), and this zone shows very strong variability. For the selected temporal data rows we use the same optimal interpolation technique [details see in Gandin, 1964; Bretherton et al, 1976]. Temporal and spatial gaps in data coverage were filled by combination with a regional climatology. The climatology used (WOCE Global Hydrographic monthly climatology Gouretski and Koltermann, 2004; and WOA-2001, Levitus, 2001) demonstrates substantial differences in T and S distribution. The local variations of T, S characteristics were strongly dependent on the interpolation schemes used: isopycnal in WOCE and isobaric in WOA. Long-term variability of the heat content anomaly (AHC) in the Newfoundland region was identified. The AHC, based on historical data, obtained during 20 years interval (1980-1999) is comparable in amplitude with the AHC for the last 6 years (1999-2004) based on ARGO buoy data. In the early 1980s the AHC increased substantially. From 1984 to 2000 AHC did not show any strong trends though some inter-annual variability occurred. After 2001 the AHC substantially increased turning to positive values in 2003. A weak link between the North Atlantic Oscillations index

(NAO) and the AHC in the Newfoundland domain was found. The coefficient of correlation r was in vicinity of 0.3 for both periods. However the negative values of the AHC in 2001 is synchronised with the NAO.