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Temperature and Salinity variability of the Northern Atlantic Ocean in the last six years according to the ARGO data

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The evolution of temperature and salinity fields during the last six years of observations in the upper 2 km layer in the Northern Atlantic were analysed in this study. The optimal interpolation technique is based on Gandin (1964) and Bretherton et.al. al. (1976). Temporal and spatial gaps in data coverage were filled by combination with a climatology. The climatologies used (WOCE Global Hydrographic monthly climatology Gouretski and Koltermann, 2004; and WOA-2001, Levitus, 2001) demonstrate 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. Especially large differences take place near frontal zones. We used ARGO profiles data for the last 6 years (1999-2004) to calculate anomaly of heat content (AHC). We found a statistically significant link between variability of the heat content in the upper 2000 m of the North Atlantic and the North Atlantic Oscillation index (NAO). The correlation between AHC and NAO are r=0.52, r=0.65, r=0.49 and r=0.55 if the lag is 0,1,6 and 8 years, respectively (NAO leads). The small lag relates to the barotropic adjustment (propagation of the fast barotropic Rossby waves) or the quick response of the Ekman transport to the changes in the wind field. The long time lag may be linked with the Kelvin waves propagation along the continental slope and shelf, and reflection of the baroclinic Rossby waves from the eastern boundary of the North Atlantic.