Geophysical Research Abstracts, Vol. 9, 06498, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06498

North Atlantic Central Water at both sides of the North Atlantic subtropical gyre: comparative view from time series studies.

A. Cianca, M. J. Rueda and O. Llinás.

Instituto Canario de Ciencias Marinas, Spain.

(andres@iccm.rcanaria.es / +34928132900)

Discussions about the origin of the salinity difference, noted in the literature by several authors, found for the water mass present in the permanent thermocline at both sides of the North Atlantic subtropical gyre, have gone along for some time. However, a quantification of this difference was only made as an approach. In this study, we present a comparison of TS characteristics of the NACW sampled to the east and west of the subtropical gyre by use of a concomitant 10-year (1994- 2003) CTD time series. These data come from BATS (Bermuda Atlantic Time series Study) located southeast of Bermuda Islands, and ESTOC (European Station for Time series in the Ocean Canary islands) sited to the north of the Canary Islands archipelago.

After checking up to five different polynomial degrees, we determined to use the three degree polynomial solutions for the TS curves at BATS and ESTOC, and estimated the differences between both stations. The results show the lowest difference (near 0.05 salinity units) in the temperature range from 14 to 16ºC, whereas this difference increases reaching 0.1 and 0.2 above and below this range repectively. Higher variability is detected at ESTOC since the salinity varies from 0.2 to 0.08 between the isotherms of 18 and 10ºC, while at BATS salinity variation swings from 0.1 to 0.05. The greatest variability is at the extremes of the temperature range, and so are the differences between them. Seasonal variability, waters advected from an upwelling area or annual differences in the mode water core, may be the mechanisms to explain the higher differences at ESTOC in the upper range; mixing with intermediate waters (MW and AAIW at ESTOC and SPIW at BATS) would explain the values rise in deeper waters.

To state the significance of both stations as reference for TS characteristics of the NACW at the eastern and western sides of the North Atlantic subtropical gyre, we used CTD data from several squares extracted from the World Ocean Database 2005. These geographical squares were distributed from east to west between 20º and 40º N. Comparison between the TS diagrams from both stations show that the curves estimated for each station may represent the boundary conditions for the NACW at the eastern and western sides of the subtropical North Atlantic.