Geophysical Research Abstracts, Vol. 8, 00339, 2006
SRef-ID: 1607-7962/gra/EGU06-A-00339

Water mass formation and modification in the South-Western Atlantic diagnosed by a box inverse model

L. Jullion(1), K.J. Heywood(1), A. Naveira-Garabato(2) and D.P. Stevens(3)

(1) School of Environmental Sciences, University of East Anglia, Norwich, UK, (2) National Oceanographic Centre, Southampton, (3) School of Mathematics, University of East Anglia, Norwich, UK (l.jullion@uea.ac.uk/ tel: +44 1603 591100)

The Brazil-Malvinas Confluence (BMC) in the South-Western Atlantic is one of the most energetic regions of the world ocean and a key region for the renewal and formation of Antarctic Intermediate Water (AAIW) and Sub-Antarctic Mode Water (SAMW). In the BMC, newly-ventilated, fresh and cold AAIW and SAMW flow with the Malvinas current and meet old, warm and salty AAIW and SAMW that have recirculated in the subtropical gyre. The flow of intermediate and thermocline water is one of the main components of the meridional overturning circulation as it compensates for the southward flow of North Atlantic Deep Water in the South Atlantic. Therefore, accurate estimates of the formation and modification rates of AAIW and SAMW are crucial to understand and quantify the role of these Antarctic water masses in the upper return branch of the meridional overturning circulation. Data collected in the region have shown a clear modification in the θ-S properties of AAIW in the BMC. However, the processes driving the formation and ventilation of these water masses in the BMC remain undetermined and most of the studies done so far focus on large scale estimates. We perform an inversion of 4 hydrographic sections surrounding the BMC in order to quantify the net formation and modification of water masses within the box and determine the driving mechanisms. Our study provides new insights on the mixing rates and processes in the Brazil-Malvinas Confluence. We will evaluate the relative contributions of isopycnal mixing with Antarctic Surface Water, diapycnal mixing in the ocean interior and air-sea interactions to the formation of SAMW and AAIW. We will also discuss the role of the BMC in the injection of North Atlantic Deep Water into the Antarctic Circumpolar Current.