

CIRCULATION AND TRANSPORT IN THE EASTERN BOUNDARY CURRENT OF THE NORTH ATLANTIC SUBTROPICAL GYRE

Oral

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Bimonthly sections between Gran Canaria and Fuerteventura (GC-F), and between Fuerteventura and the African shelf (F-A) have been carried out from November 1996 to September 1998 to study the time variability of circulation and transport in the Eastern Boundary Current. In January 1997 an additional section between Lanzarote and the African shelf was made to compare the derived geostrophic circulation and transport with the Eulerian measurements from 5 moorings anchored in this region

Each section consisted of approximately 9 T7-XBTs (eXpandable BathiThermograph) which measure the temperature of the water column to a depth of 760 m. During the September-98 section CTD (Conductivity, Temperature, Depth) stations were taken instead of XBTs. The CTD casts were made to a depth of within 50 m above the bottom, giving the opportunity to study the water masses. These consist of North Atlantic Central Water (NACW) which extends from the surface to a neutral density value of about 27.3 (corresponding to about 600 m depth). The lower thermocline begins at this neutral density level and is characterized by two intermediate waters, the Antarctic Intermediate Water (AAIW) with its fresh anomaly (salinity value < 35.3), and the warm, high salinity Mediterranean Water (MW) (salinity value > 35.5). Although the salinity minimum and maximum appear scattered in depth, they are located at approximately 900 m and 1100 m, giving the depth of the core for these water masses.

To estimate the geostrophic current and transport, we have used T/S diagrams obtained from historical data, and divided our region into 2 degree squares of longitude and latitude cells. Since XBTs only measure the temperature of the water column to 760 m, our results will focus on the NACW. To integrate the thermal wind equation we have chosen a neutral density reference level of 27.3 in order to avoid the AAIW. Our results show that the circulation and transport present a strong spatial, temporal and interannual variability. The circulation in each section does not consist of a single current and is not easy to define. It consists of counter and undercurrents together with the main current. The annual mean transport in each section is low, about 1 Sv (1 Sv = 10⁶ m³/s). The transport is southward, with a reverse in May for section G-F and in November for section F-A. This northward transport is present for the two years. The circulation and transport of the section between Lanzarote and the African shelf shows a pattern similar to that of the section F-A.