



Circulation patterns in the deep Subtropical Northeast Atlantic with ARGO data

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In this work we study the dominant circulation patterns in the Subtropical Northeast Atlantic using ARGO data [25-45° N, 5-35° W]. The data were obtained from the Coriolis operational data center (<ftp://ftp.ifremer.fr>) for the years 1999-2013. During this period of time in the study there were available area 376 floats with 15062 float-months of total time. The floats were launched in the depths range between 300 and 2000 m, but most of the floats were concentrated at 1000 m (2000 float-months) and 1500 m (3400 float-months). In the upper 400-m layer there were also about 1000 float-months, but their number and distribution did not allow analysis of the mean currents over the study region. For each float position Lagrangian current velocity was computed as the difference between the position when the buoy started sinking to the reference depth and the consequent position of surfacing of the float, divided by the respective time interval. This allowed reducing the noise related with sea-surface drift of the buoys during the data-transmission periods. Mean Eulerian velocity and its error were computed in each of the 2°x2° square. Whenever in a 2°x2° square more than 150 observations of the Lagrangian velocity were available, the square was split into 4 smaller 1°x1° squares, in each of which the mean Eulerian velocities and their errors were estimated.

Eulerian currents at 1000 m, as well as at 1500 m depth formed an overall anticyclonic circulation pattern in the study region. The modal velocity of all buoys at 1000 m level was 4 cm/s with an error of the mean of 1.8 cm/s. The modal velocity of all buoys at 1500m was 3 cm/s with an error of the mean of 1.4 cm/s. The southwestward flows near the Madeira Island and further westwards flow along the zonal band of 25-30° N at 1500 m depth well corresponded to the extension of the deep fraction of the Mediterranean Water salt tongue.