



Does the Western Alboran Gyre help ventilate the West Mediterranean Deep Water through Gibraltar?

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In a recent paper (García-Lafuente al.,2009, JGR-Oceans, doi: 10.1029/2009JC005496) the authors postulated that the Western Alboran Gyre (WAG) helps Western Mediterranean Deep Water (WMDW), wich has preference to be banked against the Moroccan slope, to be aspired and to participate more actively in the outflow. The greater and stronger the gyre, the more effective the aspiration. When this enhancement happens, a cold signature typical of WMDW should be detected at Espartel sill (ES), the westernmost gateway of Gibraltar for the outflow. This hypothesis is now investigated using 16-year of altimetry data from AVISO website, along with in situ data coming from a monitoring station that is working in ES since 1994 in the frame of the Spanish-funded INGRES project, and the outputs of a simple numerical model. To show the WAG variability, the spatial average of the zonal component of the geostrophic velocity at the southern half of the WAG has been computed from AVISO data. Large values of this variable correspond to a well-developed gyre which, potentially, can uplift more easily deep water and make it available for suction through the Strait. This variable has been successfully correlated with temperature observations at around 10m above the seafloor in ES to validate and further confirm the relationship between WAG varianbility and the type of water participating in the outflow. The output of the numerical model reproduces the spatial distribution of intermediate and deep waters in the Alboran Sea and nearby the Strait (for instance, the banking of the WMDW against the African slope) and confirms that WMDW in the Alboran Sea residing at depths of around 600-700m can be uplifted over the sill of Camarinal (around 290 m depth) and escape towards the Atlantic Ocean.