Geophysical Research Abstracts,
Vol. 10, EGU2008-A-02239, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-02239
EGU General Assembly 2008

Direct velocity measurements of the Mediterranean Water outflow plume in the Gulf of Cadiz

N. Serra (1,2) and I. Ambar (1)

(1) Instituto de Oceanografia, University of Lisbon, Portugal, (2) Institut für Meereskunde, University of Hamburg, Germany (nserra@fc.ul.pt / Fax: +351 21 750 00 09)

Direct measurements of the velocity and thermohaline fields in the Gulf of Cadiz were conducted during November 2006 in the frame of the Portuguese funded MUD ("Mediterranean Undercurrent Dynamics in the Gulf of Cadiz") project in a region where the Mediterranean Water (MW) flows down-slope as a gravity current. The objective of the project is, on one hand, to understand how mixing by entrainment of Atlantic Water and frictional effects, acting at the plume interface and at the bottom boundary layer, control the rate of descent of the MW plume over the slope and, on the other hand, to assess how the bottom topography contributes to the descent of the plume and its splitting into distinct veins.

The measurements are here jointly analysed with high-resolution three-dimensional numerical model simulations of the MW spreading in the Northeast Atlantic including wind stress and tidal forcing. It is shown that the high bottom stress region coincides roughly with the high entrainment region, which, in turn, is located where the MW plume has a more pronounced descent, i.e., within the first 100 km off the Strait of Gibraltar. The descent and mixing, which are processes related and intrinsically imposed by the bottom topography, are seen to be crucial to the downstream evolution of the dense plume (for instance its penetrating level). Models that do not adequately resolve the prominent features of the bathymetry and do not respect the real slopes will not represent correctly the MW intrusion into the Northeast Atlantic.