



Hydrology and circulation in the Algerian gyres

Katia Mallil (1,2), Laurent Mortier (1), Ferial Louanchi (2), Pierre Testor (1), Anthony Bosse (1,3), Hervé Le Goff (1), Kathrin Schroeder (4), and Félix Margirier (1)

(1) Université Pierre et Marie Curie-CNRS, LOCEAN-IPSL, Paris, France., (2) Ecole Nationale Supérieure des Sciences de la Mer et de l'Aménagement du Littoral, Alger, Algérie., (3) University of Bergen, Geophysical Institute, Allegaten 70, 5007 Bergen, Norway., (4) CNR – ISMAR, Institute for Marine Science, Venezia, Italy.

Introduction:

The exploitation of data collected during the SOMBA-GE2014 cruise on the R/V Tethys II [1], combined with data from other sources, has allowed to firmly evidence two large scale cyclonic gyres in the East and West of the Algerian basin (already suggested in [2]) and to highlight the hydrological characteristics of these gyres. In particular, the differential warming of the deep waters of the gyres can be shown.

Main results:

East-West salinity and temperature sections across the Algerian basin for 2008, 2010 and 2014, reveal a clear hydrological separation of the water properties in the basin at around 4° W, especially in the intermediate layer: Waters in this layer are warmer and saltier in the eastern part.

This difference in the hydrological properties results in a more pronounced double diffusion phenomenon shown by well defined staircases in the eastern part of the basin (or eastern gyre).

A heating of about 0.04 °C/year of the deep waters is observed considering the period of (1980 to 2015) – respectively 0.048°C/year in the eastern gyre and 0.032°C/year in the western one. Indeed, the difference in the double diffusion phenomenon in the two gyres (which is an effective way of heat export to the deep ocean) could explain the difference in deep layer heating trends.

References:

- [1] Mortier Laurent, Ait-Ameur Nadira, and Taillandier Vincent (2014), SOMBA GE cruise, RV Téthys II, <http://dx.doi.org/10.17600/14007500>
- [2] Testor P., Send U., Gascard J.-C., Millot C., Taupier-Letage I., and Béranger K. (2005), The mean circulation of the southwestern Mediterranean Sea - the Algerian Gyres, *J. Geophys. Res.*, 110, C11017, doi:10.1029/2004JC002861
- [3] Borghini M., Bryden H., Schroeder K., Sparnocchia S., and Vetrano A. (2014), The Mediterranean is becoming saltier. *Ocean Sci.*, 10, 693–700, doi: 10.1029/2004jc002861