DEFINITIVE EVIDENCE OF MESOSCALE-INDUCED LEVANTINE INTERMEDIATE WATER (LIW) ENTRAINMENT IN THE ALGERIAN BASIN

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Abstract:

CTD and XBT casts in the eastern Algerian Basin are used to study the distribution and the entrainment of LIW (Levantine Intermediate Water) filaments from the Sardinian northward-flowing vein by the algerian eddies. We definitely conclude that there is no LIW vein flowing westward along the Algerian slope.

Key words: Algerian Basin, circulation, hydrology, mesoscale phenomena, vertical profiles

Even in the Western Mediterranean some aspects of the general circulation of the water masses are still debated [1]. Millot showed that the algerian eddies (AEs) can entrain filaments from the Sardinian northward-flowing LIW vein, which explains the presence of little-modified LIW in the interior of the basin, and thus refuted the existence of a LIW vein flowing westward along the Algerian slope [2, 3].

The ELISA experiment (Eddies and Leddies Interdisciplinary Study off Algeria, www.com.univ-mrs.fr/ELISA) was dedicated to study, in the eastern part of the Algerian Basin, the mesoscale (anticyclonic) AEs generated by the instability of the Algerian Current [4] and their consequences. AEs diameters range from 50 to 250km, vertical extents from few 100s of meters down to the bottom (~3000m), lifetimes from few weeks to nearly 3 years, and their general trajectory is a counter-clockwise circuit in the eastern part of the Algerian Basin [5, 6]. A total of 307 CTD and 346 XBT casts were realized during 4 ELISA cruises in 1997-1998. These data sets are used to study the LIW spatial distribution, and its relationships with AEs. The salinity distribution (figure 1) shows i) continuity between the (Sardinian) LIW vein and the filaments spiraling inside AEs when close to the Sardinian slope, ii) that all little-modified LIW lenses in the basin interior can be related to AEs entrainments, iii) that little-modified LIW is not located along the Algerian slope. The complementary XBT data allow to refine the LIW distribution. We definitely conclude that there is no LIW vein flowing westward in the Algerian Basin.

References

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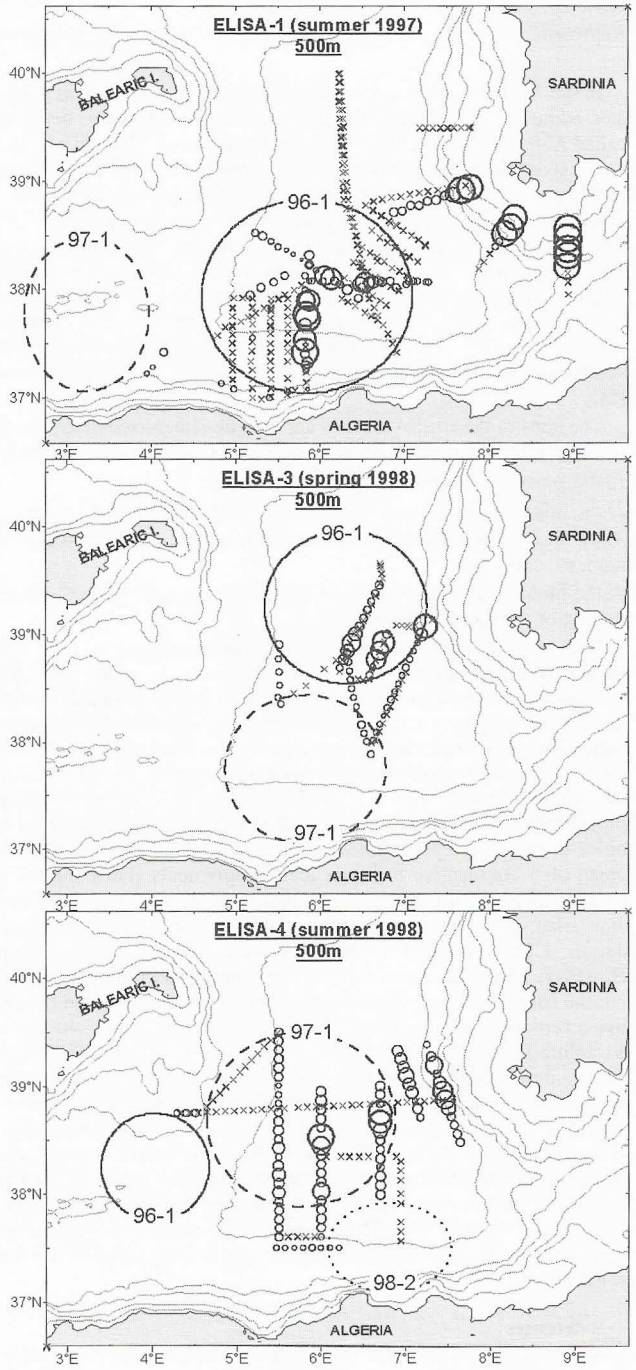

Distribution of salinity (O) at 500m using the CTD casts. Dots diameter increases linearly from 38.49 to 38.70. Positions of the complementary XBT (+) casts. Schematic positions of the AEs (named 96-1, 97-1, 98-2) at time of sampling.