Thermohaline Lens in the Eastern Mediterranean Sea

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The Meddies-Mediterranean salt lenses consider to be the most well investigated T,S inversion caused by the intrusion of the LIW to the North Atlantic Ocean (ARMI and ZENK, 1984).

In contradiction to the above, the present task attemps to spequlate on the existence of a cool and less saline inversion of the T,S water characteristics in the Eastern Mediterranean Sea similar to that mentioned by FEDOROV *et al.* (1986).

During the POEM-5 cruise, late summer 1987 in the SE Ionian Sea - south of Greece mainland, a well developed lens of cool and less saline water was found at the intermediate depths.

The analysis of the CTD data and vertical section (Fig.1) shows that the lens bounded by the isotherm of 14.30 (deg.C) and isohaline of 38.84 between the depth of 250-500 m. The horizontal diameter of this lens was approximately 40 Km, while it center lie at the depth of 390 m. The thermohaline differences within the lens, in comparison with the surrounding waters, were about 0.4 (deg.C) for temperature and 0.24 for salinity.

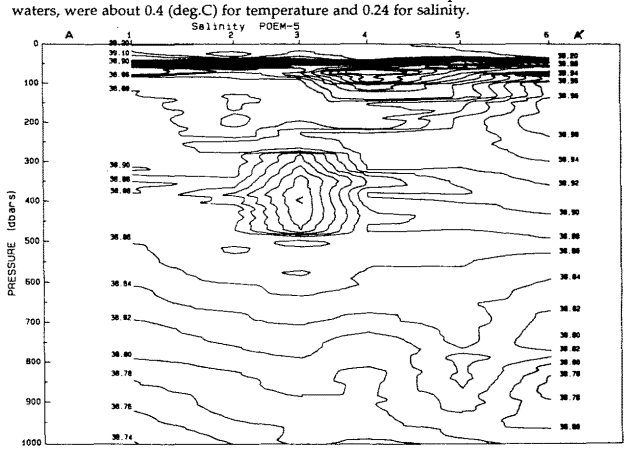

Fig. 1.- Vertical distribution of salinity, SE Ionian Sea, POEM-5.

The intense cooling of the surface water, during the previous winter 1987, in conjuction with the circulation caused the generation of well developed thermohaline dome; whereas water from deeper layers rised to the uppers. Later the variability of the circulation allowed the intrusion of the LIW into the area of study. Finally, the latter activity caused the isolation of a patch of less saline and cool water forming by this way the observed lens.

Such type of water creature, where the T, S characteristics within the lens differs from the surrounding, create conditions for the study of the fine thermohaline structure of the water.

The high gradient layers alternation at the lens boundaries promote the develop of the convective instability.

The main mechanism responsible for the formation of the observed (Fig. 2) stepwise and high gradient layers was the double diffusive activities. As indicators of the double diffusional instability processes possibility and intensity are the density ratio-Rp and Turner angle-Tu. The vertical profile of Tu (Fig. 2) indicates that on the lens upper boundary salt fingers convective instability occurs, while at it under boundary diffusive convection instability. Both were responsible for the vertical salt and heat transfer across interfaces. Its worthy to mention that these fluxes are twice as less to those of T,S stepwise structure observed in the Cretan Sea (ZODIATIS, 1991).

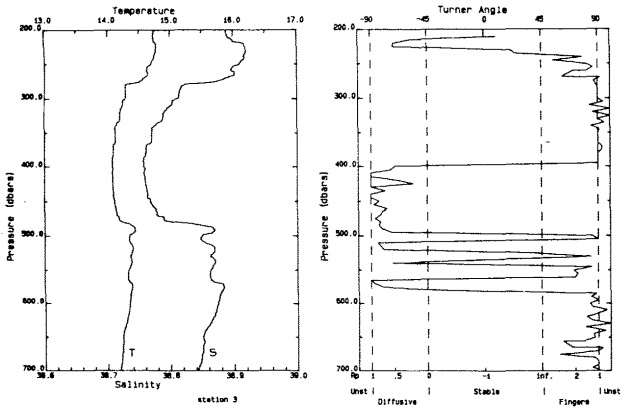

Fig. 2.- Profiles of T,S and Tu; Rp with the double diffusive regimes at st.3, SE Ionian Sea, POEM-5.

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