

THERMOHALINE LENS IN THE WESTERN MEDITERRANEAN SEA

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Mesoscale and fine structure analysis of the water masses in the Ligurian sea revealed the presence of a cool less saline thermohaline lens. This lens with temperature .8 and salinity .4 differences, from the surrounding waters, extended vertically at about 100 m between 300 - 400 m depth and horizontally about 20 km. Similar cool less saline lenses were found at the sub-polar front in the North Atlantic (KARLIN *et al.*, 1988) and in the SE Ionian sea (ZODIATIS, 1992), in contrast to the salt Meddies and Reddies (ARMI & ZENK, 1984; FEDOROV & MESCHANOV, 1988).

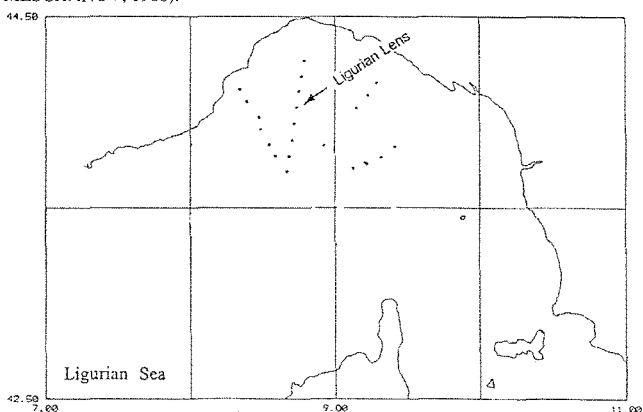


Figure 1. LIGUR 1991 (April)

Two possible mechanisms of such lens formation are proposed: a) frontal intrusive, due to isopycnic flow of denser surface water over a thermohaline frontal slope and b) convective one, due to the advection of residual winter intermediate layer. Various diagnostic fine structure and frontogenesis parameters, the density ratio, slope angles of T, S, density, isopycnic gradients were employed on the T(z), S(z).

The data processing indicates that the salt finger instabilities were favourable to be developed in the upper lens boundary, while diffusive convection instabilities were likely to appear in the lower lens interface. The contribution of the temperature on the density gradient found to be greater than of the salinity, as the density ratio does not exceed the $R_p = <.5$ value. In addition, at the lens boundaries the like frontal interface is distinguished by the increase of the thermocline. The latter indirectly give evidence on the intrusive origin of the lens. Such intrusion may contribute to a substantial heat-salt fluxes, vertical mixing through the pycnocline.

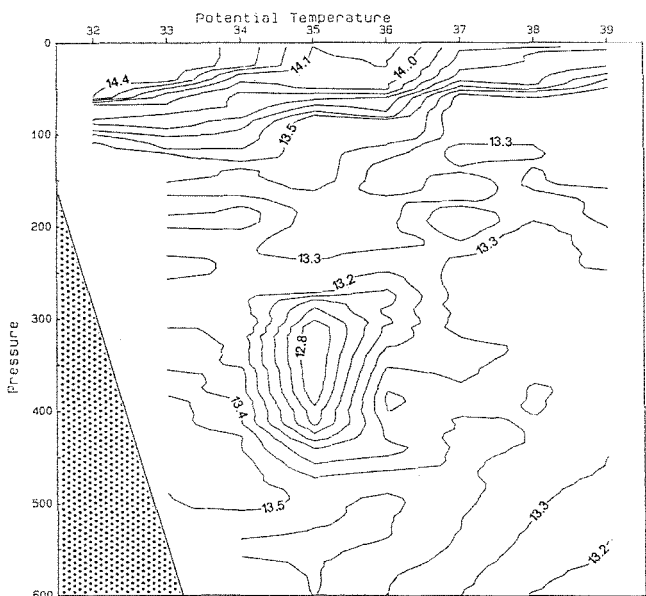


Figure 2. Ligurian lens - revealed by vertical temperature distribution

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