C-I9

Effect of a Coastal Current on the Pelagic System off Catalonia (NW Mediterranean)

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The Liguro-Provençalo-Catalan current that flows off the NW Mediterranean shelf between the Ligurian Sea and the Ibiza Channel (Font and Miralles, 1978; Font et al., 1988) was studied off Catalonia (Fig. 1) with a Doppler Acoustic Profiler installed on the hull of the B/O GARCIA DEL CID. In this area, the current is found on the slope, over depths of about 1000 m and shows a SW direction with a maximum intensity of about 35 cm s-1 at the surface, linearly decreasing with depth (Fig. 2), and a width of about 15 km.

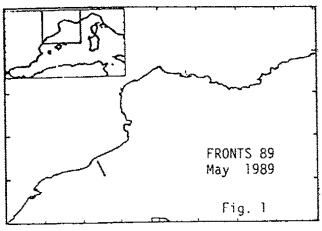

Fig. 1

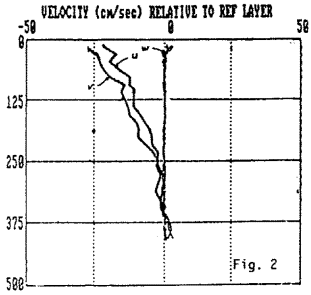

Fig. 2

The density distribution shows values over the shelf lower than those offshore. The former correspond to low salinity coastal water generated in the Gulf of Lions (Castellon et al., 1985) while the latter constitute the high salinity "Mediterranean Water Mass" (Salat and Cruzado. 1981) typical of the central parts of the Liguro-Catalan basin.

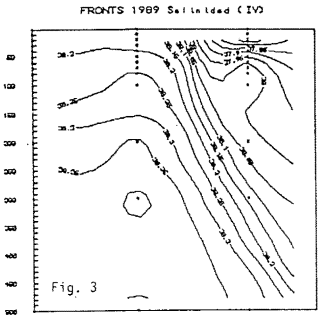

Fig. 3

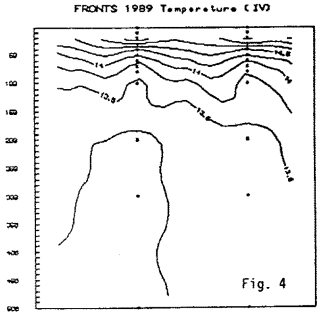

Fig. 4

The structure of the hydrodynamic front formed between the two water masses is best shown by the salinity distribution in various sections along the coast (Fig. 3). The lifting of the isohalines appearing in the central part of the sections is due to the vertical component of the water motion inducing an upward movement at the outer boundary of the current and a downwards movement at the inner boundary. The temperature distribution (Fig. 4) also shows a rising of the 13.5 °C isotherm in the middle of the sections and a sinking in the nearshore side. Some slight rising of the nutrient isopleths is also evident (Fig. 5) while the chlorophyll distribution shows maxima 40 to 50 m deep with greater values at the stations in which lifting occurs (Fig. 6).

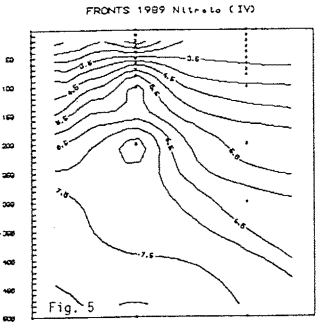

Fig. 5

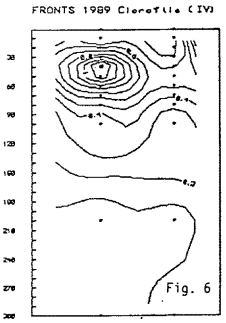

Fig. 6

These observations point out the existence of a hydrodynamic front in equilibrium with the longshore current that separates the less saline coastal water from that more saline offshore. Through the vertical component of the current, the flow of nutrients to the euphotic zone is enhanced at the offshore boundary allowing the phytoplankton community to develop at this boundary a larger biomass than that produced over the shelf.

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Font, J., Ll. Miralles (1978). Circulacion geostrofica en el Mar Catalan. Result. Exp. Cient. B/O Cornide de Saavedra, 7:155-162.

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