AN ANALYSIS OF CURRENT DATA COLLECTED ON THE EAST LIGURIAN CONTINENTAL SHELF.

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ABSTRACT

The characteristics of the currents flowing along the East Ligurian coast are described. The response of the current meters is integrated with an analysis of the temperature field of the area, drawn from CTD measures.

RESUME

Les caractéristiques de la courant qui coule au dessu de la plate-forme de la M. Ligurienne Orientale sont ici représentées. La reponse des courantométres est completée par une analyse de la distribution de la température, obtenue à l'aide des mesures d'une sonde CTD.

So far the characteristics of the coastal current in the East Ligurian Sea are mostly unknown since only a few works can be found in the open literature. An initial contribution was given by effecting long term current measurements in front of Sestri Levante on the 100 m. isobath: from September '78 to July '79 three Aanderaa current meters operated at 15, 50 and 90 m. About 6000 hours of current and temperature data were recorded.

A second array with a single instrument at 50 m. was deployed in front of Portovenere (mooring P, 20 Kms. apart) from April 13 to May 5, 1979. In this period an oceanographic cruise was performed in the area using a Neil Brown CTD. From mooring S, a general movement of the current parallel to the coast resulted (Fig. 1). The surface speed exceeded 25cm/s for most times, and the maximum speed was about 100 cm/s. At the bottom the mean velocity decreased to about 10 cm/s, if also values of 40 cm/s could be found. The computed hodograph ellipses confirmed a direct dependance of the current on the local bottom topography. The spectra were not homogeneous during the various seasons, featuring different patterns in the circulation. Peaks at about 3, 5 and 10 days were found: while for the first two periods a

dependance from analogue wind oscillation could be found, the origin of the 10 days fluctuation is not yet fully explained and the exam of the whole gathered data is needed.

The values of the vertical shear did not result uniform in the various seasons, indicating that local forcings are currently affecting the surface water motion. The correlation matrix among the current meters showed that the currents at the various depth resulted highly correlated. At last, the EOF analysis indicates the alongshore current fluctuations were depth indipendent, configuring a barotropic response of the water mass.

The comparison of the two moorings response showed that no coherence was found at lower frequencies between the alongshore currents; furthermore the correlation between the currents was very low and the respective mean velocities different, with the major values registered at the S mooring. A more energetic current was present at this location deriving likely from the circulation of the Ligurian Sea funnelled from the 500 m. isobath from Corsica. In front of the Cinque Terre it interacted with a second warmer current coming along the Tosco-Ligurian shelf, creating a pattern of very difficult integration. This can be evidenced from the results of the CTD survey of the area