

HIGH AND LOW FREQUENCY COMPONENTS OF CURRENT IN WESTERN MEDITERRANEAN SEA FROM ACOUSTIC DOPPLER CURRENT PROFILER (ADCP) AND HYDROGRAPHIC DATA

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In the Western Mediterranean, where mean currents are usually weak, important high frequency velocity fluctuations, corresponding mainly to inertial oscillations, have been recorded with eulerian currentmeters in surface and intermediate waters. This poses a major problem in mesoscale dynamics studies from ship underway current measurements, since spatial and temporal variability are mixed.

A filtering method (CANDELA *et al.*, 1992) has been applied to separate high and low frequency observations of currents recorded with a vessel mounted Acoustic Doppler Current Profiler (ADCP) in several cruises in the Catalan and Alboran seas during Spring-Autumn 1992. Such filtering regards the current data as function of time and location, integrating also hydrographic data to consider the vertical and horizontal effect of thermohaline fronts in the coherence of near-inertial motion. The low frequency currents obtained with this method are compared with geostrophic velocities from CTD, discussing the ranges of error affecting data from different sources.

In the Alboran Sea, where the dynamics is greatly determined by the exchange of Atlantic and Mediterranean water through the Strait of Gibraltar, the currents of low frequency show the western Alboran gyre, also detected with geostrophic studies and satellite images (SHIRASAGO *et al.*, 1994). Tidal currents play a significant role in the area (CANDELA and LOZANO, 1994). They have been separated by the filtering method, accordingly to main tidal frequencies. A discussion on mesoscale structures observed from the separated frequency components is made.

This study is part of EUROMODEL MAST II/MTP project (MAS2-CT93-0066). E.G. Gorriz acknowledges a research grant from the Comissio Interdepartamental de Ciència i Tecnologia, Generalitat de Catalunya.

REFERENCES

- CANDELA J., LOZANO J., 1994. Barotropic response of the Western Mediterranean to observed atmospheric pressure forcing. *In*: The seasonal and interannual variability of the Western Mediterranean Sea. Ed. P.E. La Violette, American Geophysical Union, *Coastal and Estuarine Studies*, 46: 325-360.
- CANDELA J., BEARDSLEY R.C., LIMEBURNER R., 1992. Separation of tidal and subtidal currents in ship-mounted Acoustic Doppler Current Profiler observations. *J. Geophys. Res.*, 97: 769-788.
- SHIRASAGO B., GORRIZ E.G., FONT J., 1994. Comparison between ERS-1 SAR images and acoustic Doppler current profiler (ADCP) velocity data in the Alboran Sea. *In*: Proceedings of the European Symposium on Satellite Remote Sensing, Roma (in press).