

Coastal Processes

Analysis of ADCP data in the Bay of Setúbal

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Abstract

Current data from an acoustic Doppler current profiler (ADCP) deployed in the Bay of Setúbal at 100 meters depth are used with the aim of analysing the observed current oscillations. The deployment recorded vertical profiles of horizontal velocity with a broadband of 300 kHz and 24 bins of 4 meters size for the period 4-14 April 2004. In this work, spectral analysis and empirical orthogonal functions (EOF) decomposition are used to interpret the diurnal and semidiurnal oscillations and evaluating their relative importance. The EOF shows that the 90 % of the variance is explained by the combination of three modes: a diurnal near-inertial mode, a barotropic tidal mode and a baroclinic tidal mode. The results reveal that the strong near inertial oscillations, characterized by a 180°-phase difference between the upper and lower layers, and the added effect of the baroclinic tides, induce the strong vertical shears previously studied by Aguiar-González et al. (2011).

References

Aguiar-González, B., A. Rodríguez-Santana, J. Cisneros-Aguirre, A. Martínez-Marrero, (2011), Diurnal-inertial motions and diapycnal mixing on the Portuguese shelf, *Continental Shelf Research*, 31 (11), 1193–1201