



Cross-shore flow on the inner-shelf off southwest Portugal

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Velocity measurements from 4 bottom-mounted ADCP deployments (summers of 2006, 2007, 2008 and 2011) at a 12-m depth site off Sines, Portugal, complemented with time series of winds, waves and tides, are used to study the inner-shelf cross-shore flow dependence on wave, tidal and wind forcings.

During these four summers, the dominating winds are from the north (upwelling-favorable), with strong diurnal sea breeze cycle throughout these periods. This quasi-steady wind circulation is sometimes interrupted by short event-like reversals.

The observed records were split in different subsets according to tidal amplitude, wave height, cross- and along-shore wind magnitudes, and the vertical structure of the cross-shore flow was studied for each of these subsets. Despite different forcing conditions, the cross-shore velocity profiles usually show a vertical parabolic structure with maximum onshore flow at mid-depth, resembling the upwelling return flow for mid-shelf conditions, but atypical for the inner-shelf and in disagreement with other inner-shelf studies from other sites. We compare the observations with simplified 2D inner-shelf models and with results from other studies.