Influence of strong easterly events (Levante) on the coastal and estuarine circulation off the southern Portugal.

Influência dos ventos de Levante na circulação costeira e estuarina ao largo da margem continental sul de Portugal.

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The coastal ocean off the southern Portugal margin is recurrently invaded by warm waters with origin further east in the interior of the Gulf of Cadiz, that spread westward leaning along the coast. This phenomenon is clearly identified during the upwelling season in the sea surface temperature imagery due to the thermal contrast. In this study we investigate the relations between the strong easterly events, known regionally as "Levante", and the setup of this pattern and interleaved upwelling events. We extend the study to the influence of these events on the Guadiana estuary.

After the assessment of several wind data sources, daily average winds observed at Faro and Sagres were chosen to established a criterion to identify the "Levante" events. We made use of time series (May-Dec 2008 and Aug-Dec 2010) of current velocity and temperature from an ADCP deployed on the inner shelf, at 22 meters depth, offshore Armona (Ria Formosa) and also the surface temperature by the Instituto Hidrográfico buoy, located offshore Santa Maria Cape (at 93m depth). Water level time series were also analysed. The influence on the Guadiana estuary was studied using time-series from the SIMPATICO buoy.

Good correlations were found between the alongshore current reversal measured in the ADCP and the temperature variations observed in the water column. The occurrence of Levante favours the development of the warm coastal countercurrent, but some current reversals cannot be attributed to the identified Levante events. Upwelling events leave a stronger signature in the estuarine water properties than the "Levante" episodes.

Palavras chave: SW Iberia, estuário do Guadiana, ventos de "Levante", contra-corrente costeira, circulação costeira.

Keywords: *SW Iberia, Guadiana estuary, "Levante" winds, coastal countercurrent, near-shore circulation.*

Acknowledgments: This is a contribution of "Sustainable and environmentally friendly aquaculture for the Atlantic region of Europe" - SEAFARE (INTERREG IVB) and the "Evaluation of the Impact of Armona aquaculture production in the coastal ecosystem and local communities" – IAPAA (PROMAR). The authors wish also to thank André Cid for the several deployments of the ADCP equipment.

Benchmarks and sediment source(s) of the 1755 Lisbon tsunami deposit at Boca do Rio Estuary

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Standardizing the signature of tsunami deposits has been pointed as a major limitation on the identification of paleo-tsunami deposits. This limitation majorly arises from the strongly source-dependent nature of these deposits, which in turn determines their composition and structure, and from the effect of the local morphology of the corresponding depositional environment. Here, we provide new high-resolution mineralogical, geochemical and paleontological data of the 1755 tsunami layer of Boca do Rio estuary (Algarve, Portugal) with the aim of unraveling the signatures of estuarine tsunami deposit and link them to sediment source. Our results show that the tsunami deposit is featured by an enhancement in Sr and Ca linked to the input of biogenic and detrital carbonates from the beach foreshore and a strong depletion in most terrestrial- and marine-sensitive indicators. The latter is interpreted to result from the reworking of the estuarine clays and subsequent dilution within a huge volume of sand eroded from the coastal barrier. It confirms that in the case of estuarine beach embayment, the sediment source is essentially proximal and coastal. Distinct textural and mineralogical features between the base and the top of the tsunami layer suggest the imprint of run-up and backwash currents derived from a unique wave. These findings provide a solid database for identifying tsunami deposits and can serve as a model for others tsunami investigations in estuarine beach embayments.

Keywords: *tsunami deposit, estuary, geochemical proxies, mineralogy, hydrodynamics.*

ACTAS
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16 - 20 de Dezembro de 2012

Faculdade de Ciências

Universidade de Lisboa