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Sediment transport dynamics at the Ria de Vigo inferred from two mooring stations

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The aim of this study is to characterise bottom currents and associated seafloor sediments at the Ría de Vigo, a 28 km long by 12 km wide funnel shaped coastal embayments at the NW coast of the Iberian Peninsula. The embayment is south-westerly oriented, against the general northerly trend of the main coast, and partially closed at its mouth by the Cies Islands. Forms a wide U-valley with central depths varying from 10 to 60 m. Hydrodynamics shows a semidiurnal mesotidal regime, negative estuarine circulation; and important south-western wave climate component, particularly in winter. Coarse sediments are mostly siliciclastic-bioclastic carbonates mixtures and are preferentially distributed at shallow depths parallel to the coast. Fine grained sediments mostly consist of mud and are preferentially distributed in the most internal parts and occupying the deep central parts of the embayment.

The survey was carried mooring two stations at the inner and outer parts of the embayment, the later quite close to the southern mouth. In each station the current velocity and direction, salinity, temperature, turbidity, pressure and dissolved oxygen were measured near the bottom. The survey period covered two weeks, from June 28th till July 11th of 2005. Surficial sediment grain size was characterised in representative sediment samples from different points of the ría, including the stations sites, using box corers.

The analyzed temperature and salinity data show an upwelling process, taking place since the third day on, registering low temperature values, about 13ºC and high salinity values, about 36.5 ppt. During the non-upwelling period the bottom current direction in both stations was different, NE during the flood SW during the ebb, at the station 1 and eastwards during the flood and SW during the ebb at the station 2. But during the upwelling period was the same at both stations, NE-SW. At the same time the velocity during whole survey period was higher in the first station than in the second station. The grain size at the second outermost station was coarse sand and mostly muds in the innermost.

The results indicate that there are one or more factors affecting the current direction at the bottom at the station 2 which make it change during the non-upwelling period but not during the upwelling period. This implies a different transport direction of the fine sediment for each period. The calculated shear stress at this station indicates no transport by tidal currents, and subsequently that the main transport mechanism is dominated by waves in the area.

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