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First studies of bottom boundary currents in the Ría de Vigo (NW Iberian upwelling system)

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The NW Iberian Upwelling system has a set of physical and chemical characteristics that determine the ecology at the coast, specifically inside the Rías Baixas where activities like raft culture have a significant weight in the local economy. Although several studies have dealt with the physical processes driving the rías general circulation, no previous research has faced the study of bottom boundary currents. This work studies the behavior of bottom currents inside the Rías Baixas and identifies their possible forcing mechanism.

For tackling this issue, high resolution time series of bottom currents by means of a downwards looking ADCP (3-5 meters above the bottom) were recorded at one site in the Ría de Vigo covering the four seasons of the climate year 2004 – 2005.

Our analysis shows that most of the time (aprox. 70 -80%), the bottom currents respond to a logarithmic profile being possible to apply the law of the wall. This pattern can be applied to the residual component and also to the tidal component of the currents. Based on this logarithmic fit, we have obtained characteristic parameters like shear stress and shear velocity.

Our results point to a coupling among shear stress, shelf winds and runoff. Other important conclusion is the relative importance of tidal shear stress versus residual shear stress because the typical assumption of tidal has more influence is not true always. In some occasions when there are neap tides and high shelf winds the residual stress could be just three times the tidal ones.