



Surface circulation in the Strait of Gibraltar: a comparison study between HF radar and high resolution model data.

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Surface currents from the HF radar system deployed by Puertos del Estado (PdE) at the Strait of Gibraltar and an operational high resolution configuration of the MIT global circulation model, implemented in the strait area in the frame of the SAMPA project, have been analyzed and compared in the period February 2013 - September 2014. The comparison have been carried out in the time and frequency domains, by statistical a geophysical (tide ellipses, wind forcing, EOF) methods.

Results show good agreement between both current fields in the strait axis, with correlation around 0.6 (reaching 0.9 in the low frequency band). Higher discrepancies are found in the boundaries of the domain, due to the differences in the meridional components, likely related to the sparser and less accurate radar measurements in these areas. Rotary spectral analysis show a very good agreement between both systems, which is reflected in a very similar and realistic representation of the main tide constituents (M2, S2 and K1). The wind forced circulation pattern, of special interest in the mouth of the Bay of Algeciras, is also precisely represented by radar and model. Finally, the spatial patterns of the first four EOF modes of both fields are rather close, reinforcing the previous results.

As conclusion, the analysis points out the proper representation of the surface circulation of the area performed by the PdE HF radar system and the SAMPA model. However, weak and strong points are found in both, stressing the importance of having two complementary tools in the area.