Geophysical Research Abstracts
Vol. 20, EGU2018-16257, 2018
EGU General Assembly 2018

Integration of coastal altimetry data, HF radars and high-resolution models in the Ligurian Sea

Carlo Brandini (1), Stefano Taddei (1), Bartolomeo Doronzo (2), Letizia Costanza (2), Maria Fattorini (2), and Paolo Cipollini (3)

(1) Consorzio LaMMA Italy (brandini@lamma.rete.toscana.it), (2) CNR Ibimet - Firenze, (3) NOC Southampton

Our understanding of regional and coastal hydrodynamic processes can be greatly enhanced by the combined use of multiple, heterogeneous sources of information. In particular, coastal altimetry data that are becoming increasingly available (Cipollini et al., 2017) can be integrated in hybrid monitoring systems (Wilkin and Hunter, 2013) alongside HF radars and hydrodynamic models, to describe seasonal and sub-seasonal circulation scales.
In the area connecting the Ligurian Sea and the North Tyrrhenian in the North-Western Mediterranean, some important processes of water masses exchange take place through the Corsica Channel and, further north, in the well-known convergence zone of the Eastern and Western Corsica currents which together form the North Mediterranean current. The dynamics of this active region has been repeatedly studied using Coastal Altimetry data, which allowed a better understanding of the seasonal variability (Vignudelli et al., 2000, 2002, 2005; Bouffard et al., 2014). The availability of new data from a recently installed HF radar system along the coast of Tuscany, is now highlighting the presence of some non-permanent but recurrent mesoscale circulation structures, which modulate the current, which was previously thought to be only affected by geostrophic mechanisms. Such mesoscale vortices cause the reversal of the prevailing current in some periods of the year, greatly impacting a number of societal applications (fishing, ecosystems, pollution).

In this work we show results from the integration of observed data with each other and with a numerical high-resolution circulation model at a regional scale (Tyrrheno-ROMS). Results highlight important links between HF radar and coastal altimetry observations and the synergy with the model improves the dynamic interpretation of the observed circulation. The comparison between the sea level data obtained from the model and from the altimetry indeed shows significant correlations, and the presence of some previously unobserved circulation structures, which deserve further investigation, is also confirmed by the comparison between the surface currents estimated by the radar and the calculated ones.