



## **Currents, Tides and Waves measured by an HF Radar in the Gulf of Naples**

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An HF radar has been operating in the Gulf of Naples (Southeastern Tyrrhenian Sea) since 2004. The system is a SeaSonde manufactured by CODAR Ocean Sensors Ltd. Three mono-static radar units working at about 25 Mhz ensure the surface current mapping over nearly the entire Gulf of Naples area. The grid resolution is 1 Km with a range of approximately 40 Km. From continuous observations of the surface current fields several characteristics of the surface circulation were assessed. One of the most prominent evidences is the wind field forcing of the surface current, which determines different but recurrent circulation patterns affecting the transport and the off-in shore exchanges.

The analysis of long and continuous current observations has revealed significant tidal currents. Previous studies regarding the tide magnitude in the Southern Tyrrhenian Sea showed a very limited tidal contribution to the current field. The determination of tidal current in the Gulf of Naples has pointed out a prevalent diurnal contribution and intensity values up to a maximum of 10 cm/s.

Waves are one of the most important elements in a coastal management framework. HF radar may provide an estimate of the main parameters characterizing the wave field: wave direction, significant height and period. Waves were studied in the Gulf of Naples over a range cell located between 5 and 6 km from the coast. This choice, based upon preliminary sensitivity studies, allowed us to analyze the surface gravity wave field over an area of the Gulf where the depth is not too shallow and the sea echo intensity is sufficiently high to ensure good data quality. A pluriannual wave observation time series was studied in order to depict typical seasonal patterns.