



## **Satellite and in situ measurements for coastal water quality assessment and monitoring: a comparison between MODIS Ocean Color and SST products with Wave Glider observations in the Southern Tyrrhenian Sea (Gulf of Naples, Italy).**

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A wave-propelled autonomous vehicle (Wave Glider, WG) carrying a variety of oceanographic and meteorological sensors was launched from Gulf of Naples on the 12th September 2012 for a three-week mission in the Southern Tyrrhenian Sea. The main objective of the mission was the opportunity to evaluate the usefulness of combined satellite and autonomous platform observations in providing reliable and concurrent information about sea water parameters about the Southern Tyrrhenian Sea surface layer. The Wave Glider was equipped with sensors to measure temperature, salinity, currents, as well as CDOM, turbidity and refined fuels fluorescence. Wave Glider oceanographic data were also compared to satellite measurements. In particular, MODIS Ocean Color (OC) products concerning sea water properties collected during the Wave Glider mission were used. The EOS constellation allowed us to have about two daily diurnal imagery providing information about ocean color products. Concerning SST, both diurnal and night-time data were available. The first study we performed was focused on the analysis of SST information coming from both WG and MODIS. A good coefficient of correlation was achieved considering together both day-time and night-time acquisitions, with a discrepancy not higher than 0,7 °C. The correlation increases considering only day-time values, when more samples respect to the night-time ones were available. The results confirm the capability of MODIS products to reproduce over large area the SST variability, with a good level of accuracy. A similar analysis has been carried out to compare the turbidity WG data with the kd-490 MODIS product, which provide information about the diffuse attenuation coefficient in water at 490 nm and it is directly related to the presence of scattering particles, either organic or inorganic, in the water column and thus it is an indication of water clarity or of the water column turbidity. The absence of correlation seems to indicate, for such a specific parameter, that the two sensors are looking at not similar objects. A different depth of investigation or a small scale variability, that MODIS is not able to capture, could be a few of the explanations of these results. It should be also stressed that, by its design, the WG is propelled at the surface like a surfboard and bubbles of all sizes will roll along the bottom of the float. Microbubbles are of particular concern since they will not rapidly ascend and are likely to represent a source noise for the turbidity WG parameter. Finally, the refined fuels WG data have been compared with a statistical indicator of oil spill presence named RST-OIL and the correlation was quite poor. Such a results is quite expected since for its construction, values of RETIRAbbox within  $\pm 2 \sigma$ , like those achieved along WG path, have a probability of occurrence of 97,75% representing the normal fluctuation of the signal, hence randomly varying.