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A Virtual Geostationary Ocean Colour Sensor to characterise the river-sea interaction over the North Adriatic Sea.

Marco Bracaglia[2], Rosalia Santoleri[1], Gianluca Volpe[1], Simone Colella[1], Federica Braga[3], Debora Bellafiore[3], and Vittorio Ernesto Brando[1]

[1]Istituto di Scienze Marine (CNR-ISMAR), Via Fosso del Cavaliere 100, 00133, Rome, Italy
[2]Università degli Studi di Napoli Parthenope, Via Amm. F. Acton 38, 80133, Naples, Italy
[3]Istituto di Scienze Marine (CNR-ISMAR), Arsenale-Tesa 104, Castello 2737/F, 30122 Venice, Italy

Inherent optical properties (IOPs) and concentrations of the sea water components are key quantities in supporting the monitoring of the water quality and the study of the ecosystem functioning. In coastal waters, those quantities have a large spatial and temporal variability, due to river discharges and meteo-marine conditions, such as wind, wave and current, and their interaction with shallow water bathymetry. This short term variability can be adequately captured only using Geostationary Ocean Colour (OC) satellites, absent over the European seas.

In this study, to compensate the lack of an OC geostationary sensor over the North Adriatic Sea (NAS), the Virtual Geostationary Ocean Colour Sensor (VGOCS) dataset has been used. VGOCS contains data from several OC polar satellites, making available multiple images a day of the NAS, approaching the temporal resolution of a geostationary sensor.

Generally, data from different satellite sensors are characterized by different uncertainty sources and consequently, looking at two satellite images, it is not easy to ascertain how much of the observed differences are due to real processes. In the VGOCS dataset, the inter-sensor differences are reduced, as the satellite data were adjusted with a multi-linear regression algorithm based on in situ reflectance acquired in the gulf of Venice. Consequently, the use of the adjusted spectra as input in the retrieval of the IOPs and the concentrations allows performing a reliable analysis of the short-time bio-optical variability of the basin.

In this work, we demonstrate the suitability of VGOCS to better characterise the river-sea interaction and to understand the influence of the river forcing on the short time variability of IOPs and concentrations in the coastal areas. This variability will be analysed for different case studies characterised by a different regime of river discharges, using meteorological, hydrological, and oceanographic fields as ancillary variables. This new approach and the availability of this new set of data represent an opportunity for interdisciplinary studies, in support to and interacting also with modelling implementations in river-sea areas.