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The IOSMOS (IOnian Sea water quality MOnitoring by Satellite data) project: integration of satellite data and in-situ measurements

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Coastal zones are complex and dynamic ecosystems representing one of the most productive areas of the marine environment. These areas deserve the development and the implementation of a monitoring system able to guarantee their continuous and reliable control for a timely and accurate identification of any possible sign of degradation. Remote sensing data can give a relevant contribution in this framework, offering the capability to provide the information about the spatial distribution of water constituents over large areas with high temporal rates and at relatively low costs. In this context, the main objective of the IOSMOS (IOnian Sea water quality MOnitoring by Satellite data) Project - a European Transnational Cooperation action co-funded by the ERDF Operational Programme Basilicata 2007-2013 is the development of advanced satellite products and techniques for the study and the monitoring of the Ionian sea water quality along Basilicata (Italy) and Crete Island (Greece) coasts.
In particular, the RST (Robust Satellite Technique) approach has been applied to more than 10 years of MODIS-Ocean Colour products in order to identify the areas at highest level of degradation and/or at greatest potential risk. Following RST approach anomalous space-time variations of optical variables (e.g. upwelling normalized water-leaving radiances) and bio-optical parameters such as chlorophyll–a concentration, Cromophormic Dissolved Organic Matter (CDOM), diffuse attenuation coefficient at 490 nm (Kd490), etc. have been identified taking into account the site history (in terms of expected values and normal variability of each selected parameter) as obtained from long-term, multi-temporal time series analysis. Such an approach allowed to generate similar products both for shallow and deep water. Specific measurements campaigns have been carried out with the collection of in-situ (radiometric and chemical/physical measurements) and airborne (radiometric measurements) data, in order to define and calibrate new algorithms for quantitative estimation of the above mentioned parameters even in the more critical situation (e.g. shallow waters). In this paper, the results achieved so far will be presented and discussed.