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A multi-disciplinary approach for sea water quality monitoring: the IOSMOS project

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Coastal zones are complex and dynamic ecosystems which represent one of the most productive areas of the marine environment. They are an important economic resource for human populations: they provide food, energy as well as a lot of commerce and recreation activities. The strong anthropization, the irrational exploitation of resources and the climate changes are causing a strong modification of the coastal areas, representing a continuous threat to the biodiversity of these areas. This is why coastal zones deserve the developing and implementing of a monitoring system able to guarantee their consistent and reliable control as well as to timely identify any sign of degradation. Water quality is an important indicator of the health of coastal ecosystem. Remote sensing data can give relevant information in this framework, offering the capability to provide the spatial distribution of water constituents over large spatial areas with high temporal rates and relatively low costs. In particular Ocean Color (OC) satellite instruments furnish information both on sea surface optical variables (e.g. upwelling normalized water-leaving radiances) and on bio-optical parameters such as chlorophyll-a (as a proxy of phytoplankton), suspended materials and dissolved organic matter. A study of these parameters and of their evolution in the space-time domain may provide useful information on the overall quality of the sea water for a specific area, offering, in addition the reference behaviors necessary for identifying significant changes (possibly induced by anthropogenic pressure) in the coastal environment.

In this context main aim of IOSMOS (IOnian Sea water quality MOnitoring by Satellite data) - a Project for European Transnational Cooperation co financed by the Operational Programme ERDF Basilicata 2007-2013 – is the development of advanced and exportable satellite products for measuring the above mentioned coastal water parameters as well as to timely identify short-medium term changes potentially dangerous for environment and/or human health. Original techniques based on multi-temporal satellite data analyses will be developed and validated on the base of airborne and in situ calibration campaigns. Their advantages, in terms of reliability, sensitivity and exportability, will be evaluated also by comparison with existing satellite products achievable by EOS-MODIS, NPP-VIIRS and SeaWifs sensors.

In this paper first IOSMOS project results will be presented and discussed, starting from the preliminary long-term (up to 15 years) analyses performed for the Ionian sea within the gulf of Taranto (Southern Italy) with particular attention to the area along Basilicata Region coasts.