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Relation between Oceanographic parameters and Optical properties in 5 coastal areas of Southern Italy

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In the framework of the CLAM-PHYM (Coasts-and-Lake-Assessment-and-Monitoring-by-Prisma-Hyperspectral-Mission) project it was carried out an oceanographic cruise (27/08-13/09/2010) along the coasts of southern Italy in order to analyze the physical, biochemical and optical properties of some coastal areas. The sampling areas are: the Gulf of Taranto, the Policoro area, the Cetraro Bay, the Gulf of Augusta and the Gulf of Gela.
CTD profiles and reflectance measurements of the sea surface and along the water column with portable field spectroradiometers were collected. Water samples were also collected for the analysis of nutrients, chlorophyll-a and CDOM. These optically active substances interact with solar radiation along the water column through absorption and scattering phenomena.
The collected data were analyzed to identify the relationship between the bio-optical concentrations of optically-active-substances and the surface reflectance spectra measured in situ; this relation, if reversed, can be used to map the concentrations of optically-active-substances from hyperspectral-satellite-data.
Results stress high biological activity in the Gulf of Taranto and in the Gulf of Gela showing the highest values of chlorophyll-a and aCDOM440. These areas are characterized by the presence of important industrial and port sites. The Gela's gulf, where we found the highest concentrations of chlorophyll a and CDOM, is also characterized by the runoff of the Salso river increasing the biological activity.
The correlations found in the Gulf of Taranto between Kd, chlorophyll a and aCDOM440 indicate that the high concentrations of CDOM are primarily due to phytoplankton rather than from terrestrial source. The Gulf of Taranto shows the best site among those investigated where to identify bio-optical relationships between the concentrations of optically active substances and the surface reflectance spectra measured in situ. The preliminary results encourage the combined use of physical, biochemical and optical properties to retrieve water quality parameters in order to improve the coastal areas monitoring.