Geophysical Research Abstracts
Vol. 20, EGU2018-19808-2, 2018
EGU General Assembly 2018


# Remote sensing of water quality indexes from Sentinel-2 imagery: development and validation around Italian river estuaries

Massimo Orlandi (1), Frank Silvio Marzano (1), and Domenico Cimini (2)

(1) Sapienza University of Rome, (2) National Research Council of Italy, Institute of Methodologies for Environmental Analysis

The importance of coastal water leads to the need for monitoring water quality both at local and global scale. The quantitative ocean color remote sensing allows to estimate the concentration of chlorophyll-a (Chl-a) and turbidity in the coastal waters, however an accurate atmospheric correction is required to retrieve water constituents from water reflectance.

In this work, we want to test the suitability of European Space Agency Sentinel-2 MSI sensor (MultiSpectral Instrument) for mapping water quality indexes. With a five days revisit, and 10 m to 60 m spatial resolution, Sentinel-2 presents a scientific opportunity for coastal water research.

More in detail, different algorithms using visible and near infrared bands, were applied for the estimation of chlorophyll-a, turbidity and suspended solids and were compared with the values measured in situ. The areas of interest are the central Italy Tyrrhenian coasts and the Pescara River estuary on the Adriatic Sea.

Fifteen Sentinel-2 images were used and two different atmospheric correction procedures, Acolite and Sen2Cor, were considered for processing the Level-1C images.

Results showed that the regional band ratio algorithm developed for the Tyrrhenian coasts study area, using MSI B1-B3 bands for the estimation of Chl-a, gives better results than standard OC3 algorithm, with coefficient of determination $R^2$=0.55 and RMSE 0.1 $\mu$g/l. Concerning turbidity a significant coefficient of determination ($R^2$=0.96, RMSE 0.61 FTU) is observed between the turbidity measured in situ (Pescara River Estuary) and satellite single band exponential model.

Despite in situ dataset was limited in number, the results show that Sentinel-2 MSI has great potential for coastal water remote sensing and it is an important tool for coastal water monitoring and research.