



## **Trends and Intra-annual variations of spectral biases in multi-mission remote sensing primary ocean color products at a coastal site**

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The assessment of uncertainties and biases affecting remote sensing products is a pre-condition for an effective exploitation of these data in climate studies. Within such a context, this work presents and discusses the trends and intra-annual variations of spectral biases in primary satellite ocean color products (i.e. normalized water-leaving radiance,  $L_{wn}$ , and aerosol optical thickness,  $\tau_a$ ) at a coastal site in the northern Adriatic Sea for the period 2002 - 2010. The analysis is performed using in situ data from the Ocean Color component of the Aerosol Robotic Network (AERONET-OC) and, satellite data products from the Sea-viewing Wide Field-of-view Sensor (SeaWiFS) and the Moderate Resolution Imaging Spectroradiometer (MODIS-A and MODIS-T) onboard the Aqua and Terra platforms. Results from intra-annual analysis indicate larger biases in fall and winter traceable to high sun zenith values. Results from trend analysis do not indicate any statistically significant bias of  $L_{wn}$  when restricting the investigated period to May 2002 – April 2010 for SeaWiFS and MODIS-T, and July 2002 – June 2008 for MODIS-A. Absolute biases, determined at around the middle of the considered period, exhibit values from -0.4 to +7.7 % for SeaWiFS and from -1.9 to +4.6% for MODIS-T in the 412-555 nm spectral interval. Higher and systematically negative biases from -15.4 to -6.2 % are observed for MODIS-A in the same spectral interval. Statistically appreciable trends are observed for  $\tau_a$  from SeaWiFS at 443 and 490 nm (approximately +1% per year) and from MODIS-A at 667 nm (+4.7% per year). Very high are the biases for both MODIS-A and MODIS-T  $\tau_a$  products in the 412-555 nm spectral interval (on average 21 and 16%, respectively) when compared to SeaWiFS (exhibiting values in the range of -1 and +2.5%).