Validation and Calibration of the Ocean Color Satellites: Modeling and Field Approaches

Ocean Color (OC) satellite sensors in order to provide reliable estimates of concentrations of water constituents require accurate radiometric calibration because of the weak signal from the ocean and strong impact of the atmosphere. Data from the sensors should be validated against field measurements obtained in various illumination, viewing and water conditions. We first present results of validation where satellite data from MODIS and VIIRS sensors are compared with measurements by SeaPRISM instrument on the Long Island Sound Coastal Observatory (LISCO) operated by NOAA CREST and similar platforms in other parts of the world and which are part of the NASA AERONET-Ocean Color Network. Further, these data are used in radiative transfer approach for the simulation of the top of the atmosphere (TOA) radiances which are compared with the radiances measured by the satellite sensors and thus can be used in several calibration and validation procedures. Finally, we present results of measurements on the research vessels during recent NASA and NOAA cruises collected by the HyperSAS radiometric system installed at the bow of the ships and compare with the data from co-located instruments and from satellites. Advantages and uncertainties of the approaches are discussed.