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Tuesday, October 9
Poster Session 2
10:30–12:30

Poster 130

AN EMPIRICAL ORTHOGONAL FUNCTION APPROACH TO DERIVE CYANOBACTERIA:EUKARYOTIC ALGAE RATIOS USING BOTTOM OF RAYLEIGH REFLECTANCE DATA

Eutrophication and increasing prevalence of potentially toxic cyanobacterial blooms occurring in inland water bodies and coastal regions is quickly becoming a global issue. Quantitative detection of chlorophyll in these scenarios by remote sensing techniques are plagued by uncertainties due to lack of appropriate atmospheric corrections and spatial resolution. However, cyanobacteria have distinct spectral features that enable them to be identified from optical information and the bright nature of eutrophic waters allow these features to be seen without the requirement of a full atmospheric correction. In this study, we investigated the sensitivity of cyanobacteria detection using partial atmospherically corrected data using a synthetic database of varying chlorophyll concentrations and ratios of cyanobacteria to eukaryotic algae. The synthetic Rrs database is also modelled to Bottom of Rayleigh Reflectance (BRR) using varying atmospheric profiles and inclusion of an adjacency effect. Through this, we have developed an EOF analysis method to derive cyanobacteria:eukaryotic algae ratios using optical reflectance measurements. Multi-nonlinear regression models were developed using principal component scores derived from the EOF analysis of normalized hyperspectral and multi-spectral Rrs and BRR synthetic data and matchup cyanobacteria:eukaryotic ratios. The models performed with high success and showcases how a partial atmospheric correction still preserves necessary spectral variation. To demonstrate the method in an operational sense, the EOF approach was applied to both Sentinel 3 OLCI and Sentinel 2 MSI imagery. Based on the ratio of cyanobacteria:eukaryotes, new empirical models are currently being developed with the intention of deriving more accurate chlorophyll concentrations for cyanobacteria dominated scenarios.

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