

Thursday, October 11

Poster Session 4

10:30–12:00

Poster 112

THE RELATIONSHIP BETWEEN PHYTOPLANKTON ABSORPTION COEFFICIENT AND CHLOROPHYLL-A CONCENTRATION FOR REMOTE SENSING APPLICATIONS IN OPTICALLY COMPLEX WATERS.

Phytoplankton main pigment Chlorophyll a (Chl a) has been a proxy for phytoplankton biomass for a long time despite of its variable content in a cell. Phytoplankton pigment absorption (a_{ph}) is an important parameter to support models for bio-optical remote sensing (RS) algorithms for Chl a retrieval. RS of Chl a in highly turbid inland and coastal waters represent a challenge, due to masking of the Chl a signal by various amounts of highly absorbing coloured dissolved organic matter (CDOM). In Estonian lakes CDOM is the main absorber, especially in dark-water lakes, where CDOM absorption might account for up to 100%. We studied the relationship between a_{ph} at 442 and 670 nm and Chl a concentration in Estonian large lakes Peipsi (N=346) and Võrtsjärv (N=94) together with small lakes (N=59) during 2012-2017. Linear relationship fitted for all studied lakes, but power function suited better for L. Võrtsjärv. Strong relationship ($R^2 > 0.6$) between Chl a and a_{ph} was evident in all studied lakes. Correlation between Chl a and a_{ph} was stronger using a_{ph} values at 670 nm ($R^2 = 0.7$), whereas strongest correlation and lowest RMSE was found in small lakes ($R^2 = 0.89$). Seasonal variation of phytoplankton absorption was studied in Estonian large lakes: average absorption was generally lower in May and June, and highest in August-September in case of Peipsi and Lämmijärv and in October in Võrtsjärv. Various bio-optical models are tested on Sentinel-3/OLCI data to estimate the retrieval of a_{ph} and its suitability to generate a product for Chl a.

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