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Thursday, October 11
Poster Session 4
10:30–12:00

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HOW MUCH CARBON STORED IN THE LAKES AND COASTAL WATERS ORIGINATES FROM PHYTOPLANKTON?

A global inventory of lakes has shown large proportion of lakes in higher latitudes, where also an increase in organic carbon concentration resulting in lake browning has been reported, affecting the ecosystems from directly reducing underwater light field to altering lake food webs. Based on the dataset measured in the Nordic inland and coastal waters, we focused on estimating phytoplankton related parameters in the Particulate Organic Carbon (POC) fraction in the carbon cycle and its derivation from remote sensing (RS) data. We have compared various models to estimate primary production (PP) from RS data. The individual PP model parameters, derived from RS data, describing light conditions (Kd(λ)) and water temperature, show high accuracy (R^2>0.9), when validated against in situ data. The quantification of absorption by phytoplankton is associated with higher uncertainties, but is more straightforward when using absorption coefficient at 442 nm (aph(442)) than the Chl-a based approach, due to the high variability (although R^2>0.7) between Chl-a and aph(442) over Case-2 waters, especially in more productive waters (Chl-a > 20 mg/m^3, aph(442) >2 m^{-1}). In addition to PP, Carbon-to-chlorophyll ratio and conversion factors between biomass of different phytoplankton groups and carbon from literature were analysed and applied to estimate their contribution to the POC fraction. By the synergy of optical and thermal RS sensors on board of ENVISAT, S3, S2 satellites, the analyses offer insight into carbon cycling that show high spatial and temporal variability indicating RS as an essential source of information to monitor these processes.

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