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

Poster 150

RETRIEVAL OF SUN-INDUCED CHLOROPHYLL FLUORESCENCE FROM OPTICAL PROFILER OBSERVATIONS: A THEORETICAL STUDY

Phytoplankton photosynthesis accounts for up to half of global primary production. Its variations are largely related to changes in phytoplankton physiology, but the global characterization of physiological status is still extremely challenging. Sun-induced chlorophyll fluorescence (SICF) has proven a useful tool to provide rich source of physiological information of phytoplankton. Traditionally, the SICF is retrieved from chlorophyll fluorescence height (FLH) separated from water-leaving radiance using a simple linear approximation between two wavelengths on either side of chlorophyll-a emission spectrum. However, the rude estimation sometimes provides FLH with big uncertainties and further results in unreliable interpretation of SICF. Based on radiative transfer simulations, we here present a new method to derive SICF from convectional optical profiler observations (or optical buoy). This new method takes advantage of the difference of upwelling and downwelling diffused attenuation coefficients (KLu and Kd). Results show that this new method works very well for different water types (chlorophyll-a concentration varying from 0.01 to 10 mg/m^3), with an overall difference of less than 1% between the retrievals and true values. The novel method also explorers a new way to accurately correct the impact of chlorophyll fluorescence on leaving signal acquired by remote sensing platforms (e.g., satellite). This method opens a door for the study of phytoplankton physiology and photosynthesis processes in the aquatic environments.

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