Tuesday, October 9
Oral Session 3
08:30–10:30

08:30–08:50

RETHINKING APPROACHES FOR INFORMATION RETRIEVAL FROM OCEAN COLOUR

For several decades, metrics of ecological and biogeochemical process have been derived from ocean colour using empirical or semi-analytical methods. These methods provide reasonably accurate estimates of chlorophyll-a concentration (Chl-a) and various inherent optical properties (IOPs) across a wide variety of water types. However, accurate retrieval of these parameters in optically complex waters where atmospheric correction is challenging remains elusive. We argue that it is time to modernise our approach to information retrieval from ocean colour in these challenging scenarios, and use signals that include the atmosphere instead of trying to subtract it by estimation. Here, we present results from research performed as part of the first NASA PACE (Phytoplankton, Aerosol, Cloud and Ocean Ecosystem) Science Team activities, which demonstrate the feasibility of deriving Chl-a and IOPs from ocean colour using non-traditional modeling techniques. Specifically, we investigated the performance of an empirical orthogonal function-based algorithm, and various machine learning approaches. The models were trained and tested using a modified version of the NASA NOMAD in situ-to-satellite SeaWiFS matchup data set and a synthetic dataset derived from a coupled ocean-atmosphere radiative transfer model. In comparisons with the 'true' data, all models were found to retrieve Chl-a and spectral IOPs accurately (Chl-a: R^2 = 0.76-0.84, mean percent difference (MPD) = 29-36%, slopes ~ 1; IOPs: R^2 = 0.72-0.90, MPD ~ 0-25%), demonstrating the potential of these approaches to retrieve ecological and biogeochemical in otherwise intractable scenarios.

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