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

Poster 136

INFORMATION CONTENT OF IN SITU AND REMOTELY SENSED CHLOROPHYLL-A: LEARNING FROM SIZE-STRUCTURED PHYTOPLANKTON MODEL

The distribution of phytoplankton shows high spatial and temporal variability. Chlorophyll-a concentration (Chl-a) derived from satellite remote sensing reflects both real phytoplankton variability and inherent uncertainties. Ocean colour data are commonly used to calibrate marine biogeochemical models; therefore, understanding the distribution of errors in the remotely sensed Chl-a product is critical. Here, we explore the relationship between phytoplankton size structure and an ocean colour product (GlobColour) using both model simulations and in situ observations. We focused on the offshore eastern Australian ocean region, largely characterised by oligotrophic waters in which phytoplankton primarily define the optical properties of the water column. To explore the properties and relationship of the satellite ocean colour product and in situ observations, theoretical experiments were performed through a coupled biogeochemical-optical model. Specifically, an optical model was used to calculate the inherent optical properties (IOPs) of seawater from size dependent multi-phytoplankton biogeochemical model simulations and convert them into remote-sensing reflectance (Rrs). Then, Rrs was used to produce a satellite-like estimate of the simulated surface Chl-a concentration through the OC3M algorithm. The information content of simulated in situ and simulated remotely-sensed data sources was investigated through theoretical experiments that suggested the OC3M algorithm underestimates the simulated Chl-a concentration because of the weak relationship between large-sized phytoplankton and Rrs. This concept was tested with data collected in the same area during an oceanographic voyage. The consequent ocean colour match-up points confirmed the underestimation of in situ Chl-a concentrations when phytoplankton larger than 10 μm dominated the photosynthetic community.

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