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# Can satellite measurements of back-scattered sunlight help to constrain parameters in an ocean carbon cycle model?

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Biogeochemical models of the ocean carbon cycle are frequently validated by, or tuned to, satellite chlorophyll data. However, for climate prediction, ocean carbon cycle models are required to accurately model the movement of carbon, not chlorophyll. Due to the high variability of the carbon to chlorophyll ratio in phytoplankton, chlorophyll is not a robust proxy for carbon. However, using IOP inversion algorithms it is now possible to also derive the backscattering coefficient ($b_b$). Using empirical relationships between particulate organic carbon (POC) and $b_b$, a 1-d biogeochemical model is used to simulate $b_b$ at 490nm. The model can now be compared with either remotely-sensed chlorophyll or $b_b$ data. Here I test (by model-tuning with a genetic algorithm) whether using $b_b$ in conjunction with chlorophyll can help to constrain more model parameters than using chlorophyll alone. Since there are several IOP algorithms available for estimating $b_b$, the consequences of the uncertainty in $b_b$ are also investigated.