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

10:10–10:30

AN ANALYTICAL FRAMEWORK FOR CALCULATING UNCERTAINTY IN NASA OCEAN COLOR OBSERVATIONS

Quantifying uncertainty in derived ocean color data products serves several purposes including, but not limited to, allowing end-users to: assess if datasets are fit-for-purpose, assess if observed temporal change is greater than uncertainty, assimilate errors into climate models, and assess consistency among sensors. Recently, first-order error analysis methods have been proposed that directly propagate radiometric uncertainty through an ocean color algorithm to derive data product uncertainty. First-order error propagation methods benefit from being computationally efficient, making them suitable for implementation in NASA's ocean color processing software. Here, we present an analytical framework, based on first-order error propagation theory, to directly calculate uncertainties in NASA ocean color products given uncertainties in spectral remote-sensing reflectances. We show by using first-order uncertainty propagation it is possible to identify the magnitude of individual uncertainty sources within an algorithm. Additionally, we evaluate how data product uncertainties affect down-stream estimates of productivity and other ecologically-relevant variables. Collectively, the analytical framework presented here is anticipated to be valuable to scientists designing next-generation bio-optical algorithms. In this work, we utilized a high quality in situ hyperspectral radiometric dataset that can be spectrally subsampled to match the spectral characteristics of most existing ocean color sensors. This includes NASA's Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) mission that is currently under development and will carry the first dedicated hyperspectral ocean color sensor.

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