MOCMAC: Polarimetric ocean color atmospheric correction with Bayesian inference

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Ocean color remote sensing relies heavily on accurately modeling atmospheric effects – a process called atmospheric correction – to isolate signals from ocean constituents. This correction is crucial, as the atmosphere can contribute up to 90% of the radiometric observations made at the top of the atmosphere. Here, we introduce a novel multi-sensor atmospheric correction algorithm that employs Bayesian Inference techniques to propagate atmospheric information content from the multi-angle MISR-Terra instrument to improve ocean color observations from the multi-spectral MODIS-Terra sensor. These techniques allow us to provide probability distribution functions of atmospheric parameters such as aerosol and surface wind properties as well as oceanic parameters like the chlorophyl a concentration and absorption due to phytoplankton, detritus, and colored dissolved organic matter. Additionally, we explore the use of neural networks to boost computational efficiency in processing these data. We further discuss the integration of polarization measurements as increased information content for atmospheric and ocean color retrievals and showcase initial results made using a combination of radiometry and polarimetry from the recently launched PACE mission.

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