Retrieval of aerosol and water leaving radiance properties over open and coastal oceans using multi-angle spectral polarimetric measurements

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Ocean color remote sensing is important to understand global carbon cycle, study ocean ecology, and, monitor coastal water quality. The retrieval process requires an accurate estimate of atmospheric path radiance in atmospheric correction, which is challenging over coastal waters involving absorbing aerosols. We have developed a joint retrieval algorithm which simultaneously retrieve both water leaving and aerosol properties through an optimization approach using multi-angle spectral polarimetric observations which contain rich information about aerosols and hydrosols. The joint retrieval algorithm is designed and validated for the Research Scanning Polarimeter (RSP) [1,2] with great retrieval performance. In this work we will further extend the algorithm for processing the SPEX airborne Spectro-Polarimeter [3] and AirHARP Polarimeter data. The algorithms will be validated with respective airborne polarimetric measurements over open and coastal oceans from Aerosol Characterization from Polarimeter and Lidar (ACEPOL) field campaign in 2017. Retrieval algorithm consists of two different bio-optical models [2] for open waters (Chlorophyll-a based model) and coastal waters (generalized seven parameters model) and is capable of retrieving complex refractive indices of aerosols, aerosol volume density distribution, wind speed and bio-optical model parameters. Comparison of ocean color retrievals will be carried out with Aerosol Robotic Network (AERONET) ocean color product and that of aerosol retrievals will be carried out with aerosol products from AERONET and High Spectral Resolution Lidar (HSRL-2) onboard the ACEPOL field campaign aircraft.

References

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Preferred mode of presentation: Oral/Poster