

Retrieval of ocean waves slopes from measured light polarization

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Light reflected from the ocean is partially polarized from scattering by sea surface and its underlying suspended particles. The new launch of the PACE observatory satellite [1], with its two polarimeters, will provide a new measurement of the Earth's atmosphere and ocean that can aid in better retrieval of the ocean biogeochemical properties. We present data from shipborne field experiments using NRL polarimeters built for the ground truth capabilities for PACE.

Shipborne measurements of water and sky polarized radiances were made to retrieve the ocean surface wave slopes at different water conditions. The degree of polarization and orientation of its polarization ellipse depend on the wave-slope and its orientation relative to the observer [2, 3]. Polarimetric imaging techniques will be used to infer the water surface shape information utilizing the relationship between surface orientation and the change in polarization of reflected light. The influence of the sea-surface statistics at discrete grid points will be examined to define the variance of the waves slope. Results will be demonstrated at different sun elevations and sensor orientations. Lastly, the effect of spatial polarization variabilities in the observed hyperspectral polarization will be investigated using a division of time hyperspectral polarimeter and a synced division of focal plane polarization camera.

References

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Preferred mode of presentation: Oral