Hyperspectral measurements, parameterizations, and atmospheric correction of whitecaps and foam for ocean color remote sensing

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Background

- Breaking waves are highly reflective features on the sea surface that change the spectral properties of the ocean surface in both magnitude and spectral shape.

Findings

- Whitecap spectral shape was well-characterized by a third order polynomial function of liquid water absorption (Fig. 1A)
- Localized troughs in whitecap reflectance correspond to peaks in liquid water absorption and depths of the troughs are correlated to the amount and intensity of the breaking waves (Fig 1)
- An effective whitecap factor was defined as the optical enhancements within a pixel due to whitecaps and foam independent of spatial scale (Fig. 1C,D).
- Dry and wet marine harvested microplastics have similar absorption features with absorption bands identified at 1215 and 1732 nm.

Algorithms

- Developing algorithms to differentiate whitecaps and other bright targets like plastics, clouds, sea ice for PACE mission.
- Testing algorithms for the Whitecap Factor from PACE instrument.

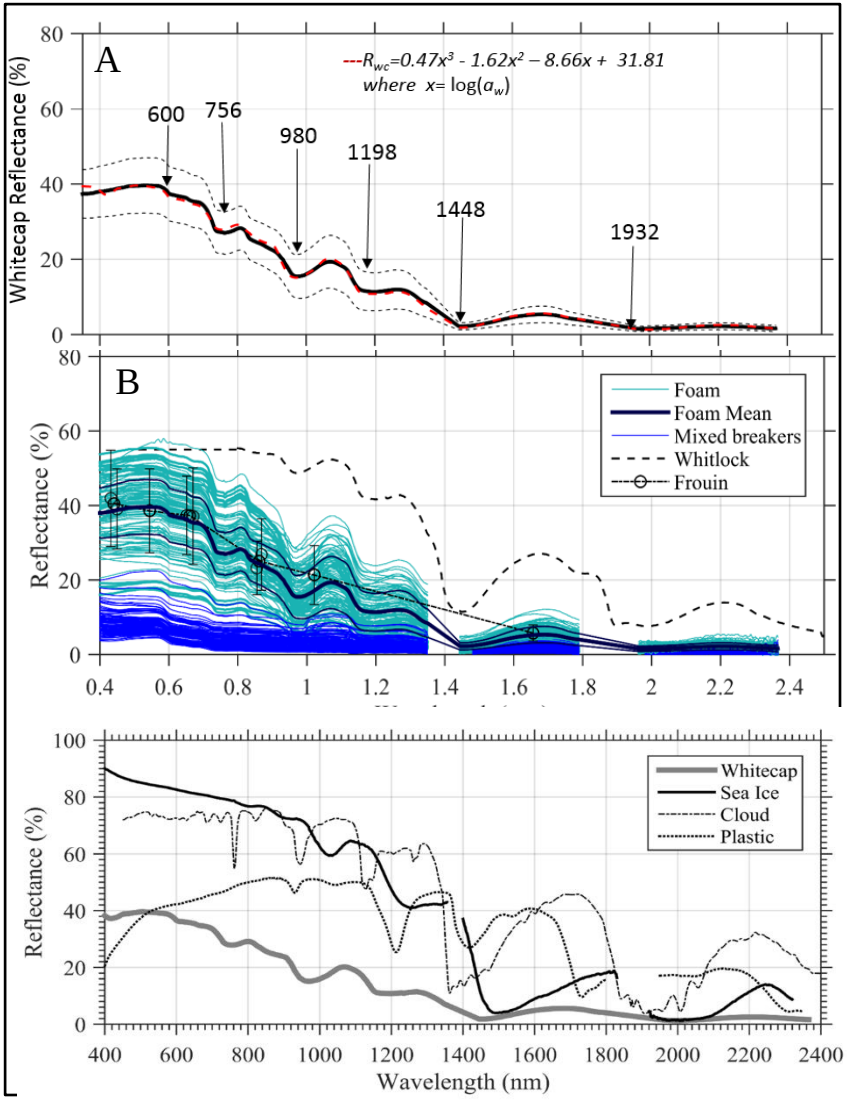

Fig. 1. Hyperspectral measurements, parameterizations, and potential algorithms to estimate whitecap reflectance