Monday, October 8
Poster Session 1
16:00–18:00

**Poster 5**

## THEORETICAL INVESTIGATION OF THE USE OF THE PARTICULATE BACKSCATTERING SPECTRUM TO OBTAIN THE PARTICLE SIZE DISTRIBUTION

Knowledge about the size, composition, and distribution of particles in the global ocean has led to breakthroughs in understanding surface ecosystem dynamics as well as the ocean's role in the Earth's carbon cycle. Remote sensing has recently become a powerful tool for characterizing the global particle size distribution (PSD) on globally relevant spatio-temporal scales through the use of bio-optical algorithms. Here we extend the results of Boss et al. (2001) evaluating the relationship between the slope of a log-log PSD and the beam attenuation spectrum to explore the relationship between the shape of the particulate backscatter (bbp) spectrum and the PSD. We use Mie theory to model bbp spectra to test limitations of inversion methods for determining PSD distribution from bbp spectra by varying particle indices of refraction, integration limits, particle shape from spherical, etc. We find strong relationships between the bbp slope and log-log PSD slopes for typical open ocean conditions (Chl concentrations $< 2$ mg $m^{-3}$, PSD slopes $> 3.5$). Correspondence is not as good for shallow PSD environments, such as coastal and upwelling regions. This is in contradiction with the Boss et al. (2001) analysis of beam attenuation spectra, which showed good correspondence with PSD slopes for eutrophic waters but not for oligotrophic environments. Additionally, we explore the relationship between PSD and the backscattering spectra of coated spheres and hexahedrals. Future work will involve adding and testing particulate absorption spectra to the algorithm and testing the theoretical limits in a variety of ocean environments, particularly eutrophic environments.

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