Tuesday, October 9
Poster Session 2
10:30–12:30

Poster 42

EXPLORING THE RESPONSE OF POLARIZED LIDAR TO BULK PARTICLE PROPERTIES THROUGH COMBINED MODELING AND FIELD STUDIES

Oceanographic LiDAR has become an important tool for revealing the vertical distribution of optical and biogeochemical properties in the ocean, expanding our ability to understand a variety of ocean processes. In addition to the information that can be derived by relating profiles of attenuation and backscatter from a single wavelength LiDAR to profiles of particle concentration, a variety of studies suggest that the polarization state of the return signal may provide additional information regarding the bulk properties of the particles in the scattering volume, including composition and size distribution. While this additional information would significantly improve the scope of oceanographic LiDAR investigations, the development of LiDAR algorithms that exploit the information included in the polarization state of the return signal has not progressed beyond qualitative observations or simple correlation, at least in part due to the lack of sufficient coincident measurements of polarized LiDAR returns and bulk particle properties and the lack of a quantitative framework in which to interpret the processes that contribute to the relationships that have been observed. To address this disparity in our ability to interpret polarized LiDAR return signals, we have developed a Monte Carlo radiative transfer model to explore the depolarization response of a shipboard LiDAR to a variety of bulk particle properties. Here, we present a closure experiment comparing measurements made from a custom built shipboard LiDAR system and a modeling simulation parameterized from in situ measurements of inherent optical properties that can be related to the bulk properties of the particle ensemble.

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