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

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Poster 66

POLARIZED LIGHT SCATTERING PROPERTIES OF EMILIANIA HUXLEYI COCCOLITHS AND COCCOSPHERES

It has been recently suggested that a significant amount of information about coccolithophore blooms could be retrieved by analysis of their light polarization properties. In recent optical modeling work we have shown that light backscattering from Emiliania huxleyi coccoliths is dominated by the reflection from their calcite surfaces. Here, we extend our model to include the polarization signal of backscattered light from E. huxleyi liths. Previous investigations using exact numerical Discrete Dipole Approximation models have assumed a single uniform average index of refraction for the multi crystalline calcite material of the liths while in reality calcite is strongly birefringent. We show that this structured birefringence induces significant depolarization effects which are spatially distributed over the surface of the liths. These effects are completely unaccounted for in exact codes. Using the optic axis structure of liths we have developed an approximate model that allows us to evaluate the effect of this internal depolarization on the overall polarized backscattering of E. huxleyi coccoliths and quantify the difference with the backscattering depolarization computed for a material with a single orientation averaged index.

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