



Optical scattering properties of phytoplankton: Measurements and comparison of various species at scattering angles between 1° and 170°

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ABSTRACT: We describe the results of a laboratory scattering experiment performed to investigate differences in the optical scattering properties between five common phytoplankton species (*Dunaliella tertiolecta*, *Isochrysis galbana*, *Nanochloropsis*, *Skeletonema costatum*, and *Thalassiosira weissflogii*). Data sets were taken at scattering angles 1° to 170° at incident polarizations parallel and perpendicular to the scattering plane. Differences between the species were especially apparent in the slopes at near-forward (1° -10°) angles and the enhanced scattering at nearbackward (150° -165°) angles. There were also notable differences observed between the depolarization ratios, especially at scattering angles between 70° and 110°. The data are shown to be not only helpful in differentiating several species from each other, but also in separating the phytoplankton from bubble/hydrosol contributions to the ocean's inherent optical properties. The results presented here motivate the development of in situ large-angle polarimetric scatterometers and associated retrieval algorithms.

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