



Comparisons of Discrete Ordinate and Monte Carlo Simulations of Polarized Radiative Transfer in Coupled Media like the Atmosphere-Ocean System

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A comparison is presented of two different methods for polarized radiative transfer in the coupled atmosphere-ocean system. One of the methods is based on solving the integro-differential radiative transfer equation using the discrete ordinate approximation. The other method is based on probabilistic and statistical concepts and simulates the propagation of polarized light using the Monte Carlo approach. The emphasis is on non-Rayleigh scattering for particles in the Mie regime. Comparisons with benchmark results available for a single slab with constant refractive index show that both methods reproduce these benchmark results when the refractive index is set to be the same in the ocean as in the atmosphere. Computed results for several test cases with coupling (different refractive indices in the atmosphere and ocean) show that the two methods produce essentially identical results for identical input in terms of absorption and scattering coefficients and scattering phase matrices.