A Monte Carlo simulation of two- and n- stream theory

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Abstract

We apply the Monte Carlo method to radiative transfer and reproduce the optical depth probability density distribution, the angular scattering probability distribution, and simulate the statistical behavior of particles encountering a boundary with optical thickness using both two-stream and n-stream theory. We assume a spherically symmetric, plane-parallel medium to reduce the physical and computational complexity of the problem, as well as forego interference effects. Particles (e.g., unpolarized radiation) injected into the medium (e.g., a cloud) are allowed to transmit through, get absorbed by, or reflect out of, the medium by the variation of the asymmetry parameter and the single-scattering albedo.

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