

Radiative Transfer in Vertically Layered Soil

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At thermal wavelengths, the upwelling radiation at surface is often expressed as a product of emissivity and surface temperature. For a vertical stratified medium (e.g. permittivity varies with soil depth), the emissivity at the surface is normally calculated from Fresnell formula. For an electromagnetic (EM) wave that does not penetrate through soil (e.g. zero transmissivity), the emissivity and reflectivity equals unit. However, when the EM wave penetrates through the medium, the emitted radiation must be considered from the energy contributed from the deeper layers and can be calculated from variable radiative transfer schemes. This study will investigate on uses of auxiliary soil information to quantify the optical parameters used in surface radiative transfer schemes. The impacts of this newly developed approach on simulations of the radiances at the top of the atmosphere will be also discussed.

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