

## **Review of the optical properties of ice crystals within ice clouds**

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Ice clouds are ubiquitous in the atmosphere, where they play important roles in various physical and dynamical processes. In particular, these clouds strongly regulate the radiation budget of the earth-atmosphere system through their interactions with solar radiation and terrestrial thermal emission and are critical elements in association with space remote sensing of aerosols and surface properties. However, quantifying the radiative properties of ice clouds poses a significant challenge for the atmospheric research community due primarily to complex and intricate morphologies and sizes of ice crystals within these clouds. In this presentation, we will provide an overview of the efforts on simulating the optical properties of nonspherical/inhomogeneous ice crystals in the past 40 years, followed by a review of application of the single-scattering properties of ice crystals to various remote sensing implementations and radiative forcing simulations.