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Sensitivity of depolarized lidar signals to cloud and aerosol particle properties YU YOU, GEORGE KATTAWAR, PING YANG, YONG HU, BRYAN BAUM, Texas A&M University — Measurements from depolarized lidars provide a promising method to retrieve both cloud and aerosol properties, which play an important role in the modeling of the global atmospheric system and in the forecasting of climate, and thus can help prevent meteorological disasters. For depolarization study of space- borne lidars, e.g., the upcoming CALIPSO lidar, multiple scattering must be included in the analysis. Monte Carlo simulation is a powerful approach to investigate the multiple scattering, especially for multi-layer clouds and/or aerosols. Monte Carlo calculations are carried out to investigate the sensitivity of lidar backscattering depolarization to cloud and aerosol properties. Lidar parameters are chosen to simulate those of the CALIPSO lidar. It is demonstrated that besides thermodynamic cloud phase, the depolarized lidar signal may provide additional information on ice particle shapes as well as aerosol particle shapes and types. Additionally, for the multi- layer case involving both ice clouds and aerosols, the depolarized lidar contains information that can help identify particle properties of each layer.

Yu You
Texas A&M University

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