



Aerosol Influence on the Polarized Sky Radiance Distribution

A. Kreuter and M. Blumthaler

Division for Biomedical Physics, Innsbruck Medical University, Innsbruck, Austria (axel.kreuter@i-med.ac.at)

Aerosols in the atmosphere absorb and scatter solar radiation and thus modify the sky radiance and its polarization. So the polarized sky radiance is the observational key in ground based remote sensing to determine aerosol optical and micro-physical properties. We use a novel Monte-Carlo radiative transfer code (the MYSTIC solver within the freely available libRadtran package) to model all three Stokes-parameters I, Q and U of down-welling sky radiance for all viewing angles in the UV-visible spectral range. In a comprehensive sensitivity study, we vary aerosol microphysical parameters, i.e. the particles complex index of refraction, the size distribution and shape and identify their individual impact on the Stokes parameter distribution. These results form the basis to develop a suitable algorithm, an inverse process to retrieve aerosol properties from polarized sky radiance measurements. We explore the viability of this method for a polarized hyperspectral imaging system and estimate the technical requirements for such an instrument.