EFFECT OF POLARIZATION ON UV SKY RADIANCE DURING TWILIGHT

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Accurate description of radiation field in the atmosphere requires solution of the transfer equation in unknown vector of Stokes parameters, which characterize the radiance intensity and the radiance polarization. A simplified treatment of light as a scalar value equal to the radiance intensity may have only limited area of applications. A few studies compared previously results of the vector and the scalar radiative models and showed that scalar calculations are in error by up to 8-10% for many cases (for example, [1][2]). Though several observational conditions were exploited, effect of polarization in modeling of UV radiance has not been yet investigated for twilight conditions.

We have estimated error of scalar calculation relative to more accurate vector modeling for scattered spectral radiance observed from the ground during twilight. Simulation has been carried out for the solar deep angle up to 8 degree below the horizon for UV-A and UV-B wavelengths. Model atmospheres take into account molecular and aerosol scattering, gas and aerosol absorption, and Labertian surface albedo. Error of scalar calculation reaches 8% and significantly depends on wavelength. Influence of total ozone content, aerosol loading and albedo on polarized UV radiance is discussed.

A linearized radiative transfer model MCC++ [3][4], which had been validated against other radiative models for twilight conditions [5] and compared with twilight field observations [6], was used for numerical simulations.

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[6] **Ugolnikov O.S., O.V. Postylyakov, I.A. Maslov.** Observations of the polarization of the twilight sky using wide-angle CDD camera and their modeling. *This issue.*