Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

ACG39-P13 Room:Convention Hall Time:May 19 18:15-19:30

Estimation of errors due to aerosol scattering on the remote sensing of the lower tropospheric ozone with measurement of

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abstract

Estimation of errors due to aerosol scattering on the remote sensing of the lower tropospheric ozone with measurement of solar UV-Vis. backscattered spectra from space

The lower tropospheric ozone is a major photochemical oxidant affecting human health and vegetation. In recent years, the long-range transport of the tropospheric ozone from the Asian Continent affects air quality in Japan and other wide areas. Remote sensing from a satellite is effective to observe such extensive/transboundary air pollution. However, it has been quite difficult to measure the lower tropospheric ozone from the satellite.

We have proposed that it can be evaluated with simultaneous measurement of solar backscattering spectra in the ultraviolet(UV) and visible(Vis) regions. Because the atmospheric Rayleigh scattering cross-section is much larger in UV than that in Vis, lower tropospheric light path length of the solar scattered radiation observed from space is significantly different in these two wavelength regions. This difference in the light path changes ozone column amount along it in the lower troposphere, and enables us to evaluate the lower tropospheric ozone mount.

The accuracy/precision in this evaluation depends on the accuracy/precision both in the ozone column measurement from UV/Vis solar backscattered spectra and in the model calculation of the light path length in these wavelength region. In this study, we estimate errors in the mode calculation of the light path length with a simulation of

UV/Vis solar backscattered spectra measurement. The scattering by atmospheric aerosols is one of most significant factors influencing the light path length of the solar scattered radiation because the quantification of its vertical profile is quite difficult because it is highly variable temporary and spatially. Variation of the light path length with model profiles of aerosol extinction coefficient based on a lidar measurement is calculated with SCIATRAN (Rozanov et al., 2005) to estimate errors due to the difference between the ”true” aerosol profile and the ”assumed” profile.

Keywords: Remote Sensing