

The effect of the surface BRDF on the measurement of tropospheric NO₂ from a geostationary orbit and ISS

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BRDF (Bidirectional Reflectance Distribution Function) is the dependency of the surface reflectance on incident and output directions. Zhou et al. [2010] showed that the surface BRDF affects the retrieval of the tropospheric NO₂ column density with sun-synchronous low Earth orbit (LEO) satellites, as line-of-sight angles largely change in the sun-synchronous LEO measurements. In the present study, we have estimated the influence of BRDF on the tropospheric NO₂ DOAS retrieval supposing the observations of air pollution over Tokyo from a geostationary orbit (GEO) and ISS. In the analysis, we used the results of actual surface measurements: the MODIS BRDF product released by NASA. The result showed that the use of the assumption of Lambertian surface instead of BRDF would cause up to a 30% difference in the reflectance value. We also show the influence of such a difference on the tropospheric NO₂ column density measurements.

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