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Effect of Surface BRDF on the Geostationary and Low Orbit Observations of Tropospheric NO_2

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We investigated the effect of surface reflectance anisotropy, Bidirectional Reflectance Distribution Function (BRDF), on geostationary and low orbit satellites' retrievals of tropospheric NO_2. We first develop an empirical model of the three BRDF coefficients for each land cover type over Tokyo, and then apply the model to the calculation of land cover type dependent AMFs and BAMFs. Results show that the variability of AMF among the land types is up to several tens percent, and if we neglect the reflectance anisotropy, the difference from BRDF's AMF reaches 10% or more. The evaluation of the BAMFs calculated shows that not to consider variations in BRDF will cause large errors if the concentration of NO_2 is high close to the surface, although the importance of BRDF for AMFs decreases for large AOD.