Sensitivity analysis of polarization correction algorithm of GEMS on surface parameters

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In ultraviolet and visible region, surface reflectivity and surface pressure indicate information about the extent to which sunlight returns from the surface and how much sunlight passes through the atmosphere, respectively. Surface information such as surface reflectivity and surface pressure are important parameter for retrieval algorithm of atmospheric composition.

GEMS (Geostationary Environmental Monitoring Spectrometer) is scheduled to be launched in 2019 ∼ 2020 on GEO-KOMPSAT-2B satellite with 10 year life time. The purpose of GEMS mission is to monitor the atmospheric pollution over East-Asia. GEMS measure reflected radiance from the earth-atmosphere system in UV / VIS region from 300 to 500 nm with 0.2 nm spectral resolution. There are various sources of errors in the measured radiance spectrum. And there are several important processing steps from L0 to L1, for example, dark current correction, stray light correction, wavelength calibration. Additionally, we have developed polarization correction algorithm for improving the radiometric calibration accuracy of GEMS. The polarization correction algorithm uses the various information such as geometry, total amount of ozone, surface pressure and climatology data of LER (Lambertian Equivalent Reflectivity).

In this study, we performed a sensitivity analysis that how much of the surface parameters cause an error in the accuracy of GEMS polarization correction algorithm. The tested data are well known LER climatology dataset of GOME-1 (Global Ozone Monitoring Experiment-1), GOME-2, SCIAMACHY (Scanning Imaging Absorption Spectrometer for Atmospheric CHartographY) and OMI (Ozone Monitoring Instrument).