The Status of Geostationary Environment Monitoring Spectrometer

Hyunkee Hong (1), Sang-Kyun Kim (1), Jong-Min Yoon (1), Won Jun Choi (1), Kyung-Jung Moon (1), Sang-Min Kim (1), Chang Suk Lee (1)

[1] Environmental Satellite Center, National Institute of Environmental Research, Environmental Research Complex, Seo-gu, Incheon, 22689, Republic of Korea
Email: brunhilt77@gmail.com, wanju77@korea.kr;

Abstract: To monitor and forecast air quality and short-lived climate pollutants in East Asia, Geostationary Environment Monitoring Spectrometer (GEMS) will be launched in late 2019 - early 2020. Its coverage is about $75°$ E - $114°$ E and $5°$ S - $45°$ N and the spatial sampling is 8×3.5 km (aerosol) and 8×7 km (trace-gases) at Seoul. Main products (O_3, HCHO, NO_2, SO_2, AOD, etc.) of GEMS are retrieved via Differential Optical Absorption Spectroscopy (DOAS) (NO_2, SO_2, HCHO, and cloud), Optical estimation (AOD, O_3 profile, and O_3 total), The Total Ozone Mapping Spectrometer algorithm (O_3 total) and principle component analysis (SO_2) using UV-Vis hyper-spectral earthshine radiance from 300 to 500 nm with a spectral resolution of about 0.6 nm.

All GEMS L2 retrieval algorithms have been developed. In order to validate the algorithms, the Environmental Satellite Center and the GEMS algorithm development team evaluated their performance using synthetic radiance, Ozone Monitoring Instrument (OMI) LV1B radiance, and Tropospheric Monitoring Instrument LV1B radiance. Main products retrieved from the GEMS algorithms have over 0.75 correlation with those form OMI algorithms.

The Environmental Satellite Center will carry out the validation and update of GEMS L2 algorithms with ground-based and air-borne remote sensing measurements such as Pandora, Multi Axis-DOAS, and The Geostationary Trace Gas and Aerosol Sensor Optimization after the satellite launch.

Keywords: The specification of GEMS, GEMS L2 algorithm, Validation of GEMS