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Retrieval of Aerosol Optical Properties over East Asia from TROPOMI using GEMS Aerosol Algorithm

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To better understanding the role of aerosols in climate change and their direct effects on human health, aerosol optical properties have been monitored by various satellite sensors. Successful operations of the Tropospheric Monitoring Instrument (TROPOMI) onboard the Copernicus Sentinel-5 Precursor satellite allow an improved understanding of the wide-ranging variation in aerosol distribution and properties with high spatial resolution since 2018. The Geostationary Environmental Monitoring Spectrometer (GEMS), onboard Geokompsat-2B (GK-2B) satellites, is the first air quality monitoring sensor in geostationary earth orbit and was successfully launched on February 19, 2020. GEMS measures hourly hyperspectral radiances with the spectral resolution of 0.6 nm in UV and visible range (300 – 500 nm) and the spatial resolution of 3.5 x 8 km^2 over Asia during the daytime to provide air quality information. TROPOMI which has similar specifications to GEMS, has the advantages of the sensitivity of aerosol absorption and aerosol height information in UV-Vis wavelengths. GEMS aerosol algorithm was applied to the Level 1B data of TROPOMI to retrieve aerosol optical properties such as aerosol optical depth (AOD), UV aerosol index (UVAI), single scattering albedo (SSA), and aerosol loading height (ALH). We present GEMS aerosol retrieval results to discuss high aerosol loading cases over East Asia and analysis results as a case study. Our results show that the GEMS aerosol products have the advantage to capture the fine-scale features of aerosol properties in high spatial resolution. Further, the results are compared to other aerosol products obtained from the Advanced Himawari Imager (AHI) onboard Himawari-8. Qualitatively good agreements and fine-scale features are shown in this case study.