Operation Plan of Geostationary Environmental Monitoring Spectrometer (GEMS)

Jaehoon Jeong, Goo Kim, Kyung-Jung Moon, Minseok Nam, Deokrae Kim, and Dongwon Lee
National Institute of Environmental Research, Environmental Satellite Center, Korea, Republic of (jaehoon80@korea.kr)

The Geostationary Environmental Monitoring Spectrometer (GEMS), which is the world's first geostationary environmental satellite, is scheduled to be launched in February of this year. Observing more than 8 times a day (up to 10 times), GEMS is expected to play an important role for regional and periodic monitoring of air quality and pollution in East Asia. In this study, we report the status of GEMS operation readiness and the overall operation plan after launch. The design and development of a ground station system for GEMS operation and utilisation are now completed. The GEMS ground system will generate level 1B (L1B) data through radiometric and geometric correction after receiving the signal and produce a level 2 (L2) product by using L1B as input data. In the case of L2 data, it will produce 20 kinds of output, including ozone, aerosol, volatile organic compounds (VOCs) such as formaldehyde and glyoxal, gas products such as nitrogen dioxide and sulphur dioxide, surface information, and more. All algorithms for L2 product generation have been developed and verified. Currently, we are continuing to work toward stabilisation and speed improvement and plan to produce L2 products within one hour of observation. All processing must be completed within one hour before the next observation begins, specifically 30 minutes for L1B generation and the remaining 30 minutes for L2 generation. GEMS L2 processing is scheduled day and night. In the daytime, the goal is to produce L2 products within one hour for real-time distribution. In the night operation, on the other hand, the goal is to produce L2 products with a main purpose of improving the quality of L2 products through the use of additional information. GEMS will have an in-orbit test (IOT) period of approximately eight months following launch for radiometric and geometric calibration. During this period, many efforts will be made to ensure the quality of GEMS data, including comparative verification with reference data obtained from various observation methods and cross-calibration and -validation with the organisations that have made an agreement in advance. Suggestions from institutions interested in mutual collaboration for GEMS calibration are still welcome (note that proposals for mutual collaboration remain open). We also plan to verify the effectiveness of the night-time operation during the IOT period. The products will be distributed in stages after IOT according to the internally established distribution regulations. In this study, the overall operation of GEMS and the data distribution plan are presented. Although the schedule may change slightly depending on various situations after launch, this information is expected to be useful for many institutions and researchers in related fields who are very interested in GEMS data.