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Retrieval and Evaluation of Atmospheric Temperature and Humidity Profiles using Geostationary Hyperspectral Infrared Sounder

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The hyperspectral infrared sounder is known to play an import role in now-casting, data assimilation on NWP, and climate change monitoring. In particular, the first hyperspectral infrared sounder in GEO, FY-4A/GIIRS launched by CMA in December 2016, would be very useful for monitoring the three-dimensional information of atmospheric temperature and humidity fields with high temporal and spatial resolution. It observes around the Chinese region including the Korean Peninsula with 16 km spatial resolution every hour with 1,650 channels. In order to improve the accuracy of satellite-based atmospheric vertical profiles and its application in now-casting, KMA has been expanded 1D-VAR based GEO-KOMPSAT-2A AMI Atmospheric Profile(AAP) algorithm for FY-4A/GIIRS. To expand the AAP algorithm to the GIIRS, channel selection and systematic bias correction of GIIRS were performed. The channels sensitive to gas absorption were removed and weighting function were considered as evenly distributed vertically for temperature and humidity. The retrieved temperature and humidity profiles with the selected channels for one month in April 2022 were compared with radiosonde. The validation result was similar to the result with GK-2A/AMI only algorithm, so it is needed various sensitivity tests to get more accurate temperature and humidity profiles using hyperspectral infrared sounder such as the number of channels and wavelength selection used by the algorithm. The detailed results and plans are presented in the conference.

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