The KIAPS Observation Processing System Development for the Satellite Data Assimilation

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The Korea Institute of Atmospheric Prediction Systems (KIAPS) was founded in 2011 by the Korea Meteorological Administration (KMA) for a nine-year (2011-2019) project to develop Korea's own global Numerical Weather Prediction (NWP) system. KIAPS is in the last year of its first development phase (2011-2013).

The KIAPS data assimilation team has been developing the KIAPS Observation Processing System (KOPS) as a part of KIAPS data assimilation system. At this stage, a prototype framework for the satellite radiance data (AMSU-A, IASI), and Global Positioning System Radio Occultation (GPS-RO) data processing system has been developed using the fortran 90/95 code. KOPS adopted the RTTOV_v10 (Radiative Transfer for TOVS) for the AMSU-A and IASI radiance, and the ROPP (Radio Occultation Processing Package) for the GPS-RO, to implement observation operator. The observation data obtained from KMA GTS get extracted via the BUFR decoder. The background fields such as temperature, specific humidity, geopotential height and pressure used for the bias correction and quality control of the observation was prepared from the KMA-UM (Unified Model) forecast.

Interpolating the UM forecast fields on a regular latitude-longitude grid into the observation space is rather straightforward, but interpolating unstructured background fields on a cubed-sphere grid into the observation space is not so simple, and additionally computational efficiency should also be considered. Currently, the "index-based point search method" concerning a virtual regular grid (e.g. Plate-Carree) with a relatively high horizontal spatial resolution is under development for the unstructured background fields.