Current status and plans of direct-readout LEO satellite data processing in NMSC/KMA

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Abstract

National Meteorological Satellite Center(NMSC)/Korea Meteorological Administration(KMA) is processing various direct-readout Low-Earth-Orbit(LEO) satellite data such as Advanced TIROS Operational Vertical Sounder(ATOVs), Infrared Atmospheric Sounding Interferometer(IASI), Advanced Technology Microwave Sounder(ATMS) and Cross-track Infrared Spectrometer(GHS) radiance data for NWP data assimilation and weather analysis. Currently, NMSC is operating ATOVs and AVHRR Pre-processing Package(AAPP), Community Satellite Processing Package(CSPP) and International ATOVs Processing Package(AAPP) for direct readout data processing. KMA has provided the direct-readout ATOVs since 2009, IASI since 2017, ATMS and CrIS level 1c data of Suomi-NPP(NOPOESS Preparatory Project) satellite via GTS for Direct Broadcast Network(DBNet) activity since 2018, and is working on processing the direct-readout ATMS and CrIS data of NOAA-20 satellite which will be shared via GTS too. In this paper, we describe the current status and future plans of KMA's direct-readout LEO satellite data processing to support NWP assimilation including the quality check activities.

The status of satellite data reception of NMSC

- GEO Satellites: COMS-GK-2A, Himawari-8, FY-2E
- LEO Satellites: Terra/Aqua, NOAA-15/18/19/20, MetOp-A/B, S-NPP, DMSP COROLIS, GCOM-W1 etc.

Data processing packages operated by NMSC

Operation status of data processing packages for direct-readout data processing in NMSC  
- AAPP Version 8.3(Installation ‘19. 3. 8.) ‘  
- SPP: SDR Version 3.1(Installation ‘19. 10. 21.)  

Realtime data distribution via GTS for DBNet  
- ATOVS (since 2009), Metop-A/B IASI (since 2017) and S-NPP ATMS & CrIS (since 2018)

Quality verification of direct-readout NOAA-20 satellite data

- KMA’s direct-readout NOAA-20 ATMS/CrIS LID LI4F6 data  
- Data: NOAA-20 ATMS/CrIS LID LI4F6 data  
- Analysis method: To compare NMSC direct-readout data with MetOffice global data  
- Geolocation differences of each pixels  
- Brightness temperature differences of each pixels  
- Verification criteria : distance difference within 5km, brightness temperature values within ± 0.1-0.2K

Satellite data utilization on the UM Model in KMA

- To make the ATMS/CrIS data of NOAA-20 be DBNet-operational  
- To prepare direct-readout and process the MetOp-A/ATOVS & IASI data  
- To improve the ATMS/CrIS granule combining process of global Suomi-NPP(data collected from EUMETCast) using AAPP  
- To prepare EARIS direct-readout data processing (IASI, ATMS, CrIS) for NWP assimilation

Future plans

Reference

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