

P07

Diurnal and seasonal variations of inter-calibration for COMS Infrared channels

Minju Gu and Dohyeong Kim

KMA/NMSC

COMS (Communication, Ocean, and Meteorological Satellite) Meteorological Imager (MI) has been monitored following Global Space-based Inter-Calibration System (GSICS) since April 2011. KMA use four well-calibrated hyper-spectral instrument on Low Earth Orbit (LEO) satellites, Atmospheric Infrared Sounder(AIRS) onboard Aqua, Infrared Atmospheric Sounding Interferometer(IASI) onboard MetOp-A /B and Cross-track Infrared Sounder (CrIS) onboard Suomi NPP (SNPP), as references for inter-calibration of four infrared (IR) channels of COMS. Mean brightness temperature(TB) biases of MI-IASI/A inter-comparison are 0.29K for IR1 (10.8 μm), 0.22K for IR2 (12.0 μm), -0.75K for IR3 (6.7 μm), and 0.04K for IR4 (3.7 μm) from April 2011 to December 2014. Mean TB bias of MI-IASI/B are 0.33K, 0.28K, -0.77K, and 0.05K, respectively from August 2013 to December 2014. Mean TB bias of MI- AIRS are 0.22K, 0.22K, -1.00K and 0.18K, respectively, from April 2011 to December 2014. Mean biases of MI-CrIS are 0.14K, 0.17K , -0.91K and -1.44K, respectively, from January 2014 to December 2014. The mean biases of MetOp-B shows slightly larger than those of MetOp-A through the all four channels.

In addition, seasonal variation of inter-calibration for COMS-LEO is examined for 4 years accumulated observation data. Mean TB biases of MI-AIRS and MI-IASI show the different pattern that is, MI-AIRS has two peaks around March and September-October while MI-IASI has one peak around August-September. The difference between minimum and maximum values are 0K~0.4K for IR1 and IR2, -1.1K~0.3K for IR3 and -0.2K~1.5K for IR4 while 0.1K~0.5K for IR1 and IR2, -0.9K~-0.6K for IR3 and -0.35K~0.25K for IR4.

With the different equatorial crossing time with mid-morning orbit (MetOp-A and MetOp-B) and afternoon orbit (Aqua and SNPP), the diurnal variation of mean bias of COMS/MI IR channels could be examined in spite of time-gap between two orbits. In result, inter-calibration coefficients of IR1 and IR2 such as slope or bias seem to be relatively stable with respect to observation time in a day. But for IR3, the negative bias increases from around -0.9K at daytime to -1.2K at the local midnight. Both AIRS and CrIS show the same diurnal pattern, although the negative biases of MI-AIRS are slightly larger than those of

MI-CrIS. The further investigation is needed for the diurnal variation of COMS WV channel. IR4 shows relatively large variation which may be caused by stray light contamination including lunar radiance and/or by midnight effect due to the extra heating of scan mirror for three-axis body-stabilized geosynchronous satellite. The impacts of temporal variations of inter-calibration results need to be investigated before utilization of the GSICS correction products.