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Trend Analysis based on Ray-Matching for Level 1B Products of AMI/GK-2A and GEMS/GK-2B

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Ray-matching is a well-known calibration technique based on direct comparison of radiances measured from different satellite sensors. One of prominent strengths of this technique is its high adaptability to various sensors as long as there are enough scenes concurrently measured with matched angle conditions by the target and reference sensors. Within this realm, the Advanced Meteorological Imager (AMI) and Geostationary Environment Monitoring Spectrometer (GEMS) onboard Korean Multi-Purpose Satellite-2A and B (GK-2A and GK-2B) have a strong advantage especially in collocation, which is attributed to the close satellite nadir points at 128.2 °E. This advantage is evident in optical path alignment for all overlapped scenes under various spatiotemporal conditions, which facilitates temporal analysis of the measured radiances including diurnal and seasonal variation. This indicates both sensors can serve as complementary sources to each other, enabling the monitoring of measurement characteristics in a relative manner. For the analysis, collocation data were constructed by convolving the GEMS spectra with the spectral response function of AMI Band 1 (470 nm) after the spatiotemporal match. The comparison results show a high correlation

coefficient of over 0.99, which indicates strong agreement between AMI and GEMS. The differences (GEMS-AMI) also exhibit daily variations and seasonal fluctuations within around 10 and 5% for radiance and reflectances, respectively. The temporal trends show very stable signals over two years but with a drift caused by the increased signals of GEMS at the wavelengths over 450 nm. A certain temporal pattern is also found in the regression slopes along with latutidinal dependence within the GEMS field of regard. These results provide an enhanced understanding for the Level 1B radiances of AMI and GEMS, and will be employed further for improving inter-calibration with a reference sensor in the Global Satellie Inter-Calibration System (GSICS).