Cross-calibration of high-energy electron observations at geostationary earth orbit

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Cross-calibration of high-energy electron observations obtained from individual satellites are quite essential procedure for reconstruction of high-energy electron distribution at geostationary earth orbit (GEO). To compare high-energy electron data from individual satellite, we should find the period where the L*-value (drift shell) is the same. Because the magnetic dipole axis is not aligned with the rotational axis of the Earth, L*-value of each GEO satellite is changing depending on the longitude of GEO and magnetic local time. In addition, L*-value of each GEO satellite also changes depending on geospace disturbances. We have compared Himawari-8 high-energy electron (SEDA-e) data with GOES 15 high-energy electron (MAGED and EPEAD) data during the same L*-value of both satellites with quiet geomagnetic condition. This result shows quite good correspondence of both observation, and factor of sensitivity can be estimated.
Our previous study showed seasonal dependence of sensitivity difference between high energy electron sensor onboard Himawari and that onboard Kodama. We found that this seasonal dependence might be caused by the north-south drift of the Kodama’ s orbit. Previous study, we assumed that the orbit of Kodama is aligned with GEO. This result suggests that the detailed orbit information is important for cross-calibration. Based on this cross-calibration procedure, we can produce particle distribution at GEO. In our presentation, some sample events of particle distribution at GEO will be shown, and the future plan for producing particle distribution in the inner magnetosphere using energetic electron data from ARASE(ERG), Van-Allen Probes, and GPS will be introduced.

Keywords: space weather forecast, magnetospheric particle distribution, cross-calibration of particle data

