

MeV Electron Dynamics of the Radiation Belt Inferred from JAXA Satellite Observations

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Japan Aerospace Exploration Agency (JAXA) has been conducting radiation belt observation for more than 20 years to investigate radiation belt structure and temporal variations. JAXA installed radiation particle detectors on several satellites with orbits of LEO (Low Earth Orbit), GEO (Geostationary Orbit), and GTO (Geostationary Transfer Orbit). One of the most distinguished results was to identify the temporal variations of MeV electrons in the outer radiation belt. Internal acceleration model was proposed based on the JAXA satellite observation. Acceleration is achieved internally in the heart of the outer radiation belt in the periods of storm main phase and recovery phase. Increase of the MeV electrons in the heart of outer radiation belt was controlled by the magnetic activities. Effects of the solar wind velocity and IMF sector structure were identified for the large increase of the MeV electrons at GEO altitude. With these finding, we have constructed empirical model of MeV electron variation in the radiation. Transport of MeV electrons into the inner radiation belt was identified. They penetrated into the inner belt across the slot region only during the recovery phase of the very big magnetic storms. In the talk, we highlight above mentioned topics and then introduce details of the next mission: i.e. QZS (Quasi Zenith Satellite) observations of MeV electrons to make contributions of radiation belt sciences.

Keywords: JAXA, satellite, radiation belt, MeV electron