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RADIATION BELT MEASUREMENTS AND DATA BASE IN JAXA

Takahiro Obara[1*]

[1]Japan Aerospace Exploration Agency

In order to monitor space environment and its temporal variations, JAXA (Japan Aerospace Exploration Agency) Space Environment Group has been conducting space environment measurements for more than 20 years. JAXA installed space radiation detectors, magnetometers and plasma detectors on LEO (Low Earth Orbit) satellites, GEO (Geostationary Orbit) satellites, GTO (Geostationary Transfer Orbit) satellites and JEM (Japanese Experimental Module) of the ISS (International Space Station). These space environment data brought by JAXA satellites and International Space Station /Japan Experimental Module (ISS/JEM) have been used in real-time to inform warnings through the SEES (Space Environment & Effects System; http://sees/tksc.jaxa.jp/) to operators of JAXA satellites as well as ISS/JEM when the space environment becomes dangerous. With these data, some distinguish achievements on radiation belt science have been obtained and an assessment of radiation belt models is under taken. Intensity of MeV electrons in the radiation belt (L˜3 to L˜8) increases by the increases of solar wind velocity as well as magnetic activities. We confirmed seasonal variation of outer belt electrons; i.e. in both spring and autumn seasons the intensity of outer belt electrons increases together with magnetic activity. This phenomenon is understood as Russell - McPherron effect. Strong injection or transportation of intermediate energy (40-100keV) electrons into the heart of outer radiation belt was identified during the magnetic storms. These intermediate energy electrons should be seeds of MeV electrons and then accelerated internally. Transport of MeV electrons into the inner radiation belt was identified; i.e. MeV electrons penetrate into the inner radiation belt across the slot region during the recovery phase of the very big magnetic storms. These penetrations will be one of the supply processes of MeV electrons in the inner radiation belt. We also identified intense precipitations of outer belt electrons into the atmosphere by means LEO satellite observations. These losses have been evident during main and recovery phases of the magnetic storms.

Keywords: Radiation Belt, Satellite Observation, Data Base