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ENERGETIC ELECTRON DYNAMICS IN THE INNER MAGNETOSPHERE INFERRED FROM JAXA SATELLITE OBSERVATIONS

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In order to investigate space environment and its temporal variation, JAXA has been installing radiation particle detectors on LEO satellites (GOSAT, ALOS, Jason-2), GEO satellites (ETS-V, DRTS), GTO satellites (ETS-VI, MSD-1) and Quasi zenith orbiting satellite (QZS-1). With these radiation particle data, some distinguished sciences of energetic electrons have been obtained. Intensity of highly energetic (MeV) electrons in the outer radiation belt increases drastically during the magnetic storms in a very wide region from L˜3 to L˜8. Increase of MeV electrons in the outer radiation belt (L˜3 to L˜8) seems to be controlled by solar wind velocity as well as magnetic activities. Seasonal variation of the increase in the intensity of MeV electrons was found with peaks of spring and autumn. This is understood as Russell-McPherron effect. With these relations, we have constructed an advanced (dynamic) outer radiation belt model, and compared it with observations. Strong injection or transportation of intermediate energy (40-100keV) electrons from the plasmasheet into the heart of outer radiation zone (L˜4) was identified during the major and big storms. These intermediate energy electrons should be seeds of highly energetic (MeV) electrons in the outer radiation belt. Thus means that seed electrons should be accelarated internally in the outer radiation zone via wave particle interaction. It was found that MeV electrons penetrated into the inner radiation belt across the slot region during the big magnetic storm. We also found that low energy (40keV) electrons have been transported to very near Earth region; i.e. a few thousand km above sea level. We will make comparison with simulation results to interpret observations.

Keywords: Inner Magnetosphere, High Energy Electrons, JAXA Satellite Observation