

Variations of energetic electrons and magnetic field in the radiation belt during magnetic storms

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We have investigated energetic electron flux variations and the magnetic field in the outer radiation belt obtained from the Standard DOse Monitor (SDOM) and the MAgnetoMeter (MAM) of the Space Environment Data Acquisition equipment (SEDA) onboard Tsubasa (Mission Demonstration Test Satellite (MDS)-1) launched on February 4, 2002. Since Tsubasa is operated in geostationary transfer orbit (GTO), it has provided a rare opportunity for directly observing near-equatorial radiation belt plasma particles and the magnetic field through the wide range of L-value during magnetic storms. Energetic electrons in the outer radiation belt are known to display drastic flux variability associated with magnetic storms. Sharp drops and subsequent slower recoveries of the energetic electron flux in the outer radiation belt during the magnetic storms are linked respectively to typical variations of the magnetic field. An anomalous pitch-angle distribution of energetic electron, which is a dumbbell-like distribution, is observed in the outer radiation belt during the main phase of the magnetic storm. These observations could shed light on possible mechanisms for the depletion and subsequent recovery and/or build-up of energetic electrons in the outer radiation belt.