Contribution of escaping through the magnetopause boundary to loss processes of the outer radiation belt during magnetic storms

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While it is known that the high energy electron flux of the Earth's outer radiation belt exhibits a sharp decrease at the main phase of magnetic storms, its mechanism are still controversial. For the loss processes of the outer radiation belt, adiabatic change, dropping into the atmosphere by pitch angle scattering, and escaping through the magnetopause boundary have been proposed. We have suggested that the sharp decreases of the outer radiation belt are deeply related with the escaping through the magnetopause boundary because the butterfly distributions of the energetic electrons are frequently observed by MDS-1 (Tsubasa) satellite at L=5~5.5 around the nightside magnetic equator in the March-April 2002 storms. Calculating the orbits of the high energy electrons using the inner magnetic field model (Tsyganenko 2001), we have inferred that those distributions are due to the drift-shell splitting mechanism in the deformed inner magnetosphere. We will evaluate a contribution of the escaping thought the magnetopause boundary to the loss processes for the recent magnetic storms including the Oct.-Nov. 2003 and Nov 2004 big storms using the new dynamic inner and near magnetosphere magnetic field during strong storms (Tsyganenko et al. 2004).