

PEM024-09

Room: Function Room A

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Time variation of outer boundary position of the outer radiation belt: THEMIS observation

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It has been known that variation of the electron fluxes in radiation belts is determined by a delicate balance between effects of electron acceleration and loss. The magnetopause shadowing (MPS) is proposed for a possible mechanism of electron flux losses in the outer radiation belt. Several test particle simulations and observational studies have suggested that the MPS may efficiently work for the loss when the solar wind dynamic pressure is high and/or the southward IMF is large. This issue, however, has not been concluded yet. To discuss the role of the MPS on the time variation of the outer boundary of the outer radiation belt, we analyze statistically energetic electron data using THEMIS/SST. The THEMIS satellites can directly detect the outer boundary of the outer radiation belt because of broad area coverage of the inner magnetosphere. These observations show that the inward movement of the outer boundary is well correlated with the solar dynamic pressure as well as the amplitude of the southward IMF. Furthermore, it is found that the variation of the outer boundary is correlated with the variation of the magnetopause position. These results are consistent with the test-particle simulation, suggesting that the MPS actually controls for the variation of the outer boundary. Results of a quantitative assessment using our GEMSIS-RB code, which is the three dimensional drift approximated relativistic test particle simulation code, will also be presented.

Keywords: radiation belt, loss, inner magnetosphere, particle acceleration,
solar wind - radiation belt interaction