

定常 IMF の下での磁気圏電離圏複合系の振舞

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Dynamic Behavior of the Magnetosphere-Ionosphere Compound System under the Stationary IMF Condition

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When the interplanetary magnetic field (IMF) is negative (southward) and stationary, it is well known that quasi-periodic occurrence of substorms (the sawtooth event) is observed [e.g., Borovsky, 2004]. On the other hand, there are no works considering dynamic behavior of the magnetosphere when IMF is positive (northward) and stationary. Thus, we started to study the behavior of the magnetosphere for the constant IMF condition. From a simulation study of the magnetosphere in the constant northward IMF condition with non-zero IMF B_y , we revealed that the magnetosphere is not always stationary when IMF is northward and constant. There are two phases for the northward IMF condition; the static phase in which the magnetosphere is quasi-stationary and the dynamic phase in which quasi-periodic generation of weak plasmoids in the middle tail region. Synchronized with the plasmoid generation, there appears moderate earthward flow in the near-earth plasmashet region. Furthermore, at the same time, pressure is enhanced in the inner boundary region of the plasmashet, and subsequently the Region 2 current is intensified in the ionosphere. These features are quite similar to those of the substorm onset revealed from the MHD simulation [Tanaka et al., 2009] although the intensity of each phenomenon is weak compared with that in the substorm onset. It is noteworthy that no reconnection in the plasmashet is observed in the simulation.