

## Response of the Earth's Magnetosphere to the IMF Rotation

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orientation of the interplanetary magnetic field (IMF) has an important role to dynamics of the earth's magnetosphere through magnetic reconnection and induced magnetospheric convection. Magnetic reconnection and magnetospheric convection has closed and complicated relationship. Dayside magnetic reconnection between the IMF and the geomagnetic field remarkably influences the configuration and dynamics of the earth's magnetosphere. That is, relations between the IMF and geomagnetic field determine where magnetic reconnection favorably occurs, and how the reconnected field lines move. There are fundamental two factors to determine where and how much magnetic reconnection occurs at the magnetopause: The extent to which the IMF and the geomagnetic field are antiparallel and the relative velocity of the reconnected field lines in the direction perpendicular to the magnetic field. The first factor determines where the reconnection occurs while the second determines how the reconnected field lines move. The IMF lines flow radially from the subsolar point in the magnetosheath. Their velocity can easily exceed the local Alfvén speed. Therefore, it is not easy to generally separate the reconnection electric field and convection electric field near the magnetopause. It is a reason that the reconnection rate is hard to estimate in the realistic 3-dimensional magnetosphere.

We have used a three-dimensional global magnetohydrodynamic simulation of the interaction between the solar wind and magnetosphere to carry out a systematic investigation of the effects of the orientation of the IMF and dipole tilt on magnetospheric structure and dynamics by rotating the IMF in the y-z plane. The combination of dipole tilt and finite IMF  $B_y$  and  $B_z$  leads to complex structures in the magnetosphere with no symmetry planes anymore. Competition between antiparallel reconnection and the relative velocity of reconnected field lines well determines the location of dayside reconnection. It frequently suppresses to occur in the subsolar region because the geomagnetic field is not weakest there. Dayside reconnection maximizes the condition that the fields are antiparallel. We will demonstrate variation of the configuration of dynamics of the magnetotail depending on the IMF rotation.