



Concerning the Reconnection-Induction Balance at the Magnetopause of Mercury

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The location of the magnetopause separating the magnetosphere from interplanetary space is usually controlled by a pressure balance between the magnetic pressure inside and the thermal pressure of the shocked solar wind outside this boundary. As a result of magnetic reconnection some of the dayside magnetospheric flux is eroded to the nightside of the planet. In consequence, the magnetopause is moved towards the planet taking along the magnetopause currents. Thus, the external field from the magnetosphere that the planet experiences is intensified. Electromagnetic induction within the planetary interior acts against this external field amplification by increasing the effective planetary dipole moment. This pushes the magnetopause outwards again. In-situ spacecraft observations by the MESSENGER probe show that the magnetopause at Mercury is remarkably stable even during intense reconnection events implying a balance between reconnection and induction effects. Here, we estimate the magnitude of planetary electrical conductivity required to achieve this balance.