

Planetary Induction and Field-Aligned Currents at Mercury

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Magnetosphere-ionosphere coupling is a most important process controlling magnetospheric dynamics in the terrestrial magnetosphere. Due to the lack of a significant ionosphere at Mercury its magnetosphere is directly coupled to the surface of the planet and its interior. As the spatial scale of the Hermean magnetosphere is rather small, any dynamic process in the enigmatic magnetosphere of Mercury occurs on much smaller time-scales. Furthermore, spatial scales of important physical structures such as the magnetopause or flux transfer events are smaller than at Earth. Rapid temporal variations as well as rapid motion of magnetospheric features therefore should cause major magnetic induction effects, strongly influencing magnetospheric dynamics, and probably controlling the electromagnetic magnetosphere-planetary coupling. Basic features of the induction problem are discussed with special emphasize paid to moving field-aligned current systems in the Hermean magnetosphere.