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Abstract

A Preliminary Statistical Analysis of Flux Transfer Events along the Flanks of the Earth's Magnetopause

This work consisted of a statistical survey of flux ropes (also called Flux Transfer Events, or FTEs) along the flanks of the Earth's magnetopause. THEMIS spacecraft data were used for this survey due to their proximity to the equatorial plane, where kelvin-helmholtz (KH) surface wave amplitudes are the largest. FTEs are believed to be generated locally by magnetic reconnection when the nonlinear KH waves are developed (e.g., Nakamura et al., 2008; Eriksson et al., 2008). The objectives of the study were to identify bipolar magnetic events which indicate either an FTE or a KH surface wave and develop statistical results that would illuminate the nature of the FTEs.

The importance of this study is twofold: First, it helps satisfy basic human curiosity and an understanding the world around us, which is an essential pursuit. Second, FTE generation contributes to plasma transport across the normally impassable magnetopause and directly affects space weather, which has numerous tangible applications.

During this study, we found that trailing-edge FTEs dominate (see trailing-edge diagram). We also performed MHD reconstruction for two ideal FTE events to verify that they were, indeed, FTEs. These results are preliminary since we performed statistical analysis on 11 of 123 dates.