Geophysical Research Abstracts, Vol. 9, 04698, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-04698

Pulsed Reconnection at the Dayside Magnetopause

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Reconnection at the magnetopause has been established as the dominant mechanism by which magnetic fields in different regions change topology to create open magnetic field lines that allow energy and momentum to flow into the magnetosphere. Observations and data analysis methods have reached the maturity to address some of the major outstanding questions about magnetic reconnection: e.g., the variability of the reconnection rate. The consequences of variations in the reconnection rate are predominantly shown in the occurrence of cusp structures.

In investigations of cusp structures caused by precipitating particles, results are often obscured due to the intermixing of spatial and temporal effects. Multispacecraft observations allowed for a clear separation of these processes. In this presentation we are reporting on a single spacecraft method to document the characteristics of the reconnection rate as a function of IMF and solar wind conditions. Variations in the particle precipitation observed by the TIMAS instrument on the Polar spacecraft in the northern cusp together with the information about where the reconnection line is located are used to systematically characterize magnetic pulsations. Several test cases will be discussed to demonstrate the method.