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Transmission and consequences of solar wind fluctuations in the plasma sheet

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The purpose of this study is to quantify how solar wind conditions affect the energy and plasma transport in the geomagnetic tail and it's large-scale configuration. To uniquely identify the role of various effects, the magnetospheric data will be sorted according to different solar wind plasma and interplanetary magnetic field (IMF) parameters: Speed, dynamic pressure, Alfven mach number, IMF north-south component, and the power in the dynamic pressure and IMF Ultra Low Frequency (ULF) fluctuations. We will study and compare the magnetospheric magnetic field magnitude and configuration as well as the variations of the average flow speed pattern and the occurrence and properties of flow bursts in different solar wind conditions. Magnetospheric data from five THEMIS spacecrafts and solar wind data from NASA's omniweb will be used in this study. During the studied time period the five THEMIS spacecraft were periodically aligned in the night-side plasma sheet parallel to the Sun-Earth line covering distances from about 10 Re to 30 Re downtail. The studied time interval covers years from 2007 to 2009 and it corresponds to the extended and prolonged solar activity minimum between solar cycles 23 and 24, which will allow investigating magnetospheric processes and solar wind-magnetospheric coupling during the relatively quiet state of the magnetosphere. The motivation of this study is to improve our understanding on solar wind-magnetosphere coupling and thus ultimately improve space weather forecasting.