Properties of Magnetopause Magnetic Flux Ropes as a Function of SYM-H Index

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Abstract

Magnetic flux ropes are meso-scale (a few RE) structures that form on the day-side magnetopause due to multiple reconnection. By characterizing flux ropes during storm vs non-storm conditions, we can thus learn about the reconnection process under these different driving scenarios, which is a key objective for the NASA Magnetospheric Multiscale (MMS) mission and the upcoming TRACERS mission. Using a database of magnetic flux ropes observed by MMS, we compare properties of the events as a function of the storm-time sym-H index. The relative occurrence rate (with respect to SYM-H), estimated diameter, and plasma properties (density, temperature, velocity, etc.) inside the flux ropes are examined for SYM-H values ranging from 0 to $< \tilde{}$-50 nT. Results of this study will contribute to the current understanding of dayside magnetospheric response to varying intensity of solar wind driving.

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