

Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Spatio-temporal dynamics of the magnetosphere: Mutual information function analysis¹ SURJA SHARMA, JIAN CHEN, THANGAMANI VEERAMANI, University of Maryland, College Park — The magnetospheric response to strong driving by the solar wind is highly structured, and spatially resolved data are essential for the understanding of the spatio-temporal dynamics. The global and local features of the magnetosphere are studied using nonlinear dynamical techniques of phase space reconstruction. A database of the solar wind data from satellites and ground-based magnetometer stations is used to study the magnetospheric response to solar wind variables using mutual information functions. A key feature of the mutual information function is its ability to bring out the linear as well as nonlinear correlations and such functions are needed to study the inherently nonlinear dynamics of the magnetosphere. The spreads in the average mutual information functions computed for the different stations show strong correlations with the solar wind convective electric field and the sudden changes in the dynamic pressure. The time evolution of mutual information shows a westward expansion of the disturbed region in the night side magnetosphere, starting from the near mid-night sectors. The mutual information functions are used to quantify the transfer of information among the different locations.

¹Supported by NSF grants ATM-0318629 and DMS-0417800

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Date submitted: 20 Jul 2007

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