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On the Storm-Substorm Relationship: an Information Theory Approach

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Recently, an increasing interest has been developed in the application of information theory to the global magnetospheric dynamics. Most of these studies are based on the use of Shannon entropy and delayed mutual information to get some insights about the driving of a particular magnetospheric process by another.
Here, we put our attention on the storm-substorm relationship by applying the transfer entropy technique introduced by Schreiber [2000] to storm and substorm proxies (AL, Dst and SymH indices). The results suggest the existence of a statistical evidence for a transfer of information from substorms to storms.