



Intermittent criticality revealed in the ENIGMA magnetometer array time series prior to the strongest magnetic storms of the present solar cycle

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The geomagnetic field observations of the ENIGMA magnetometer array associated with the most intense magnetic storms of solar cycle 24 are studied in terms of the theory of critical phenomena and phase transitions. The application of the critical fluctuations analysis method on the unprocessed Earth's magnetic field variations provides evidence of the existence of criticality from 8 up to 45 hours before the occurrence of these intense magnetic storms. The identified dynamics are analogous to those of thermal systems undergoing phase transition of the second-order. Detrended fluctuation analysis results are consistent to the findings of the method of critical fluctuations implying that the underlying nonlinear processes are anti-persistent, as expected for criticality caused by intermittent dynamics.