Geomagnetic diagnosis of the magnetosphere and its dynamical interaction with the solar wind

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A b s t r a c t: In the present study we investigate the dynamical behaviour of the magnetosphere and solar wind by wavelet-based analysis of geomagnetic time series and in-situ record of solar wind magnetic field. It has long been accepted that the solar wind behaves as an ideal magnetohydrodynamical (MHD) system. This kind of description, however, cannot be used for the magnetosphere, which is a bounded system where coherent plasma streaming cannot take place. On the other hand, several studies evidenced that the geomagnetic field data and AE index time series exhibit similar behaviour as that can be observed in the case of ideal hydrodynamical (HD) or MHD systems. The question may arise then, to what extent the fluctuating nature of the magnetosphere dynamics can be influenced by the solar wind. We hope that the present analysis can provide some useful information to answer this question.

Key words: wavelet transform, distribution function, self-organized criticality

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