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Intensity distribution of AE and Dst and its relation to solar wind parameters

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Storm-substorm relationship and related solar wind-magnetosphere coupling process are studied on the basis of statistical analyses of AE, Dst, epsilon parameter and Em using OMNI data base from 1995 to 2013 and Wp index data from 2005. The statistical relationship between AE and Dst is examined to clarify the difference between CME storm and CIR storm. The intensity distribution of AE and Dst for a year is compared with that of epsilon and Em parameters in the solar wind.

The obtained major results are,

1). Relationship between AE at substorm and Dst is rather linear.

2). AE vs Dst relationship at CIR storm is different from that at CME storm.

3). Intensity distribution of AE and Dst for a year shows the exponential distribution.

4). Intensity distribution of epsilon parameter for a year shows the power low distribution.

5). Intensity distribution of Em for a year shows the exponential distribution.

6). The results 3) to 5) suggest that magnetospheric disturbances are mainly controlled by the solar wind electric field rather than by solar wind Poynting flux.

Keywords: substorm, magnetic storm, solar wind interaction