

Efficiency of solar wind-magnetosphere interaction during geomagnetic storms

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We have compared the relationship between merging electric field (E_m) and PC index using data from Wind and PC index during 1995-1998, since previous theoretical work suggests that the efficiency of merging process will be maximum when the magnetic field B_1 (solar wind) and B_2 (magnetosphere) are antiparallel and equal magnitude. We found that the value of the PC index tend to be saturated when $B_t \sin(\theta/2)^2$ ($B_t: \sqrt{B_y^2 + B_z^2}; \theta: \text{IMF clock angle}$) tend to increase. We also compared the relationship between E_m and Polar cap potential using ACE and DMSP data during two magnetic storms. We also found the similar saturation effect of polar cap potential. From the results of our data analysis suggest that efficiency of dayside merging tend to be low during intense $B_t \sin(\theta/2)^2$ period.