Observation of dusk electric field in low-latitude boundary layer

Naiquan Wang,1 Tao Chen,1 Zhenxing Liu,1 Jing Luo,1 G. Gustafsson,2 A. Balogh,3 and H. Reme4

1Center for Space Science and Applied Research, Academia Sinica, Beijing 100080, China.

2Swedish Institute of Space Physics, Uppsala Division, Uppsala, Sweden.

3The Blackett Laboratory, Imperial College, London, UK.

4CESR, BP 4346, 31028 Toulouse Cedex 4, Frace.

Abstract

A big magnetic storm with Dst of order –472 nT occurred on November 20, 2003. Cluster spacecrafts passed through the magnetopause at about 16:13:20 on the dusk flank, and crossed low-latitude boundary layer (LLBL) between 14:40:00 and 16:13:20. The dusk electric field component E_{dusk} was observed in the LLBL, magnetopause and magnetosheath. The E_{dusk} is about order of 0 – 70 mV/m during big magnetic storm, but the E_{dusk} is about order of (-3) – 3 mV/m during quiet time. The E_{dusk} is convective electric field, and the variance of E_{dusk} is correlative with B_z and V. The ions and electrons will be accelerated by continued increase of the E_{dusk} for very long time.