



A statistical study of the distribution and size of dipolarization fronts observed by Cluster

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Magnetic reconnection in the Earth's magnetotail accelerates fast plasma jets. The front edge of the earthward propagating jet is a type of discontinuity, called the dipolarization front (DF). The DF is characterized by an abrupt increase in the Z-component of the magnetic field mainly. The spatial distribution of DFs is investigated based on the data of four satellites of Cluster from 2001 to 2009. 920 earthward propagating DFs are found in this study. We found the maximum occurrence is at $Z_{GSM} \sim 0$ and $r \sim 16 R_E$ with one event occurring about every 2 hours, where r is the distance to the centre of the Earth in the XY_{GSM} plane. We investigate the spatial distribution of dipolarization fronts simultaneously observed by different numbers of satellites. The results show that the DFs near the earth would decrease with the number of satellites increasing. That means the spatial scale size of DF might reduce with earth-ward propagating. Most of the DFs are observed by only one satellite. It can be deduced that the majority of the DFs have a small extension, which is less than $1 R_E$.