



Re-creation of Dipolarization fronts observed by Cluster

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Dipolarization fronts (DFs) are an important structure ahead of bursty bulk flows (BBFs) and can accelerate electrons and ions in the plasma sheet, is. The evolution of two DFs, observed by four Cluster satellites, are studied. One DF is observed on 9 July 2002 at ~ 0417 UT when Cluster is located near $[-9.0, -15.0, 4.6]$ RE in GSM. The inter-satellite separation is ~ 4000 km, while the ion initial length is ~ 447 km. C1 and C2 are mainly separated along the X direction, observe similar profiles of BZ. The DF is first observed by C2, and then observed by C1. Interestingly, the front observed by C1 displays wave profiles on the ion initial length scale, which are observed by C2 just ahead of the front. Another DF is observed on 14 September 2004 at ~ 2042 UT when Cluster is located near $[-17.4, 1.8, 0.9]$ RE. The ion initial length is ~ 646 km, and the inter-spacecraft separation distance is ~ 1000 km. The distance between C1, C3 and C4 is less than 500 km along Y direction, and we find that these three satellites observe similar magnetic profiles behind the DF, and a waves with period ~ 2.5 s ahead of DF. The amplitude of the waves ahead of the DF becomes larger as time increases. This suggests that waves of ion initial length scale ahead of a DF can become larger in amplitude and may re-create the DF, while the previous DF can be found as large magnetic oscillations behind the new DF.