



Solar wind and substorm excitation of the wavy current sheet

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Following a solar wind pressure pulse on 3 August 2001, GOES 8, GOES 10, Cluster and Polar observed dipolarizations of the magnetic field, accompanied by an eastward expansion of the aurora observed by IMAGE, indicating the occurrence of two substorms. Prior to the first substorm, the motion of the plasma sheet with respect to Cluster was in the Z_{GSM} direction. Observations following the substorms show the occurrence of current sheet waves moving predominantly in the $-Y_{GSM}$ direction. Following the second substorm, the current sheet waves caused multiple current sheet crossings of the Cluster spacecraft, previously studied by Zhang et al. (2002). We further this study to show that the velocity of the current sheet waves was similar to the expansion velocity of the substorm aurora and the expansion of the dipolarization regions in the magnetotail. Furthermore, we compare these results with the current sheet wave models of Golovchanskaya and Maltsev (2005) and Erkaev et al. (2008). We find that the Erkaev et al. (2008) model gives the best fit to the observations.