



Field-aligned currents observed by MMS in the near-Earth plasma sheet during large-scale substorm dipolarizations.

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During substorms significant energy conversion has been reported to take place at the sharp dipolarization front in the flow braking region where the probability of observing bursty bulk flows (BBFs) significantly drops. On 10 August 2016, MMS traversed the pre-midnight near-Earth plasma sheet when dipolarization disturbances were detected in an extended nightside local time region by Cluster, Geotail, GOES 13, 14 and 15, and the Van Allen Probes. In an expanding plasma sheet during the dipolarization, MMS detected sub-ion scale field-aligned current layers that are propagating both Earthward (equatorward) as well as tailward (outward). These multi-scale multi-point observations enable a unique investigation of both the meso-scale evolution of the disturbances and the detailed kinetic structures of the fronts and boundaries relevant to the dipolarizations.