



Current system associated with small dipolarization fronts

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We present a case study of eight successive Plasma Sheet (PS) activations (usually referred to as « Bursty Bulk Flows » or « Dipolarisation Fronts ») associated with small individual $B_{Z_{GSM}}$ increases on 31 March 2009 (0200 - 0900 UT). This series of events happens during generally very quiet SW conditions, over a period of 7 hours preceding a substorm onset at 1230 UT. The amplitude of the dipolarizations increases with time. The low amplitude dipolarization fronts are associated with few (1 or 2) Rapid Flux Transfer events ($E_h > 2mV/m$), whereas the large amplitude ones engulf many more RFT events. All PS activations are associated with a small and localised current wedge (« wedgelet ») which seems to be the consequence of RFT arrival in the near tail. Ground magnetic perturbations affect a larger part of the contracted auroral oval for the events with more RFT event embedded (> 5). Dipolarisation Fronts with very low amplitude, a type usually not included in statistical studies, are of particular interest because we found them associated with clear wedgelets and particle injections at geosynchronous orbit. This exceptional dataset highlights the role of flow bursts in the magnetotail and brings up the question: are we in this case observing the smallest form of a substorm ?