



Plasma flows and three-dimensional current system before and at substorm onset

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With this study we show that Bursty Bulk Flows (BBFs) in the tail, associated with small Dipolarisation Fronts (DFs), can create a small Substorm Current Wedge (SCW) when entering in the near tail, under quiet solar wind conditions. The mechanisms at play in the magnetosphere are the same as in substorms but very localised (magnetic variations can still be relatively strong). Dipolarization fronts with very low amplitude, a type usually not included in statistical studies, are of particular interest because we found even those to be associated with clear small SCW-like current system. We show the first observation (for 8 hours long) of the ionosphere response to gradual plasma sheet heating, confirming the relation between the plasma sheet temperature and the ionosphere response in recent studies. We will discuss the impact of plasma flow on field-aligned currents and ionosphere under quiet solar wind conditions, before and after a substorm onset.