



Multi-scale observations of magnetotail flux transport during IMF-northward non-substorm intervals

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Simultaneous observations by the Cluster spacecraft and SuperDARN radars are presented of magnetotail flux transport during northward, but B_Y -dominated IMF. Two events are discussed, which occurred on 14 August 2004 and 17 September 2005, during intervals of negative and positive IMF B_Y respectively. During both intervals the Cluster spacecraft observed isolated bursts of Earthward plasma convection in the central plasma sheet. During the first event, the flows observed by Cluster also had a significant $V_{\perp Y}$ component in the duskward direction, consistent with westward azimuthal flows observed in the midnight sector by the northern hemisphere SuperDARN radars. During the second event, Cluster 4 observed a significant downward $V_{\perp Y}$ component, again consistent with the northern hemisphere SuperDARN observations which revealed eastward azimuthal flow. In this instance, however, Cluster 3 observed a duskward $V_{\perp Y}$ component which was more consistent with the duskward sense of the convection observed by the southern hemisphere SuperDARN radars. This implies that Cluster 3 and Cluster 4 were located on different field lines which experienced opposite net azimuthal forces and hence observed oppositely directed convection. These observations are consistent with previous SuperDARN studies of nightside flows under northward IMF and, more importantly, provide the first simultaneous in-situ evidence for a new mode of tail reconnection during non-substorm intervals involving an asymmetric tail.