



## **Time evolution of the current sheet associated with fast flows in the near-Earth plasma sheet observed by Cluster**

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Time evolution of current sheets (CSs) associated with fast flows in the near-Earth plasma sheet is examined using multipoint observations by the Cluster spacecraft. The superposed epoch analysis is conducted for fast flow events classified by the thickness of the CS calculated from the magnetic field data. The results are summarized as follows; (1) The CS remains thin ( half thickness < 3000 km ) during the Earthward flow in the thin CS, then it becomes thick ( half thickness > 3000 km ) abruptly at the end of the flow; (2) Earthward flows are seen in the thick CS during/after the dipolarization; (3) The CS remains thin during the flow reversal; (4) The CS becomes thin during the tailward flow observed in the thick CS. These results suggest that the CS changes in the course of the fast flow generation as follows; If fast flows are generated by magnetic reconnection, the CS near the reconnection site remains thin. On the Earthward side of the reconnection site the CS becomes thick when the flow stops. On the other hand, in the thick CS on the tailward side, it becomes thin during the flow. The new X-line can be formed in the latter thin CS and generate Earthward flows which propagate even in the thick and magnetically dipolarized CS.