



## **Cluster observations of O<sup>+</sup> escape into the magnetotail in comparison with the ring current input rate during an intense magnetic storm**

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On August 17<sup>th</sup> 2001, during the development of an intense magnetic storm main phase ( $Dst_{peak} \sim -105$  nT), the Cluster spacecraft were crossing the plasma sheet/magnetotail at  $\sim 19 R_E$ . An interplanetary shock and a consequent compressed southward interplanetary magnetic field (IMF) were observed by ACE in solar wind and its effects on the magnetotail by CLuster. Low (CIS) and high (RAPID) energy ion composition instruments onboard the Cluster spacecraft measured a high flux of O<sup>+</sup> ions near the plasma sheet, after the interplanetary shock. O<sup>+</sup> pitch angle distributions showed a field aligned ( $\sim 180^\circ$ ) beam in the northern lobe and a bidirectional (along  $0^\circ$  and  $180^\circ$ ) beam during the crossing of the central plasma sheet. Estimated tailward O<sup>+</sup> low energy flow was  $\sim 1 \times 10^{25}$  ion/s, which is  $\sim 5-6$  times the O<sup>+</sup> earthward flow during intense magnetic storms.