



Ion composition changes in the plasma sheet during the fast flow intervals observed by Cluster

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The plasma sheet in the magnetotail contains different ion species, where the H⁺ comes from the ionosphere and/or the solar wind, whereas the O⁺ and He⁺ originate mainly from the ionosphere. The ion composition in the plasma sheet dramatically changes during the fast flow intervals. In this paper we used the Cluster data to compare the variations of O⁺, He⁺ and H⁺ density in the plasma sheet during the fast flow intervals by applying the superposed epoch analysis technique. We found that after tail activities, the O⁺ density changed little while the densities of other species decreased much. Comparison between H⁺ and He⁺ showed little difference, which indicates that the behavior difference between O⁺ and other species is mainly due to the processes in the plasma sheet rather than the source difference between these species. The lighter ions were flushed away towards the Earth and down tail while most of the O⁺ remained in the plasma sheet.