



On the motion of energetic ions in the near-Earth plasma sheet: Cluster/RAPID observations

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The plasma sheet is considered as a critical region where the energetic particles are accelerated and transported into the inner magnetosphere. Knowing the behavior of the energetic ions in the near-Earth plasma sheet is important for understanding the acceleration processes in the magnetosphere. In this study, 11 years of 3-D energetic ion flux data (protons, helium, and CNO) from RAPID instrument on board Cluster 4 were used to statistically study the energetic ions in the near-Earth plasma sheet with different propagation directions (earthward or tailward) in response to different geomagnetic and solar wind conditions. Earthward (tailward) anisotropy for energetic ions was statistically found preferably at the duskside (dawnside) of the near-Earth X-line during substorm times. During quiet times sporadic earthward or tailward anisotropy in energetic ion motion is seen indicating local internal acceleration processes.