

Ring current development and ion transport: Geotail and Cluster comparison

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Ring current ions are energized to 20-200keV during storms and substorms while the energy levels of ionospheric ions are electron volt. It has been reported by previous studies that these ions flow into the plasma sheet and are accelerated there before being transported to the ring current. In particular O^+ ions gain larger energy than other ions. However there are no studies that compare the ion flux data of the plasma sheet and those of the ring current during the same time period.

We use the ion flux data collected by EPIC (Energetic Particles and Ion Composition) instrument on board the Geotail spacecraft and those collected by RAPID (Research with Adaptive Particle Imaging Detectors) instrument on board the Cluster. They have the ion flux data since 2000. The energy range of EPIC is 9-210keV/e and that of RAPID is 20-1500keV for H^+ and 90-1500keV for O^+ .

Using the data that are collected when the Geotail is in the near-Earth plasma sheet ($\sim 8-10R_e$) and the Cluster is in the night-side ring current region ($\sim 4-6R_e$) we compare the energy spectrum of these two regions during storms and substorms. If these spectra are similar, the ring current ions are considered to be adiabatically transported from the plasma sheet after they are accelerated there. The difference between the ion species (i.e., H^+ and O^+) is also examined.