

Comparison of the ion energy spectra between plasma sheet and ring current during storms

Yumi Ono[1]; Masahito Nose[2]; Stephen P. Christon[3]

[1] Earth and Planetary Sci., Kyoto Univ.; [2] DACGSM, Kyoto Univ.; [3] Focused Analysis and Research

It has been reported by previous studies that ring current ions are energized to 20-200keV during storms. A possible mechanism to explain these observations is that the ions are accelerated initially in the plasma sheet and then they are transported into the ring current either adiabatically or non-adiabatically.

In order to clarify which transport process is more plausible, we compare the energy spectra of H^+ and O^+ ions in the plasma sheet and the spectra in the ring current during storms. We use the ion flux data observed when Geotail/EPIC is in the near-Earth plasma sheet ($\sim 8-10R_E$) and Cluster/RAPID is in the ring current region ($\sim 4-6R_E$).

During a storm that occurred on 15 October 2003, we find that the spectral slopes of O^+ and the first adiabatic invariants are nearly the same in the two regions. This implies that the ring current ions are adiabatically transported from the plasma sheet. In order to examine whether such a case is dominant or not, we statistically compare the energy spectra in the two regions for the various Kp indices.