

## Differences between earthward and tailward flows in their dependences on IMF and geomagnetic conditions

# Akimasa Ieda[1], Toshifumi Mukai[2], Shinobu Machida[3], Shin-ichi Ohtani[4], Tsugunobu Nagai[5], Yoshifumi Saito[2]

[1] STEL, [2] ISAS, [3] Dept. of Geophys., Kyoto Univ., [4] JHU/APL, [5] Dept. Earth & Planet. Sci.

Earthward and tailward perpendicular fast flows in the plasma sheet were studied and their differences in response to the interplanetary magnetic field (IMF) and to geomagnetic conditions are discussed. We first identified the plasma sheet from 3.5 years of Geotail plasma and magnetic field observations between 8 and 32 Re down the tail. We then studied occurrence probabilities of fast flows during northward and southward IMF intervals, and during geomagnetically quiet and active intervals as identified by Kp and ASY indices.

As a result, both earthward and tailward flows were observed more often during southward IMF or active intervals than during northward IMF or quiet intervals, as expected. On the other hand, we found that there is a difference between earthward and tailward flows: Earthward flows are relatively sensitive to IMF conditions and tailward flows are relatively sensitive to geomagnetic conditions. We thus conclude that tailward flows indicate substorm expansion phase much better than earthward flows do.