

## Substorm-associated magnetic field fluctuations around $X=-10R_e$

# Kazuo Shiokawa[1], Iku Shinohara[2], Toshifumi Mukai[2], Hajime Hayakawa[2]

[1] STE Lab., Nagoya Univ., [2] ISAS

<http://stdb2.stelab.nagoya-u.ac.jp/member/shiokawa/>

We have investigated 21 events of near-Earth dipolarization at  $|X|$  less than 11  $R_e$  and  $|Y|$  less than 5  $R_e$  associated with substorms, using magnetic field (16 Hz), plasma moment (12 s) and electric field (12 s) measured by the GEOTAIL satellite for 1995-2000. Substorm association is identified using ground magnetometer chain (CANOPUS, WDC, GADC, MM210, and IMAGE). Polar UVI, GOES magnetic field, and some ground Pi 2 are also checked. The results can be summarized as follows. (1) Dipolarizations are often accompanied by intense fluctuation of magnetic field with duration of a few min - 10 min. (2) The amplitude of the fluctuations relative to the ambient field  $B$  is larger for smaller  $B$  (closer to the neutral sheet). (3) The fluctuations are not sinusoidal curves, but are spikes of sudden decreases or increases. The rise and fall times of the spikes are less than a few seconds, while the amplitude is often more than 10 nT. The period of the spikes tend to be 5-20s. (4) Most of the fluctuations are accompanied by earthward convective plasma flow when they occur in the smaller  $B$  region. The velocity of the flow is usually less than 300 km/s. (5) For the two events of 950705 and 970730, total pressure ( $P_b + P_{th}$ ) gradually decreases before the fluctuation (dipolarization), but increases during and after the fluctuation (dipolarization).