

In-situ evidence for the IMF-induced tail twisting in association with interhemispheric displacement of conjugate auroras

Tetsuo Motoba[1]; Keisuke Hosokawa[2]; Yasunobu Ogawa[1]; Natsuo Sato[1]; Akira Kadokura[1]
[1] NIPR; [2] UEC

We provide in-situ evidence for twisting near-Earth magnetotail configuration, responsible for time sequence of the conjugate auroral features with the relative interhemispheric displacement during a weak substorm reported by Motoba et al. [2010]. We have analyzed the magnetic field data observed with four Cluster satellites in the vicinity of the 11-14 RE central down-tail, in close conjunction with the Iceland-Syowa optical auroras. Interestingly, the magnetic y -component (B_y) at the four satellites varied moderately coincident with the time-shifted IMF clock angle (CA) variation. The correlation coefficients (0.56~0.61) between the B_y field at Cluster and the IMF CA peaked at a time delay of 52 ± 1 min from the dayside magnetopause, probably corresponding to the timescale for the IMF CA-related B_y field in the near-Earth tail to reconfigure. The IMF CA-related B_y variation at Cluster, regarded as a manifestation of the twisting magnetotail configuration, roughly coincided also with the relative MLT displacement of the nightside conjugate auroral forms. These results strongly support that the reconfiguration (twisting) process of the near-Earth tail on relatively longer timescale controls the locations of conjugate auroras observed in both ionospheres.