Local Time Distribution of the Day-Night Net Birkeland Current System Deduced from the Oersted Satellite

Satoru Yamashita[1], Toshihiko Iyemori[2], Shin'ya Nakano[3]

[1] Dept. of Geophysics, Kyouto Univ., [2] WDC-C2 for Geomag., Kyoto Univ., [3] Dept. of Geophysics, Kyoto Univ.

http://www-step.kugi.kyoto-u.ac.jp/~yamasita/

From the precise magnetic field measurements by the Oersted satellite at low-altitudes over various local time, a distinct spatial variation at mid- and low- latitudes was detected in the eastward component residual after the subtraction of a geomagnetic main field model. The average eastward component residual decreases on the dayside as latitude increases and it increases on the nightside; that is, the latitudinal structure of the eastward component residuals has a negative trend in the northward direction on the dayside, and a positive trend on the nightside. The slope of latitudinal profile of magnetic field eastward component residuals is steep on both dayside and nightside under geomagnetically disturbed condition, and has a high correlation with geomagnetic activity index such as the ap. These results strongly suggest the existence of a day-night net Birkeland current system that flows into the polar ionosphere on the dayside, and flows out on the nightside. These net currents seem to distribute in wide local time range, and the current intensity is strong around 1000LT and 1400LT on the dayside, and around 2200LT on the nightside. This local time distribution of these net currents is caused by incomplete cancellation of the region-1 and the region-2 Birkeland currents over each local time. The Results of detailed analysis of these net currents in the polar region will be discussed.