

Analysis of Sq vortex structures obtained from ground-based magnetic field observations

Hiroko Kohta[1]; Akimasa Yoshikawa[2]; Teiji Uozumi[3]; Kiyohumi Yumoto[4]; Yumoto Kiyohumi MAGDAS/CPMN Group[5]

[1] Graduate School of Sci., Kyushu Univ.; [2] Earth and Planetary Sci., Kyushu Univ.; [3] SERC; [4] Space Environ. Res. Center, Kyushu Univ.; [5] -

To clarify relationship between the global Sq current system, the equatorial electrojet and interhemispheric field aligned currents in daytime. we have examined seasonal and day-to-day variations of Sq current structures in both hemispheres. We used global ground-based magnetic dataset obtained from the Circum-Pan pacific Magnetometer Network(CPMN) stations on quiet days over past 10 years(1996-2006).

We have obtained following features about latitudinal and local time distributions of Sq current focuses: (1) The latitude of the Sq Current Center(SqCC) in the southern hemisphere is about 10 degrees higher than that in the northern hemisphere all year. It corresponds to difference between geographic and geomagnetic latitudes around the 210-degree magnetic meridian. (2) The SqCCs in the northern hemisphere and the southern hemisphere shift to earlier and later local time in around April, respectively. While the SqCCs shift vice versa in around October. This result may come from the magnetic field effect by the field aligned current flowing from the center of Sq current vortex in the winter hemisphere to that in the summer hemisphere(Takeda, 1990).

These observational results suggest a possibility that neutral wind structures and interhemispheric field-aligned current system can be monitored by ground-based magnetic observations. In the present paper, we will also discuss seasonal and day-to-day variations of Sq current structures, and connections among Sq currents reproduced by ground-based magnetic data, the field aligned current and the neutral wind.