

## Field-aligned current system and asymmetrical geomagnetic disturbances

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The dawn-dusk asymmetry in the north-south geomagnetic disturbances have been examined by many studies. Crooker and Siscoe [1981] attributed such asymmetrical geomagnetic disturbances to the net field-aligned current, flowing into the ionosphere on the dayside and flowing out of the ionosphere on the nightside. Their hypothesis of the day-to-night net field-aligned current system was supported by many low- or mid-latitude ground observations. On the other hand, low-altitude spacecraft observations revealed a statistical picture of the high-latitude field-aligned current distribution. However, from such observations, the net day-to-night current system is not necessarily derived.

In order to confirm whether the net field-aligned currents actually generate asymmetry of geomagnetic disturbances as observed on the ground or not, we examine the azimuthal magnetic disturbances in the inner magnetosphere, which would represent the magnetic disturbances caused by the net field-aligned currents, by using the magnetic data obtained by the DE-1 satellite. The results shows:

1. At the low latitudes in the inner magnetosphere, the magnetic disturbances tend to be westward and eastward on the dayside and on the nightside, respectively. This result is consistent with that of ground observations.
2. The net field-aligned current is downward in the pre-noon sector, and upward in the pre-midnight sector. This result suggests some dawn-dusk asymmetry in the intensity of the Region-1 or the Region-2 currents.

We also discuss whether the dawn-dusk asymmetry of the north-south geomagnetic disturbances can be generated by the net field-aligned current distribution derived from the DE-1 data.