Statistical study of near-Earth magnetic reconnection region by Geotail satellite

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Magnetic reconnection has been studied for more than decades. In many cases, magnetic reconnection is observed with fast plasma flows. Recent studies reveal that the Hall magnetic field forms in the reconnection region.

The magnetic field structure and the ion flows around the magnetic reconnection region are examined statistically using Geotail data. We study flow reversal events. We focus on following two points.

Difference of the Hall magnetic field structure between dawnside events and duskside events.
The magnetic field dependence of the ion flow direction.

We confirmed that the Hall magnetic field forms on magnetic field lines connected with the earth, and found that fast tailward flows observed at the midnight or the duskside tend to flow to the duskward. These flows are not seen in the dawnside. This can explain dependence on the interaction with the magnetic field. We discuss the relation to the magnetic field structure.