

## Study on structures of the dayside magnetic reconnection using GEOTAIL data

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In the present study, we have investigated the magnetic reconnection structure in the dayside magnetosphere that has not been studied intensively compared to nightside, by analyzing the GEOTAIL data. In the nightside magnetosphere (magnetotail), it is considered that a symmetric reconnection will occur because the characters of plasmas of two upstream sides are almost the same. On the other hand, in the dayside magnetosphere (magnetopause), it is considered that the asymmetric reconnection will occur because the magnetospheric plasma and the solar wind plasma are both involved in the reconnection. It is considered that the nightside reconnection has a quadrupole structure produced by Hall effect, and the dayside reconnection has a dipole structure. We selected reconnection events based on the simultaneous sign inversions of the ion outflow velocity and the magnetic field from the GEOTAIL data. We obtained 32 cases from the year 1995 to 2014, and found that they have either quadrupole or dipole structure in the duskward magnetic field component ( $B_y$ ). In the LMN coordinate system, we further investigated the magnetic field structure near the neutral line by analyzing changes in the ion density and magnetic field when GEOTAIL passed near the neutral line. In the quadrupole structures cases, the averaged value of the ion density ratio is 7.5 (Density in the magnetosheath / Density in the magnetopause) and the averaged value of the magnetic field ratio is found to be 1.53 ( $B_z$  in the magnetopause /  $|B_z|$  in the magnetosheath). On the other hand, in the dipole-structure cases, the averaged value of ion density ratio is 36.1, and the averaged value of the magnetic field ratio is 2.68. These values are greater than those with the quadrupole structure. We also investigated hot fast outflow component and cold inflow in the velocity distribution function of the ions in the selected event. We will discuss the difference between the symmetric reconnection and the asymmetric reconnection based on these results.

Keywords: magnetic reconnection, Hall effect, asymmetry, GEOTAIL spacecraft