

# Hall Effects in the ion convection pattern in the Y-Z cross section of the magnetotail

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It has been pointed out and confirmed by satellite observations that electrons are more rigorously frozen-in to magnetic field lines than ions are, and the difference in the ion and electron behaviors lead to the so-called Hall effect. The Hall effect is believed to become apparent when the gradient scale of the magnetic field approaches the ion inertia length, as has been confirmed by observations around the magnetic neutral point when the reconnection process is going on. We here show that the same effect is almost always seen in the earth's plasma sheet near the midnight meridian plane, where the plasma sheet thickness takes the minimum value. we propose that the persistent duskward ion flow that is localized near the neutral sheet around the midnight meridian plane is due to this effect.