

Longitudinal and latitudinal displacement of starting points of cusp ion precipitation controlled by IMF

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From Akebono observations, we selected 177 cusp precipitation events. We investigated the displacement of starting points of cusp ion precipitation dependent on the simultaneous IMF and found that the starting points are located upstream of the main deflection point of magnetospheric convection controlled by IMF. These starting points are regarded as the foot point nearest, along the satellite trajectory, to the dayside magnetopause reconnection site. Their location can indicate where the magnetic field on the magnetopause is anti-parallel to the simultaneous IMF, provided that magnetopause reconnection occurs on the field line directed anti-parallel to the IMF. Therefore, the orientation of the field lines on the magnetopause can be estimated from the displacement of the starting point.

From Akebono observations at low-altitudes, we selected 177 cusp precipitation events for which solar wind/IMF data were available. We defined a starting point of a precipitation event as the point where the cusp ions had the highest energy in the energy dispersion structure observed along the satellite path. We investigated the displacement of the starting points dependent on the simultaneous IMF. It is found that the starting points are located upstream of the main deflection point of magnetospheric convection controlled by IMF. They are distributed in the region of 8 - 16 MLT and 65 - 85 LAT. The latitudinal displacement of the starting points depends only on IMF B_z while the longitudinal displacement mainly depends on IMF B_y . The latitudinal displacement is linear between the B_z signs. The B_y effect on the longitudinal displacement appears larger for positive B_z than for negative B_z .

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