Effects of IMF on displacement of starting points of cusp ion precipitation and dayside convection

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Using Akebono observations, we have investigated relationship between IMF components (y and z, perpendicular to solar wind) and latitudinal and longitudinal locations of the starting points of cusp ion precipitation. The background is the following. (1) Cusp ion precipitation with clear energy dispersion is triggered by dayside reconnection. (2) Dayside reconnection can occur on terrestrial field lines anti-parallel to the IMF, which tangent to the surface of the dayside magnetopause. (3) Starting point, high-energy edge of the dispersion, is the location of the cusp ions nearest to the separatrix. The starting points of cusp ion precipitation have been identified semi-automatically.

As the result, the latitudes of the starting points linearly change depending only on the IMF Bz with good correlation. On the other hand, the local times of them change depending not only on the IMF By but also on the IMF Bz. The By effect to longitudinally shift the starting points is larger for northward (positive) Bz than for southward (negative) Bz.

We have also investigated convection flows estimated from electric field observation at the starting points. The latitudinal components of convection velocities tend to be smaller than the longitudinal components. A linear correlation is seen between the longitudinal velocities and IMF By clearly more than between the latitudinal velocities and IMF Bz. Events with large longitudinal velocities appear are located far from noon mainly for negative Bz largely. However, longitudinal velocities and IMF By for positive Bz are correlated with the same inclination of correlation line as for negative Bz. IMF Bz depends on the longitudinal position of the starting point regardless of longitudinal convection flows.