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Temporal vs spatial changes of dispersion patterns at the cusp

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Structured dispersion patterns of the ion precipitation in low- and mid-altitude cusp regions have been reported by many authors. These patterns are interpreted either as temporal features in terms of the pulsed reconnection model or as spatial changes caused by a combination of the particle velocity with the convection of magnetic field lines. It is generally expected that the spatial dispersion is predominantly observed in lower altitudes where the spacecraft crosses a wide range of geomagnetic coordinates in a short time, whereas the high-altitude spacecraft observes temporal changes because it stays nearly on the same field line for a long time.

We have analyzed several passes of the INTERBALL-1/MAGION-4 satellite pair through the high-altitude cusp and found that both temporal and spatial dispersion effects are important even in the magnetopause vicinity. We present two-point temporal variations of a cusp precipitation that allow us to estimate fast changes caused by IMF rotations during the event. The slope of the dispersion profile is used for determination of the reconnection-site location.