

## Aurora surge at poleward boundary of aurora zone related to Pi2-associated bi-directional flows

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From the statistical analyses of Pi2-associated geomagnetic field changes and plasmas at the geosynchronous altitudes, occurrence of the diversion of the fast earthward flows has been suggested (1). We found a possible manifestation of the flow diversion in aurora (2).

Summaries of the aurora observations are:

- (1) Poleward surges propagating eastward/westward along a thin and narrow aurora arc were observed in the invariant latitudes from 68 to 74 degrees.
- (2) The poleward surge repeated at Pi2 periodicities.
- (3) The propagation direction of the surge correlated to the sense of Pi2 polarizations (CW/CCW) at geosynchronous altitudes.
- (4) Multiple occurrence of the surge was found at adjoining sectors.

From those observations, we concluded:

- (1) The bi-directional flows passing at the outer boundary of the inner magnetosphere generated Pi2 polarizations at the geosynchronous altitudes.
- (2) Poleward surge was an auroral manifestation of the plasma instabilities, such as Ballooning-Interchange instabilities, in the directed flows.
- (3) The mechanism that repeated the poleward surge at Pi2 periods was not related to the FLR.

References:

- (1) First 10 min intervals of Pi2 onset at geosynchronous altitudes during the expansion of energetic ion regions in the night-time sector (Saka, Hayashi, Thomsen, JASTP, 2010).
- (2) Periodic aurora surge propagating eastward/westward at poleward boundary of aurora zone during the first 10 min intervals of Pi2 onset (Saka, Hayashi, Koga, JASTP, 2012).

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