R006-17
Zoom meeting B ：11/1 PM2 (15:45-17:30)
15:45-16:00

Plasma flow burst in the cusp: Relationship to the large-scale poleward motion of the electron precipitation region

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Previous studies on the plasma flow in the cusp have shown that the fast flow regions can exist in the vicinity of the mesoscale moving cusp aurora. For the large-scale motion of the electron precipitation region in the cusp, it is understood that fast ion flow often occurs nearly simultaneously with the intensification of the electron precipitation, but the detailed spatial relations between the fast ion flow and the large-scale motion of the electron precipitation region require clarification. In this study, we examined auroral image data obtained by an all-sky imager at Longyearbyen, Svalbard, plasma data from field-aligned fixed EISCAT Svalbard Radar (ESR), and the line-of-sight velocity data from the Hankasalmi SuperDARN radar to clarify this issue. We first identified approximately 84 hours as the period of the simultaneous observation of the all-sky imager and the field-aligned fixed ESR from the observation in the daytime sector during six winter seasons (December 2012 to January 2018). Examination of the ESR ion temperature at F region altitudes during those periods of time has shown that ion temperatures exceeding 2000 K are very limited, while the ion temperatures up to 2000 K are often observed. Since high ion temperatures at F region altitudes reflect how fast the ions convect through the slower moving neutral gas, these high ion temperatures can be regarded as events of very fast flow, which have speed faster than 2 km/s. Multiple flow burst events occurred in the cusp on 8 December 2016. One flow burst occurred at the time of the equatorward shift of the large-scale cusp aurora belt responding to the southward turning of the IMF, and then several flow bursts occurred repeatedly. With the help of a high-resolution two-dimensional local model representing the time-dependent interaction between the ions and neutrals in the high-latitudes (Oigawa et al.), we show the spatial relationship of the flow burst to the large-scale motion of the electron precipitation using the aforementioned data obtained simultaneously, and discuss the intrinsic difference between the large-scale poleward motion of the aurora and mesoscale poleward motion of the aurora in the cusp.