

Plasma flow enhancements preceding a large-scale moving cusp aurora

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Plasma flow associated with a small-scale poleward moving cusp aurora shows a twin vortex pattern. For a large-scale moving cusp aurora, whose longitudinal width is 2 - 3 hours MLT, however, plasma flow features surrounding the aurora are still unclear. In this study, we present the result from simultaneous observations of the EISCAT Svalbard Radar (ESR) with 32-m steerable and 42-m field-aligned fixed antennas, and a nearby all-sky imager for a large-scale moving cusp aurora event obtained on 8 December, 2013. The result shows that plasma flow enhancements precede the large-scale moving cusp aurora. In other words, the large-scale moving cusp aurora is not created at the forefront of the enhanced plasma flow region. The result also indicates that the forward boundary of the enhanced plasma flow is located nearly perpendicular to the poleward boundary of the moving cusp aurora. We discuss a plausible mechanism of the formation of this boundary.

Keywords: Plasma flow, cusp, aurora, polar cap