

Spatial structures of polar rain during the period of poleward moving cusp auroras

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Polar rain electron energy fluxes are usually very small and spatially uniform. Recent studies have shown that the short scale (approximately 140 km) modulation can occur in the polar rain electron energy flux, and that this modulation might be caused by flux transfer events. In this study, using simultaneous observations of poleward moving 630-nm cusp auroras from an all-sky imager at Longyearbyen, Svalbard, and precipitating electrons from the DMSP spacecraft, which traverse the dayside polar cap from the duskside to the dawnside, we examined spatial structures of polar rain electron precipitation during the period of poleward moving cusp auroras. Results of analyses of the DMSP precipitating electron data show that in addition to the above scale the energy flux of polar rain has smaller-scale structures. We discuss relationships of those scales to the electron precipitation producing the poleward moving cusp auroras.

Keywords: Polar cap, cusp, aurora, electron precipitation