Homogeneity of soft electron precipitation in the cusp for northward IMF

Satoshi Taguchi[1]; Kohei Takasu[1]; Keisuke Hosokawa[2]
[1] Grad school of Science, Kyoto Univ.; [2] UEC

When IMF is northward, electrons and ions are injected into the cusp along open magnetic field lines after reconnection poleward of the cusp. It is well understood that the injected ions often produce the dayside proton auroral spot at 75-85 MLAT at ionospheric heights, and that the cusp reconnection plays a significant role for the distribution of the cusp ion precipitation. In contrast, the electron precipitation in the cusp is rather homogeneous, and the redline cusp aurora, produced by the electron precipitation, is generally less structured than that for southward IMF even if the northward component of IMF is strong. In this study, using 630-nm aurora data from an all-sky imager at Longyearbyen, Svalbard, and precipitating electron/ion data and field-aligned current data from the DMSP spacecraft traversing the region above the cusp auroras, we examined what is reflected by the homogeneity of the cusp electron precipitation. From five winter seasons, we took more than 20 events for which the 630-nm aurora appears at latitudes higher than 75 MLAT, the DMSP observed the cusp ion precipitation concurrent with the field-aligned current associated with northward IMF. Results of the analysis have shown that the solar wind speed is important for the homogeneity of the soft electron precipitation in the cusp for northward IMF. We discuss this result in terms of the electron distribution in the upstream solar wind.