

Red line aurora in the dayside cusp for northward IMF

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During northward IMF magnetosheath 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 ionospheric heights, and that its brightness increases as the solar wind dynamic pressure becomes high. It remains unclear to what extent the injected electrons, which produce red line cusp auroras, reflect solar wind parameters including the dynamic pressure. In this study we examined relationships of red line cusp aurora emissions during northward IMF to solar wind parameters by using observations of cusp auroras from an all-sky imager at Longyearbyen, Svalbard, and observations of precipitating particles from the DMSP spacecraft traversing the region above the cusp auroras. Results of analyses show that the average component of the red line aurora emissions tends to increase with the solar wind speed, not the solar wind density or the dynamic pressure. We interpret this relationship in terms of the electron velocity distribution in the solar wind.

Keywords: cusp, aurora, electron precipitation, solar wind