

Magnetospheric-ionosphere dynamics associated with STEVE

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We present three STEVE (strong thermal emission velocity enhancement) events in conjunction with THEMIS in the magnetosphere, and DMSP and Swarm in the ionosphere, for determining equatorial and inter-hemispheric signatures of the STEVE purple/mauve arc and picket fence. Both types of STEVE emissions are associated with SAID (subauroral ion drifts), electron heating, and plasma waves. The magnetosphere observations show structured electrons and flows, and waves just outside the plasmasphere. Interestingly, the event with the picket fence had a >keV electron structure detached from the electron plasma sheet, while the event with only the mauve arc did not have precipitation or ultra-violet emission. We suggest that the electron precipitation drives the picket fence, and heating drives the mauve emission. We further present particle transport processes in the magnetosphere and discuss how magnetosphere conditions that are favorable to STEVE occur.

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