SuperDARN observations of storm-time plasma dynamics: Ionospheric backscatter occurrence and convection response to Storm Sudden Commencement

Tom A. Kane and Roman A. Makarevich

Department of Physics, La Trobe University, Bundoora, Victoria 3086, Australia
Email: r.makarevich@latrobe.edu.au

We present observations of the ionospheric echo occurrence and Doppler velocities during the periods of significant geomagnetic disturbances (Kp ≥ 7) in 2002-2006. The total numbers of ionospheric echoes are compared for all SuperDARN radars the data from which were available. The comparisons are conducted for the occurrences throughout an entire storm event as well as for the occurrence time variations in 10-min intervals. It is shown that both exhibit large variability from event to event with the Kodiak, Hankasalmi, and Bruny Island radars performing reasonably well. The time variation of the plasma convection intensity near the Storm Sudden Commencement (SSC) is also investigated. It is demonstrated that the plasma convection intensity often peaks several hours after SSC with the peak occurring near the time when a sharp drop in the Dst index is observed.