



## **Storm-time outflow of ionospheric ions and related features of convective E fields and particle precipitation**

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With coordinate data analysis of in-situ satellite DMSP measurements of IDM and RPA, ground-based SuperDARN observations of global plasma convection, along with particle and field data from FAST and auroral UV image from Polar as well as EISCAT/ESR data, an investigation is made on the features of ion up-flowing (including both of bulk and conic flow) during some major magnetic storms with minimum Dst less than -200nT. The morphologic characteristics of strong ion upflow versus MLT and MLAT and related large shear of convective field or its strong fluctuation will be presented. Attention is also paid to the relationships between large O<sup>+</sup> up-flowing fluxes with strong soft electron precipitation, field- aligned electrical field and currents, respectively. It is confirmed that dayside cusp/cleft is a very important region of storm-time ionospheric O<sup>+</sup> up-flowing, but not the unique dominant one. In most cases energetic oxygen O<sup>+</sup> out-flowing from dawn sector ionosphere is dominant during main phase of magnetic storm, but not true for all storms. Most of O<sup>+</sup> upflow bursts occur near the poleward edge of strong aurora activity region, mapping into magnetospheric boundary layers.