

Observations of ion outflow events with IMAGE/LENA and ground-based optical and IS radar facilities

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A variety of ion outflow processes have been observed in the high-latitude ionosphere from satellites, rockets, and ground-based IS radars. Low Energy Neutral Atom (LENA) imager onboard the IMAGE spacecraft can observe high energy neutral particles (10 - 300 eV) created by charge-exchange of ions moving upward from ionosphere. The LENA can take a global image of ion outflow with a time resolution of 2 min. On the other hand, EISCAT Svalbard Radar (ESR) and Aurora Spectrograph (ASG), installed at Longyearbyen, Spitzbergen in the arctic, can measure plasma parameters in the ionosphere and auroral spectra, respectively.

We have examined global characteristics of the ion outflow using the LENA image data along with Polar/UVI data. Further, those data were compared with ionospheric parameters obtained with ESR and ASG. We will present an event study which is associated with a substorm on November 28, 2000. In this event, ion outflow was observed by LENA imager during a period of 1940 - 2030 UT. Increase of LENA count rate showed that good correspondence with AE values and aurora emission in 00 - 06 MLT obtained by Polar/UVI. ESR data showed that ion upflow in the topside ionosphere (300 - 800 km) started at 2030 UT. It was found that this instance coincided with the time when poleward expanded aurora oval reached above Longyearbyen. This suggests that ESR may have observed a poleward moving spatial structure. In the presentation, we are also going to present detailed results of ion outflow based on ESR and ASG data in 2000 - 2002.