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Study of auroral-zone MSTIDs using 630nm airglow images

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There have been many observations of nighttime Medium-Scale Traveling Ionospheric Disturbances (MSTIDs) using all-sky airglow imagers at middle latitudes. However few airglow-imaging observations have been made at high latitudes. In this study we analyzed the MSTIDs observed at Tromso (69.6N, 19.2E; magnetic latitude: 67.1N) in Norway and at Athabasca (54.7N, 246.7E; magnetic latitude: 61.7N) in Canada using all-sky cooled CCD imagers. The imagers observe 630-nm airglow which has an emission layer at altitudes of 200-300 km. This is the first study of high-latitude MSTIDs in the longitude sector of Europe and Canada using airglow images. For Tromso, we analyzed 52 hours of clear sky from 9 January to 2 March 2009, and recognized three MSTID events. All three events were observed in January and their propagation directions were toward northeast, east, and NNW-NNE, though nighttime MSTIDs at middle latitudes usually propagate southwestward. We are going to increase the number of events by analyzing 2009-2010 winter data for Tromso. For Athabasca in Canada, we have analyzed 1-year data from September 2005 to August 2006 and recognized a tendency that southeastward-moving MSTIDs occur frequently in winter. In the presentation, we report these results and discuss possible causes of high-latitude MSTIDs.

Keywords: MSTID, airglow