

オーロラ帯近傍における 630nm 大気光イメージング観測による 夜間の中規模伝搬性電離圏擾乱の研究

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Observations of nighttime medium-scale travelling ionospheric disturbances by 630-nm airglow imagers near the auroral zone

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We study nighttime medium-scale travelling ionospheric disturbances (MSTIDs) observed in the 630-nm airglow imagers at Tromsø (69.6N, 19.2E; magnetic latitude: 67.1N), Norway and at Athabasca (54.7N, 246.7E; magnetic latitude: 61.7N), Canada. This is the first study of high-latitude MSTIDs by all-sky imagers in the European and Canadian longitudinal sectors. For Tromsø we analyzed airglow images for two winters from 9 January to 2 March 2009 and from 9 October 2009 to 3 March 2010. For Athabasca, we analyzed 2-year data from September 2005 to August 2007. At both stations, the MSTIDs were observed before the midnight with the occurrence rate of more than ~30%. The average wavelengths, phase velocities, and periods of the observed MSTIDs were 100-400 km, 50-150m/s, and 30-60 min, respectively. We found that MSTIDs at Tromsø tend to show eastward motion in addition to the typical southwestward motion. At Athabasca, we recognized a tendency that southwestward-moving MSTIDs occur frequently in winter. In summer, however we found characteristic northward-moving MSTIDs at Athabasca. At both stations, some MSTIDs showed characteristic change of their directions of propagation and wave front in association with auroral activity. We report an example of sudden motion of MSTIDs at substorm onset observed at 1730 UT on December 8, 2009 at Tromsø. On the basis of these results, we discuss possible cause of generation and motion of high-latitude nighttime MSTIDs.