

Turning of MSTID motion from southwestward to northeastward observed by an airglow imager at Paratunka, Russia

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Nighttime medium-scale traveling ionospheric disturbances (MSTIDs) are frequently observed at midlatitudes particularly in summer. They have predominantly northwest-southeast phase surface and move southwestward. However, there have been no successful explanations regarding the observed systematic southwestward motions of MSTIDs.

We have started measurements of the mesosphere and the thermosphere using an airglow imager at Paratunka, Kamchatka, Russia (52.97N, 158.25E, dipole magnetic latitude: 45.8N) since August 17, 2007. During the test observation on August 19, 2007, clear medium-scale traveling ionospheric disturbances (MSTIDs) were observed in the 630-nm airglow images at 10-14 UT (20-23 LT). The MSTIDs move first southwestward, but then move back northeastward in the northern part of the images. The northeastward motion was not observed at lower latitudes over Japan in GPS-TEC map. The northeastward motion of MSTIDs seems to be initiated by F-layer height decrease, which was simultaneously observed by an ionosonde at Paratunka. The F-layer height decrease was also confirmed as the enhancement of the 630-nm airglow intensity, which propagates from north to south. This fact indicates that poleward wind enhancement, probably associated with an equatorward-moving large-scale TID, caused the F-layer height decrease. These facts suggest that poleward neutral wind enhancement caused the turning of the MSTID-moving direction.

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