

R005-13

Zoom meeting C : 11/1 PM1 (13:45-15:30)

14:00~14:15

HF ドップラー観測と GPS-TEC による異なる高度の MSTID の伝搬特性

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Propagation characteristics of MSTIDs of different altitudes Obtained by HF Doppler sounding and GPS-TEC

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We analyze medium scale traveling ionospheric disturbances (MSTIDs), which frequently occur during daytime in winter and during nighttime in summer. The period of the MSTIDs is about 15 to 60 minutes. Although it is known that the MSTIDs are caused by Perkins instability and atmospheric gravity waves, there are some unknown characteristics about the altitudinal distributions of the MSTIDs. In this study, we examined the characteristics of the MSTIDs using HF Doppler sounding utilized by the University of Electro-Communications (UEC) and TEC data from the GNSS Earth Observation Network (GEONET) of the Geospatial Information Authority of Japan (GSI). The HF Doppler sounding observes the ionosphere at the altitudes of 150km to 250 km, using 5.006 MHz and 8.006 MHz radio waves transmitted from the UEC Chofu campus. The TEC observation, on the other hand, observes fluctuations of the plasma distribution of the altitude around 300 km. By using these data, we analyzed the MSTID that occurred on January 24, 2015. In this study, Doppler frequency data received at seven sites were used; Iitate, Sugadaira, Kakioka, Oarai, Sugito, Fujisawa, and Kyoto.

In the HF Doppler observation, similar waveforms were observed at these seven sites for both 5.006MHz and 8.006MHz during 00:00UT to 06:00UT. Here, we examined the propagation characteristics of MSTIDs using the Doppler frequency data of 8.006MHz. We calculated the correlation coefficient of Doppler data for any two sites every one hour and determined the time delay of MSTIDs at each location by identifying the time when the correlation coefficient was the maximum. As a result, we found that the wave propagated from northwest to southwest.

We also examined the temporal variation of the TEC disturbance, and found that the TEC disturbance also propagated from northwest to southwest, which is consistent with the propagation characteristics of the HF Doppler observation.

These results indicate that the propagation characteristics at altitudes of 150km and 300 km are similar each other. In the presentation, we would like to mention the three-dimensional distributions of MSTIDs by comparing 5.006 MHz and 8.006 MHz.