Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

PEM27-P28 Room:Convention Hall Time:May 26 18:15-19:30

Statistical study of longitude dependencies of MSTIDs observed with GPS networks

YAMAWAKI, Keita[1*] ; OTSUKA, Yuichi[1] ; SHIOKAWA, Kazuo[1] ; TSUGAWA, Takuya[2] ; NISHIOKA, Michi[2]

[1]Solar-Terrestrial Environment Laboratory, Nagoya University, [2]National Institute of Information and Communications Technology

We revealed statistical characteristics of medium-scale traveling ionospheric disturbance (MSTID) by using global positioning system (GPS) networks in North America and compared them with previous studies.

TEC (Total Electron Content) is obtained from delays of radio wave transmitted GPS satellites to the receivers. Using two-dimensional maps of TEC perturbations, for the first time, we statistically analyzed MSTID above North America in 2013. The observed characteristics can be summarized as follows:

1. The occurrence rate of MSTID above North America during daytime (0800LT-2000LT) is high in winter (November-March) and its propagation direction is predominantly south-eastward. This seasonal variation of daytime MSTID occurrence rate is consistent with that reported by earlier publications. The daytime MSTID could be caused by gravity waves.

2. The occurrence rate of MSTID during nighttime (2200LT-0600LT) is high in summer (May-August) and its propagation direction is predominantly south-westward. This feature is consistent with that reported in earlier studies. Perkins instability could play an important role in generating the nighttime MSTID.

3. The occurrence rate of morning MSTID is high throughout the year. Its propagation direction is predominantly eastward and the gravity waves generated by terminator could account for this type of MSTID.

4. The occurrence rate of MSTID above the west part of North America is 20 percent higher than that above the east part in summer (May-June).The pervious paper shows that occurrence rate of ES layer in west part of North America is higher than that in east part, on the basis of occultation observations using low orbit satellite. Our statistical result suggests that the coupling process between E and F regions could play an important role for generating MSTIDs.

Keywords: MSTID, GPS, sporadic E layer, longitude dependencies