

Characteristics of 100-1000 km-scale ionospheric disturbances observed by ISS-IMAP in collaboration with TEC map

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Two-dimensional Total Electron Content (TEC) map has been used for revealing characteristics of meso-scale ionospheric disturbances, such as Medium-Scale Travelling Ionospheric Disturbances (MSTIDs) and Equatorial Plasma Bubble (EPBs). We have developed high-resolution TEC maps as "Dense Regional And Worldwide International Networks of GNSS-TEC observation (DRAWING-TEC)" project (<http://seg-web.nict.go.jp/GPS/DRAWING-TEC/>). The project provides regional and global maps of absolute value of TEC, de-trended TEC with 60-min window, and Rate of TEC change Index (ROTI). As of 2015, regional maps are produced over North America and Europe in addition to Japan. These regional maps are powerful tools for studying characteristics of MSTIDs and EPBs. However, it is impossible to detect MSTIDs and EPBs over oceans by only TEC data derived from ground-based GPS receivers. In contrast with GPS-TEC data, airglow images observed by ISS-IMAP/VISI cover all areas including continents and oceans. But detecting MSTIDs from the space-borne imager is difficult since the 630 nm-airglow is weak in the mid-latitude ionosphere. In this study, we analysis both GPS-TEC data and ISS-IMAP/VISI 630 nm imager data and succeeded in detecting MSTIDs using ISS-IMAP/VISI 630 nm imager data. The spatial structure and occurrence characteristics of MSTIDs detected from ISS-IMA/VISI 630nm imager will be discussed in this presentation.

Keywords: ionospheric disturbance, ISS-IMAP, VISI 630nm airglow, GPS-TEC map