

Traveling Ionospheric Disturbances Triggered by Typhoon Hagibis (2019)

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The tropospheric severe weather system could affect the ionospheric plasma structure through triggering vertical propagating gravity wave disturbances. By analyzing receiving signals from Global Position System (GPS), we calculate the total electron content (TEC) to observe the corresponding ionosphere variations triggered by the severe weather events. On 11 October 2019, a series of traveling ionospheric disturbances (TIDs) generated by a strong typhoon Hagibis was observed in the ionosphere over Japan region. Over the central Japan, concentric TIDs (CTIDs) signature with periods 10-25 min, phase velocity 277.8m/s characters were observed. Over the Hokkaido area, north of the typhoon, another TIDs with the south-westward propagation was also observed. It has the concentric gravity wave characteristics of 10-25 min period and 500 km radius at 200 km altitude traveling for 103 minutes. Although the TIDs at the north has the characteristics of concentric gravity wave, it also has the property of medium scale TIDs (MSTIDs).

Keywords: ionosphere, gravity wave, MSTID, typhoon