

Observations of concentric and medium scale traveling ionospheric disturbances triggered by typhoons using dense GNSS observations over Taiwan

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In this study, we utilize hundreds of ground-based GNSS receivers over Taiwan to study the traveling ionospheric disturbances at the low-latitude region. During the typhoon approaching periods, we observe distinct concentric traveling ionospheric disturbances (CTIDs) produced by the typhoon induced concentric gravity waves. Following the CTIDs, the local generation of medium scale traveling ionospheric disturbances (MSTIDs) was observed. The MSTIDs were formed mainly on the west edge of CTIDs suggesting the electrodynamic coupling of the CTIDs and MSTIDs. The CTIDs provide seeding ionospheric density and electric field perturbations that could accelerate the growth rate of Perkins instability and lead to the local generation of MSTIDs. A physical model of the coupling effect is also proposed.

Keywords: Concentric Traveling Ionospheric Disturbances, Medium Scale Traveling Ionospheric Disturbances, GNSS