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GPS detection of the ionospheric disturbances over China due to impacts of Typhoons Rammasum and Matmo

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Medium-scale traveling ionospheric disturbances (MSTIDs) possibly excited by typhoon have been presented, for the first time, by applying the two-dimensional total electron content perturbation maps derived from the dense Global Position System (GPS) network in China. Two MSTIDs were observed on 19 July and 23 July 2014, respectively, during the landing phases of Typhoons Rammasun and Matmo. The MSTIDs excited by Rammasum were detected at 06:56–07:40 UT on 19 July 2014, with a mean horizontal phase velocity of 118 m/s and an amplitude of about 2 total electron content unit (TECU), it horizontally extended to about 600 km. The Matmo-related MSTIDs were observed at 14:48–15:54 UT on 23 July 2014; the wavefront, perturbation amplitude, and the mean horizontal phase velocity were 1000 km, 1.8 TECU, and 132 m/s, respectively. Both MSTIDs propagated southwestward with a distance less than 200 km. The short propagation distances of the MSTIDs indicate that the MSTIDs may be caused by the body forces resulting from the typhoons.