



## **A case study of ionospheric storm effects in the Chinese sector during the October 2013 geomagnetic storm**

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In this study, we investigate the ionospheric storm effects in the Chinese sector during 2 October 2013 geomagnetic storm. The TEC map over China sector ( $1^{\circ} \times 1^{\circ}$ ) and eight ionosondes data along the longitude of  $110^{\circ}\text{E}$  are used to show significant positive ionospheric phases (enhancements in TEC and ionospheric peak electron density NmF2) in the high-middle latitude region and the negative effects at the low latitude and equatorial region during the storm. A wave structure with periods about 1–2 h and horizontal speed about 680 m/s, propagating from the high latitudes to the low latitudes is observed in electron densities within the height region from 200 to 400 km, which is caused by the combined effects of neutral wind and the large-scale traveling disturbances (LSTIDs). In the low latitude regions, compared with those in the quiet day, the ionospheric peak heights of the F2 layer (hmF2) in the storm day obviously increase accompanying a notably decrease in TEC and NmF2, which might be as a result of the eastward prompt penetration electric field (PPEF) evidenced by the two magnetometers and the subsequent westward disturbance dynamo electric fields (DDEF). The storm-time TEC enhancement mainly occurs in the topside ionosphere, as revealed from the topside TEC, bottomside TEC and GPS TEC.

Keywords: Ionospheric storm; Neutral wind; LSTIDs; PPEF; DDEF