



## **Ionospheric response to a long-lasting southward IMF Bz geomagnetic storm**

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The 14-17 July 2012 storm is an extreme space weather event in solar cycle 24, which is featured by a southward IMF Bz lasting for about 30 h below 10 nT. In this work, multiple instrumental observations are used to comprehensively present the ionospheric storm-time effects during this extreme event. In the Asian-Australian sector, an intensive negative storm is detected near longitude  $\sim 120^{\circ}\text{E}$  on 16 July, and the negative phase is caused by the combined effects of intrusion of neutral composition disturbance zone and long-lasting daytime westward disturbance dynamo electric field (DDEF). The topside and bottomside TEC contribute equally to the depletion in TEC, and the DDEFs make a reasonable contribution. On 15 July, the topside TEC make a major contribution to the enhancement in TEC for the strong positive storm effects, showing the important role of the equatorward neutral winds. For the American sector, the combined effects of the disturbed electric fields, composition disturbances, and neutral winds cause the complex storm time features. The remarkable hemispheric asymmetry in this sector is mainly resulted from the asymmetry in neutral winds and composition disturbances. In addition, the storm-time effects show remarkable regional differences in longitude, altitude and sector during this geomagnetic storm.