



The ionospheric storm effects at low latitudes and equatorial regions during the 2015 St. Patrick's Day storm

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Ionospheric storms manifest an extreme state of the ionosphere caused by geomagnetic storms, and the complicated ionospheric storm effects are always a research focus for the ionospheric community. The geomagnetic storm occurring on 17-20 March 2015, which is characterized by the minimum SYM-H value -233 nT, is an extremely event of space weather in the current 24th solar cycle. In this report, multiple observations including GPS total electron content (TEC), ionospheric parameters from ionosondes, and magnetometer data are used to investigate the profound ionospheric disturbances at low latitudes and equatorial regions during this geomagnetic storm. Through observation and analysis, the disturbed electric fields, which comprise penetration electric fields (PEFs) and disturbance dynamo electric fields (DDEFs), are closely related to the ionospheric storm effects at low latitudes and equatorial regions during this event. The decisive role of electrodynamics at equatorial regions are focused in view of these observations to understand the complete process of the low-latitude and equatorial ionospheric response during the great geomagnetic storm.