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Salient features of the dayside low latitude ionospheric response to the main phase step-I of the 17 March 2015 geomagnetic storm

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Abstract

Based on TEC observations by India's GPS Aided Geo Augmentation Network (GAGAN), we report the dayside low latitude ionospheric variations over the Indian region during the moderate main phase step-I of the 17 March 2015 geomagnetic storm. In addition, we assess the efficacy of GPS inferred TEC maps by International GNSS service (IGS) in capturing large scale diurnal features of equatorial ionization anomaly (EIA) over the Indian region during this period. Following the prompt penetration electric field (PPE) at ~6:05 UT, equatorial electrojet (EEJ) enhances by ~55 nT over $75 \pm 3^\circ\text{E}$ longitudes where main phase step-I is coincided with local noon. Initial moderate EIA gradually strengthens with the storm commencement. Although GAGAN TEC exhibits more intense EIA evolution compare to IGS TEC maps, latitudinal extent of EIA are comparable in both. The enhanced EEJ reverses by ~9:18 UT under the effect of overshielding electric field, the later is accompanied by northward turning of interplanetary magnetic field (IMF) B_z . The weakening of well evolved EIA reflects

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