Global ionospheric disturbances during the 6-10 September 2017 solar storms

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Solar activity during the period of 6-10 September 2017 is characterized with a series of very strong flares and powerful coronal mass ejections (CMEs). Observations indicate more than two dozens of M-class and 4 X-class flares being emmitted from the solar Active Region 12673. In particular, one of these flares led to a halo-type CME which traveled earth-bound at ~1570 km/s apparent speed. With the arrival of this CME, IMF Bz turned to southward and reached a minimum of -30 nT at 23:25 UT on 7 September, triggering a Kp 8 geomagnetic storm with a sudden commencerment at ~2300 UT and a minimum Dst ~ -150 nT near 0100 UT on 8 September. These conditions caused very significant geospace disturbances, in particular, ionospheric disturbances with various spatial and temporal scales. In this presentation, we report flare induced ionospheric perturbations and post-flare traveling ionospheric disturbances (TIDs), storm-enhanced density (SED) plumes at subauroral and high latitudes of the dayside ionosphere, subauroral polarization streams (SAPs), and large scale TIDs over the globe. Our discussion will focus on some unique post-flare ionospheric oscillation and TID features, TIDs at high latitudes, and gigantic cross-hemispheric ionospheric electron density depletion channels. This study is based primarily on ground-based GNSS and Millstone Hill incoherent scatter radar observations.

Keywords: geospace storm, solar flare, traveling ionospheric disturbance

