

Solar Flare Signatures of the Ionospheric GPS TEC

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Sudden ionospheric Disturbances (SIDs) result from an interaction of solar flare radiation with constituents of the upper atmosphere, which form a major part of flare mentoring program in many observatories. In this paper, we examine midday GPS total electron content (TEC) and its time rate of change (rTEC) disturbed by 1 M-class and 10 X-class solar flares (Table 1), including the greatest flare X28 on 4 November 2003 and the well known the fourth greatest flare X17.2 on 28 October (Hollowing) 2003. It is found that values of the two quantities are inversely proportional to the distance of the flare location to the solar disc center. Meanwhile, a simultaneous observation of ground-based GPS receivers and a co-located Doppler sounding system is carried out to show that the frequency deviations (or Doppler shifts) of the two signals are well correlated as the theoretical result predicated.