



Investigation of Geomagnetic Storm Impact on Hourly PPP Static Coordinates

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This paper investigates the effect of geomagnetic storm on hourly Precise Point Positioning (PPP) static coordinates of IGS stations at mid-latitudes. 12 IGS stations in mid-latitude were chosen to conduct the experiment. These IGS stations were classified as non-cross correlation receiver reporting P1 and P2 (NONCC-P1P2), non-cross correlation receiver reporting C1 and P2 (NONCC-C1P2) and cross-correlation (CC-C1P2) receiver. Two extreme geomagnetic storms (October 29, 2003 Halloween Storm and November 20, 2003) and two geomagnetic quiet days in 2005 (DOY 98, 99) were chosen for this study. The processing was performed by GIPSY/OASIS 6.4 scientific software. After processing, root mean square errors (rms) of north, east and up component were calculated for each station and each day. In parallel, we generate vertical total electron content (VTEC) with 15 second interval for each station to detect small changes in VTEC and ionospheric scintillation during geomagnetic storm. The results indicate that three-dimensional (3D) accuracy of hourly PPP obtained during the geomagnetic storm for CC-P1P2 type of receiver is significantly low comparing the geomagnetic quiet days. When it comes to rms there is no statistically difference was observed between the geomagnetic quiet days and geomagnetic disturbed days for all NONCC-C1P2 and NONCC-C1P2 receivers. As far as outliers are concern, significant increase was observed for the geomagnetic disturbed days comparing with the geomagnetic quiet days.