



GPS observations during geomagnetic storms at low-latitude magnetic conjugate regions – Results from the COPEX campaign

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Global Positioning System data sets collected at three sites during the Conjugate Point Equatorial Experiment (COPEX) campaign conducted in Brazil from October 1 to December 10, 2002, are analyzed in this work. We present observations of radio signal amplitude scintillations at the GPS L1 frequency (1.575 GHz), total electron content (TEC) measurements and ionospheric irregularities zonal drifts inferred during three events of geomagnetic storms. The three observation sites were located along a same magnetic meridian, one at the magnetic equator, Cachimbo (9.5° S, 54.8° W, dip angle: -3.9°), one at the northern conjugate point, Boa Vista (2.8° N, 60.7° W, dip angle: 22.5°) and one at the southern conjugate point, Campo Grande (20.5° S, 54.7° W, dip angle: -22.5°). These observations used, at each site, one dual-frequency GPS receiver for TEC observations and two ground-based GPS receivers for L-band scintillation and zonal drifts measurements. F-layer ionospheric response features were analyzed from ionosondes measurements and are used to complement the study. The data collected in the COPEX campaign occurred during high scintillation activity months, which are associated to periods of high occurrence of ionospheric plasma depletions. The present investigation is important to evaluate the latitudinal variations and dynamics of irregularities, and can be used in future studies to quantify the potential for GPS navigational degradation during geomagnetically disturbed periods, which is one of the relevant themes in the space weather effects studies.