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Scintillation zonal drifts inferred at equatorial and low-latitude magnetic conjugate regions

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Ionospheric irregularities zonal drift velocities were inferred using Global Positioning System GPS measurements at three sites during the Conjugate Point Equatorial Experiment COPEX campaign conducted in Brazil from October 1 to December 10 2002. The three observation sites were located along the 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. Radio scintillations at the GPS L1 frequency 1 575 GHz monitored by two magnetic east-west spaced-receivers and the cross-correlation technique applied on the scintillation pattern measured by the two spaced receivers were used to obtain the scintillation zonal drifts. Our observations show that the zonal velocities decrease with local time and at the conjugate locations they are smaller than that at the equator, presenting a negative latitudinal gradient which indicates a vertical shear of the eastward plasma drift velocity at nighttime in the equatorial ionosphere. However, the average values of the zonal velocities at each of the two conjugate locations also show difference in magnitudes, which can be attributed to latitudinal variations of the ionosphere and thermosphere dynamics along the magnetic field line. In order

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