# Disturbed time observations of the temporal dependence and dynamics of TEC, scintillation, and ionospheric irregularity zonal drifts



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GPS amplitude scintillations at the L1 frequency (1.575 GHz) and integral data of total electron content (TEC) obtained from measurements of the Brazilian ground-based GPS network are used to study specific relationships between TEC, scintillations and ionospheric electron density imaged at near the southern crest of the Equatorial Ionization Anomaly (EIA). Using a time-dependent tomographic model, 3-dimensional images are created to couple the geophysical quantities measured by the GPS receivers during the storm time period of November 18-23. It allows studying large variations in the temporal and spatial evolution of the electron density affecting the behavior and dynamics of the scintillations. Estimations of the ionospheric irregularity zonal drift velocities at 350 km obtained from two-spaced GPS receivers observations, and the coupling of the neutral atmosphere and the ionosphere obtained from the ASPEN- TIMEGCM model results are also used in the investigation. The model is used to analyze the north-south symmetry/asymmetry conditions in the ionization distribution of the equatorial anomaly produced by a meridional/transequatorial wind, and its effect to the development and evolution of the scintillations associated to the ionospheric irregularities. In this work we present some relevant aspects of the ionospheric dynamics and the thermosphere-ionosphere coupling system, which are some of the most important topics of study during the occurrence of geomagnetic storms.

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