

Equatorial Ionosphere over Brazil: Observations and Modelling

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The objectives of this research are an investigation and modelling of the ionosphere over Brazil, a region of the Earth daily affected by strong ionospheric variability and scintillation occurrence particularly at post-sunset, as it encompasses the equator and the crests of the Equatorial Ionospheric Anomaly (EIA, Figure 1). Such “daily” ionospheric scenario is further complicated and exacerbated during space weather events because the prompt (Prompt Penetrating Electric Field) and delayed (Disturbed Dynamo Electric Field) may change the electrodynamics of the low-latitude ionosphere, indicating storm-time reinforcement/depression of the EIA.

The study, carried out in the frame of the TREASURE project (<http://www.treasure-gnss.eu/>), highlights the characteristics of the variability of the Total Electron Content (TEC) and ionospheric scintillation over Brazil under quiet and disturbed geospatial conditions. The variations are studied by the use of both experimental observations available from the Global Navigation Satellite System (GNSS) receivers and an empirical model capable of providing ionospheric regional short-term forecasting [1,2]. The results suggest the possible use of velocity field computed by the model as proxy for scintillation occurrence, particularly when TEC and scintillation monitor receivers are not available.

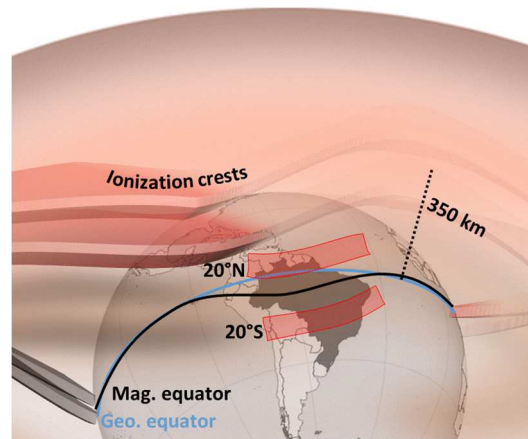


Figure 1. Schematic view of the EIA over Brazil. The shadow area represents the projection of the ionosphere at ground.

References

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