

Space Studies of the Upper Atmospheres of the Earth and Planets including Reference Atmospheres (C)

Space Weather and Earth's Atmosphere-Ionosphere (C1.5)

**A MULTI-INSTRUMENTAL AND MODELLING ANALYSIS OF THE IONOSPHERIC RESPONSES TO THE SOLAR ECLIPSE OF DECEMBER 14, 2020, OVER THE BRAZILIAN REGION**

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This work presents an analysis of the ionospheric responses to the solar eclipse that occurred on December 14, 2020, over the Brazilian sector. This event partially covers the south of Brazil, providing an excellent opportunity to study the modifications in the peculiarities that occur in this sector, as the Equatorial Ionization Anomaly (EIA). Therefore, we used the Digisonde data available in this period for two sites, Campo Grande (CG, 20.47° S, 54.60° W, dip 23° S) and Cachoeira Paulista (CXP, 22.70° S, 45.01° W, dip 35° S), assessing the E, and F regions, and Es layer behaviors. Additionally, a numerical model (MIRE, Portuguese acronym for E Region Ionospheric Model) is used to analyze the E layer dynamics modification around these times. The results show the F1 region disappearance and an apparent electronic density reduction in the E region during the solar eclipse. We also analyzed the total electron content (TEC) maps from the Global Navigation Satellite System (GNSS) that indicate a weakness in the EIA. On the other hand, we observe the rise of the Es layer electron density, which is related to the gravity waves strengthened during solar eclipse events. Finally, our results lead to a better understanding of the restructuring mechanisms in the ionosphere at low latitudes during the solar eclipse events, even though they only partially reached the studied regions.