



STUDY OF IONOSPHERIC IRREGULARITIES USING ROTI MAPS ON THE BRAZILIAN REGION

C. S. Carmo, National Institute for Space Research (INPE)

C.M. Denardini, National Institute for Space Research (INPE)

C.A.O.B. Figueiredo, National Institute for Space Research (INPE)

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Abstract

The ionosphere over the South American sector, as in other sectors of the globe, presents complex electrodynamic processes due to the interaction of the neutral atmosphere with the conductive ionosphere, which produces electric fields and electric currents, affecting its dynamics. However, the magnetic declination of the equator of -20° gives this region peculiar characteristic, such as modifying the occurrence of plasma bubbles. Additionally, the South American Magnetic Anomaly (AMAS) lies in this region, and its influence on ionospheric phenomena is still poorly studied. As for irregularities, the geomagnetic field lines that couple the equatorial E and F regions are responsible for several phenomena, including their generation, which are generally associated with plasma bubbles. These irregularities are well known when they occur after sunset, unlike those observed in the pre-dawn period. Therefore, this work aims to conduct case studies on pre-dawn ionospheric irregularities. Furthermore, we made a statistical study of the occurrences of plasma bubbles that occurred from July 2014 to July 2015 (solar maximum) and from July 2019 to July 2020 (solar minimum). The objective is to detect and characterize ionospheric irregularities in the Brazilian sector. The methodology applied is based on ROTI maps with Multi-Global Navigation Satellite System (GNSS), including data from GPS, GLONASS, and Galileo.