

# **A STUDY OF THE EQUATORIAL IONIZATION ANOMALY AND THERMOSPHERIC MERIDIONAL WINDS DURING QUIET AND DISTURBED PERIODS OVER BRAZILIAN LOW LATITUDES**

Paulo A. B. Nogueira, Mangalathayil A. Abdu, Inez S. Batista, Ângela M. Santos

Instituto Nacional de Pesquisas Espaciais, S. J. Campos, SP, Brazil

The aim of this work is the study of meridional thermospheric winds, during geomagnetically quiet and disturbed periods and their effects on the development of equatorial ionization anomaly. This research theme depends on the theoretical and experimental knowledge of the coupled ionosphere/thermosphere/magnetosphere system. This study is based on ionospheric data collected by digital ionosondes operating in São Luís, Fortaleza and Cachoeira Paulista and by *Global Positioning System* (GPS) receivers installed in São José dos Campos and São Luís. Here, the nighttime thermospheric neutral winds aligned to the magnetic meridian are derived from F-region height variations between two equatorial stations, São Luís and Fortaleza. In order to evaluate the strength and development of the equatorial anomaly, two parameters were determined:  $\Delta f_oF2$  and  $\Delta VTEC$ . During the magnetic storm, the ionosphere goes through disturbances on a global level. The main ionospheric effects produced by storms which studied here, are: the response of the F-layer to prompt penetration of zonal electric field from the auroral to the equatorial region, and the effects of disturbance dynamo electric fields and the meridional winds. The methodology employed to study the magnetic storm effects in the equatorial ionosphere consists on the comparison of the ionospheric parameters on disturbed and quiet days. The magnetic parameters such as the auroral index AE, components of the interplanetary magnetic field Bz and the Dst index, were used to analyze the storm. The results show significant variation in the plasma vertical drift, in the thermospheric winds and in the equatorial anomaly developments during different phases of the storms.

Equatorial Ionization Anomaly, vertical drift, magnetic storm.

Paulo A B Nogueira, Av dos Astronautas, 1.758 Jd. Granja - CEP: 12227-010  
São José dos Campos – SP, Brasil, tel: 55 (12) 3945-7187, e-mail: paulo@dae.inpe.br/