

EQUATORIAL IONIZATION ANOMALY: THE ROLE OF THERMOSPHERIC WINDS AND THE EFFECTS OF THE GEOMAGNETIC FIELD SECULAR VARIATION

INEZ S. BATISTA ¹, Erica M. Diogo ¹, Jonas R. Souza ¹, M. A. Abdu ¹, G. J. Bailey ²

¹ National Institute for Space Research, São José dos Campos, Brazil, email: inez@dae.inpe.br

² Department of Applied Mathematics, Sheffield University, Sheffield, UK

The equatorial ionization anomaly (EIA) is one of the important features of the equatorial and low-latitude ionosphere. It is generated by the well known fountain effect, produced by the upwards vertical ExB/B^2 plasma drift that moves the F-region ionosphere plasma to higher altitudes over the magnetic equator, followed by diffusion along the geomagnetic field lines, that moves the plasma down and away from the equator, forming ionization peaks in the subtropics on both sides of the magnetic equator. Further this configuration is modified by the thermospheric meridional wind. The role of meridional wind in the latitudinal distribution of ionization can only be determined precisely through the use of theoretical models because it depends not only of the local configuration of the wind, but is a complex function of its distribution along the entire magnetic field line. Besides, in the Brazilian region, the magnetic field secular variations are fast enough to be observed in the time interval of a few solar cycles. In this work we use the ionospheric model SUPIM (Sheffield University Plasmasphere-Ionosphere Model) to investigate the role of the thermospheric wind and of the magnetic field secular variations in the EIA over the Brazilian region.

equatorial ionization anomaly, thermospheric wind, secular variation

Inez S. Batista, National Institute for Space Research, Cx. Postal, 515, São José dos Campos, SP, Brazil, 12201-970, tel. +55(12)39457153, fax: +55(12)39456990, email: inez@dae.inpe.br