

DISTURBANCE ELECTRIC FIELD EFFECTS ON EQUATORIAL EVENING VERTICAL DRIFT AND SPREAD F DEVELOPMENT

M. A. ABDU

Instituto Nacional de Pesquisas Espaciais, Sao Jose dos Campos, SP, Brazil

The most studied and perhaps the most readily verifiable precursor condition for the growth of post sunset equatorial plasma instabilities leading to spread F irregularity (ESF) development is the prereversal enhancement in the zonal electric field (PRE). Its day-to-day, seasonal and solar flux dependent variabilities are to the first degree responsible for the corresponding variabilities in ESF. The day-to-day variability which is the most challenging problem results from upward propagating atmospheric waves (especially, gravity- and planetary- waves) as well as from disturbance electric fields arising from weak to intense substorm/magnetic storm disturbances. Recent studies have shown that the evening F region vertical drift/PRE and hence the ESF suffers drastic modifications due to under-shielding as well as over-shielding electric fields. The PRE can undergo large increase, decrease, total suppression or even reversal to downward depending upon the polarity and intensity of the prompt penetrating zonal electric field. While the ESF intensity follows in general moderate increase in the PRE it does not follow very large increases in vertical drift. This paper will present results from recent investigations, mainly based on Digisonde observations in Brazil, on the evening vertical drift and ESF day-to-day variabilities arising from magnetospheric- and atmospheric- forcing.

Disturbance electric fields, Low latitude ionosphere, Equatorial spread F

M. A. Abdu, Instituto Nacional de Pesquisas Espaciais - INPE, Sao Jose dos Campos, 12245 970, SP, Brazil, maabdu@dae.inpe.br