

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

Whole Atmosphere Wave Coupling and Interaction Processes (C2.2)

PLANETARY/KELVIN WAVE MODULATION OF THE EQUATORIAL IONOSPHERIC EVENING VERTICAL PLASMA DRIFT AND THE POST SUNSET SPREAD F DEVELOPMENTS

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Abstract: Recent studies have shown that the evening prereversal enhancement in the equatorial ionospheric zonal electric field /vertical plasma drift (PRE) and hence post sunset spread F irregularity (ESF) generation are significantly modified by Planetary waves of a few-day (2-, 5-, 7-day) periodicity, although many specific details of which remain to be investigated. Thus the widely observed day to day/short terms variability in the PRE and ESF developments originate not only from the variable forcing (in the form of disturbance electric fields) from magnetosphere, as is well known, but a large part of it arises also from forcing by upward propagating wave from lower atmosphere. In this paper we have analyzed the PRE vertical drifts measured by an equatorial Digisonde (Fortaleza), and the mesospheric zonal and meridional winds as measured by two meteor radars operated at an equatorial site (Sao Joao de Cariri) and a low latitude sites (Cachoeira Paulista), in Brazil, together with mesospheric winds as measured by MF radar at an equatorial site (Tirunelveli) in India. The comparison of these results show the presence of oscillations of around 3 and 5-7 days of periodicities in the evening vertical drift as well as in the mesospheric wind field simultaneously in the Brazilian and Indian longitudes, which are shown to be produced by eastward propagating Equatorial Kelvin wave as well as by westward propagating planetary waves. The effects of these waves on the development

of the ESF/plasma bubble irregularities are also studied.