

Title : INVITED - Storm time variability in Equatorial Spread F/Plasma bubble irregularity development

Session: S6: Ionospheric storms and Space weather effects at low and mid latitudes

Preferred type of presentation: Oral

Abstract:

The equatorial spread F/plasma bubble irregularity development is known to be controlled by sunset electrodynamics processes in which the rapid changes from the day-to-night transition of the background ionosphere-thermosphere system play major roles. The leading factors that determine the ESF growth process are: the enhanced prereversal vertical drift (PRE) associated with the plasma vortex flow, the thermospheric meridional/trans-equatorial winds, and gravity wave perturbations in plasma density and polarization electric fields as seed perturbations for the R-T instability growth. During magnetic storms the drastic change that occur in these parameters, especially in the first two, together with the modification of the large scale spatial distribution in ionospheric conductivity, can cause significant modifications to the development and dynamics of the plasma bubble irregularities. Enhanced development of the irregularities followed by their anomalous drifts, and suppression or disruption of the irregularity generation has been reported for the different storm phases. Prompt penetration electric fields of under-shielding and over-shielding types, the disturbance dynamo electric field originating from the storm energy input and auroral heating, as well as the disturbances in low latitude thermospheric zonal and meridional/ trans-equatorial winds are the main agencies that control the storm time ESF development process, which is dependent also on season and longitudes. Our current understanding of the above factors and some outstanding questions of the ESF variability arising therefrom, as revealed by recent results from observational as well as modeling studies will be covered in this talk.

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