Some Outstanding Issues on the Short Term/Day-to-Day Variability in the Equatorial Plasma Bubbles Development.

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The background ionospheric conditions shaped by sunset electrodynamic processes are responsible for the development of equatorial plasma bubble (EPB) irregularities of the post sunset ionosphere. Distinct conditions exist also for the EPBs development at later hours of the night. The instability growth leading to the generation of EPB is dependent on the precursor conditions existing at the bottom side of the F layer, that is, the evening prereversal enhancement in vertical drift (PRE), wave structure in plasma density with polarization electric field required to initiate/seed the instability, plasma density gradient to control the growth rate. Statistical and case studies have revealed the control of these specific parameters on the EPB occurrence under different geophysical, seasonal, or longitudinal conditions. However, little is known regarding the relative roles of these parameters in shaping a given event. Large degree of day-to-day variability in these parameters arise from different sources of forcing (such as upward propagating gravity waves and Planetary/Kelvin waves, or storm-time disturbance electric fields) that in turn are responsible for the widely observed variabilities in EPB development and dynamics. In this presentation we will discuss relevant aspects of EPB short term variability based on studies seeking to evaluate the relative roles of the precursor parameters, and seeding perturbations (such as the relative roles of the PRE vs. wave structures) in specific cases of EPB developments, identifying also causes of their enhanced generation, or suppression, dependent on the geophysical conditions. .