

# **Seasonal variation of the ‘forecast parameter’ for the occurrence of post-sunset ESF using ground based TEC measurements**

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Even though the importance of ambient ionospheric and thermospheric conditions in the initiation and non-linear development of ESF and its dynamics has been well recognized, the day-to-day variability of ESF has been remaining an enigma. All the studies demonstrate that the daytime electrodynamic play a decisive role in the initiation of ESF on a given day and hence, parameters like EIA strength have been used for forecasting the ESF. However, all such predictions were only probabilistic. This paper attempts to give deterministic prediction of ESF using the observations of EIA strength and asymmetry. These observations are made using the Coherent Radio Beacon receiver (CRABEX receiver) located at Trivandrum (8.5°N, 77°E, Diplat ~0.5°N), which basically receives the 150 and 400 MHz transmissions from the NIMS satellites, and measures the differential Doppler between them. This can be converted to the latitudinal profile of the Vertical Total Electron Content (TEC). The TEC data in the time interval 1600-1845 IST has been chosen for the analysis. The EIA strength and asymmetry two parameters, obtained well ahead of the onset time of ESF, are combined to define a new ‘forecast parameter’ for the generation of ESF. It has been shown that this parameter can uniquely define the state of the ‘background ionosphere’ conducive for the generation of ESF irregularities as early as 1600 IST. A critical value for this parameter has been identified such that if the estimated value exceeds it on a given day, the ESF is seen to occur, making deterministic prediction of ESF possible. It is also observed that this critical value varies with season. The threshold value of the ‘forecast parameter for the equinoctial and solstitial periods of the low solar activity years 2005-2006 are estimated.