

## Statistical Features of Fast Rising Ionospheric Bubbles From ROCSAT-1 Observations

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A large set of F-region ionospheric irregularities (bubbles) at low latitudes has been detected by the Ionospheric Plasma and Electrodynamics Instrument (IPEI) onboard the ROCSAT-1 satellite during March 1999 to June 2004. Over those years IPEI has been collecting data by alternating operations of the NORMAL mode with a sampling rate of 32 Hz and the FAST/AUTO mode with a sampling rate of 1024 Hz. The simultaneously high-resolution data of ion density and two cross-track ion velocity components allow us, never before from satellite ion drift data, to study the spectral characteristics of the irregularities to the smallest scale of 15 m along the satellite track. Here, we concentrate on the bubble structures, within which the ion upward motions exceed 500 m/s. We report some statistical features associated with these fast rising bubble (FRB) events. In particular, we are interested in the followings: (1) the pre-conditionings such as horizontal density gradients and prereversal upward drift enhancements that trigger instabilities thus FRB structures; (2) the dependencies of their occurrences and sizes on local time, longitude (geomagnetic field configuration), season, as well as the evolution of storm-time disturbed electric fields; and (3) the detailed spectral features such as spectral index, wavelengths of spectral breaks that differentiate various wave modes, and the correlation between density and velocity spectra for the FRB events. Based on these characteristic features we hope to identify the underlying processes (instabilities) that control the evolution of fast rising bubbles.

Keywords: F-region bubbles, fast rising, horizontal gradient, pre-reversal enhancement, spectral index, cross-power spectrum