

# **Topside ionosphere irregularities from ROCSAT-1 observations at low and middle latitudes**

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Ion density and drift velocity data collected by ROCSAT-1 IPEI during October 1999 to May 2004 are used to investigate the large-scale plasma irregularities (bubbles) in the low and middle latitude ionosphere. The bubble events are further selected according to Kp index for quiet-time ( $K_p < 3$ ) and for severe storm-time ( $K_p > 6$ ) conditions. Here, we present the characteristic differences between the two cases in terms of their spatial distribution, local time dependence and moreover the sources of gravity wave seeding, density gradient as well as electric field, which are responsible for triggering instabilities thus bubble structures. Tropospheric seeding associated with inter-tropical convergence zone (ITCZ) is found to be required for producing quiet time plasma bubbles. However, penetrating magnetospheric disturbance electric fields (e.g., SAPS) are important drivers for the bubbles observed at mid-latitudes during the expansion phase of a severe magnetic storm.