

Characteristics of ionospheric scintillation and its relation to PRE vertical drift using CADI ionosonde at Tirunelveli

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ABSTRACT

Plasma density irregularities in the ionosphere (associated with ESF, plasma bubbles and Sporadic E layers) cause scintillations in various frequency ranges. VHF radio wave scintillation technique is extensively used to study plasma density irregularities of sub-kilometre size. Indian Institute of Geomagnetism operated a ground network of 13 stations monitoring amplitude scintillations on 244/251 MHz (FLEETSAT 73°E) signals in India for more than a decade under AICPITS. At present VHF scintillation is being recorded at Mumbai by monitoring 251 MHz signal transmitted by geostationary satellite UFO2 (71.2° E). Statistical analysis is performed on VHF scintillations at Mumbai and ionosonde observations of post sunset height rise over Tirunelveli, an equatorial station to understand their relationship to each other during ascending phase of solar cycle 24 (year 2011-12). The observations suggest that occurrence of scintillation at Mumbai and h'F data of ionosonde are correlated well only when the virtual height of h'F over equator reaches above 300 Km which seems to be necessary condition to cause VHF scintillation at Mumbai. Occurrence of VHF scintillation at Mumbai is lower as compared to equatorial spread F occurrence at Tirunelveli as seen by ionogram due to fact that only plasma bubble rising to higher altitude only could reach upto Mumbai and cause scintillations at VHF band. Occurrence of range spread F is found to be higher in the pre-midnight period but frequency spread F is found to be dominant during post-midnight. These observations are compared with occurrence of scintillations at Mumbai and will be presented in full length paper.