

Study of Large Scale Wave Structures (LSWS) using GRBR Network over Southeast Asia and Pacific region

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The GNU Radio Beacon Receiver (GRBR) Network has been recently established over the low latitudes of Southeast Asia - Pacific regions and further expanding into Indian and African low latitudes. The principal experiment involves dual/tri-band frequency, differential phase measurements from the low Earth orbiting satellites (LEOs) to study the latitudinal, longitudinal and altitudinal structures of ionospheric total electron content (TEC). With the availability of tri-band beacon transmissions from C/NOFS, with its unique low-inclination orbit, it is possible to study the longitudinal structures in the ionospheric total electron content (TEC) with finer spatial scales. The estimation of absolute TEC from C/NOFS beacon transmission and the longitudinal variations of TEC are automated through the robust single station procedure for initial phase offset estimation, which is further consistent with Leitinger et al., [1975] two station method. The longitudinal variation of TEC often exhibits significant wave-like structures with zonal wavelengths of 200-800 km during the evening hours. These longitudinal structures are identified as Large Scale Wave Structures (LSWS) in the bottom side F-region which bears bearing on the occurrence of post-sunset equatorial spread-F. It is often found that the initial development of ESF irregularities occur at the westward wall of TEC depletions. These LSWS structures can be earliest detected even before the E-region sunset, however, their amplitude found to grow significantly after E-region sunset suggesting that the pre-reversal enhancement of zonal electric field plays a crucial role for the amplification of LSWS.