

Medium scale traveling ionospheric disturbances using FORMOSAT-2/ISUAL 630.0 nm airglow images

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In this work characteristics of nighttime medium-scale travelling ionospheric disturbances (MSTID) are investigated using 630.0 nm limb images by Imager of Sprites and Upper Atmospheric Lightnings (ISUAL), onboard FORMOSAT-2 satellite. The limb integrated measurements, when projected to a horizontal plane, reveal bands of intensity perturbation with distinct southwest to northeast orientation in the southern hemisphere. Airglow simulations are carried out to confirm that such azimuthally oriented features are related to MSTID. Further statistical analysis shows more MSTID occurrence in solstices with peak in June-July months. The wavelengths of the observed perturbations were in the range 150-300 km. The wave fronts were oriented about 30°-50° from the east-west plane, indicating that coupled Perkins and Es-layer instability might be important in the MSTID generation. The results demonstrate that spaced based airglow imaging is an effective method for global investigation of MSTID events that are appropriately aligned with the viewing geometry.

Keywords: MSTID, Ionospheric disturbances, FORMOSAT-2/ISUAL, Space based airglow imaging