

SIMULTANEOUS MEASUREMENTS OF DARK BAND STRUCTURES IN THE OI 630 nm EMISSION ALL-SKY IMAGES ASSOCIATED WITH RAYLEIGH-TAYLOR INSTABILITY AND PERKINS INSTABILITY

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Using ground-based measurements we investigate the simultaneous occurrence of dark band structures in the OI 630 nm nightglow emission all-sky images associated with the Rayleigh-Taylor instability (RTI) and Perkins instability. This is the first reported observation related to the quasi north-south aligned intensity depletion bands (plasma bubble) simultaneously with the presence of medium scale traveling ionospheric disturbances (MSTIDs) in the tropical region using OI 630 nm nightglow emission all-sky images. On February 27-28, 2006, the OI 630 nm emission all-sky images obtained at Cachoeira Paulista (22.7°S, 45.0°W), Brazil, were used to map the spatial and temporal locations of plasma bubble and MSTIDs in the bottomside of the F-region. The ionospheric plasma bubble zonal drift measured by the all-sky imaging showed that it moved to eastward with average speed of 50 m/s, whereas MSTIDs moved from southeast to northwest with average speed of about 40 m/s. Also, digisonde observations registered abrupt increases in both the F-layer peak height (h_mF_2) and base height ($h'F$) when the MSTIDs passed over Cachoeira Paulista. It should be pointed out that these thermospheric/ionospheric events are not related to geomagnetic disturbed conditions. In this work, we present and discuss the dynamics of these kind airglow structures and their effects in the thermosphere/ionosphere dynamics.

MSTIDs, bubble, Spread F

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