WAVE STRUCTURES OBSERVED IN THE F-REGION POSSIBLY ASSOCIATED WITH TROPOSPHERIC-STRATOSPHERIC DISTURBANCES: A STUDY USING ALL-SKY IMAGING SYSTEM AND SATELLITE DATA

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Observations of both mesospheric and thermospheric nightglow emissions using a wide-angle imaging system (CCD camera) have been carried out at Cachoeira Paulista (22.7°S, 45°W, 15.8°S dip latitude), Brazil during the period from 1998 to 2008. During this period we report cases which wave structures in the mesosphere region were accompanied by traveling ionospheric disturbances in the F-region. All-sky images in the Na emission showed mesospheric dark band structures at Cachoeira Paulista propagating from southeast to northwest. Also, at the same time, wave structures in the OI630.0 nm nightglow emission were detected in the F-region stretched across the entire images propagating from southeast to northwest. These dark patches moved with average speed of about 50–200 m/s. The nighttime azimuthal distribution of the waves observed in both Na and OI630.0 nm emissions were highly anisotropic, exhibiting directions to northwestward with azimuths between 280° and 320°. On the other hand, the meteorological satellite observations and the winds and omega (Pa/s) obtained from NCEP site show intense tropospheric-stratospheric disturbances. In this work we suggest that gravity waves generated below ~25 km are a plausible cause of the observed wave structures in the airglow images.

Spread F, low latitudes, plasma irregularities

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