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Gravity waves and transient disturbances at low-latitude ionosphere. A comparison with mid-latitude measurements.

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A statistical study of propagation of small-scale and medium scale GWs at low-latitude ionosphere, based on multi-point observations by Doppler sounding system located in the in Northern Argentina, Tucuman, is presented. A comparison with similar measurements at mid latitude is given. We also show that Doppler system is capable of detecting various transient phenomena like ionospheric response to solar X-ray flares and occurrence of spread F, associated to local ionospheric disturbances or plasma bubbles.
The results of statistical study of GWs shows that the most frequently observed horizontal velocities of GWs ranged from ∼100 to ∼160 m/s. At low-latitudes, in the northern Argentina (Tucuman), in the vicinity of Andes, the short scale GWs have clear preference for Northward or Southward direction of propagation. However, no seasonal (diurnal) dependence has been observed unlike the mid-latitudes, where the analyzed waves propagated roughly poleward in the local summer, whereas approximately equatorward propagation dominated in local winter, and propagated roughly against the neutral winds obtained from the HWM07 model. The largest fluctuations of Doppler shift (wave activity) were observed when the sounding radio waves reflected at altitudes from ∼150 to ∼250 km (sometimes up to 300 km), i.e. mainly in the F layer.