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Study on Medium-Scale Traveling Ionospheric Disturbances Observed in the South American Equatorial Region

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This work presents Medium-Scale Traveling Ionospheric Disturbances (MSTIDs) over the South American equatorial and low latitude regions (latitude 0 - 15° south and longitude 30° - 55° west) during the maximum to minimum phase of solar cycle 24. Using data collected by GNSS (GPS and GLONASS) dual frequency receivers' network, detrending total electron content (TEC) maps were constructed to find out the presence of MSTIDs, and keograms were used to characterize MSTIDs. The horizontal wavelengths of the MSTIDs were mostly concentrated between 500 and 800 km, with mean values of 654 ± 110 km while the observed periods were distributed around 30 - 40 min with the mean of 35 ± 5 min, and the horizontal phase speeds extended from 200 - 400 m/s, with mean of 290 ± 110 m/s. Most of the MSTIDs were observed during the daytime in winter solstice (June-August) and tend to propagate northeastward and northwestward. Atmospheric gravity waves could be the prime precursor of the MSTIDs that propagated in the same direction. However, during summer solstice the MSTIDs propagated in all directions. It is noted that a few oscillations of MSTIDs propagated to southeast along the year, which could be associated with Intertropical Convergence Zone (ITCZ).

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