

A comparative study of the quasi-2-day wave observed at 7.4° S and 22.7° S, Brazil, during summertime

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From simultaneous observations of the atmospheric neutral winds in the mesosphere and lower thermosphere (MLT) region by meteor radar carried out at São João do Cariri (7.4° S, 36.5° W) and Cachoeira Paulista (22.7° S, 45.0° W), we have investigated the planetary-scale quasi-two-day wave, which are present in both the sites during 2005 and 2006 austral summers. Amplitude of the meridional component was larger than that of the zonal component, reaching the maximum value of ~50 m/s. The phase propagation with height shows a descending mode and vertical wavelength estimated for Cachoeira Paulista was longer than at São João do Cariri, for all of the observed events. Significant changes on the mean zonal wind can be observed as suggestive of the quasi-2-day wave impact. Spectral analysis for meridional winds shows the presence of additional peaks with periods near 16 hours, suggesting nonlinear coupling between the 2-day wave and the diurnal tide in the equatorial MLT region. Cross-correlation and bispectral analysis supports the existence of the relationship between the quasi-two-day-wave and the diurnal tide.