2-day tidal modulation: evidence for nonlinear coupling in the MLT region over São João do Cariri (7.4˚S, 36.5˚W), Brazil

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The fact that the amplitude and phase of the atmospheric tides show long- and short-term variations in the MLT region is already well-known. From theoretical and observational studies, the nonlinear interactions between tides, or tides and planetary waves, have been proposed to explain the tidal variability with the same periods as observed in the winds. In this work, hourly horizontal winds obtained by meteor radar at São João do Cariri (7.4˚S, 36.5˚W) during January and February 2005, have been used to investigate the variability of atmospheric tides in the presence of quasi-two-day wind enhancements. 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.