

INVESTIGATION OF SOURCES OF GRAVITY WAVES OBSERVED IN THE BRAZILIAN EQUATORIAL REGION ON 08 APRIL 2005

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ABSTRACT

On 08 April 2005, a strong gravity wave activity (more than 3 hours) was observed in São João do Cariri (7.4°S, 36.5°W). These waves propagated to the southeast and presented different spectral characteristics (wavelength, period and phase speed). Using OH airglow images captured by the all sky imager, the parameters of 5 observed gravity waves were spectral analyzed; the wavelengths ranged from ~90 to 150 km, the periods from ~26 to 67 min and the phase speeds from 32 to 71 m/s. These observed waves presented spectral characteristics that are very compatible with gravity events previously observed in the same locality. A reverse ray-tracing analysis was performed to investigate the likely sources of these waves. The ray-tracing database was composed of temperature profiles from NRLMSISE-00 model and SABER measurements and wind profiles from HWM-14 model and meteor radar data. According to the ray path, the likely source of these observed gravity waves was the Inter Tropical Convergence Zone with intense convective processes taking place in the northern part of the observatory. Also, the observed preferential propagation direction of the waves to the southeast could be explained using blocking diagrams due to the wind filtering process.

Keywords: Gravity waves, Airglow, Reverse Ray Tracing, Troposphere, Mesosphere, ITCZ.