



DETERMINATION OF GRAVITY WAVES PARAMETERS IN THE AIRGLOW COMBINING PHOTOMETER AND IMAGER DATA

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ABSTRACT

Mesospheric airglow measurements of two or three layers were used to characterize both vertical and horizontal parameters of gravity waves. The data set was acquired coincidentally from a Multi channel filter (Multi-3) photometer and an all-sky imager located at São João do Cariri (7.4°S, 36.5°W) in the equatorial region from 2001 to 2007. Least Square fitting and wavelet analysis techniques were used to determine the phase and amplitude of each observed wave as well as the amplitude growth. The dispersion relation of gravity waves was used to estimate the vertical and the horizontal wavelength and then compared to the wavelength obtained from the keogram analysis of the images observed by the all-sky imager. Results from the study showed that both the horizontal and vertical wavelengths obtained from the dispersion relation and keogram analysis agree very well for the waves observed on the nights 14th October and 18th December 2006. The determined parameters showed that the observed wave on the night of 18th December 2006, had a period of $\sim 43.8 \pm 2.19$ min with the horizontal wavelength of 235.66 ± 11.78 km having a downward phase propagation, whereas that of 14th October 2006 propagated with a period of $\sim 36:00 \pm 1:80$ min with a horizontal wavelength of $\sim 195 \pm 9.80$ km, and having an upward phase propagation. The observation of a wave taken by a photometer and an all-sky imager, allowed to conclude that the same wave could be observed by both instruments permitting the investigation of the 2-dimensional wave parameter.