

Title : Observed gravity wave-gravity wave interaction at mesospheric heights

Session: S3: Wave propagation between low/middle atmosphere and ionosphere

Preferred type of presentation: Poster



Abstract:

This study presents and discuss two simultaneous mesospheric fronts observed through the OH nightglow emission, using an all-sky imaging system at Palmas (10.2° S, 48.2° W), Brazil. On May 29-30, 2008, an uncommon event of gravity-wave was observed and identified as an interaction between two mesospheric gravity-wave type fronts. After the two waves cross each other in almost opposite direction, a great depletion in the OH emission rate was observed between these fronts. The two wave fronts extended throughout the north-south extension and propagated in southwest and northeast direction, respectively. In fact, the gravity-waves moved in almost the opposite directions, and when they crossed each other during their passage, a region between the wave fronts showed a band of airglow depletion. The airglow depletion between the two fronts became wider as the waves moved away from each other. The two mesospheric fronts showed distinct horizontal wavelengths and periods, but very similar observed phase speed. In addition, meridional and zonal wind components were obtained by a meteor radar operated in Sao Joao do Cariri (7.4°S, 36.5°W), Brazil, and temperature observations from the TIMED/SABER satellite were used together with the wind measurements to characterize the vertical propagation characteristics of the observed waves. The large airglow depletion seen between the two fronts after the wave-wave interaction is a puzzle, but could be explained by photochemistry models forced by dynamics. Essentially, the observed OH emission depletion will depend on the photochemistry that forms the excited OH and on the local temperature.

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