

Stereoscopic imaging of gravity waves in the mesosphere over Peru

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A program of stereo-imaging of the mesospheric near-infrared emissive layer has recently been initiated using two CCD cameras operating in a vis-à-vis observation mode at a separation distance of ~ 550 km. These images were analyzed using a stereo-correlation method suitable for low contrast objects without discrete contours. This approach consists of calculating a normalized cross-correlation parameter for the intensities of matched points. Initially, the altitude of the layer is chosen to be between 82 and 92 km. The computer code calculates the altitude of the centroid of the emissive layer for each observed point and produces surface maps of the layer for 50×50 km² areas. In addition to results from the Peruvian observations, results of simultaneous observations obtained at the Pic du Midi (Pyrénées) and the Château-Renard (Alpes) observatories will be presented. The surface maps are compared with coded maps of the emission intensity. Both types of maps show significant wave structures. The vertical amplitude of the waves is found to be typically between 1 and 2 km. The Fourier characteristics are measured using a Morlet type wavelet generator function. The horizontal wavelengths in the meridional and zonal directions are ~ 20 -40 km and 100-150 km and the temporal periods are ~ 15 -30 minutes. The same observational program was conducted in the Peruvian Andes in October 2005. The sites were the Cosmos Observatory (12° 04' S, 75° 34' W, altitude 4620m) and the Cerro Verde Tello mountain (16° 33' S, 71° 40' W, altitude 2272m). Preliminary results including a video sequence that shows the propagation of gravity waves will be presented.