MONTHLY FREQUENCY DISTRIBUTIONS FOR TROPOPAUSE VARIABLES OVER MEXICO AND THEIR RELATION TO THE TROPICAL WESTERN HEMISPHERE WARM POOL

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ABSTRACT

Climate monthly frequency distributions for standardized tropopause pressure, height and temperature at five upper-air stations located in Mexico are presented. In addition, the χ^2 goodness-of-fit test is applied in order to establish the normality of each distribution. For most of the stations the datasets used in this research consist in radiosonde data spanning the period January 1973 - December 2006, and soundings launched at 12Z are considered. The stations analyzed are Chihuahua (CUU) (76225, φ=28º37'N, λ=106º05'W), Monterrey (MTY) (76394, φ=25º52'N, λ=100º14'W), Guadalajara (GDL) (76612, φ=20º39'N, λ=103º22'W), Mérida (MID) (76644, φ=20º58'N, λ=89º39'W) and Mexico D.F. (MEX) (76679, φ=19º26'N, λ=99º07'W). The thermal tropopause is obtained by means of an algorithm that estimates it from mandatory levels.

In summary, to a level of confidence of 95% results are as follows. Temperature possesses a normal distribution for almost all the months at all the stations. As to height and pressure, distributions are normal only for the summer months and to a lesser degree for the fall months. MEX is excluded from the aforementioned results. Specifically for this latter station, only temperature possesses a normal distribution, mainly for the summer months. Whether a distribution is normal or not seems to be governed by the stage of the Tropical Western Hemisphere Warm Pool (TWHWP). Indeed, normality approximately coincides with the mature stage of the TWHWP, i.e. late summer and early fall.