

Comparison of the simulated and LIDAR measured atmospheric density and temperature in transitional flow regime

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The understanding of the atmosphere in the transitional flow regime is quite limited, due to the limited accuracy of measurement data. In the proposed paper, the atmospheric density and temperature at around 100 km altitude are analyzed, by using numerical simulation, empirical model, satellite data and ground LIDAR measurement. The WACCM global atmosphere model is used as the numerical simulation method, and the empirical models include NRLMSISE-00 and US-76. The satellite data are taken by US SABER/TIMED satellite. The atmospheric density and temperature at around 100 km altitude at Gernu in August 2013 are analyzed, and the results from different methods are compared. The density below 90 km altitude from different methods is in relatively good agreement, and the temperature below 80 km altitude agrees well. Above these altitudes, the discrepancy of the density and temperature from different methods increases with increasing altitude. Also reported in the proposed paper is daily and diurnal variation of the density and temperature, which becomes significant above 100 km altitude.