Mesoscale gravity waves revealed in a whole-atmospheric global model and upper atmospheric observations

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Specified chemistry whole atmosphere community climate model (SC-WACCM) is successfully set up on the 1/2-degree horizontal resolution and 0.6-km vertical resolution and carried out to understand the sources of mesoscale gravity waves in the mesosphere and lower thermosphere and their propagation properties throughout the whole atmosphere. For validation with observations, SC-WACCM is initialized using traditional dynamic initialization method at a specific date and time. Atmospheric state variables from the ground to the thermosphere employed for initialization are obtained from various data sets such as operational analyses and empirical wind and temperature model results. Model initial conditions are corrected for mass and dynamical balance to reduce spurious waves due to initial shocks. Observational results to be used for model validation are also presented, and future plans regarding target simulations are discussed.