

Comparison between migrating atmospheric tides in TIMED/SABER observations and SD-WACCM X simulations

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Abstract

The Whole Atmosphere Community Climate model – eXtended (WACCM-X) is a comprehensive numerical model with a range from the Earth's surface to the upper thermosphere (~ 500 km) and also includes the ionosphere. The specified dynamics (SD) WACCM-X with nudging of Modern-Era Retrospective analysis for Research and Applications, Version 2 (MERRA-2) data from the surface up to about 50 km.

Excited in the troposphere and stratosphere, atmospheric tides are the dominant dynamical feature in the mesosphere and lower thermosphere and play an important role in vertical coupling. In this study, we used the least squares method to extract solar migrating tides from SD-WACCMX temperatures in the mesosphere and lower thermosphere region (MLT). The results are compared to observations from TIMED/SABER. Differences in tidal structure and variation during solar maximum and minimum in March and June are examined, to better understand the variation of migrating tides resolved in WACCM-X, and its implications for future studies utilizing this model.