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THE DEPENDENCE OF THE DIURNAL TIDE IN THE MESOSPHERE ON THERMAL FORCINGS, ZONAL WINDS AND PLANETARY WAVES

N.Grieger , G. Schmitz , U. Achatz

Leibniz-Institut für Atmosphärenphysik an der Universität Rostock
(grieger@iap-kborn.de/Fax: +49-38293-6850)

A linear wave propagation model with a three-dimensional (3d) background atmosphere has been developed to study the spatial structure of both migrating and nonmigrating diurnal tidal components and their seasonal variations. These linear model results have been compared with results of a general circulation model, extending up to the mesosphere and lower thermosphere (MLT).
The migrating and nonmigrating diurnal tide in the MLT have been studied in their dependence on different thermal forcing processes and the 3d background circulation. The model results show that the largest amount of migrating tide in the mesosphere is forced by the tropospheric heating source due to shortwave solar insolation, and only minor contributions are given by the stratospheric Ozone heating and deep convection. The heating source due to large scale convection and condensation directly forces the nonmigrating tide. An additional large part of the nonmigrating tide results from the influence of the planetary waves on the propagation of migrating diurnal tidal components.