

Japan Geoscience Union Meeting 2011

(May 22-27 2011 at Makuhari, Chiba, Japan)

©2011. Japan Geoscience Union. All Rights Reserved.



AAS020-06

Room:102

Time:May 22 12:00-12:15

Diurnal migrating tides in the troposphere to lower-mesosphere as deduced with TIMED/SABER data and six reanalysis data

Takatoshi Sakazaki^{1*}, Masatomo Fujiwara¹, Xiaoli Zhang², Maura Hagan³, Jeffrey Forbes²

¹Grad. Sch. of Env. Sci., Hokkaido Univ., ²University of Colorado, ³High Altitude Observatory, NCAR

It is important to study the tidal variability in the troposphere and stratosphere, since it has a great impact on the mesosphere and lower thermosphere (MLT region). However, there has not been a comprehensive study of tides in this altitude region. Here, we reveal the global structure and seasonal variation of diurnal migrating tides in the troposphere to lower-mesosphere, using TIMED/SABER satellite data and six reanalysis data sets (NCEP/CFRSR, NASA/MERRA, ERA-Interim, JRA-25, NCEP1, NCEP2), as well as output data from Global Scale Wave Model (GSWM09).

It is shown that MERRA, ERA-Interim and CFRSR perform best in reproducing the observed features in SABER as follows. The amplitude is basically the largest in the tropics for this altitude region, except for the maximum in midlatitudes in the upper stratosphere. The amplitude maximizes in winter and in summer over the tropics, while it maximizes at solstice in midlatitudes.

Using the classical Hough mode decomposition, it is confirmed that the propagating modes are mainly excited by the tropospheric heating, while the trapped modes are excited by the heating in the troposphere and upper stratosphere. Also, numerical experiments with a linear tidal model shows that the seasonal variation of background winds/temperatures (non-classical terms) shows a non-negligible contribution to that of tidal signatures.

Keywords: diurnal migrating tides, SABER, reanalysis, seasonal variation