

A global climatology of semidiurnal nonmigrating tides in MLT winds: Results from the TIMED Doppler Interferometer (TIDI)

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TIMED Doppler Interferometer (TIDI) measurements of zonal and meridional winds in the mesosphere/lower thermosphere provide a data set that is unprecedented in that it is amenable to global nonmigrating tidal analysis over a range of MLT altitudes. We report on semidiurnal nonmigrating tides determined from 2002-2005 TIDI data and overview climatologies of monthly mean amplitudes and phases for six tidal components (westward propagating wavenumbers 1, 3 and 4; the standing semidiurnal tide; and eastward propagating wavenumbers 1 and 2) at altitudes between 85 and 105 km and latitudes between 45°S and 45°N .

A comparison with models of differing characteristics, the global scale wave model (GSWM) and the thermosphere-ionosphere-mesosphere-electrodynamics general circulation model (TIME-GCM), provides considerable insight into the two most important tidal forcing mechanisms: latent heat release in the tropical troposphere and non-linear wave-wave interaction. Although the model descriptions are quite satisfactory for some components and seasons, the comparisons nevertheless indicate numerous shortcomings in our current understanding of the nonmigrating tides. The TIDI data can thus provide the necessary guidance for further improvements of tidal forcing and dissipation schemes in atmospheric models.