



Forcing mechanisms of the terdiurnal and quarterdiurnal tide

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Solar tides such as the diurnal and semidiurnal tide, are forced in the lower and middle atmosphere through the diurnal cycle of solar radiation absorption. This is also the case with higher harmonics like the terdiurnal tide (TDT) and the quarterdiurnal tide (QDT), but for these also nonlinear interaction of other tidal components are discussed as possible forcing mechanism. To shed more light on the sources of the TDT and QDT, bispectrum analysis of meteor radar wind data at Collm (51.3°N, 13°E) from 80-100 km has been performed. The results indicate that nonlinear interaction probably plays a role in forcing the TDT and QDT, especially at higher altitudes. Numerical modeling of QDT and TDT amplitudes qualitatively reproduces the gross seasonal structure of the observed waves at Collm. Model experiments with removed tidal forcing mechanisms lead to the conclusion that, although nonlinear tidal interaction is one source of the QDT and TDT, the major forcing mechanism is direct solar forcing of the 6-hr tidal components. In addition, periodic gravity wave forcing has to be taken into account when investigating the sources of the TDT and QDT.