

NEW CLIMATOLOGICAL FEATURES OF THE MIGRATING DIURNAL AND SEMIDIURNAL TIDES SEEN IN THE SABER/TIMED TEMPERATURES (2002-2007)

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The presentation is focused on the global spatial (altitude and latitude) structures, seasonal and interannual variability of the migrating diurnal and semidiurnal tides derived from the SABER/TIMED temperature measurements for full 6 years (January 2002-December 2007). The tidal results are obtained by a new analysis method where the tides (migrating and nonmigrating) and the planetary waves (zonally travelling and stationary) are simultaneously extracted from the satellite data. It has been found that above 70 km height the SABER migrating diurnal tide reflects mainly the distinctive features of the first symmetric propagating (1,1) mode, while below this height – the first symmetric trapped (1,-2) mode. The trapped component amplifies near 50 km and its phase is close to ~16 LT. The seasonal behavior of the diurnal tide over the equator is dominated by semiannual variation while the interannual variability indicates a clear correlation with the stratospheric quasi biennial oscillation (QBO). The tidal amplitude revealed an ubiquitous double-peaked vertical structure with maxima near 85 and 100 km. The analysis indicated that in the latitude range $\pm 50^\circ$ the strongest migrating semidiurnal tide is derived at tropical latitudes (± 20 - 30°) where it revealed significant amplification in the lower thermosphere of both hemispheres. The tidal amplitudes at 110 km height are nearly a factor of 5 larger than those at 90 km. The migrating semidiurnal tide in both tropical hemispheres revealed remarkable seasonal behavior indicating repeatable each year maxima exactly in May-June and August. The vertical wavelengths indicated seasonal variability being larger in summer (~38-50 km) than in winter (~25-35 km). The interannual variability of the semidiurnal tide in the midlatitude lower thermosphere is at least partly connected with the stratospheric QBO as this effect is stronger in the Northern hemisphere.

migrating tides, propagating and trapped modes, double-peak vertical structure

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