

The QBO impacts on tides and the SAO

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It has been known for several decades that the amplitude of the migrating diurnal tide in the mesosphere and lower thermosphere (MLT) varies with the phase of the quasi-biennial oscillation (QBO) in tropical stratospheric winds. We use observations from the SABER instrument on the TIMED spacecraft and simulations from the NCAR Whole Atmosphere Community Climate Model (WACCM) to investigate the processes that contribute to this coupling. The generation and propagation of the tide respond to heating in the troposphere, to the winds across the tropical region, and to the distribution of stratospheric ozone, which affects the diurnally varying heating. The QBO can also affect the vertical propagation of equatorial and gravity waves, which can alter tides and background winds in the MLT through damping or other interactions.

Key words: diurnal tide, quasi-biennial oscillation, semiannual oscillation