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High vertical resolution GPS temperature retrievals are used to study large- and small-scale atmospheric waves in the tropics over 10-35 km during 2006-2017. Temperature variance patterns exhibit persistent maxima in the tropical tropopause layer (~17-20 km), along with transient maxima in the stratosphere over 20-35 km which are closely linked to the background zonal winds (maxima during the westerly shear phase of the quasi-biennial oscillation, QBO). Phase-speed spectra of tropical waves, derived from space-time spectral analysis, highlight a dominance of eastward traveling Kelvin waves, and these data provide an idealized situation to study the relationships between wave amplitudes, phase speeds and background winds in the real atmosphere. We use these results to improve understanding of critical layer interactions and Kelvin wave amplification and dissipation processes.
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