



Towards a synthesis definition of the TTL

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The tropical troposphere and stratosphere have distinctive properties in thermal structure, dynamics, and trace constituents. In between, there is an atmospheric layer called in recent years the "tropical tropopause layer" or "tropopause transition layer" (TTL) whose characteristics are distinctly different from either the troposphere or the stratosphere. This transition from troposphere to stratosphere may extend over several kilometers in the vertical, and a number of different definitions of the TTL have been proposed. Each of these descriptions has merit, but they are based on different assumptions about which physical and chemical processes are instrumental in defining the TTL, and yield definitions of base and top of the TTL that are only roughly in accordance with each other. Moreover, the lateral bounds of the TTL are as yet poorly defined. Here, we synthesize observations or estimates of thermal structure, radiative heating, clouds, atmospheric circulation, relative humidity, ozone, and other trace constituents, to arrive at a process-based synthesis definition of the TTL.