



How variable is the long-term transpiration-to-evapotranspiration ratio?

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Recent studies using various methodologies have found that the ratio of transpiration to total evapotranspiration (T:ET) spans from 35 to 90% across different biomes, making the partitioning of terrestrial water budget components uncertain. Models typically predict a lower T:ET than observations. Concurrently, literature results suggest that T:ET does not depend on mean precipitation and has a positive correlation with Leaf Area Index (LAI). Here, we used the mechanistic ecohydrological model T&C with a refined process-based description of evaporation from soil together with a detailed representation of canopy biophysics and physiology, to investigate T:ET across multiple biomes. Numerical simulations highlight a much more constrained range of mean T:ET ($70 \pm 9\%$) when compared to observation-based estimates. T:ET is lower than 55% only in a few sites that often correspond to specific conditions (e.g., degraded grasslands, boreal tundra). Our analysis confirms that T:ET is independent from mean annual precipitation and only weakly correlated to wetness index. T:ET was found to be uncorrelated with LAI across biomes, but strongly correlated to LAI seasonally. These results offer mechanistic interpretations of T:ET variability and the factors affecting its magnitude across biomes.