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Modelling insights on the partition of evapotranspiration components across biomes

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Recent studies using various methodologies have found a large variability (from 35 to 90%) in the ratio of transpiration to total evapotranspiration (denoted as T:ET) across biomes or even at the global scale. Concurrently, previous results suggest that T:ET is independent of mean precipitation and has a positive correlation with Leaf Area Index (LAI). We used the mechanistic ecohydrological model, T&C, with a refined process-based description of soil resistance and a detailed treatment of canopy biophysics and ecophysiology, to investigate T:ET across multiple biomes. Contrary to observation-based estimates, simulation results highlight a well-constrained range of mean T:ET across biomes that is also robust to perturbations of the most sensitive parameters. Simulated T:ET was confirmed to be independent of average precipitation, while it was found to be uncorrelated with LAI across biomes. Higher values of LAI increase evaporation from interception but suppress ground evaporation with the two effects largely cancelling each other in many sites. These results offer mechanistic, model-based, evidence to the ongoing research about the range of T:ET and the factors affecting its magnitude across biomes.