



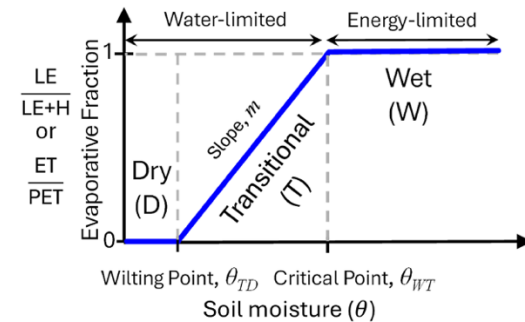
Global Terrestrial Water–Energy Coupling Across Scales



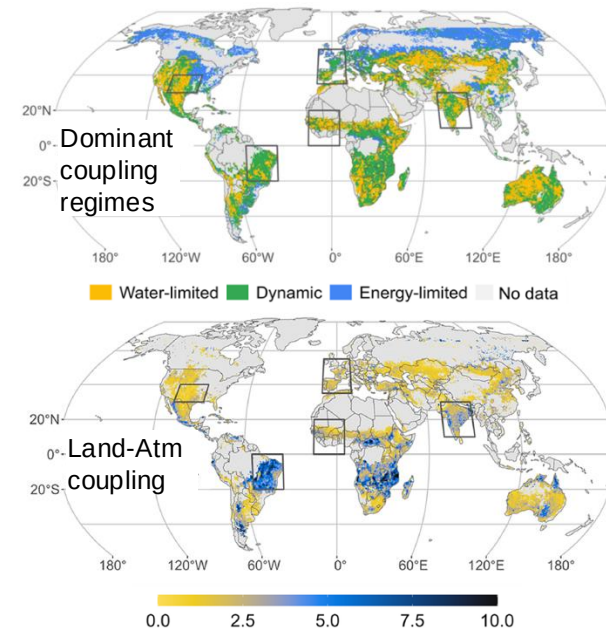
Problem: Water and energy cycles are strongly coupled at terrestrial land-surface and are foundational to ecohydrological processes which sustain life on Earth. However, gaps remain in estimating critical water-energy limitation thresholds of ecosystem processes and availability constraints on water and energy at landscape scale.

Finding: Global landmass can be categorized into three dominant mesoscale water-energy coupling regimes. Climate governs the spatial distribution of dominant coupling regimes, while soil-plant interaction moderates the critical thresholds of ecosystem water- and energy-use.

Impact: Global understanding of governing controls and dominant regimes of water-energy coupling will advance the representation of ecohydrological processes in Earth-system model.



A schematic of soil moisture-evaporative fraction coupling



Global distribution of dominant water-energy coupling regimes and land-atmospheric coupling strength (m)