



Understanding ecosystems' sub-daily water and carbon flux changes during dry-down events

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Sub-daily water and carbon flux patterns give important and sometimes overlooked information about ecosystem processes and land-atmosphere feedbacks. While models often perform well down to daily timescales, they can be uncertain with respect to the diurnal courses, especially during dry-down events where the fraction of T to ET is shifting. We analyzed events from multiple locations for unique pattern changes that were robust across sites. Of particular interest were the divergence of water and carbon fluxes during high radiation periods, which indicates changes in water use efficiency as drought conditions intensified. The validity of attributing the signatures to ecosystem transitions such as changes in phenology, switches in soil evaporation vs transpiration dominance, and physiological stress were evaluated by comparing to site specific sap flow, soil moisture, and remote sensing data. Going forward, these findings can be used to further understand ecosystem physiology under drought conditions, and can also be used to partition of water fluxes and better constrain future models.