

EGU22-10902

<https://doi.org/10.5194/egusphere-egu22-10902>

EGU General Assembly 2022

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## Tree water-use recovery after drought-intermittent rainfall events

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Short drought-intermittent rainfall (SDIR) events, i.e., short rainfall events after long dry spells, typically re-wet top few centimeters of soil layer and often has little impact on the water balance of the ecosystem. Nevertheless, these SDIR events could provide the much-needed short-term water supply during dry spells to the terrestrial ecosystem, especially trees. An efficient use of these SDIR events could provide the trees with a buffer to withstand longer drought conditions, which will become more frequent and intense with the upcoming changes in climate.

This study aims to quantify the tree water use (TWU) recovery in terms of sapflow recovery following SDIR events across multiple global forest sites (35 sites) spanning over 250 site-years. SDIR events are identified probabilistically as rainfall periods (1-2 days with daily rainfall < 75<sup>th</sup> percentile) occurring after an extreme dry spell (> 90<sup>th</sup> percentile of dry spell duration) during the growing season. For each tree, TWU recovery ( $R_{TWU}$ ) is estimated based on percentage increase in sapflow rate after the SDIR event ( $S_a$ ), compared to before the SDIR event ( $S_b$ ), and standardized by seasonal maximum sapflow ( $S_{max}$ ). The inter-species  $R_{TWU}$  and intra-species  $R_{TWU}$  relationship with tree allometry (height and diameter) is used to explain the recovery rates. The main hypothesis tested here is that the intra-species differences in  $R_{TWU}$  are positively related to tree size due to better root development in larger trees. The understanding of  $R_{TWU}$  provides a new axis to understand and predict tree recovery after drought events.