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Tree species and climatic factors driving net precipitation partitioning in regions with prevailing cloud deposition and wind-driven rain

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Partitioning of rainwater in interception, throughfall and stemflow plays a crucial role for potential soil water fluxes, especially in semiarid regions. On the one hand, reducing interception and enhancing net precipitation is crucial for maximizing rain yield. On the other hand, a large proportion of stemflow is likely to induce infiltration hotspots leading to fast transport of water to the deep soil, where it is safe from evaporation.

In this paper we investigate, whether climate factors or species properties are more conducive to dividing net precipitation into stemflow and throughfall. For this, we use measurements of stemflow and throughfall from two growing seasons in an semiarid cloud forest in Oman, where both wind-driven rain and cloud deposition occur together. Using multivariate statistics, we compare the drivers of stemflow, throughfall partitioning between periods with different wind and rain conditions to understand, weather periods of extremely inclined rain promote stemflow, or alternatively weather stemflow depends solely on the specific position, tree species and tree morphology (height, crown diameter).

Our results indicate that in particular position and species shape stemflow rates, while variation between singular events are influenced by climate variables. Our results show the importance of tall vegetation in semiarid regions for shaping patterns of soil infiltration and potential for groundwater recharge.