Supplement of Hydrol. Earth Syst. Sci., 29, 701–718, 2025
https://doi.org/10.5194/hess-29-701-2025-supplement

Hydrology and Earth System Sciences
Open Access
EGU

Supplement of

Canopy structure modulates the sensitivity of subalpine forest stands to interannual snowpack and precipitation variability

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S6: Figure showing difference in volumetric water content under adjacent conifer and aspen stands as in Figure 4 of the main body of the paper but for a second nearby site.

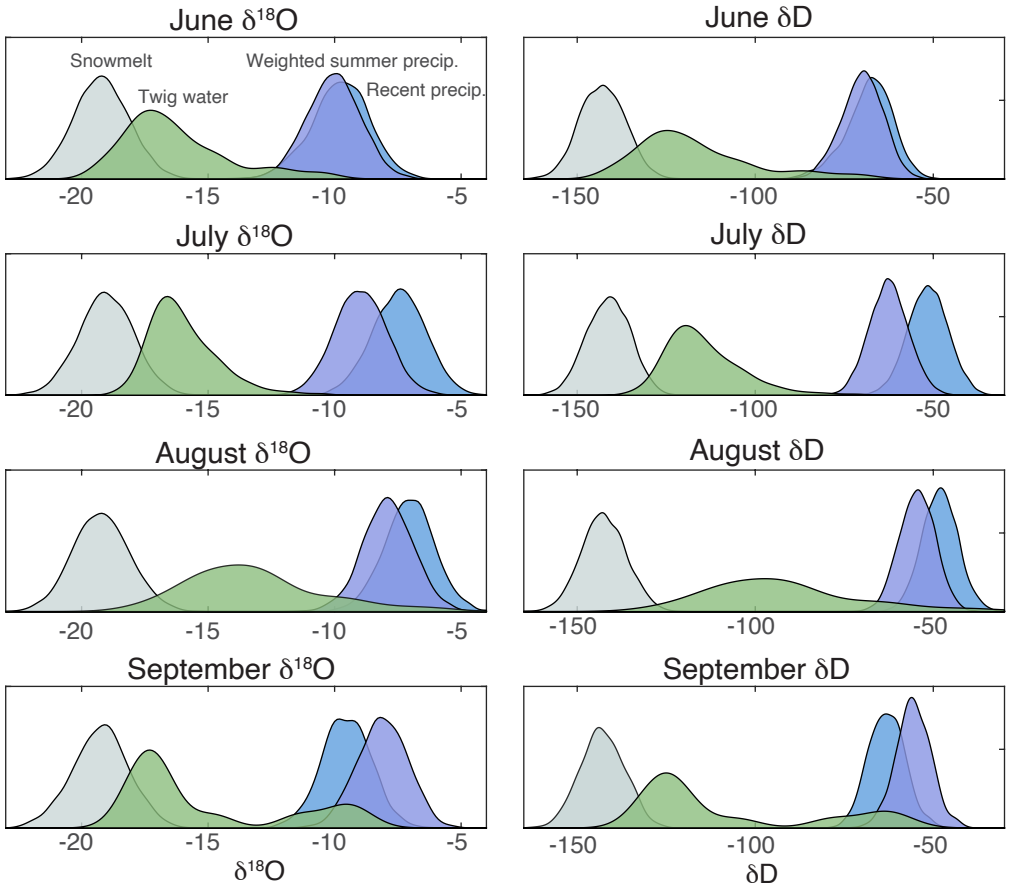

Figure S 1. Distribution of the three isotopic end members across the different months of the growing season (top to bottom corresponds to June-September) and for the different isotopes (left is oxygen and right is deuterium). The green distribution captures the measured twig water samples and where those values plot relative to the end members.

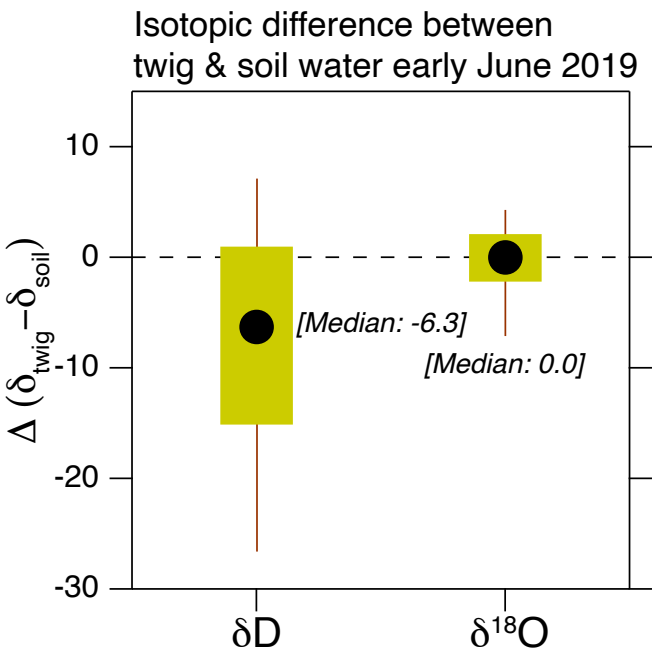

Figure S 2. The difference (i.e. Δ) between the isotopic ratio of stem water samples and coeval 10 cm soil water samples take in early June 2019 just following snowmelt. This includes data taken from all species across the network of sites (Figure 1). The box and whisper plots capture the quartiles, 5th and 95th% of the measured offset between stem and soil water. The left box and whisper plot shows the offset for deuterium and the right shows the same for oxygen-18. This result implies a small fractionation present in the deuterium of twig waters that is not present for oxygen. We use this empirical offset to bias-correct the deuterium ratio of the twig water samples.

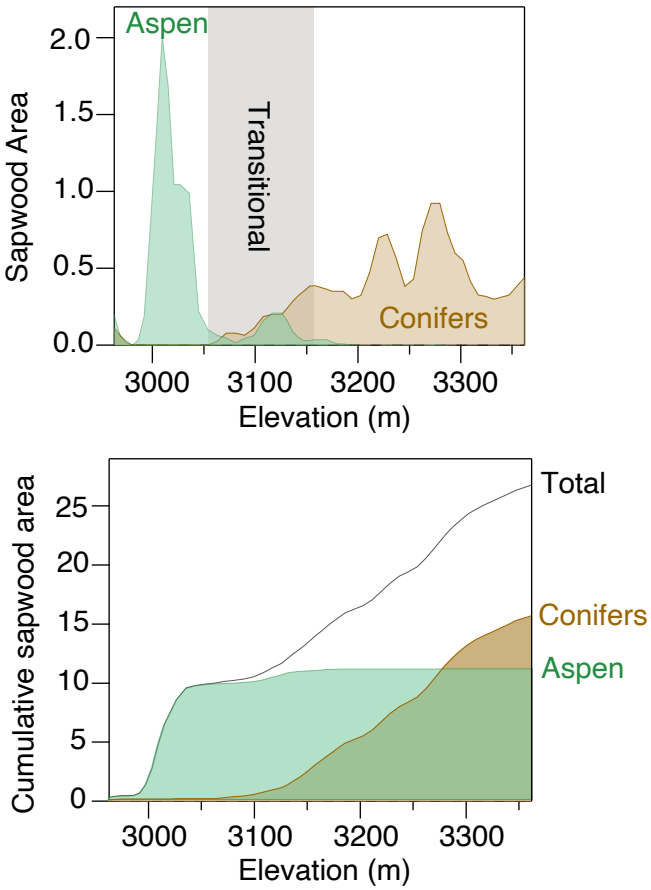

Figure S 3. (Top) The distribution of sapwood area along a transect in 10 m increments connecting the lowermost to the uppermost sites in the network. Sapwood was estimated as described in the paper through estimating tree type (deciduous vs. coniferous) and height, then estimating DBH and finally the sapwood area. The results show the transition between aspen to conifer dominant stands with a small transitional band around 3150 m. (Bottom) Cumulative sapwood area based on the top figure showing the overall higher coverage of conifer sapwood on the hillslope.

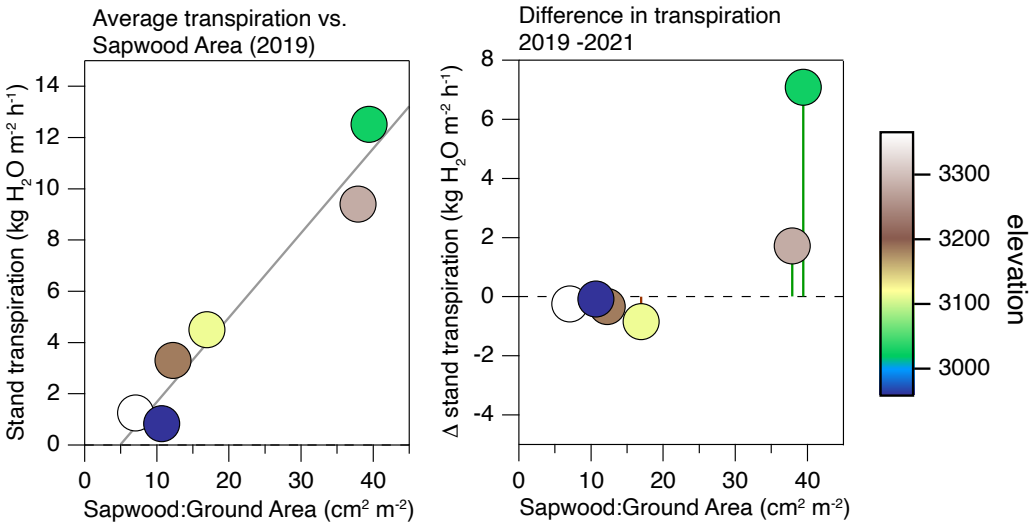

Figure S 4. (Left) Total transpiration estimated for each site by multiplying the sap velocity by sapwood area vs. sapwood to ground area. There is a strong linear relationship indicating the strong control of stand density on transpiration rates. (B) The difference in 2019 and 2021 transpiration for these sites as a function of sapwood to ground area. As discussed in the paper this illustrates that stand density had a strong control over whether a site responded positively or negatively to the large snowpack year of 2019. The negative response of the open sites has a much smaller amplitude than the positive responses in the dense sites owing to the much high overall transpiration rates in the dense stands.

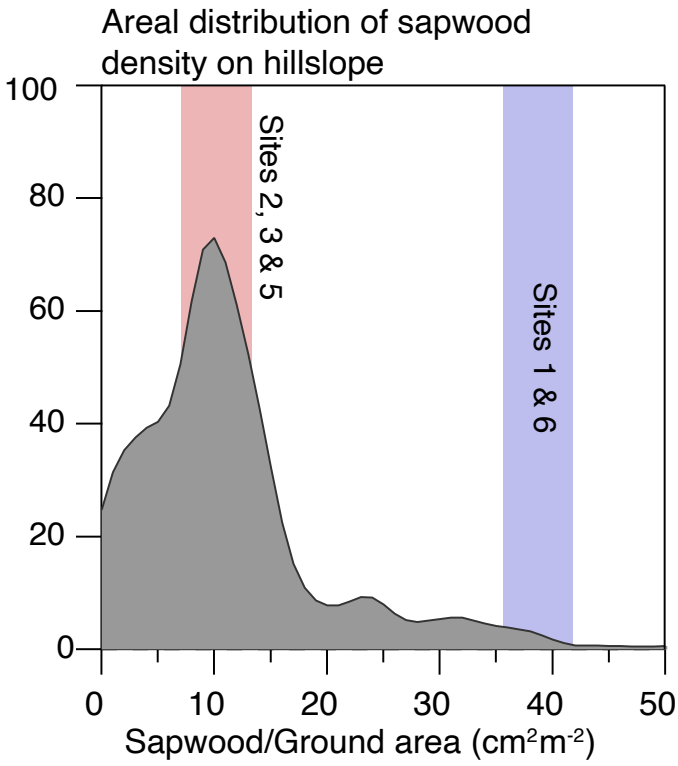

Figure S 5. Distribution of sapwood density along the transect of sites in Figure 1. Based on the range of stand densities captured by the site network we identify how most of the hillslope was similar to the open sites (2, 3 and 5). The dense sites (1 and 5) capture the conditions in the outer range of stand densities for this hillslope.

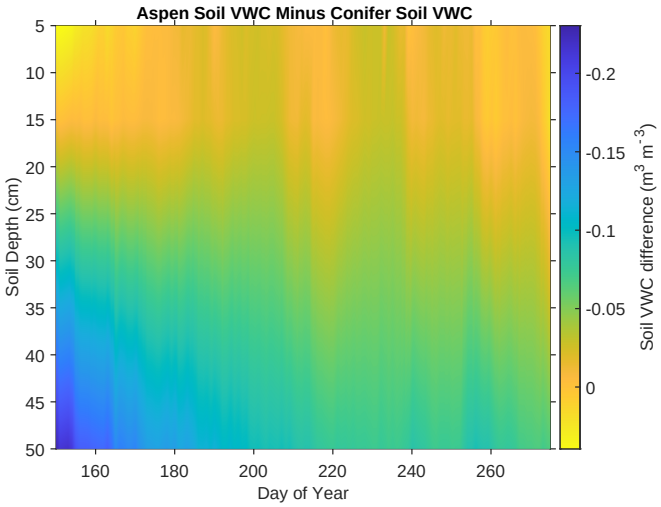

Figure S 6. Difference in volumetric water content between adjacent aspen and conifer stands from Carbone et al., (2023). This data is similar to Figure 5d in the main body of the manuscript but from another site in the watershed. The data is interpolated from volumetric water content measured at 5, 15 and 50 cm and averaged from all data from 2014-2023.