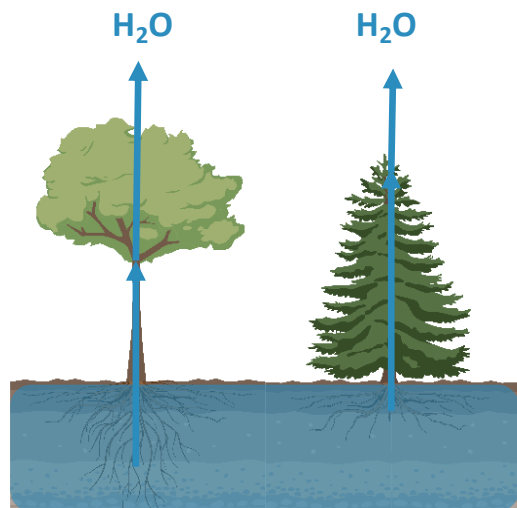




Does root water uptake depth drive drought responses of temperate tree species?

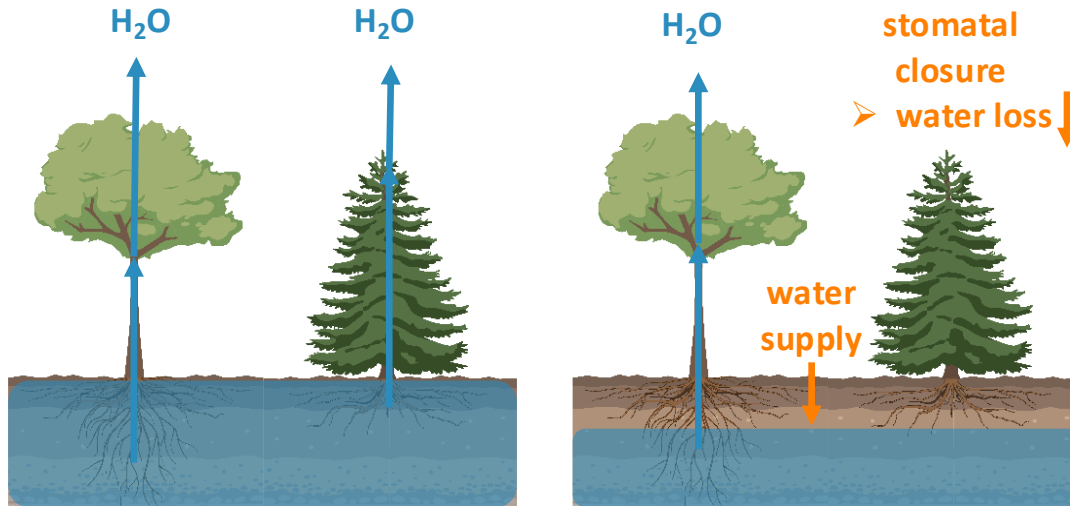
David N. Steger, Richard L. Peters, Tobias Zhorzel, Raphael Dups, Günter Hoch, Daniel B. Nelson, Cedric Zahnd,
David Basler, Katrin Meusburger, Fabian Bernhard, Matthias Arend, Bernhard Schuldt, and Ansgar Kahmen

Background – hypothetical relation between root water uptake depth and drought



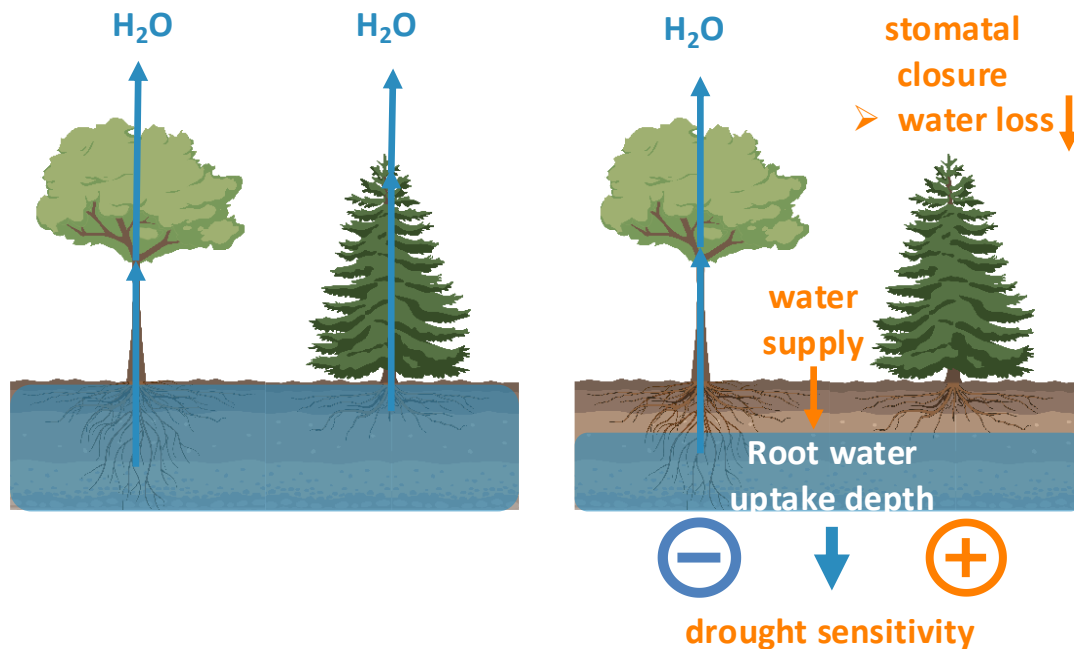
Background – hypothetical relation between root water uptake depth and drought

drought

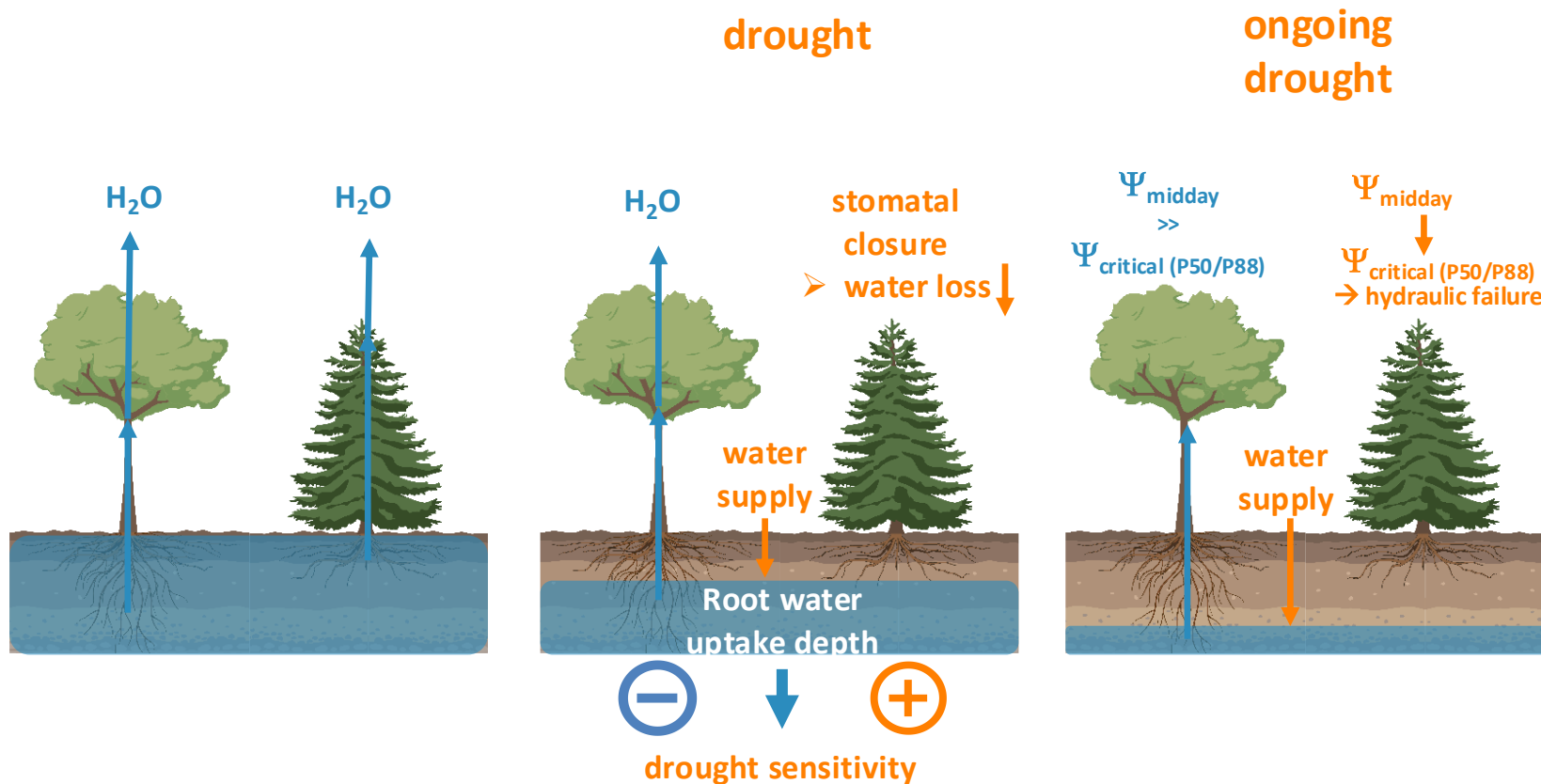


Background – hypothetical relation between root water uptake depth and drought

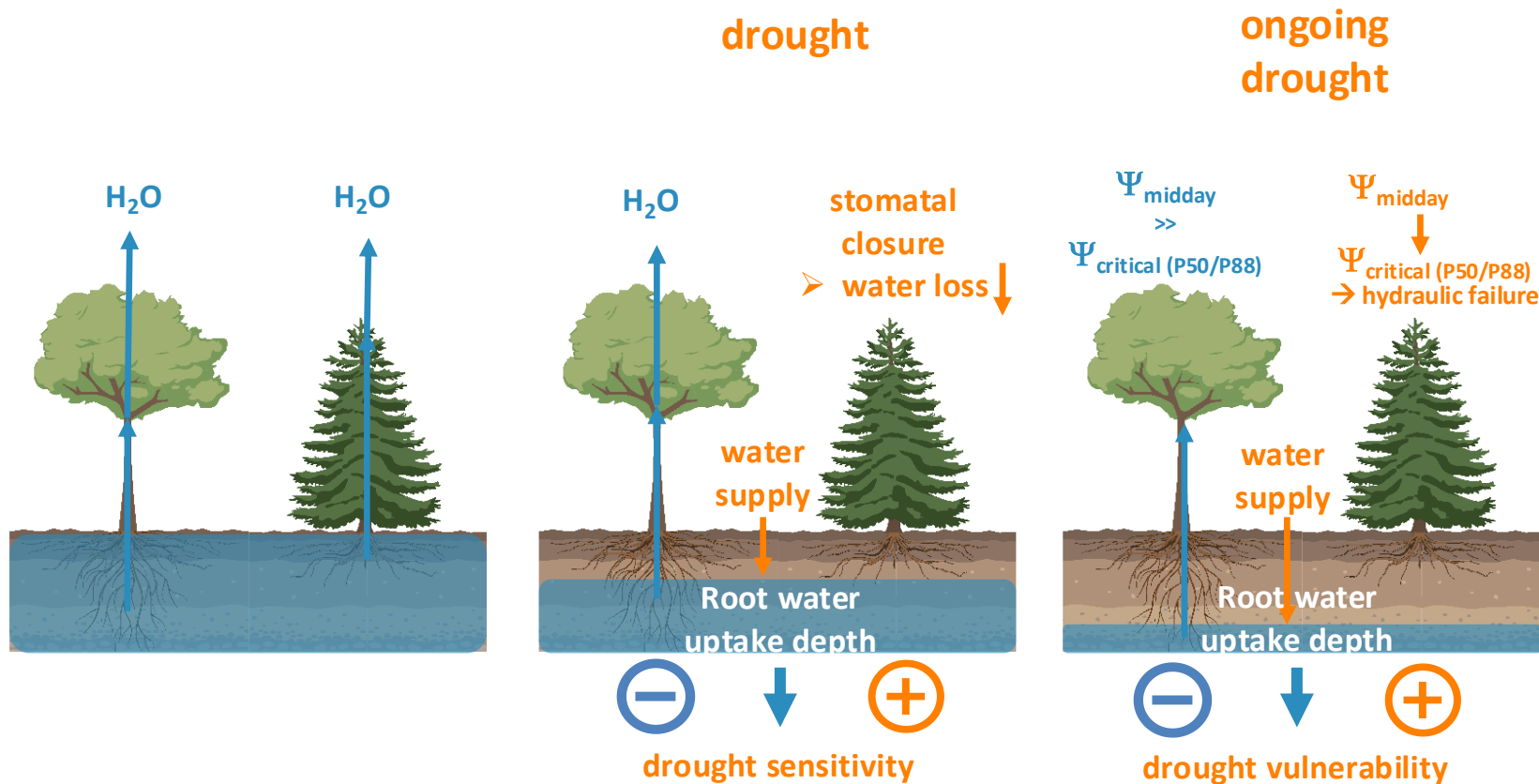
drought



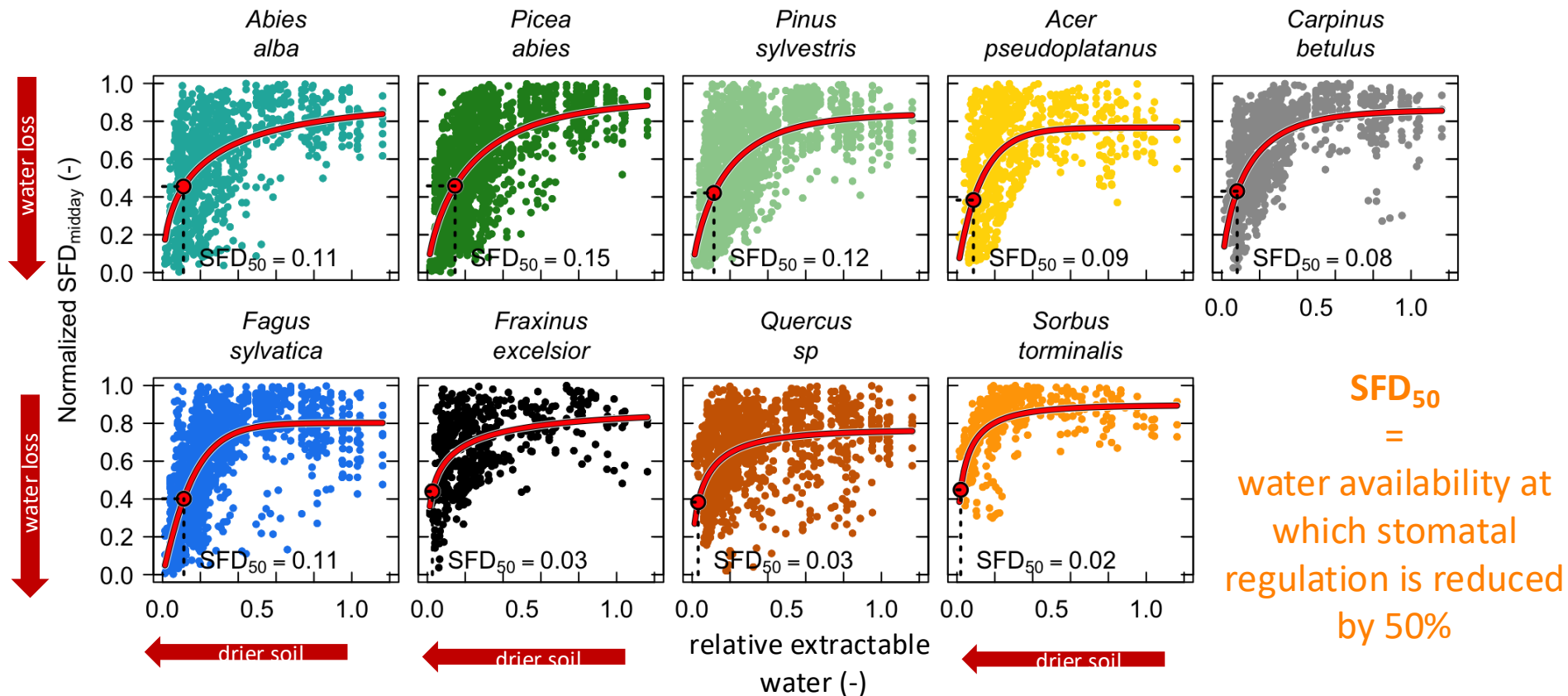
Background – hypothetical relation between root water uptake depth and drought



Background – hypothetical relation between root water uptake depth and drought

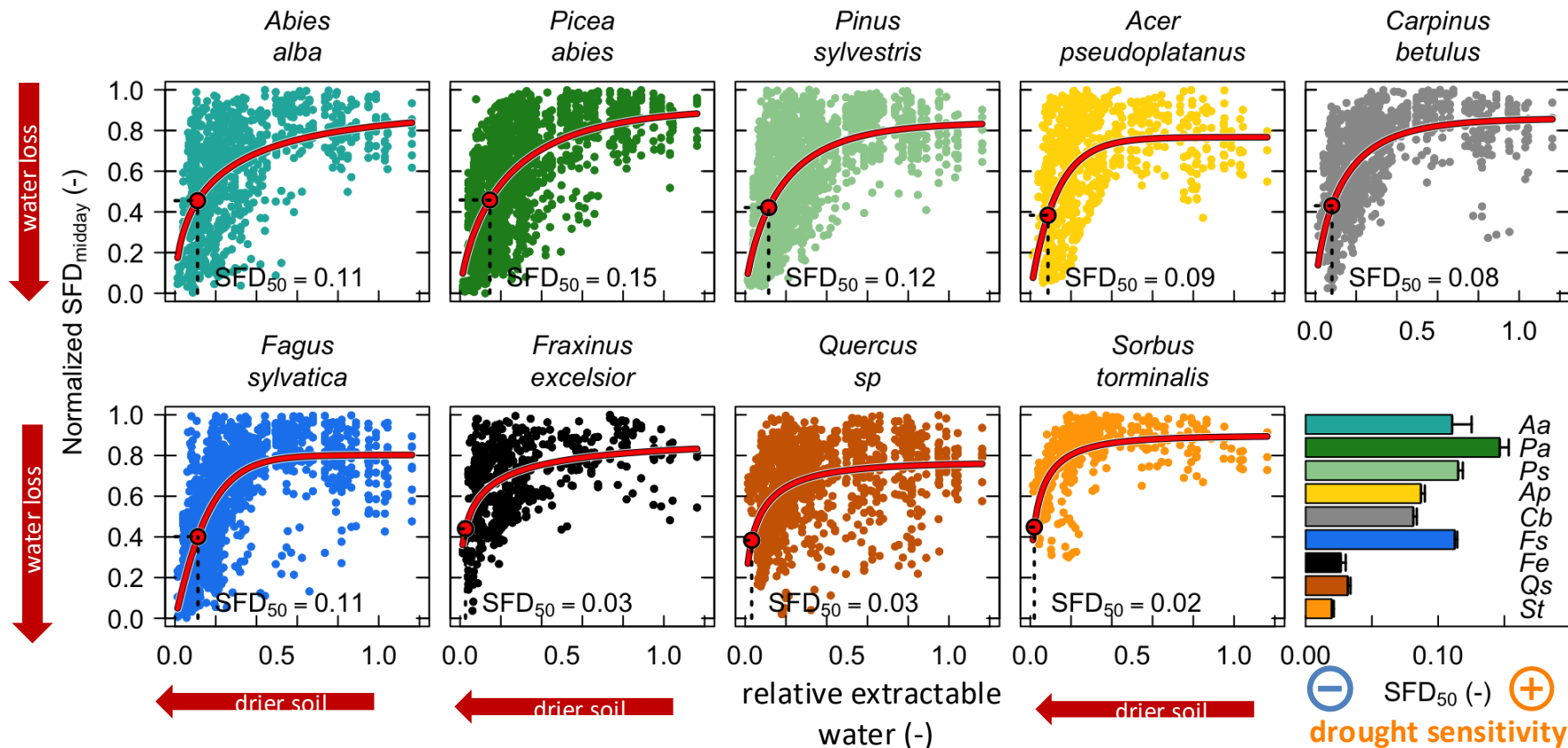


Results: drought sensitivity = SFD_{50}



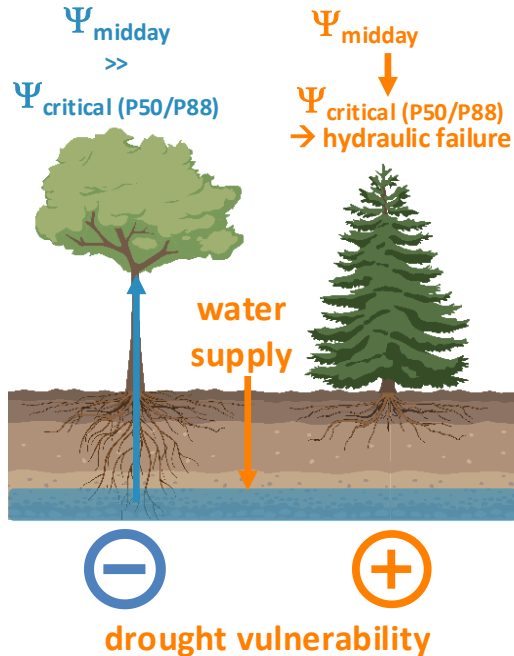
SFD_{50}
= water availability at which stomatal regulation is reduced by 50%

Results: drought sensitivity = SFD_{50}



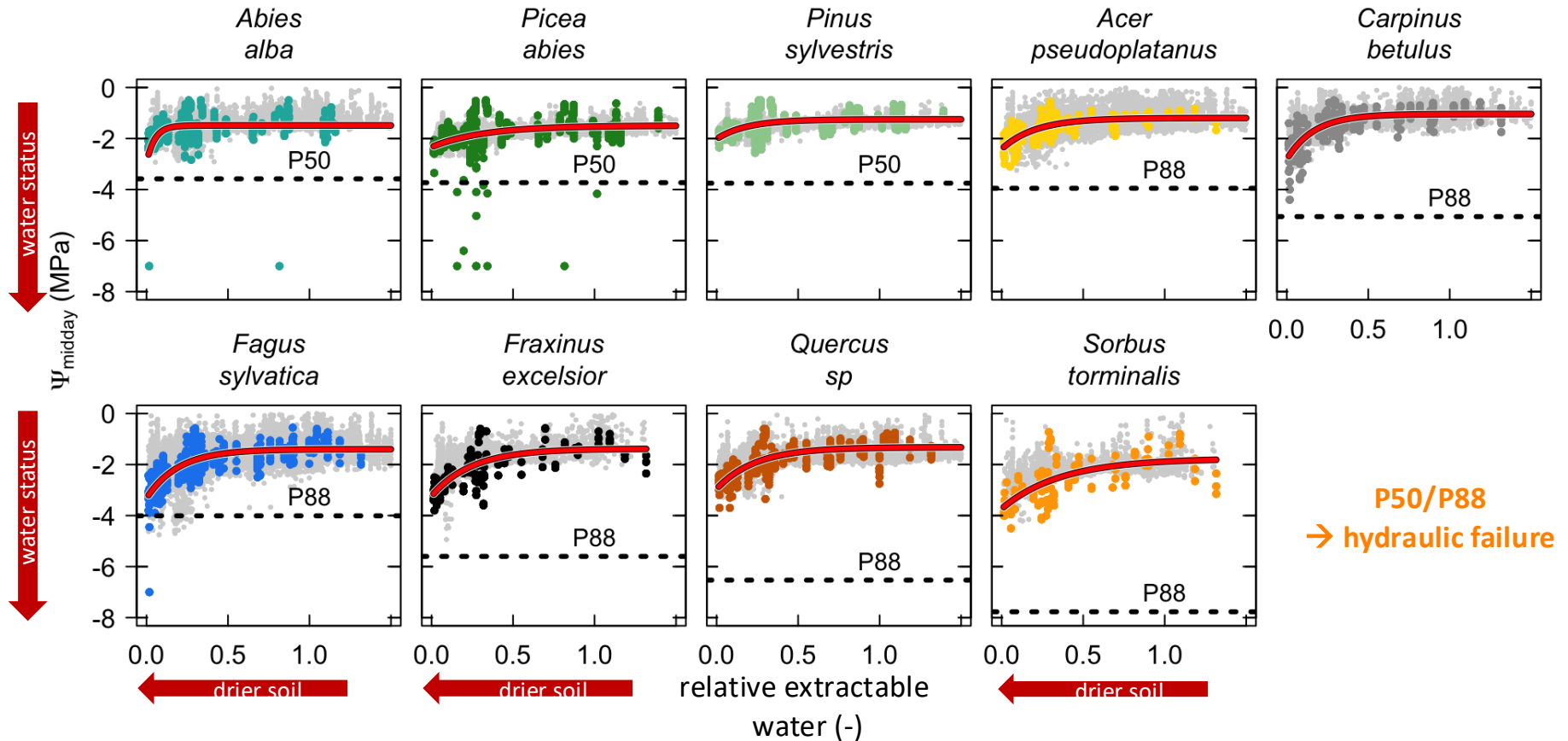
Drought vulnerability = Hydraulic safety margin $HSM_{50/88}$

ongoing
drought

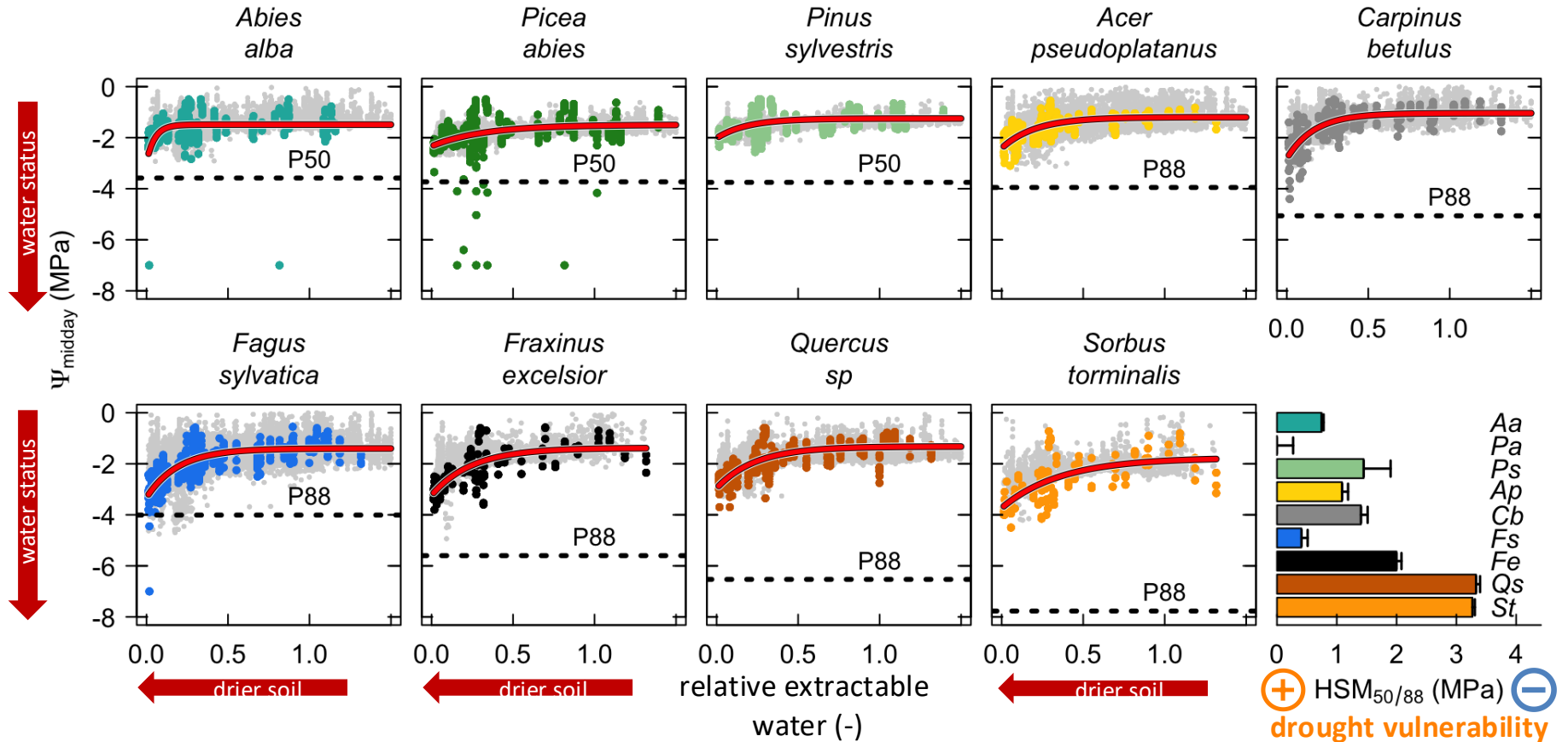


hydraulic safety margin
($HSM_{50/88}$)
=
minimum leaf water
potential
-
critical leaf water
potential threshold for
hydraulic failure
(P50/P88)

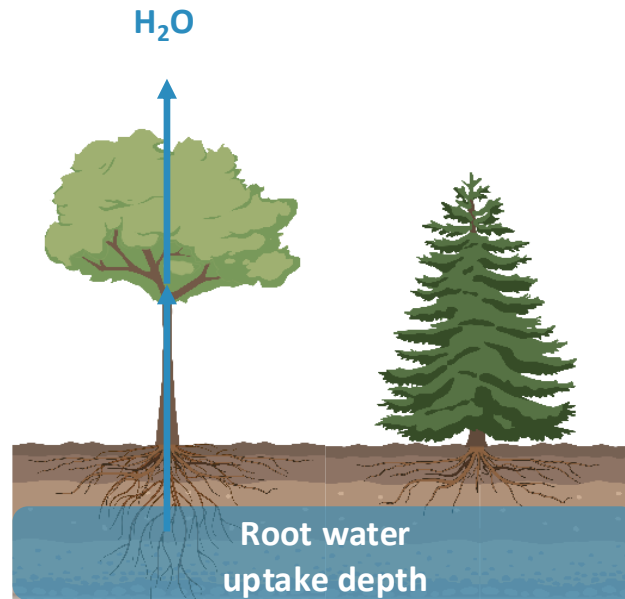
Results: drought vulnerability = Hydraulic safety margin $HSM_{50/88}$



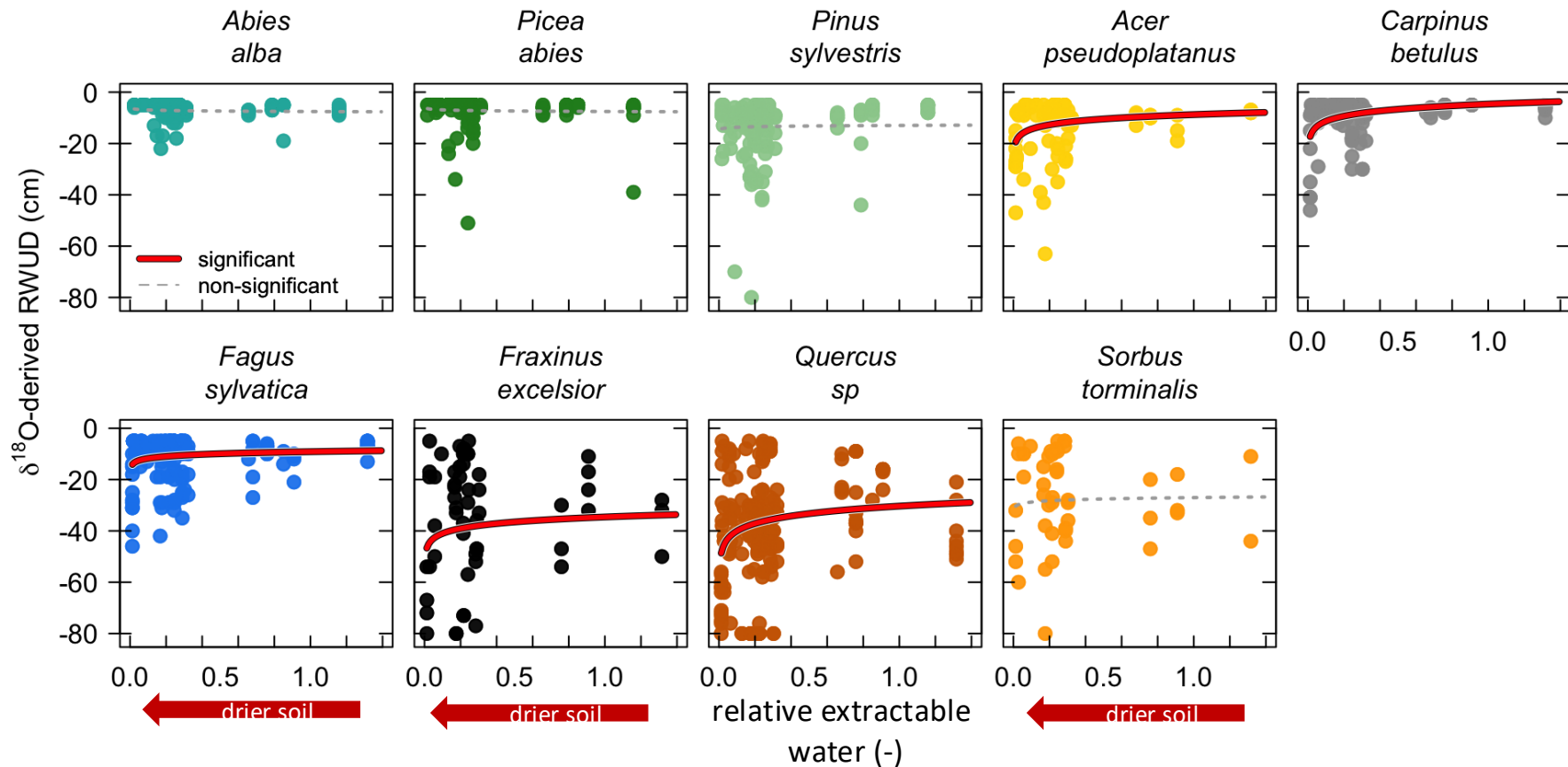
Results: drought vulnerability = Hydraulic safety margin $HSM_{50/88}$



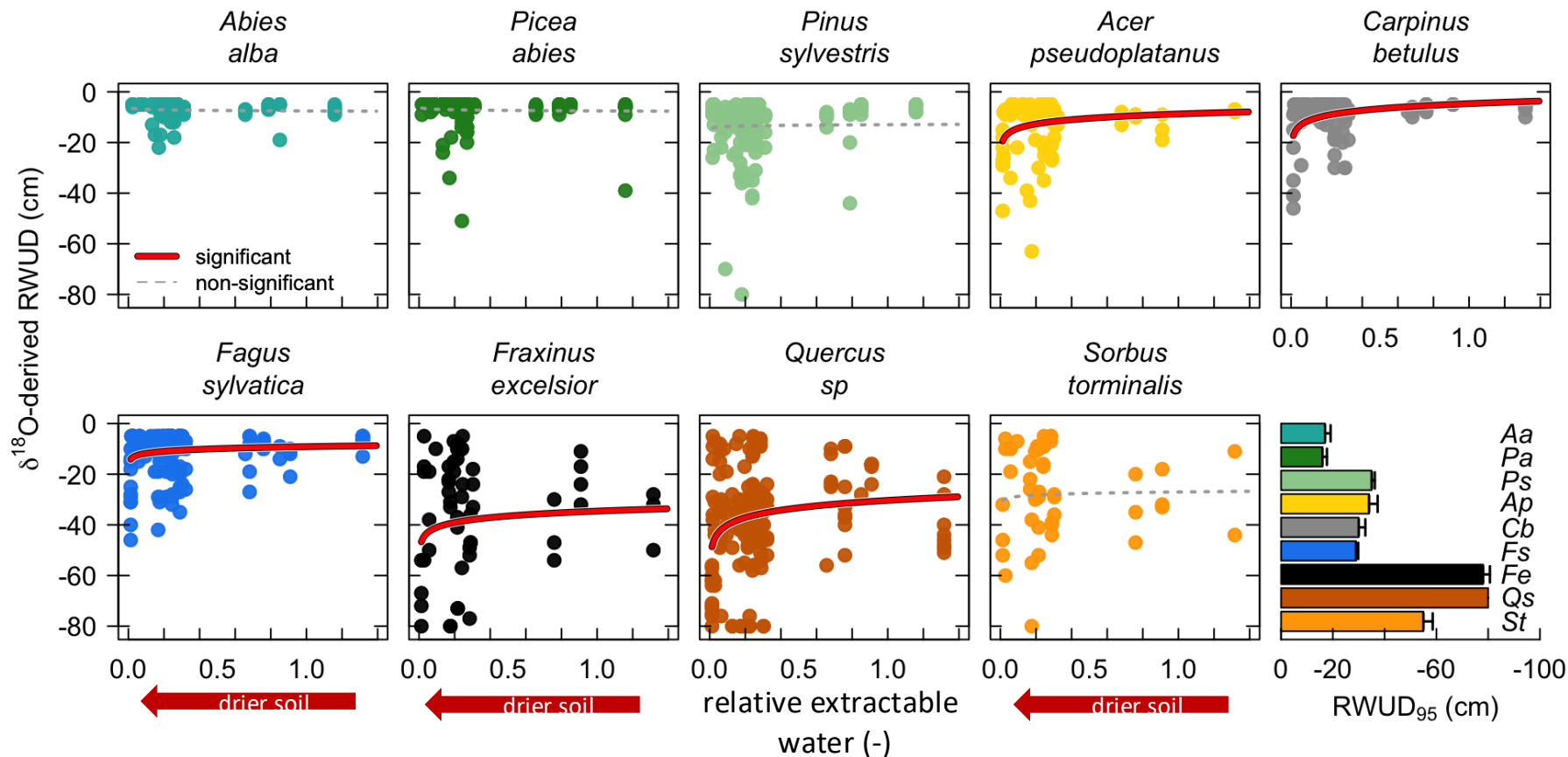
Results: Root water uptake depth



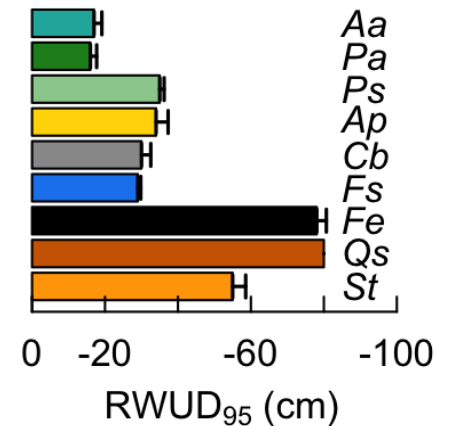
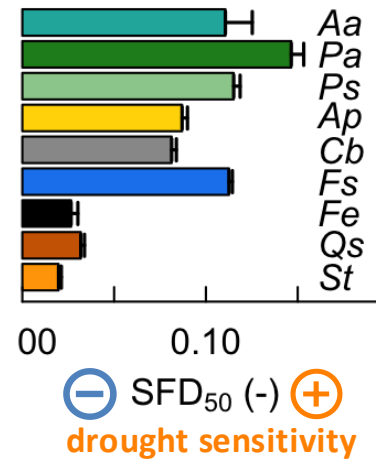
Results: Root water uptake depth (RWUD)



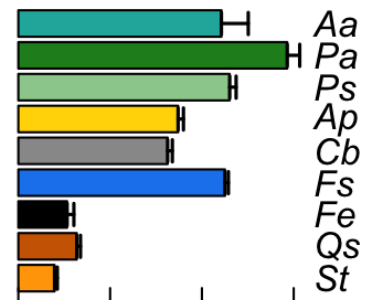
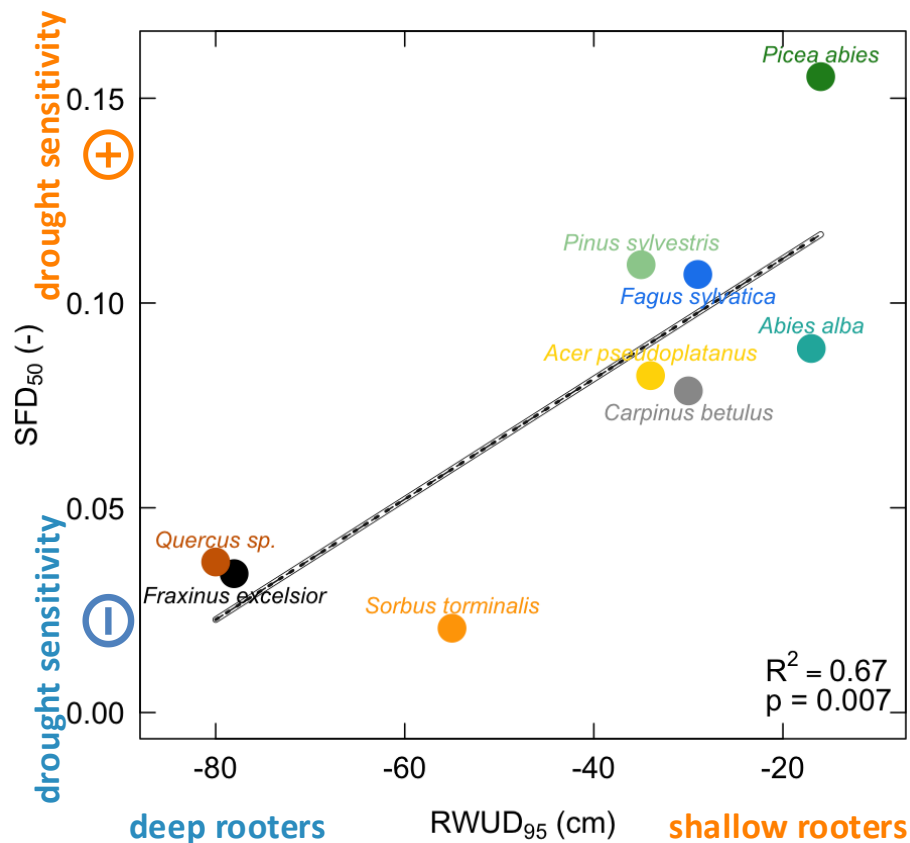
Results: Root water uptake depth (RWUD)



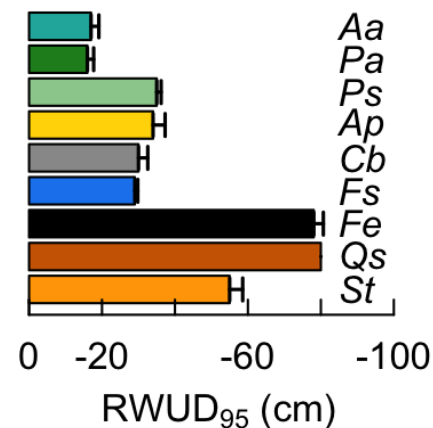
Results: Root water uptake depth drives drought sensitivity



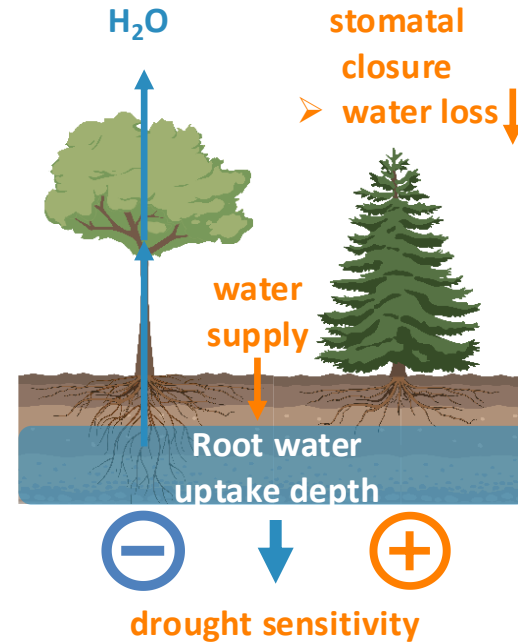
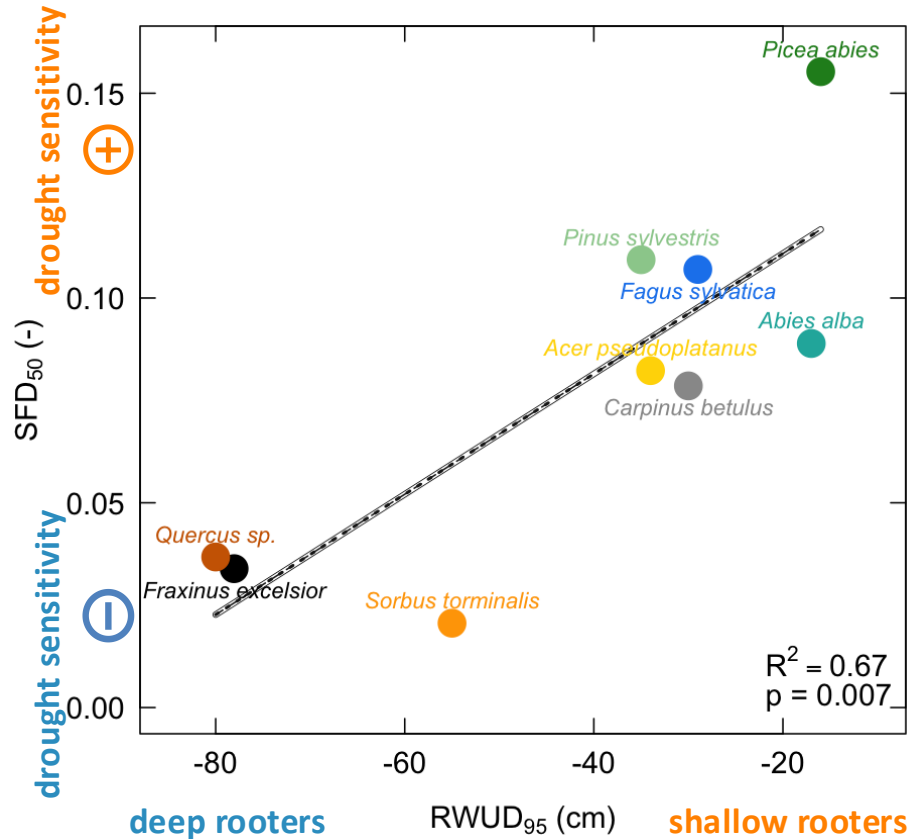
Results: Root water uptake depth drives drought sensitivity



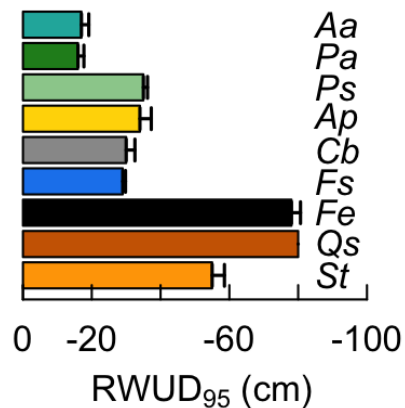
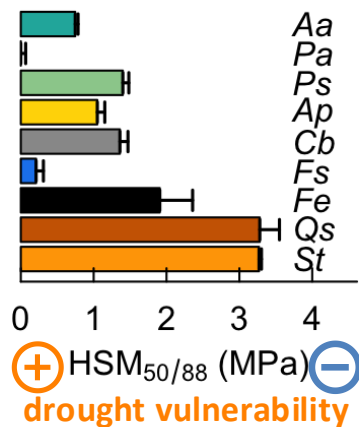
⊖ SFD₅₀ (-) ⊕
drought sensitivity



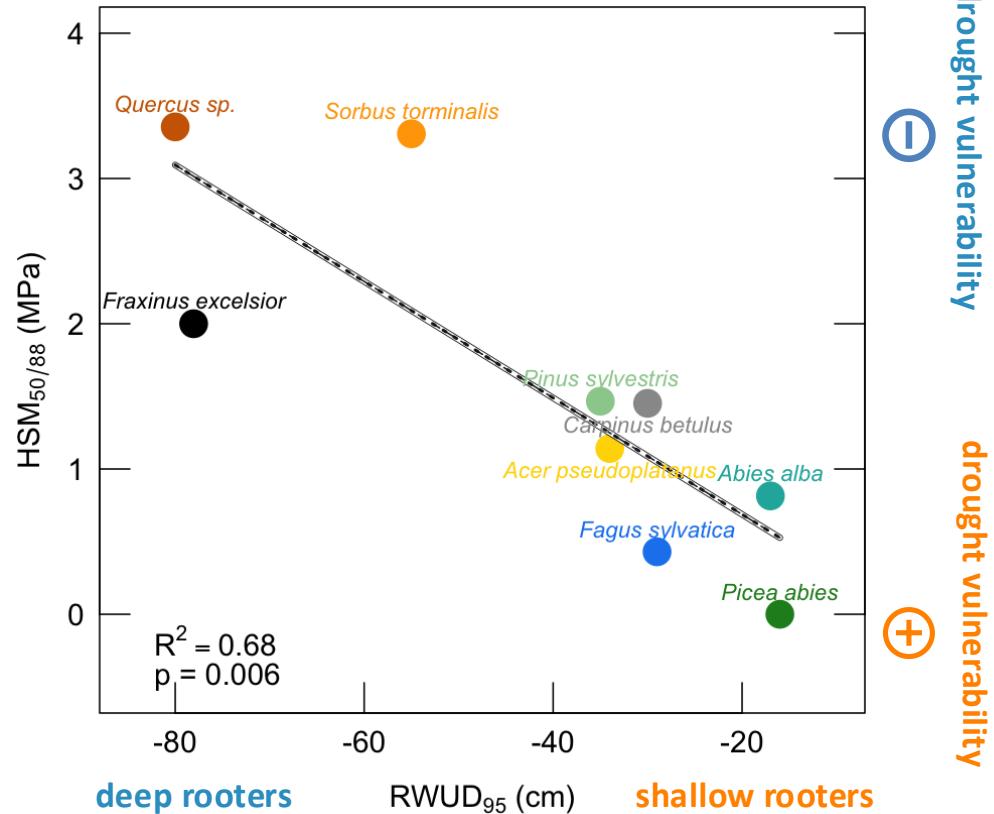
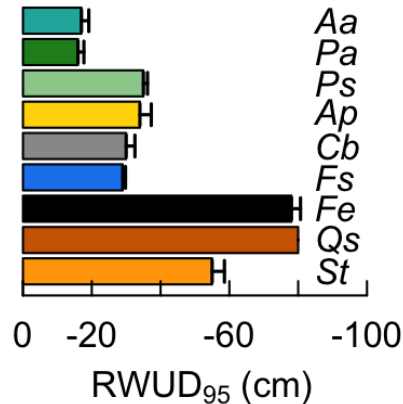
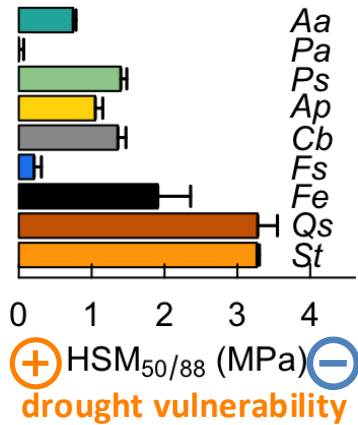
Results: Root water uptake depth drives drought sensitivity



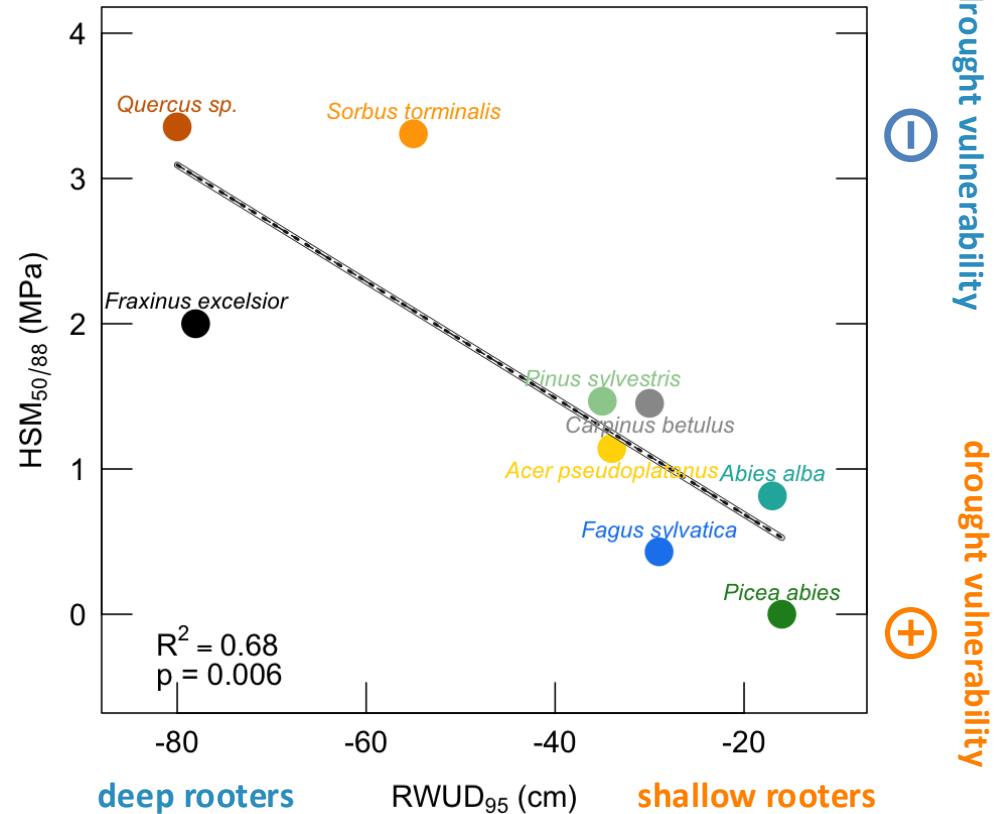
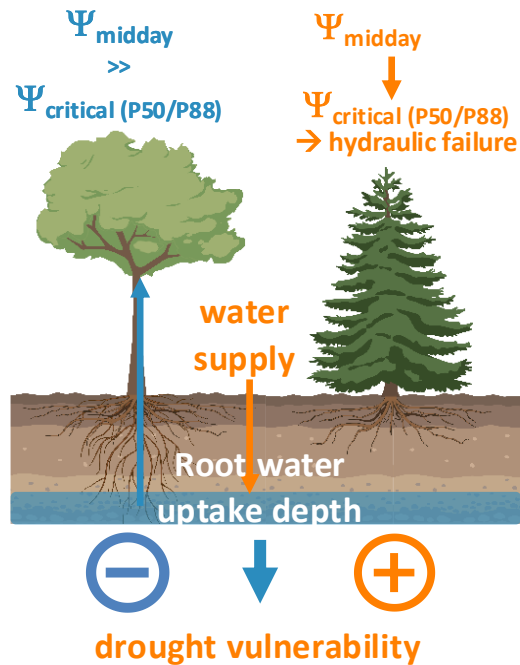
Results: Root water uptake depth drives drought vulnerability



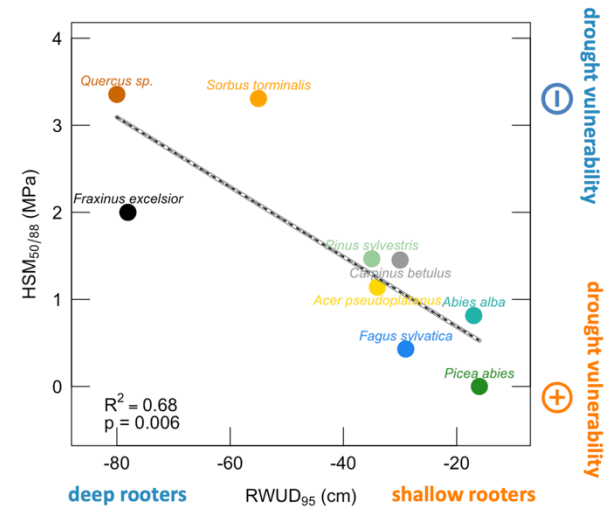
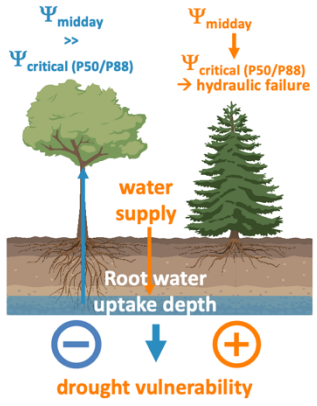
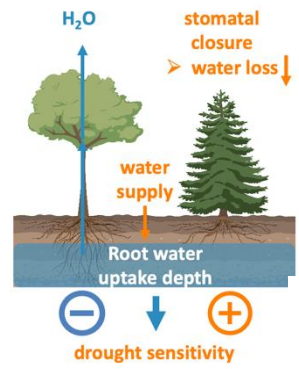
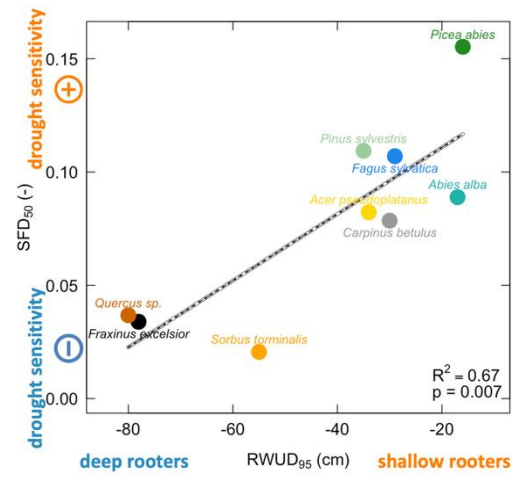
Results: Root water uptake depth drives drought vulnerability



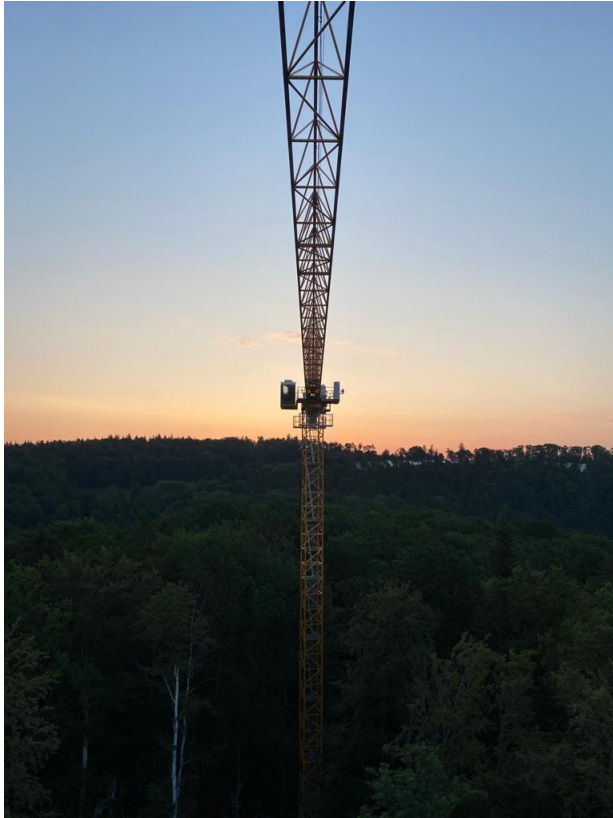
Results: Root water uptake depth drives drought vulnerability



Take home: Root water uptake depth drives drought sensitivity and vulnerability



Thank you very much!

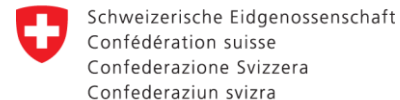


Acknowledgements

Physiological Plant Ecology Group



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