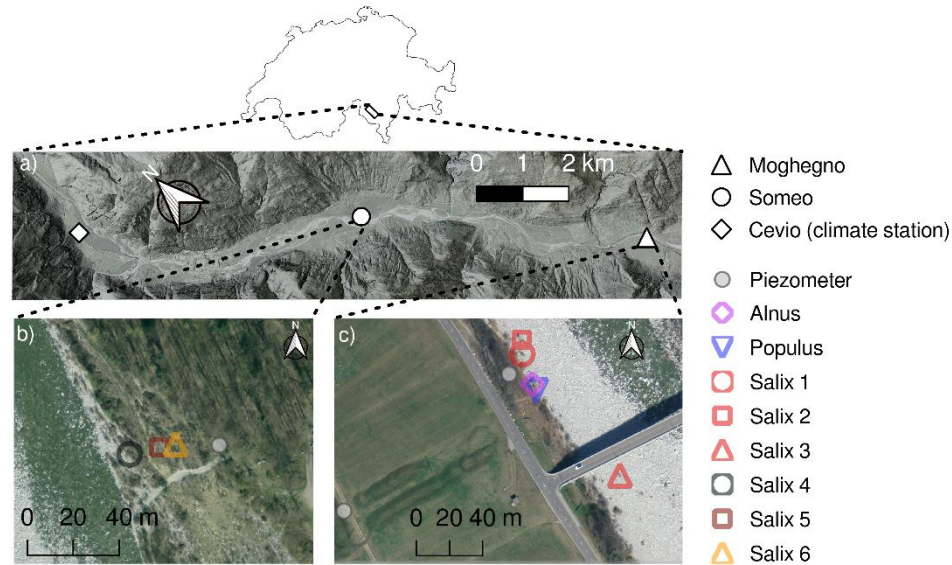


Near stream groundwater table fluctuations impact transpiration rates of riparian plants: a field study with stomatal conductance and dendrometry measurements

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Paolo Burlando & Peter Molnar**

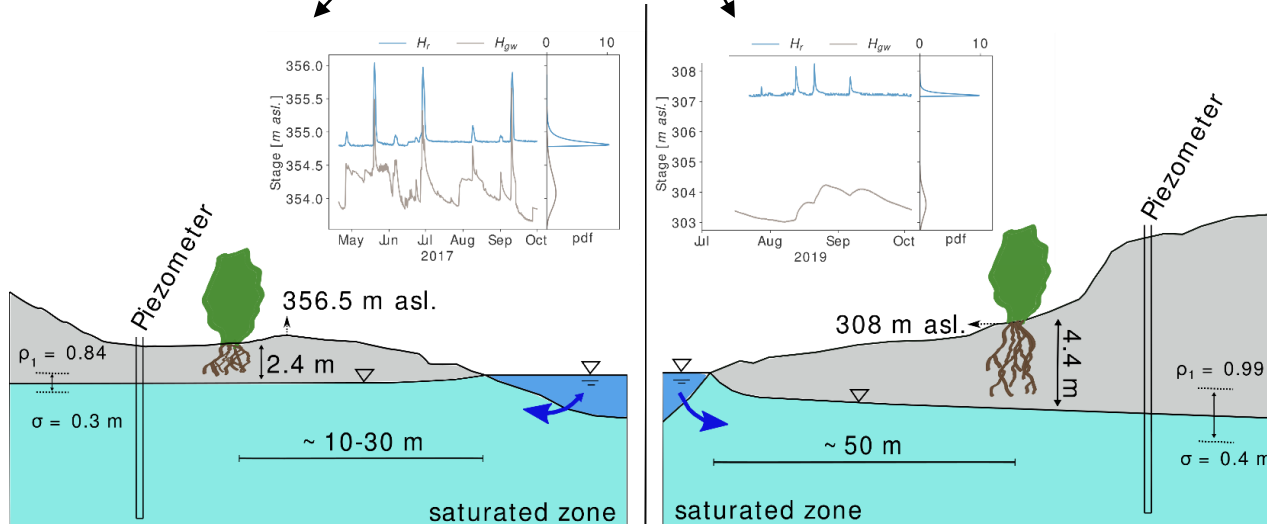
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Study site

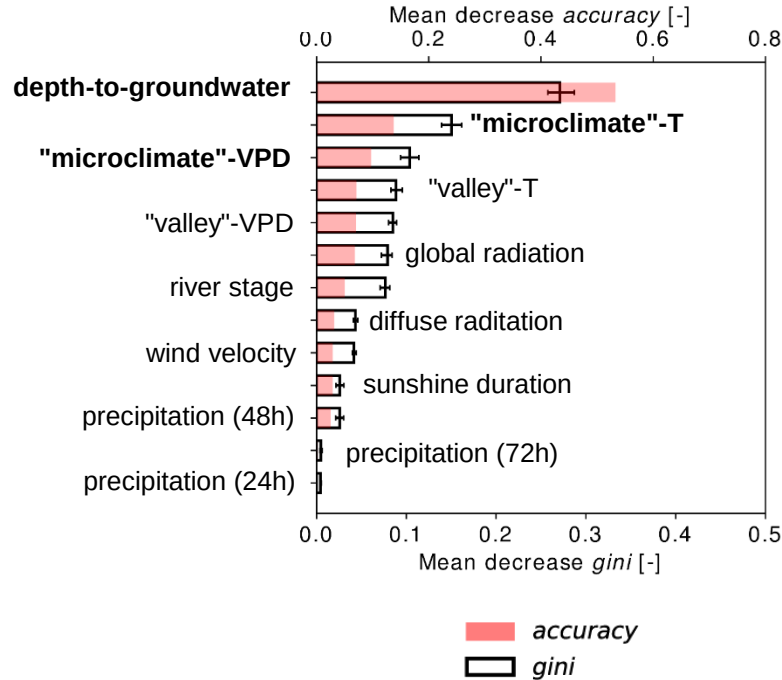
Time series of river (H_r) and groundwater (H_{gw}) level, position of considered trees and groundwater wells at the two study sites Someo (left) and Moghegno (right) situated in southern Switzerland.



Plant physiological measurements of trees in Someo were conducted with high resolution dendrometers during the growing season 2017, while in Moghegno stomatal conductance was measured on 11 one-day field trips during the growing season 2019.

Plant transpiration is best explained by local microclimate.

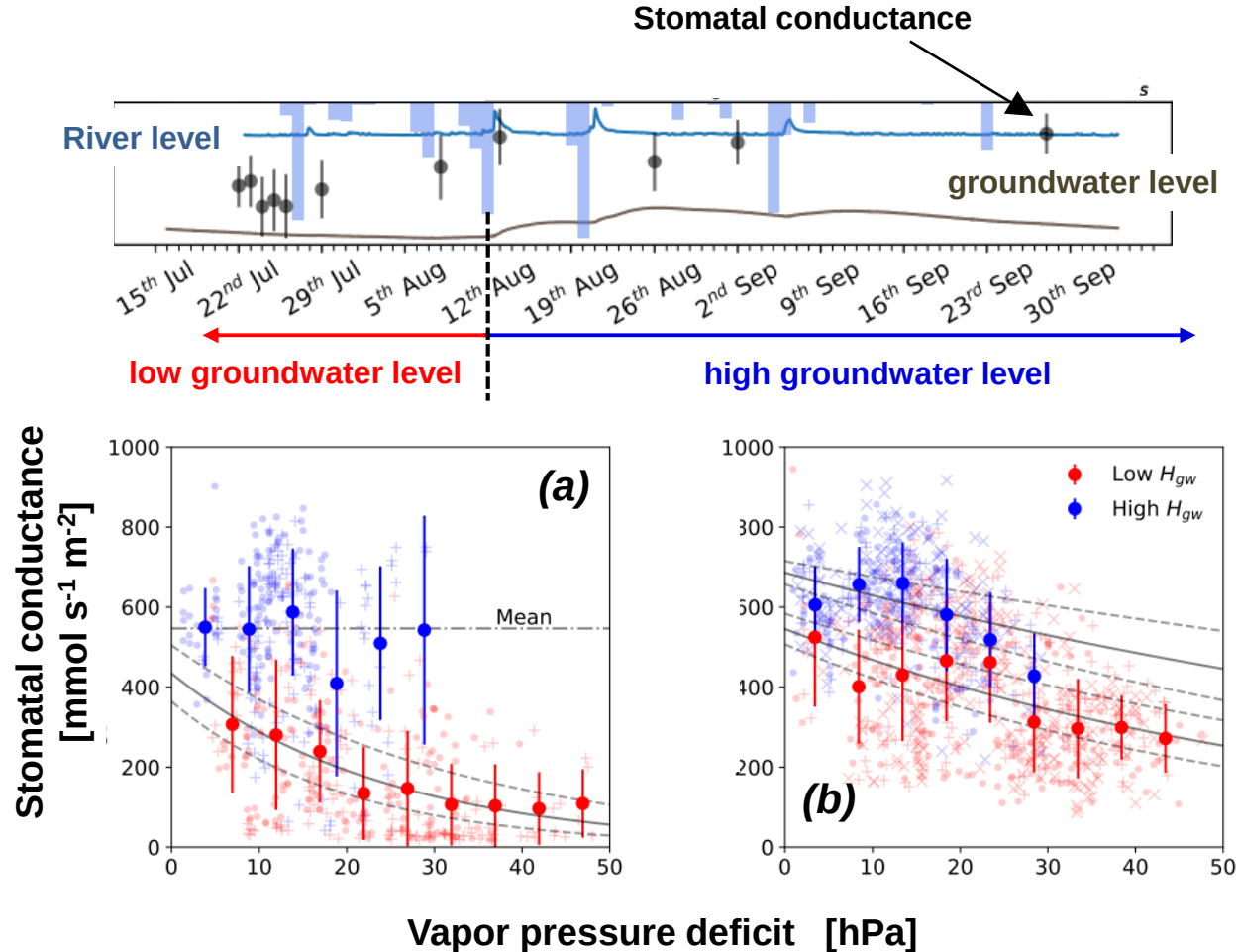
Moghegno - stomatal conductance



Importance (x-axis) of different variables (y-axis) on measurements of stomatal conductance derived from the **Random Forest** algorithm.

Depth to groundwater (DGW) was the most important driver for stomatal conductance, followed by measurements of **local microclimate**: temperature and vapor pressure deficit measured within the canopy.

Groundwater table (and VPD) impact transpiration rates of riparian plants



We measured stomatal conductance at three *Salix eleagnos* (a), one *Alnus incana* and one *Populus nigra* (b).

Stomata closure is induced by **high vapor pressure deficit**, but also by **lower groundwater table**.

Conclusions

- **Groundwater table** and local floodplain **microclimate & geomorphology** impact riparian plant transpiration
- Instantaneous **stomatal conductance** was related to **VPD** – **groundwater level** affects this relationship significantly!

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Field evidence of riparian vegetation response to groundwater levels in a gravel-bed river

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