



Lesní mikroklima z pohledu bylin

Martin Macek

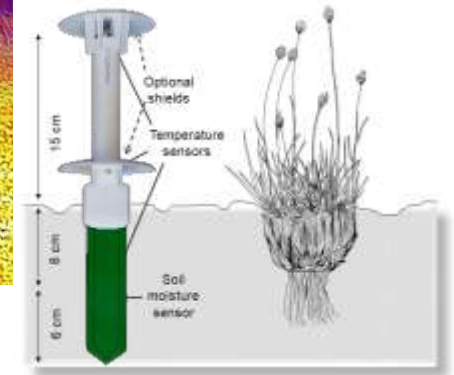
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mikro/makro klima

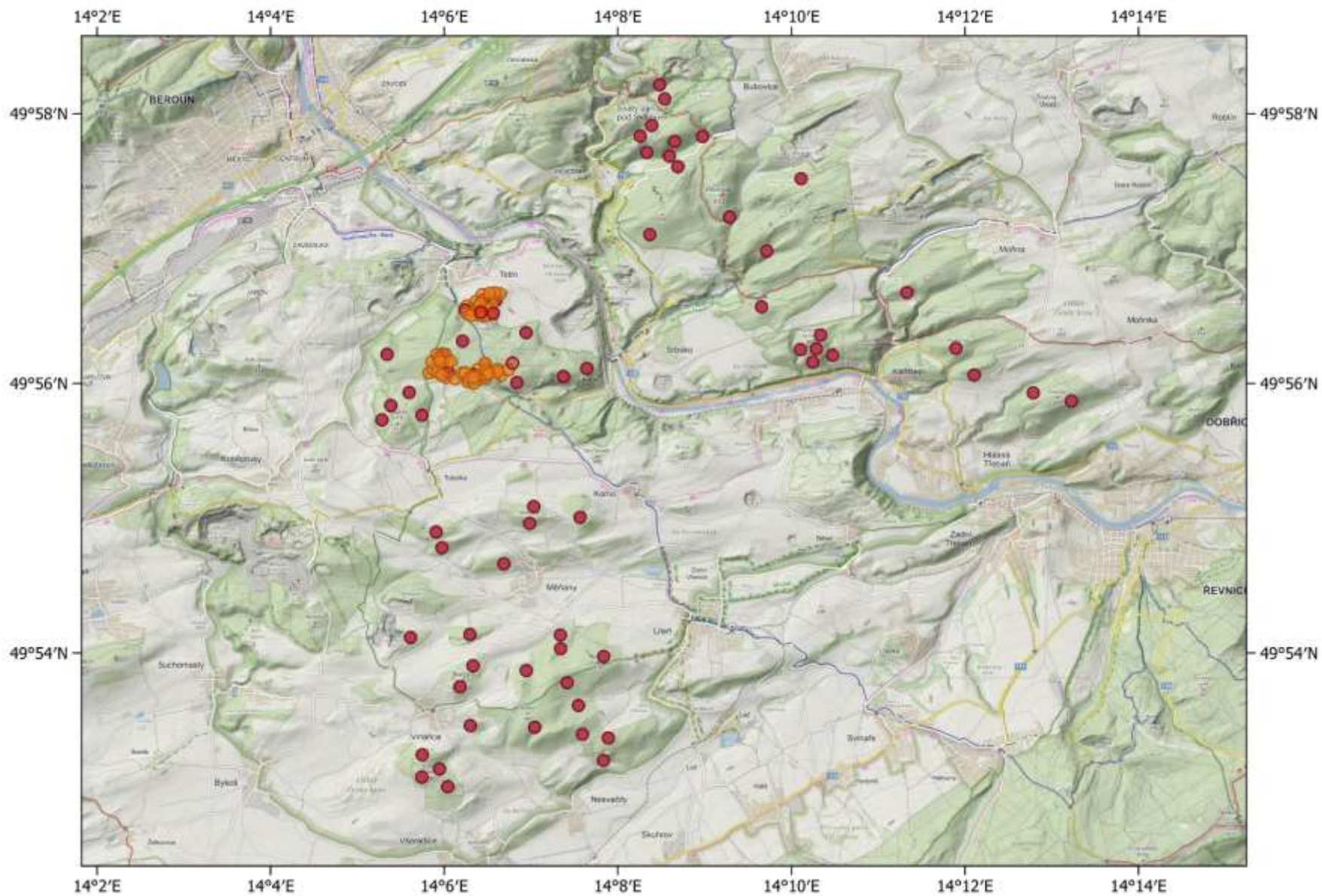
- Lesní byliny zažívají jiné klima, než jaké měříme na meteorologických stanicích:



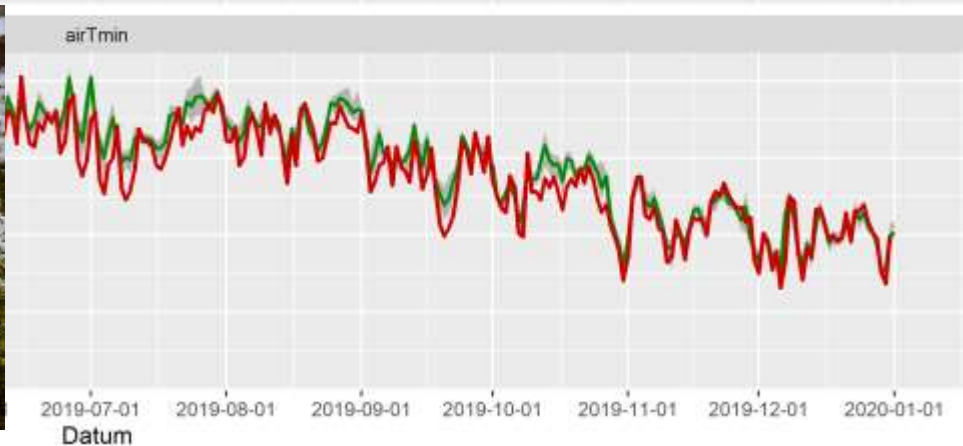
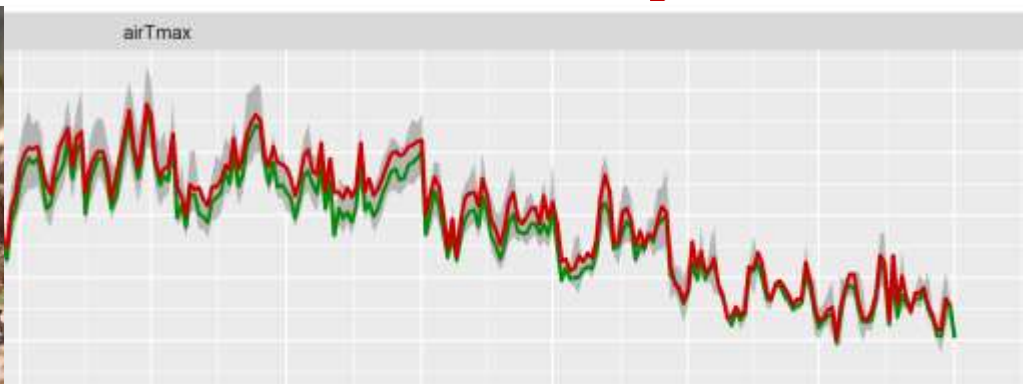
Mikroklimatická síť



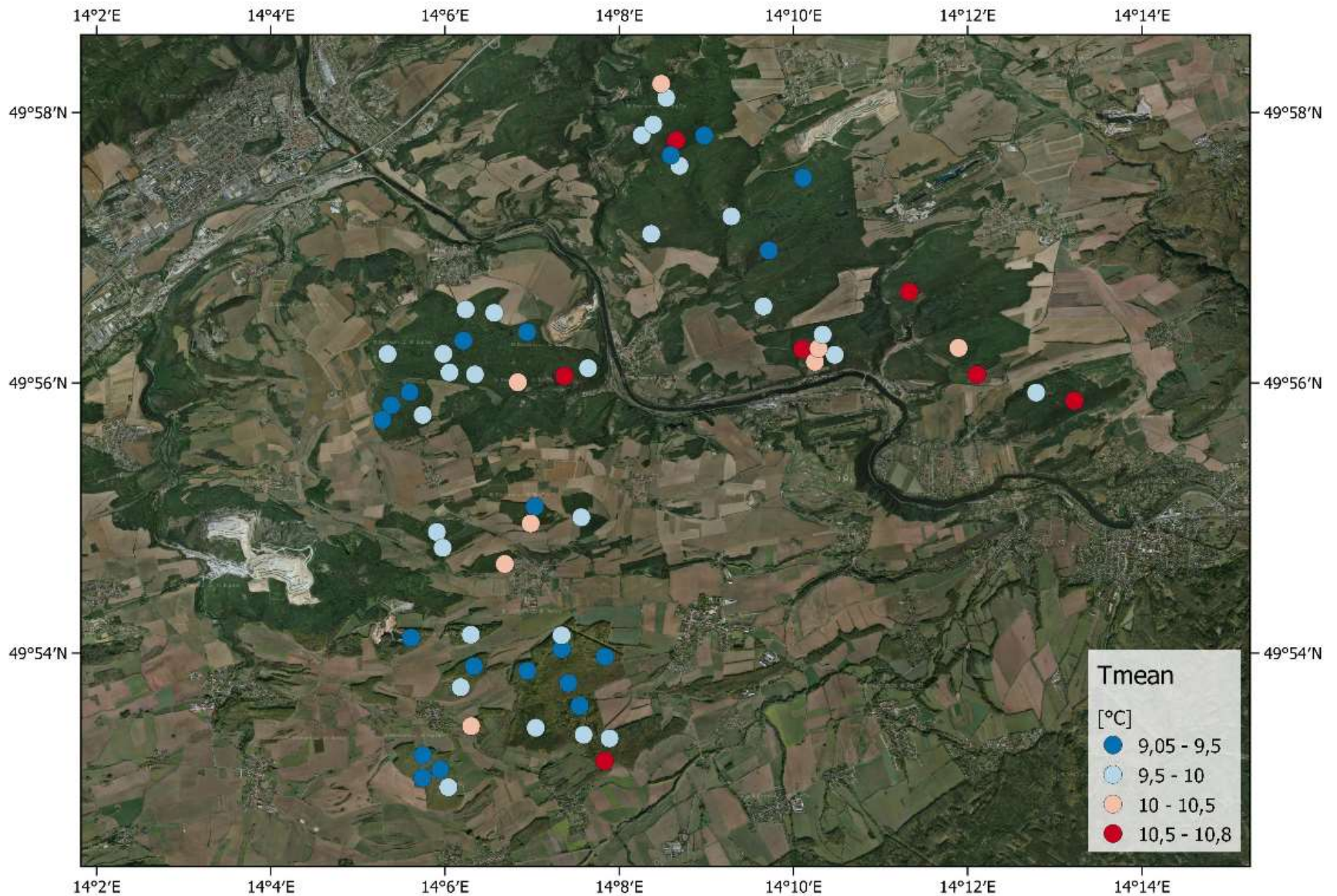
Mikroklimatická síť BÚ AVČR



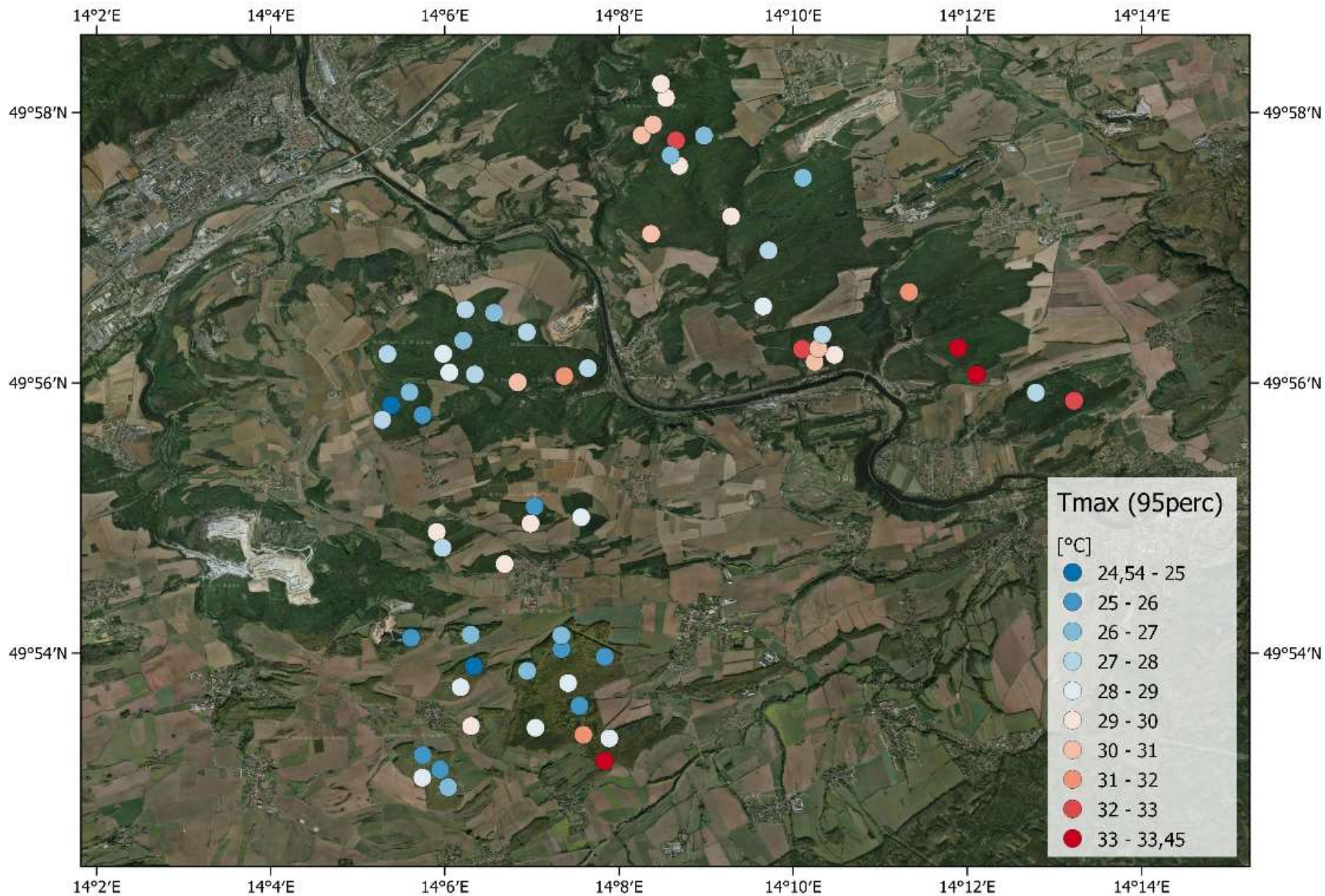
Mikroklima lesa a meteobudky



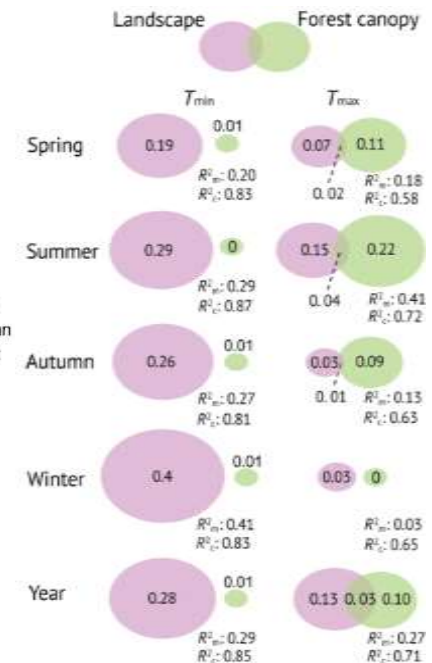
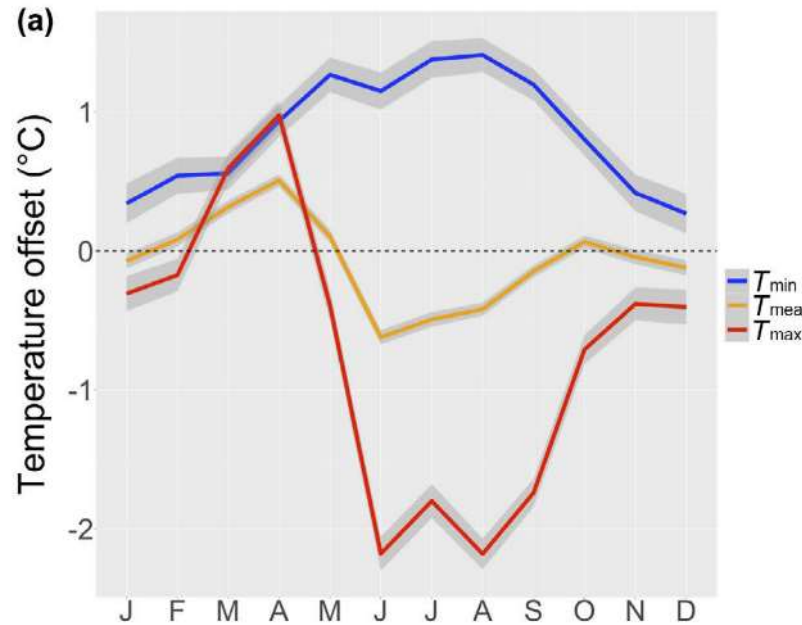
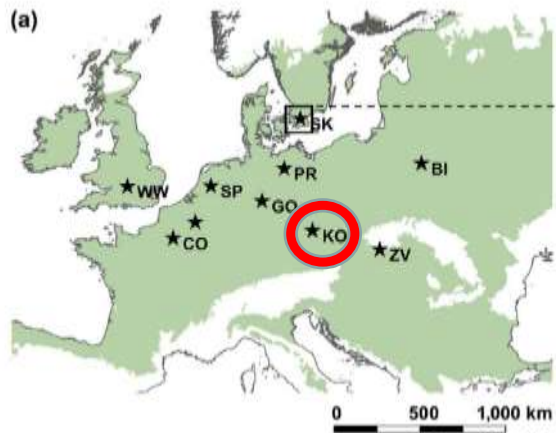
Mikroklimatická síť BÚ AVČR



Mikroklimatická síť BÚ AVČR



Mikroklima: role zápoje lesa



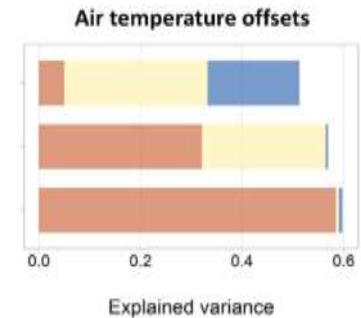
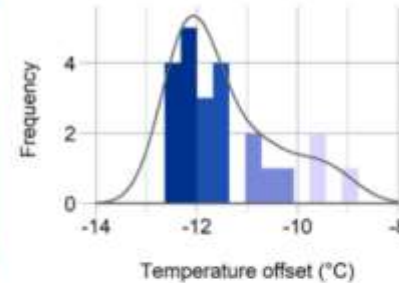
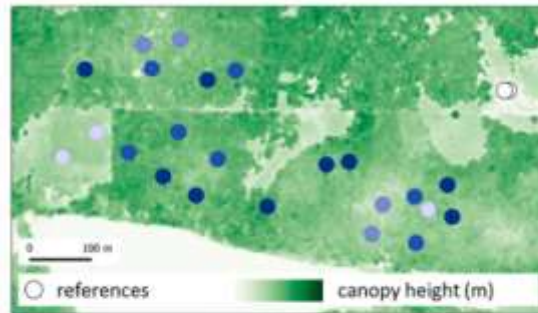
Zellweger F. et al. (2019) Seasonal drivers of understory temperature buffering in temperate deciduous forests across Europe. *Global Ecology and Biogeography* 28: 1774–1786. <https://doi.org/10.1111/geb.12991>

Mikroklima: role zápoje lesa

Struktura lesa

- Hemifoto + výškoměr (GROUND)
- LiDAR (ACTIVE RS)
- SFM (PASIVE RS)

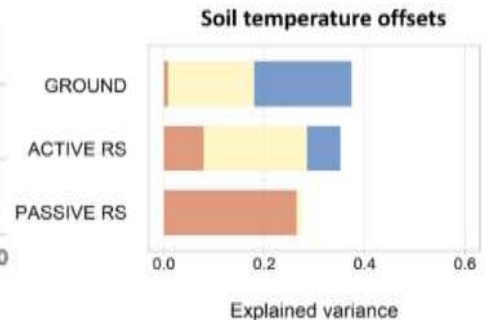
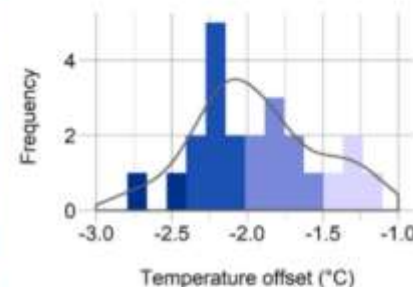
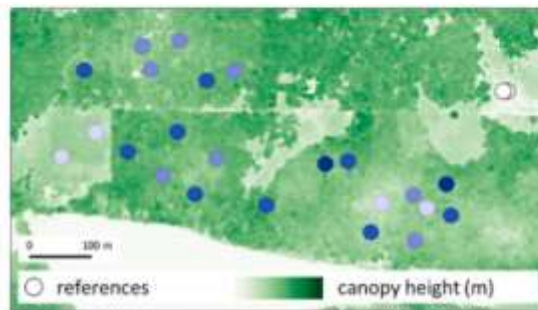
Air temperature offsets



● < -12°C ● -12 - -11°C ● -11 - -10°C ● > -10°C

■ CANOPY HEIGHT ■ SHARED EFFECT ■ CANOPY COVER

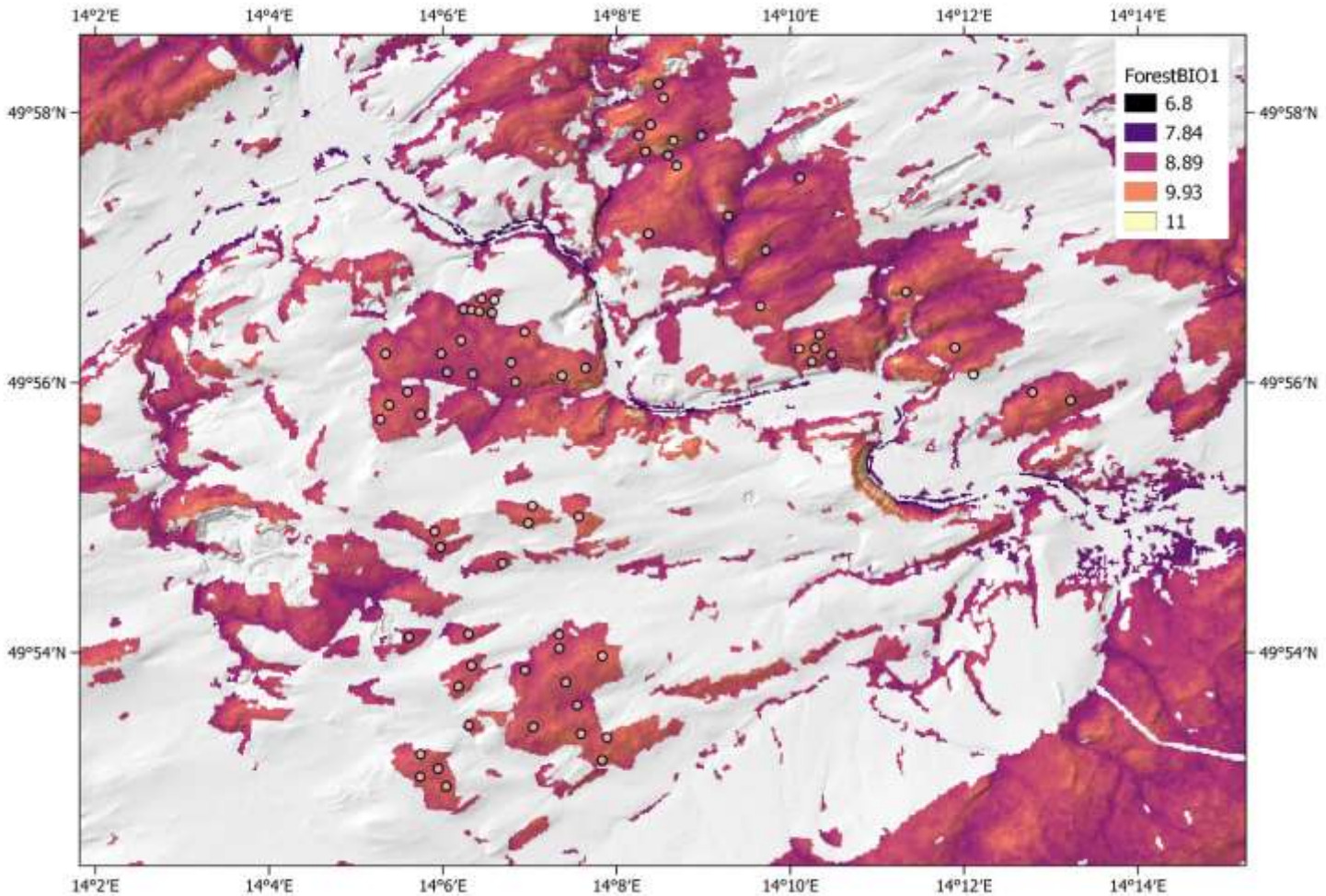
Soil temperature offsets



● < -2.5°C ● -2.5 - -2.0°C ● -2.0 - -1.5°C ● > -1.5°C

Kašpar V., Hederová L., Macek M., Müllerová J., Prošek J., Surový P., Wild J. & Kopecký M. (2021) Temperature buffering in temperate forests: Comparing microclimate models based on ground measurements with active and passive remote sensing. *Remote Sensing of Environment* 263: 112522. <https://doi.org/10.1016/j.rse.2021.112522>

ForestTemp

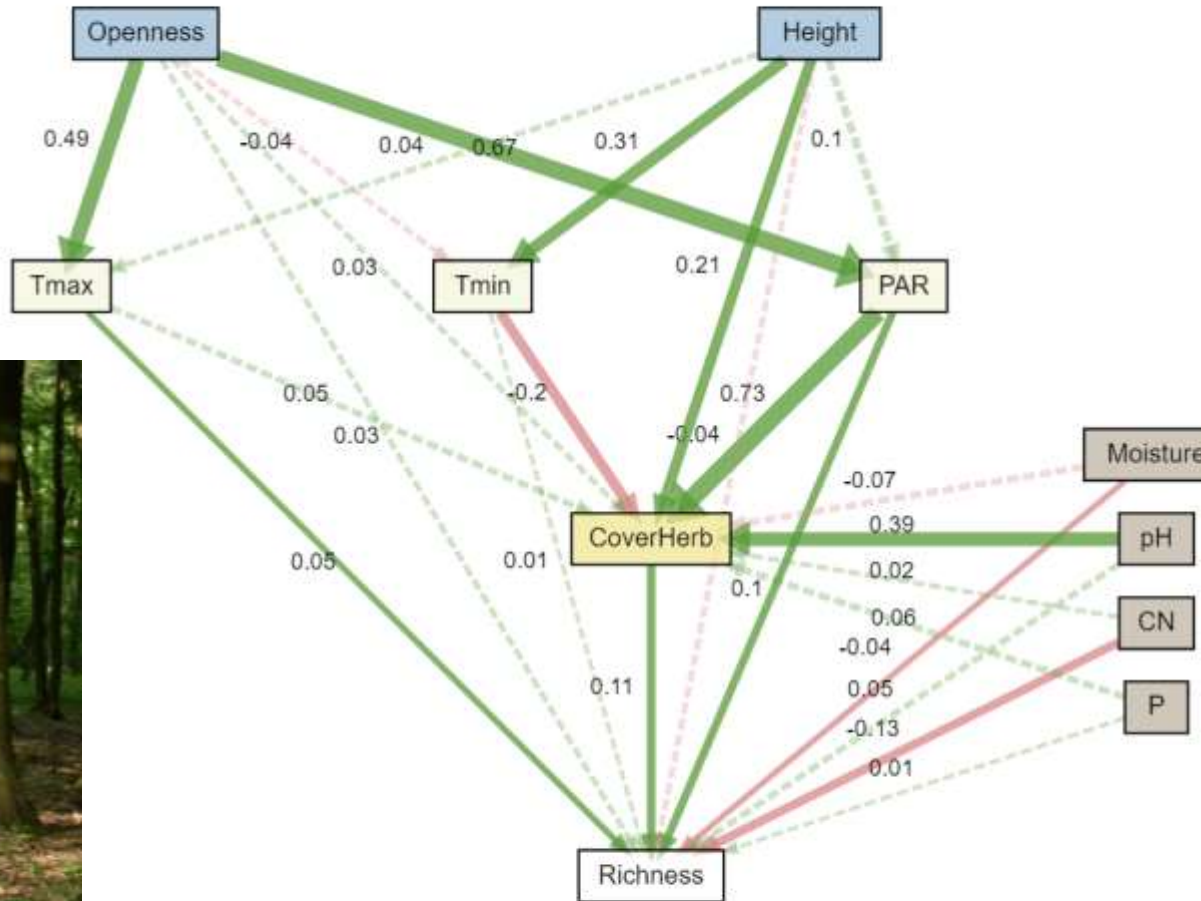


Haesen et al. (2021) ForestTemp – Sub-canopy microclimate temperatures of European forests. *Global Change Biology* 27: 6307–6319. <https://doi.org/10.1111/gcb.15892>

Co je důležité pro lesní vegetaci?

- druhová bohatost roste s otevřeností zápoje
- pozitivní efekt teploty i fotosyntetického záření

Druhová bohatost

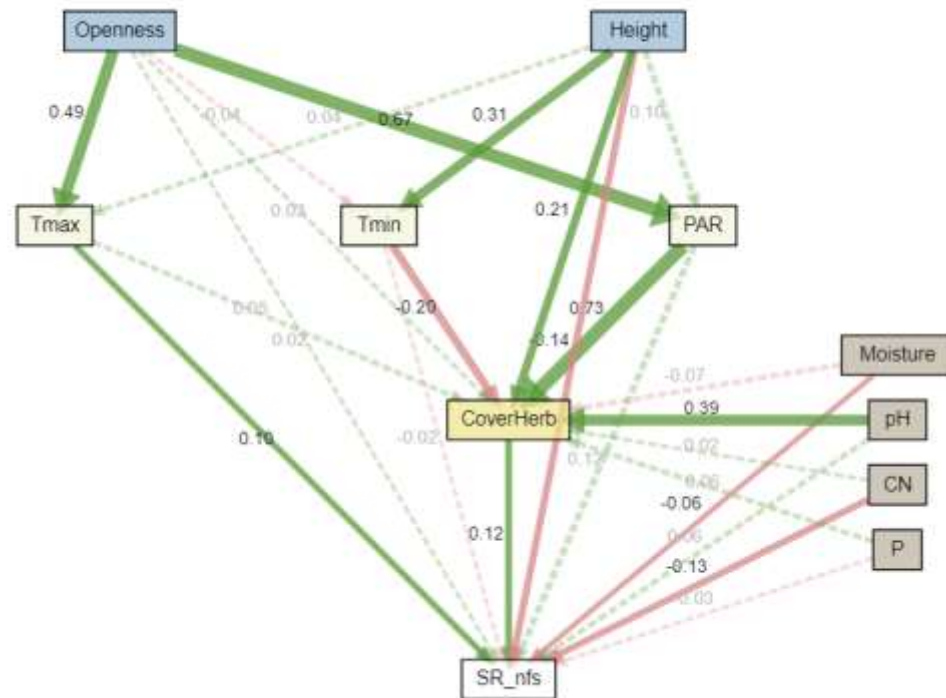
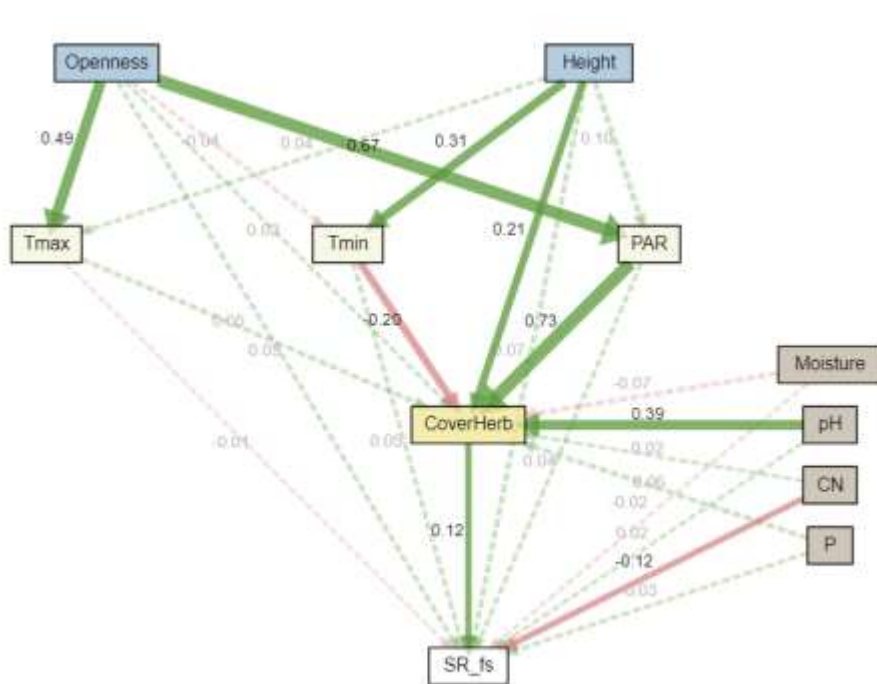


Co je důležité pro lesní vegetaci?

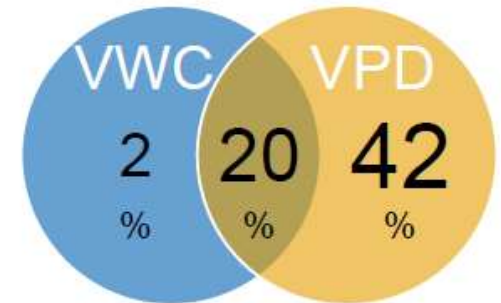
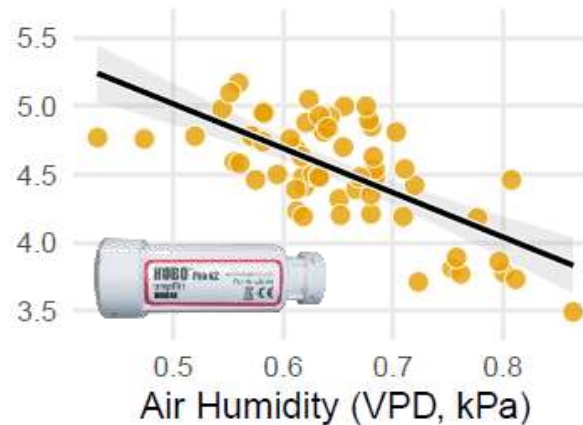
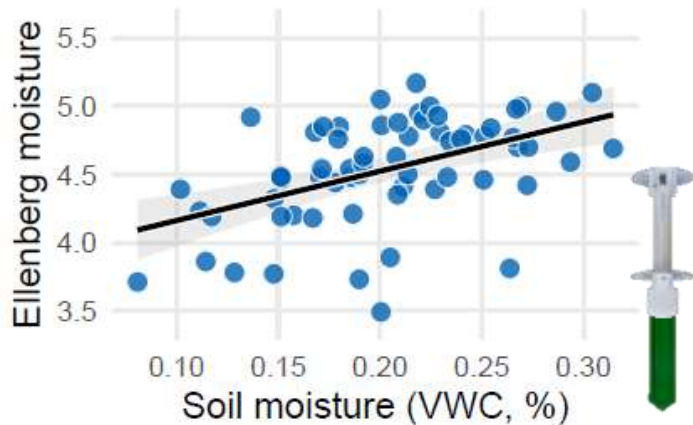
lesní specialisté

vs.

generalisté



Voda v půdě nebo ve vzduchu?



n = 64 plots, year 2020

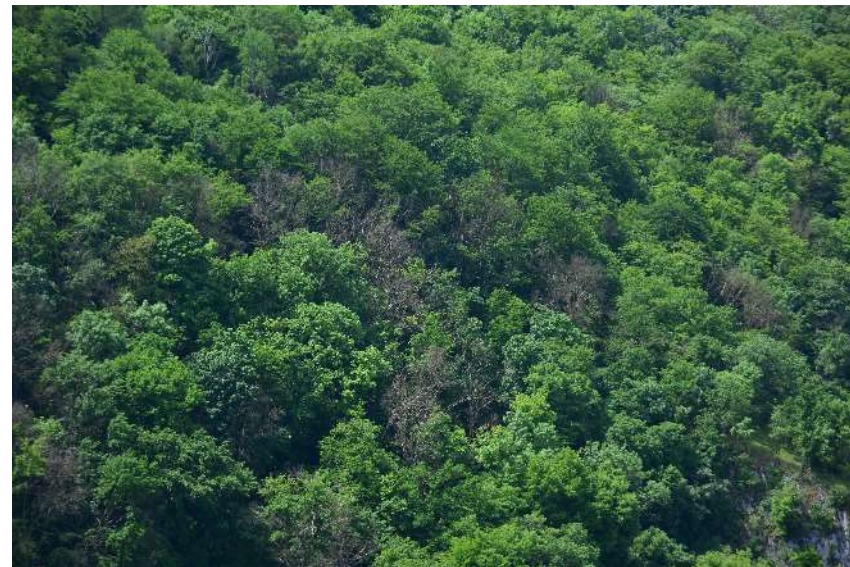
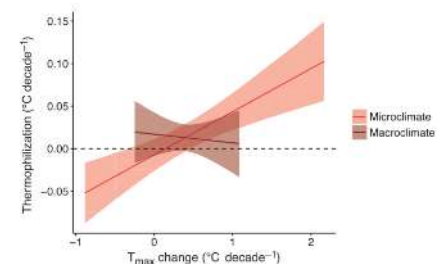


Kopecký M., Hederová L., Macek M., Klinerová T. & Wild J. (nepubl.)

Mikroklima v čase globální změny

- změna o 2°C znamená kompletní posun podmínek Českého krasu u průměrné teploty, ale pouze částečný posun u max. teplot
- houstnoucí stromové patro pufruje efekt změny klimatu
- světlejší (a teplejší) lesy podporují diverzitu bylinného patra

Fig. 2. Thermophilization in forest understory plant communities is related to microclimate change, not to macroclimate change. Thermophilization rates increase with increasing microclimate warming of maximum temperatures during the growing season (T_{max}), as shown by the regression slope and 95% CIs for microclimate. The thermophilization rate was not statistically related to the rate of macroclimate warming (see text for statistical results).



Zellweger et al. (2020) Forest microclimate dynamics drive plant responses to warming. *Science* 368: 772–775. <https://doi.org/10.1126/science.aba6880>

Děkuji za pozornost

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