

# M3 Bark beetle outbreaks

## Interaction between climate change driven bark beetle outbreaks and forest decline and nitrogen deposition driven inertia in ecosystem succession in mountain ecosystems

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ECOPOTENTIAL Storylines



# Atmospheric deposition

leads to higher nitrogen availability



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# Bark beetle outbreaks

provide higher light availability

# Wild-life density

results in a high browsing pressure

Photo: David Kientle



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# *Calamagrostis villosa*

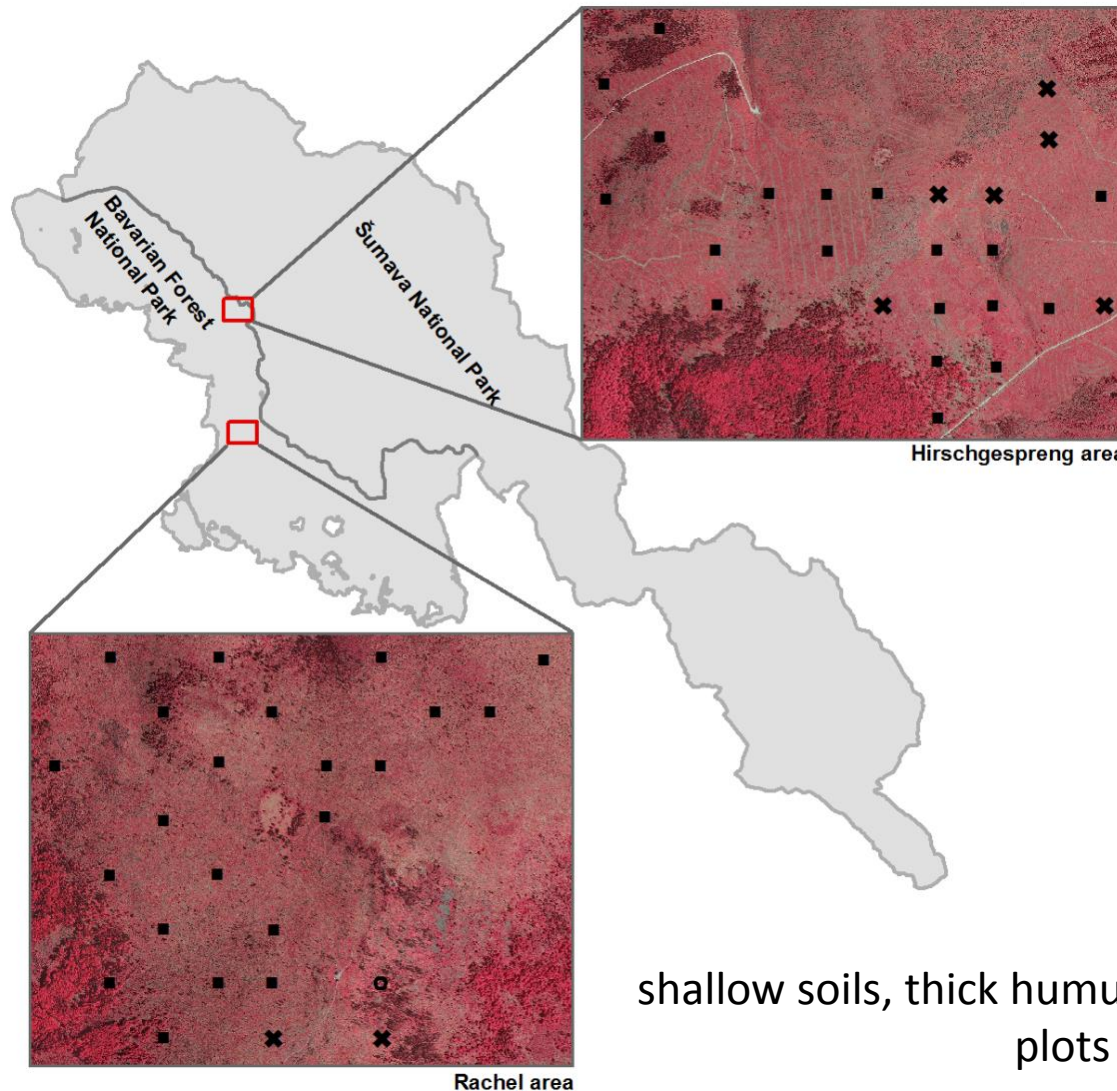
Dominant grass species suppresses tree regeneration after bark beetle attacks

Photo: David Kienle



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1140-1380m,  
no human  
interventions,  
infestations  
1996-2004  
24 plots

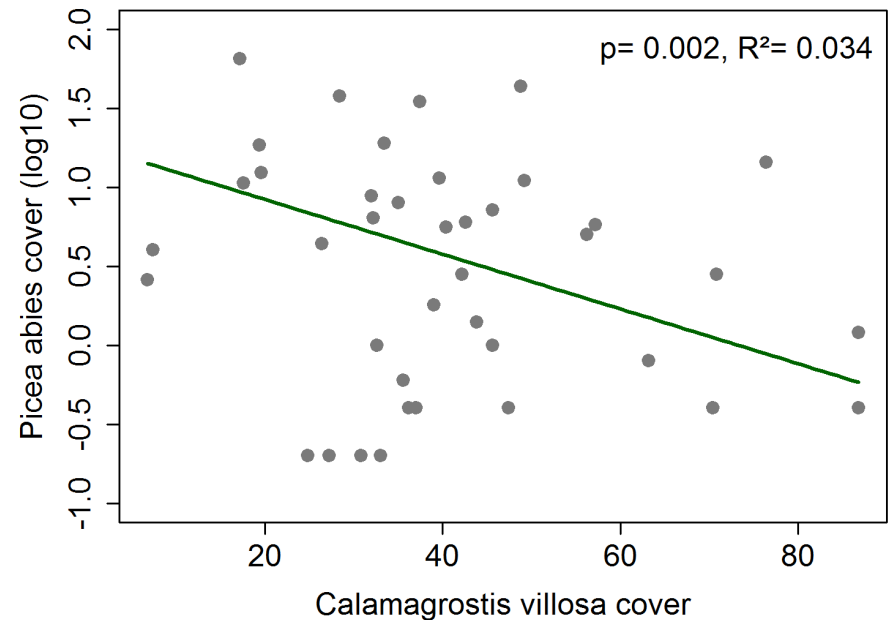
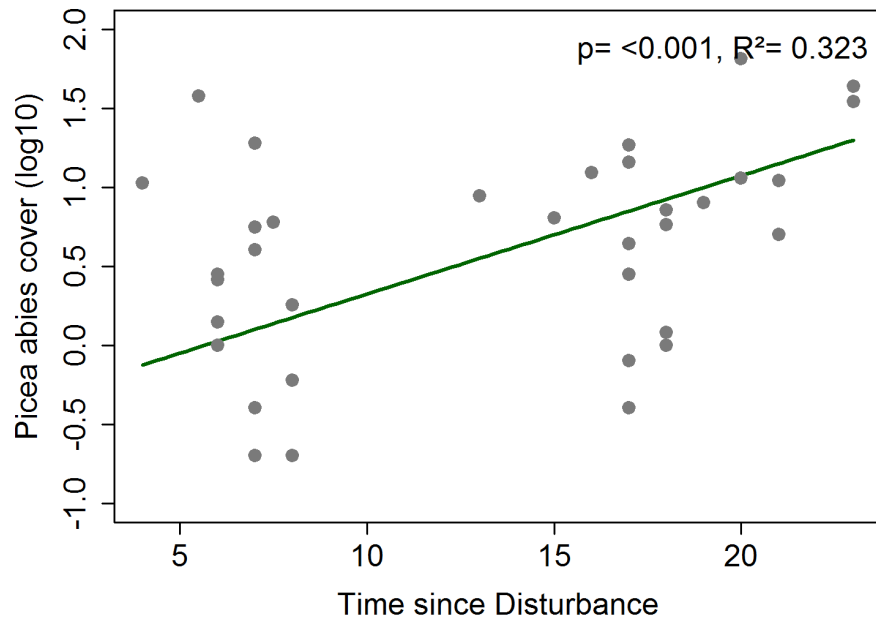
1110-1300m,  
salvage logging,  
infestations  
2009-2011  
25 plots

shallow soils, thick humus layer; 252 ha each  
plots based on 200m grid



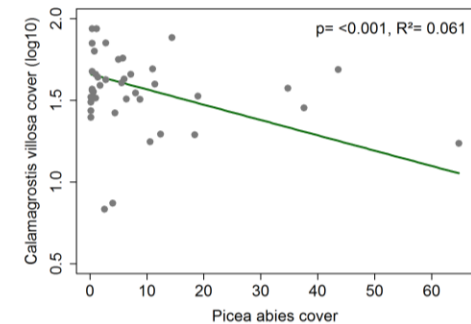
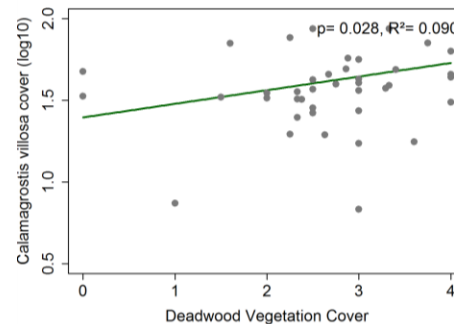
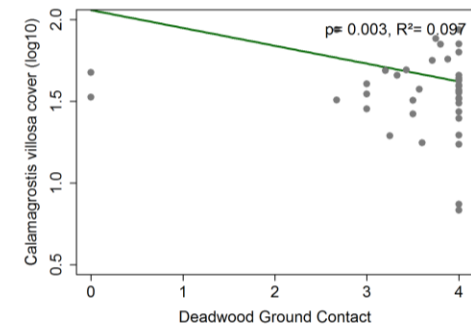
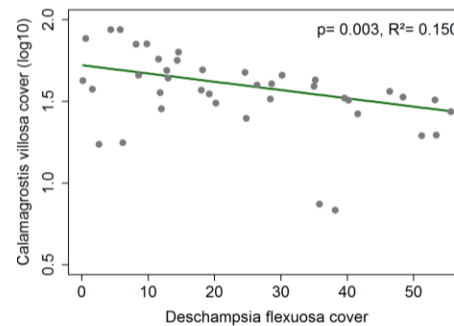
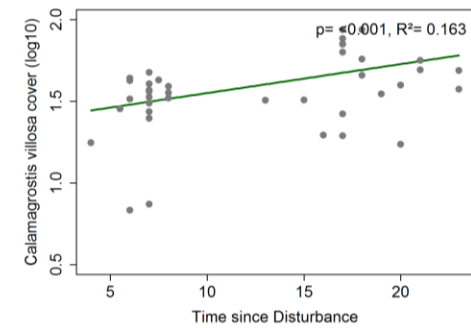
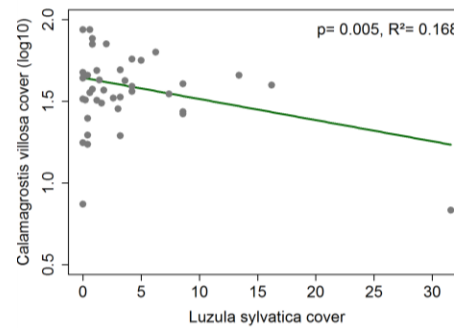
## The higher the amounts of dead wood the higher the cover of Norway spruce regeneration?

best model explanatory variables



The higher the amounts of woody microsites, the lower the cover of *Calamagrostis villosa*?

best model explanatory variables



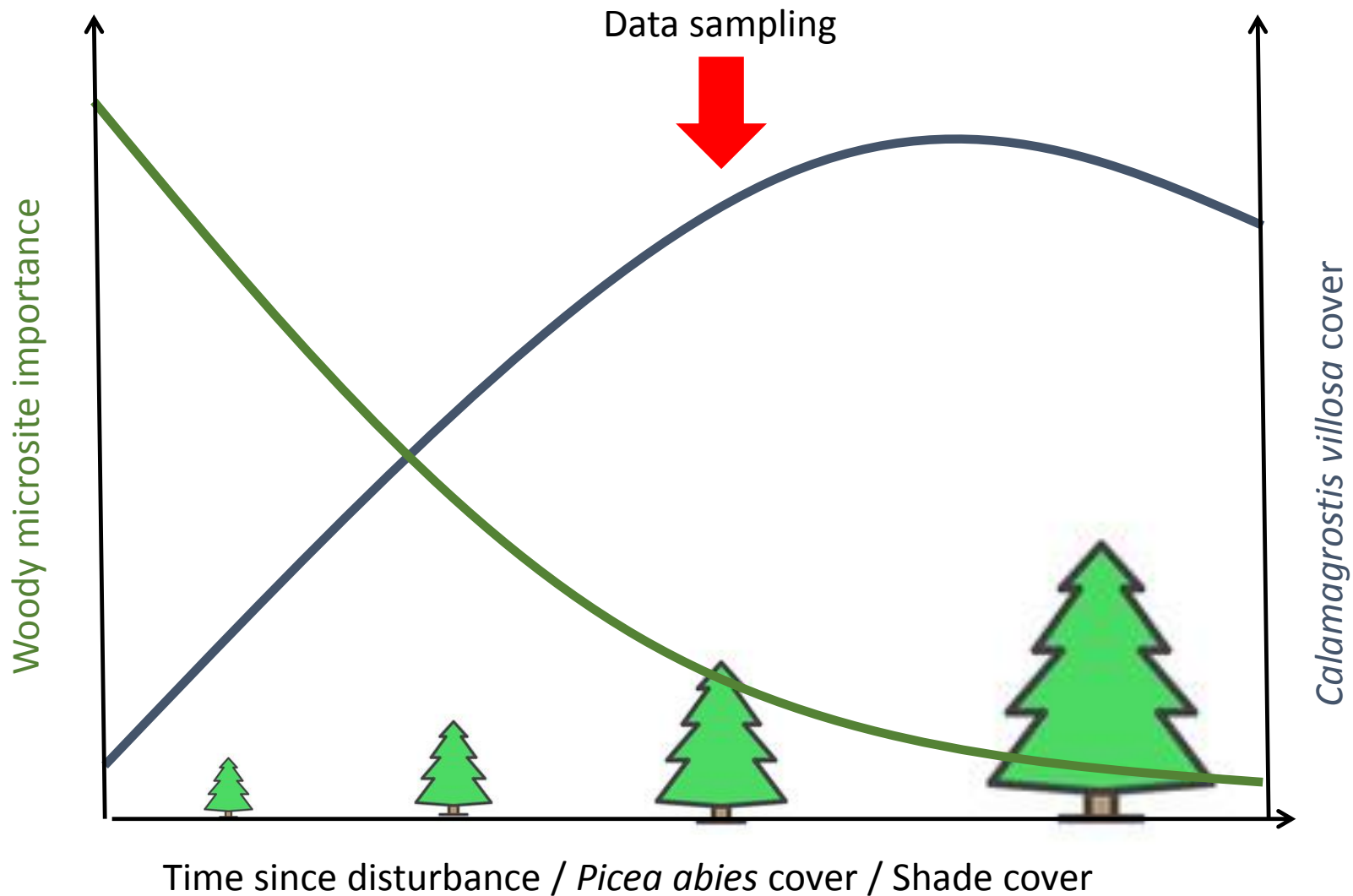
## The higher the amounts of dead wood the higher the cover of Norway spruce regeneration

- 😊 Mean cover of Norway Spruce separated plots best
- ✘ Dead wood count low and insignificant explanatory power
- ✘ Most important: **positive** effect of time since disturbance
- ✘ Lower importance: **negative** effect of *Calamagrostis villosa*

## The higher the amounts of woody microsites, the lower the cover of *Calamagrostis villosa*

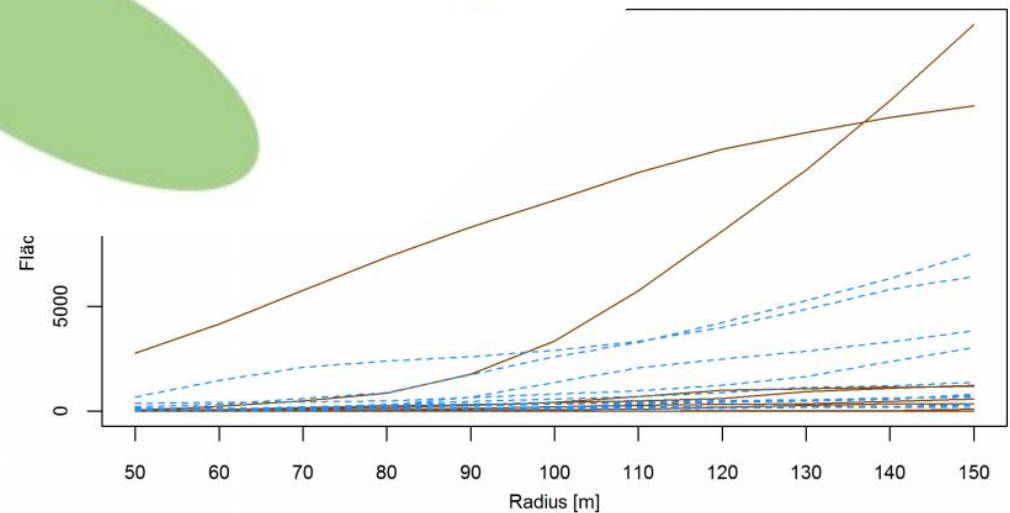
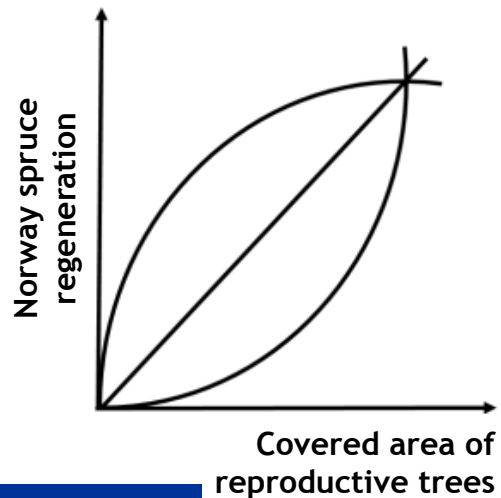
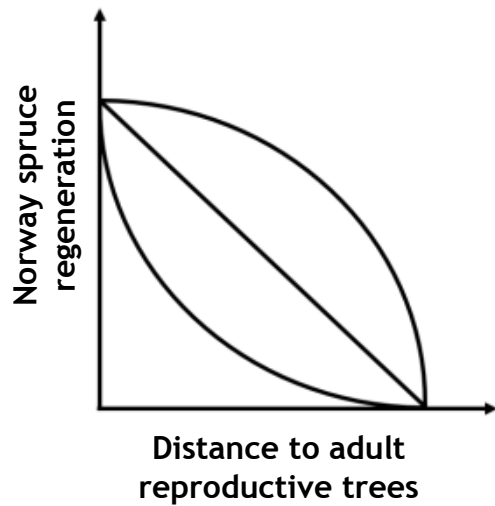
- ✘ No quantitative dead wood related parameters in best model
- ✘ most important: Time since disturbance (**positive**), mean cover of *Deschampsia flexuosa* and *Luzula sylvatica* (both **negative**)

**Reject both hypotheses!**





## Availability of adult reproductive trees



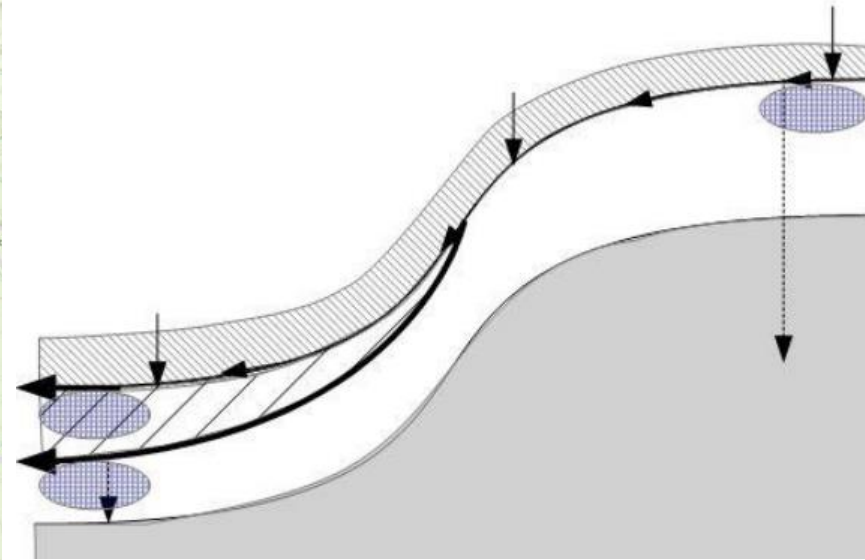
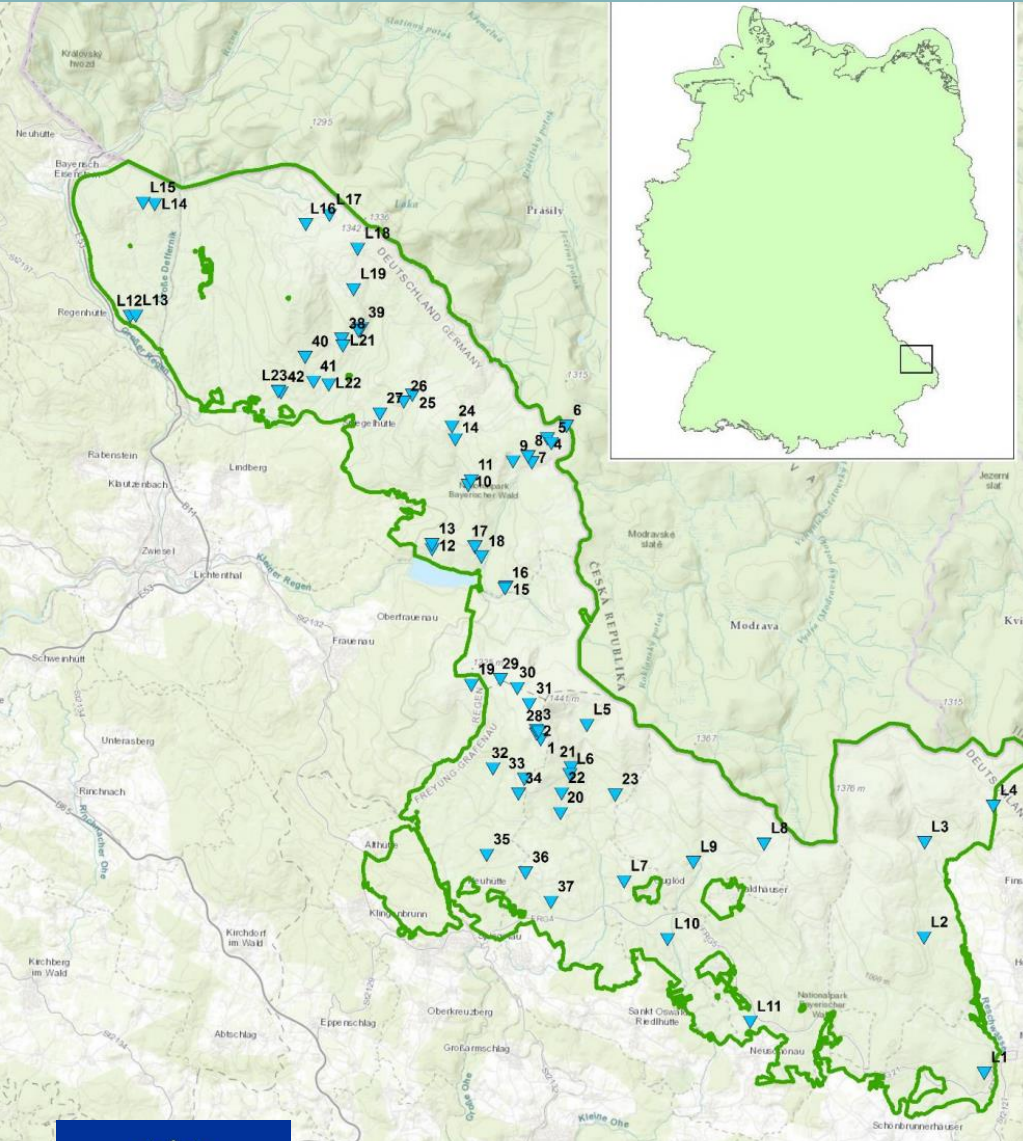
# Forest springs

Photo: David Kienle



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# Student field courses

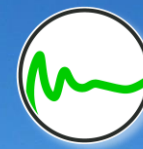


Photo: Frank Weiser



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# Student field courses



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