

What is the outcome of Forest Monitoring for forest management?

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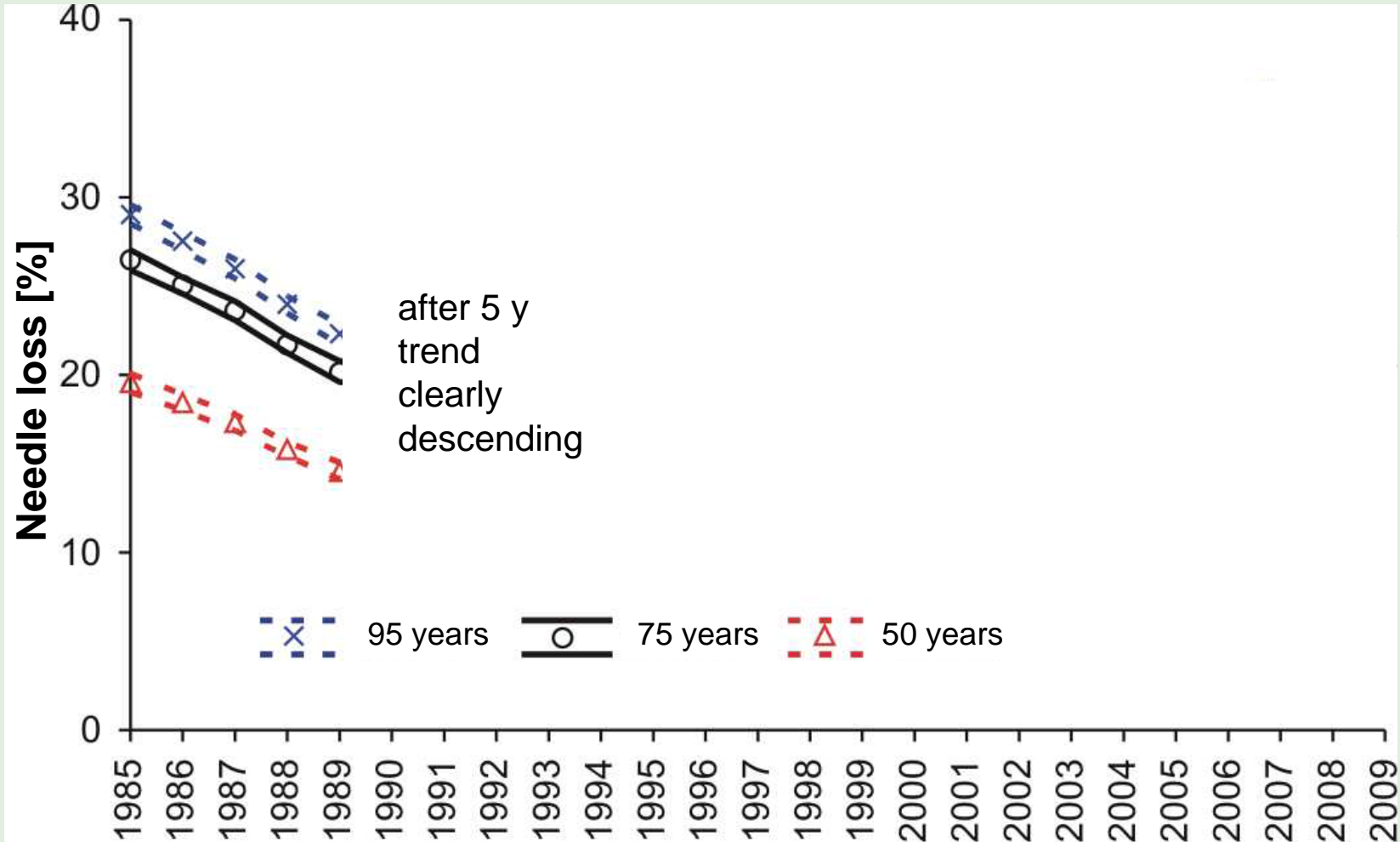
What has to be observed to make Forest Monitoring fit for practice?

Preconditions

Monitoring data have to be:

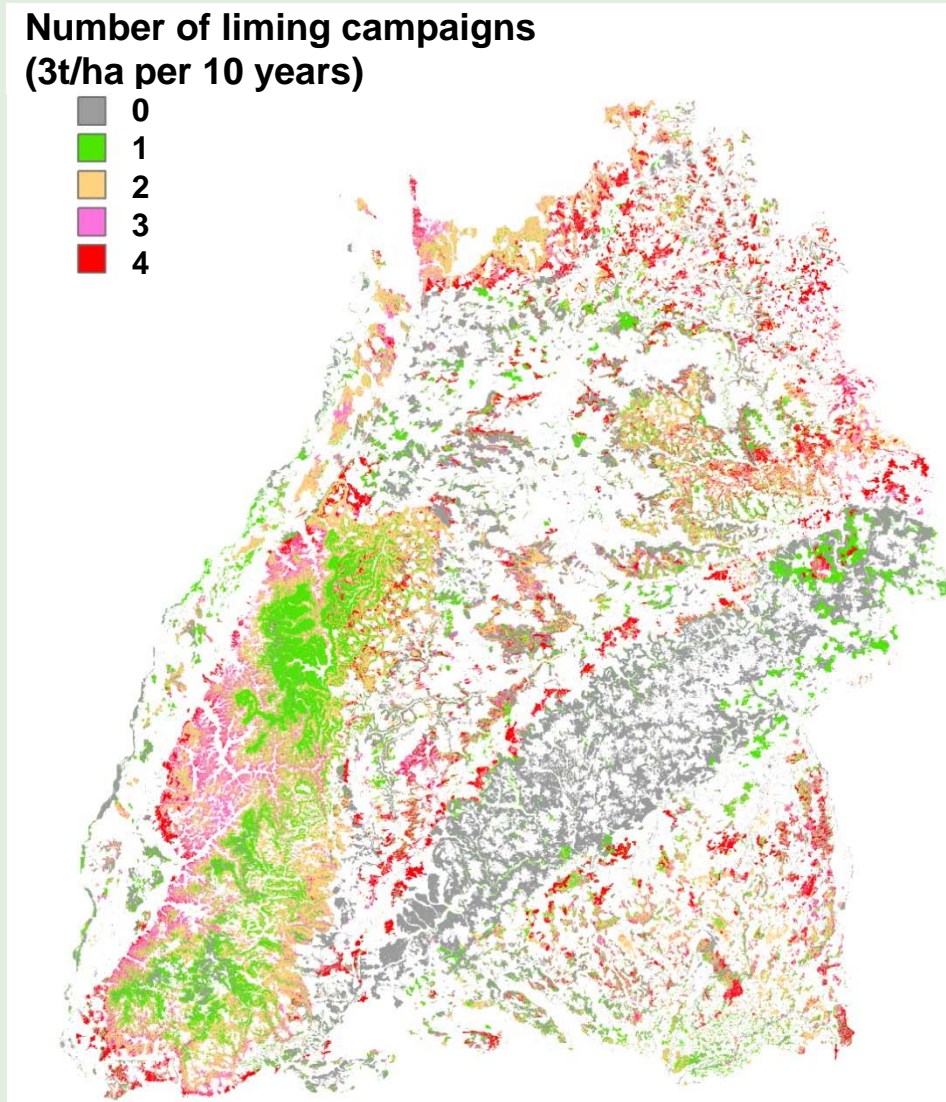
- continuous in **space**
- **time series** should be continuous and as long as possible
- to be conducted with **harmonized methods**

Time trend in crown condition data for spruce (age-indexed time effect from a mixed spatio-temporal GAMM)



Augustin, N.H., Musio, M., v.Wilpert, K., Kublin, E., Wood, S.N., Schumacher, M. (2009): Modelling spatio-temporal forest health monitoring data. Accepted for publication in the Journal of the American Statistical Association, DOI: 10.1198/jasa.2009.ap07058

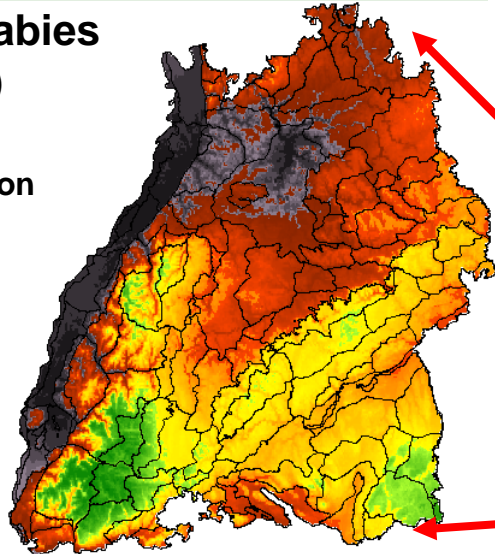
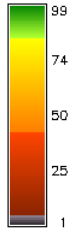
Spatially explicit concept for the amount of lime needed for recovering natural soil quality



Deriving maps on „climate risk“ on spruce from the EU-wide Level I dataset

**Picea abies
(2010)**

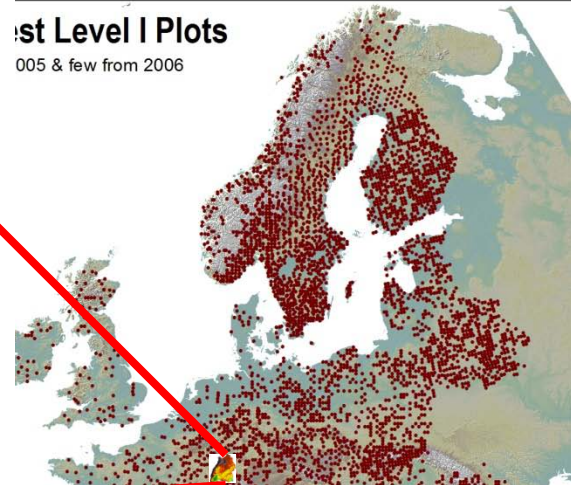
Adaptation



G: 85 43 6

Level I Plots

2005 & few from 2006

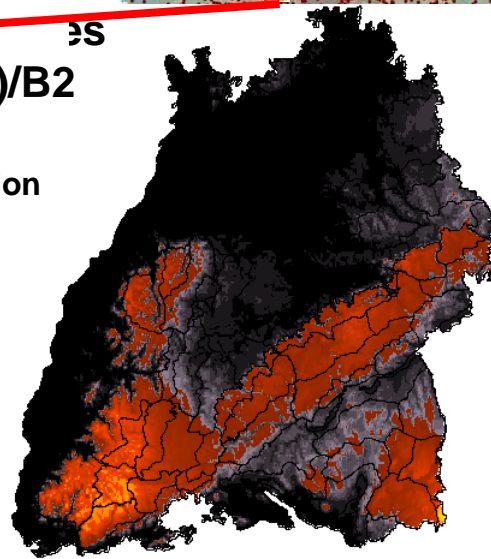
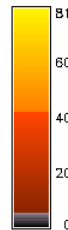


Level I dataset:

- 6129 plots
- ~16km grid
- 139 tree sub-species

(2050)/B2

Adaptation



G: 85 43 6

Conclusions

- Forest monitoring data can be adapted to new problems like climate change
- Statistical modeling allow for assessing environmental state variables, where they are not measured in space and/or time and thus provide powerful decision support for practical ecosystem management and political advice
- Monitoring can be designed for both, the more generalizing interests of nations or EU as well as the more practice-oriented and detailed demands of regions / provinces



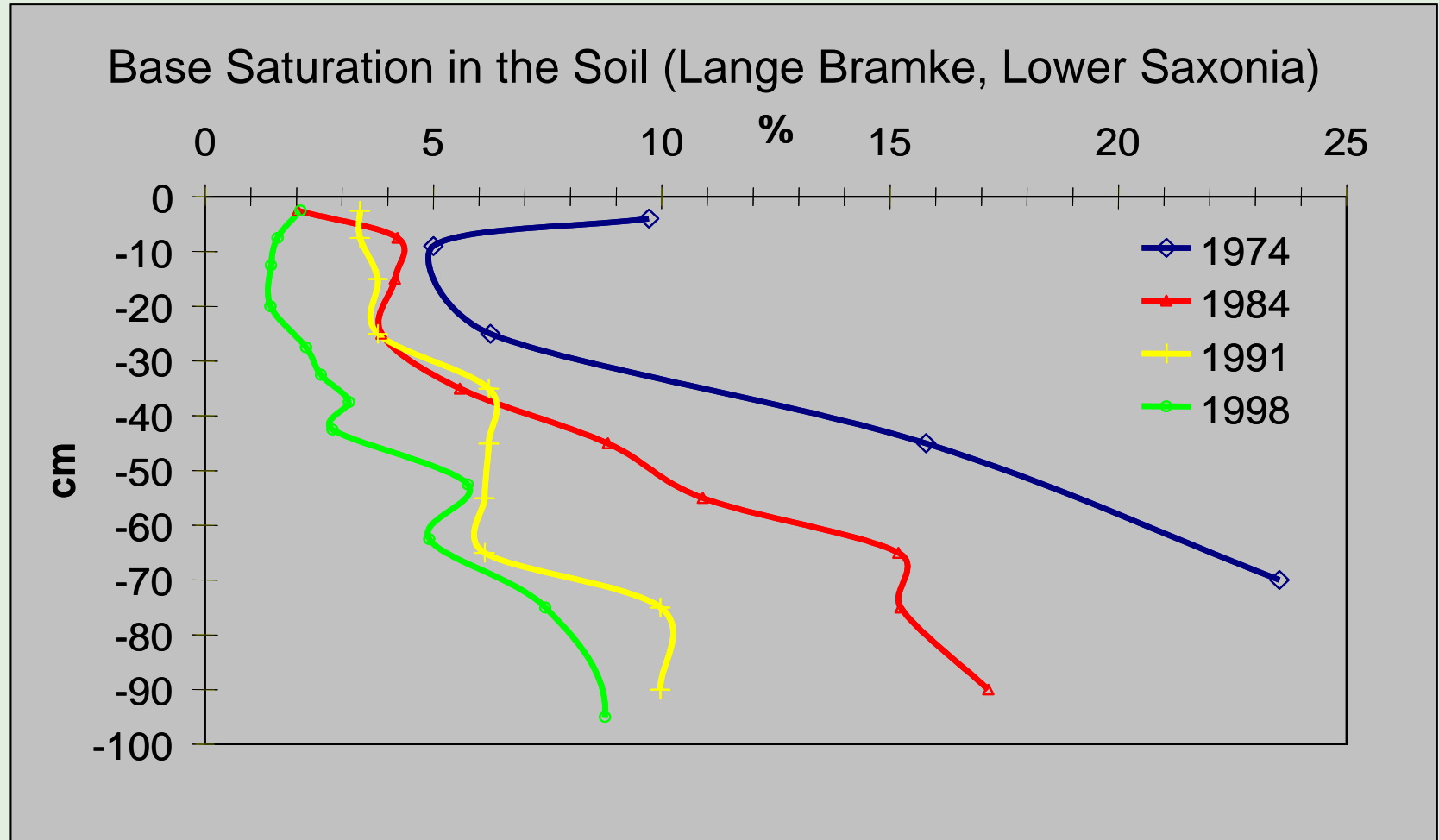
**Thank you
very much
for your
kind
attention**

Historical development

- **Early 1980s:** Forest Monitoring started as **crown condition survey**, motivated by Forest decline
- **Until mid of 1990s:** Inclusion of measurements on **deposition, stand nutrition, chemical and physical soil condition, case studies** (intensive plots with temporally high resolution) concerning **element flux** and **climate** in order to find cause effect relations of forest decline.
- **Now:** Forest Monitoring gets an adaptive tool to solve various environmental problems, not only the effect of air pollution on forest health

Leaching of base cations from forest soils during the last 25 years

Effect of „Acid rain“ in Central Europe



H. Meesenburg, 2006