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BAYERISCHE FORSTVERWALTUNG

Water availability

A new aspect in European Forest Ecosystem Monitoring

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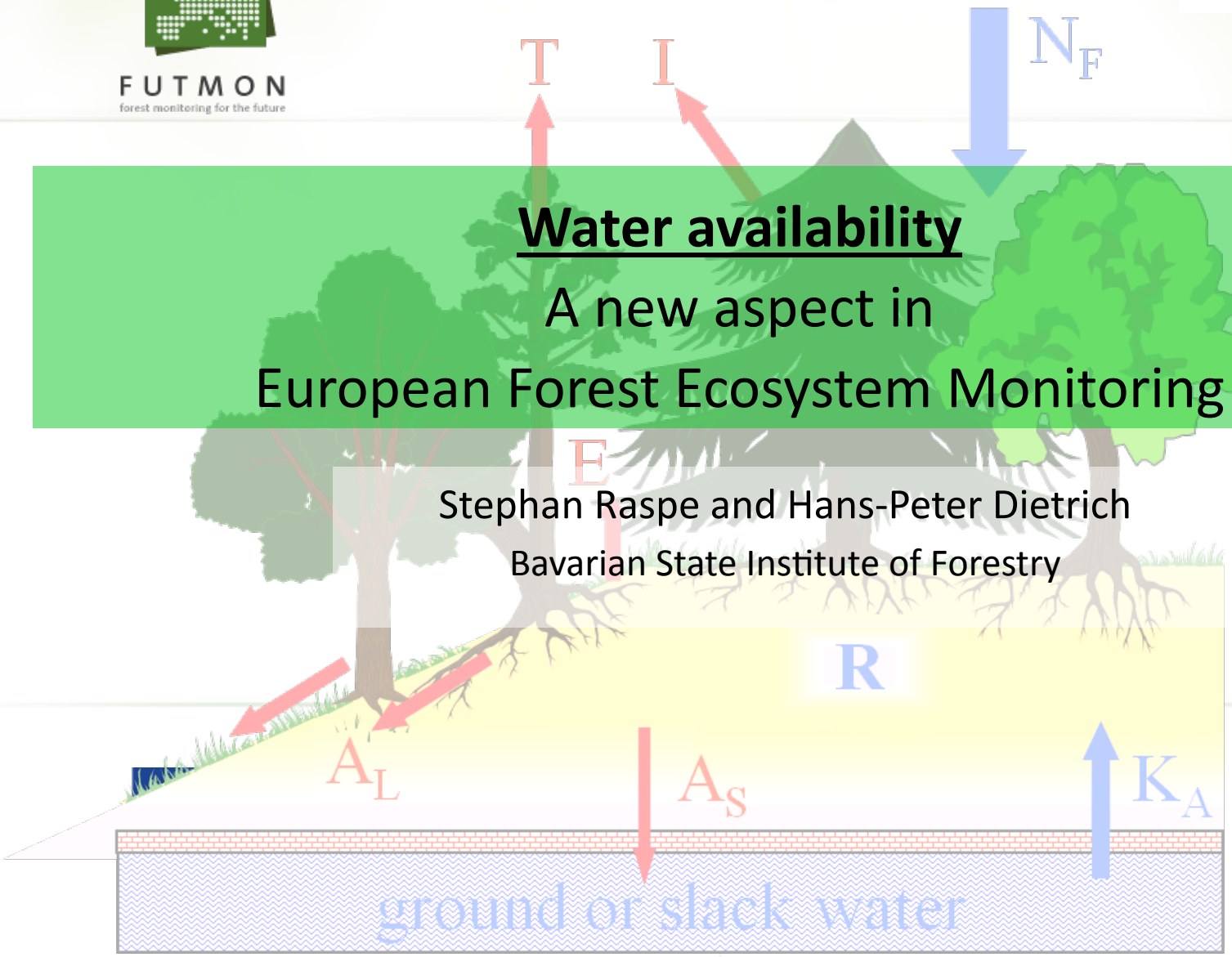


Introduction

Water supply is a major driving force for:

- tree vitality and forest condition
- nutrient uptake
- growth/yield
- response to biotic stress

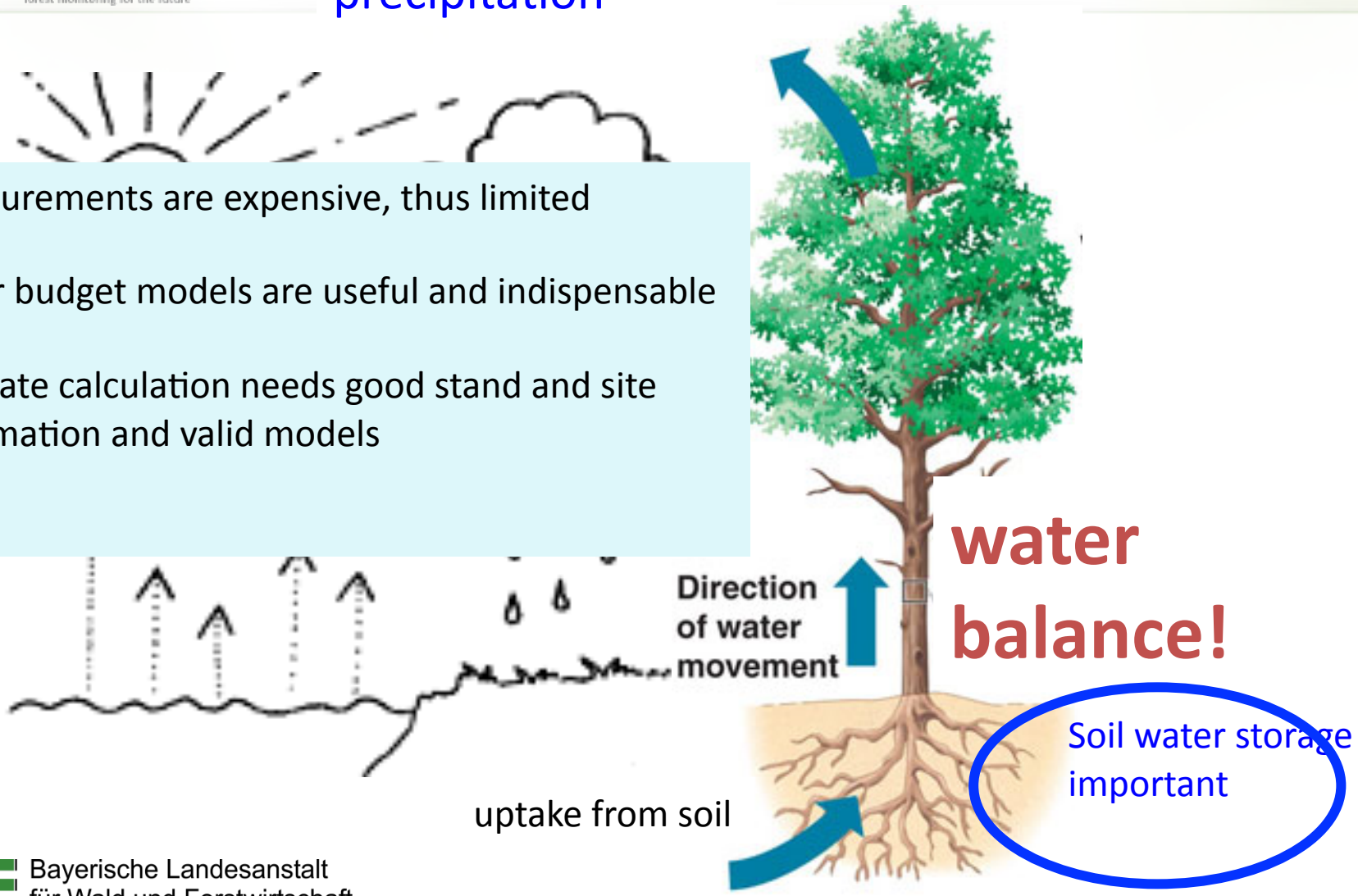
➢ <u>Key factor in risk assessments of Climate Change impacts to forests</u>

Water availability is more than precipitation

Measurements are expensive, thus limited

water budget models are useful and indispensable

accurate calculation needs good stand and site information and valid models



water balance!

Soil water storage important

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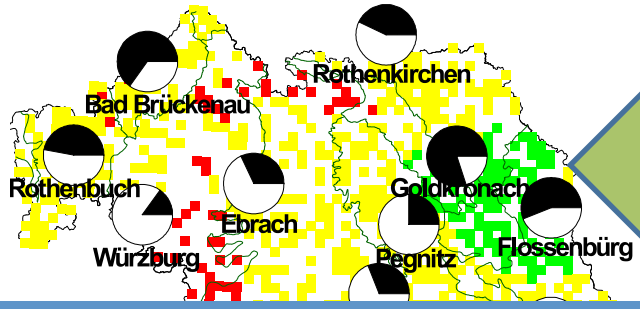
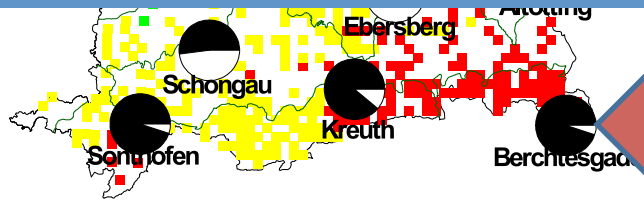
Precipitation and water supply



no reduction in precipitation but strong limitation in water supply

Water availability is a better indicator for drought stress than precipitation!!!

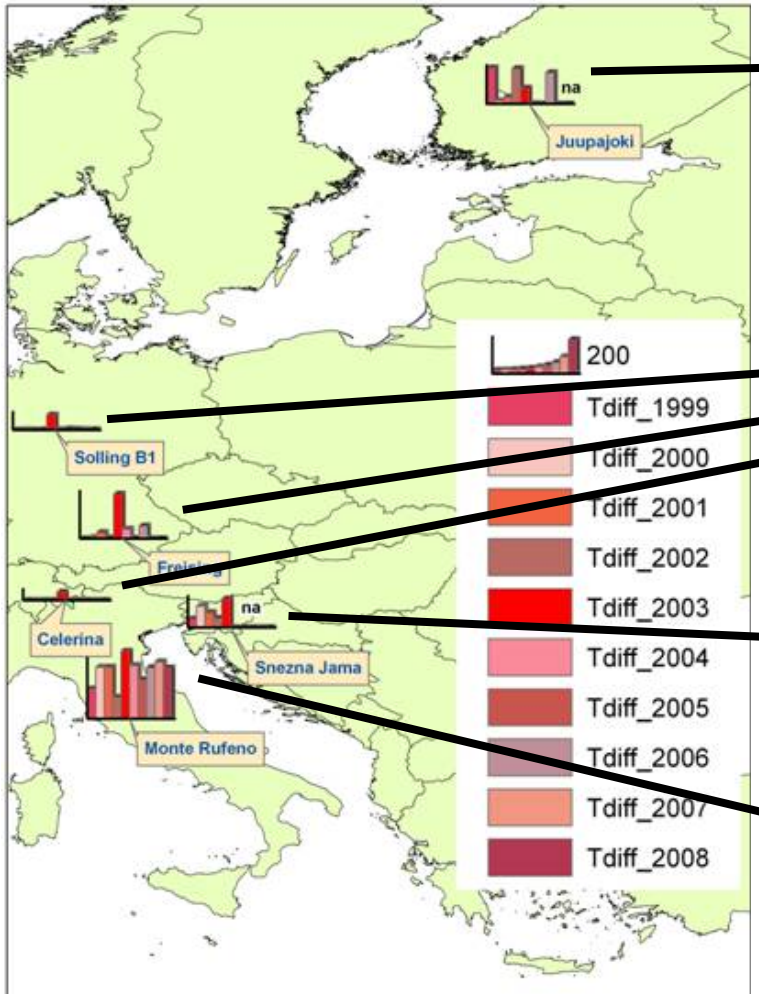


70 - 90%

huge reduction in precipitation no reduction in water supply

LWF Bayerische Landesanstalt für Wald und Forstwirtschaft

Water Budget at Testsites Level II



Finnish site
- water deficite 2003 lower
- Drier summers 1999, 2002,2006

Central Europe and Alpine sites
- water deficite only 2003

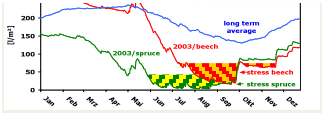
Slovenean site
- water deficite every year

Mediterranean site
- Huge water deficite every year

Plant Available Soil Water

diff. tree species at same site

Level II Plot Freising 919

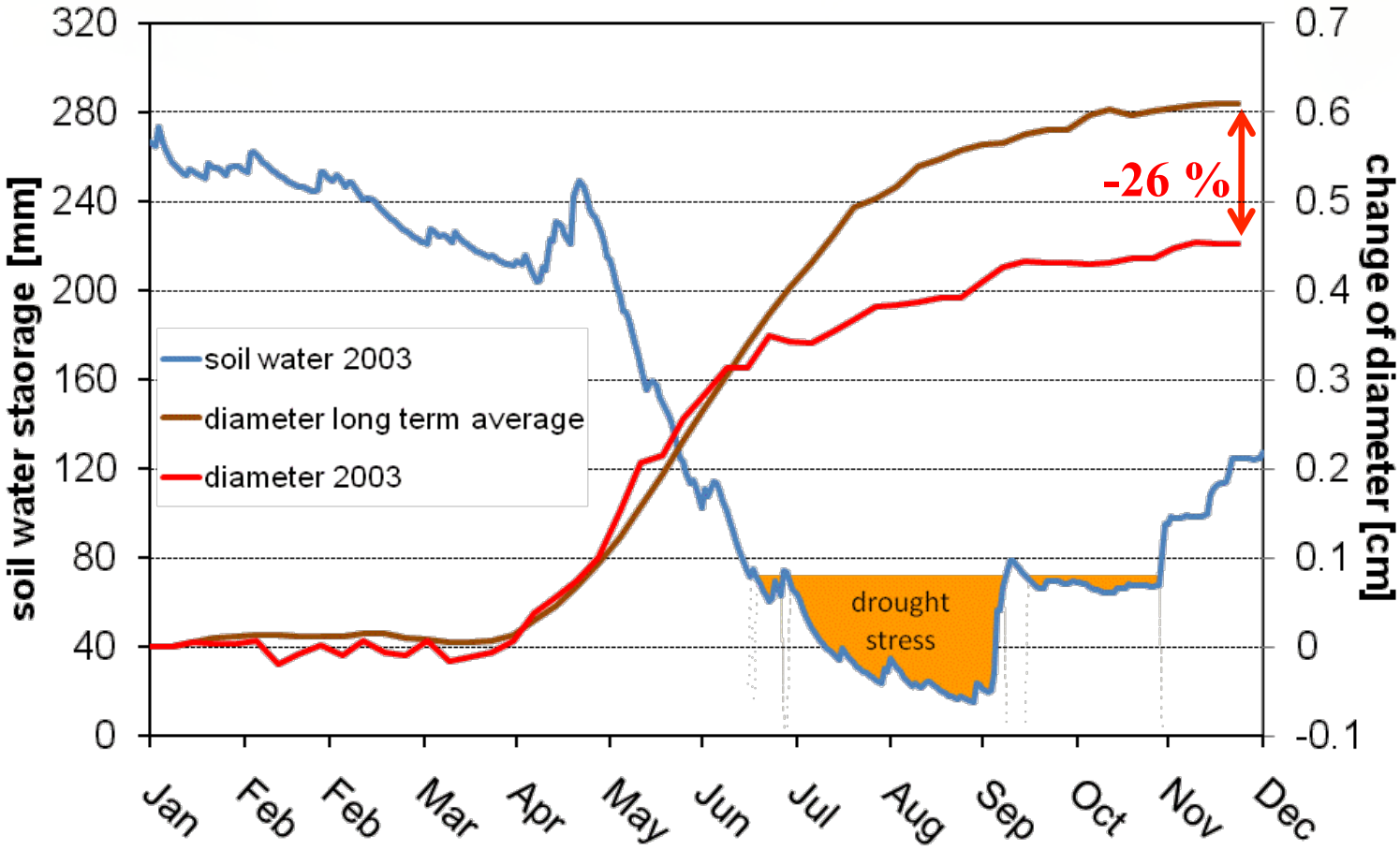


- available soil water capacity is fairly high.
- water storage became almost depleted in 2003 and trees suffered from drought stress.

Soil water availability depends on root dynamic and differs between tree species

Tree Growth and Soil Water

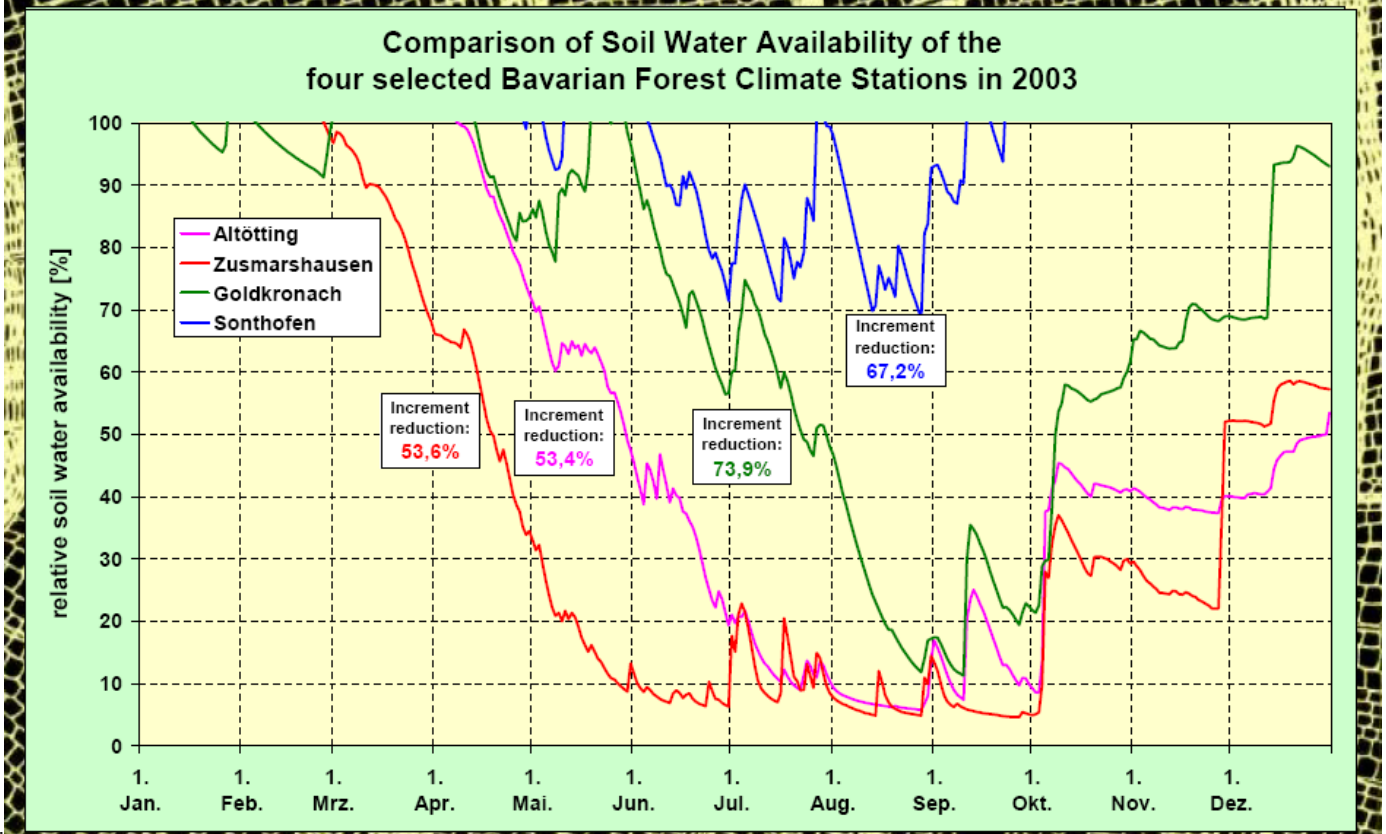
Level II Plot Freising - fagus sylvatica



Growth and Soil Water

Different spruce tree Level II-plots

Impact of Drought and Heat on Tree and Stand Vitality
Results from Level II-Plots in Southern Germany
Causes and Effects – an Example of Synoptical Analysis



Increment reduction in spruce tree stands much stronger

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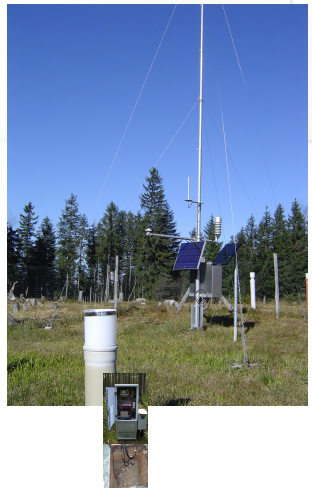
Conclusions



FutMon-Partners strengthened their efforts to detect Climate Change Effects in forests

- soil moisture measurements at 80 core plots established
- feasibility of maintenance within the European forest ecosystem monitoring demonstrated and data quality improved

- essential parameters for the modelling of water budgets of different forests all over Europe measured (soil physics) and modelling work started.

- different water budget models are compared and usability valuated

Conclusions

Thus Future European Forest Monitoring

- provide reliable information to
  - improve critical limits or thresholds of drought stress effects
  - validate water budget models and their usability for upscaling issues
  - control climate forecasts (reference)

- contribute to
  - determine effects of climate changes
  - compare tree species vulnarability
  - quantify the need and potential for conversion of forests
  - rate and value the consequences to forests and forest management

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