



The Pfynwald site – one piece in a bigger picture

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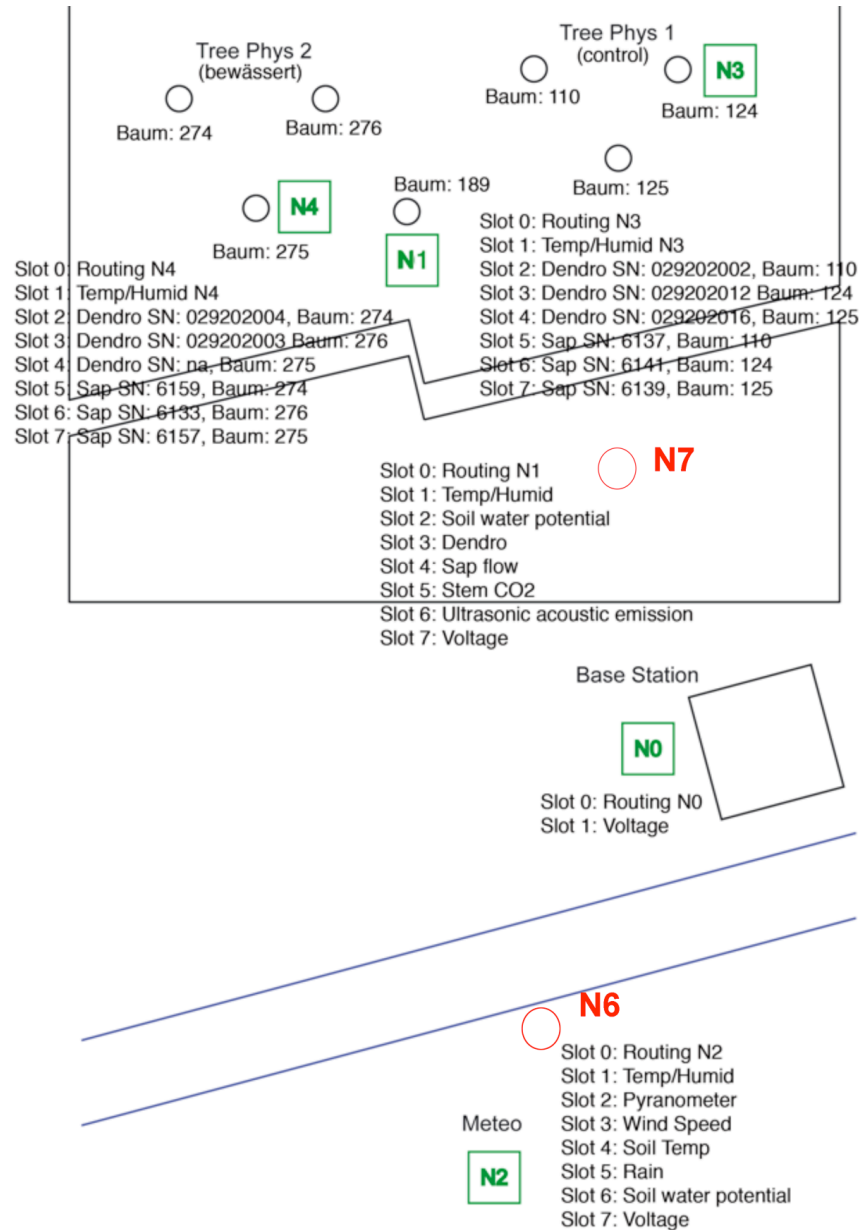
Pfynwald Workshop, WSL

25. November 2014



Set up Pfynewald 'Ecophysiology'

- 7 trees (3 I, 4 C)
- Sap flow
- Dendrometer
- 1 tree with UAE and stem CO₂
- Soil water potential (1 C)
- Meteostation



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Modelling

HPMZ09

NEP-SRI



Tree water relations and growth analyses

Tree water deficit

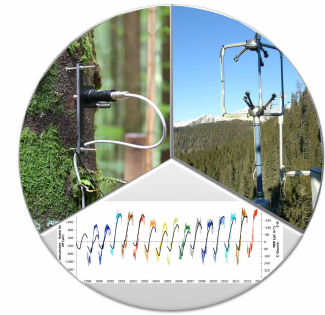
Growth

Water transport

Hydraulic characteristics

Drought indicator

NEP indicator



P-SRI

TreeNet

The biological drought and growth indicator network

ICOS

The integrated carbon observation system

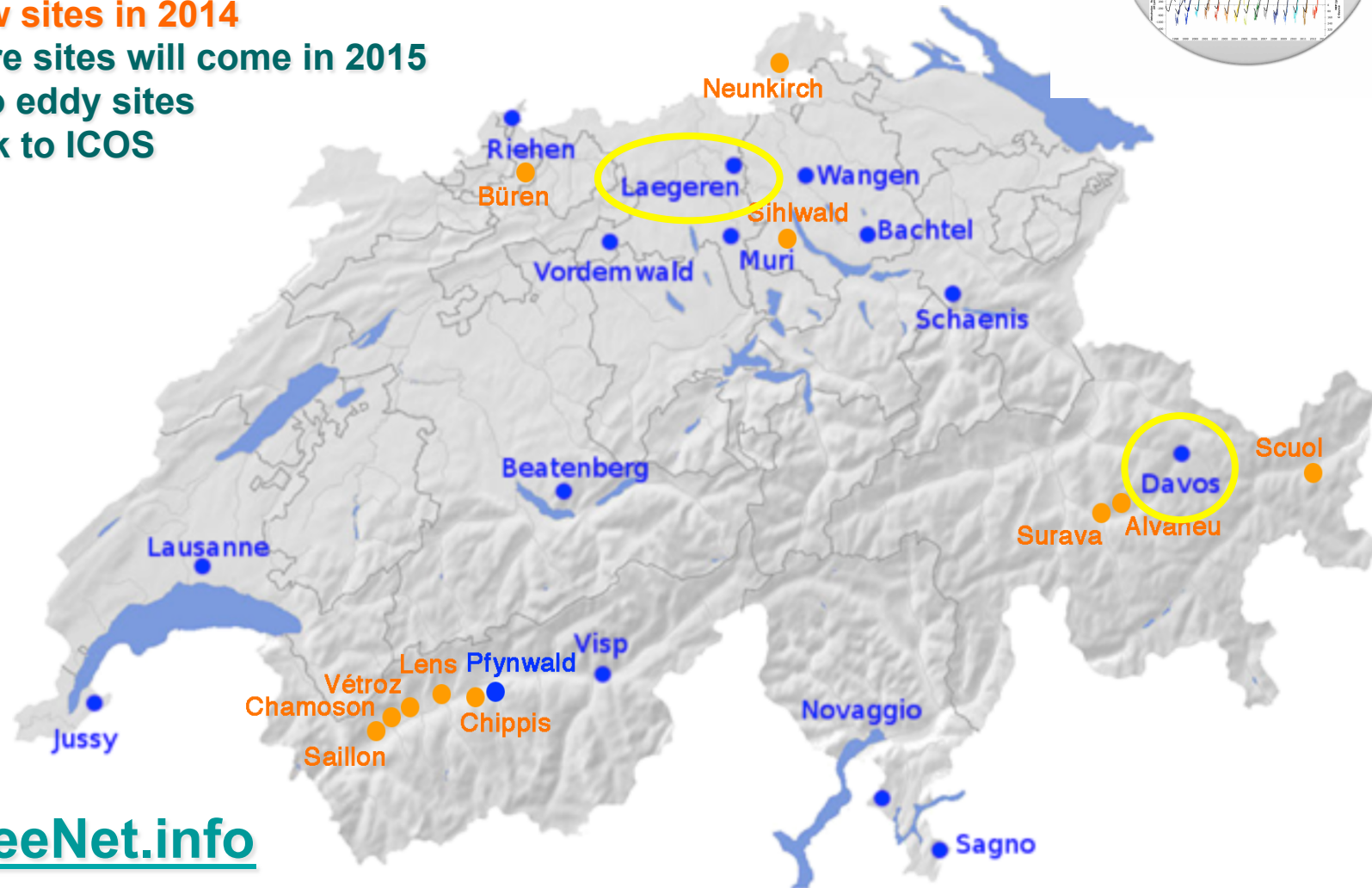
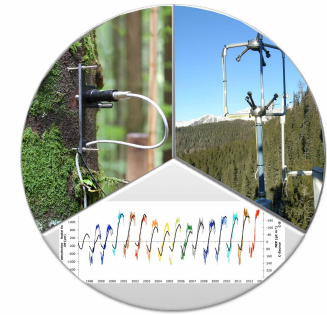
Drought
indicator

NEP indicator



TreeNet Infrastructure (October 2014)

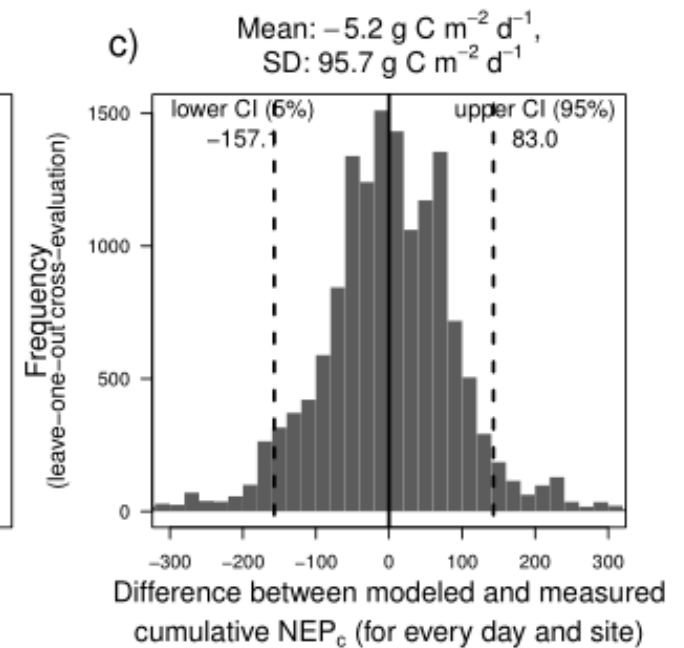
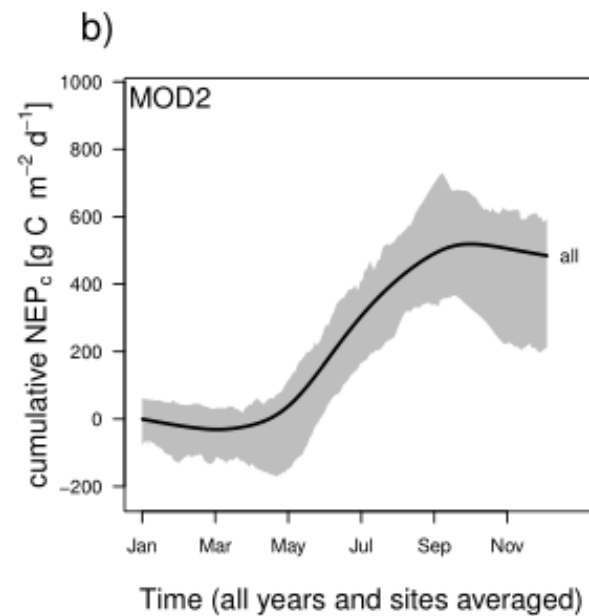
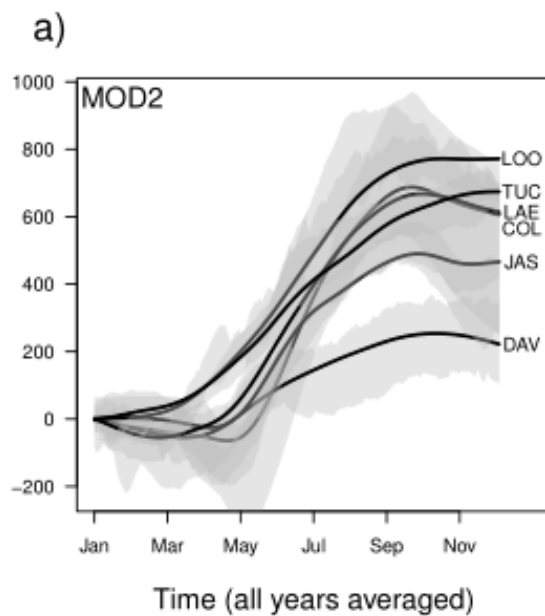
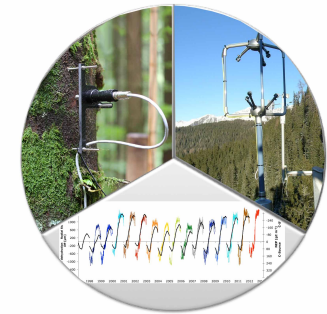
- > Total 26 TreeNet-Sites in CH
- > with 200 individual trees measured
- > **New sites in 2014**
- > More sites will come in 2015
- > Two eddy sites
- > Link to ICOS



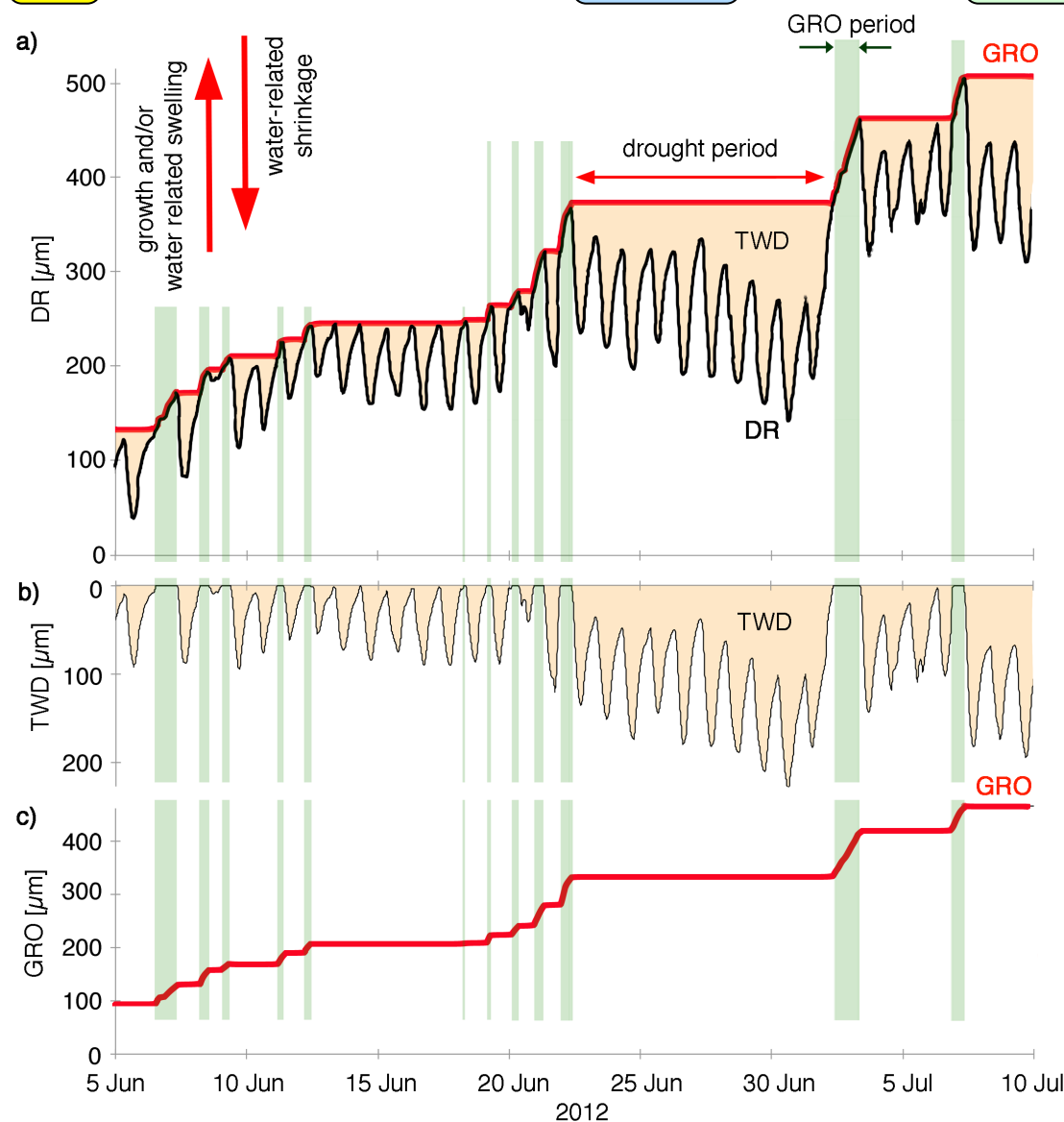
www.TreeNode.info



Estimating net ecosystem productivity (NEP) based on dendrometer measurements



$$\text{DR} = \text{Tree water deficit (TWD)} + \text{growth (GRO)}$$

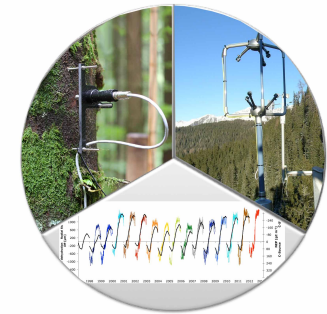


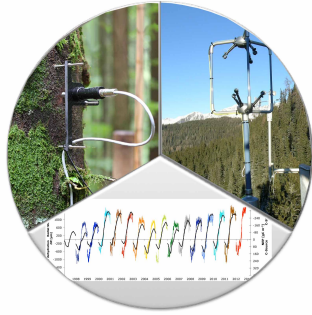
⇒ **TWD is the missing water of a tree to fully saturate its tissues**

(Daudet et al. 2005, Steppe et al. 2006, 2008, Zweifel et al. 2001, 2007)

⇒ **GRO is cell division and cell expansion (wood and bark!)**

Premiss: GRO occurs only for TWD = 0 (Lockhart 1965)





Further projects related to Pfynwald:

- **FOREST_CH** (PhD ETHZ/WSL)
- **StemCO₂** (WSL/ETHZ)
- **SOIL (WSL)**
- **COST STTRESS** (EU)
- **Trees/UAE** (WSL/ZHdK)

HPMZ09

Tree water
deficit

Growth



Chances within the Pfywald project ...

- ... -> **Combine drought stress indicator of individual trees with physiological and soil measures. Compare treatments.**
- ... -> **Resolve stem growth (cambial activity) patterns on a new level of temporal resolution. Compare treatments.**
- ... -> **New insights into carbon budgets x tree water relations.**
- ... -> **Up scaling of any results relatable to SRI measurements to the landscape level via TreeNet.**
- ... -> **Combining data with other sites**