



Tree physiology 2

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Objectives

Test Scots pine ecophysiology at the xeric end of its distribution to better understand proximal causes of drought-induced death.

Three main processes investigated:

- The inability to maintain water supply to the canopy (hydraulic failure)
- The decrease in C reserve, resulting from lower C acquisition or higher C consumption (C starvation)
- The inability to allocate C to C sink (phloem transport failure)

In Pfywald: Irrigation experiment allows to compare stressed trees (control) and non-stressed trees (irrigated)

Methods

Continuous measurements of for carbon:

- Stem respiration (2 * 4 trees)
- Soil respiration: soil chambers (2*4 trees) and soil CO₂ profile (2*3 trees)

Continuous measurements of for water:

- Sapflow (2*8 trees)

Continuous measurements of for phloem transport:

- Sapwood and living bark diameter (2*4 trees), point-dendrometer



Methods

Additional measurements in May and August

- Leaf gas exchange, light and A-Ci curves (2*8 trees) diurnals (2*3 trees)
- Water potential (planned: osmotic and turgor components) (2*8 trees)
- Non-structural carbohydrates (needles, twigs) (2*8 trees)
- Phloem d13C (2*8 trees)

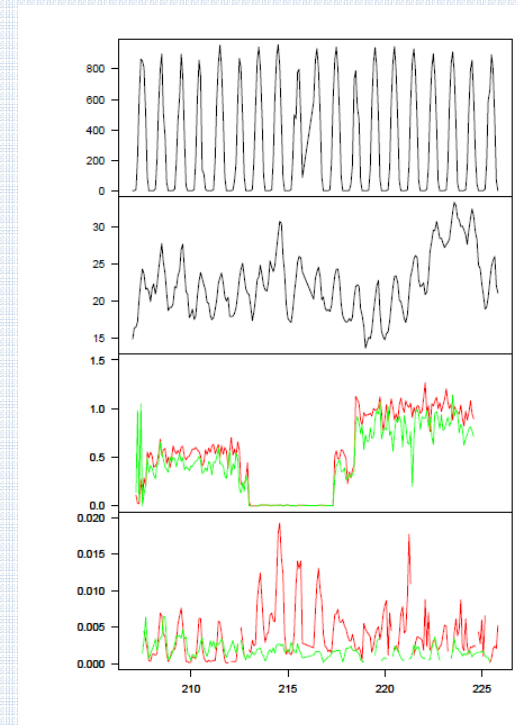
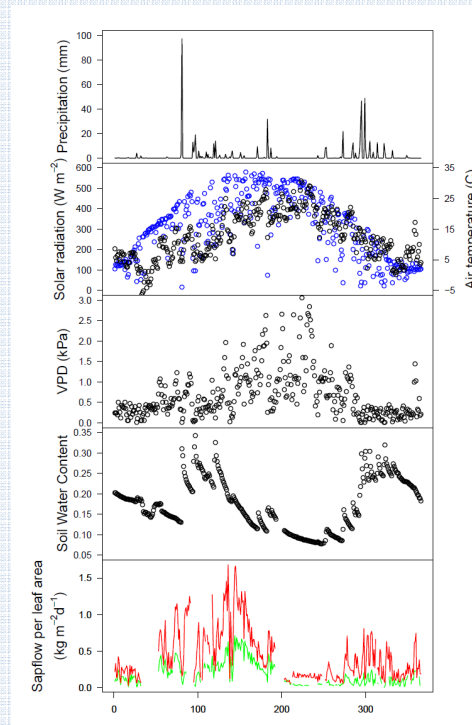


First and future results

NSC: no irrigation effect, seasonal decrease of starch, soluble sugars (Sucrose, glucose and Fructose) generally increase from spring to summer.

Example of future results and analyses:

- Sapflow
- Stem respiration



Future

- Continue measurements in 2014 with the same setup
- Two additional measurements campaigns (spring and summer)
- How to investigate roots and belowground components of the ecosystems? Some ideas but need collaborations
 - Cold girdling / Girdling
 - Trenching
 - Labelling