

Thesis topic description

Understanding the soil-plant water relations of apple tree

Problem and working hypotheses:

The soil available water is an essential basis for plants, to sustain the transpiration and survival of forest trees. The impact of environmental variables on the water relations of an apple tree is less understood.

Objectives

In a joint project with the TU Dresden and LWF, we develop a model system for measuring transpiration with conventional and sap flow sensors, xylem water potential sensors in tree stem, shrinkage and swelling of tree stem using dendrometers and the soil hydraulic parameters to better understand the transpiration behavior and soil- tree hydraulic system of different tree species in Germany. Overall, we want to improve the understanding of the water balance of forest sites by including new types of sensors and evaluations.

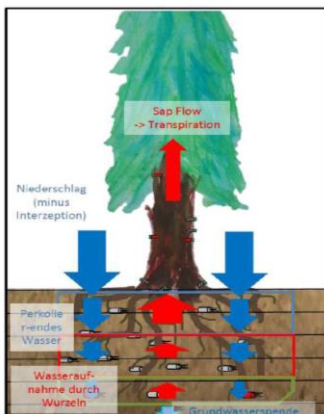


Figure 1: Overview of tree and the installed sensors



Figure 2: FloraPulse (left) and Saturas (right) sensors for measuring stem water potential embedded into tree trunks

Requirements for candidates

The topic requires an interest in working with data so a certain basic knowledge of data handling with programs like R or SAS or MATLAB is required. For the experimental part, careful and precise operations in the laboratory are required to ensure reliable measurements, which can be learned during the thesis.

The technical support, handling of the sensors, etc. is guaranteed, fun in independent technical work, and in the handling and development of measuring instruments are important. A visit to the experimental plots and supplementary sampling could be asked to compare the lab and field data. Careful experimental work in the field as well as in the laboratory is important. The starting date is flexible.

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