

# Estimating ecosystem water fluxes by combining the approaches of eddy covariance and plant hydraulics



Master and Bachelor thesis opportunity at the Department of Plant Ecology and Ecosystems Research in close collaboration with the Department of Bioclimatology at the University of Göttingen, Germany. You will get insights into several plant ecophysiological methods that are used to understand drought resistance and drought tolerance strategies of a species.

## ***Motivation and goals of the project:***

Frequent and intense drought conditions have altered the productivity, structure and susceptibility of our forests leading to large-scale tree mortality. In this scenario, it is essential to understand energy and water fluxes at the ecosystem scale to be able to predict changes in forest ecosystems and to support future forest management decisions. In this study, we aim to understand the water fluxes by combining the eddy covariance and species specific hydraulic approaches.

## ***Experimental Approach***

- [setup complete] *Eddy covariance measurements*: A 44-meter-high flux tower is equipped with meteorological instruments and eddy covariance systems to measure the energy, water vapor, and CO<sub>2</sub> fluxes between the biosphere and atmosphere at the ecosystem scale.
- [setup complete] *Stand transpiration and stem growth*: the dual method approach (DMA) type sap flow sensors are installed to measure water uptake and high precision dendrometers to measure stem growth and tree water deficit.
- [tasks for 2024 summer] *Hydraulic measurements*: seasonal dynamics in species-specific foliar water status regulation, desiccation tolerance and embolism resistance strategies will be investigated. The bigshot technique and rope climbing technique will be used to collect sun-exposed branches.



Figure 1. Eddy covariance flux tower at the Hainich National Park.

## ***Requirements:***

We are looking for a motivated candidate willing to learn and work with plant ecophysiological methods. The planned intense measurement campaign demands flexible hours in the field and laboratory. Experience with R-statistical software and good English writing skills are desired. Tree climbers license is an advantage.

## **For further information, please contact:**

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