

BSc./MSc. Thesis Topic

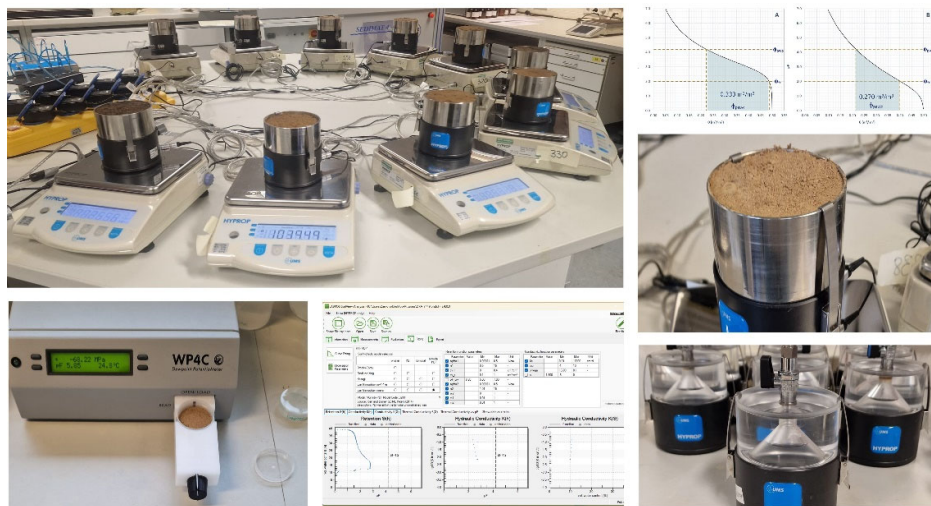
## Linking soil hydraulic properties and pF curves to observed soil moisture dynamics in Saxonian forest soils

### Background/motivation

Soil moisture dynamics in forest ecosystems are controlled not only by atmospheric forcing and vegetation, but also by intrinsic soil hydraulic properties. These properties determine how water is retained in the soil, how quickly it drains after rainfall, and how much water is available for plant uptake.

Laboratory-derived pF curves provide detailed information on soil water retention across a range of matric potentials. By fitting hydraulic functions such as the van Genuchten model, these measurements can be translated into parameters that describe soil behavior in hydrological models.

Combining pF-derived properties with in-situ soil moisture measurements offers a powerful approach to better understand observed field dynamics and to explain differences between forest sites.



Laboratory-derived pF curves- Waiklim project

### Tasks / objectives

1. Data preparation: Processing of pF curve data and soil moisture measurements.
2. Derivation of soil hydraulic properties: Determination of field capacity, wilting point and plant-available water.
3. Model fitting: Fitting of van Genuchten parameters to describe soil water retention.
4. Linking soil and field data: Comparison of soil hydraulic properties with observed soil moisture dynamics.
5. Interpretation: Discussion in the context of soil water availability and forest regeneration.

**Requirements**

- Basic knowledge of soil physics
- Experience with programming language (R, Python, Matlab,...)

**Supervision**

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