



Experiments in the Soil-Plant-Atmosphere continuum enabled by an Ecotron system

Context:

The shallowest meter of the Critical Zone (CZ) is where rock, soil, water and air interact, regulating essential water and life processes. Natural landscapes are challenging to study because subsurface heterogeneity and variable weather conditions produce a large variety of concurrent biogeochemical processes that are difficult to isolate. To overcome these issues, the Institute of Earth Surface Dynamics has acquired a new Ecotron system, which is a laboratory reproduction of the upper CZ. Ecotrons allow studying complex biogeochemical processes under controlled conditions of temperature, humidity, rainfall, light. Thus, they are ideal to investigate the effect of climatic perturbations on hydrological and biogeochemical processes in the CZ.

Goals:

We propose to carry out one Ecotron experiment on a vegetated soil. The candidate is welcome to propose ideas (for example, vegetation effects on mineral weathering; impacts of climate alteration on redox dynamics). The details of the experiment will be defined with the supervisors within the first months of the project and the experiment(s) will start by summer 2025.

The candidate will learn to setup and operate an Ecotron system, install sensors, collect automated and manual samples and make analyses of the collected data.

Knowledge and skills required:

Basic knowledge of soil science; Broad interest in hydrology and biogeochemistry; Reasonable proficiency with oral and written English; Any prior experience in the field and in the laboratory is beneficial.

Collaboration: The project is co-supervised by Paolo Benettin, Stéphanie Grand (stephanie.grand@unil.ch) and Marco Keiluweit (marco.keiluweit@unil.ch).

Working place: Géopolis building

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