

BayCEER Kolloquium

Lectures in Ecology and
Environmental Research

Winter 2022



UNIVERSITÄT
BAYREUTH

Donnerstag/Thursday

12.01.2023

12:15 in H6, GEO



Prof. Dr. Wolfgang Durner

Leiter der Abteilung Bodenkunde und Bodenphysik,
Technische Universität Braunschweig

Soil hydrological modeling -- The devil is in the details ...

„Soil hydrological modeling“ is the numerical simulation of the transport of water and associated heat, solutes, and gases in the near-surface zone of the subsurface. Of particular interest are fluxes to groundwater and across the soil-plant-atmosphere continuum to the free atmosphere.

Soil hydrology modeling has traditionally been performed by the disciplines of soil physics and hydrology („vadose zone hydrology“), which differ in their approach to scale. Soil physics takes more of a deterministic approach to small-scale processes, while hydrology is interested in effective large-scale processes. However, the effects of small-scale processes on large-scale behavior can be significant, so their ignorance can lead to systematic macroscopic errors.

This will be illustrated by two examples dealing with the „hydraulic functions of drying soils“. One case study concerns evapotranspiration estimates, and the other concerns subsurface heating by SuedLink power transmission cables that dry out the surrounding soil. In both cases, it will be shown that the parameterization of hydraulic properties (admittedly a very specialized topic in soil hydrology) has a very large impact on large-scale processes.

