



Constructive modeling of soil water dynamics on the basis of hydrogeophysical measurements

Stefan Jaumann, Jens S. Buchner, Patrick Klenk, and Kurt Roth

Heidelberg University, Institute of Environmental Physics, Heidelberg, Germany (stefan.jaumann@iup.uni-heidelberg.de)

In general, quantitative soil hydrology is confronted with a poorly known multi-scale heterogeneous system in an a priori unknown state and with a priori unknown properties. The lack of information comprises the spatial arrangement of the materials and their corresponding properties which prescribe the dynamical water movement, poorly known initial and boundary conditions, and even the mathematical process description.

To investigate this problem area, the artificial soil architecture ASSESS-GPR was constructed by Buchner et al. (2011). There, we recorded on-ground Ground-Penetrating Radar (GPR) and subsurface Time Domain Reflectometry (TDR) measurements during combined imbibition and drainage experiments.

In this work, we focus on a subset of the data, namely on the variation of the water content in a one-dimensional vertical profile. This was chosen at a location where (i) all the layers were horizontal and (ii) both TDR- and GPR-data are available. The inversion is done using TDR-data while GPR-data are employed for independent verification.