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Evaluation of a Simple Forecast Model for Water and Solute Movement at the Field Scale

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Most of the soil physical research focuses on increasingly detailed and accurate descriptions and simulations of water and solute movement. Therefore, a large effort is required for obtaining effective parameters. Particularly, numerical simulations are highly developed but data sets having the size and resolution that are required by state-of-the-art numerical solvers are next to impossible to obtain.
Here, we explore an approach to predict average hydraulic dynamics under natural conditions using a minimal data set from which "true" effective parameters may be estimated and which can also be obtained for larger scales with manageable effort: We use a time series of TDR-measured volumetric water contents from a soil profile for the inversion of hydraulic parameters of the different layers. Precipitation as atmospheric boundary condition is measured by an automatic weather station. On this basis, a "simple" numerical simulation of water flow and solute transport is executed and the results are compared with a classical transport experiment. Obviously, such a model cannot yield the detail of a "research-grade" modeling approach.