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Hydraulic Parameter Estimation in heterogeneous Soils

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The combination of multistep-outflow experiments and inverse modeling is a standard method for the determination of hydraulic properties for unsaturated flow. Up to now it is necessary to assume, that the sample is homogeneous, which is not true for most natural porous media. Measurement techniques like x-ray tomography, geoelectrics and georadar allow the non-destructive determination of the spatial structure of a sample. If thus the structure of a sample is known, it can be possible to estimate the hydraulic property functions of the basic materials of a soil with multistep-outflow experiments and an optimisation procedure, which takes the structure explicitly into account. A code for parameter optimisation in 2D and 3D structured material is presented and applied to experimental data. The estimated hydraulic parameters for homogeneous and heterogeneous samples are compared. The relevance of dynamic hydraulic properties for multstep-outflow experiments is adressed as well.