



2D simulation of the tension infiltration experiment on the heterogeneous cambic soil

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The subject of the project is the estimation of soil hydraulic properties from the field measurements done by means of tension infiltration experiment at the location of experimental catchment Uhlirská, hillslope Tomsovka at Jizera Mountains (Czech Republic). The infiltration experiments were carried out in two 27 cm deep pits. Hydraulic conductivities were measured in the field using a tension disk infiltrometer. Infiltrations were performed with the tensions of -6, -3, -1 and 0 cm.

2D axisymmetric numerical simulations were conducted to evaluate the results of the experiment. Two different approaches were used:

1. Single-domain approach based on Richards' equation.
2. Dual-permeability approach based on two water flow domains (matrix and preferential pathways), each governed by own Richards' equation.

In the first simulation, the input hydraulic parameters were inversely optimized. Objective function consisted of infiltration flux and suction pressure head data. Parameter estimator PEST coupled with the simulation code S_2D_DUAL were used.

In the second approach a reference set of parameters, which was obtained by standard pressure extractor method, was taken as properties of the soil matrix. The parameters of preferential flow domain were again optimized by inverse modelling.

Concerning the existence of preferential flow on investigated soil, the dual-permeability model gives a better picture of flow character.

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