



Hydraulic conductivity and entrapped air in heterogeneous soil: experimental set-up

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Heterogeneous soils exhibit distinct saturated hydraulic conductivity variation in response to the changes in entrapped gas content. Entrapped gas bubbles influence significantly the results of hydraulic characterization on undisturbed soil columns by transient experiments. Therefore the predictions of water flow and solute transport in heterogeneous soils can be biased. Measurements of the entrapped air volume and flow of gas and liquid phases present significant experimental challenges. The difficulties are mainly related to the problems of water and gas separation at the soil core boundaries and subsequent complexity of experimental set-up. We will present a design of the infiltration disc and the water collection assembly which allows separation and quantification of air and water inflow and outflow. Results of numerical modeling of water flow in proximity of the infiltration disc will be given to elucidate influence of the disc design to the water flow. The infiltration disc and the water collection assembly are the key parts of the newly proposed fully automated set-up designed to measure the effective hydraulic and transport properties of soils under varying entrapped air content. This research has been supported by MSMT 1K05024 and GACR 103/04/0663.