Numerical simulation of infiltration through unsaturated layered soil column

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Abstrak

The effect of changing permeability at the interface for common residual soils, namely Silty Sand, Fine Sand and Gravelly Sand was investigated by conducting numerical simulations of vertical infiltration tests on two layered soil columns of Silty Sand over Fine Sand, and Silty Sand
over Gravelly Sand. The results show that water movement across interface between the two layered soils will only occur when the matric suction, ua - uw, at the interface reached a breakthrough head of 0.4 kPa and 3.5 kPa for Gravelly Sand and Fine Sand, respectively. The pressure heads are defined as the water-entry value, Ïˆw, at which the coarser layer became conductive regardless of infiltration rate or the properties of the overlying finer soil layer. The barrier effect in the underlying coarser soil layer was verified from the numerical analysis. The effect was more apparent when the difference in the permeability and the pore-water pressure change across the finer-coarser soil interface were larger.