



Intermediate flow regimes in single-/dual- continuum modeling of soil water flow and solute transport

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The aim of our study is to seek more versatile and robust solution of flow and transport problems involving preferential flow. Dual-continuum models of soil water movement are useful whenever significant local pressure disequilibrium, between slow moving water contained in the soil matrix and fast moving water in the preferential pathways, is encountered.

The set of two governing Richard's equations, representing the flow in a dual-continuum system, can be solved using sequentially coupled approach or fully coupled approach. To illustrate the performance of the fully coupled approach, as implemented in the new version of our S1D code, we present a simple example problem involving one-dimensional variably saturated flow in a vertical soil column, conceptualized as a dual-continuum system. The new version of S1D code, unlike the previous versions, allows for studying the complete class of intermediate flow regimes ranging from strongly preferential flow regime (in a dual-continuum system) to pure soil matrix flow regime (in a single-continuum system).