

PROBABILISTIC PREDICTIONS OF INFILTRATION RATE INTO HETEROGENEOUS SOILS WITH UNCERTAIN HYDRAULIC PARAMETERS

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Summary. Soil heterogeneity and the lack of detailed site characterization are two ubiquitous factors that render predictions of flow and transport in the vadose zone inherently uncertain. We employ the Green-Ampt model of infiltration and the Dagan-Bresler statistical parameterization of soil properties to compute probability density functions (PDFs) of infiltration rate and infiltration depth. By going beyond uncertainty quantification approaches based on mean and variance of system states, these PDF solutions enable one to evaluate probabilities of rare events that are required for probabilistic risk assessment. We investigate the temporal evolution of the PDFs of infiltration depth and corresponding infiltration rate, the relative importance of uncertainty in various hydraulic parameters and their cross-correlation, and the impact of the choice of a functional form of the hydraulic function.

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