Sensitivity of Surface Irrigation Modeling to Subsurface Flow. (S01-warrick104720-Poster)

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Abstract:

Surface flow irrigation models typically use empirical functions to describe infiltration (e.g. Horton, Philip, Green and Ampt). The modified Kostiakov equation is most commonly used because of mathematical simplicity and ease of calculations. Recent advances in computational technology easily accommodate the direct use of Richards equation through numerical solutions. The objective of this research is to examine the advantages of coupling a one-dimensional solution of the Richards equation (Hydrus-1D) with a zero inertia based surface irrigation model in terms of surface model accuracy. A by-product of the Richards solution is a logical description of soluble solutes as well as the water distribution. A one-dimensional, zero-inertia based, surface flow model was developed to describe the surface hydraulics processes in different agricultural fields. The model allows a choice of infiltration based on Richards equation or the modified Kostiakov equation. A comparison of the empirical and physically based approaches is presented for a hypothetical data set and data obtained from field experiments.

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