Modeling Spatial and Temporal Variability in Irrigation and Drainage Systems: Improvements to the Colorado State Irrigation and Drainage Model (CSUID)

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Abstract. Colorado state University irrigation and drainage model 9IDSCU) is a three dimensional variable saturated-unsaturated numerical model that simulates the subsurface flow and transport processes. A Wide range of developments have been done to CSUID to fully simulate the response of agricultural fields to external stresses such as subsurface drainage systems, root extractions, irrigation activities and bare soil evaporation. The code is also capable of simulating salinity transport process through the vadose zone and in the saturated zone. The partition of salinity between soil solid phase and water phase is included in the model to simulate the accumulation of salts in the root zone.

The strength of CSUID is in its ability to simulate irrigation-drainage activities taking into account spatially and temporal variably water quality and quantity and under spatial heterogeneous soil properties. Soil properties such as hydraulic conductivity, porosity, Van Gentuchen retention curve parameters, storativity, dispersivity, partition coefficients are all modeled as spatially variables. Having a model with these capabilities is an important step toward understanding the uncertainty in the design and the management of irrigation-drainage systems. The model contains a Graphical User Interface that allows the user to visualize the input and output. The presentation will provide an overview of the model and its application to a field near Rocky Ford, Colorado.

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