Application of predictive three-region models for unsaturated hydraulic conductivity in undisturbed soils. (S01-poulsen072712-Poster)

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Abstract:

Predictions of unsaturated hydraulic conductivity in undisturbed soil by four different three pore-size region models (Three Region Campbell (TRC) model, modified Campbell model, modified Alexander and Skaggs, model and Campbell Libardi Campbell (CLC) model) were compared. Test data were from 72 undisturbed Dutch soils not previously used in model development. Pore-size regions considered were those corresponding to soilwater potentials between 0 and -10 cm H2O (region I: macro-pores), -10 and -350 cm H2O (region II: meso-pores), and -350 and -15000 cm H2O (region III: micro-pores). The TRC and the SLC models gave similar and most accurate predictions for all three regions combined. The modified Campbell model, however, gave comparable results in the wet region (soil-water potentials between 0 and -100 cm H2O soil-water potential). An existing model for predicting saturated hydraulic conductivity from soil air filled porosity at a soil-water potential of -100 cm H2O was tested against data from the Dutch soils and yielded prediction accuracy similar to the TRC model. The possibility of including a fourth region (film flow, soil-water potential less than -15000 cm H2O) in the TRC model was investigated using data from six additional soils, and results were promising.

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