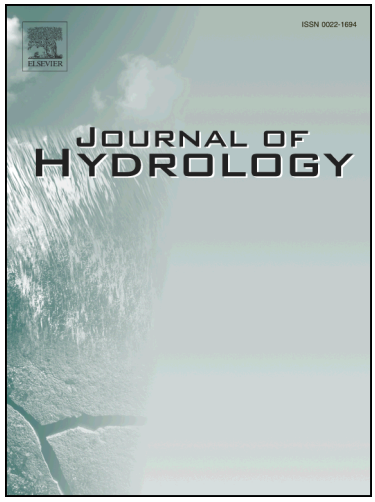

Research papers

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Measurement and Estimation of the Soil Water Retention Curve Using Evaporation Method and Pseudo Continuous Pedotransfer Function

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ABSTRACT

HYPROP (Hydraulic Property Analyzer) system works based on the simplified evaporation method, which determines soil hydraulic properties in the laboratory. This system simultaneously monitors the changes in weight of soil samples as well as the soil matric potential at two depths throughout a drying process governed by evaporation from the soil surface. In this study, we examined the performance of the pseudo continuous pedotranfer function (PC-PTF) to predict the soil water retention curve (SWRC) using high resolution data measured by HYPROP system. The dataset consisted of 7963 measured water retention data points obtained from 81 Turkish soil samples from which 60%, 20% and 20% were randomly selected for training, cross-validation and test subsets, respectively. The best PC-PTF developed in this study with a mean absolute error of 0.023 m^3 m^{-3} (a root mean square error of 0.033 m^3 m^{-3}) and a correlation coefficient of 0.96 showed promising performance considering the typical performance range (RMSE = 0.034 - 0.085 m^3 m^{-3}) for parametric PTFs predicting SWRC. The best PC-PTF used soil textural information, soil bulk density, the percentage of stable aggregates, soil organic matter content and the initial water content as the input attributes. PTFs developed in this study