Abstract

Soil water retention curve which indicates moisture in the soil water suction, on issues related to water movement in unsaturated soil frequently used. and identification of soil moisture of different physical behavior has been easier. To obtain moisture retention curve is essential that the hotspots are available field capacity and permanent wilting point.But to obtain such information, spending a lot of time is required. but through indirect methods such as transfer functions, they can be estimated. In this study Drought hotspots including FC and PWP by 4 data base, Including linear regression (LR), neural networks (ANN), inference systems neuro-fuzzy (ANFIS) and support vector regression (SVR),was estimated. For this purpose about 110 points with an average distance of about 80 meters from each other in the field of Sistan dam was determined. Then the surface (0-15 cm) samples were collected disturbed and undisturbed soil. and to measure the physico-chemical properties and soil hydraulic laboratory. Field capacity and permanent wilting point by measuring soil moisture suction, respectively, 0.33 and 15 bar, respectively. Easily accessible properties, soil (silt, sand and clay), bulk density and soil organic matter by hydrometric respectively, cylinder with specific volume and Black Valky- were measured. The modeling was done with these methods and analysis of results was also performed. For comparing the measured values with predicted values of quantitative parameters normalized root mean square error (NRMSE), coefficient of determination (R^2) and Nash efficiency coefficient (NS) was used. At best values R^2, NRMSE and NS for FC 0.51, 10.46 and 0.51 by ANN and permanent wilting point 0.51, 11/18 and 0.39 is obtained by SVR.Also the evaluation of the uncertainty related to model the structure of ANN and SVR, for FC and PWP were analyzed. The uncertainty of input parameters by using the Monte Carlo simulation 1000 times with a sampling of actual distribution of inputs and outputs corresponding to their assessment of Pedotransfer took place. For comparison criteria uncertainties include normal width is enclosed between the upper and lower (ARIC), percentage of measurement data in the range of 95% ($P_{95\%}$) and the index of uncertainty (NUE), was used. Field capacity values for ARIC, $P_{95\%}$ and NUE, respectively, 0.175, 0.523 and 0.380 and 4.44 to 0.80 and 2.99 for ANN and SVR was achieved. The results of uncertainty assessment criteria for permanent wilting point, showing the superiority of support vector regression that NUE values, respectively, 2.16 and 1.68 for ANN says it's important for SVR.

Keywords: Pedotransfer, Uncertaint, Field Capacity, Permanent Wilting Point, Support Vector Regression, Artificial Neural Networks, Fuzzy Inference Neuro,Sistan Dam.

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Comparison of Data Driven Methods to Develop Pedotransfer Functions for predicting Field Capacity and Permanent Wilting Point in Sistan Dam Region

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