



Enhancing pedotransfer functions (PTFs) with soil spectral reflectance for the estimation of hydraulic conductivity

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Pedotransfer functions (PTFs) are an alternative to expensive field and laboratory methods for acquiring soil hydraulic properties (SHPs). In recent years, soil spectral information has been considered as suitable inputs for improving the accuracy of PTFs. However, there is still controversy about reliability or efficiency of using spectroscopy to estimate soil hydraulic parameters. We used data from 171 in-situ saturated soil hydraulic conductivity (Ks) measurements in southwestern China. This study evaluated three scenarios using different input variables to create an artificial neural network (ANN)-based PTFs to estimate log-transformed soil saturated hydraulic conductivity. Compared to the PTF without soil spectral reflectance data (SPRD), the R² of the PTF (that also included the SPRD) increased by 0.33 (from 0.09 to 0.42) and decreased the AIC by 18.16 (from 273.96 to 255.8). Our results confirm the potential of including SPRD to improve the PTF in estimating hydraulic conductivity.