Uncertainty in soil water retention curves of Havana province as estimated from site-specific pedotransfer functions: effects of incorporating residual errors.

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The characterization of the soil water retention curves (SWRC) using pedotransfer functions (PTFs) has been widely discussed in the literature. However, still limited attention has been paid to the validity of these approaches to deal with soil spatial variability issues at relatively large scales. The objective of this work is to quantify the spatial uncertainty of estimated SWRC in Havana province from site-specific PTFs, using geostatistically interpolated input data, and to improve their predictive capabilities accounting for interpolated residual errors. An intensive field campaign has been carried out in the Havana province by sampling 116 locations according to a stratified random scheme. A total of 229 soil samples, corresponding to two soil depths of 10-15 cm and 35-40 cm, were collected and subjected to measurements of basic soil physical and chemical properties, as well as of SWRCs. The aggregate size distribution showed a stronger spatial cross correlation with the SWRC than the rest of the measured variables. The differences between the statistical fitting of the predictions using actual and interpolated (by kriging) input values was markedly small, evidencing the predominance of the structural errors of the PTFs on the total uncertainty. Incorporating the interpolated residual errors in the predictions meant an improvement of the determination coefficient R2 of between a 4 and almost a 30 percent, depending on pressure head values.