

Pedotransfer functions (PTFs) are often used for estimating hydraulic properties such as the moisture retention characteristic and the pressure head-hydraulic conductivity relationship. Both properties are essential for the description of water and solute movement in unsaturated soils. Frequently, PTFs are not evaluated with respect to specific applications. The criteria, presently used to evaluate the goodness of fit for a PTF do not provide information about the performance of these functions for applications such as the prediction of the downward water flux below the soil root zone or of the soil moisture deficit during the growing season. We performed functional evaluations of PTFs. In a first sample problem, the influence of uncertainty in the PTF was examined on the basis of two functional criteria: the moisture supply capacity (MSC) and the downward flux below the root zone (DFR). In a second sample problem the effect of the uncertainty in the PTFs and the variability in soil properties within a map unit on the simulated MSC distributions were analyzed. The MSC distributions were calculated and compared for two map units known by soil surveyors to differ considerably during a dry year. It was found that an improved estimate of the hydraulic properties, obtained by calibrating PTFs using detailed textural information, did not substantially reduce the dispersion of the MSC and DFR distributions. Results from the second sample problem indicated that >90% of the variation in the simulated MSC was caused by estimation errors in the hydraulic properties, overwhelming the map unit variability.