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Interactive comment on "Updated European hydraulic pedotransfer functions with communicated uncertainties in the predicted variables (euptfv2)" *by* Brigitta Szabó et al.

Anonymous Referee #3

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This manuscript aims to update the previously developed PTF for European soils called euptfv1. More importantly, euptfv2 contributes to the understudied issue of uncertainty in PTFs for potential users. Despite the existing large amount of results, the paper is easy to follow with some possibilities to improve. The authors also provide a detailed and user-friendly website from euptfv2, however, no library called eutptf exists in R Repository, even the available zip file has problems to be run. Many comparisons among the possibilities of PTFs for different soil hydraulic properties were done. These series of "euptfv(i)" will contribute to the modelling of soil processes. I recommend this paper for publication, however, I outlined some questions and comments as below (L denotes line and P for page)

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Discussion paper

L30, P1. variably saturated fluxes? do you mean flow through variably saturated soil media?

L31. P.2. Not necessary to machine learning-based methods are able to calculate uncertainty because the sampling effect can propagate parameter uncertainty, which can be implemented even in simple regression-based models. Tens of resamples for training and testing with different distributions can be drawn from the population (Tranter et al., 2010; Kotlar et al., 2019).

Do train and test datasets in bootstraps follow the same distributions?

Tranter, G., Minasny, B. and McBratney, A.B., 2010. Estimating pedotransfer function prediction limits using fuzzy k-means with extragrades. Soil Science Society of America Journal, 74(6), pp.1967-1975.

Kotlar, A.M., de Jong van Lier, Q., Barros, A.H.C., Iversen, B.V. and Vereecken, H., 2019. Development and Uncertainty Assessment of Pedotransfer Functions for Predicting Water Contents at Specific Pressure Heads. Vadose Zone Journal, 18(1).

Table1. P.18. Numbers are not aligned exactly below the names.

Correlation matrix of observations would be useful information (in appendix) at least for the dataset used for the best PTFs.

L6, P5: Please calculate variable importance of parameters in PTFs as relative which makes summation of all 100%. (e.g. Figure 3)

L3, P7: To give a better view of the performance of PTFs, compare the mean values of measured parameters with RMSE of predictions. Compared to Toth et al., (2015), improvement in the prediction of THS is less than FC and WP, why?

Figure S2, please replace SE by RMSE so the reader doesn't lose the track of comparison criteria.

L1, P8. Please mention the correlation between THS and BD, lets arguably consider

THS equal to total porosity, does the 1-BD/PD, assuming PD=2.65 give better RMSE than PTF03 for THS? or you might easily obtain the best PD to predict THS by this formula. In PTF 32, the relative importance of BD is almost 100%.

L31, P10. Elaborate the range of Ks values used in training for PTF02, so reader can judge how low is RMSE of 0.94.

L1-8, P10. You can compare the randomized RMSE by PTF02 (RMSE/(maxKs-minKs)) by some studies in the literature (preferably Europe or at least temperate soils)

L19, P10. I expect to see the high importance of clay in THETAr. It is not clear exactly how to estimate VG and MVG parameters.

L23, P10. K0, matching point should be defined earlier.

L25-30, P11. How many of K data are obtained from evaporation method, this method usually goes up to -1000cm, is it why overestimation occurs in Fig S21 in drier conditions or another reason? Note that in this dry region K data is obviously small and mean error of about 0.8 is significant.

Moreover, comparing Fig s21 with Fig S1b (Toth et al., 2015), there less error in this dry region was observed.

Fig2, 5. Explain the term “count” in legend

Table 7. RMSE is log10(cm/d) but this belongs to retention curve.

Table 8. this RMSE was computed only by K(h) data? Did you consider Lambda=0.5?

L5, P 12. That’s interesting to show Comparison of point and parameter predictions, however, you should emphasize that this works only when water retention curve matters. Because one can use the n value of WRC and l=0.5 for K function.

During some trials to run the package, I have faced with various errors such as

Error in source_data

("https://github.com/TothSzaboBrigitta/ euptfv2/blob/master/suggested_PTFs/FC_EUHYDI/FC_PTF07.rdata?raw=True") : could not find function "source_data"

please check the files again in the attached zip files. I could not also find neither euptf1 nor 2 in CRAN repository.

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