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Interactive comment on "Development and Analysis of Soil Water Infiltration Global Database" *by* Mehdi Rahmati et al.

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The authors present a 5000+ sized international data collection of soil infiltration measurements and related meta-information. I congratulate the authors for pooling these data into a great database and providing an initial exploration of the data collection. It is exemplary that such amount of data were openly contributed and made available to the community with no limitations. In my view, the lack of pooled field-based soil hydraulic data constituted a large knowledge gap for a long time now. I have a few questions about methodology and a number of small comments on the text, but I think this database and its documentation yield great service to the international soil community. I look forward to seeing the final version and further analyses performed on this data set.

I have three questions about methodology or its documentation.

Particle-size distribution (PSD): It is not surprising that the authors did not find much correlation between PSD and Ksat/S. Yet, I find it important to be clear about the way soil texture data were handled. Internationally, there are typically more than one PSD standards followed (e.g. USDA/FAO vs. IUSS), yet there appears to be only USDA/FAO conform data reported. Yet other systems may not even be possible to convert/interpolate, due to working with a fraction other than <2mm. Please add necessary information on how non-USDA/FAO-conform PSD data were handled. Were those rejected? Interpolated in any ways? Is raw data available? (L269-284, and Table 4)

Field capacity (FC) although available only for a limited number of cases: This is another example where international standards do not match – there are at least 5 matric potentials at which FC is approximated. Is there information on what definition was reported, and was there any opportunity to standardize – or at least provide metadata - if reported at different matric potentials?

Other properties, for example BD, Ksat or saturated water content: Is there any information on their methodology? Core method vs. clod method? Field or lab Ksat (constant vs. falling head?) or fitted?, sensory or gravimetry? If such information is not available, I recommend that it is stated that those were not collected or provided. I expect that methodology on Ksat will especially be of interest.

I think the above should at least be commented on in the paper – or described where possible – to help avoid misinterpretations or the lack of information may hinder the database's use in any other ways.

Minor comments, editorials:

L215: made on samples of. . .

L290: Sparse coverage?

L301: Since this is often the same for other large data collections, I suggest replacing the end o fthe sentence as: "...(Fig 2), which makes SWIG a valuable data source for comprehensive studies."

L302-303: Rephrase to make it an independent sentence. (Skip 'because' and perhaps add that it would still be desirable to know about those soils.

L332: With 22%, grasslands are the second most frequently represented land use type.

L336: replace 'striking' with 'noticeable' or something similar. Alternatively: "Data show that the upper and lower. . .."

L349-350: Does this lumping originate from the cited paper? If not, please explain.

L356: Please spell out what is meant by 'this'

L358: replace 'rejected' with 'excluded'. . . .were excluded from the presented study. The same in L359.

L363: the lsqnonlin

L365-366: restructure sentence: . . .R2 values higher than 0.9 and 0.99 were obtained in 94 and 68% of the cases respectively."

L368: from the analysis

L379: from the SWIG

L387: replace 'striking' with a more objective sounding term. It was observed. . ..or something similar.

L388-392: It would be useful to add a sentence or two here, summarizing what exactly constitute the problem. (e.g. sample size vs. representative elementary volume, sample excluding cracks or biopores, imperfection of sampling, etc.)

L397: was performed

L412: that the examined basic soil properties. . .

L416: replace 'done' with 'implemented'

L417: does not provide adequate means to estimate Ks

L421: databases

L425: errors

L427: difficult, since the required

L27-428: The uncertainty and variability related to the applied measurement technique . . .. may be assessed as information on the applied techniques is available.

L430: a strong effort has been made. . .

L431: . . .any probable error of this nature.

L435-438: Merge this para with the previous under the same umbrella with soil hydraulic properties. It is a very similar thought.

L440-441: Do you refer to measurement scale here? How about assumptions about initial conditions, 1D vs 3D flow, etc. . .? Acknowledge those other potential sources of uncertainty.

L443: please provide reference(s)

L444-454: First, the quality of text in this section should be improved in general. Second, I think it would be better to present these cases more in a general context, perhaps even with 2-3 references.

L475-476: . . .climate models, texture is not the main controlling factor.

L476: the SWIG database

References: Das Gupta should be Dasgupta. Please correct it in the relevant tables as well.

Figure 1: I don't think the scale is necessary for a World map, especially since part of the map is distorted.

Figures 3 and 4: There is a concern of visibility in these two figures. Also, there is very little difference that the reader can comprehend between the respective panels. They are not discussed too much either. I suggest that these two figures are removed, or some alternate way of presenting the relevant data is found.

Figures 5-6: What do the multiple points with the same color represent within a texture class? They appear too few (especially in Figure 5) to be individual samples.

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