

Interactive comment on “Improved calibration of Green-Ampt infiltration in the EROSION-2D/3D model using a rainfall-runoff experiment database” by Hana Beitlerová et al.

Hana Beitlerová et al.

beitlerova.hana@vumop.cz

Received and published: 7 December 2020

Dear Mehdi Rahmati, thank you very much for your insightful comments on our manuscript “Improved calibration of Green-Ampt infiltration in the EROSION-2D/3D model using a rainfall-runoff experiment database”. Besides your suggestions 4 and 5, which we find very worthwhile and will consider them in adjusted manuscript after the discussion will be completed, we would like to respond to your comments 1-3.

1) You ask, why did we use only limited database of rainfall-runoff experiments and why we did not use infiltration experiments, which are available in higher amount. The skinfactor can be basically derived only from rainfall-runoff experiments as the rainfall

C1

duration and intensity are input parameters in the skinfactor determination. We see, that the name rainfall-runoff and infiltration experiments is misleading and we suggest to correct it in the manuscript. Except this, using pure infiltration data would likely raise further issues, as experimental methodology is completely different and also some differing processes are simulated with the infiltration experiments in contrast to rainfall-runoff experiments (permanent submergence; no simulation of aggregate destruction and surface sealing, ...). Reason for our limited database is, that the skinfactor determination requires lots of input parameters which are rarely all measured during rainfall-runoff experiments. Our first intention was to use a database published by Seibert et al. (2011, DOI: 10.1594/GFZ.TR32.2) containing 726 simulations from European countries, however, we had to exclude all experiments except those made by model developers due to missing parameters. Similarly, none of the experiments in the suggested SWIG database includes full set of input parameters. We suggest to highlight the spatial limitation of the PTFs in the manuscript and comment, why those databases could not be used in our work.

2) You ask, why the linear mixed-effects model is used to develop the PTFs and why nonlinear methods (machine learning methods) are not used. We agree, that relationships between the parameters are probably more complex than linear mixed-effects models can cover. Using machine learning methods, however, would not give us an insight in the relationships between skinfactor and variables, which is an important part in our analysis. Linear-mixed effects models allow us to describe the relationships clearly by coefficients so the PTFs are easy to interpret and can be discussed in the context of the rainfall-runoff processes.

3) You believe, that the reason why the working group plays an important role in prediction of skinfactor is that the used database is not global enough. In general we agree that your assumption can be correct. The reasons why our database is not global is discussed in comment one. In case of our database it was important to consider the impact of working group.

C2

