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Discussions

Interactive comment on "Soil surface roughness: comparing old and new measuring methods and application in a soil erosion model" *by* L. M. Thomsen et al.

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Author comments to referee #2 (R2), T. Steenhuis.

We would like to thank Prof. Steenhuis (R2) for his useful and constructive comments on our manuscript. They helped us a lot to make the article a more comprehensive study. Please find our responses to the issues raised by Prof. Steenhuis below:

R2:[. . .] It seems that the modeling was an afterthought (nothing wrong with that) and should be presented in that way as well. The objective as stated in the paper is as follows: "The objectives of the study were to obtain a quantitative comparison of the

different measurement methods and to quantify the propagation of the differences <in measured roughness> in an erosion model." The authors clearly were more successful in the comparison of the different measurement of soil roughness methods than "to quantify the propagation of the differences in an erosion model". I do not believe as stated in the objective that the authors can claim that they thoroughly examined the effect of the roughness measurements in erosion models. In the manuscript there is one figure with one storm with one model about the outflow discharge of one field somewhere in Norway. So instead of rewriting the whole paper, it would be much simpler to change the objectives and write that the main objective is to test the various measurement methods for surface roughness and an example is given on the effect of these measurement of surface roughness on the surface runoff.

Response: Indeed the focus in this study was on comparing the different measurement methods and the modelling was only a minor part. The suggestion to adjust the objective of our study accordingly was followed and we changed the objectives.

R2: Using the simulation as an example, then the question becomes how much detail should be included. You could refer for the description of the model to the paper of Kværnø, and Stolte and then explain in detail in the example why there were differences in outflow. There would be no need to include the model description in the methodology and the descriptive part of the LISEM model can be included as part of the example. The important part for the reader to know is that LISEM is an infiltration-excess model and the detail about how surface roughness is included in the model: "In LISEM, ponding on the surface is simulated using the concept of Maximum Depressional Storage (MDS, cm). MDS is deïnĒĞAËŻned as the threshold value for a given area above which the surface micro-depressions will overïnĒĞC′ ow. When this value is reached in any cell, each additional raindrop will directly result in overland runoff out of the cell"

Response: We agree that, with the adjusted objectives and the changed focus (i.e. more on the comparison of the methods than on the modelling), the description of the

model was too detailed. We have removed most of it and instead now refer to Kværnø and Stolte (2013). We also added more explanation in the discussion of the model results by referring to the equations for calculating the MDS and Start Depressional Storage (SDS), which we kept in the part of the model description.

R2: It is actually interesting that the detailed measurements cannot be included in the model. So what is the need to do these measurements? Maybe because it was never possible to do these measurements efficiently, it was not included. By deemphasizing the modeling part of the paper and addressing the comment of reviewer #1, the paper would be a helpful contribution to the literature.

Response: It is true that less detailed measurements could probably be sufficient for the modelling. However, with the reviewer's help we were able to point out better now that the purpose of this study was mainly about finding more efficient ways to measure RR on a larger scale. We would like to thank the reviewer for his comment that our paper forms a helpful contribution to the literature.

References: Kværnø, S. H. and Stolte, J.: Effects of soil physical data sources on discharge and soil loss simulated by the LISEM model, Catena, 97, 137–149, 2012.

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Interactive comment on SOIL Discuss., 1, 981, 2014.