

Interactive comment on “Statistical analysis and modelling of surface runoff from arable fields” by P. Fiener et al.

P. Fiener et al.

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The comments by the reviewer are reproduced in short and then replied

Reviewer: Surface runoff generation on arable land is the most important driver of flooding. ... So their work could be very helpful to understand the surface runoff generation processes in arable ... The analysis result in the manuscript was obtained in the specific area and the specific arable land with stone cover. ... From this view, the results were overemphasized, and the title of the manuscript could be changed to “Statistical analysis and modeling of surface runoff form arable fields in Central Europe”.

Reply: We agree with this suggestion and changed the title although we think that Central Europe is rather large to be viewed as a "specific case". We made clearer

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now (small additions to the Abstract, the Introduction and in Material and Methods), that in contrast to most other researches that often are restricted to one site, we took great care to cover many sites by combining the data from several studies. Also, the stoniness of soils may appear more important than it was. Only 36% of all plots had more than 10% stone cover and 16% had >15% stone cover. Remarkably, in the soil erodibility of the Revised Universal soil loss Equation stones are also only considered if more than 10% are present. For the US it was estimated that 16% of the soil contain stones that need to be considered regarding the erodibility (Roemkens et al. 1997). We have added this information to the Discussion.

Reviewer: The authors tried to understand the surface runoff generation processes in the arable land using three mechanisms. ... From the view of reader, although the lumped hydrological model (SCS-CN) and Horton, Green and Ampt or Philips equations didn't consider the variable of "TsT" to address infiltration, other variables they considered could stand for "TsT" or even better than "TsT" for "TsT" not necessarily used in the hypothesis or in other places.

Reply: We agree – and it has also been found for subsets of our data – that other variables could replace TsT. However, these other variables provided no consistent explanation for the whole data set while TsT did. Hence the other variables cannot serve as universal predictors. No change was necessary.

Reviewer: It would be helpful to understand the results in the paper if more detail information be described about the arable land and the habit of agricultural activities in the study area, for example, why the arable land was covered by stone in agricultural operation there?

Reply: See our remark on stoniness above. We modified the wording in the Abstract to

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make clear, that the large influence of stones only applied for a rather small percentage of soils exceeding the threshold.

P3675 L23-25 ...Why stone cover was still declared to be most important to initial abstraction in the paper without any conditional explanation? Reply: See remark above

Reviewer: ... Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? No

Reply: We included more information regarding the experiments in the Materials and Methods section. However, we refer to Fiener et al. 2011 and Seibert et al. 2011 from whom the data were taken. They give an overview over all methods and they cite the individual studies from which in their data base was compiled. Even more details can be found in these studies.

Regarding the calculations we have added two references concerning the testing of residuals for variables with missing data and concerning our validation approach.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 3665, 2013.

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