

Interactive comment on “Assessing winter storm flow generation by means of permeability of the lithology and hydrological soil processes” by H. Hellebrand et al.

H. Hellebrand et al.

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Author comment for RC S595: 'Referee Comment', Salvatore Manfreda, 23.07.2007

C = reviewer comment A = author comment

General comment

C: The present paper investigates on the variability of the winter runoff coefficients (Cvalues) with respect to the physical characteristics of 16 sub-catchments of the Nahe basin (Rhineland Palatinate). Analysis are carried out using a classification of the basin permeability obtained from the lithological map of the area and a classification of the dominant soil hydrological processes affecting the runoff production. The study fo-

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cuses on the performances of linear regressions between the runoff coefficient and the quoted physical basin characteristics showing a slight improvement in model performances using the information contained in the map of the dominant soil hydrological processes.

C: A key aspect of this paper is represented by the map reported in Fig. 2.b where the classification of the dominant soil hydrological processes is depicted. This map is a result of a previous study by Steinrucken et al. (2006) that is not available in English. For this reason, I strongly recommend to describe more in details how this map was obtained and how each process was classified. Does it involve a numerical simulation model? Is the procedure time consuming?

A: Since unfortunately the final report of this study is missing (see as well Sort Comment S439), a discussion of this methodology could not be provided. However, we supplied a better description of the Scherrer method (as suggested by Referee Comment S486) to give more insight in the derivation of the dominating runoff generation processes. We complemented the text with the remark that Steinrücken used an ANN. The derivation of the processes map is in so far time consuming that the basins for validation have to be assessed according to the Scherrer method.

C: The map of soil hydrological processes was probably obtained through a modeling application (see page 1896- line 20). I wonder how the authors may suggest using this map for predictions in ungauged basins if behind all this procedure there is a hidden numerical simulation of the hydrological dynamics of the basin.

A: We removed this part from the text since it is inconsistent as remarked by the reviewer.

C: In the first part of the section “Results and Discussion”, a regression between the C values and percentage of impermeable substratum for 71 basins is introduced with a $R^2=0.79$. There after, the authors focus on a subset of 16 basins apparently without a reason and also obtaining a lower R^2 . It would be interesting and also clearer for the

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reader to see the same exercise applied over the entire data set.

A: Only for these 17 basins “dominating runoff generation processes” (DRP) were available. Therefore, the study focused on these basins. This is now better explained in the text. See as well lines 116-119.

C: Finally, I was quite surprised that among all possible runoff generation processes the snowmelt was not taken into account. How did the authors deal with this specific process?

A: Snowmelt is indirectly taken into account in the study, since the winter runoff coefficient is used. The C-value is calculated by using cumulative rainfall and runoff, including snowmelt. See also lines 152-153.

Minor points

C: In my opinion, figures 1 and 2a may be merged in a single one. Both represent the same map at different scales. If the problem is to show the sub-basins considered, those are clearly visible in figure2b.

A: Figures 1 and 2a have been merged into one figure.

C: For all the graphs (Fig.3, Fig. 4 and Fig. 5), I would also recommend to increase the font size.

A: The font size of the figures 3-5 has been increased.

References

Steinrucken, U., Behrens, T., and Scholten, T.: Nutzungsbezogene Bodenhydrologische Karte: das Einzugsgebiet der Nahe und sudlich angrenzende Bereiche (Soilution GbR.), 2006.

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