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Hydrology and Earth System Sciences Discussions

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

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General comment

The present paper investigates on the variability of the winter runoff coefficients (C-values) 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 focuses 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.

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?

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

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

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?

Minor points

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.

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Interactive Comment

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

References

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

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 1893, 2007.