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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.

H. Hellebrand et al.

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Author comment for SC S439: 'SSF means Subsurface Flow', Markus Casper, 27.06.2007

C = reviewer comment A = author comment

C: I would like to give a few comments:

C: 1. The abbreviation SSF (in the definition from SCHERRER) means SubSurface Flow. You added, "saturated" without explanation.

A: The term "saturated" has been removed from the text.

C: 2. I would also recommend using "dominating runoff generation process" instead of

"hydrological soil process".

A: "hydrological soil process" has been changed into "dominating runoff generation process".

C: 3. Why did you choose SSF to improve your permeability assessment from geology? What about SOF1 / SOF2 or a negative correlation to DP? Please make clear, what information from SSF you hope to include in your regression model.

A: A PCA was used to derive the correlation between the dominating runoff generation processes (DRP) and the C-value. The DRP with the best correlation would firstly be used in a regression with the C-value (as dependent parameter) and next in a regression with the permeability and the C-value. It turned out that the DRP combination of SSF1, 2 and 3 gave the best correlation. However, in Referee Comment S486 it was suggested to not only use the best combination of DRP in a regression with the permeability, but the three best ones. In the revised manuscript, the three best combinations of DRP were used in a regression with the permeability and by means of a cross-validation the best combination was derived. It turned out that the DRP combination of SSF1, 2, 3 and SOF1, 2 with the permeability gave the best results. This is now explained better in the methodology (lines 181-184) and in the results section (lines 244-257 and lines 287-295).

C: 4. SSF3 is a very slow reacting process? Looking at the fast runoff generating process SSF1, SOF1, SOF2 may be combined.

A: “very slow” has been removed from the text and was replaced by “gradually changing flow reaction”.

C: 5. In your discussion you say that the permeability estimation from geology may be wrong. What about a combined permeability estimation from geology map and map of soil hydrological processes? Especially because geology is included as input in the ANN model of STEINRÜCKEN et al. (unfortunately the final report of this study is still

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missing!).

A: Concerning the combined permeability estimation from geology map and map of soil hydrological processes see answer of point 3. Concerning the use of the geology: in our study we used a very simplified assessment of the permeability derived from the lithology and no geology. This is now better explained in the text (lines 66-74).

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