

***Interactive comment on “Effect of spatial distribution of daily rainfall on interior catchment response of a distributed hydrological model” by J. M. Schuurmans and M. F. P. Bierkens***

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General comments:

This useful study falls within the scope of HESS. Its outcomes make sense and are in many ways as expected. The paper is clearly an original contribution and it reaches important conclusions re. the need to consider spatial rainfall variability when using operational hydrological models, the usefulness of operational radar products in hydrological modeling and the risks associated with ignoring spatial rainfall when calibrating hydrological models. The paper is generally well written and presented, despite some issues with phraseology (see below).

## Specific comments

There are a few general points to be made on methods and assumptions. Firstly, I would have liked to get more information on the kriging operations as presumably described in another recently submitted paper. Secondly, I believe that the issue of calibration of this hydrological model for separate rainfall scenarios (p. 2178, lines 20-25) is not adequately discussed. I am sure that the hydrological model has been calibrated somehow, especially since the present study only covers 7-8 months. I also note that on p. 2190 line 25 the authors indicate that the results are dependent on the characteristics of the hydrological model. Thirdly, the soil moisture results need more explanation. Is this the total soil moisture in the unsaturated zone above the groundwater? What is meant with relative soil moisture content (p.2189, line 6; Figures 13 and 14). Why is no attempt made to relate Fig.11 to Fig. 14?

The paper's title is OK although I am not clear about interior catchment response. Should this be internal catchment response? The abstract is informative and there are no serious issues with presentation and referencing. The results are well presented with the exception of Fig. 3 where the ranges of four of the scenarios can not be identified.

## Technical corrections

2175, title: interior? 2176, line 8 (and in two other places): what is meant with stratiform rainfall? 2176, line 18: behaviour (also 2190, line 2) 2177, line 15: capture 2177, line 29: i.e. to obtain good insight 2179, line 12: due to river influences. You mean deposited by rivers? 2181, line 3: The Netherlands or the Netherlands? 2182, line 19: during daytime 2183, line 16: with mean rainfall depth of at least 1mm? 2184, line 21: "which gives the idea that" rephrase 2186, line 23: rephrase "at exceeding percentage of high discharges" 2187, line 4: rephrase "show more, 1-3%, high discharge values etc." 2188, lines 24-27: rephrase. 2190, line 17: there are more than two scenarios. Replace "either" 2191, lines 2-5: "Failing to consider spatial variability adequately will

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lead to errors in the values of the model parameters which have been wrongly adjusted to compensate for errors in the rainfall input data” or something to that effect. 2192, line 1: Penman 2197, Figure 3: three of the ranges are difficult to read. 2202, Figure 8, legend: development in time of groundwater level 2207 and 2208: explain relative soil moisture content

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