

***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**

Anonymous Referee #1

Received and published: 19 September 2006

Introduction :

This paper illustrates the impact of rainfall variability on the hydrological regime of a $\alpha(100 \text{ km}^2)$ catchment in the Netherlands, and shows that the coarse assessment of this variability using radar is sufficient to capture the main features of this regime.

General comments:

Even though the authors do not perform any calibration, I suppose that they checked that the model's outputs are realistically close to the observations. Moreover, the main processes of redistribution as observed or deduced from the observations are certainly

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adequately simulated by the model. No doubt that these two prerequisites have been verified, but this should be brought to the reader's attention. In the same vein, the authors should write a few words on the initial conditions, because on such a short period of time they have a large impact on the simulated hydrological behaviour of the catchment.

Several partial conclusions on scenario (2) seem to be related to the fact that although the cumulative rainfall for De Bilt is close to the reference scenario (3) the temporal distribution of rainfall shows a strong contrast with the other scenarios: a drier end of spring and a wetter summer with, apparently, several intense events. Could the authors comment on that in order to link the different partial conclusions together (e.g. page 2186 line 20 and page 2188 line 28) ? More generally, most of the results can be explained by the same input biases and it could be more interesting to show how the different simulated hydrological processes react to such biases instead of showing their impact on individual state variables at selected locations. These anomalies could then be summarized more efficiently than listing the results as anecdotes.

It is not clear how this study support the conclusion that “the spatial distribution of rainfall must be taken into account more because it improves the basin-average incoming volume rather than because of some dynamic interactions with flow-generating processes”. Indeed, the processes are little described in the paper, which concentrates on several state variables. In particular, (cf. the “result” section) does spatial patterns activate or deactivate some of the hydrological processes ? Looking briefly at the cumulative fluxes for the dominant water balance components (global lateral redistribution, evaporation...) alongside the main state variable (soil moisture) could be interesting as well.

Technical corrections:

Figure 3 does not show the statistical distribution of the cumulative rainfall, which is essential to the paper; the median could be a good way to indicate a non-Gaussian

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distribution.

Why do the authors present the kriging equation in details but hardly speak about the cokriging ?

Page 2187 line 4: is “1-3%” significant ?

Page 2191 line 10: the word “necessity” seems too strong: in very steep mountainous areas the use of operational weather radars is more difficult to implement.

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