**Hydrology and
Earth System
Sciences
Discussions**

Interactive comment on "How crucial is it to
account for the Antecedent Moisture Conditions in
flood forecasting? Comparison of event-based
and continuous approaches on 178 catchments"
by L. Berthet et al.

L. Berthet

lionel.berthet@cemagref.fr

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Dear Referee 1,

We thank you for your comments. You raised a number of issues that we would like to discuss in order to improve the quality of the paper.

Below we answer the main comments you addressed.

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> The main conclusion drawn by authors is that event-based models
> will perform reasonably well for flood forecast if proper
> initialization strategies and updating techniques are adopted.
> This conclusion can be accepted as a thumb rule in applying the
> tested model for flood forecast purpose.

The main conclusions we intended to emphasize is that a continuous model (i.e., when a long enough warm-up period cancels the initialization influence) gets better performances than an event-based model using the same model structure, as stated in the first paragraph of the conclusions section. We slightly modified this paragraph to make this clearer.

> [...] but which extent this general conclusion depends on the
> model used is not convincingly addressed in the discussion of
> the results.

Since we work with a single model, it is more honest to state that our conclusion is indeed model dependent (as already acknowledged page 15 - slide 1721) but we think that the conclusions would remain valid for lumped conceptual model: most of them present structural and behavioural similarities (e.g., Moore 2007). We revised our paper to make this point of view clearer.

> Furthermore the combined effect of assimilation techniques
> and initialization procedure on model's performance would
> require more results and a deeper discussion (only one example
> showing a unspecified initialization procedure, a poor-man's

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initialization?, is presented).

This issue of interaction between the model initialization process and of the updating strategies is explored through three different initialization procedures (sections 3.1.1 to 3.1.3). The results are discussed in one block (section 4.1). We strengthened the discussion in the revised paper.

In the introduction the authors mention that event-based models are preferred because of some kind of "cultural reasons" of the modellers. These are not the only reasons, event-based models are preferred tools some water resources related topics such as flush-floods or sediment transport associated to torrential rainfall in Mediterranean areas

We certainly agree with the fact that cultural reasons of the model-users (not modellers) are not the only reasons which may explain why many users still prefer event-based models. However, we do consider that continuous modelling may be our best modelling answer even for flash floods. Initialization of event-based models for flash floods is a tricky exercise which has to be completed in a very short delay due to the quick dynamics of these floods. It is even more difficult if the catchment is intermittent. We agree that sediment transport modelling may also face similar questions, but we are not at all specialists of this question.

Results about the effect of time to peak are poorly described in the paper, a table providing the summary statistics and conclusions drawn from it, would improve the manuscript.

It is true that the effects of the different explored strategies on the time to peak are rather succinctly described. It is due to the fact, that the different methods we tested have more an influence on the flow volume than on the timing and then the results are of lesser interest for our discussion. Nevertheless a table was added to the revised paper to clearly show that result.

A better graphical information of the structure of the model (Figure 2) is needed.

A more comprehensive graphical scheme was provided in the revised paper.

Please check the reference of Moore et al., it is quoted with different published date in the text and the reference section.

We refer to three different papers by Moore (or Moore et al.) in our papers. References have been checked as asked.

Finally, apart from some misspelling and typing errors, I have some doubts on the correctness of some expressions. Therefore, I would suggest that English language is carefully reviewed.

We would like to state that the manuscript was corrected by an American professional translator before submission, since English is not our mother tongue. We apologize for the spelling errors, due to minor changes after this grammar and language check.

Yours sincerely,
Lionel Berthet, Vazken Andréassian, Charles Perrin and Pierre Javelle

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 1707, 2009.

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