

## ***Interactive comment on “Large watershed flood forecasting with high resolution distributed hydrological model” by Yangbo Chen et al.***

**Yangbo Chen et al.**

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Anonymous Referee # 2 This manuscript discusses an interesting topic of using a physically-based distributed model for flood forecasting in large watershed. It deals with challenges of computational speed and forecasting accuracy, possibly advancing flood mitigation and control decisions in practice. Following suggestions will help the authors improve the manuscript:

Reply: Thank the reviewer for his/her comments, and revisions will be down based on the reviewer's comments. Following are responses to the reviewer's comments one by one.

(1) Sections 3.2 \_ 3.4 need to be reorganized by moving the results of the model (e.g., calibration and validation performances) to a subsection of "5. Results." These three

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sections can be combined into one subsection to just discuss the approaches for model calibration and validation.

Reply: The article has been reorganized based on the reviewer's comment. The revised article now as five parts, including introduction, method and data, results, discussions and conclusions. Please see the revised article.

(2) A section of Discussion is lacking. This section should be added to thoroughly discuss the major findings of this study and assess these findings in accordance with those reported by others. The purpose of this section is to put this study on the international arena.

Reply: A section of discussions has been added to address the reviewer's concerns, please see the revised article. Thank the reviewer for this comment, it improves the quality of this article.

(3) Both section Abstract and Conclusions are too long. They need to be rewritten to concisely highlight the importance/scientific contributions of the study, study approaches, and major findings. Some generic statements can be deleted.

Reply: The abstract has been rewritten more concisely, but the conclusion remains not changed, please see the revised article.

(4) Appropriate details of formalization should be provided to help audiences better understand your contributions. For example, the descriptions of the model core components, including saturation excess method, kinematic wave approximation, diffusive wave approximation, and particle swarm optimization (PSO) algorithm, are too simple. Some necessary formulas/equations should be presented because these methods could have distinctly different complexity levels, depending on how they are formulated.

Reply: The other reviewer suggested that the model introduction is simplified as the model employed is published elsewhere. To combine the comments of both reviewers, considering Liuxihe Model employed in this study has been published in internationally

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refereed journals, so only a brief introduction to the model structure, the components and algorithms used is kept, and move to the second section: Method and data. Please see the revised article.

(5) More descriptions should be provided for the statistics (e.g., Nash-Sutcliffe coefficient and water balance coefficient). What are the thresholds of these statistics, above which the model can be judged to have a good performance?

Reply: As these formulas are well known and could be retrieved from many publications, so they are not added in the revised article.

(6) Some subject terminologies should be clarified. For example, the manuscript uses several different adjectives, such as "disastrous", "serious", "huge", and "large", to describe flood magnitude. How do you classify the floods, in terms of life or economic losses?

Reply: These have been revised based on the reviewer's suggestion, please see the revised article.

(7) In Table 6 and other tables/figures, the units for some quantities are missing. Also, the values of Manning's  $n$  are larger than one. How can this be possible? In Table 6, you reported Manning's  $n = 1.17 \sim 1.49$ .

Reply: Values in table 6 are adjusting coefficient of the optimized parameters to the initial parameters, so values of the final optimized parameters are initial parameters time adjusting coefficient. A footnote has been put under table 6 to avoid confusion.

(8) Lines 292-294: if observed data are not available, how can you optimize the model parameters? What to be optimized?

Reply: If observed data are not available, it is difficult to optimize the model parameters. But for a big watershed, it usually has some data, and Liuxihe Model could optimize model parameter with limited observation data, so the model parameters in large watershed could be optimized.

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(9) The annotated manuscript has some specific comments. I suggest that the manuscript be proofread by an English native speaker. There are a number of awkward phrases/words and confusing sentences. Please also note the supplement to this comment: <http://www.hydrol-earth-syst-sci-discuss.net/hess-2016-489/hess-2016-489-RC2-supplement.pdf>

Reply: English has been improved based on the annotated manuscript with reviewer's comment by the authors, thanks the reviewer for taking time to make these comments, it helps to improve the English much. Proofread was not done by others.

Please also note the supplement to this comment:  
<http://www.hydrol-earth-syst-sci-discuss.net/hess-2016-489/hess-2016-489-AC2-supplement.pdf>

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-489, 2016.

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