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Hydrology and Earth System Sciences Discussions

Interactive comment on "Simulating typhoon-induced storm hydrographs in subtropical mountainous watershed: an integrated 3-layer TOPMODEL" *by* J.-C. Huang et al.

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1.Both in the Abstract (page 1102; lines 12, 13) and in Section 4.3 (page 1115; lines 7, 8), the authors write that the obtained validation results demonstrate the applicability of the presented 3-layer TOPMODEL in subtropical watershed. For me, the presented validation results don’t allow a reader to evaluate the model applicability and the aforementioned conclusion looks too optimistic. The point is that the number of flood events used for the model validation (4 events) is too small, especially, in comparison with ones used for the calibration (14 events). In other words, the presented results of the model validation are deficient: the overall model performance based on

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these results is very sensitive to the errors of the individual floods and the performance assessments can be rather casual. The conclusion on the model applicability would be more convincing if the authors validated the model by approximately the same number of floods as ones used for calibration, for instance, by splitting the available flood sample into the equal parts (9 for calibration and 9 for validation). Additionally, the results for the 18th event (one of the four validation floods) should be revised. As it follows from Table 5, the simulated peak discharge of the 18th flood is 270.2 m3s-1 (about 10% higher than the observed flood peak discharge which is indicated as 245.9 m3s-1) and the time of the simulated peak coincides with the observed one. However one can see from Fig. 5 that the observed peak discharge of the 18th flood is actually much higher (more than 350 mˆ3sˆ-1) and occurs later than the simulated flood peak discharge. Taking into account these circumstances, the simulation errors for the 18th flood should be changed in Tables 4 and 5 as well as the overall validation results should be changed in Table 4. Summarized the preceding, I suggest the authors to give short discussion on the selection of floods for the model calibration and validation (by the way, why the highest floods of 1996, 1998, 2000 mentioned in the Introduction were not simulated?) and to mitigate the conclusion on the model applicability.

2.I agree with the authors that the analysis of the confidence intervals of the simulation errors, which is presented in the Section 4.5, may be useful for the model users. However, I disagree with some interpretations of the obtained results. Particularly, it is obvious that the wider confidence intervals estimated after the calibration phase (and, consequently, the worse the model) the more probably validation results fall into these intervals. In this sense, it is not very important that the validation results are enveloped by the confidence intervals. More importantly is to analyze the confidence intervals and to show that they are not so wide to be able to hold any validation results. For example, the confidence intervals for low flow look too wide for me. The confidence intervals for high discharges are much better but one can see from Fig. 6 that there are systematic underestimations in simulated high discharges. I suggest paying more attention on the analysis of the obtained confidence intervals in Section 4.5 and I believe that this

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analysis would be really useful for the model users.

3. The authors rightly noted in Section 4.4 (page 1116; lines 24-26) that the raiting curve method may result in significant errors, especially in the cases of insufficient records and changes on channel characteristics. Considering these circumstances, in my opinion, the results on the peak level prediction don’t look valid and I suggest removing these results from the paper.

4. Is Q0 in Eq. 6 the same as Q0 in Eq. 3? If yes, than the saturated discharge of interflow is the same as the discharge of base flow. For me, this assumption looks too rough. Please clarify.

5. Figure 3c demonstrates that simulated flow is very slightly sensitive to changes in the surface roughness. This result looks rather unexpected and it would be perfect if the authors give some comments.

6. The conclusion that “1.0% of change in D, K, and mi may give 0.27, 0.20, and 0.15% deviations in terms of total water discharge” (page 1113 and 1118) is not clear for me. As far as I understand, and it is demonstrated by Fig. 4, the dependence of streamflow discharge on, say, soil moisture decay mi, is not linear.

Technical Comments:

1. The abbreviation “cms” should be changed by mˆ3sˆ-1

2. Y-axis in Fig. 6 should not include negative values

3. Page 1106; line 11: SD should read S2

4. Page 1115; line 3. The standard deviations are not shown in Table 3.

1. Does the paper address relevant scientific questions within the scope of HESS? YES

2. Does the paper present novel concepts, ideas, tools or data? YES

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3.Are substantial conclusions reached? NOT COMPLETELY

4. Are the scientific methods and assumptions valid and clearly outlined? YES

5. Are the results sufficient to support the interpretations and conclusions? NOT COMPLETELY

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientific (traceability of results)? YES

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? YES

8. Does the title clearly reflect the contents of the paper? YES

9. Does the abstract provide a concise and complete summary? YES

10. Is the overall presentation well structured and clear? YES

11. Is the language fluent and precise? YES

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? YES

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? NO

14. Are the number and quality of references appropriate? YES

15. Is the amount and quality of supplementary material appropriate? YES

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 1101, 2008.

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