

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

J.-C. Huang et al.

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1. The paper describes a study on using TOPMODEL in a small catchment in Taiwan. Although TOPMODEL has been applied to many catchments around the world and there are no new concepts/tools introduced in this paper, it is still useful to see the unique experience when such a model is trialed in a subtropical catchment. The confidence interval information is quite helpful. The scientific methods and assumptions are clearly outlined. The conclusions are sound. I support its publication if the following modifications could be implemented:

Thanks for reviewer’s positive comments.

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2. The authors should compare their parameters and modelling results with the published results from other researchers so that readers can see how different the case study is to other similar/dissimilar catchments.

Thanks for this comment. This is not a simple question to answer anyway. We gave a short discussion below; meanwhile, we are preparing another manuscript for this complex issue.

3. P1111 L25, 'A sensitivity analysis is performed by changing 50.0% in single parameter'. Again, it would be useful to compare the sensitivities in this study with other published results.

Thanks for this comment. We compare the original TOPMODEL and this 3-layer TOPMODEL and found that transmissivity and recession coefficient are, respectively, the dominant parameters for discharge volume and hydrograph shape in TOPMODEL framework. However to compare our parameter sensitivity with other published results is not easy due to different model structures/hydrological conditions/the period of data used. In addition, different methods of sensitivity analysis focus on their respective aspects. For example, recession coefficient affects hydrograph significantly that higher coefficient results in a sharper decline. Our recession coefficient of 80 is higher when compared with that reported previous studies, such as 66 in Sieve basin, Italy (Franchini et al., 1996), 55 in Can Vila, Spain (Gallart et al., 2007) in Mediterranean region and 40 in Slapton Wood, UK (Wang et al., 2005). This higher value is due to our three-layer structure. If two-layer is applied the recession coefficient is 60, which is much close to those reported previously. On the other hand, the scaling parameter, transmissivity, usually needs calibration (inconsistent with field measurement) and may not be compared with other studies. Theoretically, parameter sensitivity can be assessed with respect to the gradient of the response surface (e.g. predicted variables or performance measures). However, no standard method can fully describe parameter sensitivity so far.

4. There is only one raingauge in the catchment. Maybe the authors could get some nearby gauges to validate the rain gauge quality if possible.

We really want to follow this suggestion. Unfortunately, we only have three distant raingauges outside the catchment. We are not sure the influence of rainfall spatial pattern in this study due to the insufficient rainfall data. However, over 85

5. P1106 L22, 'Here we applied the most economical empirical approximation' why Please explain.

We modified these sentences. More discussions and explanations are given in P.6, Lines 9-13.

6. Table 1 Total discharge (cms)? The unit is confusing. Is it a total volume of runoff? In that case, m³ should be used.

Corrected.

7. P1127, Fig 1 contours are not very visible. Please re-draw it with clearer lines.

Revised.

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

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