Hydrol. Earth Syst. Sci. Discuss., 3, S1774–S1777, 2007
www.hydrol-earth-syst-sci-discuss.net/3/S1774/2007/


Hydrology and Earth System Sciences Discussions



# *Interactive comment on* "Comparing sensitivity analysis methods to advance lumped watershed model identification and evaluation" *by* Y. Tang et al.

**Anonymous Referee #1**

Received and published: 3 January 2007

General Comments

This paper provides a useful and interesting review of sensitivity analysis methods, and a comparison of them, illustrated through application to a widely used lumped watershed model. The portrayal of model sensitivity and comparison of methods through carefully constructed tables and figures is particularly praiseworthy.

There are some problems with the presentation of the equations which require attention (detailed under Specific Comments).

In common with other papers of this kind, there is some disappointment in not identifying how to improve the model formulation as a result of the analysis or even how to guide future model calibrations. We learn merely that “a larger number of parameters and processes within the model are impacting its performance” through the analysis of parameter interactions. A detailed study of the tables and figures will allow the diligent reader to gain further insights of value.

The paper requires minor revision to address the detailed Specific Comments below after which I recommend publication in HESS.

Specific Comments

3334 Abstract lines 1-5. First sentence too long and cumbersome. Separate setting down of the 4 methods from the broad intent of the study.

3335 Section 1 lines 5,6. water management studies

3335 Section 1 line 14. Is it too bold to suggest move towards highly complex models of the Duffy type? Suggest moderate this statement.

3336 Section 2.1. line 13. “changes in model inputs” not clear at this stage this includes model parameters.

3337 Section 2.1 line 26. In presenting the 4 approaches for the first time, it would be useful to clarify what method group each belongs to.

3339 Section 2.2.1 line 6. Style of introducing equation is poor. Introduce equation in sentence with punctuation. For example: “The composite sensitivity of parameter i is defined as” and then present equation (1) in line below.

3340 Section 2.2.1 line 10. “If the ten lines withĚ” - this needs to be expressed more clearly.

3340 Section 2.2.2 line 18. It is poor practice to point forward to figures (Fig. 5 and 6). Consider revising/rephrasing.



HESSD

3, S1774–S1777, 2007

3341 Section 2.2.3 line 1,2. Can evidence be presented that supports a normal distributed model response assumption?

3341 Section 2.2.3 line 8. The meaning of “objective values” is unclear here.

3341 Section 2.2.3 line 17,18. Style of introducing equation is poor. Delete “is shown in Eq. (2):” and rephrase sentence to define variable Yijk explicitly; also .needs to be defined.

3342 Section 2.2.3 line 3. The coefficient of determination is usually denoted as r2 (the square of the correlation coefficient), not R2 which is normally reserved for the R2 efficiency statistic (that can take on negative values).

3343 Section 2.2.4 line 11. Style of introducing equation is poor. Delete “shown in Eq. (3):”

3343 Section 2.2.4 line 17. Replace “shown below in Eq. (4)-(5)” by “as”.

3344 Section 2.2.4 line6,7. Rephrase introduction of equations. “ The Monte CarloĔare given below as presented in Sobol’ (1993, 2001) and Hall et al. (2005):” Also define the function f(.) explicitly.

3346 Section 3.1 line 22,23. Is parameter SI not an areal depletion curve parameter?

3348 line 1. “temporal impervious area” - should this be “additional impervious area”?

3348 line 15 Figure 5 (not Figure 4)

3352 line 11. Forward reference to Fig. 10a poor style - consider rephrasing.

3352 line 12 then they should be

3352 line 18 “Sections 6.1-6.4” - consider improving style.

3354 line 10 Clarify whether parameter SI is invoked if partial cover curve is not invoked.



HESSD

3, S1774–S1777, 2007

3355 line 19,20. Does normal distribution assumption hold?

3355 22,23. ..pairwiseĚ. was fitted to the model..

3355line 26. coefficient of determination r2

3356 line 20. most of the SAC-SMA

3357 line 5. pairwise (and elsewhere)

3362 line 19,20. Ěbetween a model's outputĚ

3363 line 10. ..model see Tonkin and Doherty (2005)].

3364 line 29. ..sample size. Our use of 8192Ě

3373 Table 1 Meaning of LHS and IFFD acronyms are not known at this stage. Quasi-random

3374 Table 2. MFMIN Minimum melt factor. SI appears to be part of partial cover curve definition.

3381 Table 9. pairwise

3386 Fig. 1. mme/degc/6hr poor notation. Use SI notation: mm °C-1 6h-1. What is mme?

3388 Fig. 3. Omit "The United StatesĚnames."

3390 Fig. 5 RSA (Regional Sensitivity Analysis) plot forĚ

3391 Fig. 6 RSA (Regional Sensitivity Analysis) plot forĚ

3395 Fig. 10. Change R to r and define as the correlation coefficient.

**Note Word control settings have been lost in the above review supplied by non-LaTeX user**

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 3, 3333, 2006.



HESSD

3, S1774–S1777, 2007