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Hydrology and Earth System Sciences Discussions

Interactive comment on "A mass conservative and water storage consistent variable parameterMuskingum-Cunge approach" *by* E. Todini

E. Todini

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I would like to thank Referee #2 for his positive evaluation and the useful comments. Whenever possible I have tried to comply to his requests, as it will appear in the sequel.

Referee request

Maybe it would be worth considering, for the sake of comprehensiveness, to give a few remarks on other papers, where the method has also received critical treatment, such as the problem of the negative dip of the impulse response, etc. (although it is not really within the scope of the paper).

Author reply

I have tried to comment, although briefly, on other papers, particularly on issues related to the lack of mass balance in the MC approach. Nonetheless, given the large number of papers available on the subject I also tried to avoid entering too deeply. To comply with the Reviewer request I have also added a comment on the acceptability of the negative value for "epsilon", but I will avoid discussing the negative dip problem, since it only concerns the constant parameter Muskingum, which does not fall within the scope of the present work.

Referee request

The description of the MC method could be made a bit more self-contained (especially for the generation of younger hydrologists) by giving a few more details on the derivation of the MC method (page 1556), e.g. like it is given in Wang et al. (2006).

Author reply

I took the point and I have added a more extensive description on the derivation of the MC method.

Referee request

Figure 4 contains references to the MCT method; this was not introduced in the text at the time of first referencing to the figure.

Author reply

I have modified the figure 4 in order to eliminate the discrepancy.

Referee request

A few hints, under which natural conditions in rivers the suggested improvement could reward users with higher accuracy of simulations or forecasts could be useful for those, who would hesitate reprogramming their software.

Author reply

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I have introduced, in the concluding remarks, a number of hints on the possible advantages for using the modified MCT approach, which may justify the effort of recoding the new algorithm.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 1549, 2007.