

Hydrol. Earth Syst. Sci. Discuss., 5, S1017–S1019, 2008

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**HESSD**

5, S1017–S1019, 2008

Interactive  
Comment

## ***Interactive comment on “Incorporating infiltration modelling in urban flood management” by A. S. Jumadar et al.***

**A. S. Jumadar et al.**

Received and published: 28 August 2008

(Written by the corresponding author, A. Pathirana)

We thank the anonymous referee for the comments.

**Spec.Comments:** We agree with the reviewer that that gold standard for this type of project is the validation of the modified model against actual measured data from an observation site with infiltration units. However, in order to do so in a meaningful fashion, data for situations with and without infiltration units, for the same rain storm is needed. This is a practically a difficult requirement. While it is possible

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to use a observed scenario with infiltration units present to validate a model of that scenario set-up with modified SWIMM, the complications arising from such a comparison (, which may render the exercise not so useful, ) should not be forgotten: Such a model will include a number of parameters to be calibrated that has little to do with infiltration in detention unites, e.g. for catchments: Depression storage, average slope, width of overland flow, roughness parameters, for conduits: roughness, slope. The model calibration in these situations, with a semi-physically based, lumped hydrological model like that of SWIMM involves a number of judgment calls, which makes it quite possible for one parameter to compensate for another. Therefore, such a comparison, in our opinion, would have little value in validating the technical accuracy of the model changes we have included. While it is important to consider the holistic picture, including deep percolation, groundwater rise and base flow increase due to infiltration, in designing SuDS, such a study is out of scope of the present paper, whose objective is to introduce an enhancement to an existing storm water model in order to make it possible to model the presence of detention ponds with infiltration capacity.

The standard Green-Ampt model makes two major assumptions, namely, 1) The wetting front is sharp and 2) The ponding depth at the surface is hydraulically negligible (zero pressure head). The first assumption is fairly standard and has been proved to introduce little error, Even though it is clearly an approximate model (Maidment, 2007, p 5.32). The second assumption makes the standard Green-Ampt model (Maidment, 2007, p 5.32) only suitable for hill-slopes where the rainfall excess is quickly removed by overland flow. Clearly this is not the case of a detention basin and therefore the standard G-A model can not be applied for the latter case. This is why we have introduced a simple modification to the G-A method that accounts for ponding. In spite of the simplicity of this change, we believe it is important to validate it against a completely physically based model. We clearly prefer to implement an infiltration model based on 1-D Richard's equation for the purpose, however, considering the simplicity of the SWMM model and the

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fact that it already has a (standard) G-A solver (which could easily be modified to account for item (2) above), we decided to go for modified G-A approach. The resulting product is a well-integrated, simple modification to standard SWMM-5.0 that is easy to manage to keep up with possible improvements of the original model itself.

**Tech. Corrections 1:** Maidment, D.R. (editor): Handbook of Hydrology, Chapter 5, Mcgrow-Hill, New-York, 2007.

**Tech. Corrections 2, 4:** Will be attended.

**Tech. Corrections 3:** **ml** should be corrected as **m<sup>3</sup>**.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 1533, 2008.

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