

Interactive comment on “Simulation of saturated and unsaturated flow in karst systems at catchment scale using a double continuum approach” by J. Kordilla et al.

Anonymous Referee #1

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Authors,

This paper presents one of the first attempts to couple saturated-unsaturated flow in karstic basins. As such, it is an advancement of science and it does make a significant contribution to our science and to HESS. Additionally, this paper can set the standard for modeling studies that will follow. Most of my comments are directed at helping the authors set a rigorous and high standard.

The coupling of saturated to unsaturated flow in a dual continuum model is novel and a good contribution as it is.

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The conclusions reached are within the scope of the work presented and are appropriate.

The method is a numerical model. The problem with the paper concerns the model. As far as I can tell, the model is not publicly available and therefore it will be difficult for the community to independently assess how varying the parameters changes the response of the system. Citation to a DRAFT version of a user manual is not sufficient. In this age of open source and online discussion of scientific papers, we as a community need to figure out how to make our models available to the greater community. This is on the one hand a comment to the entire community, but on the other hand, it is a comment to these authors. You can move us forward. At a minimum, provide a proper citation to the code and a link to where the code is described.

Results are sufficient, but it will be difficult for an independent scientist to reproduce the results given the nature of the code.

Specific to this paper - I would like to see the authors be more quantitative in the description of the results. There are many phrases along the lines of "steeper recession curve", "higher peak discharges"... These statements should be changed to "slope of the recession curve was 5% compared to the slope of the recession curve in the base model of 3%". These minor changes will set the standard for subsequent modeling studies.

Specific to this paper - Also, I would like better descriptions of how adding water to the bottom of the conduit was incorporated and a listing of possible effects that that might have and of the van Genuchten parameters.

Specific to this paper - in the discussion of Figure 7 - you claim that K_c and θ_{c_0} and θ_{m_0} control the simulated hydrograph. I see that K_c and θ_{m_0} influence the hydrograph, but I do not see that θ_{c_0} does. Please clarify.

The authors clearly give credit to other groups.

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This paper is clearly written and advances our science. I hope the authors increase the quantitative description of their results, work to make the code available or at least properly cited, and to clarify a few minor technical points. This paper can set the standard, if the authors so choose.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 1515, 2012.

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