

Interactive comment on “RRAFLOW: Rainfall-Response Aquifer and Watershed Flow Model (v1.11)” by A. J. Long

Anonymous Referee #2

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The present manuscript (MS) introduces a conceptual rainfall-runoff model and describes basic functionalities. The model runs in open source language “R”, the source code is provided and as such has a high potential to be used by the community either for research, for applied science or for education purposes. RRAFLOW is flexible regarding input, is simple and parsimonious and ready to use with a sample data set. This is highly acknowledged and principally deserves publication in GMD. Here, I am fully in line with referee #1. BUT: A high level of redundancy exists to a published paper in HESS by the same author (Long and Mahler 2013). While the exact wording has been changed in the present manuscript, most of the equations and also the data used to test RRAFLOW have been published before (Long and Mahler 2013). Therefore, I propose that the model should be generalized and tested with new data to show its general value. Moreover, the manuscript should significantly be shortened. I detail my

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concerns down below.

A) Redundancy with Long and Mahler 2013

In (Long and Mahler, HESS 2013) all main components of the RRAFLOW have been described in great detail: The majority of the equations (1,2,3,5,6) and also the text paragraphs in between are included there. Wording is a little different but the meaning is more or less equivalent. As a difference, a more general parametric IRF (gamma function) is introduced in the present manuscript (MS) instead of concentrating on exponential or lognormal IRFs in (Long and Mahler 2013). Also time-variant IRFs are not a new feature here, also those have been discussed and tested in depth in the preceding paper. Most strikingly, also the data set used to test the model has been published before, Figure 6 in the present MS is equivalent to Figure 3 in (Long and Mahler 2013). I recommend to refer to the published material and strictly remove redundant data, paragraphs, equations and text passages.

B) Applicability of RRAFLOW outside karst

For me it is not stated clear enough, if RRAFLOW is a model exclusively for karst systems or for other catchments/aquifers as well. This needs to be clearly clarified at the beginning of the MS. But here I see also a great chance for improvement: I propose to apply the model also to non-karst systems. If RRAFLOW can be used (and I am pretty sure that this is possible, because the structure is highly flexible), then this should be shown by new data. Differences in model performance, parameters, etc. should be highlighted in the discussion. This would add a large value to the manuscript and lower the problem of redundant information (see A above).

C) Lengthy discussions on IRFs and tests with the same data set

Eleven of thirteen Figures show IRFs, theoretic or generated by modelling the Barton Springs or a well in the Madison Aquifer. This section needs to be condensed, particularly because the IRF-discussion is not new (again see A above). Again, I propose to

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apply RRAFLOW to other systems as well, if possible outside karst, if not possible to a system with a different karstification level. Finally, the IRFs received can be compared in order to show if system properties can be deducted from different IRF-shapes.

D) Subdaily timestep

In I15-16 p5923 it is mentioned that sub-daily time steps can be used. This requires discussion and needs to be justified, because most model parameters and concepts are daily (soil moisture index, evapotranspiration, recharge, snowmelt etc.).

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