

## ***Interactive comment on “Holistic versus monomeric strategies for hydrological modelling of modified hydrosystems” by I. Nalbantis et al.***

### **Anonymous Referee #4**

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#### General comments

The paper addresses relevant scientific questions on model building in hydrology, which are definitely within the scope of HESS. The general methodology of model building is certainly an issue, which could get a wider coverage in hydrological publications. Therefore I welcome the authors' intention to contribute to the topic both in the form of a general philosophical discussion (first part of the paper) and a case study (second part of the paper). This organization of the paper enabled them to present their views on concepts, ideas and tools and support them by data. The conclusions reached may serve as a stimulus for further discussions.

The scientific methods and assumptions, which are used in the second part of the pa-

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per, are partly described in their previous papers. With respect to the HESS questions, if these are valid and clearly outlined and if the results are sufficient to support the interpretations and conclusions, I am suggesting adding a few clarifications and (hopefully) improvements under the heading “Specific comments” below. With respect to the HESS requirement to supply the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results), I would have welcomed a more detailed (and self-contained) description of the setup, calibration and use of the models (see “Specific comments”). The reason for that is, that the cited references may not be available to everybody and it would be easier to get a more complete picture at one place (a few suggestions are listed in the section “Specific comments”) and that only readers with a very good knowledge of the local conditions (both natural and anthropogenic) may be able fully follow and understand the modeling exercise.

With regards to the more formal questions for reviewers on the HESS webpage I conclude, that the title clearly reflects the contents of the paper, the abstract provides a concise and complete summary. The overall presentation is clear, but could be better structured (I recommend a few changes below). The authors give proper credit to related work and clearly indicate their own contribution (however I would recommend adding a few citations on modeling studies as illustrations for the statements on page 8269, lines 4 to 7 and lines 9 – 12).

### Specific comments

Page 8267, line 6. “processes at large scales (in the order of at least a few km<sup>2</sup>)” – the term large scale has many meanings in hydrology, wouldn’t catchment scale be more appropriate?

Page 8270, line 19. The authors may wish to add citations to such comparative studies.

Page 8271 – Section 2. The authors may think about putting a description of the organization of the paper before Section 2. When reading it first I was not sure how (or

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even if) the description of the modeling options (especially of the acronyms) relates to the modeling exercise (in fact only after looking at Table 1 it became quite clear to me). Adding a reference to Table 1 in Section 2. with respect to the acronyms could help.

Page 8275 Section 3. I would recommend considering to introduce the Case study before this section and to include the overview of the alternative modeling frameworks into it as a subsection on methods before Subsection 4.2.

Page 8279, Section 4.2, lines 6 to 19. I would welcome a few words on how physically justified (or realistic for the modeling exercise) were the assumptions used for the model building (wasn't the model maybe too handicapped by the simplifications, weren't there other more realistic but still monomeric options available, etc.?).

Page 8279, line 23. I would recommend adding an explanatory comment on “wrongly” – what does it mean for the modeling results, weren't there other options, etc.?

Page 8280, lines 10 to 17. Since the schematization in the paper differs from the cited one, I would recommend adding some text and numbers (in order to describe the model experiments and calculations sufficiently complete and precise to allow their potential reproduction).

Page 8282, lines 17 to 22. For the same reason as above adding a Table summarizing the results of the stochastic model would contribute to the information content of the paper.

Page 8283, lines 18 to 26. This information is also relevant to properly understand the model building procedure, therefore I suggest moving it forward (before Subsection 4.3). I would especially like to see Table 1 referenced there, since it nicely overviews the whole modeling strategies.

Page 8284 lines 7 to 10. I was not quite clear to me, how one can compare long term behavior, when comparison of actual values is meaningless - please add some explanation.

Page 8286, lines 8 – 22. It is not quite clear, if the calibration exercise was revisited for Fig 11., or is it just an evaluating statement?

Lines 24 – 26. For me the statement is too general, since the particular modeling problem is very (site) specific.

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