Hydrology and Earth System Sciences Discussions

Interactive comment on "Characterizing temporary hydrological regimes at a European scale" *by* M. J. Kirkby et al.

Anonymous Referee #1

Received and published: 10 June 2011

Thank you for the opportunity to review the paper titled "Characterizing temporary hydrological regimes at a European scale." I think the topic of the paper is very interesting and attempting to model stream connectivity is an important scientific question with an immediate need for practical application.

There were several places in the text where additional justification is needed to support the study findings, which I have outlined below. More substantive comments are listed first and then editorial comments are listed after.

1) p. 4356, lines 15-16: Nice opening sentence.

2) p. 4358, line 25: Please define what you mean by "define distributions"? What

variable are you fitting distributions to? I think you just need a clarifying word or two here that you mean rainfall data.

3) p. 4359, line 1: Please provide a brief justification or reference for why you used a gamma distribution.

4) p. 4359, line 14 and figure 1: You make the statement that the synthetic pattern of climate reflects long-term observed data but figure 1 appears to only show one synthetic climate realization with no observed data. It is also very difficult from figure 1 to understand what is plotted here. Why was the graph plotted as lines and not points? What are the variables shown on the x- and y-axes? From the units, it appears the y-axis is temperature but what about the x-axis? Would plotting these variables as a time series be an easier way to show this information? You could add observed averages to then show that the realization reflects long-term patterns.

5) It appears that Table 1 and 2 (the site information) are not introduced before figure 1, where one of the sites is presented.

6) Section 2.2: Could the flow chart in figure 2 be adequate enough to describe the model without the detailed text in section 2.2? I understand the need to describe the model but the text description is difficult to follow. Consider labeling parts of figure 2 and cross-reference in the text so that the reader can follow the text along with the diagram. I would also try to limit the text in section 2.2 to only describing the assumptions that would have the largest effect on the conclusions. For example, it appears that the assumption of a gamma distribution for rainfall is important to a number of processes represented by the model.

7) p. 4362, lines 2-3: What is the meaning of the phrase "without specific optimization of parameters for each site." Do you mean the model was applied without calibration?

8) p. 4363, lines 16-19: I am not sure that you can substantiate the claim that higher values of m correspond to higher values of R. Could you point to the results which

show this (other than the 4 pairs of values in figure 4)? It appears figure 3 shows that RMS is lowest when m is low relative to values of R.

9) p. 4364, lines 4-7: From figure 4, I would not necessarily agree that the global parameter set performs better or as good as the best at-site parameters for the Cal Rodo and Algali sites. It is possible that I am misreading the results shown in figure 4. Please be consistent when using 'Grouped' in the explanation on the graphs and "global best fit" in the explanation. The corresponding sentence in the text also adds to the confusion.

10) Conclusions section: Please expand on the conclusions section. The abstract emphasizes the connectivity results; however, the conclusions make no mention of these results.

Editorial changes:

Abstract, lines 8-12: This sentence is a bit wordy. Consider breaking the sentence up.

p. 4357, line 4: "focussing"

p. 4357, line 20: the abbreviation CRU is presented without spelling out the abbreviation.

p. 4357, line 22: what is the meaning the letter 'c' in front of 200 km2

p. 4357, line 28: make "Potential" lowercase

p. 4358, line 1: add the word "synthetic" between "50-year" and "period"

p. 4358, line 22: Can you provide a reference for the ERA-40 data?

p. 4358, line 25: add the word "monthly" between "50-year" and "time series"

p. 4359, line 17: spell out the first use of PESERA

p. 4360, line 8: "snow fall" should be one word; remove '.' from middle of sentence

p. 4362, line 8: Italicize "m"

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