Hydrol. Earth Syst. Sci. Discuss., 12, C4974–C4977, 2015
www.hydrol-earth-syst-sci-discuss.net/12/C4974/2015/

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Modelling socio-hydrological systems: a review of concepts, approaches and applications" *by* P. Blair and W. Buytaert

Anonymous Referee #2

Received and published: 23 November 2015

This paper is a useful addition to the literature in the growing field of socio-hydrology.

The paper claims to be a review of socio-hydrologic modeling. More than anything it comes across as a literature review on not just socio-hydrologic modeling, but socio-hydrology generally. The literature review covers not just socio-hydrology, but also eco-hydrology, socio-ecology, and draws connections and finds similarities between socio-hydrology and these other more established fields. This kind of review is valuable, especially for new entrants to the field, such as graduate students.

It is important to highlight the similarity between these fields, but also the differences. I was pleased to see the discussion on the differences between socio-ecology and socio-

hydrology (i.e., the role of infrastructure development as a dynamic process). There are many other differences, such as the fact that socio-hydrology has to explicitly deal with flowing water and the recycling of water through the hydrologic cycle. This poses special challenges to socio-hydrology. The paper can benefit from a separate (summary) section that highlights these similarities and differences (part of a restructuring, which I will take about later).

It is also clear what it is not: it is not an in depth review that draws on the methodologies and outcomes of large number of socio-hydrologic modeling studies – socio-hydrology is very new and there are less than half a dozen actual modeling studies so far that I can think of, so there is not much to review. There is a table (Table 1) documenting the modeling studies reviewed, which is broad. I am not convinced that all of them fully qualify as socio-hydrology or modeling, in a strict sense (two way feedbacks + explicit numerical modeling of coupled systems). I still like the table in that it helps to broaden the discussion.

Ever since socio-hydrology was introduced, there have been several papers that continue to define (broaden, as in this case) and refine the field further. There have been at least two review papers published already: The one by Troy et al. (2015), which is cited here, has many similarities to this paper, in that it was also a review of socio-hydrologic modeling, but somewhat more narrow. The paper by Sivapalan and Bloschl (2015) was a more forward-looking synthesis paper providing a more theoretical perspective on socio-hydrology, but did go into considerable depth on the modeling process: the latter was not cited in the discussion paper (presumably because it was submitted about the same time as the WRR paper was published). For the sake of the readership, the authors have a responsibility to frame their paper to be different from these two other papers. Their paper is already very long, so I do not demand that they introduce new material, but anything they can do to separate their paper from the others will be useful. For example, while the review of Troy et al. (2015) says that socio-hydrology is still learning the questions to ask, the review by Sivapalan and Bloschl (2015) has however

independently addressed this point head on, certain revisions are needed to recognize the progress already made in this rapidly growing field.

The authors do recognize that socio-hydrology gains importance at long time scales, in strategic decisions. However, much of their literature review relied on more traditional models, e.g., it quotes heavily from paper(s) by Kelly(Letcher). One needs to take a critical look at this. Otherwise there is a danger that more traditional approaches may be considered uncritically for socio-hydrological modeling as well.

Another aspect of socio-hydrology is the role or changing values and norms – again, the authors acknowledge the importance of these for socio-hydrologic modeling. Changes in values typically take a long time, of the order of decades, and therefore demands collaboration with a different class of social scientists and sociologists if we are to make progress. However, this issue is not given the importance it deserves.

Overall, this is a very comprehensive literature review and I applaud the efforts of the. At the same time the paper is very long, and not clearly targeted: it comes across as the kind of open-ended literature review that one finds in some traditional PhD theses. The literature review is more effective when it is goal oriented and is used to motivate new research.

I believe therefore that the readers can benefit from some kind of restructuring of the paper to make it flow better, around a clear take-home message or target. This is important in view of the fact that there have been several previous papers that (from time to time) have tried to do the same, and there is therefore a need to separate this paper from the previous ones. This does not mean adding new material, but taking the existing material and, through the use of sections and sub-sections, bring out a big-picture view that is clear to the reader, especially if it is goal oriented. I will leave it up to the authors about how to do it, and how far they want to go with this restructuring.

Technically, this could be deemed "moderate" revision

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 8761, 2015.