Hydrology and
Earth System
Sciences
Discussions

Interactive comment on "An alternative approach for socio-hydrology: case study research" *by* Erik Mostert

Anonymous Referee #2

Received and published: 27 June 2017

Mostert argues for an increased focus on detailed case study research in the field of socio-hydrology. He reviews the socio-hydrology literature noting the modeling focus. He then presents case study research as an alternative approach and compares the advantages and disadvantages of the two approaches. As an example of case study research in socio-hydrology, Mostert describes the case of Dommel Basin, located in Belgium and the Netherlands. Mostert details the limitations of modeling and demonstrates that a diversity of approaches is needed to understand complex socio-hydrological systems. The manuscript makes an important point and the topic is of interest to Hydrology and Earth Systems Science readers but discussion of existing socio-hydrology case study research and more support of the methods, advantages, and disadvantages of the case study approach is needed. I have a series of specific

comments that, if addressed, would strengthen the paper:

1. In the discussion socio-hydrological research approaches, the author focuses on modeling which he characterizes as the dominant approach. However, there are examples of case study research in socio-hydrology and a more nuanced discussion that discussion these examples and their strengths and weaknesses is needed (Gober and Wheater 2014; Kandasamy et al., 2014; Liu et al. 2014; Treuer et al., 2017). Additionally, there are numerous examples of case study work aiming to address questions relevant to socio-hydrology that are not explicitly categorized as socio-hydrological research. Acknowledging these efforts would further illustrate the potential of socio-hydrological case study research and point researchers to related work not yet well integrated in to socio-hydrology (for a few examples see: http://sfwsc.fiu.edu/Research_Questions.html, https://www.nsf.gov/awardsearch/showAward?AWD_ID=1204685, https://www.nsf.gov/awardsearch/showAward?AWD_ID=0948914 (missing from the last list: Mini et al. 2014)).

2. On page 3, the author notes that moving beyond the scale of the river basin to incorporate factors such as trade would necessarily result in more complex models. Model complexity should correspond with the model aims not model scale, a point which both references cited make (Pande and Sivapalan 2016, p13; Srinivasan et al. 2017, p5). Please revisit this point.

3. In section 3, the author describes the case study approach. This section is central to the author's message but there are notably few references here. Further examples of case study research that demonstrates the use of alternate data types, the range of questions addressed, theory guided analysis, and case selection. In particular, the discussion of case study selection criteria is an important one that is need of expansion. While the two methodological references provided are useful, examples of each of the case study selection strategies are needed. These examples need not be from water resources if more appropriate examples are found in other fields (i.e. land use change,

energy).

4. In section 4, the author presents the case of the Dommel Basin. The addition of a case study example is welcome here but the case as currently presented is weak. A stronger example would demonstrate the general points made in section 3 (i.e. range of research questions that case studies can address, integrating different data types, selecting case(s), etc.) rather than again stating these points. Revising this case to illustrate how the case study approach enables a more nuanced understanding of the shift from development to restoration, how different data types can be combined and why this case was selected would strengthen this example. Further, continuing the comparison between the Kissemee model and the Dommel Basin case to the discussion of findings would improve this discussion.

5. The author makes the important point that many socio-hydrology articles use modeling for inference but that a diversity of approaches is beneficial. However, the author presents modeling and case studies as the only two options for socio-hydrological research. Other approaches, such as large-N statistical studies, are also not widely used in socio-hydrology and have certain advantages and disadvantages (i.e. Hornberger et al. 2015). Other approaches beyond case studies and modeling should be acknowledged and the reason for the focus on case studies clarified.

6. The author rightly notes limited generalization as one drawback of the case study approach but it is worth mentioning here that there are efforts to address this challenge in socio-hydrology through meta-analysis of case studies and by synthesizing quantitative and qualitative data from case studies (Srinivasan et al. 2012; Treuer et al., 2017).

7. On page 2 line 8, and again on page 3 line 1, the term "socio-ecological" should read "socio-hydrological."

References

Gober, P., and Wheater, H. S. (2014). "Socio-hydrology and the science–policy interface: a case study of the Saskatchewan River basin." Hydrology and Earth System Sciences, 18(4), 1413–1422.

Hornberger, G. M., Hess, D. J., and Gilligan, J. (2015). "Water conservation and hydrological transitions in cities in the United States." Water Resources Research, 51(6), 4635–4649.

Kandasamy, J., Sounthararajah, D., Sivabalan, P., Chanan, a., Vigneswaran, S., and Sivapalan, M. (2014). "Socio-hydrologic drivers of the pendulum swing between agricultural development and environmental health: A case study from Murrumbidgee River basin, Australia." Hydrology and Earth System Sciences, 18(3), 1027–1041.

Liu, Y., Tian, F., Hu, H., and Sivapalan, M. (2014). "Socio-hydrologic perspectives of the co-evolution of humans and water in the Tarim River basin, Western China: the Taiji–Tire model." Hydrology and Earth System Sciences, 18(4), 1289–1303.

Mini, C., Hogue, T. S., and Pincetl, S. (2014). "Patterns and controlling factors of residential water use in Los Angeles, California." Water Policy, 1–16.

Pande, S., and Sivapalan, M. (2016). "Progress in socio-hydrology: a meta-analysis of challenges and opportunities." WIREs Water.

Treuer, G., Koebele, E., Deslatte, A., Ernst, K., Garcia, M., and Manago, K. (2017). "A narrative method for analyzing transitions in urban water management: The case of the Miami-Dade Water and Sewer Department." Water Resources Research.

Srinivasan, V., Lambin, E. F., Gorelick, S. M., Thompson, B. H., and Rozelle, S. (2012). "The nature and causes of the global water crisis: Syndromes from a meta-analysis of coupled human-water studies." Water Resources Research, 48(10), n/a-n/a.

Srinivasan, V., Sanderson, M., Garcia, M., Konar, M., Blöschl, G., Sivapalan, M., Sanderson, M., Garcia, M., Konar, M., Blöschl, G., and Sivapalan, M. (2016). "Prediction in a socio-hydrological world." Hydrological Sciences Journal – Journal des