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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

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Dear Dr Di Baldassarre,

Thank you for your insightful comments regarding this paper; the effort that was put into this is much appreciated. Responses to the comments that you have made are included below, as is a summary of the comment that each response refers to (in italics).

- *Suggestion of inclusion of a sub-goal for socio-hydrology regarding insights into the data needed to describe socio-hydrological processes and behaviour, alongside a more comprehensive discussion of the role of data in socio-hydrology, the new/unconventional types of data that might be gathered and the ensuing empirical data-theory-model development process.* Thank you for this comment, it provides an interesting perspective on the issue of data in socio-hydrology. The idea of a new goal in socio-hydrology regarding insights into the data required for modelling such systems is very interesting, and will be included in the revised version of this manuscript. We agree wholeheartedly that the issue of data in socio-hydrology merits more discussion, and so will also further discuss it, particularly referencing new/unconventional types of data, and data-theory-model development processes and feedbacks.

- *Comment on exploring anthropogenic drought in socio-hydrology.* I am glad that you agree regarding the importance of exploring human-drought dynamics. Thank you for drawing attention to the recent article by AghaKouchak et al. (2015) – I will include the points made in this article in the revised version of this paper.

- *Extension of the section about uncertainty, in particular to include the role of surprise.* Thank you for this point, it is well taken. The issue of uncertainty is certainly of vital importance in socio-hydrology, particularly uncertainty in forms not seen as much in traditional hydrology. I was previously unsure of how much detail to go into regarding uncertainty in this review, since it could certainly be the subject of a review paper on its own! I would, however, agree that more should be included and will include more detail, particularly regarding the issues of surprise, and aleatory and epistemic uncertainties in this section. The suggested references of Di Baldassarre et al. (2015) and Merz et al. (2015) will be used in this.

- *Comment on the difficulties that would be faced in applying game theory in socio-hydrology.* It is a good point that, while game theory might be applied in socio-hydrology, there are difficulties that must be overcome when doing so, which I have not mentioned. I will amend this by mentioning the uncertainties present, which differ from those traditionally incorporated into game theory models.

- *Typos.* The manuscript will be thoroughly checked through for – many thanks for drawing attention to those which you have pointed out.

References:

AghaKouchak, A., Feldman, D., Hoerling, M., Huxman, T., Lund, J. (2015), Water and Climate: Recognize Anthropogenic Drought, Nature, 524, 409-411

Di Baldassarre, G., Brandimarte, L., Beven, K. (2015), The seventh facet of uncertainty: wrong assumptions, unknowns and surprises in the dynamics of human-water systems, Hydrological Sciences Journal, doi: 10.1080/02626667.2015.1091460

Merz, B., Vorogushyn, S., Lall, U., Viglione, A., Blöschl, G. (2015), Charting unknown waters – On the role of surprise in flood risk assessment and management, Water Resources Research, 51, doi: 10.1002/2015WR017464

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