Hydrology and Earth System Sciences Discussions

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
https://doi.org/10.5194/hess-2021-638-RC2, 2022

Comment on hess-2021-638

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Referee comment on "To which extent are socio-hydrology studies truly integrative? The case of natural hazards and disaster research" by Franciele Maria Vanelli et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-638-RC2, 2022

This study aims at performing a systematic literature review of socio-hydrological studies for identifying the main gaps and discussing a research agenda for addressing them. The paper deals with a timely and important topic. I have really enjoyed reading this paper, and I believe it provides a significant contribution to the field of socio-hydrology. However, I do have a number of comments before the paper can be considered for publication. Below are my main concerns.

It is not really clear to me the procedure used for the selection of the 44 papers. I understand that the focus of the study is on natural hazards (i.e. floods and droughts). However, why agriculture, water consumption, and groundwater were used as exclusion criteria? Those are crucial components for drought impact and have a great influence on human-water dynamics. For example, Garcia et al. (2016) showed that drought awareness can significantly shape per-capita water demand, which in turn affects water use, reservoir volume, and consequent water shortage during drought periods. Similar examples can be found in Van Emmerik et al (2014) and Gonzales and Ajami (2017), which were not included in your review. Why did you decide to neglect these components of interdisciplinarity and key aspects in human-water dynamics? They may not explicitly include the term “socio-hydrology” but they are definitely important studies for unraveling human-water dynamics, i.e. the focus of socio-hydrology. Including more studies will definitely strengthen your review.

Have you considered the option to include studies that deal with understanding and modeling human-water dynamics without being considered as socio-hydrological studies? For example, Haer et al. (2020)? It would be really interesting to compare these studies with socio-hydrological studies to discuss differences in both physical and social methods used to represent human-water dynamics.

Based on the commentary of Di Baldassarre et al. (2021), multiple approaches should be implemented for better understanding and representing human-water dynamics. In your review, you compared a number of categories (e.g. type of natural hazard investigated, spatial and temporal scales of the social and physical systems, physical and social components, etc.). Would it be beneficial for this review also to include a comparison between socio-hydrological studies using quantitative vs qualitative observations?

Line 241: What do you mean by "calibrate societal memory"? In the models you cited, awareness variations influence demography, which in turn affect flood losses, and not the other way around. Also, calibration in modeling applications has a different meaning than the one you are referring to. I suggest you modify the sentence accordingly in order to avoid misunderstandings.

Line 276: use "system dynamic" modeling rather than the term "stylized model". Why are you considering that only Sugeng et al. (2019) used system dynamic modeling? Also Di Baldassarre et al. (2013, 2015) used system dynamics model. I suggest that you define the different types of modeling techniques at the beginning of this section. The fact that Sugeng et al. (2019) used Vensim software (i.e. stock and flow representation) does not mean that the other socio-hydrological studies did not use system dynamics as they used differential equations, which are equivalent to the stocks and flows formulation in vensim.

Line 377: Are you sure that socio-hydrology uses the same methods and perspectives as traditional hydrology? In my opinion, approaches like system dynamics and ABM were just recently introduced for socio-hydrological applications

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