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Reply on RC1

Franciele Maria Vanelli et al.

Author 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-AC1>, 2022

Dear Referee,

We are very grateful for your informative and constructive comments and observations, which surely improve the manuscript. We accepted and incorporated the suggestions into the paper. In this document, we report how each comment was taken into account. To aid the visualization of the changes, as soon as we receive the second review report, we will submit a "track changes" version of the manuscript where we will highlight the changes made.

1) "The authors conducted a systematic review of the literature on natural hazards and disaster within sociohydrology. The paper identifies trends and gaps in the literature and proposes some ways to address existing issues. The paper is well written, concise, and clear. It also provides some useful visual aids for those who want to get a glimpse in the current state of the art. I particularly appreciate the proposed shift from an interdisciplinary state to a transdisciplinary state. In my opinion, the paper can be accepted upon minor revision. While I am not necessarily against its publication in HESS, I believe the paper would fit NHESS better, considering its focus, but I leave this to the handling editor."

Thank you for the careful reading and the positive appreciation of our manuscript. Regarding the publication in HESS, we believe that the special issue *Contributions of transdisciplinary approaches to hydrology and water resources management* from *Hydrology and Earth System Sciences* has the ideal set of readers to our findings. Thus we are very sure that the submission of this manuscript to this special issue is perfectly appropriate.

2) "I would leave percentages out of the abstract (not wrong to have them, just a style suggestion)"

We agreed with this comment and removed the percentages of the abstract. The abstract now reads as follows:

"Abstract. Given the recent developments in socio-hydrology and its potential contributions to disaster risk reduction (DRR), we conducted a systematic literature review of socio-hydrological studies aiming to identify persisting gaps and discuss tractable approaches for tackling them. A total of 44 articles that address natural hazards or disasters were reviewed in detail. Our results indicated that: (i) Most of the studies addressed floods whereas there were very few research applications for droughts and compound or multi-hazards; (ii) none of the articles investigated interactions across temporal and spatial scales; (iii) quantitative approaches were used more often in comparison to mixed and qualitative approaches; (iv) monodisciplinary studies prevailed over multi or interdisciplinary ones, and (v) a reduced number of the articles involved stakeholder participation. In summary, we found that there is a fragmentation in the field, with a multitude of social and physical components, methods and data sources being used. Based on these findings, we point out potential ways of tackling the identified challenges to advance socio-hydrology, including studying multiple hazards in a joint framework and exploiting new methods for integrating results from qualitative and quantitative analyses to leverage on the strengths of different fields of knowledge. Addressing these challenges will improve our understanding of human-water interactions to support DRR."

3) "The authors use the affiliation as a proxy for the discipline to which a certain author belongs. I understand the reasoning behind this and I agree this is one way of doing it. However, nowadays an increasing number of researchers find themselves employed by a department which doesn't (partially or fully) reflect their expertise, especially with the rise of interdisciplinary projects that get funded and the consequent interdisciplinarity of teams where people with very different expertise end up working in the same department. I think a better way to deal with this would be to look at the publication record of each author (but extremely time consuming). I am not saying the authors should do this now, but I would refer to this limitation somewhere in the paper (e.g. in methods)."

Thank you for raising this important issue. We agreed with this comment and included this limitation in the item "3.6 Trends regarding the studies' inter and transdisciplinarity" within "3 Results and discussion":

"It is important to highlight that these results should be interpreted with care as we considered the author's affiliation as a proxy for the study's disciplinarity. Nowadays, an increasing number of researchers work in interdisciplinary projects, whose affiliation department does not reflect their expertise. Hence, although the present results can be a sufficient indicator of the current disciplinarity scenario, in the future, the studies' interdisciplinarity could be investigated, for instance, analysing the publications record of each author."

4) "p.9 line 204: it is not entirely clear what is meant with temporal series of social data, could the authors maybe shortly elaborate on that?"

Thank you for this observation. The correct expression is "time series". We corrected it in the text.

5) "p.15 line 332: in my opinion, droughts so far have received little attention for

two reasons. The first one is that the field of sociohydrology was “initiated” by hydrologist who have mostly focused on floods throughout their career. The second one concerns the characteristic of a drought, e.g. more complex phenomenon, larger spatial scale and longer temporal scale, cross-country impacts, etc., which make it more challenging to study even more so when coupled to the human component. Maybe this can also be briefly discussed in the paper.”

Thank you for raising this point. About the first reason, we did not analyse the previous publications of the socio-hydrologists and we did not have references for underpinning this sentence. We agreed with the second reason and considered it in the topic “4 Research Agenda”:

“The first persisting knowledge gap is related to the predominance of flood studies. Even though droughts and multi-hazard events also cause considerable damages, they received little attention. This result can be explained by the fact that drought and multi-hazard events have complex characteristics, which make their investigation in a coupled system to the social component more challenging. For droughts, their onset, cessation and spatial extent are notoriously problematic to determine (de Brito et al., 2020). With regard to multi-hazard events, multiple interconnections must be considered when studying them (Kappes et al., 2012).”

6) “p.15 line 334, “all types of disasters can be considered as socio-hydrological phenomena as they are directly and/or indirectly associated with water”. I am not sure I agree with this, as I don’t see the connection between, for example, earthquakes and water (unless they trigger a tsunami) or volcanic eruptions and water.”

This sentence in the text is a citation from Vanelli and Kobiyama (2021). In their article, the authors explored this subject and discussed that water can be a direct and/or an indirect trigger of most disasters, and, mainly, water is essential in the disaster response to ensure the public health of affected people. In some hazards, like storms and extreme temperature (Gopalakrishnan, 2013), the direct and/or indirect role of water is more clear. However, some geophysical researches indicate that some volcanic eruptions occur due to an increase in water vapor pressure in the subduction zones (Plank et al., 2013; Shaw et al., 2008; Walowski et al., 2015). Water in fault zones can act as a kind of lubricant that enables two adjacent blocks of rocks to move past each other, this movement can give rise to earthquakes (Hubbert and Rubey, 1959). Furthermore, in post-disaster of all types of disasters, the affected people require potable water for consumption and non-potable water to clean and disinfect their houses, avoiding or minimizing diseases (Kouadio et al., 2012; Pan American Health Organization, 2006; Suk et al., 2020; UN News, 2021; Vanelli and Kobiyama, 2021).

We modified the end of the sentence to clarify the meaning:

“Besides this, all types of disasters can be considered socio-hydrological phenomena because disasters are directly and/or indirectly associated with water, which can act as the triggering agent or/and is indispensable during disaster response (Vanelli and Kobiyama, 2021). Hence it is necessary to advance our understanding of interwoven social and environmental processes by considering the interplay between society and different types and combinations of natural hazards. To this end, new methods and data are needed to consider the dynamics between consecutive and compound hazards and society.”

7) "Technical corrections:

p.2 line 60: the main objective of this study is

p.5 line 117: I would cite the article you mention here (I believe Sivapalan, Savenije, and Blöschl 2012?)

p.7 line 171: what do the authors mean with "one-person household", is it "one person per household"?"

Thank you for your observations. We corrected all of them.

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