



Interactive comment on “Socio-hydrology: conceptualising human-flood interactions” by G. Di Baldassarre et al.

Anonymous Referee #2

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The manuscript shows promise in that it is an innovative conceptualization of settled floodplain dynamics that was developed to better understand how humans change the frequency and magnitude of flood events while also considering the extent to which flood events effect patterns of human settlement. The manuscript is exceptionally well written, and it is scholarly in its methods and organization. I am impressed with this, and I am impressed with the potential applications of the model proposed. In my opinion, the manuscript will be ready for publication upon addressing the minor edits I suggest below.

1) Referring to the model as a whole, there are a number of multidimensional parameters, simplifications of complex processes, and a number of assumptions that are necessary for operationalization to be accomplished. In the manuscript's current form,

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there are model assumptions that are not fully justified (although there are some literature citations addressing specific parameters). It would be helpful to understand the extent to which the assumptions made such as “We assume that economic benefits derive from settling as close as possible to the river and we model the penalty of settling away from it with the term. . .” are cited within the peer-reviewed literature. Perhaps such literature citations will help the reader to better understand the extent to which the model may reflect reality being that there is a lack of an external validation metric or some type of real-world empirical analysis offered.

2) One of the parameters of the Hydrology equation is related to the slope of the floodplain and the resilience of the human settlement. Resilience is a highly multidimensional construct that contains social, economic, infrastructural, institutional, community, and environmental components. Looking at resilience strictly from a social perspective, the concept includes the ability to mitigate, to respond to, to prepare for, to learn from, to adjust, and ultimately to recover from a damaging event (in this case, a flood). First and foremost, what type and/or what components of resilience are you referring to? How would one operationalize such a complex concept and represent the concept within a single parameter (α_H)? Will this be a quantified/comparative measure of resilience or a best guess? How do you define the relationship between resilience and slope in this model? It's arguable that the slope of the floodplain is simply one very small part of what makes populations resilient to floods. In essence, you may consider not going down the very complex road that is resilience. The oversimplification of the concept may be damaging, and there are few agreed upon frameworks within the literature that suggest how resilience should be measured. I suggest concentrating only on the slope of the floodplain for parameter α_H .

3) The following area of opportunity is similar to my comments proposed directly above and relates specifically to the “society” and “politics” portions of the dynamic two-way model. The two equations are greatly simplified representations of social and political systems, perhaps oversimplified. In terms of the “social” equation, one may argue that

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a multitude of contextual factors affect the awareness of flood risk as this equation was derived to describe. These include political and institutional factors, social networks, culture, learning, and the social vulnerability and resilience of populations. With respect to the “politics” equation, one may argue that there is a failure to describe the complex processes behind deciding whether a community at risk of flooding should relocate at distance from the river channel. To avoid being caught up further in such oversimplification arguments, I suggest an explicit naming convention that describes exactly what you intend the 4 equations to represent. In this case, the social equation could be renamed to “Previous experience” and the political equation could be renamed to “Distance from river” or something along those lines.

4) One of the terms in the “Technology” equation was derived to account for the rate of decay of levees. Would adding a term that addresses levee augmentation and/or repair be a beneficial addition to represent the “Technology” factor more holistically?

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