

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

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We would like to thank Luciano Raso for providing valuable comments about our paper.

The first comment is about the relationships between levees, awareness, and floods. Luciano Raso is right. Theoretically, risk awareness can increase even without the occurrence of flooding. Also, ideally, flood protection measures can also be built before any occurrences of floods. As a matter of fact, in many countries there are efforts to raise awareness, improve preparedness, and plan a set of measures to reduce or prevent flood risk (see e.g. [www.kulturisk.eu](http://www.kulturisk.eu)).

Anyhow, flood occurrences often do trigger investments in flood protection measures. This is the meaning of the arrow in Figure 2. Also, it is extremely difficult to find places

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where levees or dikes were built without any flood occurrences in past. Whereas, the large majority of places with levees has experienced flood events in the past. It can be argued that such a societal response to flood events is not instantaneous and that a time lag should be included. However, this would add complexity to the conceptualization with a limited benefit as long-term dynamics would not change significantly. We can also use different time scales for the different processes, but for the sake of reduced complexity, we model as instantaneous all the abrupt changes induced by the occurrence of flood events.

We also agree with Luciano Raso about the presence of interactions between different floodplain systems. Actually, investigating the exchange of information between different floodplain systems would be an interesting scientific effort since the ongoing globalization and the bigger role of media, e.g. the 2005 flooding of New Orleans had an impact on flood risk awareness in the Netherlands. However, such an effort would be out of the scope of our conceptualization, which focuses on the main interactions and feedbacks between floods and humans within a floodplain system.

We found interesting the proposal to split the overall wealth ( $G$ ) in “houses” and “people”. However, the philosophy here is not to increase complexity within each equation and keep the description of economical (as well as social, technological, political, and hydrological) processes as simple as possible. We think that our parsimonious approach is consistent with the goal to explore the interplay between these different types of processes and unravel long-term dynamics of a floodplain system. Also, we believe that a coherent conceptualization requires the same level of complexity for the description of the five processes.

We also agree with the proposal to list hidden assumptions. Some of them are already discussed in the current version of the paper (e.g. homogeneity of society), but they will all be made explicit in the revised paper. Anyhow, it is worth mentioning here that parameters are not necessarily constant, but they can indeed change over time. We used fixed parameters only to show some examples of runs. Also, we introduce a first

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conceptualization of human-flood interactions, from which many different models can be derived.

For the concluding comment, we would like to stress again that this paper focuses on the conceptualization of human-flood interactions. The application to the virtual WetTown was made to show examples of long-term dynamics without making attempts to speculate about the outcomes. However, we think that many points mentioned by Luciano Raso are worth discussing and we will therefore comment them in the revised paper.

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