Interactive comment on "Socio-hydrological spaces in the Jamuna River floodplain in Bangladesh" *by* Md Ruknul Ferdous et al.

Anonymous Referee #2

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Ferdous and colleagues developed a new concept called 'socio-hydrological spaces' which they define as a geographical area with distinct hydrological and social features that give rise to distinct patterns and emergent behavior. They then apply this concept to an analysis of the Jamuna River floodplain in Bangladesh. In case study they identify three distinct socio-hydrological spaces defined by geographical features and support this delineation with primary and secondary data. The example application is well supported by primary data collection. The application of mixed-method approaches is important in socio-hydrology and the topic is of interest to HESS readers. However, I do have a series of concerns that if addressed would strengthen the paper. I believe that with certain revisions it would be suitable for publication.

Comments

1. The definition of 'socio-hydrological spaces' hints at two different types of spaces. The first is space as a geographical area. The second is space as a portion of the parameter space which leads to a distinct set of emergent dynamics. (The examples of the adaptation space and levy effect space on page 4 further raise the question of the second type of space.) In the case presented, geographical features (e.g. embankment) are used to divide the case area into three sub-areas with different dynamics. Because these geographic features define the dynamics of the system all of the unions exhibiting similar dynamics are spatially clustered. However, I can envision cases in which the features defining the socio-hydrological dynamics are social not physical features. In these cases, I am not sure the 'spaces' would be contiguous. How would this approach be applied to a case where geographical features are poorly aligned with system dynamics? Or is this tool suitable for only the cases where geographical features are aligned with system dynamics?

2. In the definition section (pages 3-4), the authors present this concept/tool as an alternative to either narratives or mathematical models. However, in the case that follows the authors present both the 'socio-hydrological space' delineation with a case narrative, which I think was effective. Rather than serving as an effective standalone tool, 'socio-hydrological spaces' compliments these other approaches. I think the author's argument for this tool would be more convincing if they could frame it as part of a broad research plan. For example, the authors note that SHS is descriptive not explanatory. If combined with other approaches could it enhance the explanatory power of a study?

3. While it is important to expand the approaches used to address socio-hydrological questions and to synthesize quantitative and qualitative data, this is not the first study to do so. The authors should acknowledge other efforts in this space such as data-driven narratives (Treuer et al. 2017) and the pairing of statistical analysis and narratives (Hornberger et al. 2015), and articulate what 'socio-hydrological spaces' adds.

4. I think there is potential for this concept to be used comparatively across say multiple flood plain cases. Please speak to this potential.

5. Lastly, there are some typographic errors and awkward phrasing in the manuscript and it would benefit from a thorough review.

References

Hornberger GM, Hess DJ, Gilligan J (2015) Water conservation and hydrological transitions in cities in the United States. Water Resour Res 51(6):4635–4649.

Treuer G, et al. (2017) A narrative method for analyzing transitions in urban water management: The case of the Miami-Dade Water and Sewer Department. Water Resour Res 53(1):891–908.