



EGUsphere, community comment CC1
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Comment on egusphere-2022-52

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Community comment on "Intersecting near-real time fluvial and pluvial inundation estimates with sociodemographic vulnerability to quantify a household flood impact index" by Matthew Preisser et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-52-CC1>, 2022

This study introduces a new estimate of flood impact index at the household level in near-real time. The study is well organized and conveys clear information. The manuscript is also well written. Overall, I appreciate the practical utility of the proposed method and its added value to the field of inundation mapping. However, I think the authors can do a better job clarifying the compromised accuracy of inundation mapping as the tradeoff for improved efficiency. In my opinion, the simplifications taken in the study may be subject to limitations especially when expanded to regions of various hydrometeorology. By better realizing these limitations and discussing them with clarity, the current method has the chance to improve in maybe a future study and be implemented more broadly. Please consider addressing the following comments which are mainly about pluvial inundation mapping.

- One important assumption of this study is that the rainfall depth equals the runoff depth, which implies a 100% runoff coefficient. It should be noted that such an assumption is probably always invalid. Even a highly urbanized area can hardly reach a 80%+ runoff coefficient during a 5-hour storm event, since the actual impervious coverage could only be as high as 70%. A higher (90%+) runoff coefficient could possibly result from a prolonged storm duration, but such scenario doesn't seem permitted in this study due to the reset mechanism (see the next comment for more). Granted that this approach targets a 'worst-case' scenario, an 'impossible' estimate would not be very meaningful, would it?
- There is a reset mechanism in the inundation mapping approach with a 5-hour frequency in the case study. This setting seems to consider the time of concentration at some spatial scale as well as the storm duration, but the rationale behind this setting is ambiguous in the manuscript. I recommend give some clear guidance on this setting to help expand the application over other areas. The essential problem with this setting is that pluvial inundation is set to be strongly driven by the rainfall accumulation within the 5 hours regardless of the initial condition i.e., how much water is ponded initially. I have concerns over the implication of the inundation maps produced in the middle of a long storm event (say, 12 hours) in reality.
- The current method also nullifies heterogeneous effects of land cover on runoff generation, leaving the pluvial inundation dictated by topology. Besides the obvious uncertainty introduced, it undermines the hyper-resolution enabled by the DEM data. I

understand 'computational efficiency' is the key word here, but I can also see more realistic alternatives than assuming a uniformly impervious coverage. For instance, land use land cover data combined with curve number method seem to be efficient and well-suited for estimating runoff within the current framework.