

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2
<https://doi.org/10.5194/nhess-2021-275-RC2>, 2021
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Comment on nhess-2021-275

Anonymous Referee #2

Referee comment on "Gridded flood depth estimates from satellite-derived inundations" by Seth Bryant et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-275-RC2>, 2021

The presented floodwater depth calculation methodology, RICorDE, is innovative in its coupling of HAND and "raw" elevation data to produce more hydraulically robust results. The manuscript is well written and the authors did an overall good job at explaining the new elements in the workflow. This paper can be of great interest to the community. I have a few concerns:

1. The authors opted not to share their code and tool in an open repository - this is their right but disappointing, especially considering that they developed this tool based on open-source resources (primarily FwDET). The tool also seems to be specific to Canadian data sources, maybe a more generic version can be shared. This is not critical for the paper's publication but will considerably increase its impact in my opinion.
2. The evaluation of the tool is based solely on remote sensing-derived flood maps. This choice is understandable but as the paper shows it is hard to isolate the source of the error in the model prediction. The evaluation presented is of great value but the authors can quite easily use the hydraulic-model inundation extent as input, similar to what others have done. The authors justify their choice but it, nonetheless, leads to uncertainty of how much the new methodology is an improvement over FwDET or a result of "improving" the remote sensing errors by shrinking the flooding domain. The reader will benefit from knowing the answer.
3. The authors all but ignored the issue of runtime. They mention "longer runtime" in line 336 but offer no further details. This is quite an important aspect for depth calculation from remote sensing as these are often used for flood response and large-scale applications. The authors should report their model and FwDET runtime for their case studies. This can be most useful for future users and developments.

4. There are no floodwater depth maps presented with the exception of a very small insert and the "trusted" data. This is a major omission. As the authors discuss, floodwater depth estimations often include sharp transitions (strips) in the map. RICorDE primary premise is in its innovative treatment with boundary cells which has the potential of alleviating this problem. Yet, this is neither presented nor discussed in the manuscript. Reducing unrealistic artifacts in the depth map is important for improving its accuracy and since practitioners are much less likely to trust products that include clear errors.

5. The authors need to provide more information about the "trusted" products. Which models were used, what was the native resolution, is the DEM used here is the same as for the simulations, is the remote sensing product capture the same day/conditions as the hydraulic simulation.

Minor comments:

Lines 90-91: this sentence is technically true but misleading as FwDET average errors were much smaller ("...an average difference of 0.18 and 0.31 m for the coastal (using a 1 m DEM) and riverine (using a 10 m DEM) case studies, respectively.")

Table 1: add units to the header of relevant columns