RC2 Comments

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.

Thank you for your review and comments.

The intention is to have the tool be open source once we can resolve some contractual issues.

The tool is inspired by FwDET but does not rely on any source code from FwDET. However, many other opensource libraries are used (GRASS, QGIS, WBT, etc.). As mentioned, the tool does include scripts to pre-process from Canadian data sources, but alternate data sources could easily be provided by users.

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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.

The motivation for our tool is to develop depths from remote sensing data, therefore we used these as inputs to the tool. Others have used inundation from hydraulic model outputs – presumably as an intermediate step towards eventually working with remote sensing data. We provided the same satellite derived inputs to both RICorDE and FwDET and compared the results. The first phase of RICorDE develops a hydraulically derived inundation, removing egregious errors from the flooded domain. This algorithm is a part of RICorDE, and we therefore do not separate it for a comparison against FwDET.

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.

Our tool is optimized for accuracy – not runtime. This may make it more useful for flood vulnerability research than for disaster response; however, it could still be used in some contexts for disaster response. Run times will be added to the manuscript (< 1 hr. for each case)

4. There are no floodwater depth maps presented with the exception of a very small insert and the "trusted" data. This is a major emission. 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.

The trusted depths are provided in the Supplements where data sharing agreements allow. Additional depth maps for the tool outputs will be added to the supplements.

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.

Our objective was to demonstrate RICorDE provides some improvement over FwDET, not to quantify absolute accuracy to a real flood event. Therefore, we thought the nuances of the trusted grids less relevant. We will try and retrieve the information you suggest from the government agencies and add it to the manuscript.

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

The average difference values from Cohen et al. you mention will be added to the section.

Units of 'meters' will be added to the table.