

Geosci. Model Dev. Discuss., referee comment RC2
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Comment on gmd-2022-61

Anonymous Referee #2

Referee comment on "CREST-VEC: a framework towards more accurate and realistic flood simulation across scales" by Zhi Li et al., Geosci. Model Dev. Discuss.,
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This manuscript introduces a vector-based routing scheme (mizuroute) into the CREST hydrologic model. Additionally, the authors augment the routing scheme by adding a new subsurface routing scheme and a lake module. The new model is then tested for multiple scenarios. The manuscript is well-written and the conclusions drawn are consistent with the presented results. I have the following suggestions:

- As it stands, the manuscript does not do a good job of separating the two distinct contributions - subsurface routing and lake module - in the text. The figures show clear delineation. I would suggest adding separate sections with detailed descriptions for both the subsurface routing scheme and the lake module.
- The results section is well structured and clearly flows from regional application to a continental use case, and finally a flood forecasting example.
- However, the discussion section is insufficient. Section 4.2 is largely unnecessary as the paper does not deal with hydrologic simulation at all, unless the authors want to test ensemble simulation with varying catchment processes.
- Additionally, more discussion of the results from the flood forecasting example is needed. The authors need to contextualize the results within the large body of flood forecasting literature. In addition, the reasons for the improved FAR and/or reduced POD is not adequately addressed. I would suggest providing concrete mechanistic reasons for both improved FAR and reduced POD.