

Interactive comment on “Comparison of statistical and analytical hierarchy process methods on flood susceptibility mapping: in a case study of Tana sub-basin in northwestern Ethiopia” by Azemeraw Wubalem et al.

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This paper uses a statistical method to derive a flood susceptibility map using a relatively large database of flood event points and a number of relevant flood "factor" maps.

The paper is in itself an interesting application, although not much new novelty is presented. Nonetheless, it is an interesting use case for Ethiopia.

This said, there are several major points that should be addressed in a much revised

C1

version in my opinion. I highlighted those below.

- The English language should be revised;
- The statistical method used is sound and is appropriate for the task presented; however, the flood factor maps prepared as input are of course highly correlated with the flood event point locations chosen, so there is little surprise that this shows very good correlations, and, as a result, a very good output. In my opinion, the use of these factor maps needs to be better explained and in particular why their presented statistical method should be preferred over a simple topographic wetness index (TWI) for example, which would no doubt produce a very good flood susceptibility map too;
- In my opinion, the authors need to quantitatively demonstrate that a traditional, well-established GIS-type algorithm, such as TWI or other, is performing less well than the proposed statistical model. In other words, a TWI map could be taken as a benchmark of acceptability. This way, the authors could then also discuss more objectively the value of their proposed methods. In addition, it would allow them to use the entire flood event database as validation, instead of only 30% of it;
- Finally, I have some issue with the location of the selected flood events. Those are all located along the main river network, which makes it easy for any flood "factor" or indeed the proposed statistical method to perform well. Was there no historical flood event off the main river floodplains, in other words, was there no flood event that created flooding away from rivers? This would be interesting to assess, but at least should be explained.

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C2