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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Continental Portuguese Territory Flood Susceptibility Index – contribution for a vulnerability index" *by* R. Jacinto et al.

Anonymous Referee #2

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General comments

In this paper the authors provide a new methodology aiming to define a flood susceptibility index for the Portuguese territory, by combining morphological information derived from the Hydrosheds DEM and information about soil characteristics and land cover/land use. They valid the results obtained with an independent set of historical flood events. Although such an approach deserves some interest and has the potential for being generalized, I find that the intrinsic limit and the main weakness of the method adopted is that it doesn't take into due account information about precipitation regimes but only morphologic features.

Specific comments

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Datasets section.

Pg 6. The incipit of the section is not strictly inherent to description of the datasets, as it concerns the criteria of eligibility for the variables entering the definition of the susceptivity index. Authors should consider to move it to the Methods section and to clarify why the chosen variables meet the three criteria, and to what extent the index is sensitive to such choice.

Suppress fig. 3 and only show fig.5 which is just the same figure, but with normalized values. Moreover, I don't think that a mere normalization procedure of the values deserves an explicit point in the methods section (cft. Pg 8 point b of the methods). Methods section.

The first methodological phase, i.e. the variable spatial aggregation method, is claimed to be the main innovative aspect of the work, due to its ability to capture the cumulative nature of the flooding phenomena. For the same reason, its application to variables which have not cumulative nature is impaired, so the authors apply it only to the flow number dataset. The resulting variable is linked to the mean soil permeability conditions of all the upstream cells. However, in consideration of the fact that this is the main point of the paper, authors should better describe how this new variable has been computed (proposed references are not international ones, nor easily accessible), giving strength to the present paper. As an example, they could discuss why this new variable is more valuable than the its non-aggregated counterpart for the composition of the index, and what is its physical meaning. E.g., as the flow number variable contains information about permeability and land cover I would expect that the aggregated value should be correlated with the surface runoff at that point. I would suggest a more quantitative analysis, while the use of a hydrological model (e.g. a 1D – precipitation-runoff model) forced with synthetic hyetograms could be helpful in a validation exercise and give strength to the paper.

Pg. 9 Please, explain how the index has been constructed. Readers at this stage

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may only hypothesize a linear combination of the input variables with different weights, whose final value comes from some iterative process of minimization. Under what constraints? The fact that the index is in fact a linear combination of the variables is only cursory mentioned in the fourth section, and the final values of the weights are given without any reference to the process that brought to such results.

Explain the classes definition. Which is the method adopted to define them?

Validation section

Pg9. Rows 292-303. The description of fig.6 is not clear. In Fig. 6A the histogram bins are unevenly spaced, why? The highest density of flood events falls in an intermediate range of the proposed susceptivity index, while one would expect the highest values of a robust index to be more populated. The description and meaning of fig.s 6B and 6C are not clear. It seems the index values also depends on the represented area (i.e. high index values are only reached for small areas), which constitutes, in my opinion, a severe limitation to its significance.

Technical corrections

Pg. 6 r. 167 The usual notation for the coordinate system is WGS84 instead of WGS1984

Pg. 7 r 204 figure 5 should be fig 3

Pg. 30 Fig. 6B y axis title is a percentage of area but the unit in the caption is km2

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 7521, 2014.