

## ***Interactive comment on “Modelling the socio-economic impact of river floods in Europe” by L. Alfieri et al.***

### **Anonymous Referee #2**

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#### Referee comment

This article presents a novel methodology to assess the impacts of river floods in Europe between 1990-2013. The authors proposed two different approaches for the creation of a 2D flood inundation model based on high resolution meteorological and socio-economic datasets. The topic addressed by the manuscript is in the scope of NHES. However, it needs a major revision before publication. For a reader the paper is difficult to read especially in the methodological part where a lot of information are taken for granted. If possible, the authors should explain some key methods used, by adding explicative equations and/or one or more sentences. Moreover, discussion should be expanded and the abstract needs to be rearranged, since it lacks to include methodology novelties and some key results.

C1

#### Introduction

Page 1; L 22: The work is based on the great relevance that the three factors of risk (hazard, exposure and vulnerability) have in regard to river floods. I think that a further explanation of this should be included in the introduction section in order to contextualize the results presented. In addition the authors need to emphasize more the gap of knowledge and the importance of this study.

#### Data and methods

Page 2; L 6: “Extreme value” does not need “EV” abbreviation since it is never used in the text and could confuse the reader.

Page 2; L 9: As the Lisflood distributed model is a milestone for the supported analysis, I recommend a more detailed explanation about its efficiency, use and validation.

Page 2; L 21: T returned period considered are described in line 34. I suggest moving this information in line 20. Moreover, the consideration of 500 years of return time for 24 years analysis sounds odd.

Page 2; L 24: Why L-moment estimators are particularly useful for short samples? Are there any references in support? I would substitute short samples with short time series.

Page 3; L 6. Please explain further the depth-damage functions defined by Huizinga 2007.

Page 3; L 11-12 “For regions in countries where no damage function was available. . .” Please list them.

Page 3; L 16 For the flood risk assessment the authors proposed two approaches that I think could be merged in the chapter without the subdivision. The article is quite short and it is divided in a lot of very small chapters. As a consequence, the reading becomes quite difficult.

C2

## Results

Page 3; L 34-on: Flood risk assessment is an assessment of the various risks in relation to residential, industrial and commercial land uses. It is a requirement as part of any planning application especially flood-prone areas. The results proposed by the authors do not stress the implication at the European level of such novel modelling proposed assessing the social and the economic impacts. The authors evidenced some of the main results and poorly contextualized them. The same results are difficult to see in Figure 2 proposed, that lacks of a meaningful caption and a visual observation of the most and least economic damaged countries or population affected ones. ISO country codes need to be explicated (by adding a table or a figure).

Page 5; L 2-on: The case study comes a bit unexpected to the reader. The performance test of the event based method is not included in the objectives of the present work. In addition a further explanation of the 2013-catastrophic flood is needed.

## Discussion and Conclusions

Page 5- L25-on: Discussion and conclusions need to be separated. The discussion part lack to include a very broad discussion of the results presented and the implications they have in flood risk assessment. Fig. 2 needs further discussion since it seems that for some countries there are controversially results obtained from the two methods. In addition, it should discuss the different between the two approaches. In addition, please move some paragraphs in the discussion part: L 20 to 25 and L 29 to 38.

Page 6, L 9-on: Chapter 4.1 “The influence of flood protection” needs to be included in the discussion session, since it presents some important considerations linked to the results of the presented work.

Page 6, L 29-30 Please rephrase.

## Figures

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Figure 1 “Schematic view... risk assessment” is difficult to read. There are a lot of abbreviations that are not explained in the text.

Figure 5 “Estimates.. in Central Europe” is difficult to read. The meanings of the grey dots are explained only in the text. Please add more information in the caption. Moreover, the grey colour is difficult to notice over very dark colours.

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