

Interactive comment on “Enhancing local action planning through quantitative flood risk analysis: a case study in Spain” by Jesica T. Castillo-Rodríguez et al.

Anonymous Referee #1

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Reviewer Comments on the manuscript nhess-2016-065 Title: Enhancing local action planning through quantitative flood risk analysis: a case study in Spain.

General comments This paper is a “middle of the road” paper between a methodological paper and a policy oriented paper. It can have an important interest for the targeted readers (policy makers). However, at this stage, none are addressed carefully and the policy recommendations are too often disconnected from the results of the paper. I recommend to improve the relation between the methodological challenges of flood risk assessment and the policy orientation of the paper. I did some suggestions below and in the Specific comments.

The structure of the paper needs to be revised. Since there is no methodological con-

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tribution to the existing literature on risk assessment unless you did not highlight them sufficiently, then I would recommend to reorganize the structure of the paper and more precisely of section 3. Some subsections of section 3 are made with 2 sentences in a total of 2/3 lines: this reveals a problem in your paper's structure. I would follow an overall classical structure: Method-Results-Discussion. This means to restructure the method section and the method (calibration) of the case study since you did not propose an original method. You should have only one method section (merge section 2 and 3.4) Related to these your Fig 3 is much more informative than your Fig 1 and constitute your model/method. I would organize a method section around your model (described in fig 3) and not around a generic method that you did not improve but replicate and which leads to some misunderstanding as noticed in the Specific comments

The policy oriented research questions (page 3 line 30) and the results are quite disconnected. The paper needs to improve this drastically. I mean that, choosing a quantitative hydro-eco model to assess flood risk and simulate risk management strategies is a very good research approach and is data intensive but it also means that the conclusions you derive from the model are supported and illustrated by your results (results+sensitivity sections). This is not the case with your policy recommendations. This weakens the interest of doing quantitative models.

A policy maker should be able to understand on which parameters of your model he/she could play to reduce the risk and which part of the model are more sensitive: Flows, AV, Y, stage functions, etc. This means to improve the readability of the paper, highlight the methodological points that have policy implications and also clearly and structurally present the parameters you use and those you use to illustrate the sensitivity of the results. The paper would benefit of a summary table of the list of parameters, values, sources, model used.
Specific comments Introduction Page 3 line 30-31: how your method helps to answer these questions is not clear. Why standardization is needed and which type of standardization is required to respect “Think globally, act locally” you are citing, ie to respect local properties with standards. This has to be discussed.

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Section 2 Method and the subsections You should use the Phase number in the subsection title. Ex. Review of available data → Phase II: review of available data. Also separate phase 7 and 8 in page 4. This helps to follow. But Given the irregular size of the description of these phases (some a definition other are models, some have 2 sentences only) consider another structure to present and develop these phases.

Page 5 lines 7-8. Subsection 2.3 Base Case. A current situation is not by convention a scenario. Then in the case study, page 10 Line 20 you refer to the Base Case as the scenario with dam. This is not coherent.

Page 5 Line 10. What do you mean by plausible. Define, be more precise. What the flood defense sentence (line 12-13) has to do with this section 2.4. Develop this.

Page 5 line 24 "Failure of a flood defense (e.g. a dam). Do you mean dam break? Figure 1. You have 2 architecture models in the same figure. The indexes a and b only appear in the caption, not in the figure. To be corrected.

Figure 1: we understand that the economic damage D are estimated from the preceding step N which is the number of fatalities, meaning that your economic valuation is reduced to valuation of life lost. But then in the case study, we learn N and D are not connected. So Fig 1 can lead to a misleading lecture of your method/model. On the contrary Figure 3 which is not even mentioned in your text is more detailed and more informative for the reader. The literature has several illustrative flowcharts more informative than your Fig 1 (or Fig 6) like : Messner and Meyer 2005 In: UFZ Discussion Papers 13/2005, Foudi et al. 2015 in Land Use Policy Pelling 2001 in Social Nature, or de Moel et al. 2015 in Mitig Adapt Strateg Glob Change

I recommend to correct Fig 1 or think about the usefulness of this Figure for the reader (policy maker in your case). I believe that this architecture could be presented by inspiration of these examples in a way that the diagram reads easily. Also we cannot understand Fig 1 without having to constantly refer to the text, this does not help. You could do it all in one single figure with text instead of letters. Also consider usefulness

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of Fig 1 vs Fig 3 when you restructure the paper and develop a unique methodological section.

Page 6 Line 21-30 Reorder the description of the architecture: Routing before NOL.

Page 6 Line 25: Gate operability. Define this for the reader. A policy maker that you target as reader may not be aware of this terminology

Page 6 Line 25: Routing. Define this for the reader.

Page 9 Line 8. What do you mean by tolerability. Explain, define

Section 3 Case study Consider to reduce (regroup) the number of subsections when you restructure the paper as explained in the General comments.

Page 10 Line 3 "now" When it started, when it is finished (planned to be finished). So, the reader can understand better that this is the policy scenario you simulate (one of the two).

Page 10 Line 18 Line 20: Check the use of Current and Base. The benchmark (Base) is by convention the baseline case to which you compare a scenario. Correct the confusion this creates. The benchmark should be the no dam case (current as you call it), the other are scenarios.

Section 2.3 Consequence of estimation. Given that risk is the product of flood hazard and the negative consequences of flooding, you are mixing in this section exposure and vulnerability issues. But we miss some information as explain below:

Page 10 Line 11-14 Lines 31-34. This information is not understandable by the reader you target. Only expert that applied the DEFRA algorithm can understand it. You should explain sufficiently the algorithm of DEFRA so the area and people vulnerabilities are understandable. Also this way policy maker can understand on which parameters they could act to reduce the risk and how they could do it. This is an example of the points that could be developed in your discussion section so that you would improve

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the connection between your model and the policy implications.

Page 10 Line 16. We miss information about Land uses in the case study. Any tables or comments would be grateful.

Page 10 Lines 15-22. We miss relevant information about the economic stage damage functions. I mean more than what is said in these lines. Present the stage damage function you use in the main results (those of section 3.5) then you could say that you do a sensitivity analysis of the stage damage function.

Page 10 Line 16. How do you do the asset values adjustment? Explain for the reader.

Page 10 Lines 23-24 Reference is missing for these indirect costs. How do you select this 7%?

Page 10. Table 3. We should be able to read the table without having to come back to the text. Add the scenario definition in the Note of the table or rename them more explicitly for the reader.

Page 13 Line 6. Model section. Think about a restructuration with the section where you present the model. You should make reference to Fig3 somewhere. This fig presents your model, not a generic model as Fig1 (see earlier comment).

Page 13 Results. You should report the results of all your scenario in terms of expected risks as done in Table3 for the consequences estimation. We miss the results of the case where CS+Pampri.

Page 13 Line 28 "Figure 7 shows...". This formulation is quite synthetic to present results!! You should guide the reader and develop your ideas.

Page 13 Section 3.6 I totally miss the interest/objective of this section. Do you really need a section for 1 sentence?

Page 14 Section 3.7.1. It is not clear how you perform this analysis. Why do you need the Aqueduc Global Analyser Database? Explain explicitly the parameter you've

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played with and what are the expected consequences on the estimation of the risk of giving the 0 to the 1 year return period or to the 10 year. Discuss how others did in the literature and motivate why this is important (for the policy maker)

Page 14 line 10. Explain selected versus actual? Not clear

Page 14 Line 17. Are the results obtained under what you call Current scenario or Base Case. Give the information.

Page 15 Line 14-16. Are the results obtained under what you call Current scenario or Base Case?. Give the information.

Page 15 Line 1. You are normally using the flow velocity to assess human health risks (DEFRA algorithm). Did you?

Page 15 Section 3.7.4. There is no simulation results. You say they will be presented in section 3.7.5. So what is the interest of this section as it is now? Consider to revise it to give relevant information for the sensitivity analysis. If you only discuss the sensitivity of the stage damage function, you could make reference to the literature of sensitivity analysis among others Moel et al. (2011, 2012); Saint-Geours et al. (2013), etc

Page 16 Line 17-19 Are the results obtained under what you call Current scenario or Base Case? Give the information

Section Discussion. You should improve the discussion, selected the point you want to emphasize and really develop in a much better way than with bullet points where the interpretation is sometimes left to the reader.

Page 17 Line 9. Develop. You cannot expect the reader to interpret this.

Page 17 Line 11. What is your point? How do you jump for example from flood peak to population parameters in the uncertainty analysis. Develop your ideas.

Section 4.2 Local planning implications. This was a good intention but unfortunately the points you mention are disconnected from your results and this weakens the paper and

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the interest to do a quantitative analysis. Use the sensitivity analysis and calibration of the model to orientate the policy maker towards the parameters he/she can play with to define prevention policies and measure their expected consequences. I refer to those parameters/elements that enter in the model and affect the risk management. The other parameters (those you use in your bullet points) have no quantified effect and deals with the large epistemic uncertainty of the flood risk assessment. I recommend to separate what your paper has shown (in the results and sensitivity) and its uncertainty related limitations, ie those parameters for which you cannot simulate the sensitivity by lack of knowledge.

Section 4.3 Recommendations. You already do recommendations in the section 4.2. Reorganize your sections. Also make sure that your recommendations are derived from your results. Example, bullet point 1: did your paper deals with coastal flooding or reveal (quantify) how important coastal flooding is? I don't think.

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