HESSD

Interactive
comment

Interactive comment on "The Value of Citizen Science for Flood Risk Reduction: Cost-benefit Analysis of a Citizen Observatory in the Brenta-Bacchiglione Catchment" *by* Michele Ferri et al.

Anonymous Referee #2

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Review This paper presents a framework that combines modelling with data collected through a citizen observatory running in northern Italy. The idea that citizen science could successfully be used to reduce the risk of catchments to the effects of flooding is interesting and timely. Having said that, I find several shortcomings in this paper that need to be fixed before it can be considered for publication in HESS. These shortcomings are: 1. The core message of the paper for me should be that citizen science and modelling are effective in reducing risk. However, the paper describes extensively the modelling approach whereas the citizen science part is very vaguely described.

The two together don't make a convincing story. 2. The concept of risk used in this paper is a known one. The paper uses quite some space in the methods section to go through the component of risk but it does it in a very confusing way. For example, one would expect that Fig 1 is used through the methods to arrive to the risk estimates, but it isn't, and therefore the presentation of the method is muddled. I would suggest re-writing the risk section, shortening and focusing it on the application to flooding risk, using a comprehensive figure to guide the reader. 3. The modelling approach uses many coefficients that lead to the estimation of risk. These coefficients presented in several figures, were taken apparently from a number of sources (not always disclosed) and are not subject to a thorough sensitivity analysis. The results of the modelling are heavily determined by the coefficients adopted so it is critically to explain these very well. I don't recommend this additional explanation is included in the methods section, but it has to be properly documented in Supplementary material. Without this, it will be extremely hard to test and to apply this method elsewhere. 4. The description of the Citizen Observatory is the most disappointing. It doesn't inform the reader in terms of data collected, how did the work, how it was implemented, etc. This should be lot more prominent in this paper. I do not recommend the publication of this paper because it requires significant re-writing.

Specific comments The abstract is not informative, and it should reflect the key innovation of this study. Presumably, the successful linking of risk modelling and citizen science should be the key message in the abstract. For the case study, the findings seem misleading because the study does not cost a infra-structure adaptive intervention, only the roughly estimated costs of the potential damage.

Introduction

L20-30 This section is irrelevant for the story of the paper, and not well written. I suggest to delete it, and add instead a clear definition of risk specific to flooding that introduce the paper.

L37-39 References required for the statement 'exponential growth' in citizen science. L40 unclear why references were added after ..."Among the various form of citizen science". Instead of references I would expect a list of the different forms. This whole sentence needs re-writing.

L61-63 and L65-68

L70 section 2.1 needs to be more carefully described. Details needed to interpret results.

L74 section 2.2 See general comment. This section up to 2.4 is so poorly written that it is hard to keep track of the method used, sources of information and assumptions made. In addition, the calculation of risk must be done from the beginning with a focus on flooding risk, the aim of this study.

Fig. 1 is not self-explanatory and it is not connected properly to the text that follows in 2.2 and 2.3.

Table 1 could be sent to supplementary material. It is not critical to the results.

L100-110. A description and testing of the hydrological model are needed because the reference included is not a peer-reviewed source and can't be accessed by the reader. This could be added to supplementary material

Table 2, Table 3 and Table 4. It should be clear what the sources for these coefficients are and why these are accepted to be reasonable without performing a sensitivity analysis.

L174 why is the use of 'value functions' the preferred approach, and what is the uncertainty associated with them? I don't see an uncertainty analysis conducted here.

Fig. 3 I wonder why this figure is presented in addition to Fig 1, and using slightly different terms and approach?

Fig. 4, 5, 6, 7 and 8. What is the uncertainty associated with this coefficients?

L214 Are forecasting systems the same as 'early warning systems' of Fig. 3? This is confusing.

Fig. 9 It is very hard to understand this figure. The caption is not self-explanatory.

L284. The component of the equation should be explained. This equation should be introduced after Fig 1 when the concepts are explained.

L295. This section on C/B analysis is not clear at all. I would have expected that the costs would be the cost of remedial and/or preventive actions, which are not clearly explained here. What are the units of ISRR? I would guess hectares of km2. And of CBA?

Table 7. I would expect large variability in these values. No uncertainty analysis performed.

L348 section 2.4. This should be one of the key section of the paper, but it is unfortunately very vague and doesn't provide the reader much information on how the citizen observatory worked, data collected, for how long etc.

Results. In view of all the methodological questions, it seems pointless to go through the results. From the paragraph included in L426-432, it seems that the paper should have explained the simulations of risk and damage, and what the citizen observatory programme did and achieved, which here remains as a black box.

End of review

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