

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 #1

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General comments Ferri et al. assess the flood risk and related costs in the Brenta-Bacchiglione catchment in Italy to evaluate the contribution of the establishment of a citizen observatory to flood risk mitigation. The authors also use this case study to demonstrate the validity of cost-benefit analysis to assess the value of citizen observatories in flood risk mitigation. As citizen science is a fairly ‘hot topic’ in hydrology at the moment, I think this is a timely study, providing a relevant tool that can be applied in flood risk management. The manuscript is well-written and fits well within the scope of HESS. I do, however, have a few questions and comments that I would like the authors

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to address.

In the introduction you mention that several studies identified that the link of COs to authorities and policy does not necessarily lead to increased participation or improved participation. Yet, in the cost-benefit analysis with CO, you assume a positive impact of the CO on numerous social vulnerability indicators based only on the outcomes of the pilot study. I understand that the focus of this manuscript is to demonstrate the use of a cost-benefit analysis in this context, but it would nevertheless be interesting to discuss how citizen science or CO projects in other regions affected these social vulnerability indicators. This would also put the results of this study in a broader context, which is currently missing.

This brings me to another point. From the methods, results and discussion I got the impression that most of the benefit of the citizen observatory came from the increased awareness and participation rather than just data provisioning. In the introduction, the role of citizen science and COs in data collection is actually highlighted. Also in Section 2.3, where the CO in the Brenta-Bacchiglione catchment is described, the role of 'experts' and citizens seems to focus on data acquisition, whereas the impact on estimating other flood risk drivers has not been explained as much. If you could elaborate on how the CO contributes to these aspects, this would support the (rather many) assumptions made within this study. In addition, it would be interesting to discuss at some point in the manuscript how the additional data (especially water levels) could contribute to improved hazard evaluation in your case study.

More specific comments and requests for further clarification on certain points in the manuscript are provided below.

Specific comments L. 19-20: I would use citizen observatories in this sentence as well, since your manuscript evaluates how these can contribute to risk reduction.

Figure 1: Please add legend to map and clearly indicate the boundaries of the Brenta-Bacchiglione catchment.

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L. 143-145: What is the sustainability of such an arrangement, whereby the technicians get paid for each trip, once the project ends? Where would the funds come from?

L. 151-159: Could you be more specific on the kind of observations that citizens can contribute? I would imagine these are less 'complicated' than the contributions of the trained volunteers and technicians. Furthermore – as mentioned in the general comments – how will citizen engage further in risk reduction such that flood risks can be reduced?

L. 185: Supplementary tables: Please change the numbers of the supplementary tables in such a way that they are numbered according their appearance in the text.

L. 223-227: The section on EE and EECH is quite unclear and could do with some more detail, as I cannot really follow what has been done based on the current description.

Table 3: Are these relative values based on the data explained in the previous paragraphs? This seems straightforward for EP, but it is not clear how EE and EECH translate from costs to a relative value. And how have these values been tested and shown to be valid?

Figure 3: I would place this figure in Section (ii), where you explain how the weights and values have been obtained. How did you define the indicators? Is this based on existing literature? And could you provide more information on the stakeholder engagement to identify weights and values? Which stakeholders were engaged and how were the weights and values determined? Average of what different stakeholders provided? Or did certain stakeholder provide info for certain indicators only?

Table 4: Include the references to your data sources in the table (either in the caption or as footnote) if the values are directly taken from the studies you mention in L. 252-254.

Figure 4 and similar figures: Are only the values 0.25, 0.75 and 1.0 included in the analysis? If so, why particularly these values and not values in between?

L. 266-268: How were the value functions for the different indicators defined? Was this

also part of the stakeholder consultation?

L. 284-288: How were content and reliability quantified? Simply assigning it to one of the categories shown in Figure S2 could be quite subjective.

L. 299-302: More information on this is required. From what is provided, it is difficult to understand how to interpret Figure S3d. What does no category mean? That no citizens are involved (which would correspond to zero citizen involvement and thus increased vulnerability)?

L. 318-319: In the caption of Figure S3, it says these values are for network infrastructure. Does this only apply to roads? If so, please change accordingly.

L. 356-358: If social vulnerability decreases to 0.63, what was its original value?

Tables 8-11: If you combine the tables, the reader would have a better overview of the results of the different scenarios with and without CO without having to move from page to page to compare values. E.g. some information in Table 11 is already presented in Table 9.

L. 451-453: Not clear: were these calculations for the retention basin done within this study or do you refer to this as an example/comparison? If this was done as part of this study, I would have liked to see more information on the calculations.

L. 489-490: Could you add a sentence on how the presence of a CO reduces costs related to emergency services?

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