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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Evaluating quality of data collected by volunteers for first level inspection of hydraulic structures in mountain catchments" *by* V. J. Cortes Arevalo et al.

Anonymous Referee #1

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General comments

This is an interesting paper that merits publishing since it describes a new approach for evaluating the impacts of floods and debris flows on hydraulic structures and vice versa in difficult mountain terrain with the help of volunteers. The English is excellent and only needs one or two small modifications.

In terms of scientific significance, the paper puts forward new concepts, ideas, methods and data but the representativeness of volunteers could be expanded to include a wider spectrum. The conclusions are clear and useful. In terms of scientific quality, the

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methods are valid but the assumptions (in terms of choice of volunteers) and results could be discussed in more detail. Some of the methods could be accompanied by more systematic techniques explained below. The paper is up to international standard and the discussion of results is well anchored in existing international literature. In terms of the presentation quality, the paper is clear but some of the graphs and tables could be improved.

Specific comments

I would propose changing the title to improve its clarity either to: “Evaluating data quality collected by volunteers for first level inspection of hydraulic structures in mountain catchments” or to “Evaluating the quality of data collected by volunteers for first level inspection of hydraulic structures in mountain catchments”

In the abstract, it is important to mention the kind and number of volunteers used in the first sentence and to mention more precisely where the inspections were undertaken (nearest city, river basin, what kind of altitudinal range etc).

In the introduction (p. 3578) a more detailed explanation would be required on the reason for using citizen-based approaches/volunteers (economic, lack of staff, lack of time for high-level schooling, remoteness, physical setting). The introduction would also benefit from mentioning the type and frequency of hazards involved, their destructiveness concerning hydraulic structures (which types of events – floods, debris flows, frequent, infrequent damage?). On p. 3580, 2nd paragraph - describe in one or two sentences what type of citizen volunteer groups and how many volunteers are involved, how representative they are for different target groups. Also explain why and under which circumstances the groups are selected (remoteness, difficulty in logistics?). In the same paragraph, it is mentioned that “regular inspection of hydraulic structures is important due to their influence on water sediment processes..”. It would be logical to mention the inverse as well, influence of sediment and other processes on the security of hydraulic structures. Further on, the “. . ..obstruction and erosion of bridges and

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culverts" is mentioned. Here other forms of obstruction apart from sediments should be mentioned, such as logs, vegetation etc. The different forms of obstruction should ideally be introduced earlier on in the paper.

2. Design of the inspection forms Explain who the volunteers were. Why were no local inhabitants such as farmers, fishers, local citizens, mountain guides etc implied? What was the level of knowledge of the volunteers on the type of work they were doing? Did some already have similar training?

2.1 in the second paragraph on p. 3582, it is stated that parameter A focusses on water flow and erosion. Please mention in more detail what kind of erosion or obstruction? Sediment, vegetation, tree trunks, or even parts of bridges/pillars transported by floods from further upstream? Have these other types of obstructions / erosion catalyzers been considered in the forms? Further on, safety limitations for volunteers are mentioned. Please expand on this. How important is the physical condition of the volunteers with relation to steep mountain channels and large grain sizes? In the third paragraph, it is indicated that photos were taken by some volunteers. This should be indicated in the methodology earlier on. Why was systematic photography not used as part of the methodology by all volunteers?

2.2 Data collection Please specify in more detail where the study was carried out, mentioning in which altitudinal range the structures were inspected within the mountain catchment, the size of the catchment area, the nearest bigger town or city, approx. how many check dams and bridges are present and time taken for a full inspection programme (number of hours/days/structures visited)? It would be useful to mention the frequency and damage potential of the natural hazards affecting the hydraulic structures. Also, mention how often and with which spatial representation the volunteers were asked to carry out the inspections. Were repeat inspections carried out?

In the third paragraph, explain how the participants were chosen. Self-application or selected? What was their age group? Experience? Were they indigenous or from

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outside? Why were only students and actors from Civil Protection taken? From which university were the students from? All from the same? In which year of study were they?

3.2 Functional status On p. 3591, 2nd paragraph, discuss the differences in the origin of the volunteers in more detail (local or not)? Familiar with mountain terrain or not? Familiar with natural hazards or not?)

5 Discussion irst paragraph, p.; 391. It would be useful to have a wider statistical representation in future. It is mentioned that regional database could be updated in future. Expand on this. How could the database be improved? Higher spatial and temporal frequency of inspections? p. 3592 3rd paragraph. With relation to volunteer's awareness of the water-sediment processes, the colour / sediment concentration of the flow could also be observed to give an indication of whether the hazards is still ongoing and endangering the structure. P; 3592 Last paragraph. Concerning the photo record, was a more systematic documentation with coordinates envisaged?

Conclusions The conclusion is clear and concise but it is only at this point that the reader learns about the number of technicians and volunteers involved in the study. This should be mentioned right at the beginning of the paper (introduction and methodology).

p. 3596, 2nd paragraph. Explain why the exercise was not foreseen as a more perennial task, including the long-term experience of local citizens.

References You could also refer to work done by CIMA, Savona on linking civil protection with natural hazard emergency plans and early warning.

Figures

Please redo Fig.1 adding a clearer and larger overview map with nearby cities and rivers and some heights in m. Table 1 Do the forms include a category on the visible damage on the check dams and bridges? Are the participants asked to do any remarks

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on local sediment sources causing obstruction such as small landslides on the slopes and river banks? Do the volunteers differentiate between sediment and vegetation? Same For Table 2. Table 4 Do the volunteers estimate the sediment size causing the obstruction? Do they estimate the relation between the size of the sediment/ tree trunk and the size of the check dam or the free surface below the bridge? Do they differentiate between loose and consolidated obstructions (mobilisable or not, endangering the structure more or less?).

Technical corrections

p. 3578, line 10 change to ". . ...to the rating scales in the form in order to get an. . .."

p. 3578, line 20 change to ". . ...approaches to better understand the environment and hazard. . ..".

p. 3579, line 4 change to ". . . directives such as . . .. . ." line 10 change to ". . .. In promoting"

p. 3580 line 1 change to ". . . the extension of these training sessions should. . .." Line 8 change to " approaches as a screening method.." Line 13 change to change to ". . ..flow and sediment processes. . .." Line 25 change to ". . . How effectively were data collected by volunteers compared to those collected by. . ."

p. 3581 line 6 Change first sentence to "In a first step of the methodology two inspection forms were designed for bridges and. . ." line 18 change to ". . . Civil Protection, the Geological Survey, the Forest Service. . .."

p. 3582 line 3 "For the case of bridges, parameter A. . ."

p. 3583 line 22 change to ". . . inspection tests differed according to . . .." Line 23 change to ". . . tests accounted for a range of concerns from minimal to serious. . ."

P 3584 line 10 change to "It was comprised of statements".

p. 3585 line 8 change to ".. the description for each class. . ."

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p. 3587 change to "... It is worth mentioning that..."

p. 3592 line 1 "... frequency, spatial representation (?) line 2 change to "... That consideration is particularly relevant to mountain catchments..." line 5 "In this study. ..."

p. 3593, 2nd paragraph. Change to "..may be interpreted differently due to the higher experience..."

p. 3595 line 15. Change to "Therefore it si crucial that the systematic. ..

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 3577, 2014.