

***Interactive comment on* “Flood risk related to a fluvial system modified by dams with emphasis on morphodynamic and hydrological aspects” by Karina Vanesa Echevarria et al.**

Anonymous Referee #1

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The paper presents an expert-driven method for a qualitative risk assessment in an urban area located after a dam in Cordoba (Argentina). In the proposed approach, the flood hazard and the potential vulnerability degree maps are combined by means of a matrix to obtain a qualitative flood risk assessment map. The main aim of the study is to evaluate the fluvial morphodynamic and hydrological effects of the dam construction on the proposed case study in terms of potential residual risk due to the different dam management scenarios (gates opening). The topic is interesting and of practical interest for flood risk management and fits in the Journal scope. The simple and parsimonious approach proposed could be a relevant contribution for the territory studied. Moreover, the overall presentation of the most part of the paper is well structured

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and easy to understand by a wide audience. The figures are understandable and of a good quality. However, the paper has a number of criticalities that have not been fully addressed as exposed in the following.

General Comments Unfortunately, the novelty of the paper is not clearly explained; a state of the art is missed. Considering the several geomorphic or dem-based methods for estimation of flood hazard as well as a quite large range of qualitative and quantitative flood risk assessment tools and methods, characterized by different complexity, for different kind of floods (also considering anthropic causes) available in technical and scientific literature - some of them take into account the dynamic characteristics of risk – the authors should highlight the main new relevant scientific and/or technical questions that the paper would like to address. The main advantages and limitations of proposed method respect to technical and scientific literature approaches (so much respect to the one that considering sedimentological, morphological, and paleohydrological records) should be demonstrated and discussed in details. In particular, the transferability of the proposed methodology in other geographic region should be discussed in order to demonstrated the relevance of the contribution for the scientific community. The results presented for the proposed case study show the potential risk in case of a weak dam management or mal function. However, the conclusions don't present a guide line or a further analysis to demonstrate the importance of the proposed method in supporting risk management, i.e. in identifying the strategies (or choose among different alternatives) to reduce the effects/consequences of the dam constructions on the downstream area and limit the residual risk. Can the authors, for example, give advices to manage the dam operations or suggest structural and non-structural management actions for the area? These limitations of the paper are not really well justified and, surely, future researches need to be done on these important aspects.

Specific Comments 1. The contribution is relevant in particular for the specific case study and, thus, it should be highlighted in the title. 2. The abstract should provide

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more details on novelty of the proposed research and a concise and complete summary of the approach utilized and its results. 3. A detailed state of the art of literature in the field is missing in order to show that proposed methods are valid and innovative. A comparison with other studies should be of interest for readers. 4. Several assumptions in the methodology section aren't outlined clearly; for example, I suggest to justify the choice of the number and magnitude of hazard (threat) scenarios. Moreover, the authors should justify on which basis the degree of hazard and vulnerability assessment are evaluated. 5. The performance of the risk matrix is not usually rigorous validated and, therefore, can assign identical rating to quantitatively very different risk due to its poor resolution. Finally, its subjective and not careful explained interpretation of rating can also produce errors in comparative ranking of risk areas. Can this compromise the validity and transferability of the present study in other case studies? 6. I suggest to demonstrate the usefulness of the proposed approach for risk management in the results and conclusion section. For example, it could be of interest to do a guideline for taken into account the risk dynamic considering natural and human changes or some advices to manage the dam operations or suggest structural and non-structural management actions for the area?

Other Comments 1. More information is needed for data utilized: e.g., which spatial resolution has the risk maps and if they are adequate for the scope of analysis? The morphometric conditions and their changes are quite similar in all the area? Can be the roughness values utilized listed in the text? How detailed is the topographic map utilized for the hazard assessment? 2. How the levees, bridges and all hydraulic infrastructures are taken into account? 3. How the mining and disposal of waste are taken into account in the results section for the vulnerability assessment? 4. The table 6 should be more readable if a colour ramp will be assigned to cells that represent the level of risk? 5. In the vulnerability assessment, the authors haven't considered population at risk or have estimated the potential loss of life and other environmental, economic and cultural aspects of risk. Can the proposed methodology take into account these important aspects of the flood risk assessment?

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