Risk-based flood protection planning under climate change and modelling uncertainty: a pre-alpine case study
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This is an extremely well written paper on a very important challenge in adaptation planning – planning under deep uncertainty with flexible or inflexible strategies – also addresses adaptive management. The paper does not provide enough detail to let the reader really understand its contribution. Therefore a revision is suggest. More details below.

In the full review and interactive discussion the referees and other interested members of the scientific and technical communities are asked to take into account all of the following aspects:

1. Does the paper address relevant scientific and/or technical questions within the scope of NHESS? Yes, paper is about a natural hazard, consequences, management.

2. Does the paper present new data and/or novel concepts, ideas, tools, methods or results? Paper addresses one of the fundamental challenges of adaptation planning to climate change – how to develop strategies under deep uncertainty. They go beyond just the uncertainty of the climate change, but also the losses. Their approach builds upon applications in related fields.

3. Are these up to international standards? Yes.

4. Are the scientific methods and assumptions valid and outlined clearly? This is the drawback to this paper. The methods (Bayesian analysis and backwards induction optimization) are summarized very briefly with not enough information for the non-expert to fully understand them. While references are given, it is suggested that more detail be provided. If this is not possible due to space limitations, then more attention has to be given to them in the case study so the interested reader can see the strength of the approaches so she/he can pursue these topics in more detail.

   One challenge is that a major source of uncertainty is ignored – the emission scenario. Here they only assumed one – how can method be used if planning done more realistically under multiple emission scenarios ?

5. Are the results sufficient to support the interpretations and the conclusions? Again, more detail could have been provided. The authors determined the effectiveness of each strategy and then evaluated their performance under the uncertainties of damages and discharges. It is not clear to me why just enumeration and evaluation of all the possible

sets of strategies without the optimization model would also have been effective as small number of options. Thus would have been useful to understand the value of the optimization model. Also, the discussion of the results almost seem similar to results of conventional scenario analysis – what strategy works most reasonably over all the scenarios. Perhaps this was just a check of the results.

6. Does the author reach substantial conclusions? Generally – see #5.

7. Is the description of the data used, the methods used, the experiments and calculations made, and the results obtained sufficiently complete and accurate to allow their reproduction by fellow scientists (traceability of results)? See #5. More detail may be needed. Some figures are unclear – eg. In Figure 10, the low period discharges in many years seem higher than the high period discharged. What are the x-axis units in Table 6. Also, the term 'flexibility parameter" is used but not defined. Also, it is not clear how flexibility was considered.

8. Does the title clearly and unambiguously reflect the contents of the paper? Yes.

9. Does the abstract provide a concise, complete and unambiguous summary of the work done and the results obtained? Yes.

10. Are the title and the abstract pertinent, and easy to understand to a wide and diversified audience? Yes.

11. Are mathematical formulae, symbols, abbreviations and units correctly defined and used? If the formulae, symbols or abbreviations are numerous, are there tables or appendixes listing them? Yes.

12. Is the size, quality and readability of each figure adequate to the type and quantity of data presented? Yes.

13. Does the author give proper credit to previous and/or related work, and does he/she indicate clearly his/her own contribution? Yes. I suggest that it may be useful to compare this method to other methods of DMUUC such as Robust Decision Making, Decision Scaling, Dynamic Adaptation Pathways and Policies. This would be interesting.

14. Are the number and quality of the references appropriate? Yes. But see #13.

15. Are the references accessible by fellow scientists? Generally yes.

16. Is the overall presentation well structured, clear and easy to understand by a wide and general audience? Yes with above comments.

17. Is the length of the paper adequate, too long or too short? Adequate.

18. Is there any part of the paper (title, abstract, main text, formulae, symbols, figures and their captions, tables, list of references, appendixes) that needs to be clarified, reduced, added, combined, or eliminated? Yes, see above.

19. Is the technical language precise and understandable by fellow scientists? Yes.

20. Is the English language of good quality, fluent, simple and easy to read and understand by a wide and diversified audience? Yes. This a very well-written paper.

21. Is the amount and quality of supplementary material (if any) appropriate? It seems none was supplied.