

## ***Interactive comment on “Strong increases in flood frequency and discharge of the River Meuse over the late Holocene: impacts of long-term anthropogenic land use change and climate variability” by P. J. Ward et al.***

**P. J. Ward et al.**

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We thank the editor for his useful and constructive comments, and are pleased that he valued our work. We believe that the comments made will allow us to improve the quality of our manuscript. Below we respond to the comments in more detail.

1. The editor states that it would be valuable to carry out some sensitivity analysis to test the strength of the conclusions. In our research we did carry out such sensitivity analysis by individually altering the values of all key parameters and assessing the effects of these changes on the discharge results. However, in the original manuscript

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we only mentioned this sensitivity analysis very briefly in Section 5.3. We agree that the paper would be improved by a more detailed description of the results of the sensitivity analysis. Hence, we will expand this section and add a table in the appendices showing the results of the sensitivity analysis. Furthermore, in response to comments 2 and 3 of Anonymous Reviewer #2, we have carried out further sensitivity analysis to examine the effects of limited deforestation in the basin. These results are discussed in the response to Anonymous Reviewer #2, and will be discussed in the revised manuscript.

2. The editor states that the results section would be made richer by giving more insights into the mechanisms responsible for the increased runoff and flood frequency. For the increase between the periods 4000-3000 BP and 1000-2000 AD the main reason is wide-scale deforestation. More specifically, the results of our sensitivity analysis show that the main mechanism is a significant decrease in evapotranspiration due to the decreased potential for evapotranspiration to occur over arable land, as opposed to over forest. Hence, the results of the sensitivity analysis strengthen our paper in this regard. In the new manuscript we will make more explicit reference to this mechanism. For the last century, the main causal mechanism has been an increase in precipitation; this is discussed in Sections 4 and 5.

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