EGUsphere, author comment AC1
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Reply on RC2

Annette Sophie Bösmeier et al.

Author comment on "Reliability of flood marks and practical relevance for flood hazard assessment in southwestern Germany" by Annette Sophie Bösmeier et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-223-AC1, 2022

Dear Referee,

we would first like to thank you a lot for your support in reviewing our article and giving appreciative and valuable comments as well as raising relevant questions.

Regarding your first question on possibilities and examples of utilizing flood marks as a substantial additional value to an integrated flood risk management, we would like to elaborate on some ideas. An integrated flood risk management, as described for instance by Merz et al. (2011), extends from a broad range of preventive measures to diverse coping strategies in the case of a flood event. In the submitted article, we have mentioned some examples illustrating the potential benefit from flood marks as we believe that the verification, preservation and maintenance of existing flood marks and, if appropriate, the installation of new marks can contribute to a number of preventive measures (lines 588–589).

On the one hand, plausible flood marks may be included in flood hazard analysis in various ways. With regards to the development of a basis for planning or for technical flood protection, flood mark positions and heights may be considered indications of worst-case scenarios and could be used to check the extent of the HQextreme in hydrological and hydraulic modelling (lines 493–496, 534–538, 583–584, and 594–596). We also recommend to check for systematic discrepancies between flood mark positions and heights and the current flood hazard maps. If apparent, understanding the origin of such discrepancies might help to improve process understanding and enhance modelling of extreme events (lines 591–592). Indicating possible flood-prone areas (by position, height and number of different marks and / or associated flood events), marks may also represent additional criteria helping decision-makers to decide upon building development in these areas or flood-adapted construction. This point is not yet mentioned in the article and could be added.

On the other hand, clearly visible flood marks in public space contribute to the information on possible flood extents, which in turn may increase the awareness towards flood risk among the general public and incite interest in the topic. Thereby, flood marks can stimulate behavioral precautions, information provision, and (personal) risk prevention. Moreover, increased awareness of flood risk may contribute to an enhancement of emergency procedures. Since flood marks can survive for centuries, they also play an important role in keeping the society´s sensitivity towards flood risk alive and establishing

a long-term risk memory (lines 75–81, 550–555, and 588–589).

We have mentioned these ideas in greater or lesser detail in different parts of the submitted paper, such as in the introduction, the discussion, and the conclusion (e.g. lines 588–596). We would suggest to include a short additional paragraph in the discussion (5.2 Significance for present flood risk management) which focusses on examples illustrating the value of flood marks for an integrated flood risk management, if you agree.

Your second question refers to the replicability of this study in other catchments or study sites than the examined sites in the Kinzig catchment, Southwest Germany. Here, we are confident that many other sites provide the basis for repeating this study or some of its parts, which include the collection of flood marks, flood marks information, and flood data, the assessment of plausibility and preservation of the marks, and the comparison between flood marks and flood hazard maps (lines 584–586).

Flood marks have already been documented for many areas in Europe, as we mentioned in the discussion (lines 539–546). The abundance of marks and detailedness of flood mark information may strongly vary, but this does not principally preclude a similar study. For instance, historical information on the original condition of flood marks may rarely be as detailed as provided by the "Centralbureau für Meteorologie und Hydrographie im Großherzogthum Baden". However, in the case of extreme floods of the past few centuries, qualitative information is usually available in one form or another, e.g. as reports on the flood propagation, extent or damages, or also as pictures of the water level. Such information can also help to rate the plausibility of collected flood marks and possibly discover strongly modified or moved marks. Thereby, the overall uncertainty involved in flood mark information of a specific area could be assessed. At this point, it would be interesting to examine regional similarities or differences and their potential reasons. With regard to the last part of our study, the juxtaposition of flood marks and current flood hazard maps, we also do not see any basic obstacles for other study sites. Since flood hazard maps had to be prepared by member states according to the European Floods Directive (2007/60/EC), they are available on a large scale.

We hope that we could adequately clarify both issues that you have brought forward and would be happy to receive a short reply.