

## ***Interactive comment on “Discharges of past flood events based on historical river profiles” by D. Sudhaus et al.***

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The paper presents the historical flood analysis for the Neckar River (Germany). By the help of the HEC-RAS model and using the historical cross profiles, the authors calculated peak discharges for the extreme floods of 1824 and 1882. The obtained peak discharges have appeared to be comparable with the available historical estimations for these floods as well as with the estimations based on the water balance model (LARSIM) and obtained in the previous papers of the authors.

Overall, this is an interesting paper which deals with one of the topical problems of flood risk assessment and management. There are a few minor changes I suggest to take into account by the authors.

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1. I suggest paying more attention in the Introduction to the previous papers of the authors dealt with the reconstruction of the extreme floods of 1824 and 1882 in the Neckar River (Bürger et al., 2006; 2007). It is not clear from the Introduction what are the shortcomings of the estimations obtained in (Bürger et al., 2006; 2007) generating a need for the use of the HEC-RAS instead of the LARSIM. Also, what is the advantage in description of channel routing by the HEC-RAS comparing with the respective LARSIM-submodel? For me, the advantage of more sophisticated model in the concerned problem is not evident accounting for the large uncertainty in the channel characteristics.

2. I suggest giving more information on temporal changes of the Neckar River morphometric characteristics. What are the differences in the respective historical and present characteristics of the channel and what is the sensitivity of the flood peak discharges to the changes occurred in these characteristics? For better understanding, I suggest the authors to simulate flood peak discharges for the historical extreme floods under the present channel conditions and compare the results with simulations obtained under the historical conditions presented in the paper.

3. The authors suppose that the presented results can contribute towards a better flood risk management (page 334; line11-13). However, in the case of the unstable channel characteristics at the Neckar River, the flood peak discharge series is nonstationary and it is questionable that the reconstructed discharges can be used for improving flood risk assessment and management.

Technical Corrections 1. What is the current extreme flood; (page 330; line 18) and what is the reason for the comparison of 1824 flood event with this flood? Is this the flood of the specific return period? 2. On my opinion, formula (1) is not necessary. However if the authors prefer to keep it, than the arguments should be listed after the formula rather than before it. 3. profile radius; (page 329; line 2) should read hydraulic radius; 4. and the mean flood discharge; (page 326; line 27) should read and

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the maximum flood discharge&#8230;&#8221;

## Concluding Remarks

1. Does the paper address relevant scientific questions within the scope of HESS? YES 2. Does the paper present novel concepts, ideas, tools or data? YES 3. Are substantial conclusions reached? YES 4. Are the scientific methods and assumptions valid and clearly outlined? YES 5. Are the results sufficient to support the interpretations and conclusions? NOT COMPLETELY (see comment #2) 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientific (traceability of results)? YES 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? NOT COMPLETELY (see comment #1) 8. Does the title clearly reflect the contents of the paper? YES 9. Does the abstract provide a concise and complete summary? YES 10. Is the overall presentation well structured and clear? YES 11. Is the language fluent and precise? YES 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? YES 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? NO 14. Are the number and quality of references appropriate? YES 15. Is the amount and quality of supplementary material appropriate? YES

I recommend the paper &#8220;Discharges of past flood events based on historical river profiles&#8221; by Sudhaus et al. for publication in HESS. All the suggested changes are minor and no additional review is needed.

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