

Interactive comment on “A consistent set of trans-basin floods in Germany between 1952–2002” by S. Uhlemann et al.

Anonymous Referee #1

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General comments:

The authors analyse and discuss so called trans-basin floods for Germany, which is an interesting topic and also of high international relevance. They term floods as trans-basin floods if they affect multiple basins, are of durations exceeding several days and caused by the same hydrometeorological process. It is argued, that knowledge about trans-basin floods is very important when dealing with accumulated risk over larger domains. The objective is to provide additional information for improved risk-assessment of trans-basin floods especially concerning their occurrence and severity.

The authors use daily discharge data from 162 streamflow gauges in Germany with a minimum drainage area of 500 km² over a period of 51 years. They identify 80 trans-basin floods in the entire time period which lead to inundation for at least 10% of the

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German river network considering a total length of about 12000 km. The results show that western and central parts of Germany are mostly affected by the trans-basin floods and that they occur mostly in the hydrological winter.

The presented methods and ideas are quite new. The presentation is clear and well structured. The conclusions are supported by the data and results. One interesting point I have missed in the paper is the relevance of the trans-basin floods compared to the whole set of floods regarding the total risk accumulated over space and time. Or in other words to which degree contribute trans-basin floods and too which degree the floods with smaller extent regarding mean expected damage. The severity indicator or another criterion could be used to assess an accumulated risk for all trans-basin floods and for all events with smaller extent building each the sum of the index over all events. At least a discussion of this issue should be included in the text. In addition some specific comments are given in the following which may help to improve the paper.

Detailed Comments:

1. The ranking of multivariate events according to their magnitude is not straightforward. Here a severity indicator is used. This indicator is not easily interpreted. An obvious alternative would be the application of a mean return period calculated over all floods at different gauges, may be weighted by the affected length of the river network. A brief discussion why this latter criterion has not been considered would be useful for the reader.
2. Page 1493, lines 16-17: The exclusion of catchments with drainage areas smaller than 500 km² is certainly ok for the analysis of trans-basin floods at the country scale. However, for total risk assessment the floods in smaller catchments might contribute significantly to the accumulated risk considering e.g. events resulting from convective storms. This should be mentioned in the text.
3. Eq. (1) becomes not quite clear. E seems to denote the set of events. In that case $E = \{\dots\}$ would be the correct notation.

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4. The need to apply Eq. (2) – (4) for the flood peak identification becomes not clear. For AMS simply the largest daily discharge in each year could be chosen and for POT the n-largest values or the n values above a threshold considering a minimum lag time could be selected?

5. Fig. 5: The label for the x-axis is not completely visible.

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