

Interactive comment on “HESS Opinions “More efforts and scientific rigour are needed to attribute trends in flood time series”” by B. Merz et al.

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General comments:

Understanding the causes of trends in flood time series is an issue that is currently intensely debated in hydrology. During the EGU Leonardo conference held at the Slovak University of Technology in November 2011 the first author of this paper proposed a strategy of more rigorously attributing flood trends to climate, catchment and river processes which he is now presenting in this opinion paper. The main line of reasoning is that, instead of vague discussions and speculations, a hypothesis testing approach should be adopted by the scientific community involving (i) proof of consistency of the effect of one or more drivers of flood trends, (ii) alternatively, proof of inconsistency and

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(iii) some statement of the confidence of the attribution. They also note that the current practice in flood trend attribution is poor and more rigour is needed.

I must say, I could not agree more with their assessment. The authors make a very important point. A change in the culture of flood trend and flood attribution studies is indeed needed and the road map proposed by the authors promises an attractive way forward. Throughout the paper, the reasoning is convincing and I anticipate it will make an important impact on the relevant literature.

Specific comments:

p. 1346, l. 7: The terms “proof” and “prove” are used here and many times throughout the paper. I do not think these are the right words. Proof has a clear mathematical or logical connotation which is not justified here. Existence of trends or the effect of drivers cannot be proven. There may exist “evidence” for trends or for drivers but no proofs. I suggest to replace these terms by something like “check” or “evidence” depending on the context.

p. 1346, l. 20: Detection and attribution are one-sided terms, at least linguistically. The authors may want to add here the possibility that there are no trends and no evidence for attribution.

p. 1349, l. 23: Here, and a number of instances later in the paper, the authors refer to Hundecha and Merz (2012) which is a paper under review. I think it is not appropriate to cite a paper under review and I suggest that reference to this paper is removed throughout the manuscript.

p. 1350 and 1350: The authors seem to imply (although they do not say so explicitly) that the focus is on flood peak discharges. I think that other flood characteristics can be even more informative than flood peaks such as the time of year the floods occur

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and the flashiness of the runoff regime. Parajka et al. (2010) and Holko et al. (2011) have demonstrated that these variables allow very useful insights into flood processes related to change.

p. 1351, l. 2: Again, “unequivocal” and “proof” is just not the right wording here (and it is inconsistent with the confidence aspect proposed by the authors themselves).

p. 1351, l. 20: “likelihood statement .. that a certain driver .. caused the observed change” Perhaps add: “given the available data”. The likelihood will invariably depend on the data that are available for testing the hypothesis. If longer flood records are available evidence for trends may appear or disappear as the case may be.

p. 1355: The scales perspective is a very good point.

p.1359, l. 1: One of the uncertainties that could be mentioned here are that the model parameters of rainfall-runoff models tend not to be stable if the hydrological situation changes (eg. Merz et al., 2011).

p. 1359: The question remains how the hypothesis testing can be framed. I am sure this is something the authors will work on in the near future and there are European projects currently being launched on this topic such as the ERC FloodChange project at the TU Wien.

Recommendation:

This is an excellent paper and I fully support the opinions held by the authors. There are a number of minor comments the authors should address to further strengthen the paper.

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