

Interactive comment on “Climate impact on floods – changes of high-flows in Sweden for the past and future (1911–2100)” by B. Arheimer and G. Lindström

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General comments

This is an interesting manuscript that explores whether floods are more frequent and will increase in future in Sweden. The authors merged long (100years) observed flood time series of 69 rivers with hydrologic model simulations reflecting two climate projections for the period 2000-2100. The results indicate no significant trend in flood changes in the past, but their oscillation between the decades. The evaluation of climate projections shows a shift in flood generating processes, however the climate

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projections are not fully in phase with observations. Finally, the authors discuss the methodological uncertainties and challenges connected with such flood change assessment.

Overall, the topic is interesting, timely and within the scope of HESS. The amount of long flood time series is impressive. I have only a few comments to strengthen the presentation and to highlight more the attribution of flood changes to climate drivers. Some of the messages (no significant flood changes in the past, uncertainty of the projections, etc.) are not very surprising. I'm wondering, why mainly analyses of merged time series are presented in the results? I would suggest to consider looking more on the causes - i.e. effect of changes (increase) in air temperature on flood regime in the past, which is based on observed data, for a specific catchment. Such evaluation has potentially more significant impact than pure regional assessment. There is probably some observed increase in air temperature in Sweden, which already caused some shift in flood regime/seasonality in some specific catchments, i.e. situated in some sensitive zone. Trading space (from this sensitive zone) for time might be helpful for more general interpretation/support of the future projections. Some more detailed investigation here will be very interesting (i.e. what region is sensitive? in which season and how large increase in air temperature is important?, etc.).

I would also suggest to revise the discussion section. In the current form it presents mainly the known limits and uncertainties and does not discuss much novel information. It would be probably more interesting to put the results of attribution into the context of existing studies (i.e. Kormann et al., 2014, HESSD, ...) and also to discuss the benefits of merging the long timeseries from the past with the model projections (and why it is the case?).

Specific comments

1) Please correct the reference to Hall et al. (2013) to Hall et al. 2014 (already published in HESS).

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2) Please consider to be more precise when referring to temperature. Do you always mean air temperature (measured in 2m)?

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