

Interactive comment on “The critical role of uncertainty in projections of hydrological Extremes” by Hadush K. Meresa and Renata J. Romanowicz

Anonymous Referee #2

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The authors assess the effect of different uncertainty sources on climate change projections. The presentation of the results is easy to follow and interpret. Especially Figure 9 is very informative. However, there is room for improvement using specific comments and checklist below. I recommend major revision as the model calibration part is not clear.

Specific Comments: 1. Table 2: Optimal values of some parameters are out of lower and upper limits e.g. CFMAX which cannot be reached by an algorithm e.g. SCEUA, CMAES etc. How was this achieved by a calibration algorithm? Did you follow a manual calibration scheme? 2. Demirel et al (2013a) is in the reference list but not in the text. 3. Please explain the abbreviations used at legend in figure caption. The legend of Fig

C1

8 is confusing: “distrn”? 4. Did you compare uncertainty in HBV model parameters with other studies (Addor et al., 2014; Demirel et al., 2013b; Osuch et al., 2015) using HBV model for forecasting hydrological extremes? How would the results overlap for 10 day forecast (Demirel et al., 2013b) and long term climate predictions in EUROCORDEX (dataset used in this study)? 5. Fig5: Parameter uncertainty should be presented differently to assess the contribution of each parameter uncertainty to total uncertainty. From this figure the reader can't see the most uncertain parameter. A figure similar to Figure 4 in Demirel et al (2013b) or Fig9 in the current manuscript can be very useful for modelers. This can be easily done as the GLUE results would allow such ranking. 6. Conclusion 2 (ii): Please explain the drizzle effect? Not clear. 7. Section 3.6 and Conclusion 5 (v): Is ANOVA method a global or local sensitivity analysis method? Can interactions (parameter etc) be assessed using this method? Why ANOVA is used instead of other elementary and global methods e.g. Morris, SOBOL, PEST, FAST etc. These aspects of the ANOVA method should be described in section 3.6 and conclusions should follow these details. 8. Conclusion bullets are confusing. Two times “iv” exists and sentences are not clear. There are typos too. For example Conclusion vi should start with capital. Please rephrase them with short and clear conclusions. And relate them to the results section. Bullet conclusions in Demirel et al (2013b) can be an example. For each result section one paragraph is given in conclusion.

HESS REVIEW CHECK-LIST 1. Does the paper address relevant scientific questions within the scope of HESS? Yes, the authors assess different uncertainty sources in climate projections. They found out that the model parameters can be more uncertain than some other important sources i.e. the climate model variability and distribution fit uncertainty for the lowflow extremes. This outcome is in line with the findings of Demirel et al 2013, WRR (DOI: 10.1002/wrcr.20294). 2. Does the paper present novel concepts, ideas, tools, or data?

Yes, this is an extensive analysis of uncertainties on low and high flows. 3. Are substantial conclusions reached?

C2

Yes, especially ranking of uncertainties is significant. 4. Are the scientific methods and assumptions valid and clearly outlined?

Yes, the authors explained the methods clearly. 5. Are the results sufficient to support the interpretations and conclusions?

Yes 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

This is a research paper, a case study from Poland. 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

Yes 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 but sub-titles in methods and results sections should be consistent. Are the methods for section 4.7 explained in section 3.6? What do you mean by seasonal flows? Seasonal low and/or high flows? 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, enough 15. Is the amount and quality of supplementary material appropriate?

N/A

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