

# ***Interactive comment on “High-end climate change impact on European water availability and stress: exploring the presence of biases” by L. V. Papadimitriou et al.***

## **Anonymous Referee #1**

Received and published: 11 August 2015

1. Does the paper address relevant scientific questions within the scope of HESS? YES, it explores the response of European river basins to climate change
2. Does the paper present novel concepts, ideas, tools, or data? YES, although projections for hydrological impacts of climate change in itself are not new. Projections with this particular model JULES and based on this set of CORDEX simulations are new. It uses comprehensively bias corrected data following new methods (itself described elsewhere). The focus on low flows and droughts as presented here, is also relatively unexplored.

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? YES

minor: twice (p7281 L1 and p7292 L1) a statement is made on floods which to my opinion cannot be derived from the present analysis. I suggest to simply omit these.

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

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? YES, extensively

8. Does the title clearly reflect the contents of the paper? The title mentions water stress which is a function of both availability and demand. This is not directly analyzed in the paper. Also hydrological model biases are not analysed, only the effects of forcing biases. I suggest to change the title to something like: "High-end climate change impacts on European runoff and low flows: exploring the effects of forcing biases"

9. Does the abstract provide a concise and complete summary? YES

10. Is the overall presentation well structured and clear? Overall, the paper is well structured and clear. However, the introduction is too long and its structure is not always clear: p 7268-7269 (para 1 and 2) are OK para 3, 5 and 7 are bit long but generally OK para 4: the discussion on added stresses of population growth and human activities is not relevant in present context; a single statement reflecting its significance here or in the discussions section (4.1) suffices para 9, p7273, is superfluous after para 8 para 10: the discussion of GHMs/LSMs is not too relevant in the present context para 11: the JULES discussion can be omitted here and partially merged with section 2.2 Section 2 is OK except that I would put the present 2.5 – Bias correction directly following the present 2.1 – climate/forcing data. Section 3, 4 and 5 are OK

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11. Is the language fluent and precise? Yes, the quality of English is generally high and precise, with a few minor exceptions

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

I miss a brief description of the forcing data: how large are biases? While the five models are similar in projected temperature change (due to the time slice strategy, centering on  $\Delta T = 2$  and  $4K$  resp.) there is no indication of how their precipitation changes. What is the CV over the 5 models here before/after bias correction. Can we have 5 maps with  $\Delta P$ ? Could be part of section 2.1 or a new starting subsection in 3 or an expansion of 3.6. For other variables biases could be presented in supplementary material.

In section 2.2 I miss a paragraph on the hydrological performance of JULES over Europe from previous studies. How well does it perform wrt discharge (average, high and especially low flows)? And then in the discussion 4.1 what does that imply for the results of the present paper?

There is redundancy between fig 2 and 4, and 3 and 5 respectively. Can be reduced in discussion with the technical editor perhaps? E.g., adding perhaps one column each in figures 2 and 3 with the CV of absolute change only. Figure 9 second block is wrong: should be Guadiana and Elbe instead of a repetition of Rhine and Danube

14. Are the number and quality of references appropriate? YES, though the number of refs is on the high side

15. Is the amount and quality of supplementary material appropriate? Since the paper has a (perhaps secondary) focus on the effect of bias correction and even the use of different reference sets in these, I would like to see more information on initial biases

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of the 5 models with respect to the 2 ref sets. For precip in the paper itself, for the other variables in the supplementary material. Also the change signal for the forcing data, at least for precip, should be presented, e.g. in maps

Detailed comments, see annotated pdf: [hessd-12-7267-2015-rev.pdf](#)

I suggest major additions in the supplementary material. These will not affect conclusions of the paper but will further support the banalysis

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/12/C3055/2015/hessd-12-C3055-2015-supplement.pdf>

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