

***Interactive comment on* “Global warming increases the frequency of river floods in Europe” by L. Alfieri et al.**

Anonymous Referee #1

Received and published: 22 February 2015

General

The paper is very well written and presents a detailed analysis of changes in flood risk for Europe using state of the art datasets and analysis methods. By using a grid-based return flow analysis in combination with a consistency check using the co-variance between models, the authors really well present the projected changes and their related uncertainties for the whole of Europe. Although the results are not very unexpected it is good to see that the projected changes obtained by earlier studies are confirmed by this study based on downscaled model runs of the latest IPCC report. Overall this paper lies within the scope of HESS and is after minor revisions ready for publication.

Specific comments

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- Section 3, line 2: The authors refer to 1990 as the baseline climate and 2020 as a future climate, while 2020 is much closer to today. For more practical applications, changes compared to 1990 are of limited relevance. Why were these years chosen and can you say something about the implications of choosing 1990 as reference iso of today.

- Is equation 1 correct? It seems that for larger changes, higher xf, I , the CV values will be higher – this could be the case for ensemble consistent projected discharge decreases in southern Europe. Should it be the differences / variation between the xf, I values obtained for the different scenarios?

- In section 3.4 the authors introduce the use of peak flows with return period of 2 years. Is for the analysis of the future discharges the historical / base discharge value of the 2 year return period used as well?

- Figure 3 is said to display the warming since pre-industrial conditions. Why do you refer to pre-industrial conditions. I do not believe that in 1970 the LSAT warming was zero compared to pre-industrial conditions.

- Section 4.3: what is meant with country aggregated estimates of f_{100} ? How was this calculated?

- Discussion, second page, line 3: the authors state ‘ the region subject to decrease in Q_{100} looks shifted’. Is there an explanation for this in the precipitation fields?

- Discussion, third page, line 6: ‘model consistent climatologies can provide a bias-correction effect’. What is meant here? I do not agree that one can state that showing consistency results in bias-correction.

technical corrections:

- Page 2 line 8 should read implications of iso implications between

- Figure title Figure 1 replace text by main text or manuscript.

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- Section 4.1 second page, line 28: 7 scenarios have a 'significant' decrease
- Table 2 what does Ne stand for and what is its unit?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 1119, 2015.

HESD

12, C264–C266, 2015

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