

Interactive comment on “Flood trends in Europe: are changes in small and big floods different?” by Miriam Bertola et al.

Dominik Paprotny (Referee)

d.paprotny@tudelft.nl

Received and published: 5 November 2019

The manuscript “Flood trends in Europe: are changes in small and big floods different?” analysed changes in return periods of extreme river discharges between 1960 and 2010. The study is largely a follow-up to “Changing climate both increases and decreases European river floods” by Blöschl et al. (I will refer to it, for brevity, as the “Nature” paper). This doesn’t compromise the novelty or importance of the submission, which is overall a well-written and important contribution. I have three major comments, and some very minor points.

Major comments:

1. The analysis in section 3.2 includes the uncertainty ranges of the trends, but their

C1

ranges look in most cases proportional to the magnitude of the trend. I therefore find it not informative. It would be much more clear if instead of showing the uncertainty, to providing information whether the trends are statistically significant (at alpha of 0.1, or 0.05) by recolouring cells with insignificant trends grey. The text in section 3.2 could then be adjusted accordingly to the modified figures 5 & 6. The problem needs to be addressed as in the Nature paper as much as 72% of station trends were found to be insignificant. Also, in some areas the large uncertainty comes from the very limited number of stations. Though the stations are shown in Figure 1, a supplemental figure with the number of stations included in each 600 km box could be added, maybe even separately for large and small catchment sizes. This extra figure(s) is only a recommendation.

2. The analysis in section 3.3 includes three manually derived regions, which creates several problems. For one thing, no proper explanation for the choice is given. The Nature paper is cited as the source, but that paper also gives no real explanation apart for the attempt for homogenic regions (elliptical and overlapping for some reason). The other cited reference, Kotlarski et al. (2014) shows very different regional divisions (and not “not dissimilar” – btw. please avoid double negation). The regions omit, according to Table 1, one-third of stations in Europe, including most of the Danube catchment and northern Europe. Further, for some reason, the number of stations in each region is different than in the Nature paper, despite the ellipses being the same and the total number of stations as well. In summation, the authors should make a new derivation of regions, preferably based on actual geographical divisions of Europe (Fennoscandia, East European Plain, etc.), Koeppen’s climate zones or drainage divides. Alternatively, cluster analysis could be used for this purpose. This would provide better connection between climate, topography and observed trends.

3. Not really a comment on paper, but an important question to the authors nonetheless. The authors provided an online dataset, and I noticed that it was updated recently in order to fix the errors in station coordinates. I wonder whether those errors affected

C2

the paper's results and figures in any way, and whether they could account for the difference between the number of stations in Table 1 and the Nature paper. I suggest the authors check their data and code to ensure that there is no data-processing error present in their paper.

Minor comments:

Title: the study deals with floods understood as extreme river discharge, rather than floods as occurrence of losses. I know that's the hydrological vs natural hazards perspective issue, but even in HESS, the title could be more precise by mentioning "Flood discharge trends" rather than "Flood trends".

L4, L41, L128: the flood database is mentioned as "newly-available", but it has been compiled 4 years ago already. If it wasn't released publicly recently, the "newly-available" moniker should be removed.

L20-21: please correct this sentence, it's very ungrammatical.

L41-L44: when referring to the Nature paper, the names of regions from this submission are used instead of the Nature study. Especially the location of the "Atlantic" region, used throughout (including the abstract), is unclear until section 2.3.

Section 2.1: the similarity report noticed some overlaps in text with the author's other recent paper, which is not cited. Some comment in the section whether the presented methodology was used before or not would be beneficial.

L134-135: the authors repeat the explanation of station selection from the Nature paper, but given the methodological differences between the papers, I think the need for more even spatial distribution is much reduced here. Maybe some better explanation would do here.

L216: "British-Irish Isles" should be replaced with "British Isles", as this term encompasses Ireland.

C3

L410: the reference to the Nature paper should be updated, as it is no longer "under review".

I am looking forward to the authors' revision of their paper.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2019-523>, 2019.

C4