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Hydrology and Earth System Sciences
Discussions

Interactive comment on "On the quest for a pan-European flood frequency distribution: effect of scale and climate" *by* J. L. Salinas et al.

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Response to S. Grimaldi (Referee)

The authors are greatly thankful for the review of the referee, in particular for the pointing out to very significant literature that the authors have included in the manuscript. Corrected manuscript will be uploaded in the next days, including the changes cited below. The original referees comments will be formatted in *italics*, and the authors' response in **bold**.

The manuscript analyses a large dataset of daily peak flow time series with the aim to verify the existence of a parent flood frequency distribution across Europe. This kind of papers, as similar previous ones like Papalexiou et al., 2013, that study dataset of

thousand time series are particularly precious and useful for the Scientific community and not only. So, I would suggest to accept it for publication in HESS.

The authors thank the referee for the reference given, for its close linkage to large scale analysis of hydrological extremes and its probability distributions. The study Papalexiou et al., 2013 is now discussed in the introduction of Part 1 paper (see response to next comment below).

However, I fully agree with the comments of the two colleagues that already reviewed the paper specifically with the comments 1 3 of Francesco Laio and, in addition, I have some other few suggestions.

Comments nr.1 and nr.3 of the referee F. Laio have been taken into account in the corrected manuscript. Following the reasons exposed in the response to that reviewer (a considerable amount of additional analysis has been performed on the "first part" of the paper, in particular a new set of Monte Carlo simulations taking into account, among others, the effect of sample length; new plots, tables and subsections are included in the new manuscript that could lead the reader to lose attention in the final part), the authors have decided to split the manuscript in two parts, which are more balanced in length and content:

Regional parent flood frequency distributions in Europe – Part 1: Is the GEV distribution a suitable pan-European parent?

Regional parent flood frequency distributions in Europe – Part 2: Climate and scale controls

The authors think that now the two parts have even more differentiated and direct science questions with independent conclusions and take home messages.

From the technical point of view (following instructions of the Ms Topfer from the Copernicus editorial team), the HESSD discussion of the paper that is being reviewed now will continue, and as "post-referee review corrected manuscript",

the two parts paper will be submitted. The final decision will be taken by the handling editor.

Title and introduction should be better adapted to the paper results and consistent to the conclusions, indeed at the beginning of the paper the reader has the felling that the authors are able to provide a parent flood frequency distribution (FFD) on a European scale. Moreover, also the usefulness of the FFD should be better clarified at the beginning of the introduction. It seems that the parent FFD could be used in ungauged basins to estimate the design flood, where maybe simplified approaches starting from rainfall information could be more effective or at least an option.

The authors fully agree with the reviewer. The title could be misleading, as the main outcome of the first part of the manuscript is to reject the GEV as a single pan-European frequency distribution. Also, some examples of the flood process variety from the literature are already addressed in the conclusions of Part 1 paper, making clear that we do not necessarily need one single pan-European frequency distribution; this fact is now also stated explicitly in the introduction. The title of the Part 1 manuscript is also less ambiguous in this sense ("Regional parent flood frequency distributions in Europe – Part 1: Is the GEV distribution a suitable pan-European parent?")

It is also true, that one of the applications of this approach is to have some a-priori knowledge about the flood frequency distribution for ungauged basins. This fact will be stated explicitly in the introduction, together with some traditional methods based on rainfall statistics (such as the rational method) suggested by the reviewer.

Table 1 should be richer of information. Instead, or other, to include the Station-year of data, I would include the mean, the minimum and maximum of number of years. Similarly I would add the Basin Area information (average, min, max). A map of Europe could be also useful for the reader to easily catch the region variability.

Info about sample length distribution is added into Table 1 in the corrected manuscript. Unfortunately, neither location nor catchment area are available for the entire L-moment-ratio dataset and cannot be included.

Minor suggestions

page 6232 line 23: there is a typo (dot). **The referee probably refers to p. 6323 l. 23 → Corrected**

page 6327 line 13: I would not mention here the Figure 1a. **The authors think that both Table 1 and Figure 1a) are complementary in describing the dataset, as the table gives info about the distribution of the dataset per country and the sample lengths, and the figure gives a visual representation of the L-moment-ratios data, which will be the central part of the analysis in the paper. This will be explicitly stated in Part 1 of the corrected manuscript.**

page 6327 line 19-21: This brief intro could be removed. **The authors agree → Removed**

Figure 1a: Dark ring should be specified in the caption. **In this case the rings refer to the dataset used in Part 2, so they are not necessary anymore.**

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 6321, 2013.