

## ***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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In my personal opinion the paper is acceptable in HESS with minor revisions. The topic is of wide interest and the database is broad and comprehensive. Nevertheless I think that the following issues should be addressed by the authors in a revised manuscript.

1. My first concern was already raised by reviewer Francesco Laio and is entangled with the question: “Do we really need a pan-European flood frequency distribution?”. Following the EU Flood and Water Framework Directives this may appear necessary, or “at least” useful, at the district level. Nevertheless the various typologies of districts that the different EU member states have created since 2000 is by itself the evidence of the heterogeneity observed in Europe.

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2. Should we find a common pan-European parent distribution, this would be a consistent result from the scientific point of view but still we should have to investigate and assess the spatial variability of the involved parameters.

3. Despite some not-conclusive considerations reported in the first part of the discussion in section 3.4, the general conclusion of the paper seems to be the rejection of the GEV as a parent for a pan-European flood frequency distribution. This conclusion seems reasonable to me, nevertheless, being this basically the result of the Monte Carlo simulations described in section 3.3, I believe that more space could be devoted to the description of the choice of the distributions used to represent L-Cs and record length. Moreover, considering the extension of the available database I wonder if somehow different results could be found if using the empirical distributions of L-Cs and record length.

4. An important topic which is not addressed in the paper and I believe that should be at least commented according to the authors' feeling, regards the evaluation of the error in prediction that could descend from using the pan-European GEV obtained from the WMA obtained by averaging the 200 neighbouring L-Cs values which is not rejected for some ranges of L-Ck and L-Cs values (see table 2). Also, I believe that it is important to underline that such GEV parent fails to pass the test for the higher quantiles of L-Ck, those that in principle, at the at-site level could be significantly affected by the presence of outliers, thus leading to a possible underestimation of the predicted discharge for high return period.

5. In section 2.1, the description of the database, reported also in table 1, highlights the presence of a consistent number of sites with only daily flows, compared to others with instantaneous flows. This presence is not addressed in the paper when discussing results. Considering that the statistics of floods could be significantly affected by daily averaging, I wonder if the authors tried to make separate evaluations for daily and instantaneous data.

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6. I do not agree with the other reviewers that raised the point of separate and different topics in the first and second part of the paper. I think that addressing the existence of the pan-European flood frequency distribution and, then, providing a deeper investigation by means of two main descriptors (MAP and basin area) is a straight choice. May be that the two parts just have to be better assembled. For example by merging the two discussion sections 3.4 and 4.4. On the other hand, I agree that the choice of the different dataset has to be better explained. Why, for example, not studying one of the European cross-boundary river basins ?

7. With regard to the second part of the paper I only wish to raise a couple of points. While one may agree on the general authors' observation of decreasing L-moments with increasing Area and MAP, according to results shown in figure 4, I would like to better focus on Figure 4a (L-Cv vs Area). Looking at grey dots I see that they seem to show not a general decrease but an ascending-descending behavior with a maximum located around basins of 100 km<sup>2</sup>. This behavior is basically masked by the WMA but has been already observed in other, less extended, databases and also somehow explained (see for example Blöschl and Sivapalan, 1997; Iacobellis et al. 2002). Finding it here is important. Also the increase of L-Cv (or more in general of the distribution dispersion) with aridity has been observed by many researchers, I would mention at least Farquharson et al. 1992.

#### References

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C3222