

## ***Interactive comment on “Influences on flood frequency distributions in Irish river catchments” by S. Ahilan et al.***

**Anonymous Referee #2**

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The Authors fit the GEV distribution to 172 stream gage stations in Ireland. This manuscript is generally well-written and this journal represents a good fit for this study. I completely agree with the comments made by Reviewer 1. In addition to them, I think that the following points should be addressed before considering this manuscript for publication.

- An implicit assumption of this study is that the time series are stationary. However, some of the catchments are urbanized (Figure 8 and text at the beginning of pg. 3330), and there may be indication of a climate change signal (top of pg. 3331). Moreover, I find it a bit hard to believe that all these catchments are pristine or free from anthropogenic effects. I think that the Authors should examine whether stationarity is a

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reasonable assumption.

- Figure 1: instead of a pie chart, please show a histogram with the record length. The Authors should also show the time period covered by these stations.

- I am a bit confused: do the Authors model 172 stations or only the 143 stations with a record exceeding 25 years?

- I don't necessarily agree with the interpretation of the results. The fact that we cannot reject the null hypothesis that the data were generated from a GEV distribution does not mean that the data were generated from a GEV distribution. In general, we won't be able to know what the parent distribution is, but we can say whether there is enough evidence to reject the null hypothesis that the data were generated from a particular distribution. As indicated by Reviewer 1, it is likely that other distributions would have led to the same conclusion.

- In a study of this kind, I think that the Authors should explain why they did not include maximum likelihood estimators.

- I would have personally used other formal goodness-of-fit tests (e.g., Kolmogorov-Smirnov, Cramer-von Mises, Anderson-Darling, probability plot correlation coefficient). The critical value of the test statistic could be computed using a Monte Carlo approach.

- Is it really meaningful to compute the 100-year flood peak from 25 years of data?

- Pg. 3320: please include a reference for equation 9.

- Figure 3: are the relationships in panels a, c, and e really useful? The plots are in the log-log scale and there are differences of almost two orders of magnitude.

- Figure 4: I think that the Authors should include confidence intervals to show that the GEV fits significantly better than the Gumbel.

- Figure 6: Once confidence intervals are included, I don't think that the results from the three distributions are statistically different.

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- Figure 7: please remove the blue background to improve readability. Also, I think that the clusters are rather subjective and I don't really see them.
- Pg. 3306, line 7: "Analysis of these data"
- Pg. 3307, line 13: what does "confidence level" mean in this case?
- Pg. 3322, line 7: "short tail"

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 3305, 2011.