

Interactive comment on “Extreme weather exposure identification for road networks – a comparative assessment of statistical methods” by Matthias Schlögl and Gregor Laaha

Anonymous Referee #1

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General comments: A very interesting work on the theoretical and practical aspects of estimating the return period of extreme meteorological events, useful in a very wide range of applications. The theme of manuscript is well within the scope of NHES since it sums up and compares the major methodologies currently used for extreme values modelling with a special focus on extreme weather risk assessment. The title and the abstract are informative and inviting to the prospective reader. The presentation of the methods is comprehensive, easily understandable by a wider audience, and their application rigorous, adhering to best statistical practice guidelines. Appropriate references are provided wherever needed. Figures and tables are well placed and commented, without any redundancy. The results reached by the authors are clearly

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and methodically presented and readily exploitable by the scientific community. Even though the manuscript is a bit lengthy -albeit with little if any reduction possible without a unbalanced loss in completeness- it is also rather easy to read through. Overall a very detailed discussion of an interesting issue, presented in an inviting and comprehensive manner.

Specific comments: 1) page 2. line 30: Regarding works on extreme temperatures modelling, the authors may wish to consult: Grotjahn, R., Black, R., Leung, R. et al., 2016, North American extreme temperature events and related large scale meteorological patterns: a review of statistical methods, dynamics, modeling, and trends, *Clim Dyn*, 46: 1151. doi:10.1007/s00382-015-2638-6 Hasan H., Fadhilah N., Radi A., and Kassim S., 2012, Modeling of Extreme Temperature Using Generalized Extreme Value (GEV) Distribution: A Case Study of Penang, *World Congress on Engineering Caroni C*, Panagoulia D., 2016, Non stationary modelling of extreme temperatures in a mountainous area of Greece, *Rev Stat*, 14,1,217-228 Kharin V., Zwiers F. et al. , 2007, Changes in Temperature and Precipitation Extremes in the IPCC Ensemble of Global Coupled Model Simulations, *J. of Climate*, 20, 1419-1444 ...and so on.

2) page 7, line 14: The authors might wish to discuss why they haven't considered using distribution fitting statistical tests such as the Kolmogorov-Smirnov and/or the Anderson-Darling, for the assessment of the performance of the parameter estimation methods.

3) page 7, line 21: adding a reference to: Makkonen I., 2006, Plotting Positions in Extreme Value Analysis, *J Applied Meteorology and Climatology*, 45, 334-340 might be helpful to the less informed reader.

4) page 8, line 2: The selection of the base value for the conditional performance measures, namely T , to be 10 years should be better justified and supported by relevant references (i.e. international or national technical ordinances or standards, best practice documentation etc).

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5) page 8, line 13: Since "synoptic" has a reserved meaning in meteorology you might wish to replace it with "combined plotting" or any other suitable term. throughout the manuscript.

6) page 8, lines 16-17. Please rephrase/simplify the first sentence of section 3.1: "Linear trends....model estimation."

7) page 13, line 7 : From this point on the reader has to remember that GP refers to PDS and GEV refers to AMS. For the sake of clarity, it might be advisable to replace "GP" with "GP/PDS" and "GEV" with "GEV/AMS" in the remainder of the text.

8) page 13, lines 8-9: "(indicated by negative deviations)" only 2 out of 4 diagrams in fig 5 show negative values at low return periods.

9) page 13, line 9: "this behaviour changes in the opposite for higher returns periods" if I am reading fig. 5 correctly, this is actually true only for precipitation. This would also have an effect on the text of the Discussion (p15, l13) and Conclusions (p20, l23) sections.

10) page 13, line 12: "(ie underestimation of negative magnitude)" is not very clear-consider rephrasing as "(ie more negative values)"

11) page 19, line 32: "as well as the number of breaks set within this range" I am not quite certain about the meaning of this phrase. Could you please clarify ?

Technical comments: 1) page 1, line 24: add "the use of" after "recommend"

2) page 2, line 32: ...for risk assessment than events...

3) Page 11 ,Table 1 caption (as well Tables 2, 3, 4 and 5): referring to the data presented as success rates even though justifiable, might also be confusing since there is no visual grouping of the columns to indicate which columns should add to a 100%. Please consider either replacing "success rates (% of records)" with "success cases" or formatting the tables in a manner allowing easy distinction of the various groups of

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data (I would expect the latter to be a bit difficult for Table 5).

4) page 15, line 20: "explication" replace with "explanation" ?

5) page 15, line 23: "same distribution than the..." replace with "same distribution with the..."

6) page 16, line 11: "that only the highest events" replace with "that only the more extreme events"

7) page 17, line 11: "have to be balance against" replace with "have to be balanced against"

8) page 18, Figure 8: the labels on both vertical axes are missoriented (vertical instead of horizontal)

9) page 19, lines 21: " time series extremes it is referred to" replace with "time series extremes, the reader is referred to"

10) page 19, line 26: please add the abbreviations (ATSM, MTM) after the full names of the methods

11) page 21, line 6: "We emphasize the reliable" replace with "We emphasize that reliable"

12) page 21, line 8: "analyze the fit of distribution" replace with "analyze the distribution fit"

13) page 21, line 10: "and dependency introduces biases" replace with "and dependency introduce biases"

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., doi:10.5194/nhess-2016-373, 2016.

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