Nat. Hazards Earth Syst. Sci. Discuss., 1, C1592–C1595, 2013
www.nat-hazards-earth-syst-sci-discuss.net/1/C1592/2013/

Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "A data-based comparison of flood frequency analysis methods used in France" *by* K. Kochanek et al.

J. England (Referee)

jengland@usbr.gov

Received and published: 1 November 2013

General comments

This is a very nice paper, that is relevant to both researchers and practitioners. The authors have provided interesting data-based comparisons of flood frequency techniques used in France, with the aim of discerning the best methods based on predictive performance. Overall, this is a good paper with appropriate methods, data and references. The topic and content is appropriate for NHESS, and I recommend that it be published.

In my opinion, there are a couple of minor areas that should be improved prior to publication; these include data set details, descriptions of the homogeneous regions (noting effects on regionalizing GEV shape parameter), and some notes on potential

future work. There are also some very minor technical corrections that should be made. Further details on these items are listed below.

Specific comments

Page 4449, line 8: you should clarify what is meant by "best FFA methodology" - is it optimal predictive performance (least bias) with the FF reliability criterion? Is it the "easiest" to implement by practitioners (e.g described in a manual and standard software)?

Page 4450, lines 5-515 (ExtraFlo project): you should clarify here the purpose of FFA and the ranges of quantiles that are needed in France. This should be obvious, but some readers of NHESS may not be as familiar. Is it for peak flows Q and quantiles Q_0.99, Q_0.98, Q_0.96, Q_0.50?. Methods presented focused only on Q_0.99, but there is a mention (line 5, p 447) about dams and nuclear powerplants. Methods that are compared here do not appear to be suitable (by themselves) to estimate Q_0.999 without considering multiple methods (such as SCHADEX), so some caveats would be in order here.

Page 4451, lines 25-25: you should also point out here sampling variability (record length *N*) as an additional factor to the parent distribution.

Page 4452, lines 8-9: additional information on the SHYREG model would be useful here. It is critical that the results shown are based on rainfall presumably from the 1987 paper, or was it updated? Can you mention the gridded rainfall and scale, and 1359 stations that are the key inputs? Do these rainfall record lengths vary in time and space? Are they somewhat coincident in time with the daily streamflows? If these precipitation records input to SHYREG are short (say $\leq$ 20 years), how does this help your final conclusions about LOC_SHY?

Page 4456, lines 17-22: You should explain a bit further some details of the data set. Explain that this data also includes the 364 sites from Renard et al (2008) out of the

1076 sites. Or did you extend these records, improve them in some other way, etc.? In the next paragraph, further describe the hydroecoregions, how they were determined (independent of GEV parameters?), and/or provide (in an expansion of appendix A2) the main predictors (*A, E,* P_{10}*, ...*) for each parameter within each region. Given the large number of regions, it is challenging to reproduce the work without knowledge of what covariates were used in the prediction equations for each region. An added bonus would be to show a map (or table in Appendix) demonstrating how the scale and shape parameters varied within France. This would help explain the L+R_GEV results, and possibly defray any comments that the conclusions shown in the paper (related to the Gumbel and Oceanic regions) were not impacted due to using these fixed, homogeneous regions and constant shape parameter in each.

Page 4463, after line 20: I suggest a short sentence or two on the limitation of using predefined and fixed homogeneous regions. Given the constant model for the GEV shape parameter, you might find additional improvements by refining the regions, or performing additional investigations on the regional GEV parameters in space.

Page 4465, end of conclusions: I suggest a short paragraph outlining potential future work. For example, how would you combine L+R_GEV and LOC_SHY distributions, if they are independent? Could you refine and improve the regionalization procedures with GEV in France, and thereby see significant improvement in L+R_GEV results?

Technical corrections

Notations on local league and regional league methods need to be corrected throughout the paper. I suggest you use the notation with an underscore "_" as shown in the figures, instead of dashes interspersed in the text, as in "LOC_GUM" rather than "LOC-GUM". Ditto for LOC-SHY, LOC_SHY and REG-SHY, REG_SHY. In particular, the notation changes in the text to use underscore in section 3.1, rather than the dashes used earlier.

Page 4449, line 6: "ambits" is an unusual choice; perhaps there is a better term.

Page 4457, line 3: define hydroecoregions *HER* here as used in the legend in Figure 2.

Page 4458, line 21: replace "regional" with "local" in the phase "for the regional implementations." as Figure 1 and this section refer to the local league.

Page 4466, line 9: replace "and" with "an" in "For the GEV distribution, and ...".

Page 4469, line 22: correct reference to fix the "I.o." before "Institute of Hydrology".

Figure 3: Correct the terms in the legend to LOC_SHY and REG_SHY from SHYPRE and SHYREG. Reorient the order of the figures, so the viewer can clearly compare alternatives. I recommend the first column be LOC_GEV, L+R_GEV, and REG_GEV, to compare these GEV alternatives. Pladce the GUM alternatives adjacent to each other, and the same with the SHY alternatives.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 4445, 2013.