Hydrology and Earth System Sciences Discussions

Interactive comment on "Probability distribution of flood flows in Tunisia" *by* H. Abida and M. Ellouze

Anonymous Referee #1

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The paper reports on the application of a method frequently used since the late eighties of the last century (see Table 1 of the paper by Abida and Ellouze). Under the hydrological point of view, the paper has one drawback: Hydrology didn't get the attention it deserved. As Hosking & Wallis (1997) state in their summary (Hosking, J.R.M. and Wallis, J.R. (1997): Regional Frequency Analysis - An Approach Based on L-Moments. Cambridge University Press, 1997; p. 190) "The main conclusion is that successful regional frequency analysis involves interaction between physical reasoning and statistical assessment of the regions and their estimated frequency distributions. Ě". If we are serious about this statement we must ask the authors to answer some questions:

Out of 49 annual flood series 18 were discarded because they had a record length

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of less than 10 years or they did not pass "all of the nonparametric tests at the 5% level of significance". What is the hydrological significance of the statistical 5% level of significance? The null hypothesis e.g. of the test of randomness is that the data are random. If a data series would be discarded because it did not pass the randomness test on the 5% level of significance it could be "made random" by lowering the level of significance to 1%. (Thus, one would reduce the probability of discarding a data series in spite of the fact that it is random.). But what does all this mean under a hydrological point of view? What are the hydrological and physiographic features of the catchments the data of which were discarded and do the results of the mechanistic tests seem to be justified under a hydrological point of view?

Is the pooling procedure of "37 stations with an average length of 24,14 years" (give a distribution of the observation periods, not only the average!) to "893 site-years" justified under a hydrological point of view? What are the catchment areas of the gauging stations (give a distribution of the areas!)? Are some of the gauging stations situated at the same river? In general, different meteorological event types cause great floods in streams of different catchment areas: Convective storms in small torrent catchments, advective precipitation in great catchments, even in neighbouring catchments of similar size. Thus, such floods are similar and carry redundant information, in statistical sense they are highly correlated and should not be pooled. For a hydrologically sound pooling procedure see the Flood Estimation Handbook of the Institute of Hydrology, Wallingford (Robson, A. and Reed, D. (1999): Flood Estimation Handbook. Vol. 3, Institute of Hydrology, Wallingford, 1999, Chapter 6, pp. 28 ff). In the flowchart for constructing a pooling group given there, the first discrimination is "Experienced user?" yes/no. This points to the fact that following formal statistical rules alone is not sufficient for getting reasonable results. Compared with these considerations, the search for the best fitted probability distribution is of minor interest. Or, as George E. P. Box stated "All models are wrong, but some are useful" (George E.P. BOX (* 18.10.1919 Kent, GB): http://en.wikipedia.org/wiki/George_E._P._Box).

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There is no doubt, that the authors carefully followed statistical rules and procedures and applied well established tools. But the hydrological background of their work should be thoroughly worked out in the paper with major revisions.

1) Does the paper address relevant scientific questions within the scope of HESS? YES 2) Does the paper present novel concepts, ideas, tools, or data? NO 3) Are substantial conclusions reached? NO 4) Are the scientific methods and assumptions valid and clearly outlined? YES 5) Are the results sufficient to support the interpretations and conclusions? $$$ 6) Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Not applicable 7) Do the authors give proper credit to related work and clearly indicate their own new/original contribution? YES / NO ($$$ 8) Does the title clearly reflect the contents of the paper? YES 9) Does the abstract provide a concise and complete summary? YES 10) Is the overall presentation well structured and clear? YES 11) Is the language fluent and precise? rather YES (I'm not a native speaker) 12) Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? YES 13) Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? YES: More hydrology, less statistical finger exercises! 14) Are the number and quality of references appropriate? YES 15) Is the amount and quality of supplementary material appropriate?

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