Hydrol. Earth Syst. Sci. Discuss., 4, S463–S466, 2007
www.hydrol-earth-syst-sci-discuss.net/4/S463/2007/

Hydrology and Earth System Sciences Discussions

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

H. Abida and M. Ellouze

Received and published: 7 July 2007

M. Cannarozzo (Referee)

General comments

Comment 1: The authors failed to report almost all the mathematical formulae used in their work and do not define in a correct and unambiguous way the symbols used. Response1 Mathematical formulae were not reported because procedures used are thoroughly presented in the literature and appropriate references were given. However, statistical tests of homogeneity and 'goodness of fit' (H-test and Z-test respectively) are now presented.

Comment 2: The parameter values are not reported so that it is not easy to understand the author's decisions; there are not enough explanations for their decision. Response 2 Z-test values obtained for the different distributions are now added and further explanation for the choice of the appropriate parent distribution is provided.

Specific comments

Comment 1: Pg. 958 line 13- What is Generalized Normal distribution? Are the authors sure that this is one of the most frequently used distributions in the analysis of extreme values? Response1 Yes, Generalized Normal distribution is one of the most frequently used distributions in the analysis of extreme values. Many references exist in the literature, such as: Parida et al, (1998) Kumar et al, (2003) Hosking and Wallis (1993) and Pilon and Harvey (1994).

Comment 2: Pg. 964 There is no correspondence between the names used in the lines 2-5 and that reported in fig. 1. Response2 A new version of figure 1 is presented to make correspondence with the names used in the text.

Comment 3: Pg. 965 Line 2-3- It would be better to describe a little the CFA package. Line 9- “the study area was divided arbitrarily” if the author used the three subregions described in ch. 3, it seems rather a climatic-geographic criterion. Response3 More information is added to describe the CFA package. “Arbitrarily” was replaced by “the three main physiographic regions”.

Comment 4: Pg. 966 Line 20 - is the regional weighted average L-kurtosis, or simply regional average L-kurtosis? Response4 It is the regional weighted average L-kurtosis.

Comment 5: 1- Pg. 967 Line 8- It should be better to define what is L-moment ratio. 2- Line 18-19-“comparison of the theoretical curves with the weighted sample average” of what? 3- Line 22-23-“cannot be claimed to be homogeneous”. Therefore, it is not true, the central-southern zone is homogeneous (see line 17 on pg. 968). Explain better what you want to say. Response5 1- Linear coefficients of skewness and kurtosis are often called L-moment ratios because they are simply defined as ratios of other linear moments. The L-skewness coefficient = and the L-kurtosis coefficient = ; where ,Ĕ., are the first four sample moments. 2- If the regional data are homogeneous, the selection should be based on comparison of theoretical curves with the weighted sample average of L-kurtosis and L-skewness. 3- This is now better explained in the text. The

HESSD

4, S463–S466, 2007

ambiguity was removed.

Comment 6: Pg. 968 Line 7- “The smallest L-moment values” Are they the smallest L-moment ratio? Line 13- is the H-value reported in tab. 3 calculated with respect to L-skew or L-kurt? Line 16-19- Since the reader is seeing tab. 3 where the results for three simulation experiments are reported, the authors should specify that these sentences concern the second simulation experiment. The values are smaller than 1 (not 2). Line 28- Pg. 969 line 1-Put this sentence in line 25 and then describe the results of the third simulation experiment. Response6 Yes, L-moment values are L-moment ratios. Mathematical definitions for “homogeneity measure” were added. The H-value is calculated with respect to both L-Cs and L-Ck. Results for each simulation experiments are now clarified. If the H-test value is smaller than 2, the region may be considered as possibly heterogeneous. In this study, only regions with H-test values greater than 2 are considered heterogeneous.

Comment 7: Pg. 969 Line 3-underline that part of Tunisia was excluded from the study and no flood frequency distribution is suggested for it. Line 8-9- it is not clear why the authors prefer a theoretical distribution to others. What is the criterion? Line 10-Please shows the Z-test values. Line 16-18 Please add in the legend of figures 3-5 how the average weighted value is represented. Response7 No part of Tunisia was excluded from the study. The final delineation was achieved by regrouping stations and modifying the boundaries of the physiographic regions. The Z-test values for the different distributions were added in Table 3. The symbol of the average weighted value is now added in the legend of figures 3-5.

Comment 8: Pg. 970 lines 3-4- Please compare this sentence with that in the previous page in lines 14- 16. Lines 10-13-Considering only the final result by which Tunisia is divided into two homogeneous regions, there are only two H-values so that the information about the special variability is not enough to affirm that there is a special trend. There is a difference but not a trend. It could be useful to compare this result with what has been found for similar regions. Response8 The selection of the best fit-distribution

HESSD

4, S463–S466, 2007

was based on the L-moment ratio diagram and the Z-test value for the homogeneous regions. The selection of a theoretical distribution from the L-moment diagram is based on the agreement with the weighted average or the Lowess curve depending on the outcome of the homogeneity test. The word “trend” is omitted.

Parida B.P., Kachroo R. K., and Shrestha D. B., 1998, Regional Flood Frequency Analysis of Mahi-Sabarmati Basin (Subzone 3-a) using Index Flood Procedure with L- Moments. Journal of Water Resources Management, Vol. 12, Nb. 1, pp. 1-12.

Kumar R., Chatterjee C., Kumar S., Lohani A. K., and Singh R. D., 2003, Development of Regional Flood Frequency Relationships Using L-Moments for Middle Ganga Plains (Subzone 1f) of India. Journal of Water Resources Management, Vol. 17, Nb. 4, pp. 243-257.

Pilon, P.J. and Harvey, K.D., 1994, Consolidated frequency analysis, Reference manual, Envirinment Canada, Ottawa, Canada.

Hosking, J. R. M. and J. R. Wallis, 1993, Some statistics useful in regional frequency analysis, Water Resources Research, 29(2), 271-281.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 957, 2007.