Hydrology and Earth System Sciences Discussions

Interactive comment on "On the sampling distribution of the coefficient of L-variation for hydrological applications" *by* A. Viglione

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Overall evaluation:

This manuscript deals with a particular point in statistical hydrology, the coefficient of L-variation (L-CV). The author analyses the frequency distribution of L-CV. His analysis is not based on a pre-selected distribution. It is especially related to small samples which are often available only in statistical hydrology. Five distributions are compared in a comprehensive way under consideration of the sample length. The best distribution is determined by probability plots and by the Anderson-Darling statistic. Based on his results, the author proposes the use of the log-Student t distribution with a bias correction, which was developed in this study to represent the distribution of L-CV.

The study is related to a very relevant topic in statistical hydrology and hence, it is relevant for publication in HESS. The manuscript is well-written and follows a good structure. In particular, I would like to emphasise that the tables and figures support the analysis in a very comprehensive and understanding way.

After a short, but precise introduction into the topic, focusing on the topic of the article, the author clearly presents the aim of this manuscript. In sections 2 and 3, the methods are described. Since it is a relatively specific topic, the descriptions of a couple of equations could be extended including an adding of some additional definitions of variables (see specific comments below). In this way, these sections could be improved in order to make the article understandable for a wider community. The section 4 includes a clear and concise presentation of the results. The use of three similar figures (2, 4 and 5) facilitates the understanding of author's interpretations of the results. In the hydrological application (section 5) one catchment descriptor is used only. In this way, the possibilities of the presented procedure is shown without a detailed analysis.

I hope that the few remarks below are helpful for the author while revising the manuscript. After improving these points, I would recommend the article for publishing in HESS.

Specific comments:

p. 5471, line 13: The superscript "T" is not defined.

p. 5471, line 16: Consider a more detailed explanation of equation 4. Maybe by including an intermediate step.

p. 5472, line 4: To improve the understanding of section 2, consider a subdivision of section 2 into two sub-sections. The sub-section 2.1 could end at this line with the equation 8, since this equation is an intermediate result which is an input for equations 9, 10, 12, 13 and 14, i.e. the five distributions. This could help the reader to understand the procedure and the results in a better way. For example, you could name

the subsection 2.1 "variance of L-moment ratio" and 2.2 "selection of distributions" or something similar.

p. 5474, line 19 and figure 2: In the text, the empirical cumulative distribution function is named Ri/N. In figure 2, it is denoted as F. Consider to use one variable name consistently.

Figure 6: Could you explain why some sites which are close to the regional value are outside of the significance level and other which are far from it are in the significance level.

Technical corrections:

p. 5477, line 18: The article is partly not concise in the use of gray (AE) and grey (BE). Please use BE or AE consistently.

p. 5482, line 15: A bracket is missing after (17).

p. 5486, line 4: Please change "HandBook" into "Handbook".