Hydrology and
Earth System
Sciences
Discussions

Interactive comment on "A class of probability distributions for application to non-negative annual maxima" *by* Earl Bardsley

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As this is the third time I see this paper under review (after Advances in Water Resources and Envoronmental Modelling Software), I can conclude that the Author strongly believes in his message. I have only some very general comments that can help to put the material in the context, at least. Leaving aside the specific (monotonic decreasing) transformation, the duality between maxima and minima and their distribution is not new at all.

For example, it is well known that the Weibull distribution is a reverse (reflected to the origin) GEV and their parameters are linked by analytical relationships (see Hosking and Wallis 1997, p. 195, as well as older papers and books going back to the

1970's). This property (which actually corresponds to switching maxima and minima) is exploited for instance in the fitting procedures implemented in 'lmom' and 'lmomco' R packages.

Concerning the reciprocal transformation, the Frechet distribution (for the largest order statistics) is also known as inverse Weibull. Actually, the 'new' distribution H in Eq. 2 is just a specific parameterization of one of the uncountable generalizations of the inverse Weibull (aka Frechet, aka Log-Gompertz, etc.) distribution.

Therefore, as specified in my previous reports, the note under review does not seem to provide any new insight. On the other hand, I think that proposing 'new' statistical results in hydrologic journals is not a good strategy to guarantee the quality of the scientific production, as there is a very good chance that professional statisticians with expertise in EVT do not comment on the paper. Of course, there are examples of distributions (or fundamental stochastic results) introduced in in hydrological journals, such as the Kumaraswami distributions or some fundamental results from Benoit Mandelbrot on scaling. However, in those cases, the Authors used a completely different level of detail and accuracy compared with the present note. As mentioned by the Referee 1, the Author's proposal implies a number of assumptions that are not discussed at all, overlooking lots of theory on EV and distributions.

Finally, even though there are many good books on EVT, I strongly recommend to everyone approaching EVT a careful reading of Emil Julius Gumbel's benchmark 'Statistics of Extremes', which is dated but better than many others and can help avoiding many (many) problems in this field.

Sincerely

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References

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by Courier Corporation, 2004; Dover books on mathematics)

Hosking J.R.M., Wallis J.R. (1997) Regional Frequency Analysis: An Approach Based on L-Moments, Cambridge University Press

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