

My thanks to both reviewers.

By way of summary, classical extreme value theory is concerned with limit distributions of maxima (or minima) of large samples, viewed as samples comprising random variables from some probability distribution. For sufficiently large samples, the GEV distribution of largest extremes applies as the extreme value limit distribution for sample maxima. However, in practical application to annual maxima it can never be known whether the sample (number of independent events per year) is sufficiently large for the GEV approximation to apply. Therefore, a good fit of the GEV to annual maxima might indicate that the sample size is in fact sufficiently large. However, the good fit may also just arise because the GEV is a flexible distribution capable of matching to data.

How “large” a sample is needed depends on the distribution being sampled (unknown in practice). For example, both the normal and exponential distributions are in the domain of attraction of the Gumbel distribution, but much smaller exponential distribution samples are required to achieve the Gumbel limit for sample maxima.

This suggests using data transformation with the possibility of creating a faster convergence to the limit extreme value distribution concerned. The paper defines a class of transformations such that for sufficiently large sample size the annual maxima are approximated as random variables from the Weibull distribution of smallest extremes (provided a limit distribution exists). This applies regardless of whether the original data are in the domain of attraction of Type 1, Type 2, or Type 3 extreme value distributions. As with direct application using the GEV, there is still no certainty as to whether the Weibull limit has in fact been achieved, or simply that the transformation used is sufficiently flexible to achieve a match of the transformed maxima to the Weibull distribution.

There is no new theory involved. The transformation simply converts the extreme value situation of annual maxima to an alternative one of (transformed) annual minima. This excludes the trivial transformation of reversal of sign, which would have no influence on convergence.

Both referees raise the issue of hydrological relevance. In practice, the annual maxima transformation to Weibull is most likely to find hydrological application to apparent EV3-fitted annual maxima, supposedly indicating the presence of an upper bound to the variable concerned. Such data are not so common, but do arise from time to time in hydrology. Provided a transformation can be found that transforms the maxima to be well-approximated by a 2-parameter Weibull distribution of smallest extremes, exceedance probabilities can be obtained without the EV3 necessity of specifying a numerical value for an upper bound parameter. For example, in the response to Referee #2, the EV3 upper bound value of  $73 \text{ m}^3\text{s}^{-1}$  has a small but non-zero exceedance probability with the Weibull model.

Earl Bardsley