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Comparison of different procedures for inclusion of regional information in flood frequency analysis

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Annual maximum series from a group of catchments in a region are assumed to follow the Extreme Value Type I (Gumbel) distribution with either a common coefficient of variation or a common L-coefficient of variation as basis for estimation of extreme events using the index-flood method. The at-site mean value of the annual maxima is used as the index-flood scaling value. The difference between using ordinary moments and L-moments is shown to be relatively small. Accounting for intersite correlation is considered important unless the correlation is very small.

Ungauged estimation can be obtained either by establishing a regression between catchments characteristics and the mean value of annual maxima, or by performing a direct regression of the at-site T-year event estimate on the catchment characteristics. Only small differences are found between the two regression procedures. Ordinary least squares, weighted least squares or generalised least squares regression can be applied, where the last method can take account of intersite correlation.

In the case where both gauged and ungauged estimation have been carried out, the two estimates can be weighted in an optimal way. This method to combine at-site and regional information is found almost as efficient as the usual index-flood procedure.