**Probability Distributions of river water temperature in Switzerland**

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**Abstract**

Extreme river water temperatures affect several physical, chemical, and biological properties. Predicting river water temperature is crucial for environmental impacts assessment. In 25 independent and identically distributed stations in Switzerland, local frequency analysis is used to estimate extreme river temperatures. The estimation of river thermal quantiles corresponding to different return periods is strongly influenced by the shape of the selected frequency distribution. Akaike and Bayesian information criteria are used to assess the goodness of fit of statistical distributions. L-moment diagram methods are also proposed as alternative methods to validate the choice of appropriate candidate distributions. The Weibull distribution (W2) is best suited to high altitude stations, while the normal (N) and inverse gamma (IG) distributions are commonly used at low altitudes. The results obtained with the L-moment ratio diagram are compared to those obtained with information criteria, and a good agreement is observed. This study indicates that the thermal regime of the study area exhibits regional homogeneity. River temperature quantiles are compared to thresholds above which thermal stress occurs for a common salmonid species in Europe (brown trout).