

Selected problems of at-site flood frequency analysis

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Abstract The primary objective of flood frequency analysis (FFA) is the estimation of the upper quantiles of a probability distribution. The unknown underlying distribution function, small samples and uncertain data that are below the range of interest, make the task of achieving the objective difficult or even ill-posed. This paper discusses cognitive limitations of FFA and presents the findings of investigations on: (a) model discrimination, (b) the use of parsimonious models, and (c) the robustness of upper quantiles to largest elements of a sample. Moreover, bounded-at-zero distributions with two shape parameters for the flood variable are obtained using power transformation; then the probability density function and cumulative probability distribution for the variable are introduced. Based on the gamma distribution, two- and three-parameter heavy-tailed distributions are developed. Estimation techniques based both on the generalized probability weighted moments and the mean deviation are recommended for further investigation.

Key words discrimination procedures; mean deviation; Monte Carlo simulation; parameter estimation; probability distributions; robustness
