



## **Comparison of mapping approaches for estimation of design maximum daily precipitation totals for flood risk assessment in ungauged basins**

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The objective of this study was to test and compare methods and tools for the spatial interpretation of the maximum daily precipitation totals and their design values for flood risk assessment in ungauged basins. Four methods to the preprocessing of annual maximum daily precipitation data were used. The first method applied was the direct mapping of at-site estimates of distribution function quantiles. In the second method, the daily measurements of the precipitation totals were interpolated into a regular grid network, and then the time series of the annual maximum daily precipitation totals in each grid point of the selected region were statistically analysed. In the third method, the spatial distribution of the design precipitation was modeled by quantiles predicted by regional precipitation frequency analysis using the Hosking and Wallis procedure. Homogeneity of the region of interest was tested, and the index value was mapped using spatial interpolation. Quantiles were derived through the dimensionless regional frequency distribution estimated by using L-moments. Kriging was selected as the interpolation method and was applied in all of these three approaches. The approaches were tested on the precipitation measurements at 23 climate stations from 1961-2000 in the upper Hron basin in Slovakia. In the last step, the expert's hand drawn isohyets map of 100-year maximum daily precipitation totals constructed using data from 557

stations in Slovakia was used for the comparison of previous approaches. Finally the design values estimated by all these methods were compared and their application in engineering practice was discussed.