



## **Regional estimation of design precipitation totals by simple scaling for flood risk prediction in Slovakia**

Marta Bara, Silvia Kohnova, Ladislav Gaal, Jan Szolgay, and Kamila Hlavcova

Department of Land and Water Resources Management, Faculty of Civil Engineering, Slovak University of Technology, Bratislava, Slovakia (bara.marta@gmail.com, silvia.kohnova@stuba.sk, ladislav.gaal@stuba.sk, jan.szolgay@stuba.sk, kamila.hlavcova@stuba.sk)

Design values of extreme rainfall are of very great importance in engineering hydrology, such as input data for hydrological modeling, for the prediction of flood events, or for planning and design in water resources management. Precipitation data with sufficient temporal resolution necessary for estimation of design precipitation totals are available from a limited number of raingauges with continuous recording. One of the advantages of the simple scaling method is, that it allows estimating of design precipitation totals for required durations and recurrence intervals using daily data, available from a denser network of non-recording raingauges.

In this study the possibility of using the simple scaling method for regional estimation of design short-term precipitation totals for flood risk forecasting was tested. The analysis includes precipitation data from 56 raingauge stations from the whole territory of Slovakia, distributed into three homogeneous regions based on regionalization of the daily maximum precipitation totals in the warm season (April–September). The regional dimensionless growth curve of daily precipitation maxima was derived in the regions, and the local T-year quantiles were estimated by the index value method. In each region three verification stations were selected which were treated as ungauged sites. It was supposed that the only information on the precipitation regime at the verification stations was the index value. Using the regionally averaged scaling exponent, the IDF curves were estimated by downscaling the design daily precipitation totals. The IDF curves were finally compared with those assessed locally in previous studies and their application in engineering practice was discussed.