Methodology for the selection of 10-day maximum precipitation totals and their statistical analysis in the upper Hron region

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A b s t r a c t : In the paper 10-day maximum precipitation totals from 23 rain gauges over the period 1961 to 2000 in the Upper Hron River basin in Slovakia were analysed. A combined method, based on statistical criteria and on the evaluation of evaporation and runoff conditions during long precipitation events, has been used for the selection of the 10-day precipitation totals. N-year values of the 10-day annual maximum precipitation totals were estimated at-site separately for the summer and winter season using several distribution functions and parameter estimation methods. The distribution functions involved the Gumbel, Generalized Extreme Value, Pearson III, logPearson III, the General Logistic, Rossi, Pareto, Weibull and the Log-normal distribution functions. The parameters of distribution functions were estimated by the method of moments, the maximum likelihood method, probability-weighted moments and L-moments. The number of statistically acceptable distribution functions was tested and found rather high. A comparison

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of the resulting N-year rainfall estimated from these distribution functions showed that in the warm season they did not exhibit significant differences from a practical point of view.

Key words: extreme precipitation, L-moments, at-site frequency analysis, 10-day maximum precipitation totals