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High resolution meteorology
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Multi-daily rainfall climatology and change for water resource management

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The ongoing study on precipitation regime in the Croatian Drava River basin is intended to be used by decision makers in water and energy resource management. One side aspect of this study is the variability in daily and multi-daily amounts (2- and 5-days), the indices defined by WMO and amended by the end-users, which are critical for applications in assessment and maintenance of flooding. The daily rainfall series are from the period 1961-2000, collected at two rain gauges: Varazdin in the upper part of the Croatian Drava River basin and Osijek in the low one, not far from its mouse into the Danube River. The applied Gamma probability distribution makes it possible to estimate the likelihood of rainfall at different durations within a specific range. The generalized extreme value distribution is employed to compute the design values of annual maximal 1-, 2- and 5-day precipitation amounts with different return periods indicating at precipitation risk. In addition to the extreme precipitation characteristics of the current climate, the evolution of trends in annual maximal 1-, 2- and 5-day rainfall amounts are derived from linear regression during the period 1901-2007 at Osijek and for the both stations since 1951. Statistical significance at the 5% confidence level is established using the Mann-Kendall rank non-parametric test. The coefficients of variation, indicating interannual variability, are then computed for consecutive 30-year moving time windows (1 year step) for each parameter. Trends for 30-year periods with the 10-year step (1901-1930, 1911-1940, ...) were computed to detect the possible changes in variability.

At the level of the synoptic measurements, the analysis of weather types related to the extreme rainfall events would be deduced.