



Comparison of two approaches to fitting new IDF curves in Czechia

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Characteristics of short-term rainfalls, especially their intensity and design values, are very important for the technical (e.g., sewage system) and hydrological practice. However, measurement and data processing of these characteristics are rather complicated. The still frequently used design values of short-term rainfalls in Czechia come from studies that are more than 60 years old.

Therefore, the new design values of rainfall totals are in preparation within the project “Prediction, Evaluation and Research for Understanding National sensitivity and impacts of drought and climate change for Czechia” (PERUN). The intensity-duration-frequency (IDF) curves for the 5min – 3day rainfall totals will be prepared for selected measurement stations of the Czech Hydrometeorological Institute. More than 170 stations with sufficient length (mainly more than 25 years) of joined digitalized pluviographs records and the automatic rain gauge measurement series from 1951–2022 were processed. The 5-year to 100-year design values were estimated using the region-of-influence (ROI) method. Afterwards, the final IDF curves (theoretical function) should be fitted with the estimated design values. However, the classical approach of fitting three-parametric intensity curve is suitable only for a part of the IDF curve (i.e. short-term rainfalls). Thus, a new approach, i.e., use of a polynomial function, was suggested as suitable representation of the whole curve including long-term (approx. 6-hour – 3-days) rainfalls.

In our contribution, we focus on comparison of the classical approach to fitting IDF curves (i.e., use of three-parametric intensity curve) and newly suggested approach (i.e., use of polynomial function). We focus on the part of the curve for short-term rainfall (durations of 5-360min) where classical intensity curve is generally used.