



On the possibility of using climatic forcing indices in the ROI method for 1 and 5-day precipitation extremes in Slovakia

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The regional properties of climatic forcing, beside catchment properties, play a decisive role in the regional distribution of flood characteristics. Which hydro-meteorological characteristics and indices can be used to describe regional patterns of this forcing is therefore of central interest in regional frequency analysis.

In the poster, the region-of-influence (ROI) approach is implemented for the estimation of growth curves of extreme 1 and 5-day precipitation amounts in the Western Carpathians, where complex rainfall generation mechanisms (intensive precipitation caused by diverse atmospheric circulation patterns, orographic effects and convection) are observed over a relatively complex mountainous terrain. The interest of the study is given to finding proper site characteristics, especially climatic forcing indices, which may enhance the effective transfer of the regional information to the target site.

In the ROI frequency models, the similarity of sites is defined based on the selected climatic indices as the long-term regime of precipitation, and the Lapin's index of the Mediterranean effect, which characterizes the inter-annual variability of precipitation in Slovakia.

The statistical properties of different frequency models for two durations and three

seasons (summer, winter and annual) are assessed by a Monte Carlo simulation experiment, which was also used to imply the best suitable alternative of the site attribute sets for the ROI procedure.

In the case of shorter duration (summer and annual 1-day maxima), probably due to the fact that 1-day annual maxima occur predominantly in the warm season with weak spatial coherence, the index of the Mediterranean effect has not proved its applicability. On the other hand, precipitation extremes of longer durations are mostly of frontal origin, therefore, different precipitation regimes on the windward and leeward sides of the mountains in Slovakia appear. Since these effects are partially captured also in the selected climatological site attributes, in the case of longer durations (5-day maxima), the frequency model based on the climatological characteristics of the long-term precipitation regime has proven its applicability.

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