



## Possible future changes in extreme rainfall events in Czechia

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Many countries currently develop or improve their national strategies against natural hazards, especially against those related to weather phenomena. This is particularly important because of possible future changes in extreme weather statistics. Regarding precipitation, the increase of its intensity is generally expected in a number of regions due to the warming climate. However, major river floods are caused by extreme precipitation events affecting large areas. Therefore, it is necessary to study possible changes also in other characteristics of precipitation events, namely, the spatial extent and distribution of precipitation, and the duration of the events including a possible shift in the season of their occurrence.

The presentation focuses on the assessment of possible changes in heavy rain characteristics in Czechia within the activities of the national project PERUN. We use outputs from the Aladin-CLIMATE/CZ model and follow up on the already published analysis of extremes for the past period 1961-2020, in which we used measurements at rain gauge stations. We employ three types of model runs providing one- to five-day precipitation totals with the horizontal resolution of 2.3 km: (i) model re-analysis covering the period 1990-2019 and serving to the validation of the model in terms of its ability to simulate past extremes, (ii) historical (control) run covering the period 1981-2014, and (iii) climatological run covering the period 2015-2099 and considering two scenarios SSP5-8.5 and SSP2-4.5. Changes in heavy rain characteristics are evaluated by the comparison of outputs from the climatological and historical run. Due to the multiplication of impacts of heavy rains when occurring in larger area, we proposed an areal approach of their evaluation. We apply the weather extremity index (WEI), a universal indicator which is a function of the affected area and the average return period of precipitation totals considering the rainfall duration when the WEI is the highest. This enables to detect the events with the heaviest rains and their characteristics in the period of interest.

First results indicate higher frequency of extreme rainfall events occurring also in the cold half year which have circulation causes generally different from the summer ones. This opens the door for the next research devoted to the study of circulation anomalies which induce the events.