



Increasing extremeness of precipitation in Central Europe? Comparison between past and recent events

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Currently, the main challenge in precipitation climatology is understanding past and possible future changes in the frequency and/or magnitude of precipitation extremes because these changes could alter the frequency and/or magnitude of consequent floods. To properly assess this linkage, precipitation should be evaluated not only by its maximum totals at individual rain gauge stations but also with respect to the spatial extent of the events.

In last two decades, several extreme precipitation events and floods occurred in Central Europe, namely in July 1997, August 2002, and May/June 2013. All of them produced catastrophic flooding and intensified discussions about possible changes in precipitation climatology in the affected region. It seems to be a challenging topic whether the recent period has been unique in terms of the frequency and/or magnitude of the precipitation extremes because also other periods with enhanced precipitation extremeness are known from the past, such as the second half of 1970' and the first half of 1980' or two decades at the end of the 19th century. For example, the absolute maximum Central-European daily precipitation total 345.1 mm was recorded on 29 July 1897 at the Czech rain gauge station Nová Louka. However, this only value can hardly be considered as a representative characteristic of the precipitation event which affected a large part of Central Europe.

To compare the past and the recent precipitation events objectively, we employ a novel tool called weather extremity index, which reflects not only the highest precipitation amounts at individual gauges but also the rarity of the amounts, the size of the affected area, and the duration of the event. For these purposes, station daily precipitation data from available sources were excerpted: digitalized data sets; printed yearbooks; publications at that time; original rain gauge reports. The evaluation is performed on several spatial scales defined by watersheds.