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Verification of reconstructed historical extreme precipitation events in an hourly resolution

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Extreme precipitation events (EPEs) represent one of the main natural hazard in Central Europe, often accompanied by extensive flooding that can result in loss of human life and costly damage to property, infrastructure, and agriculture. Although more or less recent EPEs are well documented by rain gauges and/or weather radars, an observation of historical EPEs in a high spatial and temporal resolution does not exist at all. The contribution will present an application of the sub-daily temporal reconstruction method to the historical convective EPEs that occurred over the Czech Republic (CR) in the second half of the 20th century. The method requires precipitation re-forecasts (retrospective forecast) generated by a numerical weather prediction (NWP) model in a high temporal resolution along with daily rain gauge measurements. Recently, the method employing re-forecasts of the NWP model COSMO with a spatial resolution of 2.8 km and output temporal step of 10-minutes has been successfully verified with adjusted radar-derived precipitation estimates for several recent EPEs, where radar observations were available. In the presented contribution, the application of the method will be enlarged on the historical EPEs with an insufficient spatial and temporal observation. For these events, the reconstructed 10-min precipitation will be accumulated in 1 hour and verified with 1-h precipitation totals observed by pluviographs. Because their number is very limited and their distribution over the CR is sparse (especially for more historical events), an employment of their interpolated values would bring additional uncertainties. From this reason, we will verify point measurements with gridded precipitation re-forecasts taking into account information from neighbouring pixels (e. g., enlarging evaluation window over a given grid box). Reconstructed EPEs will then serve as a tool to evaluate their sub-daily extremity from historical perspective.