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Statistics of 20 years of heavy precipitation events in Germany from radar data

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Extreme precipitation events are expected to occur more frequently in a warming climate. Understanding their structure and predicting the exact time and location of precipitation events still remains a challenge because of the high temporal and spatial variability of rainfall. Nationwide weather radar networks are a common tool for investigating precipitation events and their spatial and temporal structure. The German Weather Service (DWD) provides a nationwide climatological radar data set from 2001 to 2020. A reprocessing procedure has been applied to reflectivity measurements in order to obtain precipitation estimates as homogeneous as possible. With an object-oriented analysis, all precipitation events for 11 different durations from 1 to 72 hours exceeding DWD's official warning level for heavy precipitation have been detected and statistically analysed.

We will present a comprehensive analysis of all heavy precipitation events that occurred in Germany between 2001 and 2020. We examined their size, duration, location, spatial structure and distribution as well as regional and climatological differences and demonstrate how this information is collected in an online tool for easy access. An assessment of how well these heavy precipitation events were captured by DWD's network of precipitation stations will be given. Finally, we will present the possibility to use the event detection procedure as an operational tool for assessing and classifying heavy precipitation events and their potential impact in near real-time.