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Evaluation of the extreme rainfall event of July 2021 in Western Germany and its impact based on the Catalogue of Radar-based Heavy Rainfall Events (CatRaRE)

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Within a few days of July 2021, extreme heavy rainfall associated with the low-pressure weather system “Bernd” caused severe flooding in Western Germany (North Rhine-Westphalia and Rhineland-Palatinate), as well as in Luxembourg, and parts of Belgium and the Netherlands. In Germany, this devastating event resulted in at least 184 fatalities.

In our presentation, we take a closer look at this event as classified in the Catalogue of Radar-based Heavy Rainfall Events (CatRaRE), derived from 21 years of climatological radar data (RADKLIM 1km,1h) for the area of Germany.

The CatRaRE Catalogue covers both the attributes of all classified heavy rainfall events as well as their spatial extent. The dataset is published annually by the German Meteorological Service and is freely available for all interested users at: dwd.de/catrare.

We present the extent and parameters of this extreme rainfall as an event classified in the CatRaRE together with a comprehensive analysis and comparison against all heavy precipitation events lasting between 1 to 72 hours which occurred in Germany in the period from 2001 to 2020. Apart from various extremity statistics such as return period, heavy precipitation index, and weather extremity indices, additional variables are examined as predictors for a potential impact: e.g. antecedent precipitation index, population density, land cover, imperviousness degree and topography indices.