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Characteristics and Impacts of the severe Hailstorm on 28 July 2013

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On 27/28 July, two severe supercell thunderstorms in Germany caused unexpected extreme losses of 3.1 bn EUR(insured) and 4.0 bn EUR(economic), respectively. According to the recently published damage statistics of Munich Re for the year 2013, these hail events were the costliest natural catastrophe in worldwide for that year ranked by insured losses. This example exemplifies the large damage potential related to hail events, which is still underestimated both by the public and the insurance industry.

On 27 July, the first supercell moved over the federal states of North Rhine-Westphalia and Lower Saxony. Large hail with diameters of up to 7.5 cm according to observations archived in the European Severe Weather Database (ESWD) caused severe damage especially over the Volkswagen factory in Wolfsburg. One day later, on 28 July, another supercell formed upstream of the Black Forest Mountains and moved almost parallel over the Swabian Jura and Bavaria. Hail with diameters of up to 8 cm fell over a heavily populated region between the cities of Reutlingen and Tübingen. In this area, exposed assets are extremely high, which partly explain the high total loss. Approximately 100,000 buildings and 50,000 automobiles (not considered are the damaged automobiles at the parking lot in Wolfsburg) were severely damaged by these two events. Considering the single event definition over a 72-hr period, which is usually applied in the insurance industry, these hailstorms were one of the most expensive loss events in Germany.

In this paper, we investigate the severe hailstorm on 28 July from different views. By using and combining available observational data sets, the objective is to reconstruct the whole events at a very high resolution and to examine the conditions that are most relevant for convective initiation and the further development of the organized convective cell. Using a series of photos of damaged objects the aim is to relate different object classes and hail stone sizes. Relations between radar-derived intensity and damage frequency are derived on the basis of insurance loss data provided by a special crop insurer. These analyses also reveal to what extent past hailstorms, where observations are usually scarce, can be reconstructed reliably from insurance data. Using a radar-derived event set of past hailstorms in Germany over a 9-year period, the hail storm is put in the historic context.