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A multi-data process study of a severe hail storm in complex topography

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On 6 June 2015 a damaging hail storm occurred in the complex topography of Central Switzerland. The storm persisted for about 3 hours covering approximately 40km. Despite its moderate velocity, the cell produced hail with large diameters (>4cm) on its path, as estimated by the Maximum Expected Severe Hail Size (MESHS) radar algorithm and confirmed by an unprecedented wealth of observational data, namely MeteoSwiss App crowd-sourced hail reports, anonymised insurance damage claims and independent verification material such as photos and witness reports. Storms which are comparable in severity, as estimated by the Thunderstorms Radar Tracking (TRT) radar algorithm, typically occur only twice per year in the Swiss Radar Network domain. An event analysis is carried out with multiple data sources, aimed at understanding the establishment of the environment and the triggering mechanism at play. Data used for environment characterization and process identification encompasses radar, local-scale COSMO-2 analysis, ERA-interim reanalysis and a high-resolution WRF simulation. The analysis focuses on the relative importance of large- to local-scale processes and environment for the occurrence of this specific storm. In this particular case the large-scale configuration is clearly favourable for severe convection. However, in the absence of direct convection-initiating frontal lifting, gravity waves or convergence zones, it is found that lifting due to orographic effects, particularly thermo-topographic winds, were important for the initiation of the storm and cold air outflow for the maintenance and propagation.