



Nowcasting, warning, mitigation, and documentation of hail storms in Styria, Austria

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The South-East of the Austrian province of Styria is a hail-hotspot. Typically on more than 50 days in summer hail warnings are released. Since decades, hail mitigation actions are carried out by means of specially equipped aircraft seeding 'suspicious' clouds with silver-iodide generators. In the year 2009, a project was started with the goal to document hail events and to increase the efficiency of hail finding measures. Since decades, the weather situation is observed in this region by the Austrian C-band weather radar network that provides every five minutes updated 3D reflectivity and velocity measurements with a resolution of 1 km. In 2009, the aircraft used for cloud seeding have been equipped with GPS sensors and tablet PCs. As a consequence, the position of the aircraft is accessible in close to real time and can be marked in the weather radar images. Further, the aircraft pilots have access to the current weather radar images. This idea guarantees a two-way information exchange. On the one hand, the pilots get a full picture of the overall weather situation. On the other hand, it can be documented what cloud cells the experienced aircraft pilots regarded as critical and when and where they chose to seed.

Since the project started, aircraft seeding has been documented on more than 150 days. This study analyzes convective storms as they were tracked with the weather radar during their life cycle - from the origin to the collapse. Both categories of cells, seeded and unseeded ones, have been analyzed. The duration, the path-length of the track over ground, the vertical profile, the zero-degree isotherm, as well as the precipitation rate have been extracted. These datasets will allow the evaluation of forecast models for convective storms. It was further evaluated if the seeded convective storms met standardized seeding criteria. A long term perspective of the ongoing project is a scientific analysis of the effects of the hail suppression measures based on the comparison of seeded and unseeded convective cells and on documented hail information from the ground.