

Analysis of hail pad data, an accompanying investigation for operational hail defense companies in Austria

O. Svabik

Central Institute for Meteorology und Geodynamics, ZAMG, Austria
(otto.svabik@zamg.ac.at)

Hail prevention activities in Austria were supported by the national weather service ZAMG, 1981 - 2001. Testing the efficiency of these weather modification activities (cloud base- seeding by aircrafts) hail pad-networks have been erected, 1981 in the target area NOE, Lower Austria, and 1982 in the target area STK, Styria, both with a grid of 2 km. The network NOE includes 127 stations, covering an area of around 500 km², the network STK includes 181 stations, covering an area of around 730 km².

Each hail recording station is equipped with 5 pads (white painted Styrofoam plates, size 32x32x2 cm), permitting the evaluation of impact kinetic energy (Joule/m²) and momentum of hailstones on ground, four pads in vertical position with north-south and east-west orientation, one pad in horizontal position.

The evaluation of hit hail pads shows the distribution of each hail event by the number of hailstones and the hailstone- spectrum, i.e. stones with a diameter of 5, 10, 15, ... mm. Number of dents on hit vertical pads are representing wind conditions, too.

In reference on the 20 year running hail pad projects, there were averages of following parameters worked out, statistically:

the mean number of days with hail and the mean number of hit stations per hail event, both monthly and yearly (season: April–September), a mean annual hailstone- spectrum, and the average amount of kinetic energy, per station, yearly.

Further the variability in time and space, as to hail frequency and hail intensity, subdivided in 5years- periods: 1981-1985, 1986-1990, 1991-1995, 1996-2000 in case of target area NOE, and 1982-1986, 1987-1991, 1992-1996, 1997-2001 in case of target area STK.

All averages between the first ten years and the second ten years were compared, finally, showing as results:

the yearly mean number of days with hail is decreasing from 16 to 12 in case of STK, from 6 to 3 in case of NOE;

the mean number of hit stations per hail event is decreasing from 8,5 to 4,0 in case of

STK, from 5,0 to 2,3 in case of NOE;

the average of the amount of kinetic energy, is increasing from 76 to 100 Joule/m² in case of STK, is decreasing from 67 to 33 Joule/m² in case of NOE.

The results are analyses of the stored hail pad data itself. The databank contents all hail events, seeded and no seeded cells. For finding out the efficiency of hail suppression actions hail pad data have to be sheared within a following investigation.