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Conference on European Tomadoes and Severe Storms

Severe hailstorm activity on both sides of the Alps: a survey using composite images of the Swiss Radar Network

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In the framework of the Swiss National Research Programme 31 "Climate changes and natural disasters" (NRP31, 1992-1998) a study was undertaken of whether a global warming of the atmosphere would have an influence on the frequency and/or intensity of severe hailstorms in Switzerland and Central Europe. Therefore, for the most recent time period very detailed information about single hail cells have been collected from radar observations. Since 1983 composite images from the Swiss radar network (radars La Dôle and Albis) are available for the northern side of the Alps and since 1996 the composites (radar Monte Lema added) are also useable for the southern part. Within two observational areas of 37'000 km2 (one on both sides of the Alps) and for the hail season (May - September), single hailstorm tracks are extracted from the images. A cell is defined as a radar echo contour of 47 dBZ within for at least 30 minutes an echo of 55 dBZ - a severity criteria meaning hail on the ground - is visible. This criterion excludes the short lived ordinary cells of about 30 minutes duration and therefore reduces the number of cells to a managable size.

Since 1983 a total number of 1800 hail cells have been collected on the northern side of the Alps whereas during the three most recent seasons 240 cells developed within the southern test area. From each cell the time and duration of occurrence, the length and area of storm track, the point of origin and decay, the direction and speed of movement and the maximum height of the 47 dBZ contour (since 1992) are available. About 15 % of the storm tracks exceeds a length of 100 km. Those cells are considered as most severe. In addition to the statistical evaluation of the radar derived variables, sounding information is used to characterize the mesoscale environment and a European weather

classification (according to Hess and Brezowsky) is taken to describe the synoptic setting of the storm days.

The intention of the paper is to present the unique data base of Central European hailstorms, which is available so far. The investigation is intended to be continued during the coming hail seasons to extend the so far established time series of now 17 years (hopefully inclusive 1999). In addition the radar-derived time series will be compared with a much longer series (53 years) of hail events compiled from hail damage information.