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Cloud resolving simulations of a severe hailstorm: influence of CCN conditions

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On 28/06/2006, a hailstorm in the Black Forest (Germany) produced tennis-ball sized hailstones causing significant damage to crops, buildings and cars. Several people got hurt.

In order to study the influence of aerosols/CCN on severe storms in the EU-project ANTISTORM (**An**thropogenic Aerosols **T**riggering and **I**nvigorating Severe **Storm**s) we simulated this storm with the Lokal Modell (LM), the NWP Model by the German Weather Service. Simulations were performed with a horizontal resolution of 1 km. For cloud microphysics the 2-moment scheme by Seifert and Beheng (2006) was applied.

In idealised simulations, using a single sounding to drive the model and a warm air bubble to trigger convection, a severe hailstorm developed exhibiting good agreement to radar obeservations. The simulations also show that the model is able to produce hailstones with a diameter of a few cm. In general the features of the storms that develop under continental CCN conditions and maritime CCN conditions are similar, but looking at the storms in more detail reveals that CCN conditions do have an effect e.g. on hydrometeor size, which in case of a hailstorm may matter a lot.

In a second step we simulated the case under “real” conditions, i.e including orography and using LM analysis and forecasts provided by the German Weather Service as initial and boundary conditions. Again, CCN conditions were varied. Results of these “real” simulations will also be shown.

Seifert, A. and Beheng, K.D., 2006: A two-moment cloud microphysics parameterization for mixed-phase clouds. Part 1: Model description. *Meteorol. Atmos. Phys.*, **92**,

45–66.

For information on ANTISTORM see http://antistorm.isac.cnr.it