Characterization of dynamic of convection: a case study from the COPS experiment

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The life cycle of deep convection is investigated with emphasis on their dynamical evolution. The data used in this study are from the COPS campaign (Convective and Orographically-induced Precipitation Study) that took place in southwestern Germany and eastern France in the summer 2007. On the basis of case study from 15th July the convection is described from convective initiation at 14:30 UTC to the decay around 16:30 UTC. The convective initiation is identified by significantly changing of brightness temperature of the MSG (Meteosat Second Generation satellite) rapid scan data at visible channel (10.8μm).

The dynamic evolution during the life cycle can be described by the horizontal wind field in different altitude stages. Therefore radar data of four different sites were used, namely the operational radars of the German weather service (DWD) at Feldberg and Tuerkheim, C-band radar at Karlsruhe provided by the Institute for Meteorology and Climate Research (IMK), and the polarimetric radar POLDIRAD provided by the Institut für Physik der Atmosphäre (DLR), Oberpfaffenhofen which was situated at Waltenheim sur Zorn (France) during the COPS campaign. While radar scan time was not synchronized ten minute time frames were selected before gridding all data to a common volume and processing by using multiple Doppler method. The estimated wind fields are compared with surface wind from VERA (Vienna Enhanced Resolution Analysis) of the University of Vienna and calculations from the Meso-NH model.

To investigate microphysical processes different types of hydrometeors were classified by using polarimetric information of the DLR radar POLDIRAD. In combination with 3D- lightning data, provided by the European lightning network LINET, the electrical activity of the cells are reconstructed. The type and mass density of hydrometeors are also compared with the output from model calculation by using Meso-NH model.