



The operation of the AIDA facility as a cloud simulation chamber

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During the previous years, the AIDA (Aerosol Interaction and Dynamics in the Atmosphere) facility of Forschungszentrum Karlsruhe has been improved and widely used for experiments on homogeneous and heterogeneous ice nucleation of atmospheric aerosols like mineral dust, soot, organic, and biological particles. The temperature, pressure and humidity conditions in the cloud chamber can be varied in a wide range of natural cloud systems like convective clouds, leewave clouds, or cirrus clouds. This is achieved by expansion cooling induced by strong pumping to the chamber volume. During such expansion simulation runs the pressure is typically lowered by 20% within about 5 to 10 minutes. This induces variable cooling rates of up to 4 K/min which corresponds to an equivalent updraft velocity of 6 m/s for an adiabatically expanding air parcel. The change of relative humidity and the formation of cloud droplets and ice crystals are monitored with a comprehensive set of in situ and sampling instruments. More recently, the same chamber has also been developed and recognized as a platform for the test and intercomparison of cloud, ice nucleation, and water vapour instruments normally used for measurements on mountain stations or atmospheric research aircrafts.

Various measurement campaigns on aerosol-cloud processes have been performed at the AIDA facility with strong participation of external groups mainly from Europe and the U.S.A. The participation of some groups has partially been funded within European networking projects like EUROCHAMP or ACCENT. This contribution will introduce the main methodologies of AIDA cloud simulation experiments and high-

light selected results of five years ice nucleation research with AIDA.