



New laboratory investigations of the homogeneous freezing mode in clouds

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In the absence of ice nuclei, the glaciation of tropospheric clouds can be initiated by homogeneous freezing of the supercooled cloud droplets. In this contribution we present nucleation rates $J(T)$ which were retrieved from expansion cooling experiments in the AIDA cloud chamber using a size-resolving nucleation and growth model. The experiments were carried out under simulated convective cloud conditions with a known droplet size distribution measured with an optical particle counter (OPC) and retrieved from infrared extinction spectra. The formation rate of ice crystals was also measured with the OPC. The results are in excellent agreement with recent literature data. The AIDA studies provide a basis for experimental and modelling work on the competition between heterogeneous and homogeneous freezing. This process may e.g. affect ice particle number densities and radiative properties of the anvils of deep convective clouds. First results of respective experiments with externally mixed mineral dust and sulphuric acid aerosols will also be shown.