



Groundbased Digital *In Situ* Holography of Large Atmospheric Particles in Mixed Phase Clouds at the Alpine Site *Jungfrau*joch

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In atmospheric sciences, imaging of atmospheric particles can be used to discern e.g. droplets and ice crystals, to investigate their shapes and sizes and to look for effects revealing the coexistence of ice crystals and cloud droplets like riming.

Holography is a versatile tool among the different imaging techniques, as it opens up the prospect of imaging particles in a deep volume without being restricted by a typically small depth of focus as in other imaging techniques. Thereby it offers the advantage of gaining not only information on the particles' shapes, but also on their relative 3D-position

At *Johannes Gutenberg-Universität Mainz*, a digital-holographic camera system is currently being developed which is capable of imaging atmospheric ice particles, ranging in size from several microns to several millimetres, yielding an *in situ* nanosecond-snapshot of an atmospheric volume of about 20cm³. The computer-reconstructed images of the particles can be used to investigate their sizes, shapes, habits, and possibly their macroscopic structures and three-dimensional interparticle distances.

On the High Altitude Research Station *Jungfrau*joch, situated at about 3500m a.s.l. in the Swiss Alps, the prototype underwent a first field test within the "CLACE5" experiment in early 2006. A modified version of the instrument was deployed again on the *Jungfrau*joch in December 2006. Several tens of thousands of holograms of ice crystals were obtained successfully and are under analysis.

Besides a presentation of the current system, digital holograms of atmospheric particles obtained on the Jungfraujoch will be presented along with their reconstructions and exemplary analyses.