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In-situ measurements of ice nucleating particles with FINCH (Fast Ice Nucleus Chamber)

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Ice nucleating particles (INPs), which are a small fraction of the total aerosol population, are capable of triggering ice formation under atmospheric conditions. Since INPs play an important role for the radiative properties of clouds as well as for the formation of precipitation it is important to get quantitative information on the ice activity of various atmospheric aerosol species. With the Fast Ice Nucleus Chamber (FINCH; Bundke et al., 2008) the number concentration of INP is determined at different freezing temperatures and supersaturations. In contrast to other commonly used INP counters, i.e. continuous flow diffusion chambers (CFDCs, DeMott et al., 2011), in FINCH the supersaturation is reached by mixing the sample flow of ambient aerosol with a warm moist as well as a cold dry airflow. By changing the flow rates and temperatures of the individual airflows the freezing temperature (down to -50°C) and supersaturation (up to above water saturation) can be varied relatively quickly. Particles that are ice active at the prescribed freezing temperature and supersaturation grow to crystals and are counted by a home-built optical particle counter (OPC) mounted below the chamber (Bundke et al., 2010).
FINCH was operated during the four-week INUIT-BACCHUS-ACTRIS field campaign in Cyprus in April 2016. The measuring site was the location of the Cyprus Atmospheric Observatory (CAO) at Agia Marina Xyliatou, which is typically influenced by dust from the Sahara and the Middle East, an aerosol that is known to have relatively good ice nucleating ability. First results from this campaign will be presented.

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