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# Evaluation of Meteorological and Aerosol Sensing with small Unmanned Aerial Systems

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Atmospheric aerosols have a large impact on the climate system due to their influence on the global radiation budget. Local aerosol sources such as vegetation, (bare) soil or industrial sites have to be quantified with high resolution data to validate aerosol transport models and improve the input for high resolution weather models. Our goal is to evaluate the use of Unmanned Aerial Systems (UAS) as a method for acquisition of high resolution meteorological and aerosol data.

During the INUIT measurement campaign in August 2012 at mount Großer Feldberg near Frankfurt, Germany, several flights with different sensor packages were carried out. We measured basic meteorological parameters such as temperature, relative humidity and air pressure with miniaturized onboard sensors. In addition, the Compact Lightweight Aerosol Spectrometer Probe (CLASP) for aerosol size distribution measurement or the Electrostatic Aerosol Collector (EAC) for aerosol sample collection was installed on board.

CLASP measures aerosol particles with diameters from 0.17 $\mu$m to 9.5 $\mu$m in up to 32 channels at a frequency of 10 Hz. The EAC collects air samples at 2 l/min onto a sample holder. After the flight the ice nuclei on the sample holder are activated and counted in the isothermal static diffusion chamber FRIDGE.

The results from the INUIT campaign and additional calibration laboratory measurements show that UAS are a valuable platform for miniaturized sensors. The number of ice nuclei was determined with the EAC at 200m above ground level and compared to the reference measurement on the ground.