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## Ceilometer aerosol retrieval and comparison with in-situ tower-measurements

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In recent years there is a growing interest in real-time aerosol profiling and in this context, the use of automated lidars and ceilometers (ALC) for aerosol remote sensing increased. Ceilometers were originally developed to measure cloud-base height automatically. Apart from this, they also provide vertically resolved backscatter information. Several algorithms have been developed to calibrate this signal and to derive aerosol concentration from it, bringing up new opportunities in air quality monitoring and boundary layer research.

The quality of ALCs is often evaluated by comparing the attenuated backscatter to measurements from high-power lidars. This approach is suitable to validate the backscatter signal. However, for the validation of the aerosol concentration, a direct comparison with an in-situ, optical aerosol measurement is more significant.

In this work, a comparison study was performed using the Jülich Observatory for Cloud Evolution. Data were processed and calibrated with algorithms by E-Profile (<https://www.eumetnet.eu/activities/observations-programme/current-activities/e-profile/alc-network/>). The aerosol retrieval was performed using a Klett inversion algorithm. Close to the JOYCE site a 120 m meteorological tower is located. This tower was used as a platform for the in-situ aerosol measurement, where an optical particle sizer was mounted 100 m above the ceilometer position.

We will show the setup and data processing of the in-situ measurements as well as an approach how ceilometer raw data can be processed, calibrated and used to retrieve aerosol concentration. First results of the comparison will be presented to evaluate the quality of ALC aerosol-measurement.