

AEROSOL-MEASUREMENT WITH ALC AND OPS

ExOb-presentation: Own Work

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Atmospheric
Measurement
Techniques



Ground-based remote sensing scheme for monitoring aerosol–cloud interactions

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CALCULATION OF ACI-METRICS

Sarna et. al. (2016)

$$ACI_N = \frac{d \ln(N_d)}{d \ln(\alpha)}$$

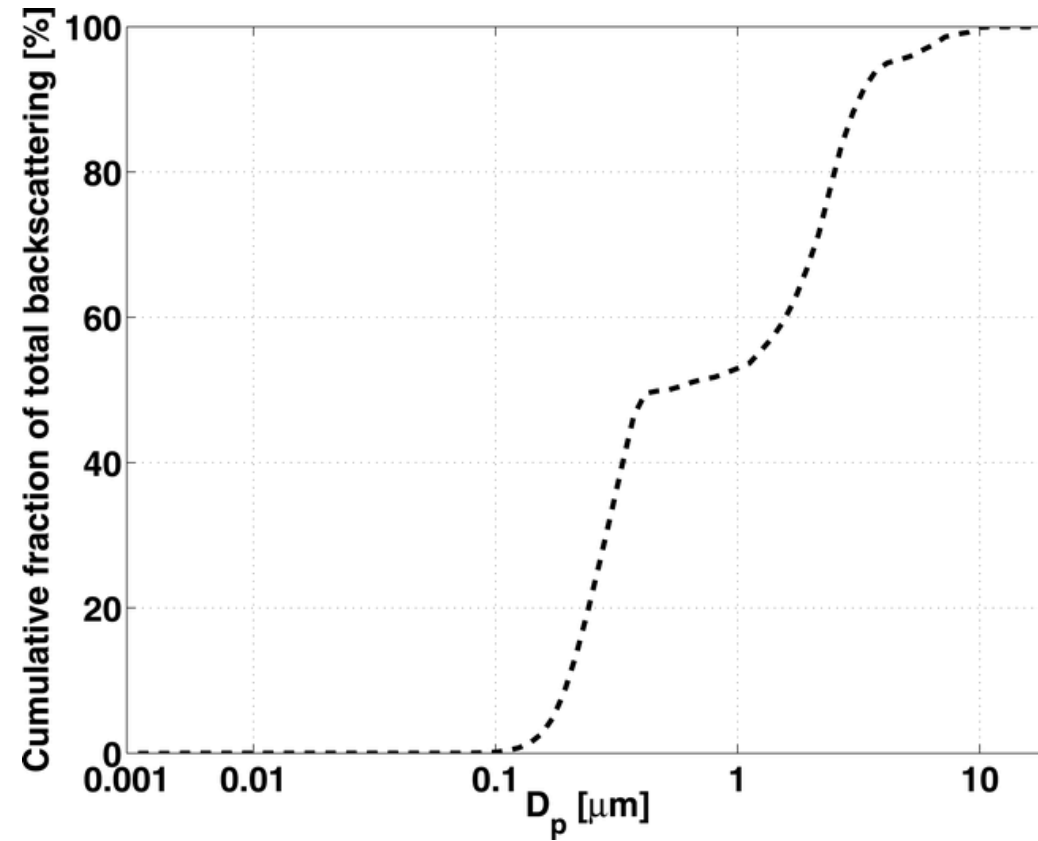
$$ACI_{r_e} = \frac{d \ln(r_e)}{d \ln(\alpha)} \Big|_{LWP}$$

observed proxy of the aerosol concentration α :

- aerosol number concentration
- aerosol optical thickness
- *backscatter of a ceilometer?*

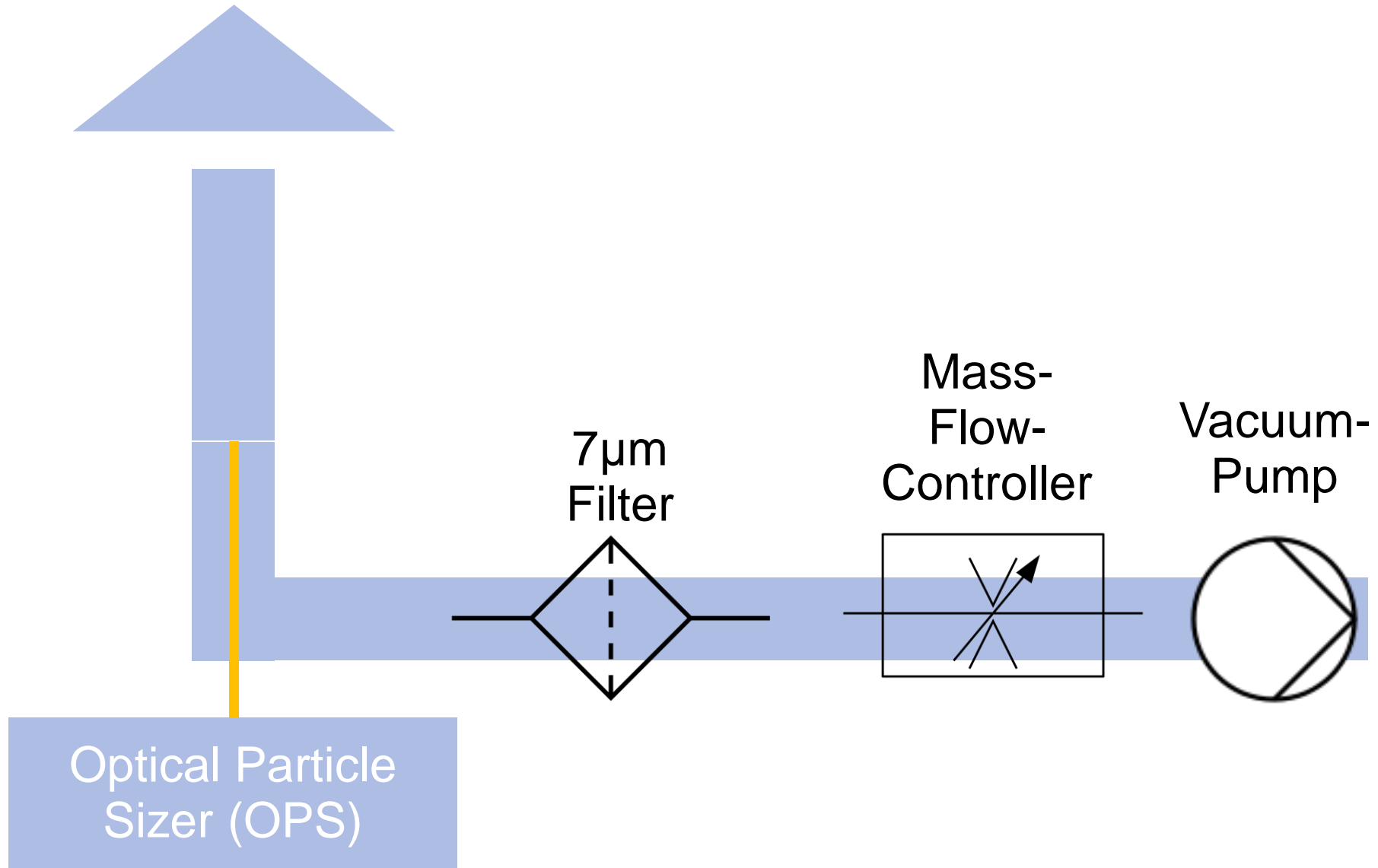
INSITU-AEROSOL-MEASUREMENT AT JÜLICH METEO-TOWER

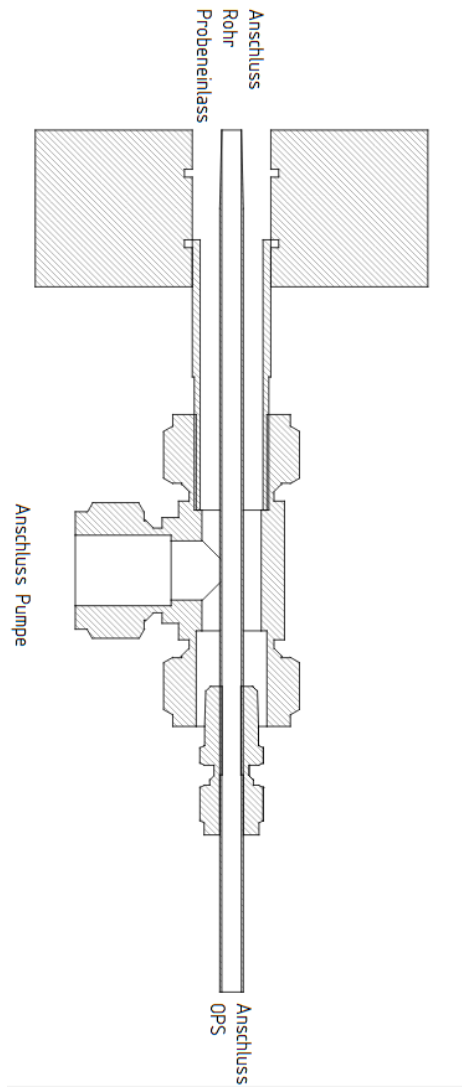
2017 DATASET

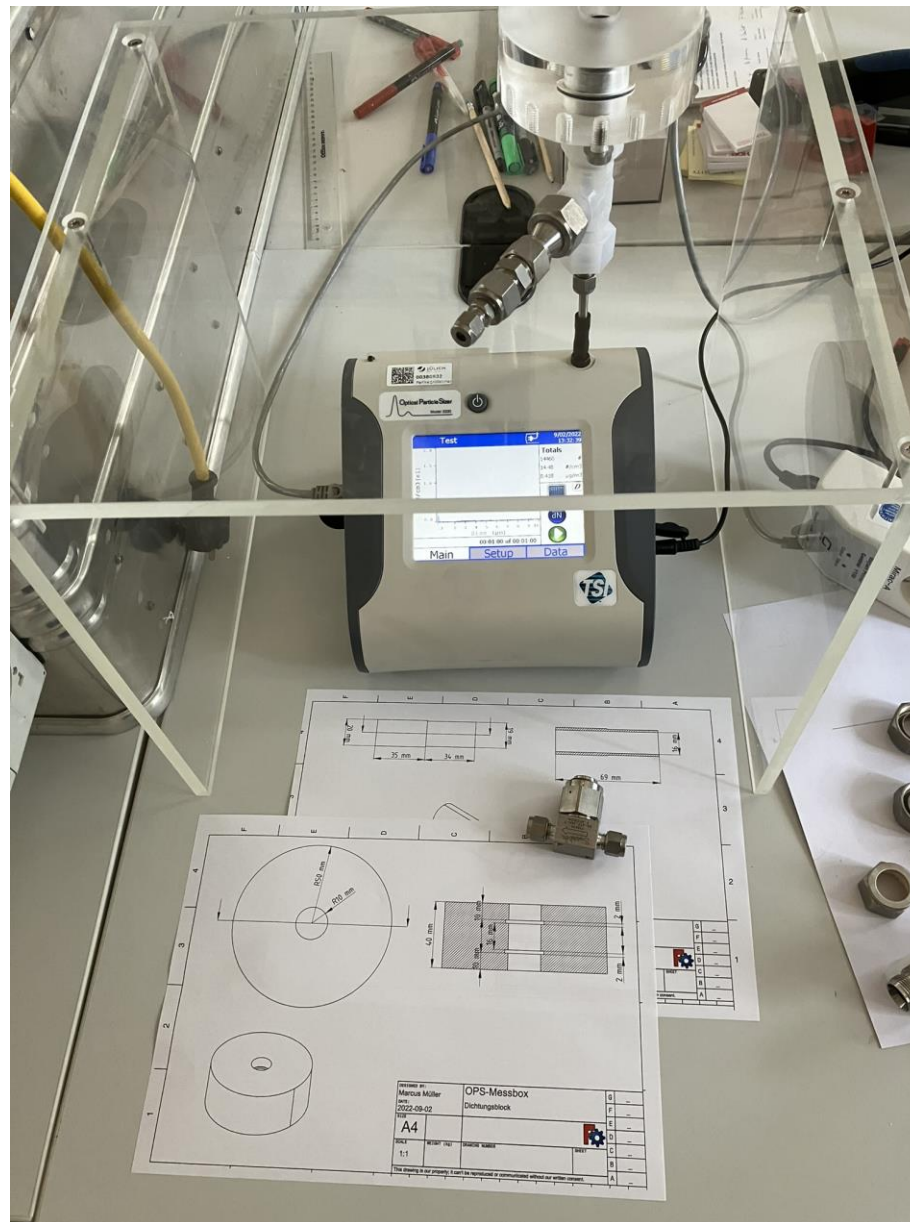


(Sundström et al. 2009)

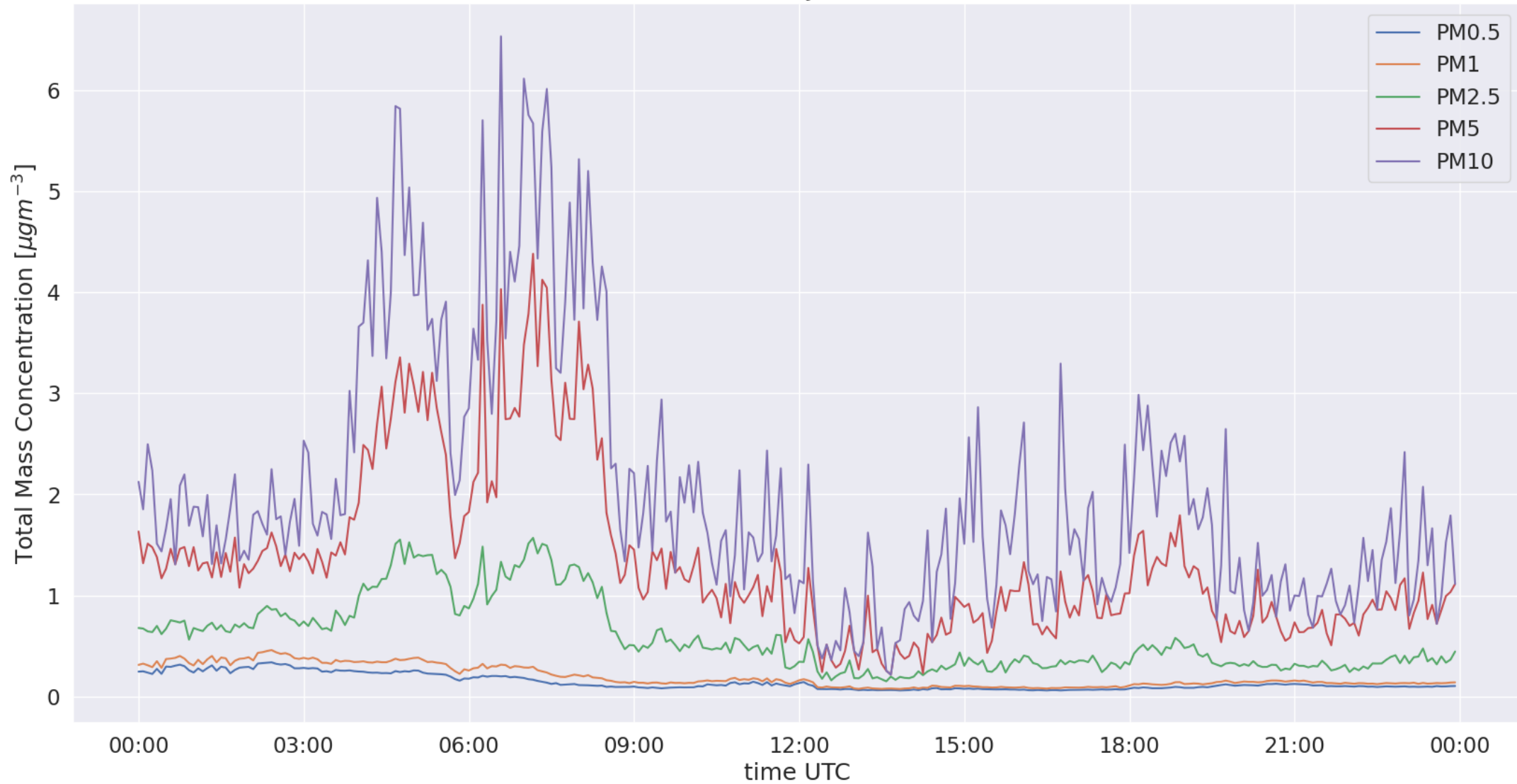










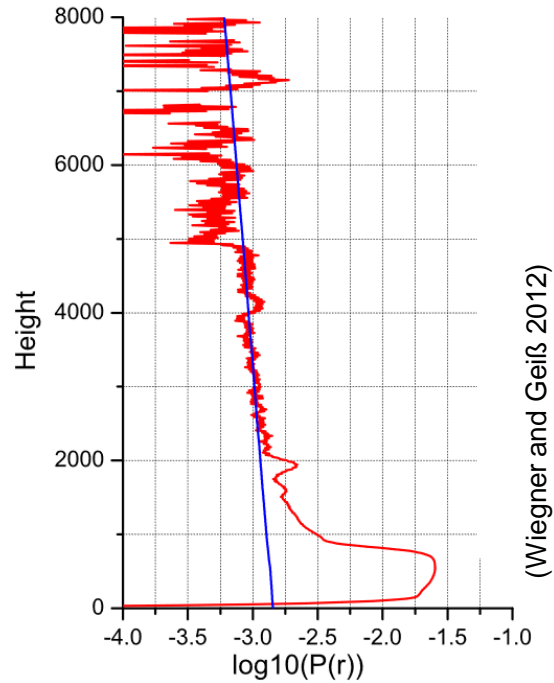


AEROSOL-REMOTE-SENSING WITH JOYCE CEILOMETER

LIDAR EQUATION

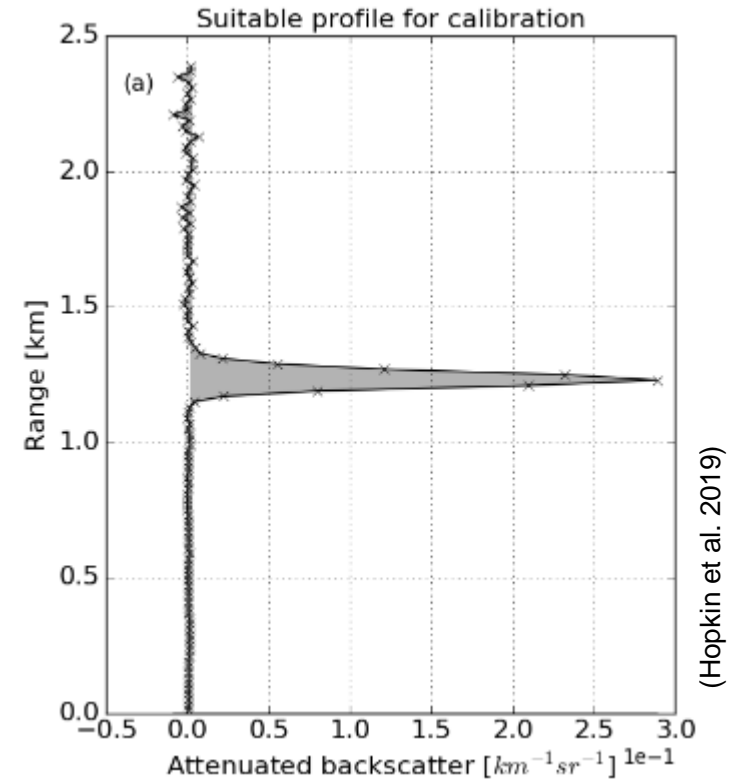
$$\begin{aligned} P(r) &= C_L \frac{\beta_r}{r^2} \exp\{-2 \int_0^r \alpha(r') dr'\} \\ \Leftrightarrow \frac{P(r)r^2}{C_L} &= \beta_r \exp\{-2 \int_0^r \alpha(r') dr'\} \\ &:= \beta^*(r) \end{aligned}$$

CALIBRATION



Rayleigh method

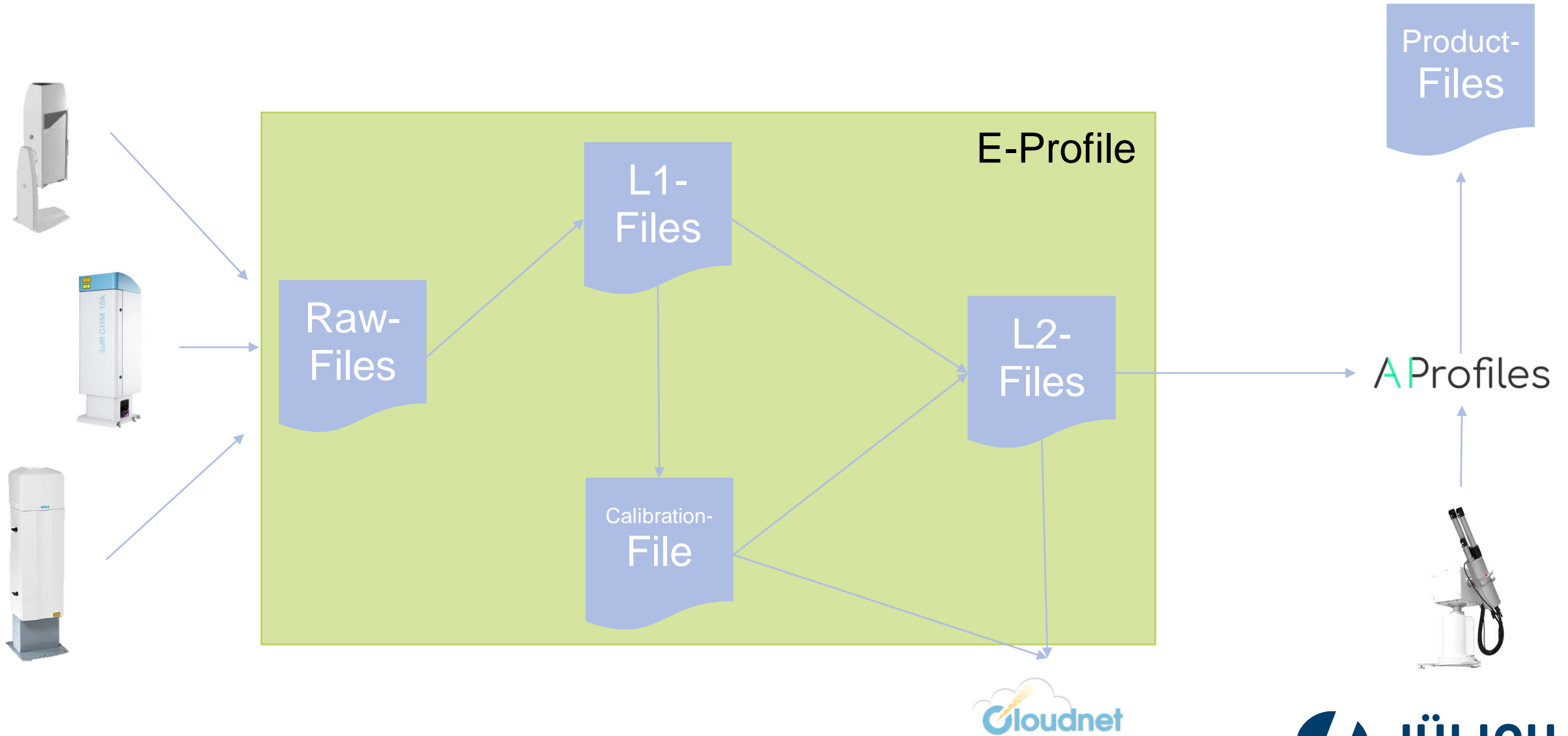
Wiegner and Geiß 2012



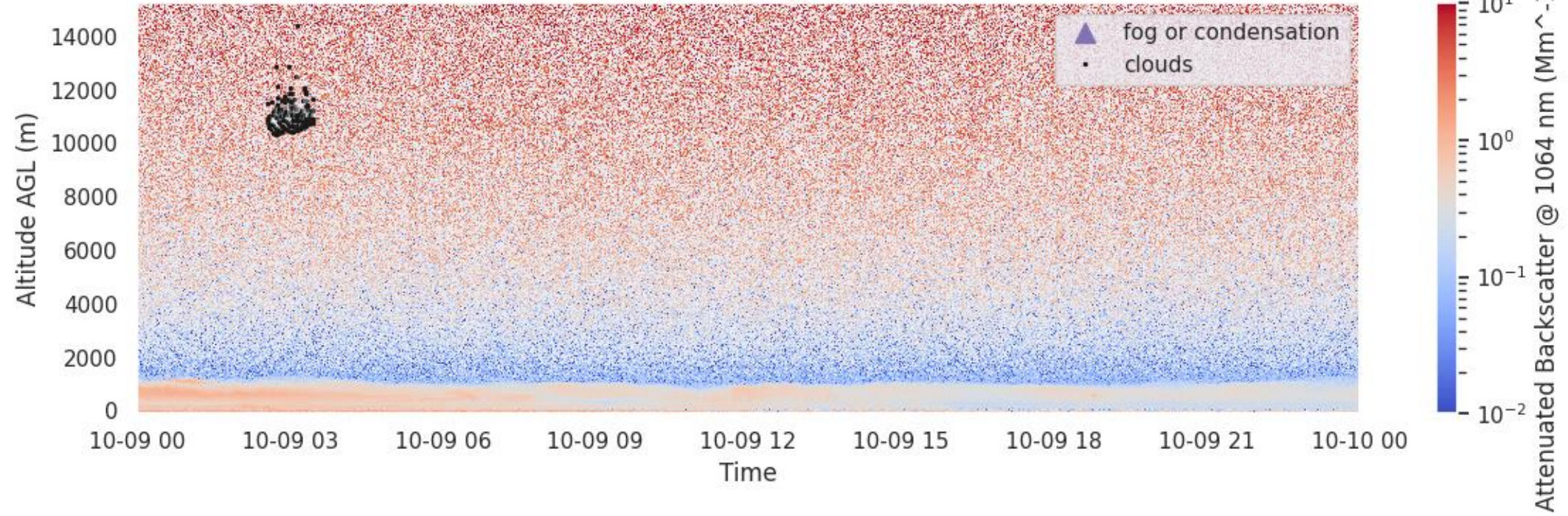
Liquid cloud method

O'Connor et al. 2004, Hopkin et al. 2019

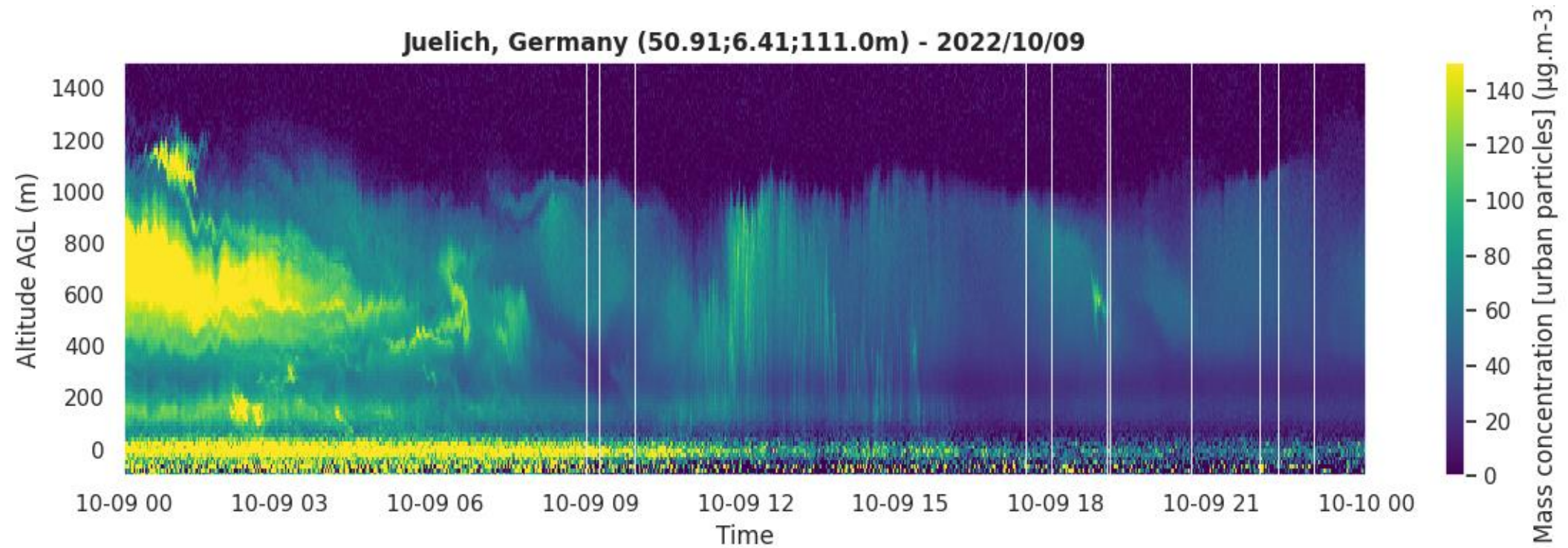
ALC PROCESSING



Juelich, Germany (50.91;6.41;111.0m) - 2022/10/09



Juelich, Germany (50.91;6.41;111.0m) - 2022/10/09



Juelich, Germany (50.91;6.41;111.0m) - 2022-10-09T00:00:00

