In the field, aerosol insitu measurements are often performed under dry conditions (relative humidity RH<30-40%). Since ambient aerosol particles experience hygroscopic growth at enhanced RH, their microphysical and optical properties - especially the aerosol light scattering - are strongly dependent on RH. The knowledge of this RH effect is of importance for e.g. climate forcing calculations.

We will present results from a campaign which took place in Cabauw where different remote sensing and insitu instruments were used to derive atmospheric gas species and aerosol properties. The aerosol scattering coefficient was measured dry and at various, predefined RH conditions between 20 and 95% with a humidified nephelometer (WetNeph). In addition, a wide range of further aerosol properties were measured. The measurements were used to characterize the effects of RH on the aerosol optical properties.

Four MAX-DOAS (multi-axis differential optical absorption spectroscopy) instruments retrieved vertical aerosol extinction profiles. The extinction corresponding to the lowest profile layer can be directly compared to the insitu values, which were recalculated to ambient RH. The comparison showed a good correlation, but a factor of 1.4-2.8 higher extinction coefficients compared to the insitu measured values. Best agreement is achieved for a few cases characterized by low aerosol optical depths and low planetary boundary layer heights. Differences showed to be dependent on the applied MAX-DOAS retrieval algorithm. The comparison of the insitu data to a Raman lidar (light detection and ranging) showed much better agreement if the Raman retrieved profile was used to extrapolate the directly measured extinction coefficient to ground.