

## CCN-activity of chemically aged SOA

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Secondary organic aerosol particles produced by ozonolysis of  $\alpha$ -pinene were exposed to chemical ageing in smog chamber experiments, carried out in January and February 2009 at the Paul Scherrer Institut as part of the MUCHACHAS campaign.

The aging experiments ran for up to more than 24 hours. They all started with ozonolysis of  $\alpha$ -pinene, which after 2-5 hours was followed by three types of aging processes:

1. Lights were turned on
2. Lights were turned on and HONO was added continuously (OH-source).
3. Tetramethylethylene (TME) was added continuously (dark OH-source)

CCN-activity of the secondary organic aerosol particles was measured continuously with a CCN-counter (continuous flow, Droplet Measurement Technologies, DMT) running in parallel with an HTDMA instrument with the object of comparing results from the two instruments and performing a closure study.

In each smog chamber experiment, a monodisperse size-cut of the smog chamber aerosol was selected and split between the CCN-counter and a condensation particle counter. Using the ratio of the two numbers, the fraction of activated particles was calculated, and the supersaturation needed to activate 50% of the particles (the critical supersaturation) was determined. The instruments were running continuously during each experiment with one value of the critical supersaturation obtained every 20-60 minutes.

In the subsaturated region, a distinct increase in growth factor (and thereby hygroscopicity) has been observed with the HTDMA operating at RH = 95%.

In contrast, preliminary results from measurements of CCN-activity indicate that the critical supersaturation does not change significantly with time. Only a very slight increase in hygroscopicity over time, possible due to chemical ageing, was observed from CCN data in some experiments. K-values of 0.06-0.14 have been calculated using the surface tension of pure water, following the parameterization of Petters and Kreidenweis<sup>1</sup>.

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<sup>1</sup> Petters, M.D., and S.M. Kreidenweis 2007 A single parameter representation of hygroscopic growth and cloud condensation nucleus activity, *Atmos. Chem. Phys.*, 7, 1961-1971.