

Aerosol microphysical properties during anticyclonic conditions over Europe during EUCAARI-LONGREX

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Airborne measurements of tropospheric aerosol properties over Europe were conducted in May 2008 during the EUCAARI-LONGREX campaign, where LONGREX stands for “LONG Range EXperiment”. 15 research flights were performed with the DLR Falcon 20, of which most flights were coordinated with research flights performed by the FAAM BAe-146. Both aircrafts operated from Oberpfaffenhofen (48.08° N, 11.28° E).

DLR Falcon 20 aerosol data used for the analysis were measured by a set of Condensation Particle Counters (CPC), a thermodenuder at 250° C, two aerosol spectrometers by Grimm, two further optical particle counters, the Passive Cavity Aerosol Spectrometer Probe (PCASP-100X) and the Forward Scattering Spectrometer Probe (FSSP-300) and one Particle Soot Absorption Photometer (PSAP). More detailed information about the instrumentation can be found in Petzold *et al.*, 2007.

During the first part of the campaign a blocking anticyclone occurred over Central Europe with its core mainly situated over Denmark. This stable synoptic situation led to accumulation of anthropogenic emissions in the continental boundary layer and westward transport of air masses across Northern Germany and South of England towards the Atlantic.

In-situ measurements of aerosol properties were performed in the vertical tropospheric column over EUSAAR ground sites at Hyytiälä, Vavihill, Mace Head, Cabauw, Melpitz, and Hohenpeißenberg. The combination of airborne measurements with ground-based observations allows analyzing the temporal development of aerosol properties in context of the meteorological changes during May 2008.

Figure 1 shows vertical profiles of CN number concentrations probed over Southern Germany and the time series of CN number concentrations at Hohenpeißenberg. During the blocking anticyclone

in the first half of May 2008 the boundary layer depth increased and showed a well mixed vertical structure. A more heterogeneous layering could be observed in the second half of May. In the same time CN number concentrations decreased from 10000 to 1000 particles cm⁻³ at Hohenpeißenberg after the anticyclone dissolved and frontal systems passed through over Southern Germany accompanied by precipitation events and changing wind directions.

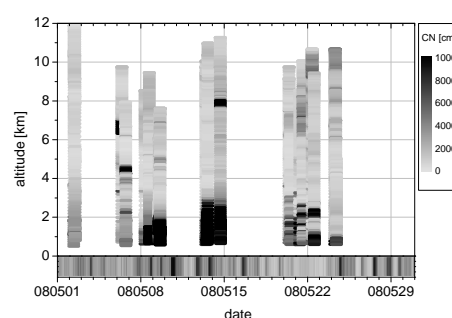


Figure 1. CN number concentrations (vertical profiles over Southern Germany and time series at Hohenpeißenberg) in May 2008.

The extensive data set obtained during EUCAARI-LONGREX within the stable synoptic situation over Europe combined with an analysis of the meteorological situation during air mass transport allows studies of aerosol microphysical properties during transformation and aging of anthropogenic emissions. These studies will also provide an important input to aerosol models. The main highlights of this analysis will be presented on the IAC 2010.

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Petzold, A., et al. (2007). *Atmos. Chem. Phys.*, 7, 5105-5127.

<http://www.pa.op.dlr.de/aerosol/eucaari2008/>