

## The EUCAARI LONG- RANGE Experiment (LONGREX)

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Keywords: aerosol mass spectrometry, ammonium nitrate, black carbon, organic aerosols, radiative properties

EUCAARI-LONGREX was an aircraft field campaign conducted between 6<sup>th</sup> May and 23<sup>rd</sup> May 2008. The experiment was part of EUCAARI, the European integrated project on Aerosol Cloud Climate and Air Quality Interactions. LONGREX stands for "LONG Range EXperiment".

The EUCAARI-LONGREX aircraft experiment was based in Oberpfaffenhofen, and involved two extensively equipped research aircraft: the DLR Falcon 20 and the FAAM BAe-146. The aircraft mainly flew West-East and North-South transects across Europe in order to follow the evolution of aerosol properties during air mass transport over Europe.

During the experimental period western Europe was greatly influenced by a large and relatively static anticyclonic system. Figure 1 shows the position of the anticyclone on 6<sup>th</sup> May 2008 but the pressure field was typical of much of the first 10 days of the experiment. During this time The DLR Falcon 20 flew mainly in the free troposphere and delivered information on aerosol microphysics across Europe during this time. It carried an aerosol LIDAR which delivered information on optical properties of the aerosol across Europe and its vertical structure. It also acted as a pathfinder for the BAe-146 which mainly performed in situ sampling at low level. Aerosol sources from the Poland-eastern Germany-Czech Republic area were dominated by sulphate and organic material. As these aerosol advected westwards towards the mouth of the Rhine and into the North Sea significant ammonium nitrate was observed to be present (Figure 1 shows an example of this). This greatly enhanced the water uptake of the aerosol and led to enhancements in the regional PM<sub>2.5</sub>, enhanced CCN concentration and the optical depth of the atmosphere in these regions during this period.

During these transport events the organic fraction was also observed to change significantly. Positive Matrix Factorization was performed on the organic mass fragment patterns obtained from an Aerodyne Aerosol Mass Spectrometer (see Lanz et

al., 2007). This showed that the organic fraction shows appreciable ageing during transport across Europe. Measurements of black carbon mass on a particle by particle basis using a Single Particle Soot Photometer (SP-2), show increasing coatings of black carbon away from source and offer an assessment of the budget of black carbon.

The main highlights of these results will be presented.

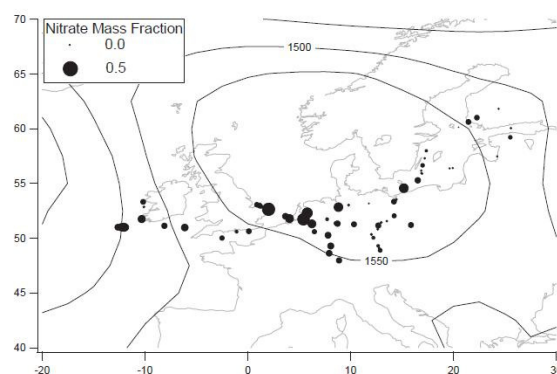


Figure 1: The circles indicate the nitrate mass fraction in submicron aerosol as measured by an Aerodyne Aerosol Mass Spectrometer. Each circle represents the average of a single straight and level run. The data shown are for the whole of the anticyclonic period. Also shown is the ECMWF 850 hPa geopotential height field for 12 UTC on 6<sup>th</sup> May 2008. These conditions were representative of the first 10 days of the experiments.

This work was funded by NERC grant ref. NE/E01108X/1, DLR, and EUCAARI. W Morgan was supported by NERC studentship NER/S/A/2006/14040.

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