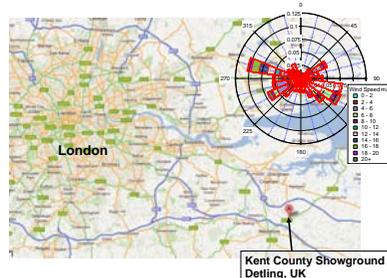


# Overview of ClearLo: Study of Aerosol Sources and Processing at a Rural Site Southeast of London

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## Clean Air for London (ClearLo) Winter 2012 Intensive Detling Site



- Study of London air pollution at an urban street site, an urban background site and a rural site in order to understand transport and aging of the urban plume.
- We provided an extensive suite of instruments at the rural site at Detling, UK.
- During the one month deployment, we sampled London outflow, continental outflow and local pollution sources.
- Understand air mass sources and aging, and correlations with London urban measurements.
- Closure between optical properties and chemical composition including black carbon. Absorption enhancement by coatings on black carbon.

### Instruments at Detling:

#### Gas-Phase Measurements:

- NO, NO<sub>2</sub>, NO<sub>x</sub>, O<sub>3</sub>, N<sub>2</sub>O, CO<sub>2</sub>, CO, SO<sub>2</sub>, NH<sub>3</sub>, HCHO
- PTR-MS and GC/FID: VOC's
- Q-CIMS: N<sub>2</sub>O<sub>5</sub>
- MOVI-CI-ToF: oxygenated HC's

#### Particle Measurements:

- HR-ToF-AMS and SP-AMS
- MOVI-CI-ToF: organic acids
- SMPS, OPC, LAS
- Thermal Denuder

#### Particle Black Carbon:

- SP-AMS, MAAP, SP2, aethalometer

#### Particle Optical Measurements:

- CAPS PMex (red and blue), PASS-3, PASS-UV

#### Bulk Particle Measurements:

- Real-time ECOC
- High volume filter sampler, medium volume filter sampler, rotating drum impactor, SEM filter collector

#### Remote Sensing:

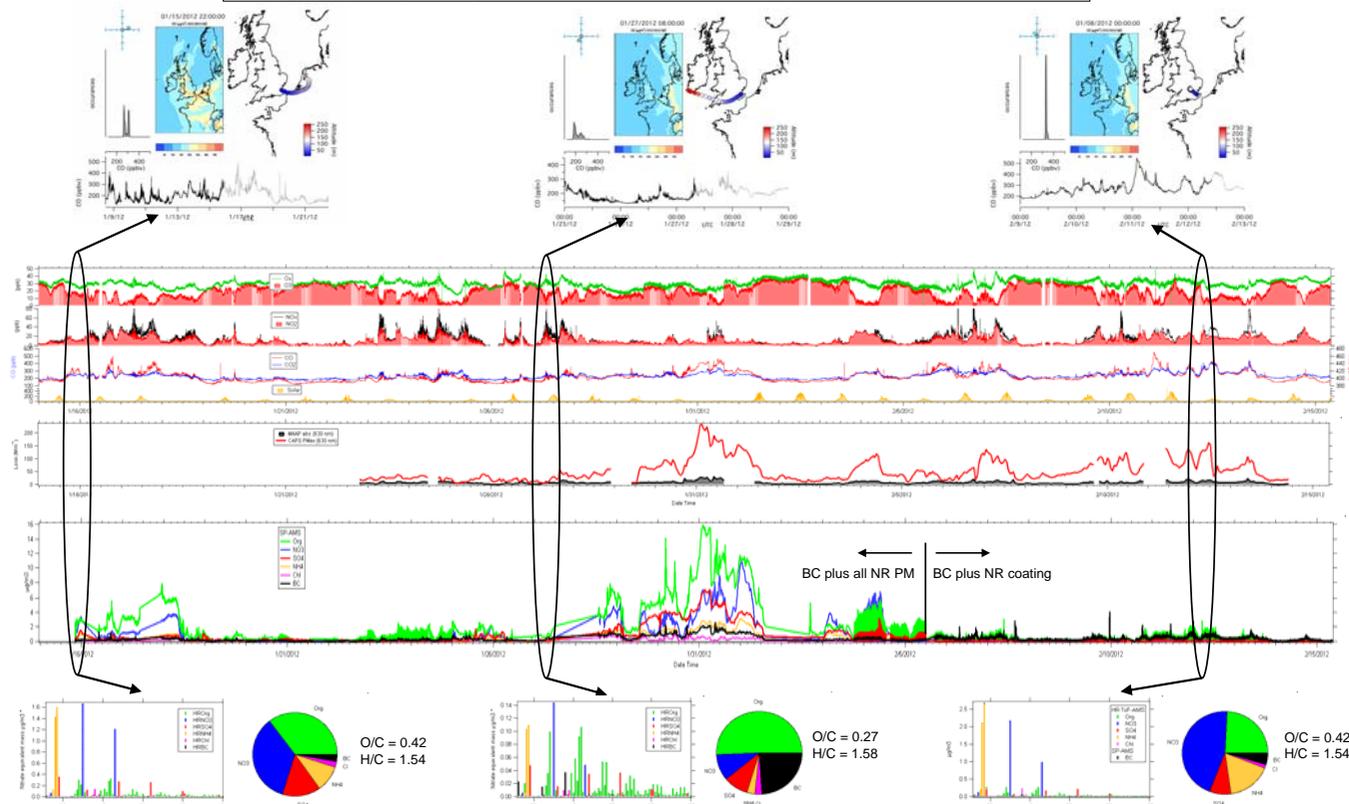
- Micro Pulse LIDAR
- Radiometer
- SODAR Wind Profiler
- Surface met

## Continental Outflow

## Local Pollution

## London Outflow

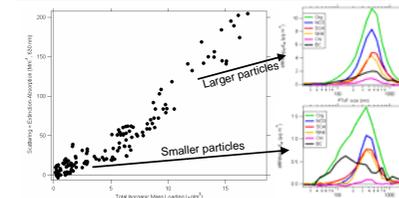
Top left: wind direction and speed, middle left: CO distribution over preceding 4 hours (ppb), top center University of Reading AQUM model CO average concentration ( $\mu\text{g}/\text{m}^3$ ), top right: Hysplit backtrajectory, bottom: CO time trend.



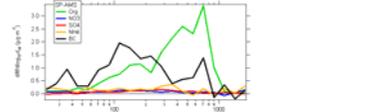
SP-AMS mass spectrum of black carbon and all non-refractory PM, pie chart of mass loading, O/C and H/C from high resolution analysis for continental outflow. Note small fraction of BC and higher sulfate.

SP-AMS mass spectrum of black carbon and all non-refractory PM, pie chart of mass loading, O/C and H/C from high resolution analysis for local pollution. Note large fraction of BC, low O/C, low inorganics and low extinction.

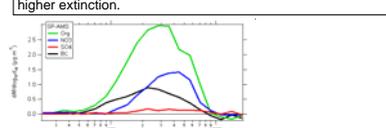
HR-ToF-AMS mass spectrum non-refractory PM, pie chart of mass loading plus black carbon from SP-AMS, estimated O/C and H/C from m/z 44/org and m/z 43/org for London outflow. Note small fraction of BC, higher O/C, higher inorganics and higher extinction.



Scattering (Extinction - Absorption at 630 nm) vs total NR inorganic mass loading for 1/23 to 2/3/2012.



SP-AMS particle time-of-flight of black carbon and all non-refractory PM. Note small BC size mode due to primary emissions.



SP-AMS particle time-of-flight of black carbon and non-refractory coating. Note larger BC size mode due to coated and aged particles.

Learn More at Breakout Session:  
Wed. 2:45 - 4:15 pm, Washington Rm. A

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