NORPAC DATABASE - HELSINKI DATASETS - 2003/2004

Luukki (bg)
NOx, O3, PM10

Runeberg Street (sc)
NOx, PM10, PM2.5

Runeberg Street
Traffic volume and speed

Runeberg Street
(Sept. 2003 – April 2004)
WS, WD

Kaisaniemi (urban bg)
(January – April 2004)
NOx, PM10, PM2.5, O3

Kaisaniemi
Meteorological data

Helsinki-Vantaa
Meteorological data

Vallila (open str.)
NOx, PM10, PM2.5

Kallio 2 (urban bg)
NOx, O3, PM10, PM2.5

+ information about traffic volumes, speeds, and fleet composition in Helsinki

Meteorological data: P, T, WD, WS, RH, Prec, CL, GR

Mervi Haakana, 6. May 2005

RUNEBERG STREET – STREET CANYON

Wind monitoring

AQ Monitoring point

Mervi Haakana, 6. May 2005
VALLILA – URBAN OPEN STREET

Manual traffic monitoring points
Vallila air quality monitoring station

KAISANIEMI – URBAN BACKGROUND

NO\textsubscript{X} AND O\textsubscript{3} inlet
PM\textsubscript{10} AND PM\textsubscript{2.5} monitors
KALLIO 2 – URBAN BACKGROUND

LUUKKI – BACKGROUND

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Mervi Haakana, 6. May 2005
Particle size distribution measurement at a height of 2.4 m:
- Electrical Low Pressure Impactor: 7 nm – 10 µm (12 channels) (aerodynamic diameter)
- Scanning Mobility Particle Sizer: 3 – 50 nm (mobility diameter)
- Condensation Particle Counter:
  total number concentration of particles larger than 3 nm

Meteorological measurements at a height of 2.9 m:
- Relative wind speed & direction
- Temperature, relative humidity

Global Positioning System:
- Van speed, driving route
Description of dilution from CAR-FMI to MONO32:
- Emission for 12m,
- then 6 m of dilution only (curve 1)
- then 12 m of emission,
- followed by dilution (curve 2).

Results: predicted evolution of particle size distribution: 19 Feb at 3 p.m.

Concentration of condensable organic vapor: $10^{10}$ molecules/cm$^3$
Monitoring sites

(1) 70 m from the motorway

(9) urban background station (Siltavuori)

Materials

- Measurement campaign near a motorway during summer 15 May – 30 Jun 2000, in Helsinki
- 2 Mobility particle size monitors (DMPS) for:
  - Nucleation mode (Nu) 7-25 nm
  - Aitken mode (Ai) 25-90 nm
  - Accumulation mode (Ac) 90-600 nm

=> definitions (for this study) / cutoff at 90 nm

- Ultrafine particles (UFP): the size range 7-90 nm
- Accumulation mode particles (ACP): 90-600 nm
The structure of the study

Statistical analyses
(with lower and upper 95% confidence limits and p values)

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Modelling of primary and secondary PM, and combining the models

**MATCH/HILATAR**
Eulerian 3D aerosol processes

**MONO32/UHMA**

Model(s) for $m_x \rightarrow N_x$

**CAR-FMI:**
llocal scale PM

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Regional dispersion computations

- **Primary particles**
  - Finnish regional runs
    - SYKE emission data
    - resolved PM 0.1, PM 0.1-1, PM 1-2.5, PM 2.5-10, and PM over10
    - 6 emission source categories (domestic combustion, transport, agriculture, other, large point combustion, other large point sources)
    - 2 emission altitudes: area sources are low-level, while point sources are taken with actual stack height
    - hourly emission time resolution (modified GENEMIS -1995)
    - output: 5 km spatial resolution, 1 day output time step
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ToDo (=>2005)

- Model evaluation
- Completing computations
  - European and Finnish-regional secondary particles
  - Years 2001, 2002 (HIRLAM is not usable)
  - Evaluation of uncertainty due to omitted aerosol dynamics (MONO-32 integrated and/or stand-alone control runs)
- ”MATCH-MONO32” – evaluation runs
- Consider inter-comparison and, possibly, unification / nesting of urban model into the regional one
- Joint publications