



Brussels expert meeting

Recommendation document II **Spatial assessment of PM in urban areas**

- **Overview**
 - Aim, application and structure
- **Examples from the document**
- **Discussion**
 - Some statistics
 - Points to be addressed

Overview

Examples

Discussion

Aim

The main aim of this document is to recommend methodologies that will lead to improved spatial assessment of PM in urban areas.

The document deals with a number of methods and issues relevant to this topic.

Emphasis is placed on the combined use of both monitoring and modelling.

*Overview**Examples**Discussion*

Applications

This document focuses on assessment for compliance with EU directives. These directives require information on annual and daily mean values for PM10 and annual means for PM2.5.

Spatial assessment can also be used to assess potential population exposure that may require hourly mean values.

The required spatial resolution of assessment for compliance with PM10 ranges from meters, to assess hotspots, to kilometres, for an overall spatial assessment. For PM2.5 this is urban scale only (kilometres).

Population exposure requires the full range of scales for all PM.

Overview

Examples

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Contents

1. Introduction

2. Monitoring

Network design, monitoring methods, QAQC

3. Modelling

Meteorology, dispersion and transport, chemistry, background, scale interactions, population exposure

4. Emissions

General and PM specific

5. Uncertainty analysis

Monitoring, representativeness, modelling, combining, spatial mapping

6. Concluding remarks

Level of assessment

- a) **Basic requirements**
- b) **Best practice recommendations**
- c) **Scientific recommendations**

Overview

Examples

Discussion

Monitoring

a) Basic requirements

- *Use hotspot and urban background station pairs*
- *Locate stations for use in combination with models*
- *Use a centrally located meteorological station*

b) Best practice recommendations

- *Monitor traffic data in streets with monitoring stations*
- *Contribution of non-exhaust particles measured at stations pairs*
- *Monitor meteorological data at air quality stations*

c) Scientific recommendations

- *Carry out source apportionment studies*
- *Study the size distribution of PM in the city*
- *Formation of secondary aerosols*

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Modelling

a) Basic requirements

- *Resolution of urban scale Eulerian model should be 1 km*
- *Gaussian models may be used in homogenous conditions*
- *PM can be treated as a primary pollutant*

b) Best practice recommendations

- *Uncertainty assessment of a model should form an integral part of the assessment*
- *Aerosol dynamics and chemistry should be included*
- *Modelling systems that avoid double counting should be used*

c) Scientific recommendations

- *Advantages of complex models should be well documented*
- *Further research in aerosol processes*
- *Refinement of the nesting approaches for subgrid and rural background coupling*

Overview

Examples

Discussion

Combining monitoring and models

a) Basic requirements

- *When model results are poor, effort should be put into model improvement rather than assimilation methods.*
- *A robust and simple method of data assimilation is to create a linear regression model, based on the air quality model*

b) Best practice recommendations

- *When selecting parameters to be used in the data assimilation procedure, focus should be on those parameters which are most uncertain, and for which measurements will be most useful.*
- *Before using more sophisticated techniques of data assimilation it is of vital importance that the model is thoroughly evaluated and validated locally, using local input data and measurements*

c) Scientific recommendations

- *More research is required into how to best characterize and estimate the representativeness of point-like observations compared to spatial averages from grid models*

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Emissions

a) Basic requirements

- *Document all information and methodologies used to generate emission data*
- *Hourly or daily emission data with a resolution of 1 x 1 km or higher is required*
- *Assess uncertainty of calculated emission*

b) Best practice recommendations

- *Compare calculated emission with other available independently compiled emission datasets*
- *Establishment of a QA/QC plan based on EUROAIRNET recommendations*

c) Scientific recommendations

- *Use source apportionment studies to compare and verify calculated and modelled source contributions*
- *Define adequate procedures for error quantification of sectorial inventories and emission data*

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Uncertainty

a) Basic requirements

- *Quantify the uncertainty of measured values*
- *For total model uncertainty estimation use: correlation coefficient, fractional bias and normal standard deviation*
- *For applying Framework directive use the alternative Relative Percentile Error (RPE)*

b) Best practice recommendations

- *Establishment of a QA/QC plan based on EUROAIRNET recommendations*
- *Analyse the uncertainty related to variability to filter out stochastic processes*
- *For assessing uncertainty when using data assimilation use cross-validation when applicable*

c) Scientific recommendations

- *Clear statement of the data quality objectives*
- *Perform sensibility analysis and model intercomparisons*

*Overview**Examples**Discussion*

Statistics

Number of individual recommendations in this document

Level of assessment	Monitoring	Modelling	Combining	Emissions	Uncertainty	Total
a)	14	23	8	4	14	63
b)	11	19	6	15	10	61
c)	6	17	5	2	9	39
Total	31	59	19	21	33	163

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Statistics

Number of modelling recommendations not followed by NILU

a) Basic requirements

5/23

b) Best practices

11/19

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Feedback on structure

- 1. Is the structure coherent and allow easy access to the recommendations?**
- 2. Is the delimitation between Basic requirements, best practices and Scientific recommendations appropriate?**
- 3. Suggestions for improvement?**

Feedback on content

- 1. Are the recommendations useful?**
- 2. Is the level of detail in the recommendations appropriate? For city users? For National and European authorities?**
- 3. Are there sufficient links and references?**
- 4. Are there missing aspects in the recommendations?**
- 5. Is the inherent repetition acceptable?**
- 6. Advice on improvement of the recommendations?**