



SR9 – Modelling Guidance Document - Outline

FAIRMODE Technical Meeting - 5th October 2023

Services to support the development of technical guidance documents in the field of air quality monitoring and modelling

Overarching objective

Support the European Commission in the development of two new guidance documents:

- a) Technical guidance document on the use of reference methods and demonstration of equivalence, and the assurance of relevant data quality objectives (including for established and additional air pollutants) for air quality monitoring.
- b) Technical guidance document on the use of modelling for various application domains under the Ambient Air Quality Directive, and the assurance of relevant data quality objectives for air quality assessments.**

Objective of the Modelling Guidance Document



- **How to apply** modelling systems for various application domains under the Ambient Air Quality Directive.
- Overview of a **QA/QC protocol** with recommendations to harmonize overall quality of modelling applications.
- Criteria to evaluate the overall **fitness-for-purpose** of modelling applications in the context of the AAQD.
- Specific guidance on the appropriate **spatial resolution** of models for the various AAQD purposes.

- **Chapter 1:** Introduction
- **Chapter 2:** Use of models for assessment, compliance checking and estimation of the exceedance situation indicators, including assessment of population exposure
- **Chapter 3:** Use of models for the assessment of spatial representativeness of monitoring stations, including the evaluation of network design
- **Chapter 4:** Use of models for source apportionment
- **Chapter 5:** Use of models for forecast and short-term planning
- **Chapter 6:** Use of models for air quality planning

General outline of each Chapter

Per application domain/chapter:

- Description of the application domain and link with the (newly proposed) AAQD provisions
- Reference to existing guidance with a specific focus on QA/QC processes to guarantee overall model quality
- Discussion of fitness-for-purpose criteria
- Open issues and challenges for the future

CHAPTER 1 - Introduction

- **Purpose of the Guidance document**

- Target audience
- How to use the guidance document in relation to the AAQD

- **General features of models in support of the AAQD**

- Modelling systems
- Requirements for emissions, meteorology
- Spatial resolution
- Coupling of spatial scales, modelling chains & double counting of emissions
- Uncertainties and variability

CHAPTER 2 - Assessment

- **Role of modelling in the (revised) AAQD assessment process**
 - What are the requirements under the proposed revision?
 - How to use modelling?
- **Modelling Quality Objective**
 - What is MQO in the proposed revised directive and how is it different from MQO in CEN and in FAIRMODE ? → link with measurement uncertainty
 - How to deal with data fusion in MQO?
 - Minimum number of stations for MQO?
- **Fitness for purpose**
 - List of criteria?
 - Spatial resolution of model application?

CHAPTER 2 - Assessment

- **Exceedance situation estimation (area, road length, pop in exceedance)**
 - Assessment methods
 - Role of natural sources/contributions

- **Population exposure**

CHAPTER 3 – Spatial Representativeness

- **Importance of SR under the (revised) AAQD**
- **SR methodology / recipe**
 - TIER-ed approach
 - Key criteria for SR areas
 - Specific requirement per station type (RB, UB & hotspot/traffic sites) → needed, useful?
- **Application areas of SR**
 - Pop exposure, exceedance indicators, model validation, network design, interpretation of real-time monitoring data
- **Monitoring network design**
 - Link with SR area and other assessment methods (indicative measurements, sensors)
 - Identification of hot spots
 - Identification of redundancies in network
 - MoNET tool

CHAPTER 4 – Forecast

- **Role of modelling in the forecasting process**
 - TIER approach for forecast
 - Statistical techniques to improve forecast quality
 - Challenges in operational forecast modelling
- **Forecast Modelling Quality Objective & fitness for purpose**
 - MQO definition
 - Forecast indicators: AQI, daily avg, 1h max, warnings...
 - Relevance and challenges of threshold indicators
 - Modelling domain and spatial resolution
- **Link with CAMS products**
 - Downscaling of CAMS results
- **Forecast and short term planning**
 - Short term forecasts in scenario mode → useful? pros and cons

CHAPTER 5 – Source apportionment

- **Overview of SA methodologies**

- Description of SA methods (tagging, brute force, incremental, receptor models)
- Description of SA properties (definition of “consistency”, “additivity”,...)
- Description of SA results (definition of the metadata needed to describe SA results)

- **QA/QC process**

- Can a QA/process QC be proposed for SA?

- **Fit for purpose criteria for SA methods**

- Links with fit for purpose in Assessment and Planning

- **Role of SA in the AAQD management process**

- Links between observed exceedances and SA strategy → e.g.: NO₂ exceedance in traffic stations versus PM_{2.5} exceedance in urban background location

CHAPTER 6 – Planning

- **Role of modelling in the AAQD Planning process**

- Requirements for emission data
- Links with Assessment and SA

- **Model setup for Planning purposes**

- Adjustment (calibration) of reference case/year and its further implementation in scenarios
- Boundary conditions for local scale scenarios, coupling local and regional/national AQ plans
- Assessment of future compliance, evaluation of remaining hot spots
- Time horizon of model simulation → compliance “as soon as possible”
- Meteorological variability in scenarios
- Evaluation of individual measures, plan as a whole

- **QA/QC process for Planning**

- Dynamic evaluation?

Expert Drafting Group Modelling

N°	Chapter	Drafting Expert
1	Introduction	Stijn Janssen (VITO, BE)
2	Assessment, incl. MQO, exceedance situation indicators & pop. exposure	Alexandra Monteiro (UA, PT)
3	Spatial representativeness & network design	Matthew Ross-Jones (EPA, SE)
4	Source apportionment	Guido Pirovano (RSE, IT)
5	Forecast	Joanna Struzewska (IOS, PL)
6	Planning	Bruce Denby (MetNo, NO)

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Drafting process

- Feedback on the Outline at the FAIRMODE Technical Meeting: October 2023 (now!)
- Draft document available for review by the FAIRMODE community: Summer 2024
- Discussion of the Modelling Guidance at FAIRMODE Technical Meeting: Fall 2024
- Review of the Modelling Guidance by the AAEG: Winter 2024
- Final version: Spring 2025

Collection of feedback

Collecting feedback on the **Outline**:

- Thematic discussions in some of the WG session (WG1, WG2, WG3 (?), WG8, WG9)
- Provide your written feedback via <https://ec.europa.eu/eusurvey/runner/MODGUI>





Thank you

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