Development of technical Guides on source apportionment with Receptor and Source oriented and Models

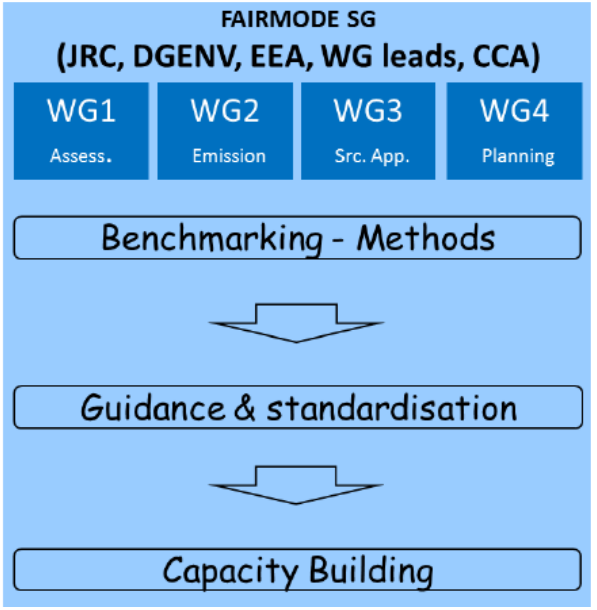
European Guide on Air Pollution Source Apportionment (SA) for estimating Particulate Matter (PM) source contributions with Source oriented Models (SMs) and combined use of SMs and Receptor Models (RMs)

Mihaela Mircea, Giuseppe Calori, Guido Pirovano, Claudio Belis,

FAIRMODE ROAD MAP 2017-2019

The future activities of the WG3 will focus on the following aspects:

-Develop comprehensive guidelines for RM and CTM approaches on the basis on the inter-comparison exercise and other scientific evidence.



-Promote the integration between RM and CTM in order to take advantages of the strengths of both approaches.

- Develop methodologies to support the evaluation o CTM models, with a particular focus on spatial issues.

- Support to the e-Reporting process (built-in SHERPA report facility)

- Support pilot regions/cities in their source-apportionment estimates (first stage of an air quality plan)
- Perform training activities to disseminate harmonized best practices

- Interact with CEN to take advantage of synergies and contribute to standardization

Scope and aims

In the beginning there was the Law…

The AQD states and demand:

*….to **identify** and **quantify** the **contributions** from main pollution sources with the purpose to provide understanding on what **measures** should be taken to address them.*

….to identify the main **causes** that determine concentrations to raise above the AQD limit values (e.g. because of site-specific dispersion characteristics, adverse climatic conditions or transboundary contributions,…)

…to provide information on **concentrations** and **sources** and the evidence demonstrating that the exceedances are attributable to **natural sources**.

Why using receptor models (RMs) and source oriented models (SMs) for SA?

Because there is not a «unique recipe» for everything!

IDENTIFYING SOURCES…

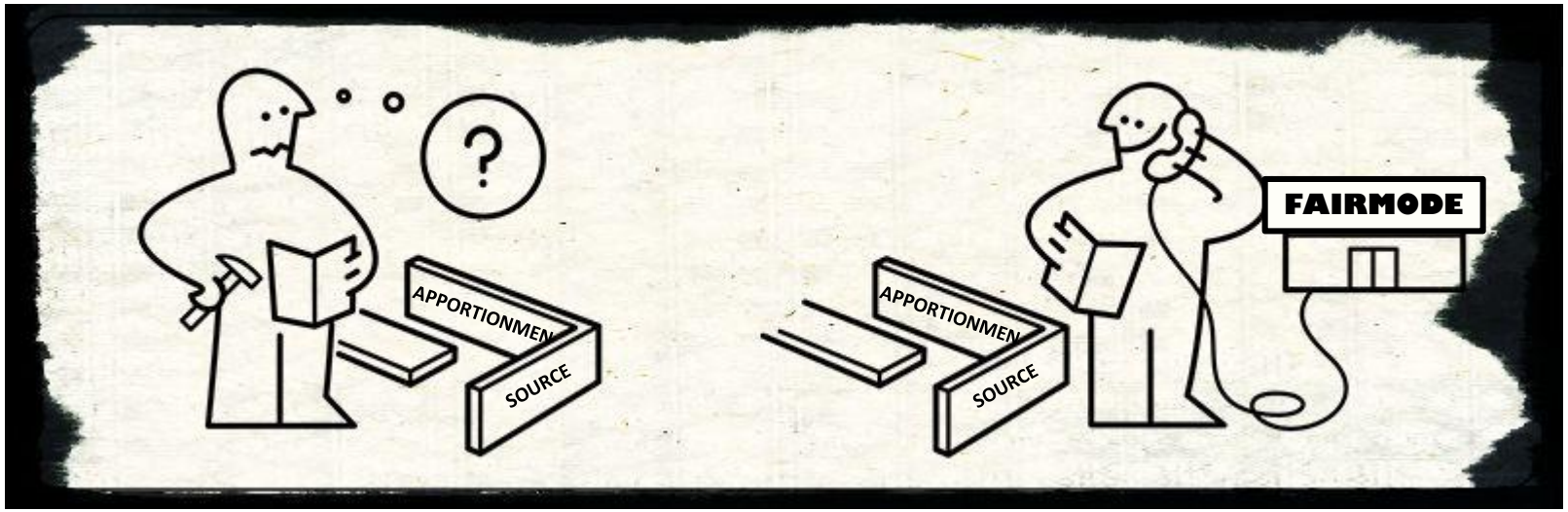
QUANTIFYING SOURCES…

NATURAL SOURCES…

EFFECTIVENESS OF EMISSION REDUCTION…

TRANSBOUNDARY POLLUTION…

What are we selling you?



This is a (draft)
«Instructions manual»
that gives you some advices on…

«HOW TO IMPLEMENT A SOURCE APPORTIONMENT METHOD»

What we are NOT selling you!

This document can help you

«TO ASSEMBLE THE WARDROBE»

«BUT NOT TO DECIDE WHERE TO PLACE IT»

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Introduction

1.1 Scope and aims

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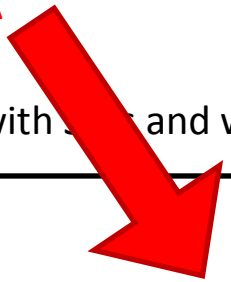
1.4 Techniques for SA using RMs

1.5 Source oriented air quality models

1.6 SM approaches for SA

1.7 European SA studies with [illegible] and with SMs-RMs: survey results



TAGGING METHODS

SENSITIVITY ANALYSIS (EMISSION REDUCTION POTENTIAL)

Estimation of source contributions with SM approaches

2.1 Modelling and validation of PM - base case of SM approaches

2.2 Sensitivity analysis methods

2.3 Tagged species methods

SHORT RECAP OF MAIN STEPS IN MODELLING SETUP

SOME PRACTICAL HINTS ON SENSITIVITY AND TAGGING METHODS

Combined use of SMs and RMs

3.1 Source categories association and species/compound association for PM validation

3.2 Comparison of source contributions from SMs and RMs

EMISSION PROFILES (SMs) AND EMISSION SOURCE PROFILES (RMs)

BRIEF LITERATURE REVIEW

LINK BETWEEN FACTORS IN RMs AND SOURCE CATEGORIES IN SMs

Outlook

LOCAL SCALE MODELS

ORGANIC AEROSOL

SOURCE APPORTIONMENT
&
PLANNING

NATURAL SOURCES?

“VALIDATION” OF SA RESULTS?

MERGING OF RM AND SM?

European Guide on Air Pollution Source Apportionment with Receptor Models REVISION 2019

REVISION COMMITTEE

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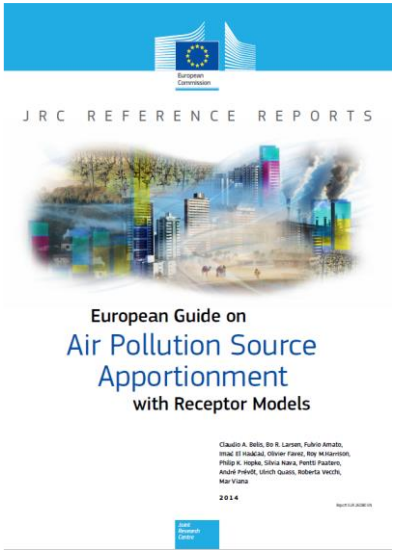
in collaboration with

European Commission

COLOSSAL
Chemical On-Line cOmpoSition and Source Apportionment of fine aerosoL

INERIS
maîtriser le risque pour un développement durable

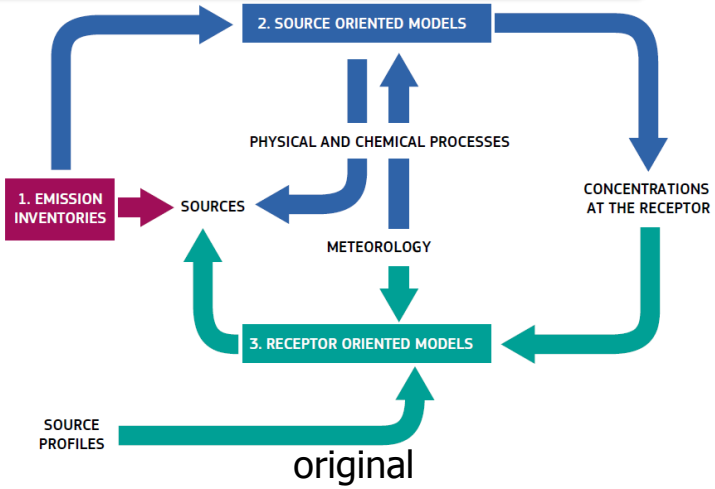
Current version (2014)



Guide on RMs used world-wide!

- Cited 42 times in scientific literature
- Used in policy documents

Asian city air quality improvement
Guide frame
Guidance Area 2: Source List and Model Simulation



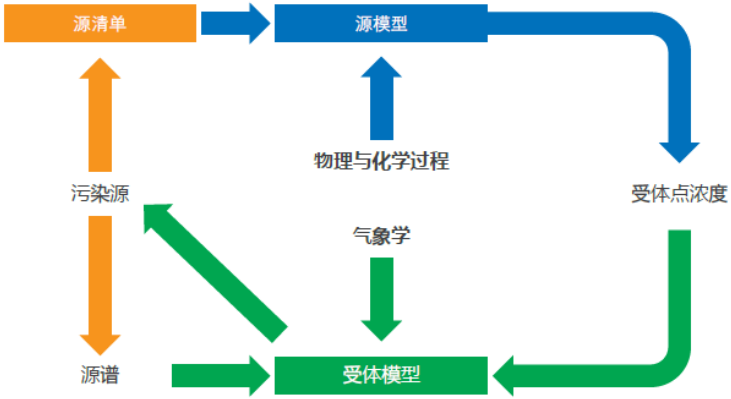


图 3.1 源解析由上至下方法与由下至上方法关联的示意图

图片引自欧盟委员会, 2013.

Source parsing The top-down method is associated with the bottom-up method.
Image taken from the European Commission

IBAQ
Integrated Programme for Better Air Quality in Asia

CLEAN AIR ASIA

REVISED VERSION 2019

MAIN CHANGES

	VERSION 2014	VERSION 2019
PAGES	88	174
SECTIONS	3 - Introduction - Harmonised protocol - Advanced methods	No sections The advanced methods are now common practice
CHAPTERS	18	20
		6 chapters about advanced methods were thorougly revised and reordered 2 new chapters: Proton nuclear magnetic resonance and fourrier transformed infrarred (FTIR) techniques

OPEN REVIEW

The drafts can be downloaded here:

http://source-apportionment.jrc.ec.europa.eu/downloads.aspx

The drafts are now open for comments mainly by the WG3 experts until end of February (remarks from all experts are welcome)

Considering the novelty and cross-cutting nature of the topic, the draft guide (handbook) on SM will be then open for comments from all FAIRMODE experts for a longer time and the final draft will be discussed in the next Fairmode technical meeting