FAIRMODE recommendations

FAIRMODE SG

February 2019

Fairmode recommendations: process

□ Which key messages/recommendations can we pass to the modelling community regarding the application of models for policy (focus on fit-for purpose, guidance, quality assurance)
□ guide technical discussions within each WG
□ Increase visibility and use of key Fairmode findings
□ Support the fitness-check process (identification of + & -)

□ Start: Athens Technical meeting (2017)
□ Draft version circulated to NCP & discussed at Baveno (2018)
□ Consolidation: Tallinn technical meeting (2018)
□ Presentation of final version (Warsaw 2019)

Assessment

Emissions

Source App & planning

Recommendations

☑ Content

❑ Implications

❑ Practical
❑ Fairmode
❑ MS
❑ Legislation

This document provides **policy recommendations** where the scientific **consensus** within FAIRMODE indicates that robust conclusions can be drawn, and identifies **actions for follow-up**

RECOMMENDATIONS REGARDING ASSESSMENT WITH MODELS

Background

Under the AAQ Directives, **models can be used over a range of situations for assessment**:

- As complementary information to observations
- To calculate specific exceedance indicators
- To provide a comprehensive understanding of the current situation
- To forecast the following hours/day(s) expected exceedances

Two main questions arise:

❑ When is a model <u>fit-for-purpose</u> for each of these situations?

❑ When is a model application of <u>sufficient quality</u>?

Challenges

❑ **Fit-for-purpose**: a model application should be able to <u>capture both the relevant **spatial** and **temporal** variability </u> of the environmental indicator under investigation

❑ While the **temporal resolution** of indicators is <u>set by the requirements in the AAQD</u>, the **spatial resolution** of the indicator has <u>not</u> been <u>discussed</u> very much. **Very little guidance exists on how to define the fit-for-purpose resolution or spatial scale of a model in order to match the level of detail required by the application.**

Recommendations

- **On the fitness-for-purpose criteria related to spatial resolution**:
FAIRMODE proposes the spatial scale(s) of the modelling system to be such that all "relevant" observations within the scope of the application can be reproduced with acceptable quality.

  - Model used as complementary information to observations: should be consistent with the type of station and pollutant that is complemented. The MQO should apply to all relevant observations that are complemented by the model application.

  - Model used to assess exceedance indicators: should describe all available relevant observations in the area of interest

  - Model Assessment as a starting point for planning, the ambition should be to reproduce what is observed. All observations in the air quality zone are used in the MQO evaluation

- **On the use of the Modelling Quality Objective (MQO)**: FAIRMODE proposes to use the MQO as a quality control mechanism to determine whether an assessment is "good enough" for application in the context of the AAQ Directives.

- **On the link with e-Reporting**: FAIRMODE proposes to use the MQO and related summary statistics as model quality control information under the IPR.

RECOMMENDATIONS REGARDING EMISSIONS FOR MODELLING

Background

❑ In order to ensure the representativeness and the quality of the assessment results required by the AAQ Directives, further focus is to be placed on the compilation of **high-quality** input data. This includes, in particular, **fine scale urban emission data**.

❑ However, **neither the AAQ Directives nor the IPR guidance documents provide any identification of the methods** to be applied in the compilation of emission data to be used as basis for modelling air quality assessments. Also, **no reference** is made to how the **quality of emission data** is to be assessed.

European Commission

Joint Research Centre

Challenges

❑ **The requirements on emission data from NEC Directive and the guidance under EMEP/EEA are too coarse** — both spatially and temporally, and also in terms of technology disaggregation — to respond to the needs of highly resolved emission data needed **to fulfil AAQ assessment requirements.**

❑ The experience gained in FAIRMODE (emission benchmarking) and in the context of the EEA´s Air Implementation Pilot revealed the existence of a **large gap between national and urban inventories**.

❑ **A higher level of disaggregation of emission information is necessary for urban scale air quality applications**, and this requirement is not solved by simply downscaling from highly aggregated data. **Greater consistency** and coherence between local and regional inventories compilation practices **needs to be ensured**.

Recommendations

- **On urban emission reporting**: Specify the requirements on the emission data to be used as input for air quality assessments under the AAQ Directives. An alignment between NEC and AAQ Directives in some key areas (notably nomenclature) should be attained. *FAIRMODE can assist in the specification of such emission data requirements*

- **On guidance to compile urban emissions**: FAIRMODE proposes to expand the existing emission guidance document or create a new one to include guidance on urban emission inventory compilation. *FAIRMODE can host a process to secure the development of user-checked guidance for urban emission inventory compilation.*

- **On the use of benchmarking for quality assessment**: FAIRMODE proposes to introduce benchmarking activities to systematically evaluate the quality of emission data used for air quality assessments and air quality planning.

- **On the nomenclature for classifying emission sources**: FAIRMODE recommends adopting the nomenclature used under the National Emissions Ceilings (NEC) Directive for reporting emissions by sector, as basis for the urban emission assessment and source allocation activities under the AAQ Directives.

RECOMMENDATIONS REGARDING SOURCE APPORTIONMENT & PLANNING

Background

Reliable and **quantitative information on the origin of pollution** and on pollution sources **is required by the AAQ Directive**, as well as in the IPR guidance documents, **with a view of supporting the design of air quality plans and programs**.

Challenges

❑ **Different source apportionment approaches lead to results that generally differ among themselves**, and can subsequently lead to inadequate conclusions about the responsibility of certain sectors and raise misleading prospects about the efficiency of mitigation strategies.

❑ The **lack of guidance on what methods to use** to support air quality planning and under which circumstances these can be used is a main challenge that FAIRMODE has been addressing.

Recommendations

❑ **On the use of benchmarking tools**: FAIRMODE recommends applying proven methodologies to ensure fit-for-purpose and reliable quality when performing source apportionment and air quality planning applications.

❑ **On the nomenclature for classifying emission sources**: Following the recommendations from emissions, FAIRMODE recommends adopting the nomenclature used under the NEC Directive for reporting emissions as basis for the source apportionment activities under the AAQ Directive.

❑ **On the use and limitations of source apportionment methods**: For the specific purpose of providing information of direct relevance to support the design of air quality plans and assess their potential benefits:

   ❑ The incremental approach is not recommended for air quality planning;

   ❑ Methods based on mass-transfer precursor mass-ratios are suited for linear pollutants but not for non-linear pollutants;

   ❑ Emission reduction potential (i.e. brute force) based approaches are recommended for air quality planning applications

Fairmode recommendation
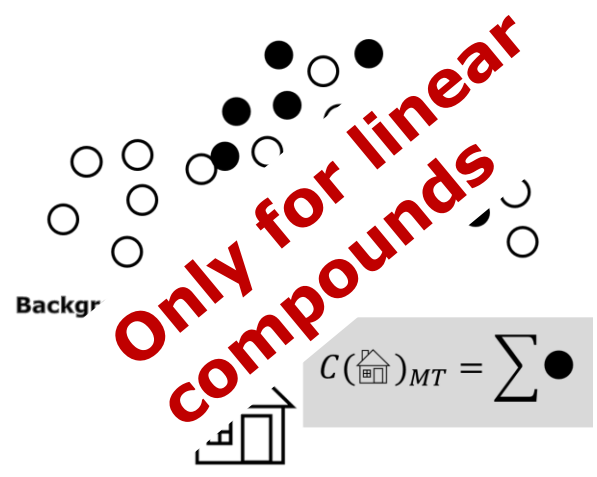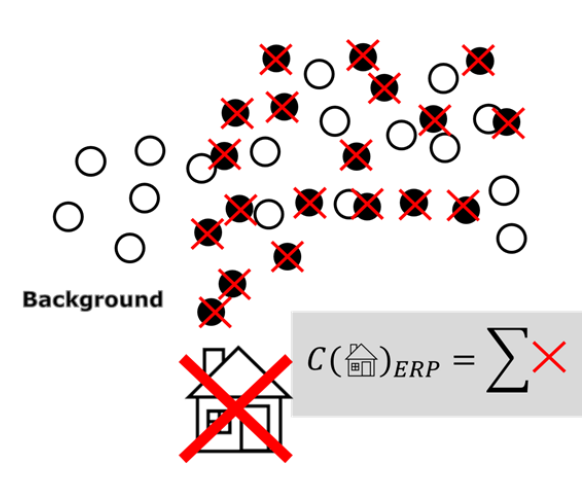
Fit-for-purpose approach to support AQP

$C(\text{🏠})=?$

Incremental

$C(\text{🏠})_{INC} = M - M_B$
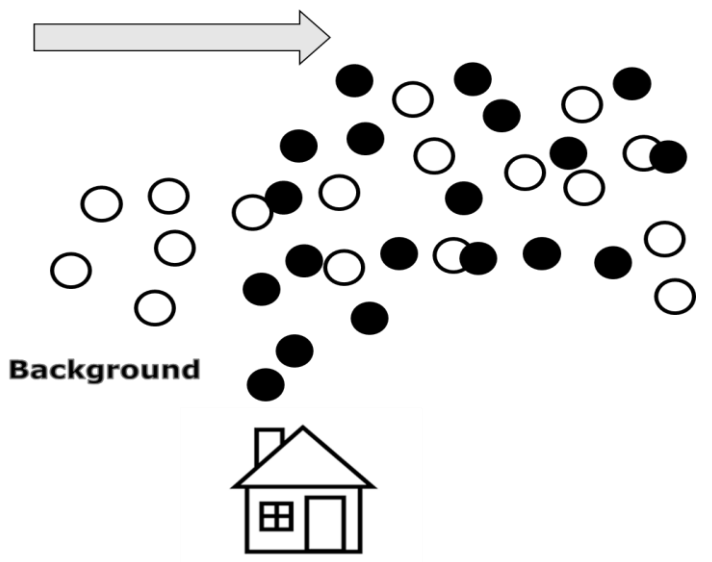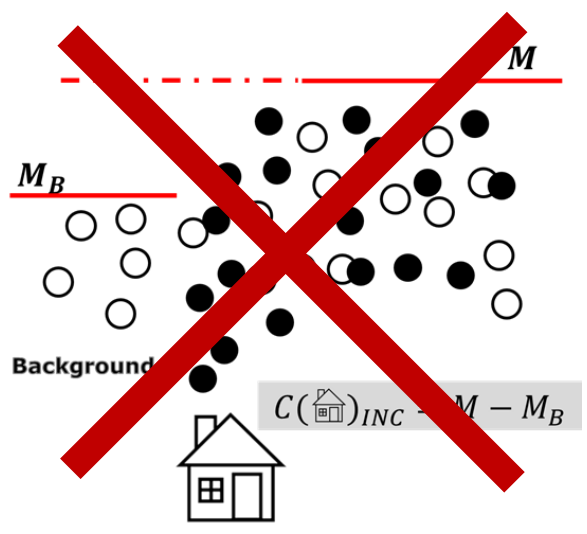
Mass-transfer (tagging / receptor)

Only for linear compounds

$C(\text{🏠})_{MT} = \sum \bullet$

Emis. Red. Pot. (Brute force)

$C(\text{🏠})_{ERP} = \sum \times$

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