

FAIRMODE Technical meeting

Tallinn (Estonia) 26-28/06/2018

The meeting, attended by 70 participants, was organized around parallel working groups and common sessions (see agenda at the end of these minutes). This document summarizes first the outcome of the common sessions before detailing the outcome of the parallel sessions. All presentations are available on the FAIRMODE web pages.

Common sessions

Fairmode recommendations

To strengthen the FAIRMODE support to policy, recommendations are currently drafted to support the FAIRMODE “benchmarking – guidance – training” process. They intend in particular to (1) strengthen the FAIRMODE support to policy, (2) better convey the main FAIRMODE messages and (3) guide the discussions during the technical meetings. The recommendations have been compiled in time to provide FAIRMODE views on some relevant aspects of the fitness-check on the Air quality Directives currently carried out by the European Commission.

Parallel sessions and plenary sessions took place to discuss these recommendations with the objective to finalize them during this technical meeting. An additional round of discussion will however be needed to converge to a common agreed version by the next plenary meeting.

Source apportionment approaches and source receptor relationships

As a follow-up of the Baveno session on the connections between air quality planning and source apportionment, the objective of this session was to discuss different source apportionment and source receptor approaches and present specific applications. During this session, the differences between the most used methods have been clarified and a scheme has been proposed to identify the capabilities and purpose of each method (P. Thunis). The importance and patterns of non-linearities have been investigated via results obtained with a dedicated dataset (Po valley – C. Belis) and an example of source-receptor relationships developed in the context of CAMS for daily forecasts has been presented by A. Colette. The next steps will be to continue the analysis of the differences between methods (in particular the non-linearities) and include the clarifications on the purpose (and range of applicability) of source apportionment approaches in the technical guide under development in WG3.

Towards increased QA/QC within Fairmode

FAIRMODE relies on benchmarking activities and the elaboration of guidance documents to secure good quality of the modelling results used in policy applications. Guidance documents are essential to secure a common understanding of what is good quality results and to establish common approaches to evaluate good quality. The session showed how in the latest years, guidance documents have been replaced with a large number of FAIRMODE publications, a development that maybe needs to be complemented with an increased focus in guidance document elaboration in the future. The Norwegian

experience is that city authorities in the country are currently in need for better guidance and documentation of what is meant by good quality of modelling results and how to evaluate the quality of modelling results for different policy applications. Guidance documents on how to establish the quality of modelling results for plans and programs applications are considered a first priority and it is expected that FAIRMODE would coordinate the effort to compile such guidance documents

Joint CENWG44/FAIRMODE session

Member States experiences on the “Validation and QA/QC of source apportionment (SA) source oriented models” were discussed during this session. Most of the experiences are based on (very different) modelling chains using both CTM and Lagrangian models. Brute force (i.e. difference between simulations in which a source is reduced) was the most applied method to perform SA, among the presentations, with the exception of LOTOS-EUROS. Only one attempt of SA validation was presented by TNO based on comparison with tracers and RMs results. Guidance and methods for validation of SA results from SMs are established in Member States only in few cases. It is unclear if this is due to a lack of appropriate methods or to the burden related to this task. In this respect, some participants considered the methodology successfully applied in the last WG3 inter-comparison is too demanding from the organizational point of view. Discussion focused on the possible orientations of the SA strategy to fill this gap.

Design of an inter-comparison exercise (WG2-WG3-WG4)

The objective of this session was to investigate the possibility of designing a model inter-comparison exercise to understand why different models provide different answers in terms of responses to control strategies. The discussion was organized around round tables to identify possible recommendations / suggestions. Specific advices were collected regarding the scale (regional vs. local), species, and sectors to be addressed or on the necessary number of models to participate. However open issues remain, in particular related to the preparation of the input data, the specific added value of the exercise and to possible funding.

WG1: Assessment

MQO & guidance

The objectives of this session were to (1) update on the status of the Model Quality objectives, DELTA and Guidance Document; (2) discuss open issues related to CEN WG43 and (3) inform about the recently established link with e-Reporting.

Regarding point (1) DELTA vs5.6 and the corresponding Guidance Document (vs2.2) will be launched soon (they have been released on 20/07). Two issues were discussed under point (2): it will be investigated how the MQO/DELTA can be modified to accommodate passive sampler observation (for NO₂). For cases where the number of available stations for urban assessment is limited, it is accepted for the time being that the MQI is calculated with less than 10 stations. One remaining issue in WG43 remains the transferability of model applications between different cities/regions that should be further evaluated. The FAIRMODE community was informed about (3) the recent decision taken by the EEA to

use the FAIRMODE MQI and related DELTA output as formal model Quality Assurance information in the e-Reporting process. This now establishes a first formal link between e-Reporting and WG1.

Pilot Exercise: Assessment

The main objective of this activity is to ensure that the FAIRMODE methodologies and guidance are applied in practice at all levels, from national to regional and urban level. Eleven regions/cities/countries (Zagreb/Croatia; Dublin/Ireland; Milan; Emilia-Romagna; ENEA in Italy; Malopolska; Stockholm; Athens, Helsinki, Slovenia, Hessen) participate to the pilot. A subset of these pilot cities/regions provided in Tallinn an update of their experiences with the WG1 tools (in particular DELTA & Composite mapping platform). Suggestions have been formulated to improve the usability of the DELTA tool and a few new interesting applications of the tools have been shown: DELTA analysis with various station types, time evolution over various years.... Regarding the composite mapping platform: amongst others, a detailed analysis of Stockholm with a focus on complex traffic sites was shown. One remaining task to complete this pilot exercise phase with WG1 and WG2 is to compile the lessons learnt into a dedicated publication/document.

Computational Fluid Dynamic Modelling (CFD)

The goal of this session was to explore the relevance of CFD as a FAIRMODE topic. In particular, the session addressed the following questions: (1) how can we couple local scale CFD to regional background? (2) How can we derive statistics that are relevant to the Air Quality Directive? (3) How can we ensure that the quality of CFD results is sufficient for policy applications?

The session was well attended (25-30 people) showing the interest in this topic and this group confirmed the fact that CFD gains attention for practical application linked to the AQD. One conclusion of the discussion was that FAIRMODE is a good platform to exchange ideas and best practices, provide guidance... but it remains to be discussed whether WG1 is the best host as most CFD applications look at (urban) planning (that falls under the WG4 activities).

Forecast

This activity aims at providing a specific benchmarking framework for modelled air quality forecasts. Performance indicators have been developed to provide additional information about the capability of the forecasting system to detect/anticipate regulatory threshold exceedances and to check its ability to provide more accurate forecasts than a persistence model. Following up the hackathon organized in Antwerp (April 2018), the updated methodology behind the Forecast Delta tool has been presented and the community was asked for their further contributions. Given the fact that the evaluation of forecasts is currently country dependent and that policy makers/authorities are interested in different indexes/factors/statistics, the development of a common tool/methodology is helpful for harmonization purposes. Future steps will consist in re-assessing the need of accounting for a measurement uncertainty in the evaluation approach and further test in practice the numerous changes made to the approach/graphics during the hackathon.

WG2: Emissions

Pilot exercise: emissions

The session was organized to follow up the pilot exercise on emissions by comparing local/regional estimates with national submissions to EMEP 0.1x0.1 emissions. Presentations from Sweden, Greece and EMEP/MS-CW highlighted the importance of the process of communication between emission experts in each country. 11 different countries (Sweden, Ireland, Germany, Poland, Emilia Romagna, Slovakia, Croatia, Norway, Spain, Belgium and Portugal) agreed to contribute to a common publication to show the results of the evaluation of EMEP 0.1x0.1 emissions – with a 2 pager contributions due 1.October 2018. A series of questions to guide the discussion for country experts were identified and will be circulated after the meeting. A remaining issue is to identify the EMEP emission experts in each country (these are not national Focal Points and an official letter from FAIRMODE will be needed in some countries to facilitate the contact between experts)

Advances on emission compilation at specific sectors

The aim of this session was to identify the lessons learnt with the compilation of emission data in priority sectors and topics identified in the FAIRMODE work-plan. During the meeting, advances done in emission compilation for the residential heating and industry sectors in Norway and in Portugal were presented. These advances rely mainly on the use of new data crawling capabilities and access to detailed datasets at national level that help improving the spatial representation of emissions. Additionally, work within Copernicus concerning the spatial and temporal variation of emissions was also presented. The availability of new regional and national datasets to allow improving the representativeness of emissions should be assessed. It would also be useful to check whether the Medium Combustion Plant Directive can be used to help allocate industrial emissions.

It is not clear yet how to compile the lessons-learnt into guidance documents. The goal would be to organize the work around the development of a Tier 4 guidance approach in the EEA/EMEP Emission Guidebook – but support is needed (EU Commission) to achieve this task.

Guidance priorities

The session was intended to explore new priorities for emission work in FAIRMODE and evaluate whether current emission estimation approaches are prepared to answer mobility policy strategies and plan the future of cities. The presentations at the meeting and further discussion highlighted two areas where guidance is needed:

- *Emissions for Air Quality Status vs. Emissions for Plans&Programs*: It was recognized that different guidance and quality criteria apply for these two different applications of emission data. In Plans&Programs links to the transport modelling community are essential – FAIRMODE will have to decide how to deal with transport modelling. Also, guidance is needed on how to take into account the emission spatial evolution and redistribution due to urban planning
- *Urban agriculture in urban planning* – Urban agriculture is an emerging source of emissions that requires very fine spatial resolution (down to 100m to describe canopy effects) and raises the issue how to deal with changes in emissions and land use due to the introduction of urban agriculture. It also links Life Cycle Analysis approaches and GHG emissions to traditional emission estimates. Guidance is needed on how to produce integrated emission estimates in an evolving city .

It was proposed to organize a session in the next FAIRMODE WG2 meeting, in collaboration with EDGAR, to present information on activity and land-use data relevant for fine scale emission compilation. The focus would be on how to deal with the spatial evolution of emissions and redistributions due to urban development and planning.

WG3: Source apportionment

Guidance on receptor modelling

The status of an updated guide (first released in 2014) was discussed. Updates will particularly be devoted to the chapters dealing with AMS/ACSM, analysis of trajectories, uncertainty calculation, and aethalometer method. The guidance is at an advanced stage with the final version to be circulated for comments and to be finalized in autumn. The contribution from COLOSSAL (Cost action on Source Apportionment of organic matter and black carbon) was recognized to be important in this respect.

Guidance on source oriented modelling

The purpose of this session was to discuss the structure of the draft technical guide and agree on specific topics. It was agreed that the guide should not be too prescriptive, present pros and cons of the different approaches, clarify the purposes for which the different approaches are suitable for and open to other pollutants. The need for specific input from WG2 (emission inventories) to cover certain sections was expressed (Action: the WG leaders/co-leaders will discuss how to deal with this issue by September?). The first draft will be circulated for comments by October/November.

Local scale modelling

The purpose of this session was to present practical experiences of Local Scale Modelling (LSM) applications for source apportionment. LSMs are used for Source Apportionment at the urban scale for PPM, NO_x, CO and NO₂. Except for the latter, all pollutants are not reactive. Modelling teams are confident in their methods and results and did not express a clear need or interest for an inter-comparison exercise. They expressed however, a concern and a possible interest for PM re-suspension emissions. A few open issues remain that will be further investigated within FAIRMODE (summarized through the following questions): How much do the different modelling approach influence SA results? How can LSMs SA results be “validated”? Is there any specific issue concerning NO₂ SA at local scale? What about the SA of the “background” contribution?

WG4: Planning

Long-term strategies

This session was intended to discuss how member states plan future strategy for air quality, taking into account the legislation requirements (national emission ceilings; future limit values following the WHO guidelines...). Although not mandatory (but recommended) some MS already deal and prepare long-term strategies for AQ. Plans are case specific, but modelling is common practice. The cases of Belgium and Portugal have been presented and discussed. Some issues were also highlighted like the

problematic of dealing with health impact assessment and costs or with the uncertainties related to meteorological variability. The influence of climate change scenarios on these long-term strategies was also discussed.

SHERPA session

SHERPA is a screening tool developed by the JRC with the aim of supporting the design and assessment of air quality plans. It is also used to harmonize modelling approaches within FAIRMODE, especially with respect to scenario analysis (WG4), source apportionment (WG3) and/or emission inventories (WG2).

P. Thunis clarified the main limitations of SHERPA (annual average; regional application; etc) and reminded the need to separate the evaluation of SHERPA on one side from the validation of the underlying CTM (CHIMERE in this case), itself depending on different input datasets (meteorology, emissions...).

E. Pisoni presented the SHERPA survey results, highlighting the user's suggestions to improve the tool. He also introduced the latest SHERPA updates (new version released in June 2018) as well as the newly developed SHERPA-city, which deals with air quality assessment at street scale (resolution of 20m). This latter tool is specifically designed to support city air quality planners, especially related to the problematic of traffic and NO₂.