

FAIRMODE Technical meeting

Madrid (Spain) 07-09/10/2019

About 100 participants attended this technical meeting organized by CIEMAT, with 20 countries represented. The meeting was organized around a series of cross-cutting topics that will form the structure of the forthcoming 2020-2022 FAIRMODE roadmap. A specific outcome (to be reached within the 3 years period of the roadmap) is attached to each topic, depending on its “level of maturity”. This outcome (indicated beside each session title below) ranges from “benchmarking” (for new topics) to “guidance” (most mature topics), with the intermediate “recommendations” stage, consisting in detailing the necessary steps to reach guidance. This document summarizes the outcome of the discussions for each of these topics. All presentations are available on the FAIRMODE web pages.

Update on the composite mapping platform

S. Janssen (VITO) presented the new features of the platform (metadata, naming conventions, link to e-reporting, availability of the GNFR classification for emissions, upload of QA/QC information [e.g. target diagram], disclaimers, updated viewer ...). About 50 local/regional/national new concentration maps and 5 European maps have been uploaded since June 2018 while 54 new maps (combination of sectors and pollutants) have been uploaded for emissions. In order to better understand differences between model results, a proposal has been made to require that each concentration map be associated with its emission map. The metadata to be requested for both emissions and concentrations is to be reviewed in order to facilitate better understanding of the data and possible links to e-reporting.

1. Source apportionment (SA) to support air quality management (Guidance)

M. Mircea (ENEA) presented the latest version of the “guide on receptor and source oriented models for SA”. This guide, which focuses on methodological aspects of both receptor and source oriented SA approaches, has undergone a last round of review and will now be published as a JRC report. The current version of the document is available [here](#).

The second part of the session was dedicated to discussions around the “fitness-for-purpose SA guide”. G. Pirovano (RSE Italia), A. Clappier (Univ. Strasbourg) and P. Thunis (JRC-EC) introduced the participants to this guide that focuses on fitness-for-purpose aspects (i.e. which SA approach for which purpose?). The session was organized around group exercises and discussions to highlight the need for guidance on this topic. An updated version of the guide will be made available soon after the meeting to be reviewed by the Fairmode community before the next plenary meeting (about 30-40 participants indicated their willingness to read and review the document).

During the session, a possible follow-up of the cooperation between FAIRMODE and CEN/WG44 activities was also discussed. WG44 is finalizing a first Technical Specification, focused on the evaluation of RMs results. A further step could be the drafting of a second document more focused on SA with Source oriented Models. About 30% of the audience supported a follow up of the cooperation between FAIRMODE and CEN and about 10 people expressed their willingness in actively contributing to this new potential CEN activity.

2. Towards an overall QA/QC protocol for air quality assessment (recommendations)

As a follow-up of the CEN TC264/WG43 on modelling quality objectives (MQO), the FAIRMODE community identified a need to develop a QA/QC protocol to ensure that the quality of a modelling application is not determined only by the pass/fail MQO test. Some countries (U. Im (Aarhus University) for Denmark, J. Wesseling (RIVM) for The Netherlands, A. Colette (INERIS) for France and A. Monteiro (University Aveiro) for Portugal) provided an overview of the quality assurance approach they currently have in place. This was complemented by a presentation by A. Clappier (University Strasbourg) on the experience gained in some regional projects (Rhones-Alpes, France). Group discussions took place with the aim of collecting insight on (1) the content of this QA/QC protocol as well as (2) on the process to follow to develop it. The quality assurance scheme proposed by the US-EPA based on a three-step approach: “documentation → implementation → Assessment” served to guide the discussions. Based on the outcome of the discussions, a draft QA/QC protocol will be prepared. It will first outline a possible flow for QA/QC with an initial scope on assessment (forecast and planning will be considered at a later stage).

3. Quality control indicators for modelling of air quality forecast (Guidance)

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 accurate forecasts (more accurate than a ‘persistence model’). P. Durka (NRI, Poland) presented the outcome of the latest hackathon organized in Antwerp (September 2019), in particular the updated methodology behind the ‘Forecast Delta tool’. All proposed indicators (Target, Probability of Detection, and Success Rate) are now normalized on the persistence model. Given the fact that beating the persistence model is a very challenging objective for current forecasts, the future steps will consist in testing the proposed updated normalized indicators with additional datasets (in particular CAMS). A follow-up test process (and if needed a new hackathon) is planned to discuss these results before the next Plenary Meeting in February.

4. Hyper-local scale air quality modelling (Benchmarking)

Hyper-local scale air quality modelling refers to air quality modelling at high spatial resolution (typically order of meter scale), usually focused on urban environments. It is one of the two topics that received

mixed support from the member States regarding its relevance within the FAIRMODE context. The discussions focused on the questionnaire sent to the FAIRMODE community to better understand the current usages of this type of modelling in the context of the air quality directive. The FAIRMODE community made clear that “hyper local scale” is not a good wording for the activity and there should be made a distinction between local scale modelling and micro scale modelling. The first activity is rather mature and can follow the existing FAIRMODE guidance. Micro scale modelling (obstacle resolving CFD) is less mature and a new survey will be sent around with the aim of clarifying the relevance of this topic within FAIRMODE.

5. Best practices for local/regional air quality management (recommendations)

The first part of the session was dedicated to the finalization of the “pilot exercise” which objective was 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) participated to the pilot. This meeting was an opportunity for some regions (Dublin, Croatia, Po-Valley, Italy, Emilia Romagna, Slovenia, Malopolska) to provide update on their latest application for air quality plans design, using their own approaches or the SHERPA model. In particular, the SHERPA applications showed how the ‘SHERPA default emission inventory’ (mainly the emission gridding) is a key parameter for the model, and it should always be checked (against local emission distributions) before applying SHERPA for local planning.

The second part of the session was organized into group discussions with the aim of collecting information to draft a “handbook for plans and programs” which would cover the following topics: measurements, source apportionment, emissions, modelling, integrated assessment, ex-post evaluation ... The table of contents of the recently published “code of good practice” from the “urban partnership on air quality” served as starting point for the discussions. These highlighted the need to include additional topics (e.g. methods to calculate air quality/health impacts) and to downsize others (e.g. for cost-effectiveness, detailed measures ... for which there is the dedicated ‘topic’, on ‘Effectiveness and robustness of air quality projections’). Based on the outcome of the discussions, a structure for the handbook will be drafted and proposed for contributions (guidance and best practices) to the FAIRMODE community.

6. Near-real time assessment with sensors (Benchmarking)

The use of sensors with air quality modelling is the second topic that received mixed support from the member States regarding its relevance within the FAIRMODE context. The session was introduced by several presentations (V. Franco – DG ENV; J. Stocker – CERC; C. Guerreiro – NILU; B. Maheu – VITO; J. Wesseling - RIVM). J. Wesseling also provided an update of the sensor workshop organized by the JRC in Vienna (1/10/2019). The discussion focused on the following questions: (1) what role does the FAIRMODE community see in the development and use of sensors; (2) what type of activities should be carried out in

FAIRMODE to facilitate the use of sensor data for air quality mapping and (3) Is there a need for general guidance on data fusion approaches, for sensor applications or other problems?

About three quarters of the participants felt that sensors are (very) relevant for FAIRMODE, especially concerning methodologies to combine sensor networks with modelled data. There was some discussion about the type of guidance that FAIRMODE could/should provide but no real conclusions were reached. The relevance of this topic will be elaborated in the forthcoming roadmap and further discussed at the next plenary meeting in Berlin.

7. Compilation of urban scale emission inventories (recommendations)

The first part of the session was devoted to presentations highlighting updates in specific inventories: J. Koenen (TNO) on a comparison between CAMS-REG and EMEP; K. Cuvelier (ex-JRC) on a mosaic inventory initiative; D. Rodriguez Rey (BSC) on the coupling between traffic and emission models for the evaluation of mobility plans; S. Fameli (NOA) on local emission profiles from residential heating in Greece; M. Guevara (BSC) on best practices on fine scale HERMESv3 emissions; and J. Kuenen (TNO) on the CAMS-REG inventory.

The second session was devoted to discussions on the roadmap 2020-2022. It was recommended to continue to focus on the spatial and temporal distribution of emissions. One important outcome of this discussion was the need to focus this roadmap on recommendations targeting ancillary and meta-data to understand better differences between inventories. The use of the composite mapping platform to support this task was highlighted.

8. Exposure & exceedance model indicators and network optimization (Guidance)

The first part of the session on exposure and exceedance model indicators included two presentations: the first by T. Megaritis (Concawe) who showed that measurements in combination with models are a better approach to consider exceedances than simply measurements. B. Colan introduced the project Ricardo has been awarded by DG ENV to look at station representativeness. She explained how the concept of station representativeness links to the design and optimization of the monitoring network, thus justifying why the two sessions were together. M. Bino (VITO) then presented the first outcome of the service contract with DG ENV on the issue of spatial representativeness. After an overview of the literature on that topic, the discussion focused on the proposal for a 'tier approach', including different levels of complexity, ranging from expert opinion to modelling complemented with dedicated measurements.

The second part of the session dealing with the optimization of monitoring network and the current classification of sampling points was based on the service contract with DG ENV on that topic. L. Tarrason (NILU) presented the first outcome of this project work package. The discussion focused on the reporting of exceedances using monitoring data and the metadata information for each monitoring station available from e-reporting. Because this metadata is scarce and often inconsistent, it prevents its usage to deduct information on monitoring data classification and/or the possible exposure calculations. The discussion

showed that the FAIRMODE community is usually not involved in reporting exposure or station representativeness, despite the advantage of using models to determine these. It was suggested to bring these points of discussions to the next IPR meeting.

9. Effectiveness and robustness of air quality projections (Benchmarking)

This topic deals with the approaches that Member States use to plan future strategy for air quality, taking into account EU and national legislation (e.g. NEC) and at the same time fulfilling local compliance. The topic was introduced by presentations of A. Monteiro (University Aveiro) on the best measures under the NEC and AQ directives; E. De Angelis (University Brescia) on efficient air quality plans for Brescia and surroundings; L. White (AERIS) on the SHERPA into SMARTER project and S. Nordmann (UBA Germany) on the modelling of future air quality in Germany under NEC scenarios. Group discussions focused on (1) the method used to prioritize measures/policies and (2) where FAIRMODE guidance would be needed to support the process. The outcome of the discussion reflected a large spectrum of possible actions to support this process. An ad-hoc meeting has therefore been proposed to further delineate the scope of the FAIRMODE support to this topic (to take place in January).

The second part of the session was dedicated to the robustness of measures, in other words the sensitivity of the model responses to emission reductions when input data (emissions, meteorology...) or the model itself is changed. During the Tallinn meeting, a discussion on the possibility of organizing a dedicated model inter-comparison exercise to tackle this issue was not conclusive. The central question addressed in Madrid was therefore: "How should we address this issue?" Apart from retrieving information from past and current inter-comparison projects, it has been suggested to put more emphasis on the ex-post assessment of air quality plans and to the existing protocols in some modelling groups to check the consistency between model versions.

Next meeting

The next plenary meeting will take place in Berlin, on 18-19 February 2020.