

FAIRMODE 14th plenary meeting: Brussels 27-28/04/2022

The meeting was hosted by the Flemish Environmental Agency (Belgium) and organized as a hybrid event to allow remote attendance. About 90 participants (45 in presence, 45 from remote) participated. The meeting was organized in sessions, each dedicated to the FAIRMODE activities or crosscutting tasks (CT) that constitute the current work structure in FAIRMODE. This document summarizes the current status and next steps planned within each of the activities as reported and agreed during the 2022 plenary meeting. The discussions in some of the sessions were supported by interactive polls, which results are annexed to this document for information. All presentations are available on the FAIRMODE web pages.

P. Thunis highlighted the particular focus of this meeting on the FAIRMODE recommendations, in support to the revision of the AQ rules. A draft version of these recommendations has been circulated before the meeting and the comments/feedback received have been accounted for in the revised version. This revised version (sent prior to the meeting) has been discussed during the meeting in 4 sessions devoted to 1) assessment 2) source apportionment, 3) emissions and 4) planning. After updates according to the main outcome of the meeting, the recommendations will be finalized by the end of May.

Air Quality: revision of EU Rules (DG ENV)

To frame the discussions in the Plenary meeting, T. Henrichs from DG ENV informed on the ongoing process of revision of the EU rules on air quality. The process focuses on three main policy areas: a closer alignment of the EU air quality standards with the latest WHO guidelines; an improvement of the air quality legislative framework and the strengthening of provisions related to air quality monitoring, modelling and plans. He highlighted the current shortcomings in legislation (health outcome, implementation and enforcement, governance, assessment and information) and their consequences in terms of health, social, economic and other impacts. He presented the set of policy interventions proposed in the three policy areas, with a focus on air quality modelling, in order to achieve different levels of ambition regarding PM targets. He also informed about the outcome of the stakeholder consultations.

Recommendations on Assessment (S. Janssen)

S. Janssen (VITO) presented the revised version of the recommendations regarding “modelling for assessment purposes”. The following points were covered: (1) **Modelling quality objective**: clarification of formulas and parameters, added note to detail its conditions of applications, state that the MQO is necessary but not sufficient to ensure fitness-for-purpose; (2) **Definition of fit-for-purpose modelling**; (3) **Forecast** (use of additional QA/QC features as proposed in Fairmode Guidance); (4) **Sensors** (use of network of sensors, development of a QA/QC procedure, use of data-fusion); (5) **scope for modelling under the AAQD**; (6) **Spatial representativeness** (recommendation to refer to FAIRMODE methodology

in the IPR) and (7) **Exceedance situation indicators** (proposal of a two stages approach for the estimation and reporting of exceedance situations). Suggestions were made to refine the two staged Exceedance situation indicators assessment process in order to increase its relevance and to limit the administrative burden for MS. These suggestions will be reflected in an updated CT8 Guidance document.

A series of polls (see details in annexes) were set-up to assess the degree of agreement with respect to proposals to make mandatory the use of modelling in certain applications. Among these, planning (88%) forecast (90%), estimate of long-range transport (92%), source apportionment (83%) and exposure estimates (85%) received very high votes (i.e. opting for mandatory) whereas support to monitoring design (44%), near-real-time mapping assessment (46%), compliance checking (41%), definition of zones & agglomeration (50%) received mixed votes.

Recommendations on high-resolution emissions (M. Guevara)

M. Guevara (BSC) first reviewed the status of the activities in the “high resolution emission” activity. Work is progressing on the estimation of non-road mobile construction machinery, on the estimation of temporal factors for time emission profiles, on specific methodologies to compare and benchmark emissions and on the definition of the required metadata information to associate to a given inventory. M. Guevara also mentioned the possible synergies between FAIRMODE and TFEIP, in particular regarding the guidance on the spatial mapping of emissions and on specific modelling information (e.g. PM speciation, temporal profiles...).

He then presented the revised version of the recommendations regarding “high-resolution emissions, in particular on the following points requiring further discussion: (1) definition and scope for high-resolution emissions and (2) the alignment between emission needs from NECD and AAQD applications.

Recommendations on source apportionment (A. Clappier, G. Pirovano)

A. Clappier (U. Strasbourg) first reviewed the status of the activities in the “source apportionment (SA)” activity. The main item is the update of the SA guidance document that now includes sections on (1) source apportionment of NO₂, (2) a dummy’s guide on receptor modelling and (3) an enlarged section on the properties and mathematical formulations of SA methodologies. The guide will be sent for review to the SA FAIRMODE community in May with the aim to publish the final version in June. He also presented the new formulation of the recommendations regarding the fitness for purpose of different methodologies. While some minor rewording is yet necessary, the audience agreed with the proposed formulation. G. Pirovano led the discussion regarding three open issues concerning: a) the nomenclature of emission sources; b) reporting information under IPR; c) limitations of air quality modelling. It was agreed that there is a need for a specific guidance for receptor models to report sources according to the GNFR classification. Finally, FAIRMODE also recommended a flexible, comprehensive and consistent interface to report emission sources in the IPR context.

Recommendations regarding planning (E. Pisoni)

E. Pisoni (JRC) presented the new formulation of the recommendations regarding “planning”. The ‘planning’ part of the circulated document received 31 comments from 9 entities (both single persons and National Contact Points collecting all their national feedbacks). Comments were on different parts of the document as for example on the ‘executive summary’, on the ‘recommendations’ section and on the ‘impact on legislation’ part. Regarding the executive summary, we discussed during the meeting the need for developing guidance for air quality plans preparation, and also the fact that models are the recommended tool to develop air quality plans. Regarding the ‘recommendations’ part we confirmed the following points partly already present in the initial document, related to: a) the need to use validated modelling applications to design these plans; b) the need to foster the development and implementation of data assimilation / data fusion techniques to improve the base case results; c) the need for having robust data to design air quality plans; d) the difficulty to prioritize measures in terms of cost-effectiveness; e) the fact that there is uncertainty associated to the model responses to emission reductions; f) the need to ensure coherence between the National air pollution control programme (NAPCP) in the frame of the NEC directive and air quality plans; g) the lack of harmonization in reporting that prevents an efficient exchange of best practice. Finally, in the ‘impact on legislation’ part we decided to set-up a group of expert, that should reflect on how to improve air quality measures reporting, in view of a more effective implementation of the Directive.

WG3: Forecast (A. Piersanti)

This CT 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’). An updated version of the guidance on model quality objectives and benchmarking, which include a section on forecasting indicators is ready and will soon be available on the FAIRMODE site. The Delta tool V7.0 and associated user’s guide, including forecast indicators and diagrams are also available for download. The set of indicators and diagrams cover 3 aspects: (1) comparison with the persistence model; (2) capability in predicting exceedances and (3) capability in predicting air quality indices. A. Piersanti invited the community, in particular CAMS, to extensively test these indicators.

WG4: Microscale modelling (F. Martin)

Microscale air quality modelling refers to air quality modelling at high spatial resolution (typically order of meter scale), usually focused on urban environments. Nine groups participated in an inter-comparison exercise aiming at comparing microscale models and methodologies (based on microscale simulations) for deriving long-term pollutant concentrations in the framework of the AAQD. The objective is to identify best practices.

F. Martin presented the main results of the ongoing analysis of the intercomparison exercise. Results of models/methodologies used by the participants are compared with the observed data in a district of Antwerp (Belgium). Some progress has been made in order to answer key questions as: (a) what is the

impact of the emissions data? (b) what type of models are more suitable? (c) what is the impact of long term hourly simulations versus methodologies based on limited use of simulations (scenarios) to derive the AAQD indicators? (d) How many simulations (scenarios) are needed to provide good results for the AAQD indicators?

It was considered that the results are not conclusive yet and more work is needed to reach solid conclusions and provide recommendations on best practices about what models and methodologies are more suitable for computing reliable annual concentration at very high resolution in urban areas. A hackathon is foreseen in summer and it is expected to provide more conclusive results in the next FAIRMODE Technical Meeting.

WG5: Air quality Management Practices (E. Pisoni)

The objective of this CT is to produce guidelines on air quality management practices, in particular to explain how to proceed from specific abatement measures, to evaluate consequent emissions and then concentrations. E. Pisoni presented the state of play of the guide which is based on key challenges collected from local, regional or national authorities. He then discussed the creation of a working group to design a reporting scheme for air quality measures. The experience gained from the current Data flow K, the JRC catalogue of measures and the CT5 activities indeed indicates that a new system for this reporting is required.

WG6: Low-cost sensors (J. Wesseling)

The main objectives of this activity are to explore and compare results from different approaches using/exploiting sensor networks. J. Wesseling informed on the status of the benchmarking exercises to test/compare/develop different methods of using data from air quality sensors in a data fusion or data assimilation approach. Presently, CT6 is working on creating realistic synthetic sensor data to use in the further development and intercomparison of calibration methods. With synthetic sensor data it is possible to test the effect of the amount of noise in the sensor data on the results of the calibration and subsequent data processing. The general procedure for creating synthetic data was described and some examples were presented. Several remarks and questions concerning sensors in the recommendations were addressed. It is important to realize that the recommendations regarding sensors deal with sensors *in networks* and not with (the quality of) individual sensors.

WG9: Air quality projections (B. Bessagnet)

This CT is dedicated to the assessment of the robustness of air quality projections. In practice, this assessment consists in analyzing the sensitivity of the model responses to emission reductions scenarios, when input data (emissions, meteorology...) or the model itself are changed. B. Bessagnet informed on the status of the exercise to which about 15 groups currently participate. First results show a high variability for which additional sensitivity simulations will be required to provide explanations for. Among these, sensitivity to resolution, chemistry and emissions will first be performed. A publication based on the first set of results is in preparation.

LIFE REMY Project

G. Pirovano illustrated the overview and the current status of the LIFE-REMY project. A brief summary of the results obtained so far was presented starting from Actions A1-A2 focused on the characterization of the uncertainty related to a few emission sectors and emission gridding. Then some results from actions dealing with receptor and oriented modelling were presented too, mainly focusing on the Po Valley case studies. Finally, G. Pirovano introduced the REMY expert meeting that will be held in Barcelona on June, 14th. The meeting will represent an opportunity to present the results of the first year of REMY and, above all, to discuss with experts and stakeholders that could offer interesting outcomes from their ongoing activities and also suggest new issues that, to a limited extent, could be assessed by REMY.

A.O.B

The next technical meeting will be organized in Oslo, Norway (18-20/10/2022) by NILU. Contact: Leonor Tarrason.