

# FAIRMODE

## Proposed 2014-2016 roadmap

P. Thunis (JRC), C. Belis (JRC), A. Lukewille (EEA), L. Tarrasón (NILU, NO), A. Clappier (U. Strasbourg, FR), S. Janssen (VITO, BE), D. Buzica (DG ENV), G. Arduino (DG ENV), A. Miranda (U. Aveiro, PT), O. Kracht (JRC), F. Meleux (INERIS, FR)

**December 2013**

**Contents**

Introduction ..... 3

Terms of reference..... 3

Users of the network ..... 4

Proposed structure ..... 4

Meetings ..... 7

Tasks and Deliverables ..... 8

Fairmode in the broader context..... 14

Contact points..... 16

## Introduction

The Forum for Air quality Modeling (FAIRMODE) was launched in 2007 as a joint response initiative of the European Environment Agency (EEA) and the European Commission Joint Research Centre (JRC). Its aim is to bring together air quality modelers and users in order to promote and support the harmonized use of models by EU Member States, with emphasis on model application under the European Air Quality Directives. FAIRMODE is currently chaired by the Joint Research Centre of the European Commission. This document summarizes the FAIRMODE work-plan for the next three years (2014-2016). Before detailing the work plan and its associated deliverables some changes proposed in terms of structure and focus are highlighted. To facilitate reading the main changes with respect to the current situation are summarized (blue font color) in each section. The terms of reference of the network are presented below, followed by the description of intended participants, the proposed new working structure for 2014-2016, a detailed meeting plan and the identification of various deliverables planned in the coming years. The document concludes by discussing the connections between FAIRMODE and other European activities.

## Terms of reference

FAIRMODE is a Forum for Air Quality Modeling created for exchanging experience and results from air quality modeling in the context of the Air Quality Directives (AQD) and for promoting the use of modeling for regulatory purposes in a harmonized manner between Member States. Its main objectives are:

- To provide a permanent European Forum for air quality modelers, particularly addressing model users.
- To study and set-up a system (protocols and tools) on the quality assurance and the continuous improvements of air quality models operating at spatial scales from national to urban and local.
- To provide guidance on the use of air quality models and input data (including fitness for purpose) for assessing current and future air quality within the framework of implementing the EU's Air Quality Directives.
- To promote capacity building activities aiming at ensuring an optimum use of the proposed common methodologies and guidance and to promote good practice among the EU Member States (MS) and the EEA member countries. To make recommendations on future priorities, research activities and other relevant initiatives to secure Air Quality improvements.

To reflect the need of addressing training or capacity-building within FAIRMODE the original terms of reference have been extended accordingly (4th bullet point). In addition, the extension of the modelling approaches considered under FAIRMODE have been explicitly identified to stress the importance of covering all spatial scales from national to local (2<sup>nd</sup> bullet point).

## Users of the network

The FAIRMODE network intends to support model users at all administrative levels (national, regional urban and local) in their policy-related model applications. National experts to participate in the FAIRMODE network are nominated by the Member States (MS). The network aims at establishing tools and mechanisms to enhance communication and promote good modeling practice among MS. The network provides a framework for exchanging experience at all levels of application, including electronic interfaces, databases and tools as well as workshops, seminars and common projects/activities.

The contributions from the national FAIRMODE contact points have been very helpful to structure the work and discussion. In complement to the national experts nominated so far, FAIRMODE's intention is to strengthen the participation and contribution of regional/local model users (e.g. French ASPA's (Association pour la Surveillance et l'étude de la Pollution atmosphérique), Italian ARPA's (Agenzia Regionale per la Protezione dell' Ambiente) to the forum in order to cover a wider range of model applications and provide enough critical mass to cover the urban/regional aspects of the work. One way forward might be for FAIRMODE to link to the Air Implementation Pilot network, which brought together 12 cities across the European Union and was jointly run by the cities themselves, the European Commission, and the European Environment Agency (EEA, 2013<sup>1</sup>) and provide a stable meeting point for the exchange of experiences on the use of modeling at urban level. In this respect the designation of test cities (possibly building up from the Air Implementation Pilot) is an activity that will be promoted within FAIRMODE.

## Proposed structure

The proposed new structure of FAIRMODE intrinsically reflects the main recommendations on the use of models identified by the forum in 2011<sup>2</sup>. FAIRMODE identified the following major applications of models within the Air Quality Directive.

- Application 1: Assessment of air quality levels to establish the extent of exceedances and establish the population exposure
- Application 2: Forecasting air quality levels for short term mitigation and public information and warnings
- Application 3: Source allocation to determine the origin of AQ standard exceedances and provide a knowledge basis for planning strategies
- Application 4: Assessment of plans and measures to control AQ exceedances

---

<sup>1</sup> <http://www.eea.europa.eu/publications/air-implementation-pilot-2013>

<sup>2</sup> <http://www.eea.europa.eu/publications/fairmode>

Figure 1 below provides an overview of the proposed structure. The work is organized around four main working groups (WGs), following three of the identified applications above: Assessment, source apportionment and planning. The fourth WG on emissions is present to provide support to the three other WGs as all WGs highly depend on the quality of the emissive input data. The fourth AQD model application type mentioned above, i.e. forecasting is closely related to assessment (through evaluation) and planning (forecast is a short term planning) WGs and is therefore inserted as a cross-cutting activity.

**FAIRMODE's implementation strategy** (common to each WG - highlighted in green): The strategy is to proceed through a three-step process based on 1) Benchmarking, 2) Guidance and 3) Capacity building and Communication. Benchmarking is intended here as the compilation of different approaches and the subsequent development and testing of a standardized evaluation/inter-comparison methodology for collecting and reporting model inputs/outputs in a way that enables relevant comparisons. The aim is to identify good practices and propose ways to diagnose problems in performance. Once a common evaluation/inter-comparison methodology has been implemented, possibly supported by common tools and/or common datasets is agreed upon, guidance documents can be drafted setting the path to capacity building with the overall objective of promoting good modeling practices among and within MS. One advantage of this structure is that it guarantees guidance being produced within the FAIRMODE network. The last but not least activity is to communicate these good practices, identified by expert groups to the broader FAIRMODE community that includes also national and local authorities in charge of the application of models for regulatory purposes.

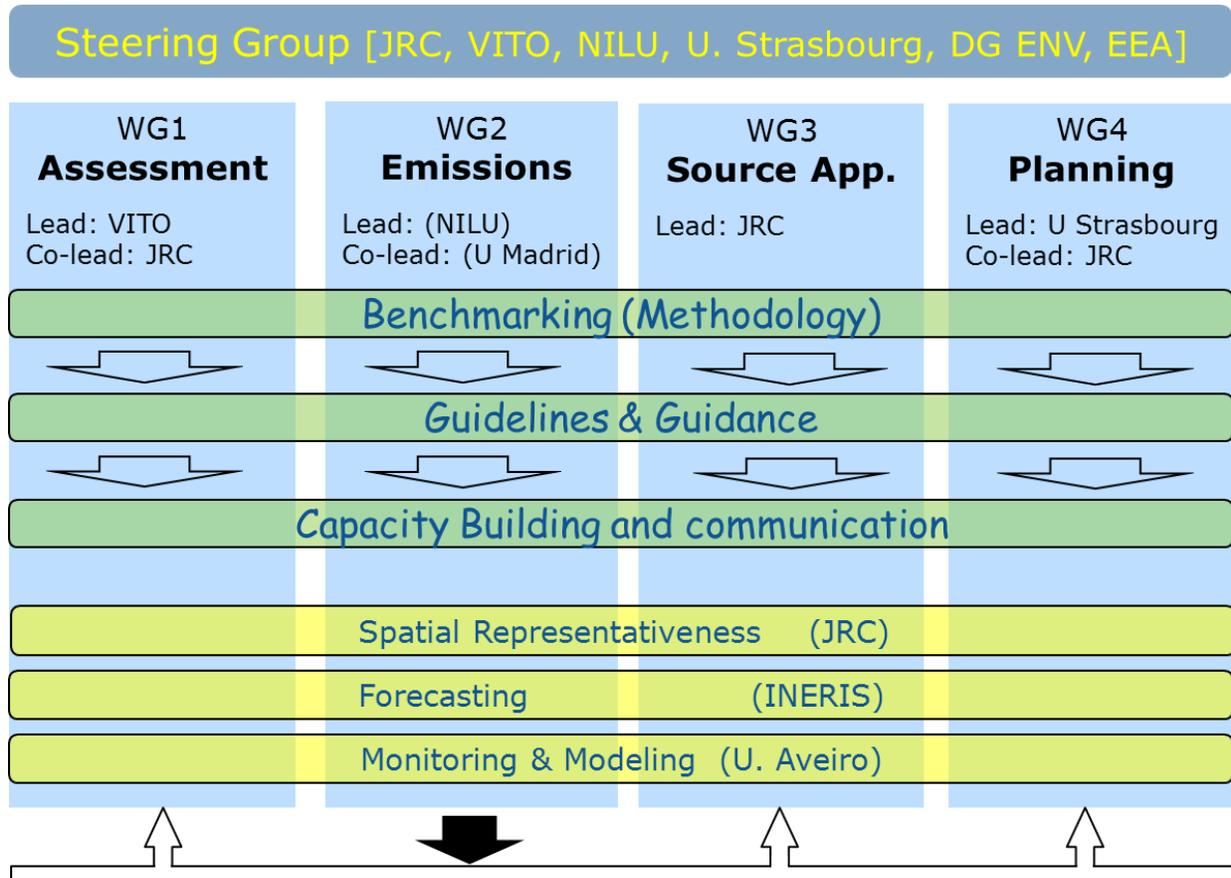
**Ad-hoc cross-cutting activities** (in yellow) will be formed to deal with inter-WG specific issues like spatial representativeness, forecasting and the use of monitoring and modeling to support assessment and planning applications.

**Steering group:** The Steering Group (SG) will be chaired by the JRC, supported by the working group leaders, EEA and DG ENV. EEA involvement is crucial in order to support networking and to ensure that experiences and results gained from work within the European environment information and observation network (EIONET)<sup>3</sup> is conveyed to the FAIRMODE community. Both EEA and DG ENV will support FAIRMODE by actively contributing to the review of guidance documents with the focus of strengthening and emphasizing policy relevant aspects of FAIRMODE products. DG ENV will support FAIRMODE by making sure that the topics identified in need for further research are included in the priorities of its non-regulatory support actions (e.g. LIFE+ program) and further set-up the frame for relations with the Air Quality Expert group. Communication and synergies with other funding schemes (FP7 (MACC-II, PASODOBLE, MyAIR), Marie Curie scheme, Horizon 2020, COST, etc.) will be established. Working Group (WG) leaders will share their WG experience and discuss the most effective way of fostering interactions among them. The SG will identify relevant cross cutting activities and secure that activities in the different WG are coordinated.

---

<sup>3</sup> <http://www.eionet.europa.eu/about>

**Working groups:** Led by either a national institution or the JRC with the possibility of co-leadership. The co-lead is here intended to (1) support technical and scientific aspects and (2) provide specific expertise (e.g. networking, tool development etc.)



The main changes with respect to the existing structure are the following:

1. Some of the former WGs are merged and former sub-working groups become WGs
2. Working groups: Creation of a new WG on model applications for planning (air quality plans or scenario mode). Benchmarking becomes overall foci of all WGs. Spatial representativeness becomes a cross-cutting activity similar to “monitoring and modeling” and “forecasting”
3. Each WG works acts along a similar 3-steps progressive strategy: (1) Benchmarking – Methodology, (2) Guidance and (3) Capacity building. This structure is therefore used to generate the guidance within the FAIRMODE network.
4. The Steering group is chaired by the JRC with the support of the WG leaders, EEA and DG ENV.

## Meetings

It is proposed to split between (1) a yearly plenary meeting devoted to national, regional and local policy makers and (2) technical meetings dedicated to model experts to develop and agree on common methodologies, carry out actual benchmarking and establish good procedures and guidance. Once at a good stage of development methodologies can then be promoted through meetings dedicated to training of model users (e.g. DELTA<sup>4</sup> tool workshop for assessment purposes).

**Plenary meeting:** This meeting (held yearly) focuses on policy aspects with the following objectives:

- Review the progress made in each of the four technical working groups
- Communicate good practices for each of the existing applications
- Suggest cross-cutting issues
- Approve plans for further developments related to all WG (and synergies among them) and cross-cutting activities
- Suggest relevant training sessions
- Gather information from related FP7(MACC, PASODOBLE), COST, LIFE+, H2020 projects
- Support DG ENV (e.g. Implementing Provisions on Reporting - IPR of the AQD, INSPIRE, etc)
- Explore potential funding mechanisms

**Technical meetings:** Technical meetings to cover the activities performed in the four WGs and other cross-cutting activities could be held at own pace (to be decided by WG members based on state of work), preferably in between the plenaries to keep momentum. For convenience, some of these groups might organize back-to-back meetings (e.g. assessment and planning). The main purposes of these expert meetings are:

- Identify different expert approaches to the activities in the WG work plan
- Development of benchmarking methodologies and indicators
- Carry out benchmarking activities
- Formulate good practices in different Tier approaches
- Prepare guidance for presentation in FM plenary meetings

**Training sessions:** Once matured, the methodologies and guidance developed within the technical groups can be presented and promoted to a wider audience of (potential) model users. These meetings (devoted to model users/experts applying modeling techniques in the frame of the AQD) could be ad-hoc ones or be combined with technical ones.

---

<sup>4</sup> The DELTA tool is a software developed to support model evaluation in the frame of the 2008 Air quality directive. More information is available at <http://aqm.jrc.ec.europa.eu/DELTA/>

Fairmode meetings have always been a challenge in terms of finding a trade-off between the expectations of policy-makers and model developers/users (adequate mix between technical and policy related presentations and discussions). Moreover momentum has been difficult to maintain due to the relatively long time lags separating the plenary meetings. It is here proposed to separate these two aspects and have a yearly plenary policy-oriented meeting complemented by technical meetings of the different WGs in between plenaries.

## Tasks and Deliverables

Although all WGs will follow a three-step strategy as mentioned above, all WGs are not at the same level of advancement. WG1 (Assessment) and WG3 (Source apportionment) are already well advanced and will devote more time to guidance and training whereas for WG2 and WG4 establishing or reinforcing a common methodology is first on the to-do list. This is reflected in the figures in each of the below tables as well as in the list of expected deliverables.

**Important note:** The list of deliverables below is only a first proposal which should be discussed at the next plenary meeting. Additional items and/or substitutions could well appear during this discussion. This three years' work program should therefore be updated regularly as a follow-up of the plenary meetings.

**WG1 – Assessment (Lead: VITO, co-Lead: JRC)**: In this WG a methodology to benchmark model performances according to a common scale and common template has been the focus for several years. In this context, model quality objectives (MQO) based on observation uncertainty have been discussed and the methodology is consolidated in the so-called DELTA tool. Currently the methodology is extensively tested by the FAIRMODE community.

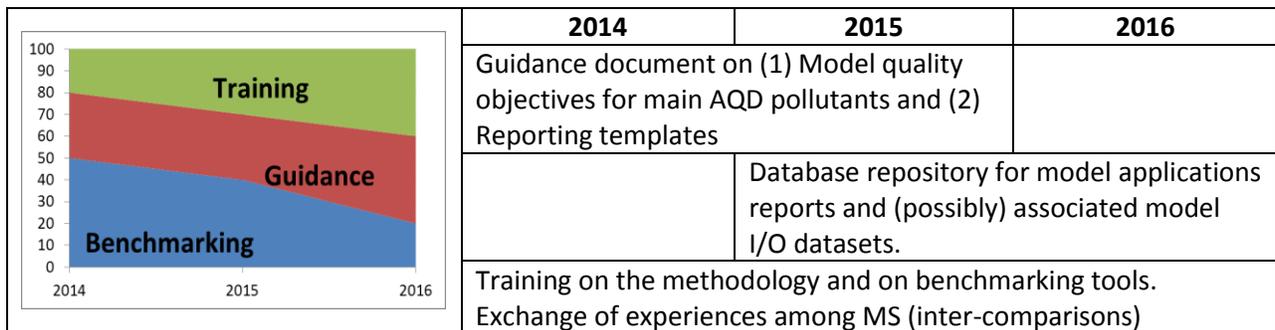
In the coming years, time will be devoted to extend the methodology to other pollutants and assess its robustness for various model applications and various scales. One output of this process is a *finalized methodology together with updated model quality objectives for the main pollutants* (i.e. how to fix a minimum level of quality for model results to be used in the policy context).

In addition to model performance, a few other relevant topics will be addressed within this WG1:

- The combined use of modeling and monitoring data is a crucial (cross-cutting) topic in this WG1. At present it is commonly accepted that any model application for assessment purposes to some extent should make use of monitoring data. This can be via (complex) data assimilation techniques or more simple bias corrections. However, in such combined approaches, it is not straightforward anymore to validate the output and common procedures have to be established how to arrive at an independent model evaluation.

- Spatial representativeness of monitoring stations has been investigated and discussed intensively in the past by a FAIRMODE subgroup<sup>5</sup>. No well-established procedure has been identified so far. Also in the scientific literature, there is no agreement to tackle this complex problem. It is FAIRMODE’s ambition to further explore this topic and make progress in the assessment procedure of spatial representativeness.
- A longstanding open issue is the use of model output in formal reporting by Member States. As a matter of fact, many regions and member states are using models in their day-to-day air quality management activities, but apparently only very few of them actually use those results in the formal reporting procedures at the EU-level. FAIRMODE will explore current practices to understand the objections and obstructions in this process. Based on those findings, recommendations can be drafted to stimulate the use of models for air quality management and the formal reporting.

The first years, further elaboration of abovementioned methodologies, benchmarking and guidance will be the main objective but more time will progressively be devoted to use the produced guidance documents for increasing modeling capacity through training.



**WG2 – Emissions (Lead: NILU, co-Lead: U. Madrid)**

The main focus for the next three years will be on the evaluation of urban emissions. This is because the compilation of urban emissions has very irregular practices across European cities and it uses systematically different practices from emission compilation at national level. Emission compilation at urban level is an important cross cutting issue that also affects the work of the other 3 FAIRMODE working groups and cross-cutting activities.

For the next three years, activities will be addressed to the evaluation of traffic emissions. This is because emissions from the traffic sector are presently dominant sources in most European urban areas. A wide range of different methodologies, with variable accuracy is currently used for calculating traffic emissions in urban areas so that guidance on best practices is expected to have an impact to improve existing emission estimates.

<sup>5</sup> [fairmode.ew.eea.europa.eu/monitoring-modelling-sg1/presentations](http://fairmode.ew.eea.europa.eu/monitoring-modelling-sg1/presentations)

The intention is that activities can continue in the future involving other sectors as funding for this important emission work becomes available under COST or LIFE+ programs.

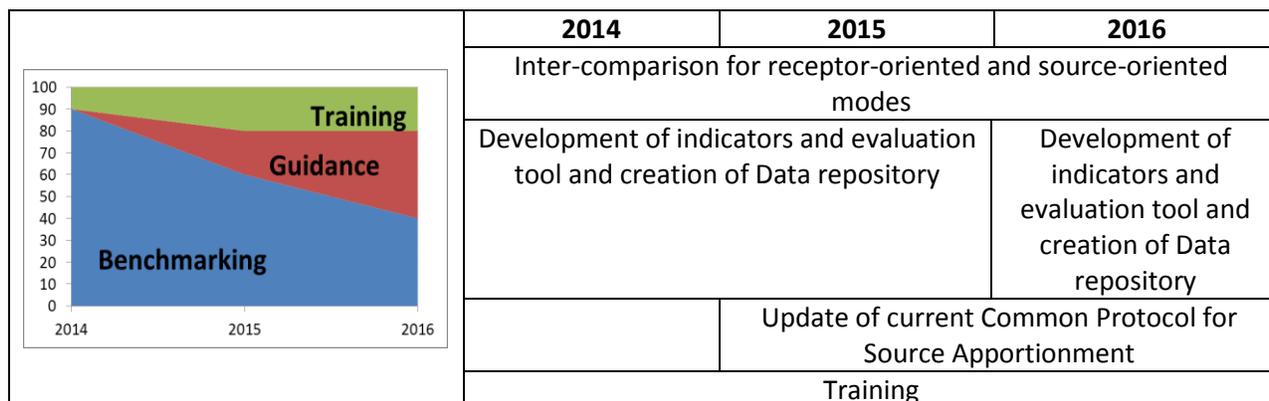
- In 2014, WG2 will work to compile a review of existing traffic emission compilation methodologies, organized in different tiers, as increasingly demands for input data information apply. The work will rely on the guidance for traffic emission compilation provided by regional and national emission inventory initiatives such as compiled under the EMEP/CORINAIR Guidebook. The working group will work to provide FAIRMODE plenary meeting with a first overview of good practices for determining traffic emission.
- In 2015, WG2 envisages a first stage of benchmarking to take place in selected participant cities, following up the results from the Air Quality Implementation Study mentioned above. The main goal is to show and interpret the large difference in traffic emission data from national and urban inventories resulting from the use of different emission compilation methodologies. Comparison with the TNO-MACC-II emission inventory will be carried out as part of this exercise. The main goal of this exercise is to provide FAIRMODE plenary meeting with an overview of the main reasons for the identified differences between national and urban traffic inventories in the selected cities.
- In 2016, WG2 will work to secure the consistency of the methodologies used for calculating city scale climate gas emissions and air quality emissions from the traffic sector. An outreach to existing networks, such as the International Council for Local Environmental Initiatives (ICLEI) will be pursued. Based on the work on the previous years and the results from 2016 guidance on how to compile traffic emissions will be finalized and communicated through FAIRMODE documents, plenary presentations and training activities.

	2014	2015	2016
	Traffic emissions methodologies review	Benchmarking Traffic emissions	GHG and AQ emissions from traffic
	Link to TFEIP EMEP/CORINAIR	Link to MACC emission work	Link to ICLEI
	Determination of good practices for traffic emissions	Differences between national and urban traffic inventories	Guidance on traffic emissions methodology

### **WG3 – Source Apportionment (Lead: JRC):**

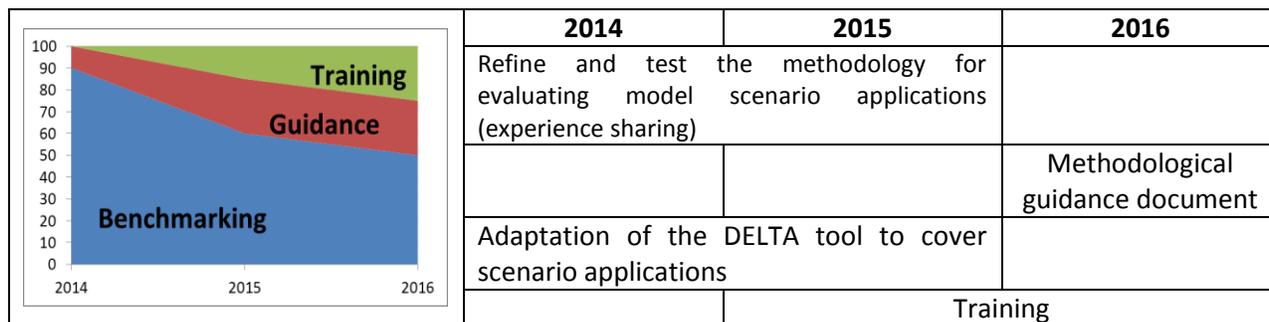
In the previous three years, the activity focused on reviewing the existing methodologies and assessing their penetration among different group of users. In addition, two inter-comparisons aiming at quantifying the model’s performances were accomplished under the linked JRC initiative on Receptor Models. The third branch of the activity was to draft a Guidance document and Common Protocol for Source Apportionment with Receptor Models in Europe. The great deal of information and the

experience gained so far constitute the starting point for future activities. The next inter-comparisons aims at characterizing a wider range of tools, with particular reference to Receptor Models and Chemical and Transport Models. Assessing model performances in the field of source apportionment requires specific performance indicators which will be further refined in order to better reflect models and practitioners capabilities in the different aspects of source identification. The indicators will, subsequently, be implemented into a common assessment tool with the objective to graphically summarize the overall performance to support the users in the assessment of their solutions and to better communicate the reliability of results to the end users. In addition, it is envisaged to develop services for European experts like the creation of a web-based data repository with ready-to-use input data for source apportionment models (e.g. chemical fingerprints) and training activities to disseminate best practices. Revision and extension of the current Guidance document and Common Protocol for Source Apportionment to take into account the output of described activities within the WG and the scientific developments in the field will be addressed under a perspective of continuous improvement.



**WG4 – Planning (Lead: U. Strasbourg, co-lead: JRC):** In this WG a methodology will be proposed to evaluate and test the robustness of models applied in scenario mode to assess the impacts of air quality plans. A first stage will consist in reviewing currently applied methodologies among MS at both the national and regional/local scales. Specific indicators will be developed as part of a common evaluation methodology (benchmarking) to assess the robustness of models when used in a dynamic mode. One objective of this evaluation methodology will be to inter-compare the following aspects in terms of model responses: (1) the absolute response strength to identify the potential in terms of precursor or/and sectors of activity for emission reduction measures within a given spatial domain and (2) the degree of non-linearity to assess the robustness of the model responses. Comparisons of model responses across spatial scales and links with underlying input data (link to the emissions WG) will also be foci of this WG. Other methodologies like trend-analysis (i.e. capacity of the model to reproduce historical yearly variations) or “spectral analysis” (capacity of models to reproduce inter-seasonal, weekly or daily variations) will also be points addressed within this WG. A guidance document summarizing the main elements of the review and of the methodology will be a long-term output of this WG. As a new WG most of the time will initially be devoted to refining the methodology through

experience sharing. Guidance and training will initially be limited but increase towards the end of these 3 years. Common tools will be developed to support this process.



**Cross-cutting activities:**

The main topics of the three cross-cutting activities (CCA) are listed below. No specific deliverables are attached to these CCA as they are intended to contribute directly to the deliverables of the WG. Likewise these topics are only a first proposal which should be discussed and updated in the context of the plenary meetings.

**Spatial representativeness (coordinated by JRC)**

- Review existing methodologies and current needs within the FAIRMODE community directed to the fields of spatial representativeness, station classification, and related topical areas.
- Support the development of the MQO: Uncertainty estimates derived from geo-statistical methods (variography of monitoring data) can contribute towards a further level of detail in the MQO formulation in addition to monitoring uncertainty. A methodology to assess the spatial representativeness of measurement stations will be developed to this purpose. Depending on the outcomes of this research, such method can also supply information for a better design of monitoring networks.
- Improvement of the model evaluation methodology: A methodology to automatically screen for anomalies within records of the AirBase database will bring a clear benefit for choosing the adequate monitoring sites for model evaluation purposes. The approach is based on spatio-temporal neighborhood statistics and is currently applicable to background type stations.
- Evaluate the feasibility of methodological comparisons (example given, on shared datasets). However, the methodological diversity of the different approaches might impose significant limitations in this regard.
- Assessing the representativeness of source contribution estimates derived from field data is essential for their proper interpretation. Interest has been expressed to explore the opportunities to review the progress in this subject within the FAIRMODE community.

Monitoring & modeling (coordinated by U. Aveiro (P)):

- Comparison of various methodologies (for assessment and planning) in which monitoring and modeling data are used in conjunction. This topic was already discussed by a FAIRMODE working subgroup in the past (2010-2011) and findings were presented in a discussion document<sup>6</sup>. This document will be a starting point to assess current best practices.
- When model output and monitoring data are combined, it is not straightforward anymore to validate the final results in an independent way. Guidance will be provided how to tackle this issue and it will be explored if and how this can be incorporated into the model quality objectives and model evaluation tool.
- Planning is one of the most important applications of air quality models. However, today very little effort is spend on the validation of models in planning mode. How do we use monitoring data to assess the planning capabilities of our modelling tools. What are best practices for so called dynamical evaluation?
- When models are used for planning purpose, how do we make sure that at least the base year is simulated well. How do we correct for observed biases/deviations in the base year (e.g. underestimation of PM) and how do we take into account this information in the planning simulations for future years?
- The location, characterization and capacities of monitoring networks is of fundamental relevance for modeling. Discussion among relevant actors on the development and organization of monitoring networks to ensure the availability of high quality information is required.

Forecasting (coordinated by INERIS (F))

- Very often, the same air quality model is used for assessment and forecasting purposes. However, additional model quality objectives might be required to evaluate the forecast capabilities of a model. What are the best indicators to evaluate the skill of a forecast model? How do they take into account that in forecast mode the focus is on air pollution episodes or threshold exceedances rather than on (annual) average statistics? How can this information be incorporated in the current FAIRMODE Model Quality Objectives and consolidated DELTA tool?
- The optimal spatial (horizontal/vertical) model resolutions required to forecast pollution episodes depend on the considered pollutant but also on the main physical and chemical processes involved in its formation. Are the current MQO adequate to provide sufficient information about model performances in such cases?
- In forecast mode, simple or complex method for assimilating AQ observations are used and require the need to split the database in two parts (i.e. assimilation and evaluation). What is the optimal way to select the most consistent and relevant set of stations for both parts (note that this topic is closely connected to the monitoring and modeling cross cutting activity)
- What is the impact of using different station classifications on model performances (e.g. usual EEA classification vs. MACC-ensemble classification from Joly & Peuch)?

---

<sup>6</sup> [http://fairmode.ew.eea.europa.eu/monitoring-modelling-sg1/sg1\\_meeting\\_smhi\\_v1.docx/download](http://fairmode.ew.eea.europa.eu/monitoring-modelling-sg1/sg1_meeting_smhi_v1.docx/download)  
[http://fairmode.ew.eea.europa.eu/monitoring-modelling-sg1/table\\_sg1\\_wg2\\_v2.xlsx/download](http://fairmode.ew.eea.europa.eu/monitoring-modelling-sg1/table_sg1_wg2_v2.xlsx/download)

- Do we have adequate indicators to address both the long-term (e.g. Gothenburg emission reductions) and short term (control scenarios) scenarios in a forecast mode? Is there any difference in terms of robustness of the model responses between these two kinds of scenarios?

## **Fairmode in the broader context**

The figure below illustrates the connections between FAIRMODE and other networks and working groups.

### **FAIRMODE <--> MACC:**

Since the FAIRMODE launch, searching for possible synergies with the Copernicus Atmosphere Service, MACC, has been a key issue. While MACC contributes with a series of products and information that may be relevant for all activities under FAIRMODE, it is not always easy to use these products. The MACC products can contribute to assess air quality levels to establish the extent of exceedances, to forecast urban air quality levels for short-term mitigation and public information and warning, to determine the origin of exceedances, to provide a knowledge basis for national planning strategies, to establish the validity of emissions and to classify station representativeness. FAIRMODE through its guidance and benchmarking activities can play an essential facilitator role assessing the capabilities of use of MACC products for regulatory purposes. Experiences of use of MACC products compiled under the technical FAIRMODE working group activities are to be communicated to the MACC steering group and effectively contribute to improve the MACC policy products. In this way, both projects can benefit from each other. Good communication between the two programs is secured by the participation of key scientists in the both groups.

### **FAIRMODE <--> Ambient Air Quality Expert Group:**

The Ambient Air Quality Expert Group will endorse the Fairmode work plan and support the participation of relevant national/regional representatives to achieve the FAIRMODE work plan goals.

### **FAIRMODE <--> EMEP/IIASA**

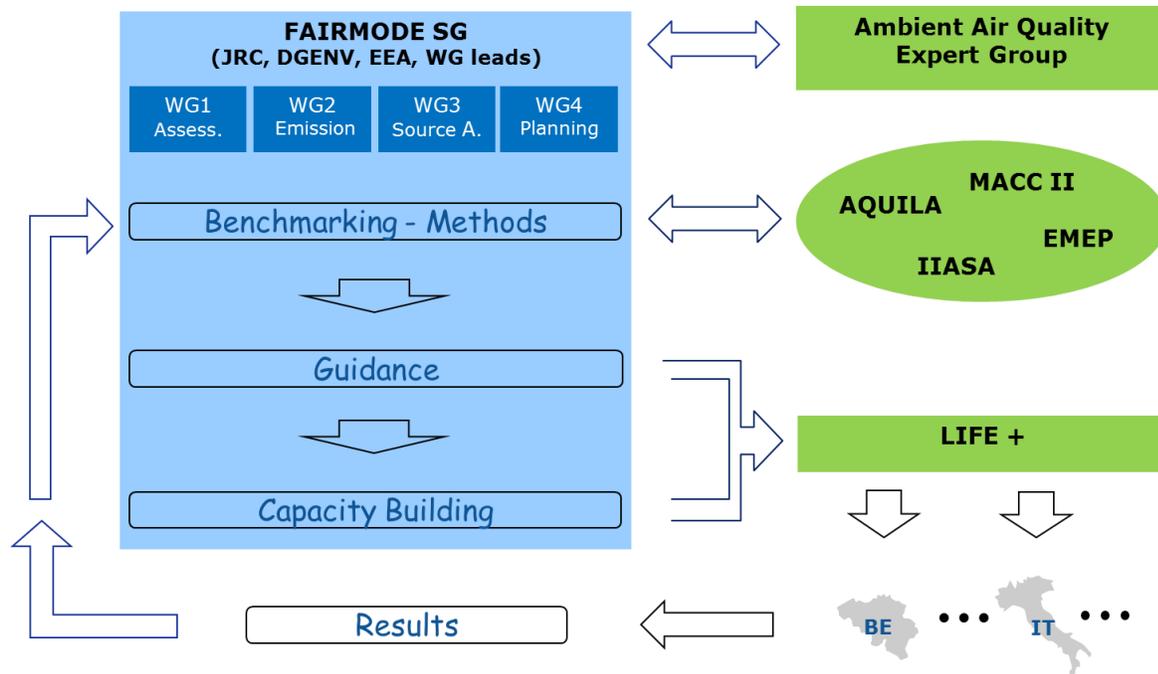
Both EMEP and IIASA can support FAIRMODE by helping identifying key problematic areas for which developments in terms of benchmarking are needed. In return the available FAIRMODE methodologies can be used in support the QAQC process of EMEP/IIASA work.

### **FAIRMODE <--> AQUILA**

Some topics are of common interest to both the FAIRMODE and AQUILA community (e.g. spatial representativeness, detection of outlying measurements, measurement uncertainty, assimilation of monitoring data with modeling studies...). In addition to potential ad-hoc workshops on these specific themes, a basic overview of the “common-interest” work performed in one network will be presented to the other community (via plenary meetings (?)).

**FAIRMODE <--> LIFE+**

In the new LIFE multiannual financial framework 2014-2020, there are two priority areas: a) Environment and Resource Efficiency (E-RE) and b) Environmental Governance and Information (EG-I) which objectives are fully complementary with the activity of Fairmode. In particular, one of the objectives of E-RE is to support the application, development, testing and demonstration of integrated approaches for the implementation of plans and programs pursuant to EU environmental policy and legislation, in the area of air (among other), while EG-I aims at contributing to a more effective compliance with and enforcement of EU environmental legislation, in particular by promoting the development and dissemination of best practices and policy approaches. Moreover, the new category “Integrated Projects” aiming at implementation of plans, programs or strategies required by EU environmental legislation offers interesting opportunities for Fairmode partners since it prioritize large scale activities and mobilization of different sources of funds



## Contact points

### WG1: Assessment

Stijn Janssen (VITO), [stijn.janssen@vito.be](mailto:stijn.janssen@vito.be), +32 14336702

Philippe Thunis (JRC), [philippe.thunis@jrc.ec.europa.eu](mailto:philippe.thunis@jrc.ec.europa.eu), +39-0332785670

### WG2: Source Apportionement

Claudio Belis (JRC), [claudio.belis@jrc.ec.europa.eu](mailto:claudio.belis@jrc.ec.europa.eu), +39-0332786644

### WG3: Emissions

Leonor Tarrason (NILU), [leonor.tarrason@nilu.no](mailto:leonor.tarrason@nilu.no), +47 63898070

Julio Lumbreras (U. Madrid), [jlumbreras@etsii.upm.es](mailto:jlumbreras@etsii.upm.es), +34 913363043

### WG4: Planning

Alain Clappier (U. Strasbourg), [alain.clappier@live-cnrs.unistra.fr](mailto:alain.clappier@live-cnrs.unistra.fr), +33 368850896

Philippe Thunis (JRC), [philippe.thunis@jrc.ec.europa.eu](mailto:philippe.thunis@jrc.ec.europa.eu), +39-0332785670

### CCA1: Spatial Representativeness

Oliver Kracht (JRC), [oliver.kracht@jrc.ec.europa.eu](mailto:oliver.kracht@jrc.ec.europa.eu), +39 0332789425

### CCA2: Modeling & monitoring

Anna Miranda (U. Aveiro), [miranda@ua.pt](mailto:miranda@ua.pt), +351 234372576

### CCA3: Forecasting

Frederik Meleux (INERIS), [frederik.meleux@ineris.fr](mailto:frederik.meleux@ineris.fr), +33 344 556 480