

Working Group 1 - Assessment

» Stijn Janssen & Philippe Thunis

Outline

- » Status report WG1
- » Guidance Document
- » WG1, the next challenge: an EU AQ mapping initiative

Status Report

Status report

- » Update of the MQO and the DELTA tool
 - » All feedback from Technical Meeting in Oslo was collected in a wish list.
 - » Input from: Joost Wesseling (RIVM), Jenny Stocker (CERC), Maria Teresa Pay (BSC), Keith Vincent (Ricardo AEA), Elke Trimpeneers (IRCEL)
 - » Feedback was implemented in the new DELTA vs4.0 release
- » Startup of CEN initiative
 - » First step towards a standardization of a Model Quality Objectives and a Benchmarking procedure
 - » Kick off of the process in Summer 2014
 - » Next milestone: CEN plenary meeting in May 2015

Status report

- » Input to e-Reporting of modelling results
 - » Input for the “data model” (meta information) of model applications
 - » Feedback on the data formats used in e-Reporting
- » Links with cross cutting activities:
 - » Modelling & Monitoring
 - » Model evaluation of data fusion/data assimilation applications
 - » Forecast
 - » Model evaluation of forecasts
 - » How to deal with threshold exceedances?
 - » Assessment of spatial representativeness

Guidance Document

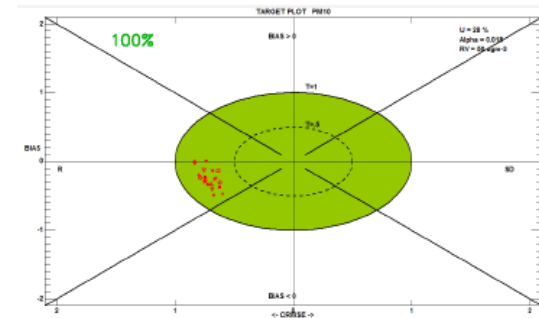
Guidance Document

- » Edited by VITO (Peter Viaene)
- » Reviewed by 15 FAIRMODE experts
- » Cases provided by 5 different modelling teams (CERC, ARPA Emilia Romagna, IRCEL, Univ Aveiro, Univ Brescia, Ricardo AEA)
- » One more case to add from NILU

Guidance Document on Model Quality Objectives and Benchmarking

Peter Viaene, Stijn Janssen, Philippe Thunis, Elke Trimpeneers, Joost Wesseling, Alexandra Montero,, Ana Miranda, Jenny Stocker, Helge Rørdam Olesen, Cristina Guerreiro, Gabriela Sousa Santo, Keith Vincent, Claudio Carnevale, Michele Stortini, Giovanni Bonafè, Enrico Minguzzi and Marco Deserti

Version 1.0 - February, 2015



INDICATOR		No of stations/groups: 10 valid; 20 selected	
D B S	Mean	[Bar chart showing distribution from 0 to 100]	
	Forecast Stages	[Bar chart showing distribution from 0 to 100]	
T I M E	Bias	[Bar chart showing distribution from -2 to 2]	
	Corr	[Bar chart showing distribution from 0 to 1]	
S P A C E	Mean	[Bar chart showing distribution from -2 to 2]	
	Corr	[Bar chart showing distribution from 0 to 1]	
S P A C E	Mean	[Bar chart showing distribution from -2 to 2]	
	Corr	[Bar chart showing distribution from 0 to 1]	



Guidance Document

- » First version released February 2015
- » Available at the FAIRMODE website:
<http://fairmode.jrc.ec.europa.eu/>
 - » WG1 → Related Documents

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Forum for air quality modelling in Europe

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Assesment Lead: VITO Co-lead: JRC Co-ordinator: S. Janssen

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

- [terms of reference](#)
- [steering committee](#)
- [national experts](#)
- [roadmap](#)
- [strategy](#)
- [Δ - benchmarking tool](#)

Related Documents

- [Draft guidance document on MQO and Benchmarking \(February 2015\)](#)
- [MQO in the framework of the FAIRMODE project \(Apr 2014\)](#)
- [MQO Template performance report & DELTA updates \(Mar 2012\)](#)
- [The Delta tool and benchmarking report template \(Apr 2011\)](#)
- [A procedure for air quality models benchmarking \(Feb 2011\)](#)

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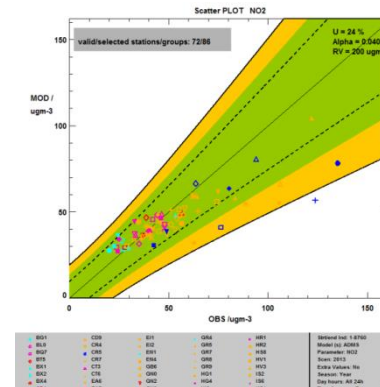
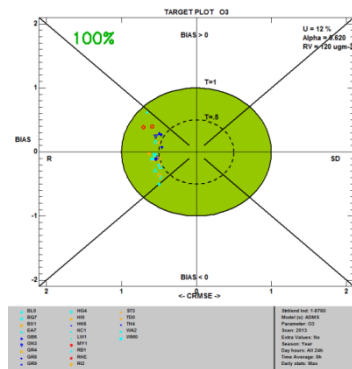
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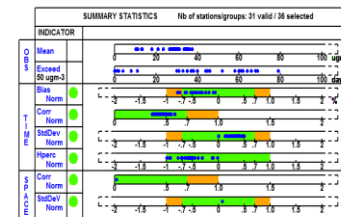
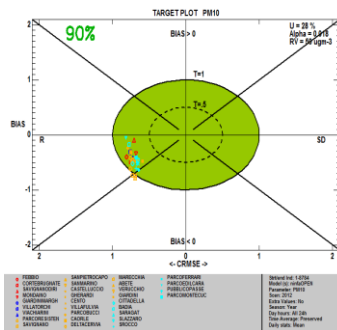
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Examples of Good Practice

» CERC (Jenny Stocker) → ADMS-Urban application for London



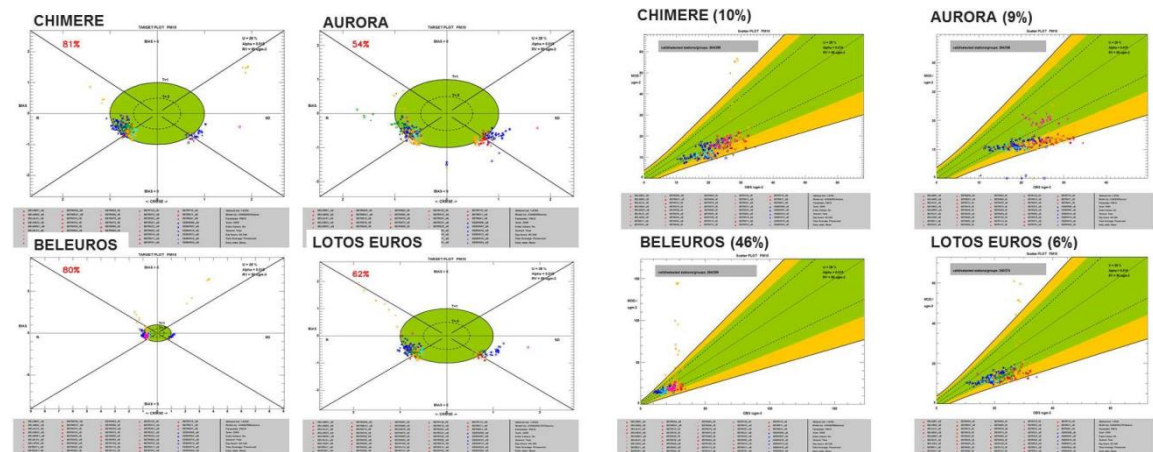
» ARPA Emilia Romagna (Michele Stortini) → NINFA Air Quality System for Northern Italy



Performance Criteria satisfied
 Performance Criteria satisfied. Error dominated by corresponding indicator
 TPER: >95% of stations fulfil the Performance Criteria
 SPACE: Did fulfil the Performance Criteria
 TPER: >95% of stations fulfil the Performance Criteria
 SPACE: Did not fulfil the Performance Criteria

Examples of Good Practice

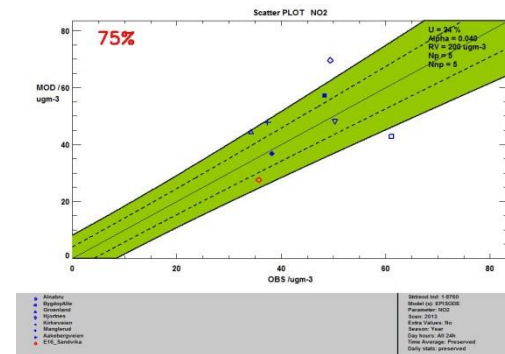
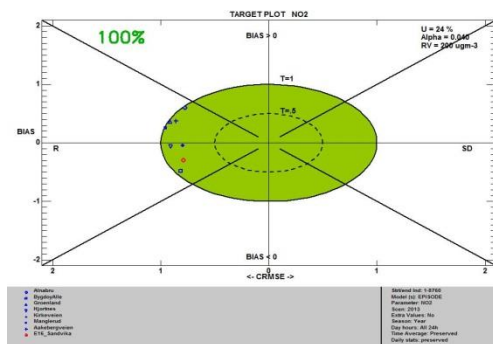
- » IRCEL (Elke Trimpeneers) → JOAQUIN Model comparison for NW Europe



- » UAVR (Alexandra Monteiro) → EURAD-IM, CHIMERE, CAMx, TAPM applications over Portugal and Porto and Lisbon urban areas

Examples of Good Practice

- » UNIBS (Claudio Carnevale) → TCAM evaluation over Northern Italy
- » Ricardo AEA (Keith Vincent) → PCM results as part of the annual AQ compliance for the UK
- » NILU (Gabriela Sousa Santos and Cristina Guerreiro) → urban air dispersion model EPISODE for Oslo
 - » Not yet included but will be added in the next version



Open issues...

- » What about other pollutants (e.g. heavy metals from AQD 2004)?
- » What about the data coverage criteria? Do we keep the 75%?
- » What about an MQO for exceedances/percentiles (mainly an issues for PM10)?
- » What about changes/improvements in measurement uncertainty → The MQO will become more stringent when monitoring techniques improve
- » How to deal with data assimilation output → see ongoing discussion in CCA M&M
- » How to deal with spatial representativeness → see ongoing discussion in CCA SR

WG1, the next challenge...

An EU mapping initiative

- » Basic hypothesis:
 - » Best possible AQ assessment for your region is made by you
 - » If we put together all national/regional maps → the best available AQ map of Europe

An EU mapping initiative

- » The credibility of the final product will be high because it will include your (official) national/regional air quality maps
- » The model behind the map does not matter. Only relevant criteria:
 - » Highest quality as possible → FAIRMODE work on the Model Quality Objectives and Benchmarking
 - » Highest spatial resolution as possible → policy relevance

EEA/ETC exercise in 2013

- » We are not reinventing the wheel!
- » Idea was already tested by the EEA/ETC in 2013 (Peter de Smet *et al*)
- » Input received from 19 countries!

A European compilation
of national air quality maps
based on modelling



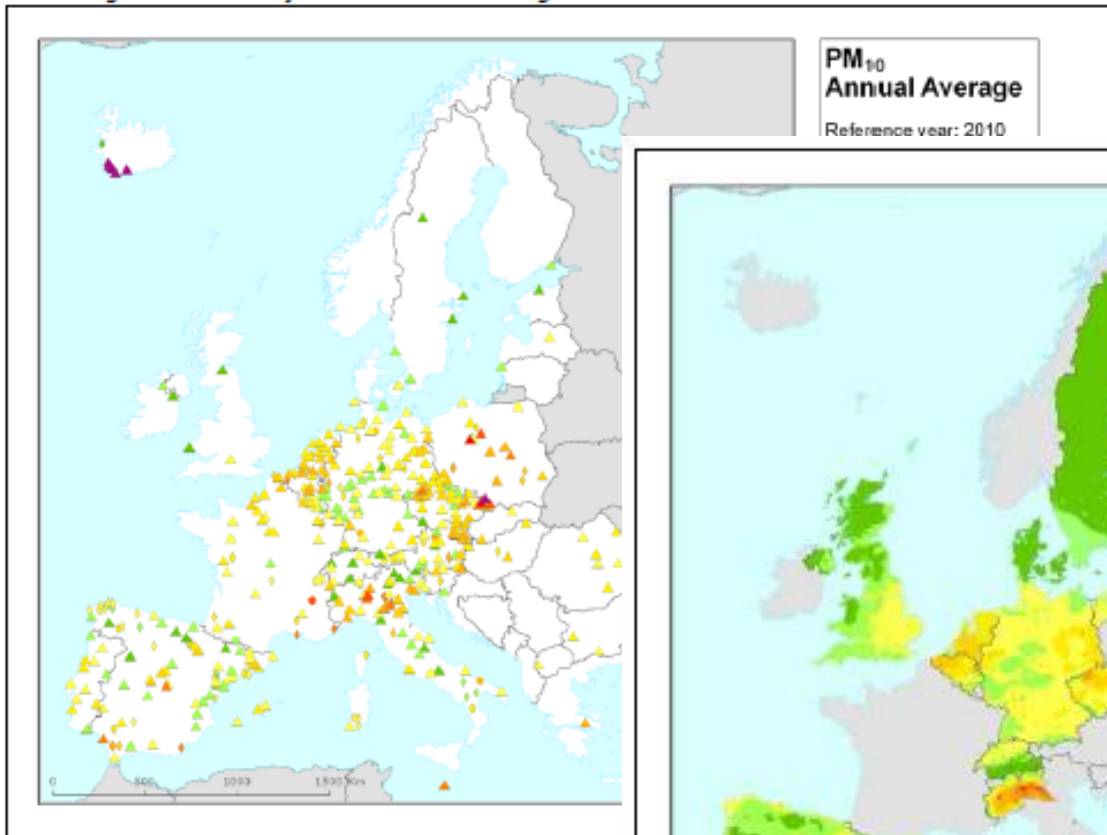
ETC/ACM Technical Paper 2013/3
March 2013

Peter de Smet, Frank de Leeuw,
Jan Horálek, Pavel Kurfürst

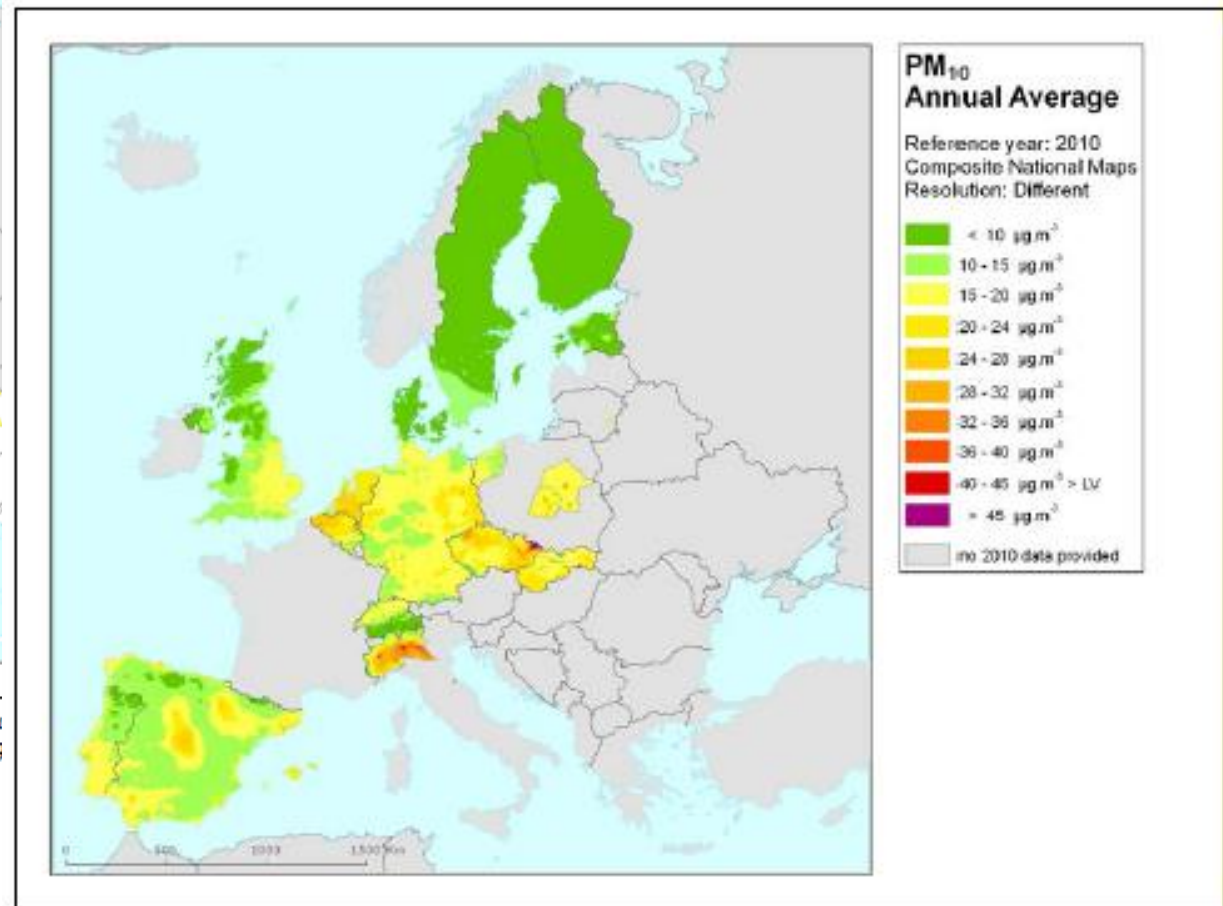


The European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM)
is a consortium of European institutes under contract of the European Environment Agency
RIVM UBA-V ÖKO AEAT EMISA CHMI NILU INERIS 45fera PBL CSIC

Assessment: from monitoring data towards maps...



Map 1a. European map with the annual average PM_{10} reported by the countries under EU legislation (EC (15



Map 1. European composite map of the annual average PM_{10} for 2010 based on national modelling contributions from countries and regions.

Technical issues encountered in the ETC exercise...

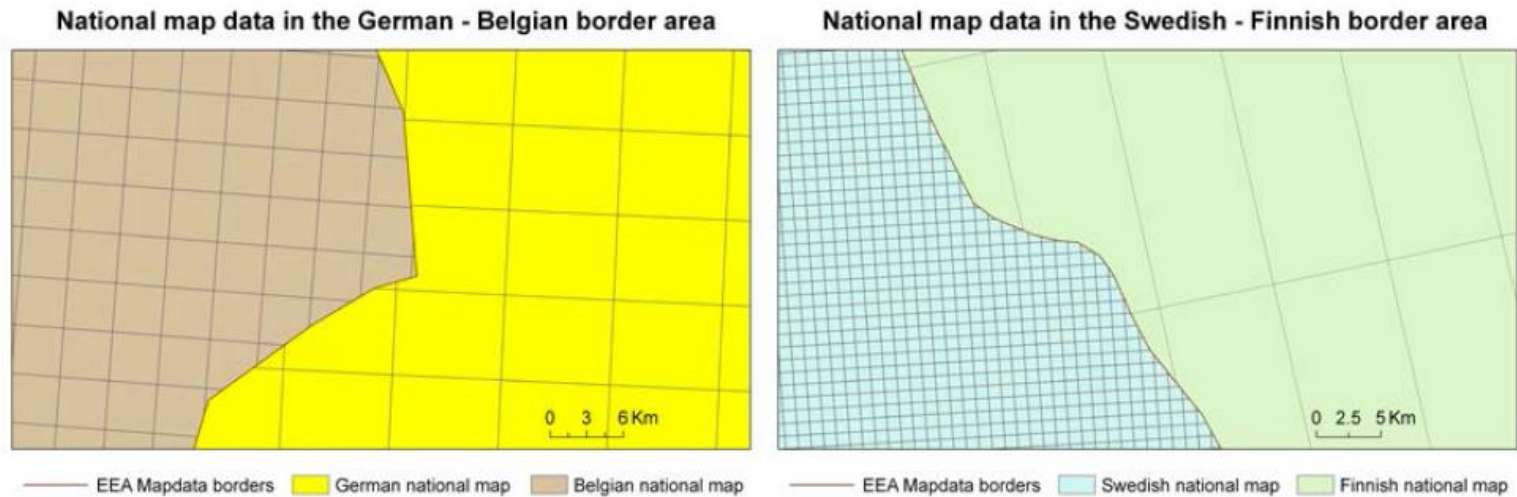
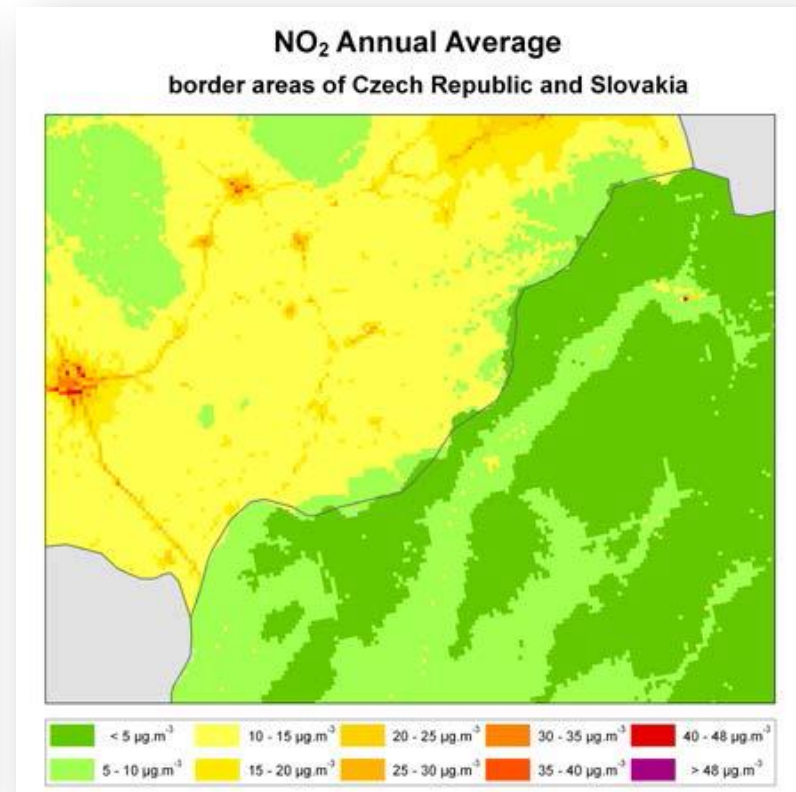
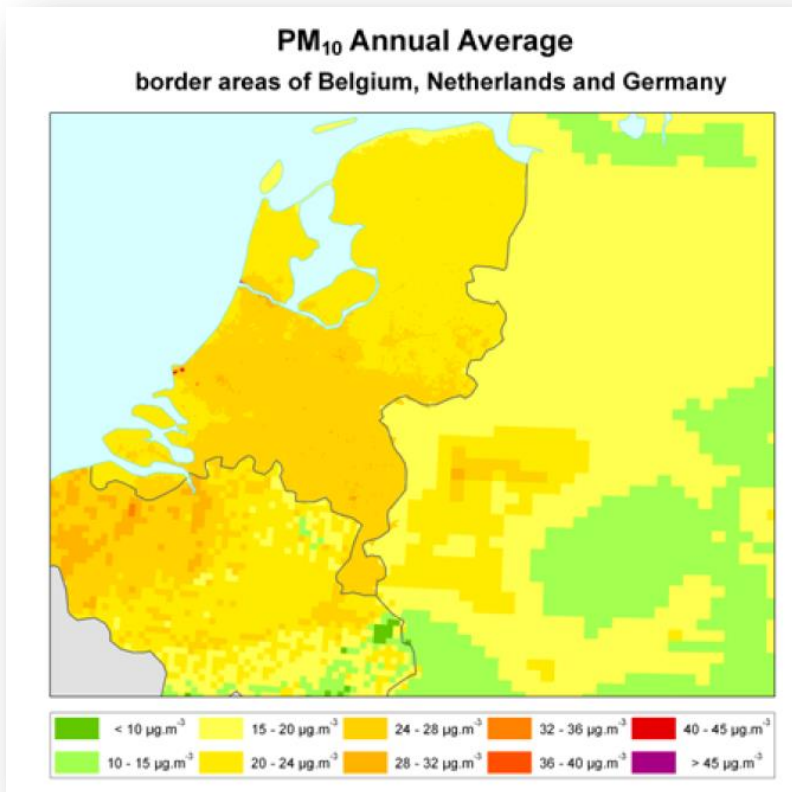


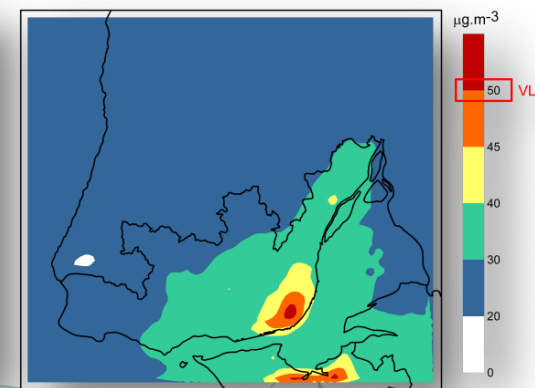
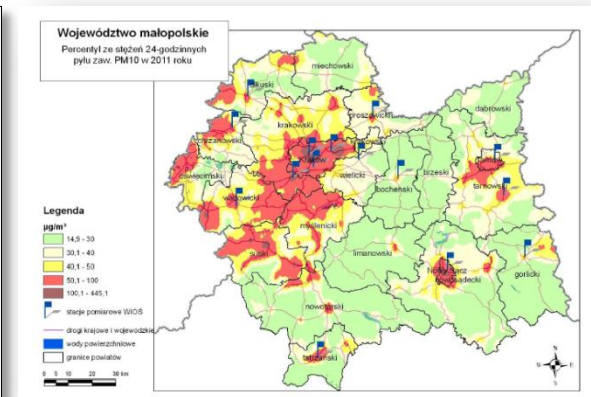
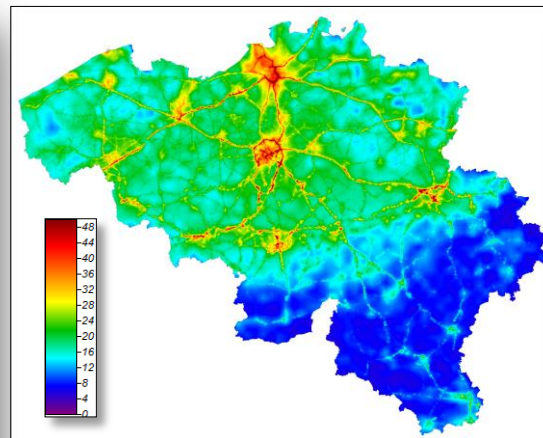
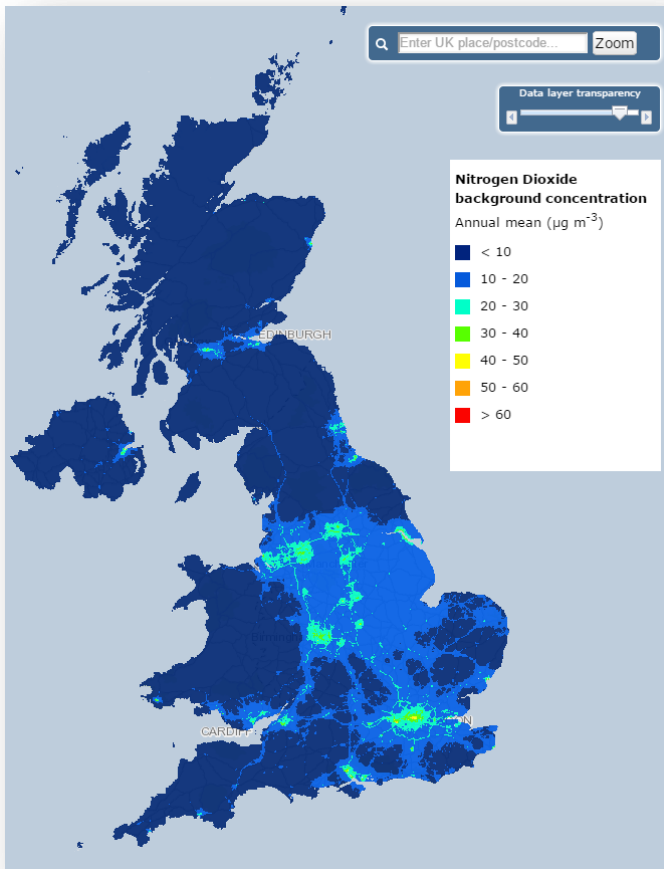
Figure 2. National map data at the German - Belgian (left) and Swedish - Finnish (right) borders illustrate the difference in grid resolution and orientation in the national maps.

Technical issues encountered in the ETC exercise...



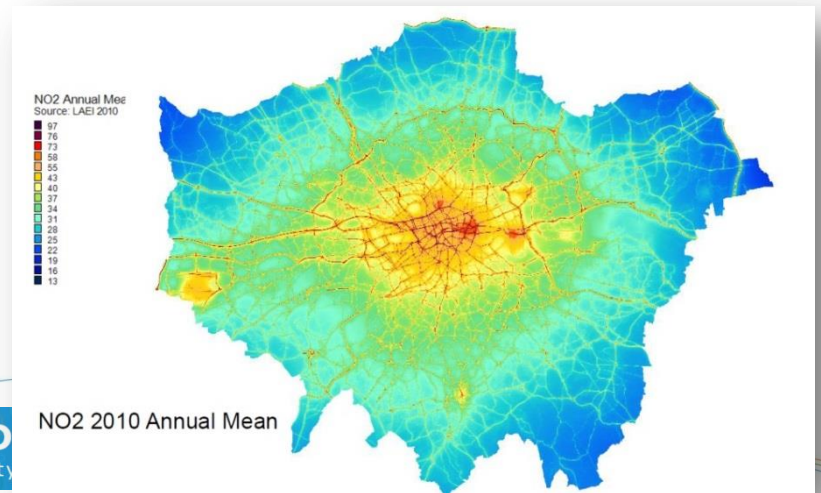
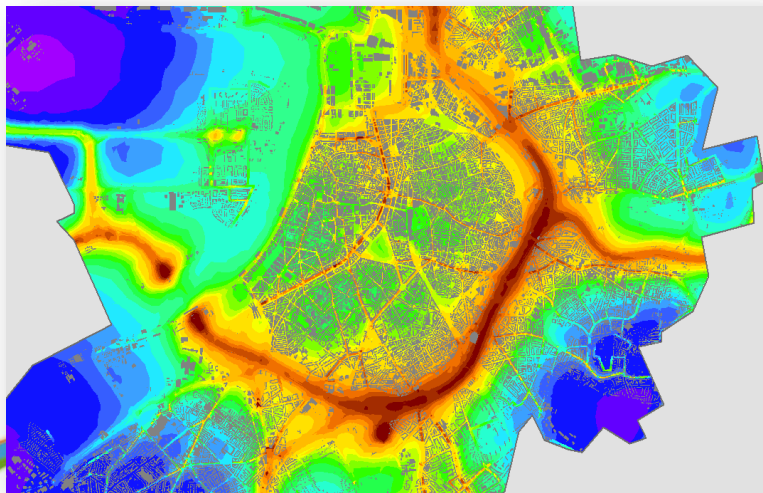
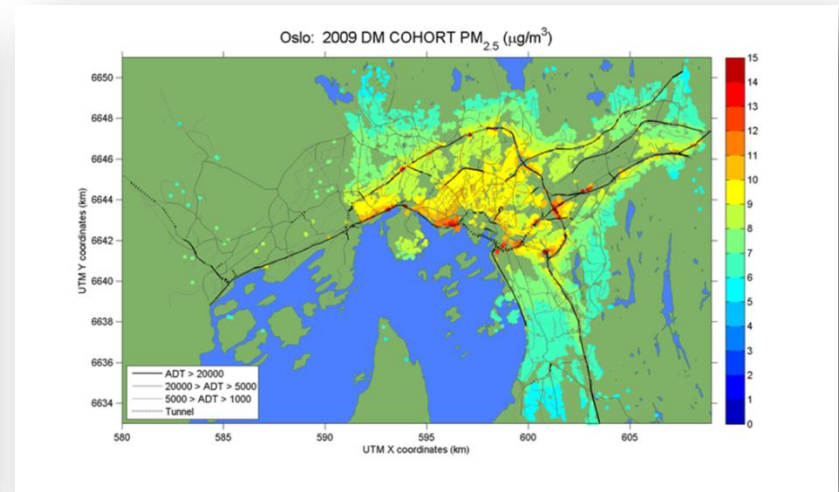
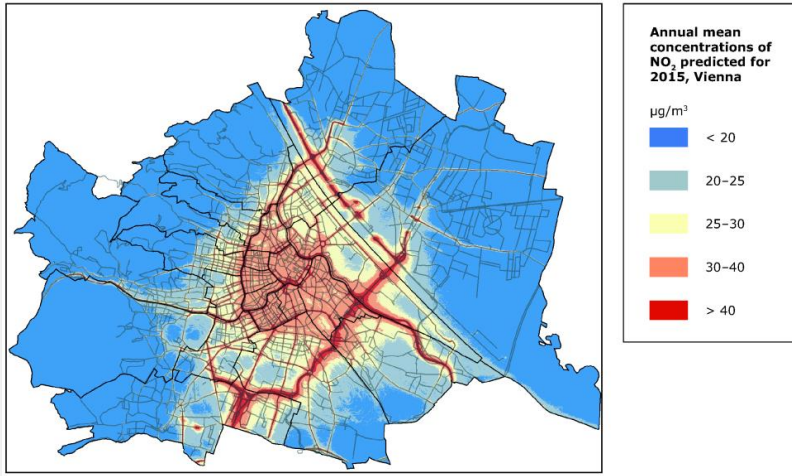
A stepwise approach...

- » Let's start with background concentrations at country/regional level



A stepwise approach...

» but we can even dream about including the urban scale



Why should we do this?

- » We have the data to produce such an EU wide composition map
- » The bottom-up approach is a guarantee for (national/regional) commitment to the final product
- » AirBase was/is a big success and is used for a multitude of applications all over Europe (and abroad)
 - » FAIRMODE could make a similar high quality bottom-up product
- » Your local modelling/mapping exercise will have an added value because it contributes to bigger EU-wide picture
- » It will encourage countries/regions which do not yet model to step into the process
 - » You (or your ministry) don't want to be the only black/white hole in the map

Why should we do this?

- » It can significantly contribute to the e-Reporting process
 - » Without any formal obligations or compliance checking if you are not ready for it (!)
 - » See discussion on e-Reporting on Friday morning
- » Over the last 5 - 6 years, we have been working hard on MQO and DELTA. This initiative can be a new momentum for WG1
 - » The discussions on the MQO were not particularly “sexy” but you were very enthusiastic anyway
 - » Contributing to a “best possible” EU AQ map is at least as appealing as validation statistics

What are the obstacles / open issues?

- » A patchwork of national/regional grids and projections or a common set of EU-grids (at various resolutions)?
 - » What about transformation errors?
 - » Who will do the work?
- » Boarder effects will become clearly visible
 - » Trigger for inter-regional discussions?
- » Multiple maps for one region (from different teams)
 - » Trigger for competition?
- » Regional versus urban scale
- » Data infrastructure required to store the data and support dissemination of the results
- » Can we (eventually) provide such a compilation map on a yearly basis like AirBase?

Questions, concerns, suggestions...?