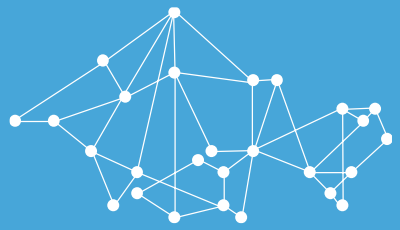
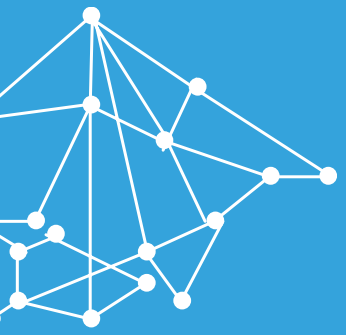
FAIRMODE
Forum for air quality modelling in Europe



WG1 ASSESSMENT: A SHORT INTRODUCTION

STIJN JANSSEN & JOOST WESSELING



Modelling Quality Objectives

MODELLING QUALITY INDICATOR & OBJECTIVE

When is a model "good enough"?

» **Modelling Quality Indicator (MQI)**: Statistical indicator calculated on the basis of measurements and modelling results.

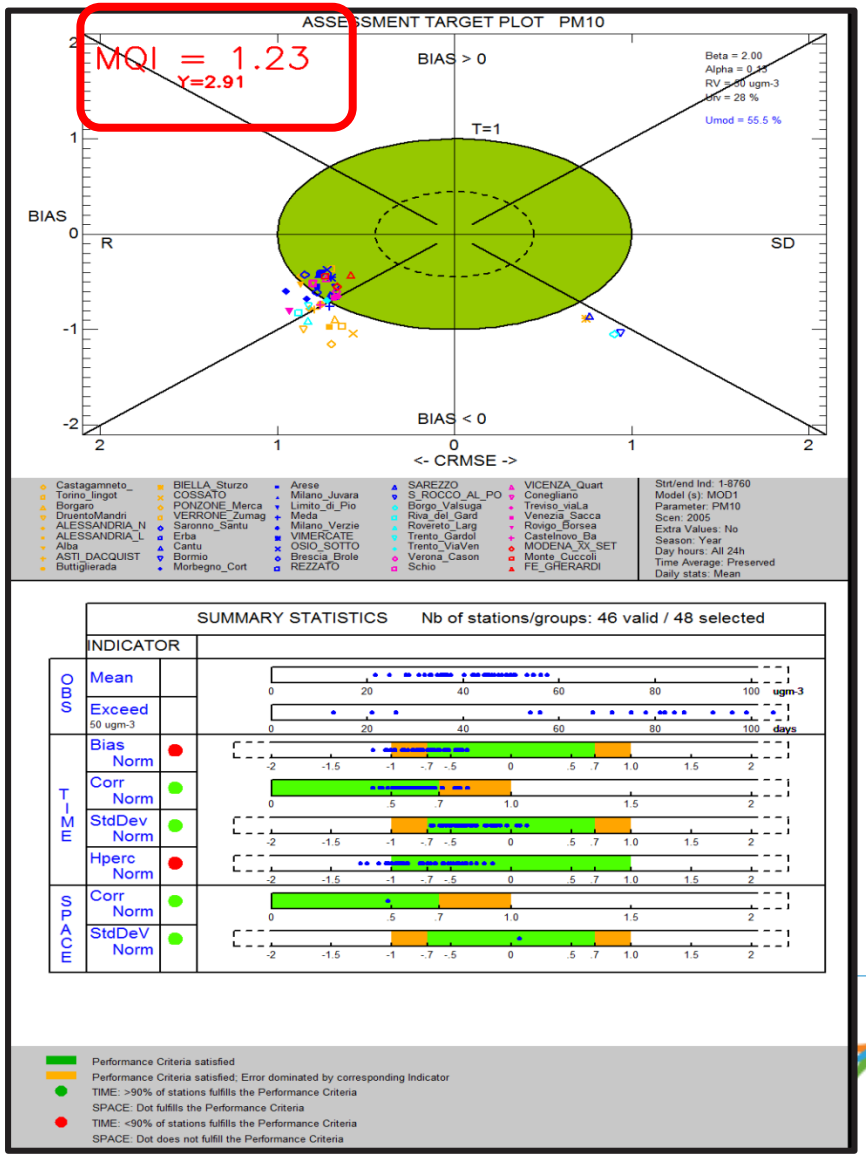
» **Modelling Quality Objective (MQO)**: Criteria for the value of the MQI. The MQO is said to be fulfilled if MQI is less than or equal to unity.

$$MQI = \frac{\text{RMSE}}{\beta\, RMS_U} \qquad \text{and} \qquad \text{MQO: MQI} \leq 1$$

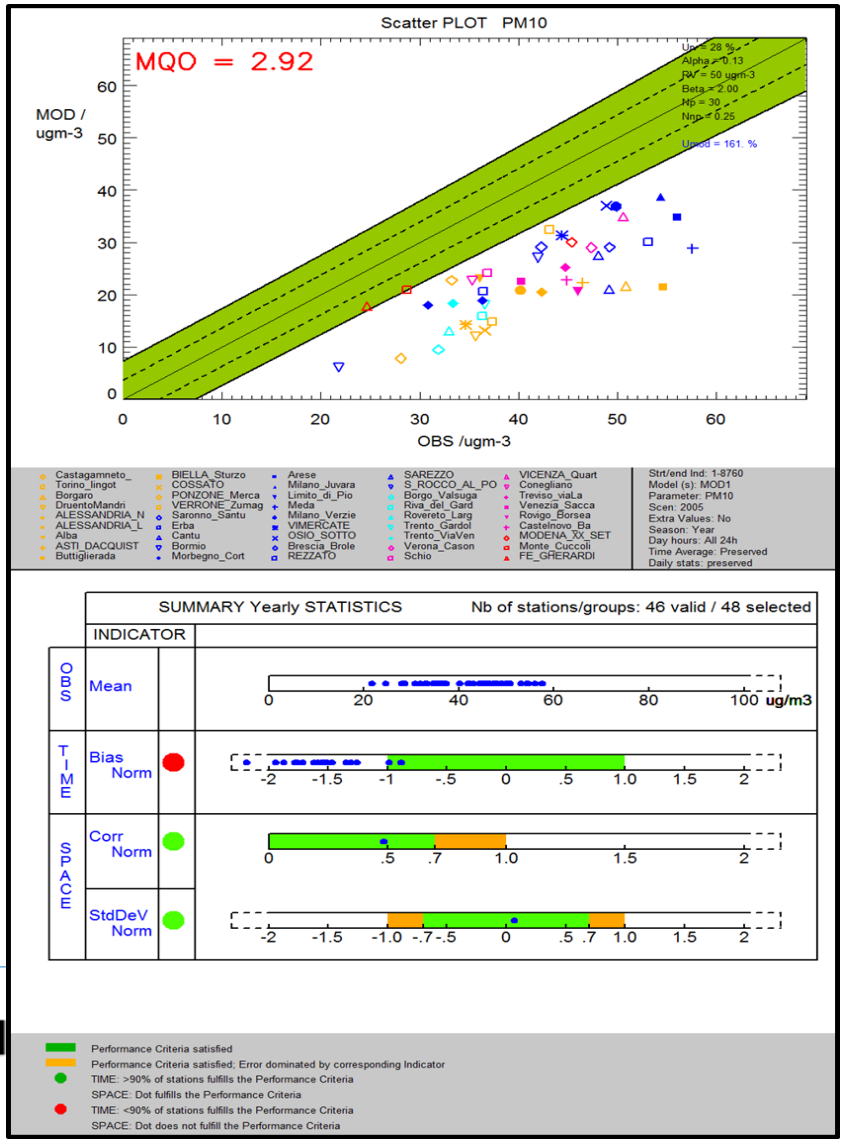
with RMS_U the measurement uncertainty

REPORTING TEMPLATE

Hourly/daily frequency

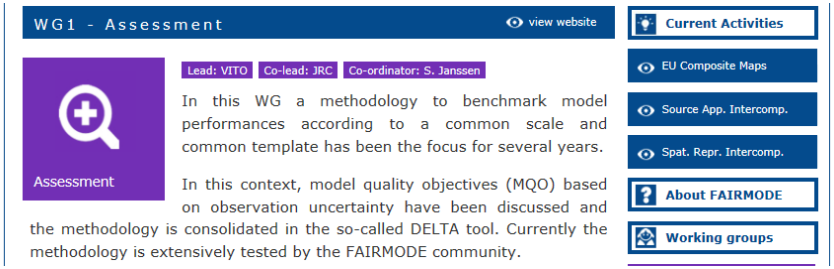


Yearly frequency



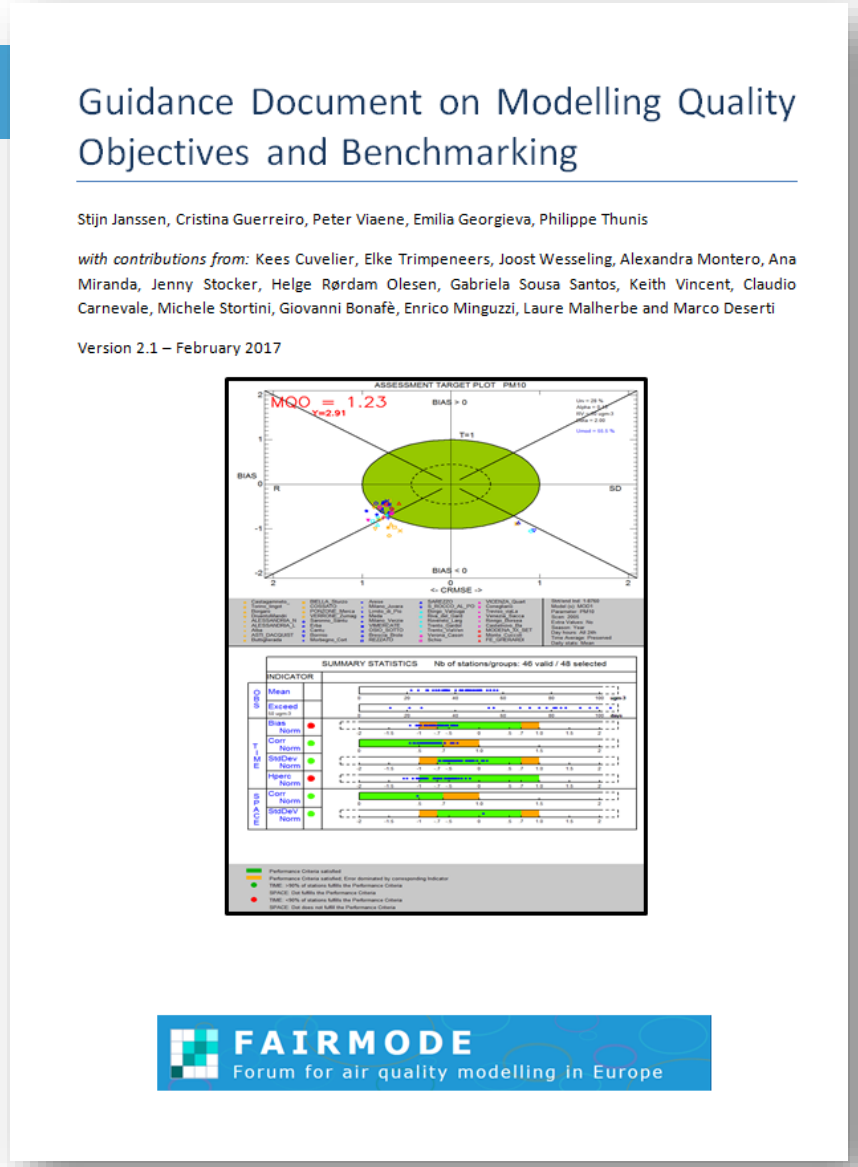
GUIDANCE DOCUMENT VS2.1

Available via the FAIRMODE website



Related Documents

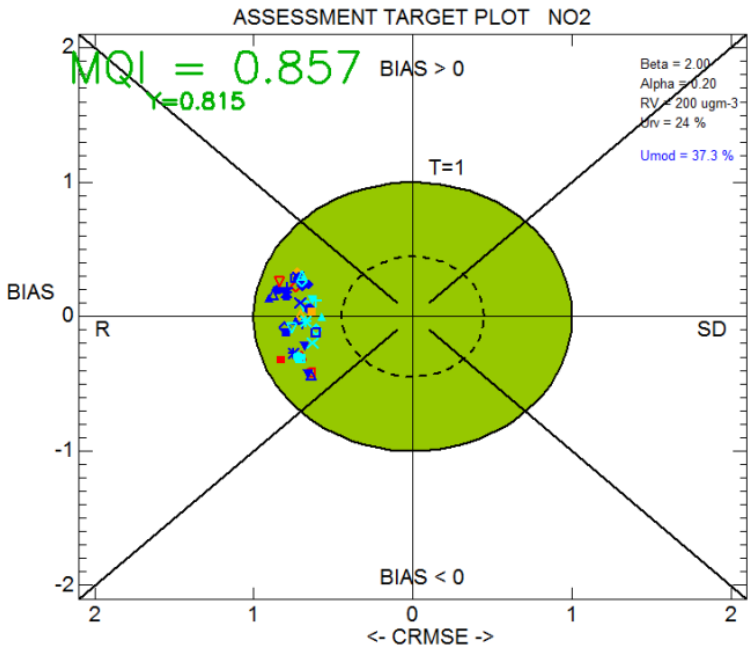
- Spatial representativeness of monitoring stations: Report on the outcome of the inter-comparison exercise (February 2018)
- Guidance document on MQO and Benchmarking V2.1 (February 2017)
- Updates on long and short term MQO and usage in the Delta tool (May 2016)
- MQO in the framework of the FAIRMODE project (Apr 2014)
- MQO Template performance report & DELTA updates (Mar 2012)
- Delta User's guide V5.4 (June 2016)

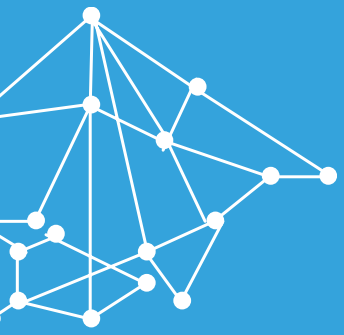


MODELLING QUALITY OBJECTIVE

- Open issues:
  - MPC for high percentiles / exceedances
  - Consistency between hourly/daily and annual MQI
  - Model evaluation with limited monitoring stations (small to medium cities)
  - Data assimilation (especially on-line DA)

→ CEN working group WG43

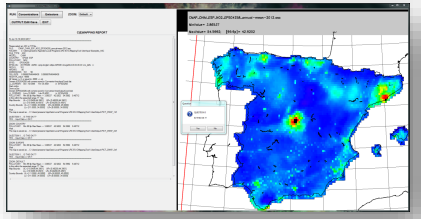




Composite Mapping

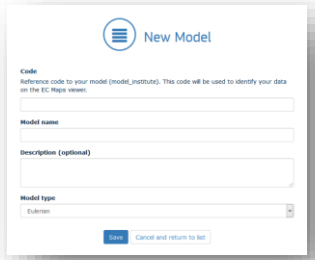
THE PROCESS

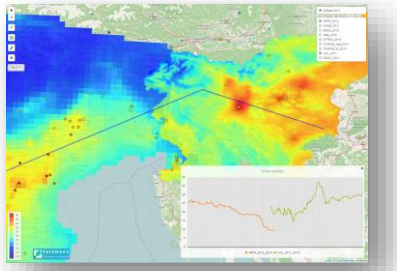
manual step which takes some time



QC check by participants

Data upload @ JRC data base

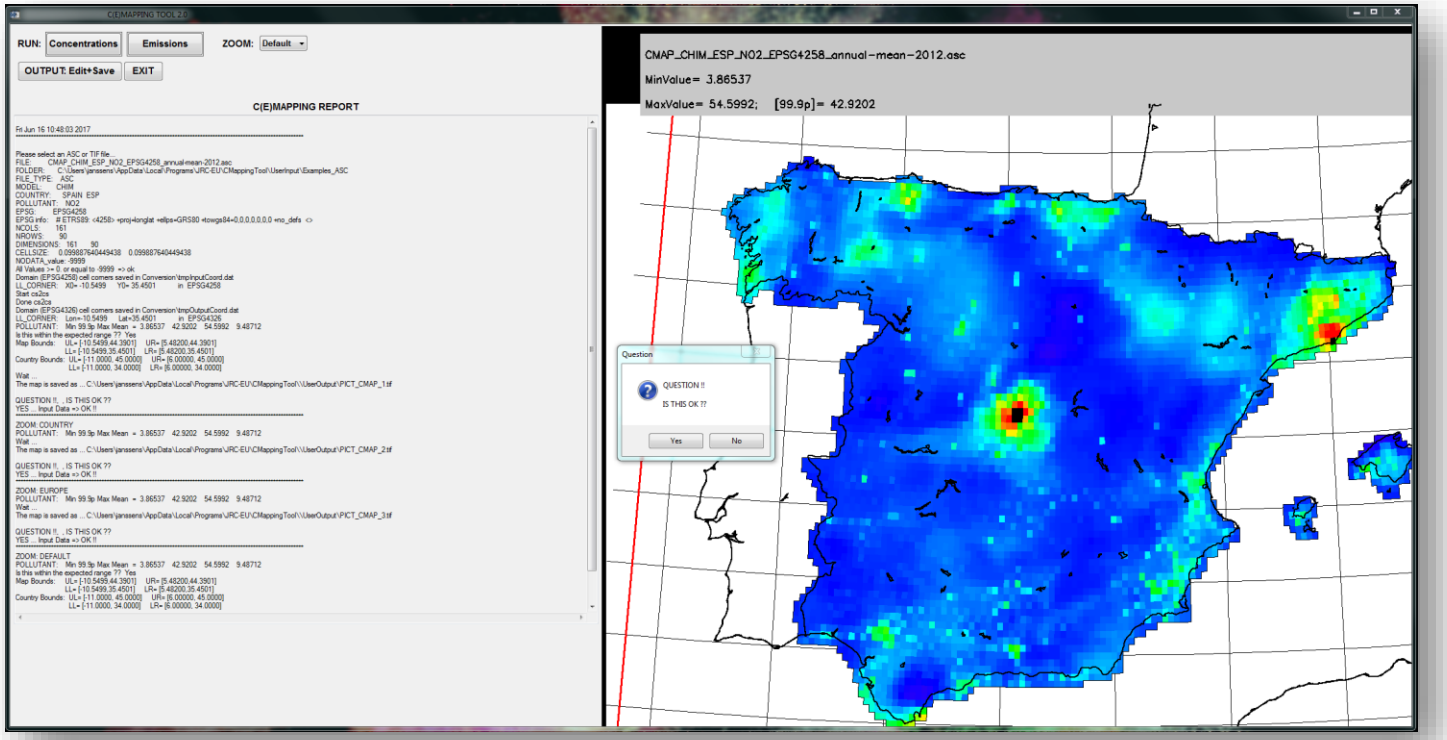




Visualization

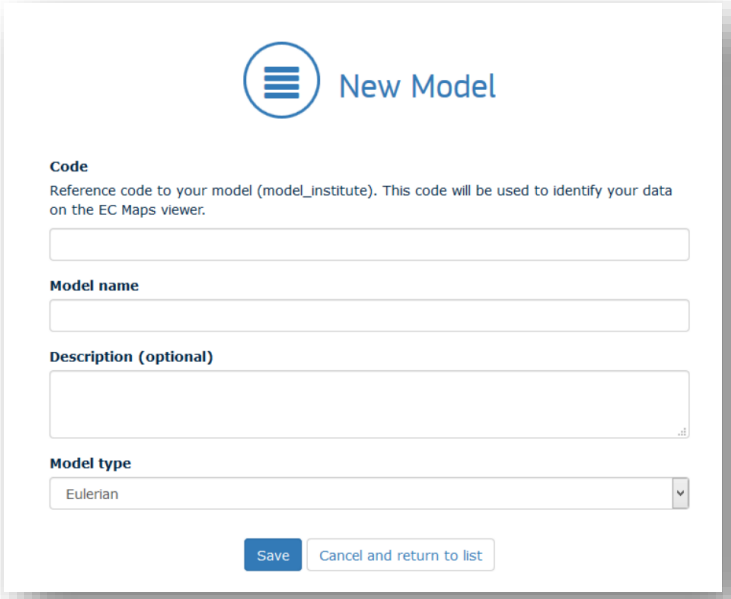
QUALITY CHECK TOOL

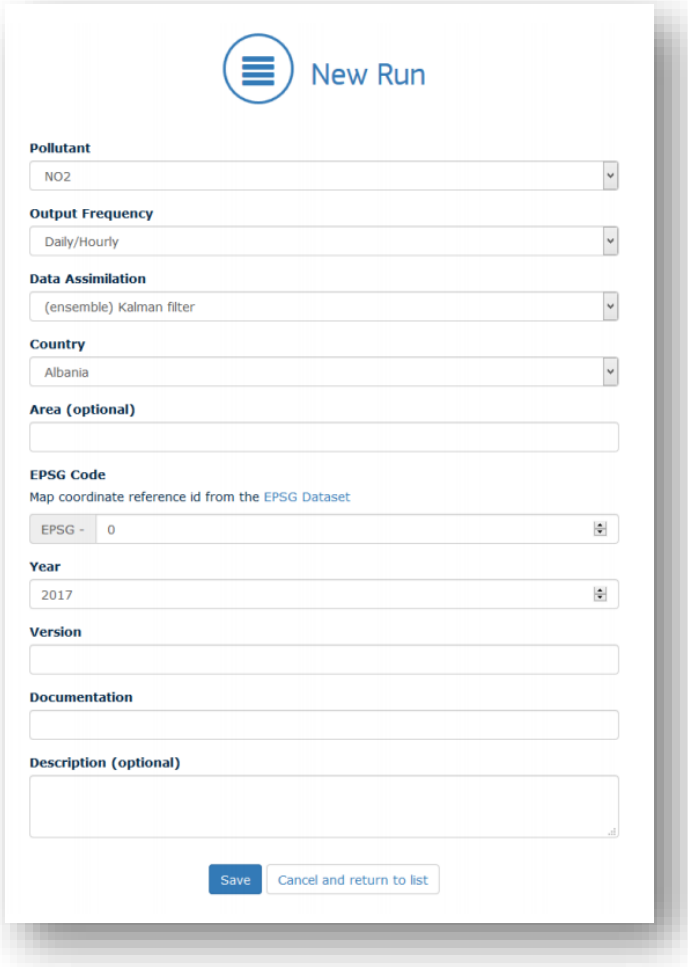
- QC tool developed by the JRC
- Has to be installed locally on your computer to perform QC tests



DATA BASE STRUCTURE @ JRC

- Upload web-form to collect meta information and data files
- 3-level structure: Model → Run → File(s)

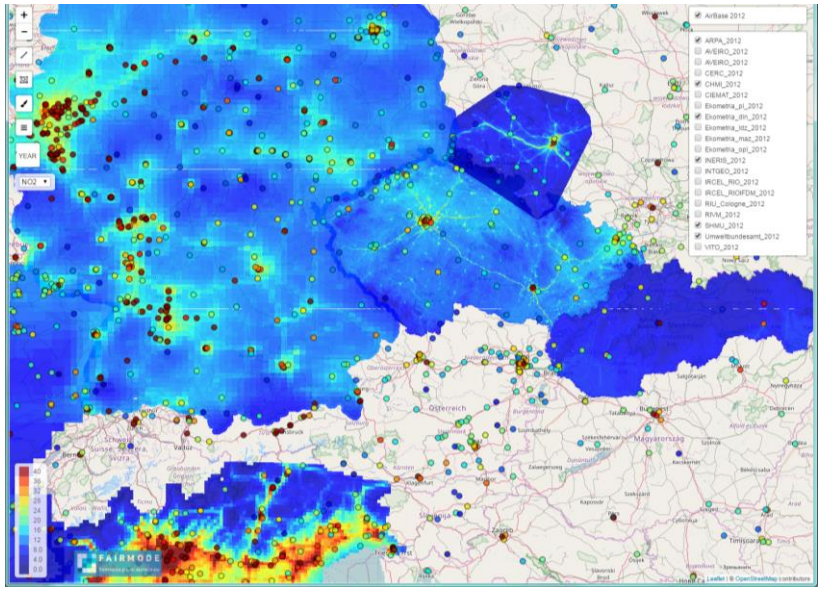


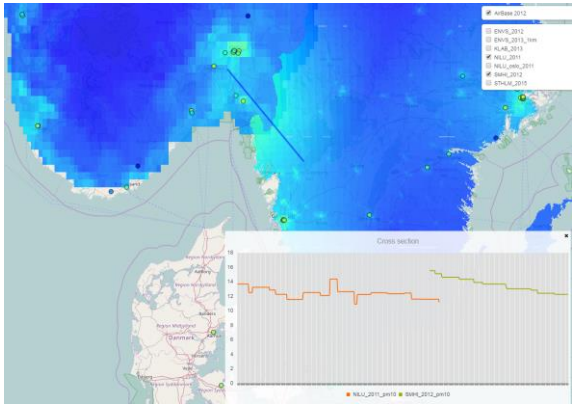


VISUALIZATION PLATFORM

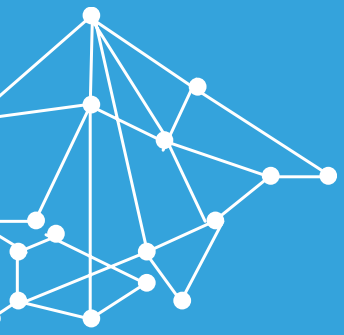
Composite mapping platform → analysis of concentration maps

- Visualization of your map
- Comparison with **measurement** data (2012 & 2015)
- Comparison with modelled maps from your **neighbors**
- Comparison with **other** modelled maps in your region
- Comparison with the **EEA-ETC** map





- **Overall objective: improve the quality of your assessment maps!**

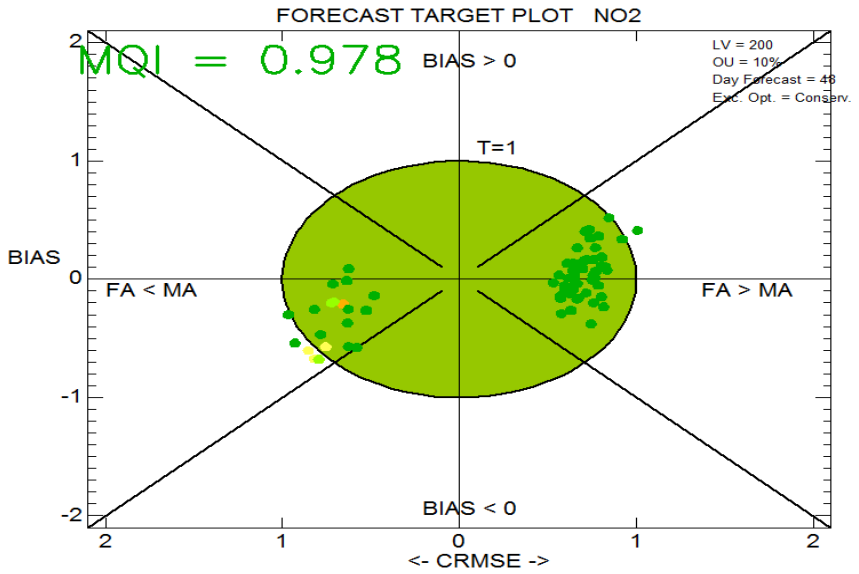


Other WG1 activities

FORECAST MODELLING QUALITY OBJECTIVE

Do we need a benchmarking procedure for forecast models?

- DELTA-*in-forecast* mode
  - Additional info for forecast models
  - Is not replacing standard benchmarking process
- Comparison with the persistence model:
  - A forecast model should do better than using the monitoring data of yesterday to predict tomorrow's AQ levels



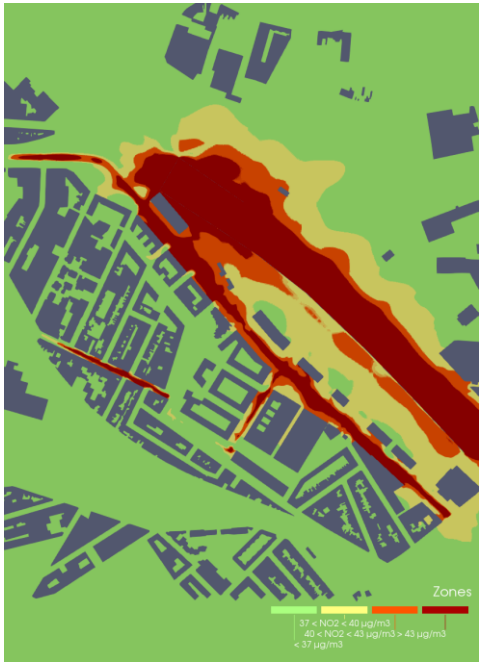
$$\text{Target}_{\text{forecast}} = \frac{\sqrt{\frac{1}{N}\sum_{i=1}^{N}\left(M_i^* - O_i\right)^2}}{\sqrt{\frac{1}{N}\sum_{i=1}^{N}\left(O_{i-j} - O_i\right)^2}}$$

CFD AND THE AQ DIRECTIVE

Hot spots more and more occur at local level → need for obstacle resolving policy tools

CFD could become a new activity in FAIRMODE to:

- Collect feedback on application of CFD in ADQ context
- Compare modelling methodologies
- Compare modelled effects of canyons, vegetation, screens…
- Exchange experience on strategies for dealing with complex geometries (e.g. road tunnels)



SENSORS AND ASSESSMENT MODELLING

- Low cost AQ sensors appear everywhere
- How to deal with this new data in AQ assessment?
- How to integrate this new information in AQ models?