



Update on FAIRMODE

Benchmarking platform for air quality projections

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FAIRMODE (Harmonisation and QA/QC)



QA/QC Protocol for assessment (CT2)



Src.
apportionment
(CT1)



Microscale
modelling (CT4)



Low-cost sensors
(CT6)



Best practices for AQ management (CT5)



Emissions (CT7)



Robustness of AQ
projections (CT9)

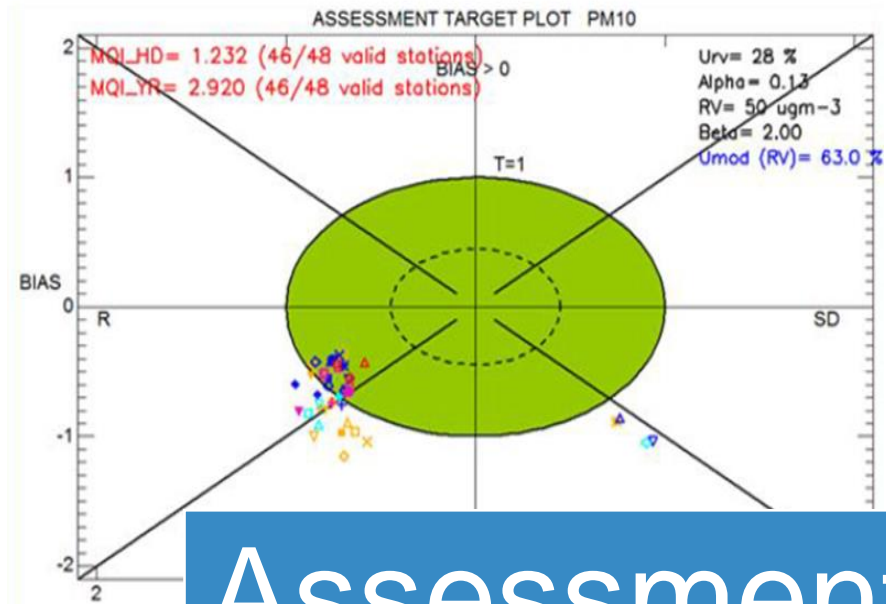


Forecast indicators
(CT3)



Exposure & exceedance indicators (CT8)

There is need for assessing planning applications

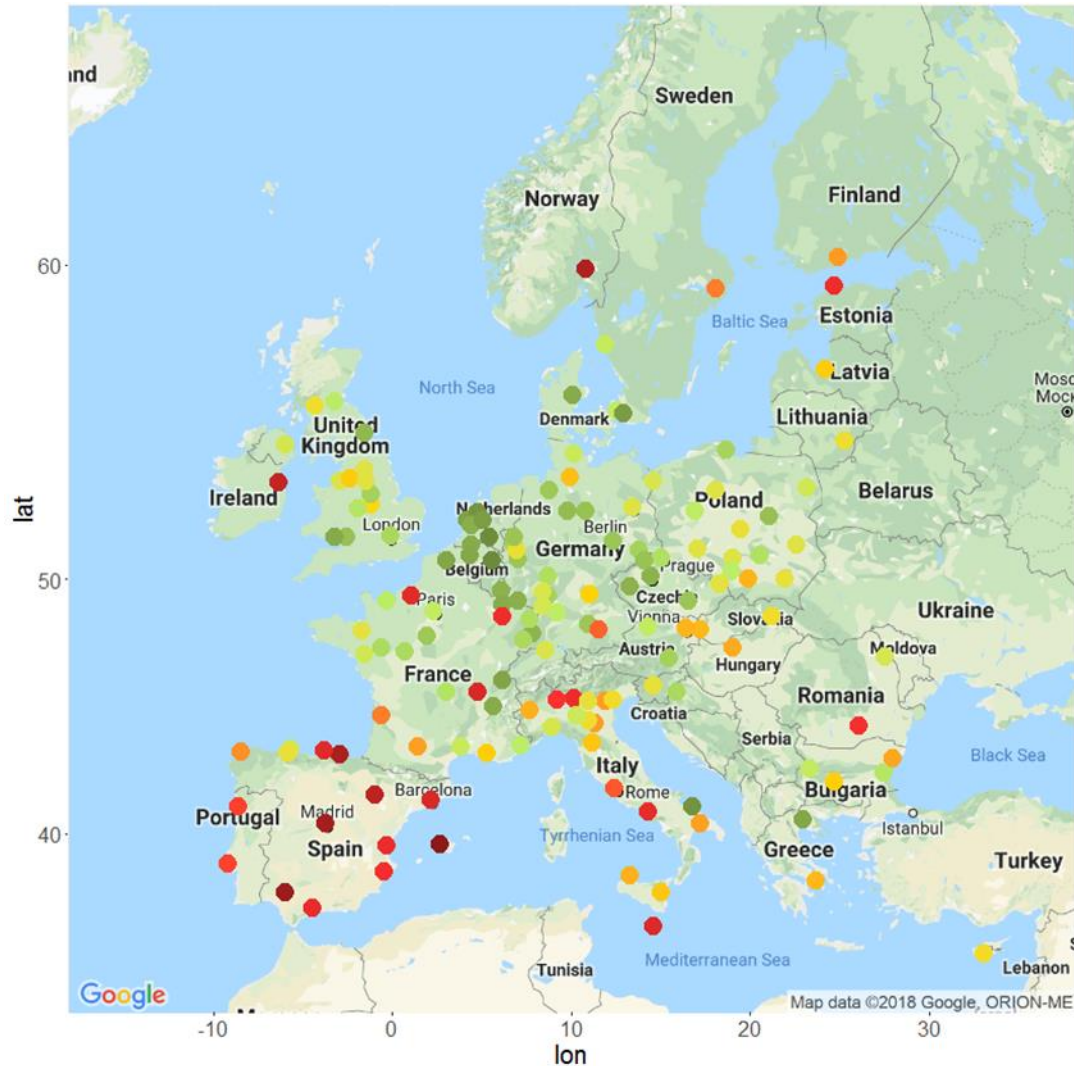


Assessment

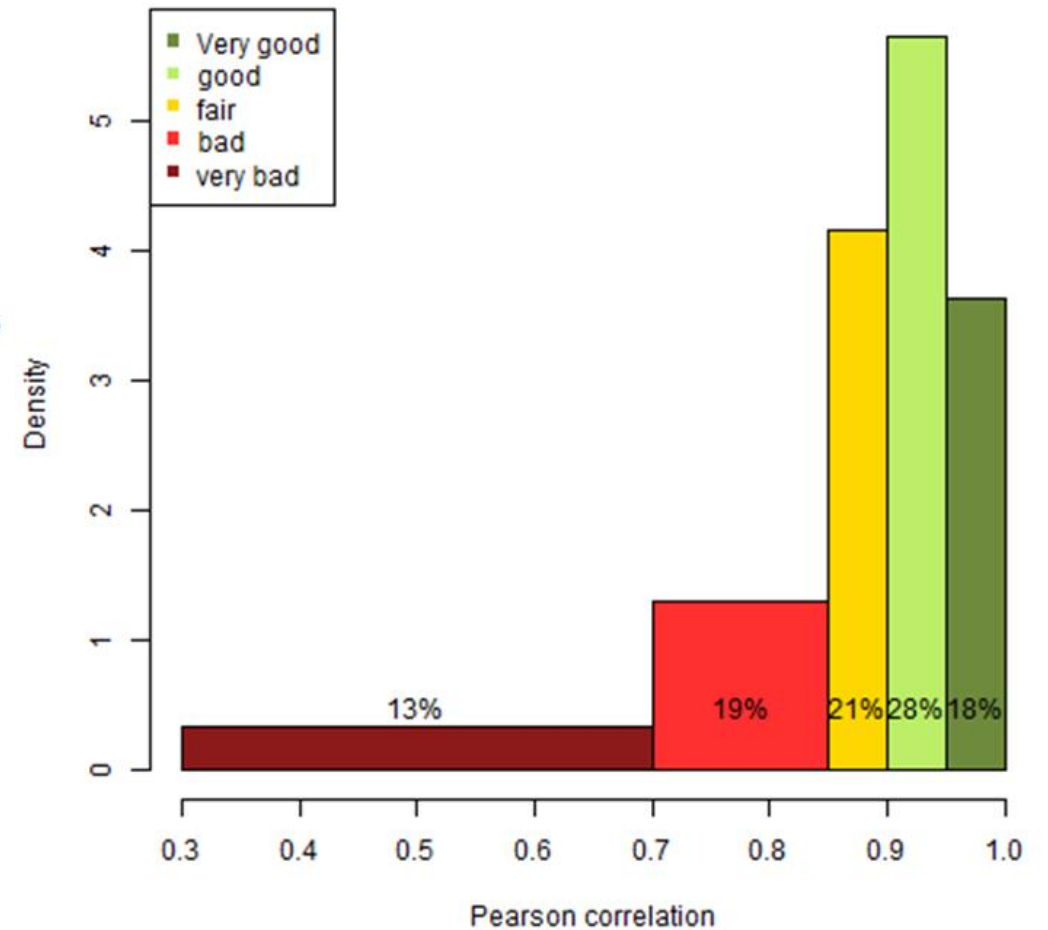


Planning

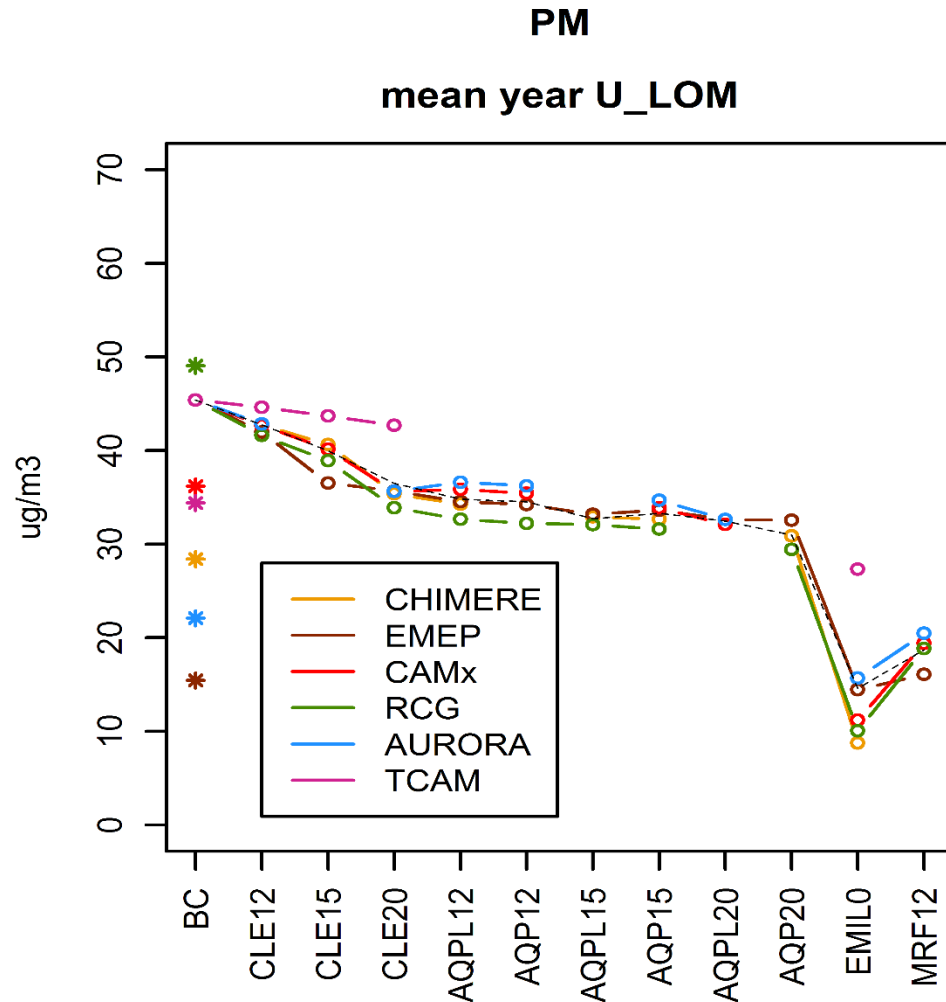
Comparison S-CHIMERE / S-EMEP



Pearson correlatoin between relative potentials for 150 cities



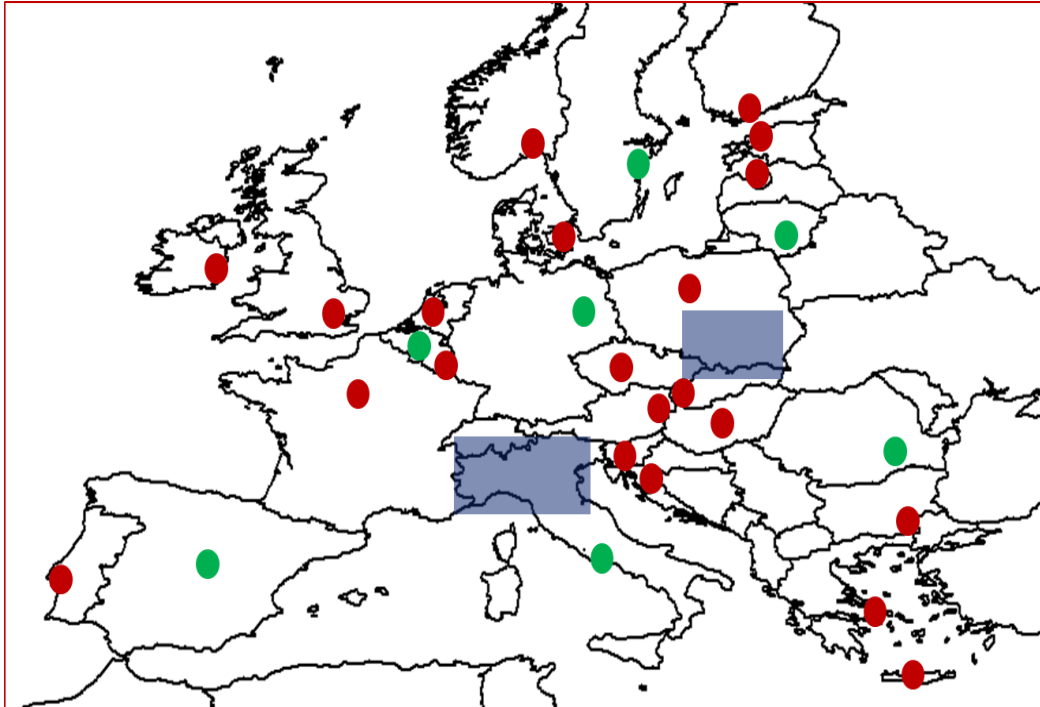
Inter-comparisons help understanding



POMI exercise (2012)

- Several models applied to Po valley Lombardy region.
- After several adjustments and several scenarios simulated → normalized responses to emission changes are similar!

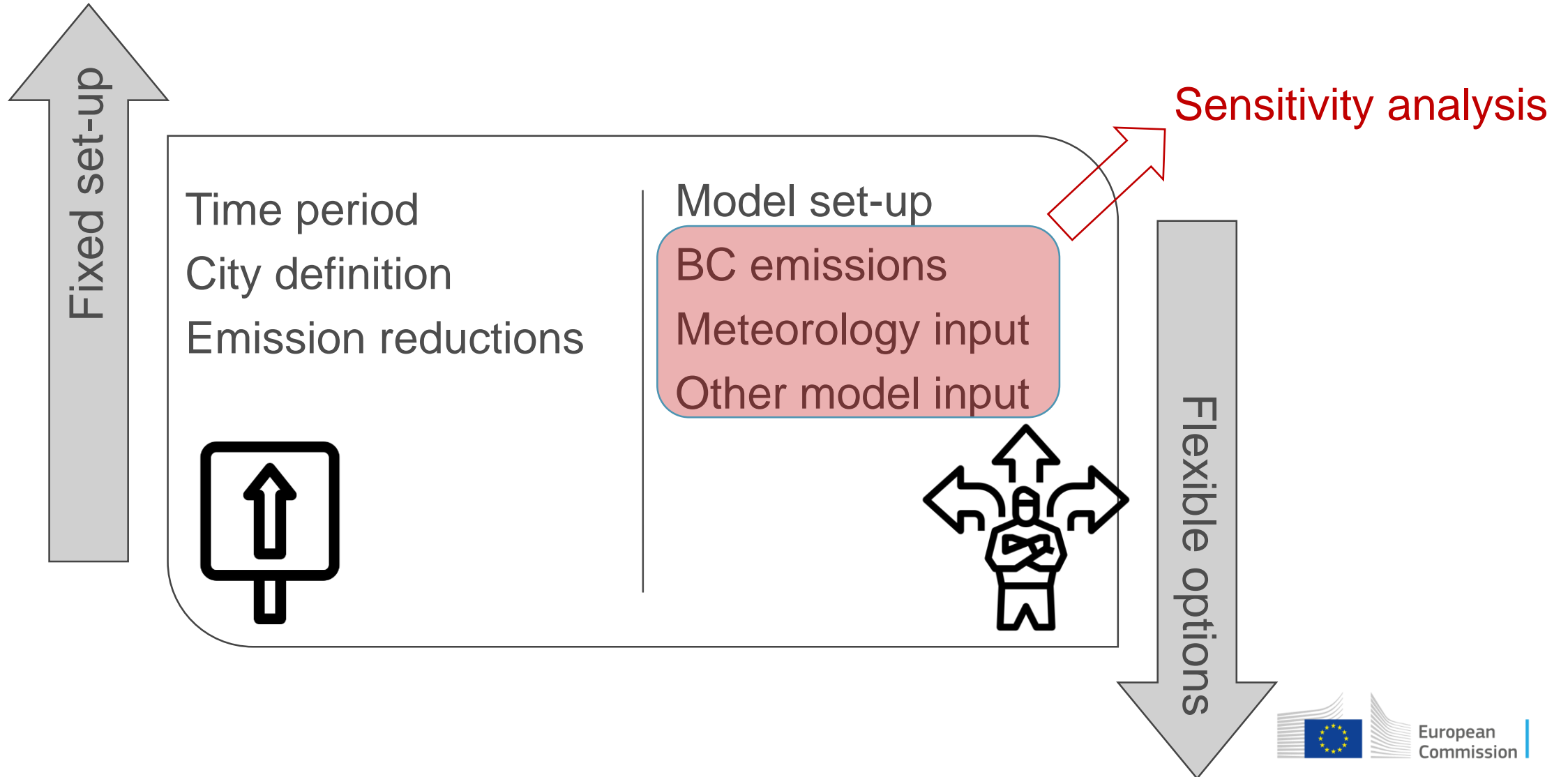
FAIRMODE CT9 (Robustness of AQ projections)



Platform intended to benchmark and understand differences among modelling system responses to urban emission changes.

- Main pollutants: PM, NO₂ and O₃
- Addressing both episodes and yearly averages.
- Theoretical emission reduction scenarios
- Intended both to local and European scale modelling systems.
- A “permanent” platform rather than an exercise

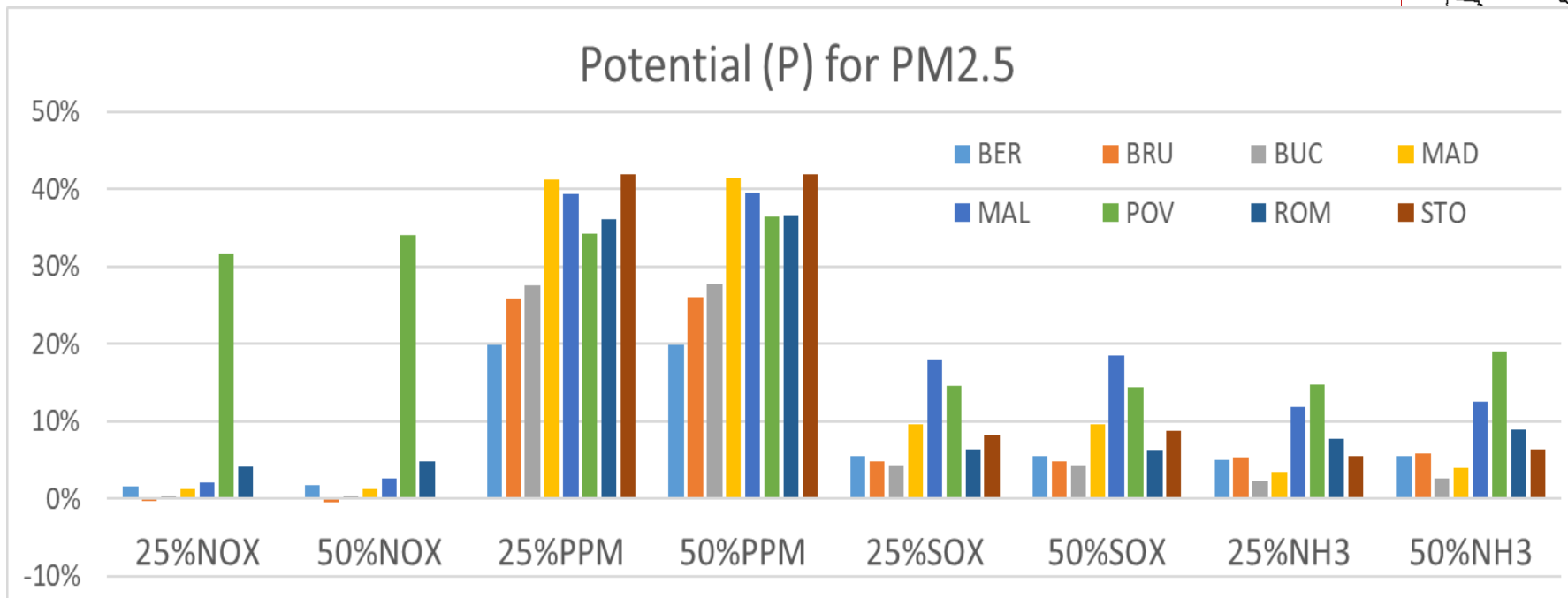
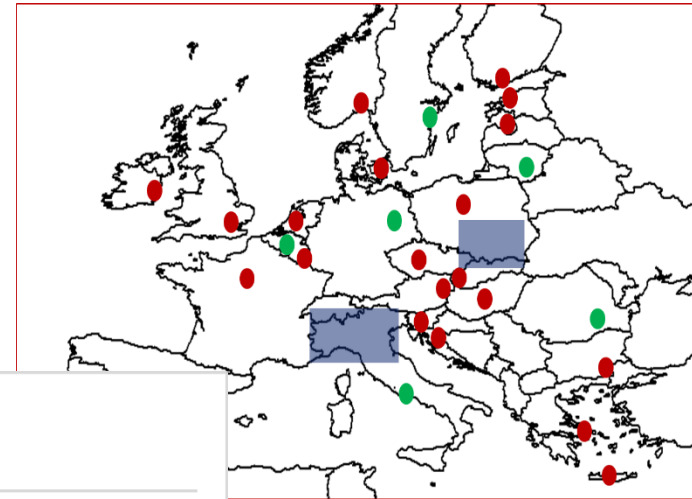
Fixed vs flexible set-up & sensitivity analysis



Results example and comparison indicators

$$P_{city}^{centerpoint}(\alpha) = \frac{\Delta C_{city}^{centerpoint}(\alpha)}{\alpha}$$

City = FUA



CT9 platform: visualisation tool

WHAT.TO.DO DOMAIN MODELS SPECIES SCEN1 --SCEN2 PREFS MapWINnr INFO EXPORT USER MANUAL

TASK= 2D Maps & Time Series
 MODEL= EMEP
 EPISODE= EPIS02 (Y)
 DOMAIN= ITALY # POV
 SPECIES= PM10 [ug/m3] DL
 SCEN= 50%NOXPPM-BC
 ACTIVE DAYS= 365
 COMMENT: -

PLOT UNITS: Values Perc%

Month Start: 1 Month End: 12
 Day Start: 1 Day End: 31
 Hour Start: 0 Hour End: 23

Year Summer(JJA) Winter(DJF)
 Day(24H) Day(12H) Night(12H)

Color Scale: Model AllModels User

LonLat=[8.225,46.540] Cell=[23,36]
 Model: Min: Max: Value:
 EMEP: -12.136 -0.0779 -0.3017

TSCoordLL=-
 TScale: Model AllModels

Scatter V0#V1:

GO EXIT

ABSOLUTE POTENTIAL [ug/m³]

EMEP POV EPIS02 PM10 BC DL
Factor = 0.2427

- Min Max Mean: 25% Red
- Min Max Mean: 50% Red
- Min Max Mean 95p: 25% Red
- Min Max Mean 95p: 50% Red

ALL

EPIS02

EPIS02_95p

NOXVOC

EPIS02

EPIS02_95p

SOXVOC

EPIS02

EPIS02_95p

NOXPPM

EPIS02

EPIS02_95p

NH3

EPIS02

EPIS02_95p

INT

EPIS02

EPIS02_95p

0. x Factor -0.25 -0.50

2D Maps Time Series

Scatter Scen1 <-> Scen2

Dynamic Evaluation ▸

Conversion to Comp Maps

ModelCompliance Test

Abs Potency

Abs Potential

Rel Potential

BaseCase

NOXVOC_Reductions ▸

NOXPPM_Reductions → 25%

SOXVOC_Reductions ▸ 50%

NH3_Reductions ▸

PM10 ug/m³ DL

PM25 ug/m³ DL

O3 ppb DL

NO2 ug/m³ DL

NO ug/m³ DL

NH3 ug/m³ DL

Plot Countries

Plot EU Regions

Plot Emis Region

Plot All Cities

Plot only DBM Cities

Plot Grid

Toggle LegMap

Toggle LegTS

Toggle LegPOT

Toggle LegSCAT

EMEP

MOD1

MOD2

MEAN

MEDIAN

Toggle ALL/NONE

None

BaseCase

NOXVOC_Reductions ▸

NOXPPM_Reductions → 25%

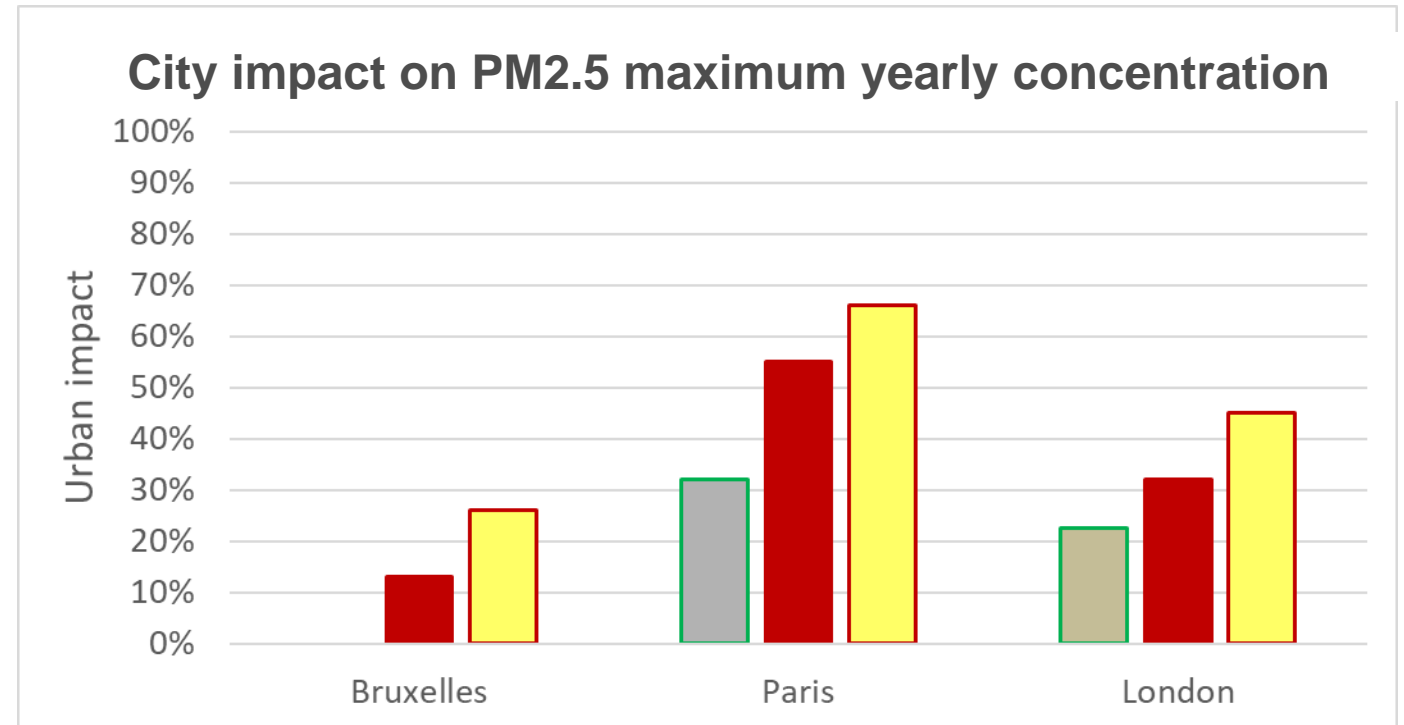
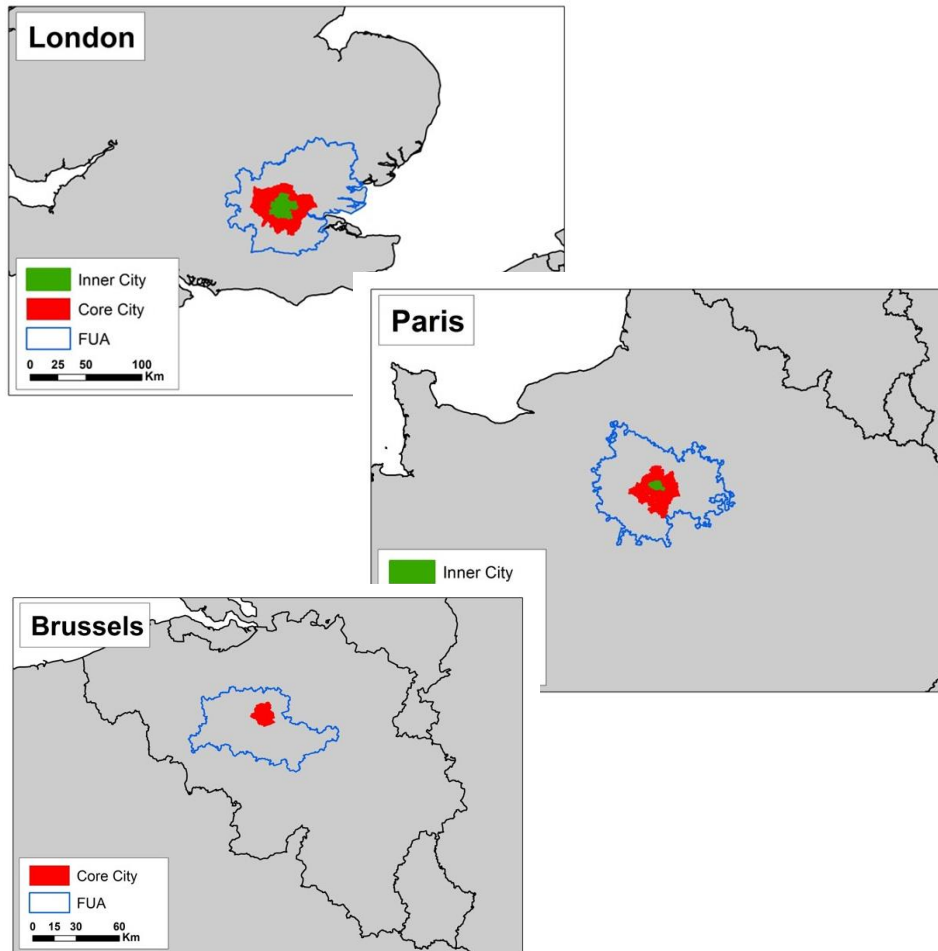
SOXVOC_Reductions ▸ 50%

NH3_Reductions ▸

Considerations on the setup of an EPCAC exercise to assess the city role in AQ

Definitions and methodological issues

What do we intend by city?



Administrative unit



City Core

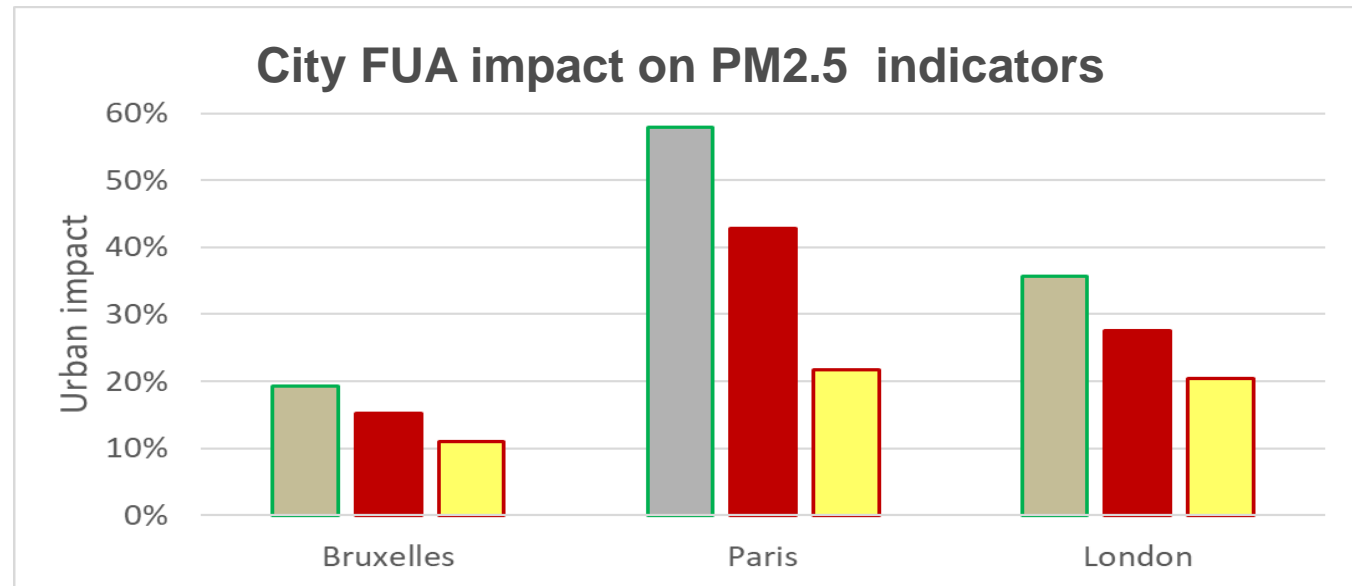


Functional Urban area



Importance of the selected indicator

- $Conc_{max} \rightarrow \overline{Exposure} \rightarrow \overline{Conc}$



Max concentration



Average exposure



Average concentration



- Episodes vs. long term averages

Methodological options to assess the background?

The urban background can be defined in many ways:

- A. Urban concentration reached when city emissions = 0
- B. Urban concentration extrapolated from a limited city emission reduction (e.g. SHERPA at 50%, CAMS at 20%)
- C. Mass of the precursor related compounds (tagging/labeling techniques)
- D. Measured rural background (e.g. GAINS, TSAP)
- E. (A or B or C or D) + Implicit/explicit assumptions (Point sources, Secondary...)

In general: $A \neq B \neq C \neq D \neq E$

Conclusions

- The indicators choices (impact on the exercise setup) and methodological assumptions will likely drive the findings and policy messages of the exercise
- Synergies / collaborations with the CT9 FAIRMODE exercise ?

Thank-you