Modelling city specific situations

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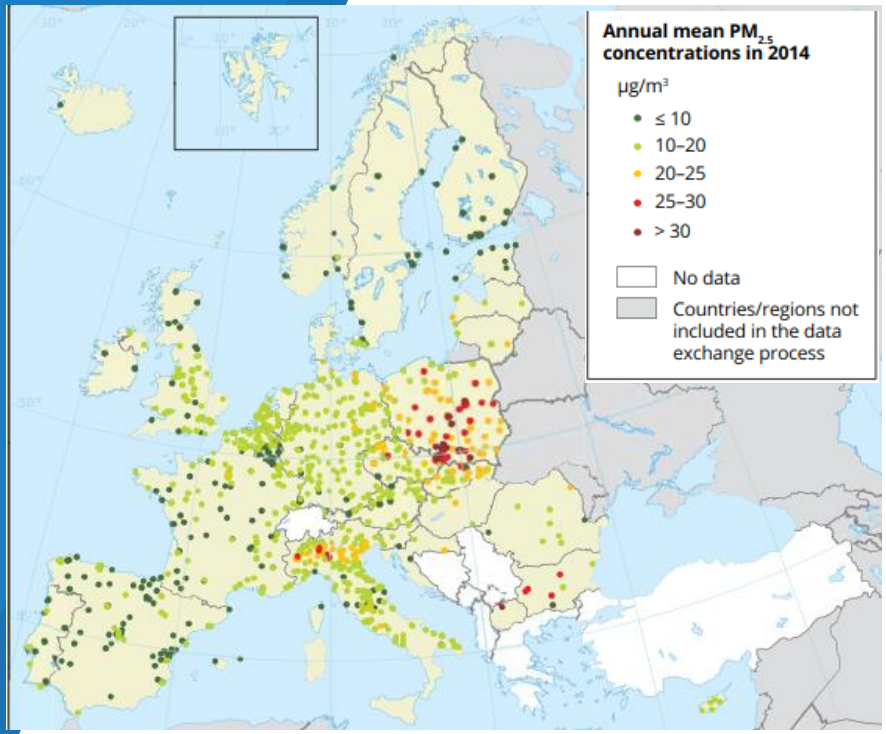
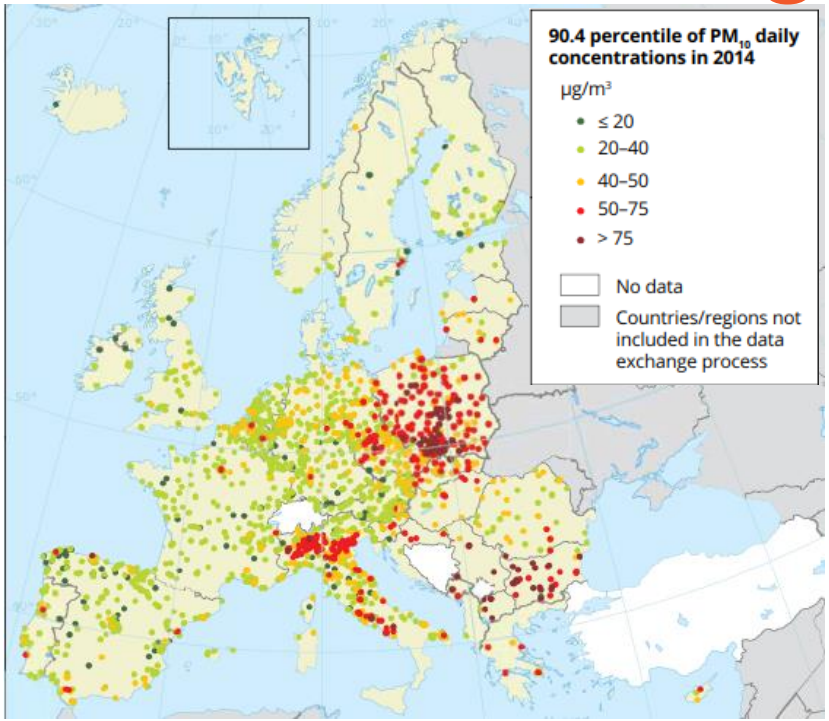
The challenge





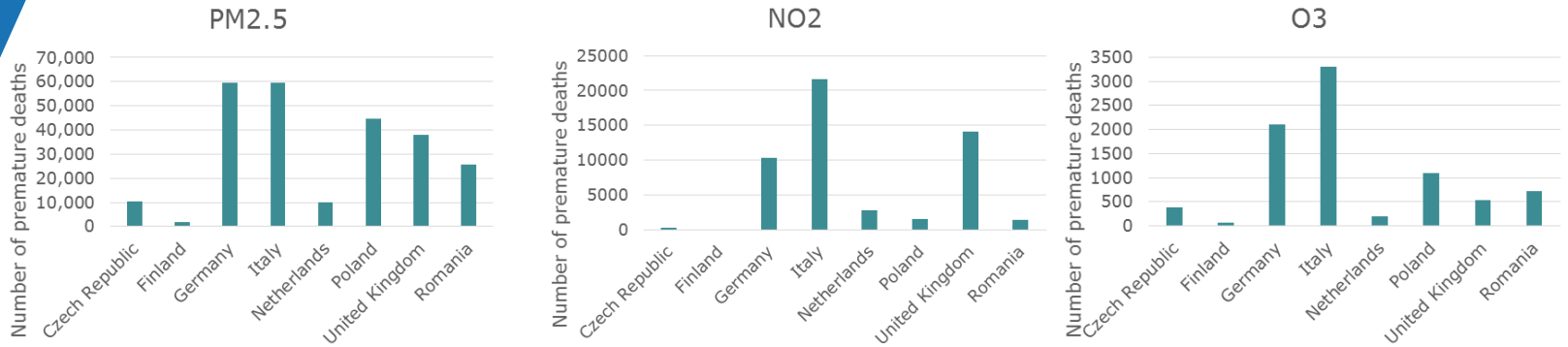
Source: EEA

The 90.4 percentile of the PM_{10} daily concentrations, representing the 36th highest value. It is related to PM_{10} daily limit, allowing 35 exceedances of 50 µg/m^3 threshold.

An health perspective

Premature deaths attributable to fine particulate matter ($PM_{2.5}$), ozone (O_3) and nitrogen dioxide (NO_2) exposure in 2012 in 40 European countries and the EU 28

	$PM_{2.5}$	O_3	NO_2
Europe	**432 000**	**17 000**	**75 000**
EU-28	**403 000**	**16 000**	**72 000**



Source: http://www.eea.europa.eu/publications/air-quality-in-europe-2015

Outline of the work

- Bottom-up approach
  Questionnaire and “Catalogue of measures”

- Top-down approach
  SHERPA model
  (http://aqm.jrc.ec.europa.eu/sherpa.aspx)

How the cities defined key measures

- On the basis of emission inventories (national, regional, local)
- On the basis of modelling: all cities used different models, from national, regional and city level to local street canyon models
- Through projections of future emissions without measures (BAU) and with the planned measures taking place
- Linking with other plans, such as SUMP (Sustainable Urban Mobility Plan) and SEAP (Sustainable Energy Action Plan)

Barriers and positive issues

Barriers

- Governance: air quality planning is not always the responsibility of the city (but cities in charge of SUMP, SEAP, …)
- Uncertainty of emission factors for traffic emissions (esp. diesel) and residential biomass burning
- Legislation does not everywhere allow for a city to collect congestion charges, and use the revenue to finance local investments

Positive issue:

- Cooperation between national, regional and local government
- Synergies between AQ effects and climate as well as noise
- Use of modelling to test effect of measures

Outline of the work

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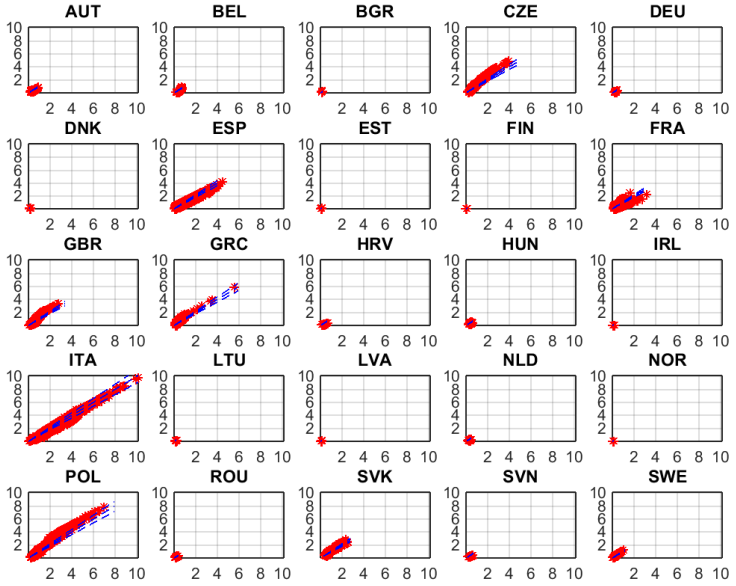
SHERPA assumptions

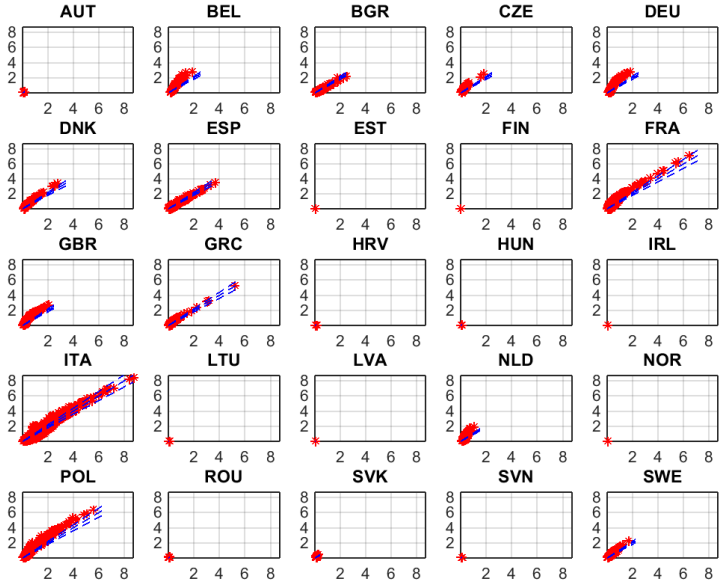
Main assumptions/limitations of SHERPA:

- It simulates urban background…you cannot use it for pollution in street canyons
- It uses 2009 meteorology, and top-down emission inventory
- It is based on a unique full air quality model CHIMERE
- It uses a spatial resolution of 7x7 km2 over the whole Europe

- SHERPA geographical domain:
  - Currently, for computational limitation, does not cover all Northern EU
  - A full domain coverage will be available Mid 2017

SHERPA validation





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A new approach to design source–receptor relationships for air quality modelling

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Research article

On the design and assessment of regional air quality plans: The SHERPA approach

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Adding spatial flexibility to source-receptor relationships for air quality modeling

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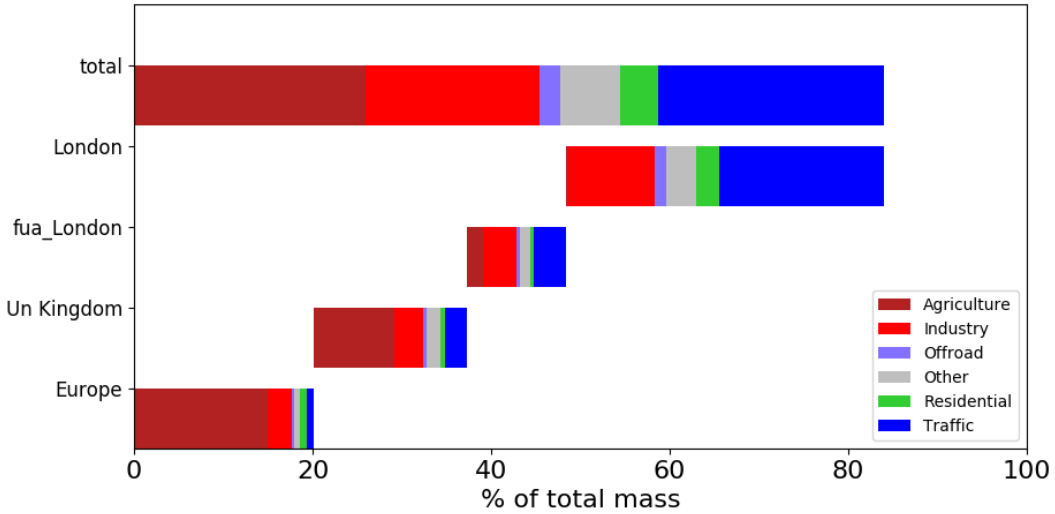
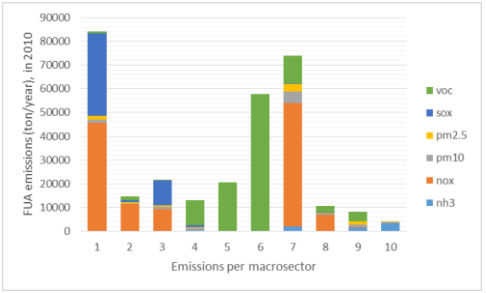
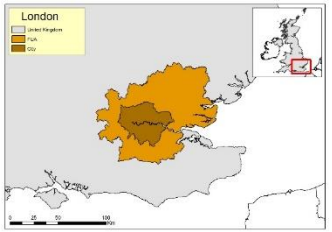
London case

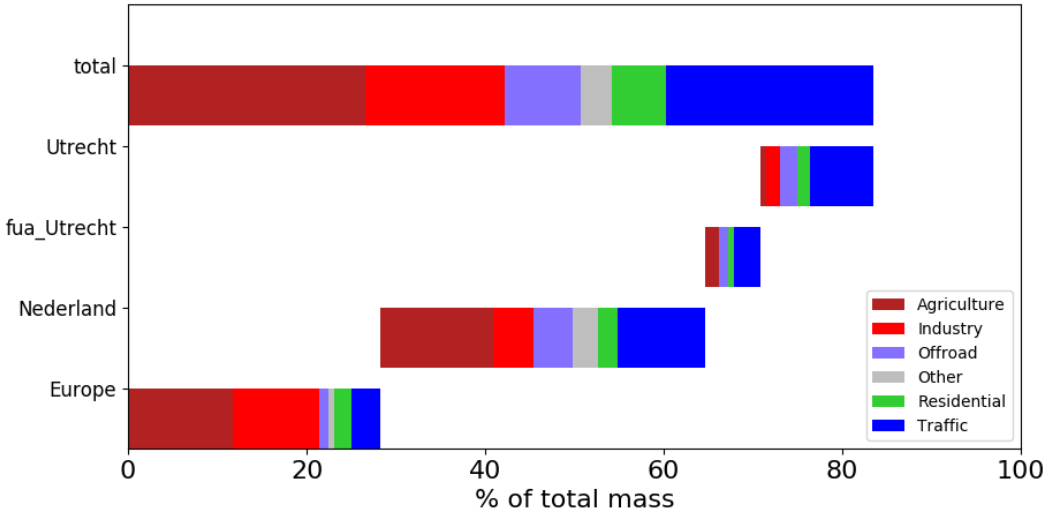


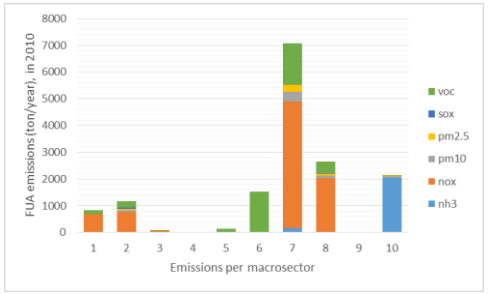


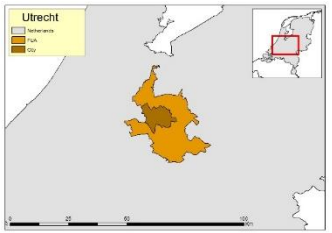
Agriculture:	ms 10
Industry:	ms 3-4
Other:	ms 5-6-9
PublicPower:	ms 1
Residential:	ms 2
Traffic:	ms 7-8



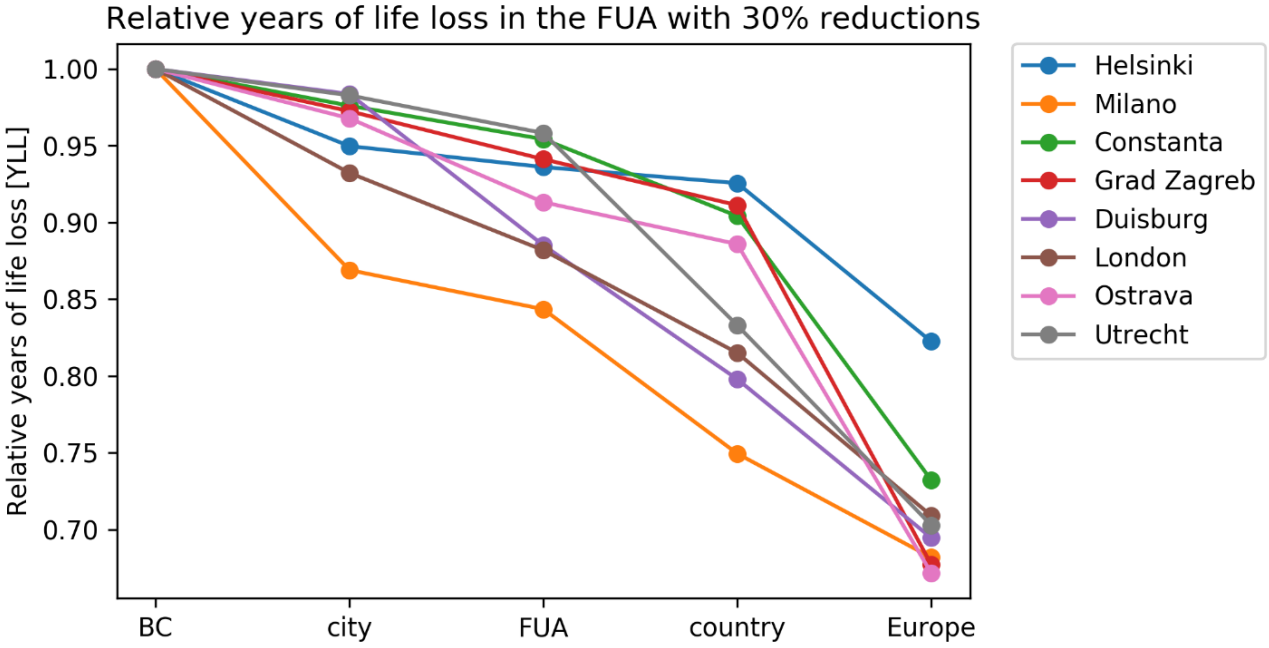
Utrecht case







An health perspective



Conclusions

- WP1 contributed to better understanding of the current air quality situation (PM and NO2), from geographical and sectoral point of view
- Focus on PM2.5: health impact is still an issue
- For the analysis, there is room for improvement, i.e. with more accurate input data
- One option to be explored: integrating the two information (TP-BU), so that the top-down approach can be applied to more cities in a robust way

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Questions ?