LIFE ACEPT-AIR
Development of A Cost Efficient Policy Tool for reduction of Particulate Matter in AIR

LIFE09 ENV/GR/000289

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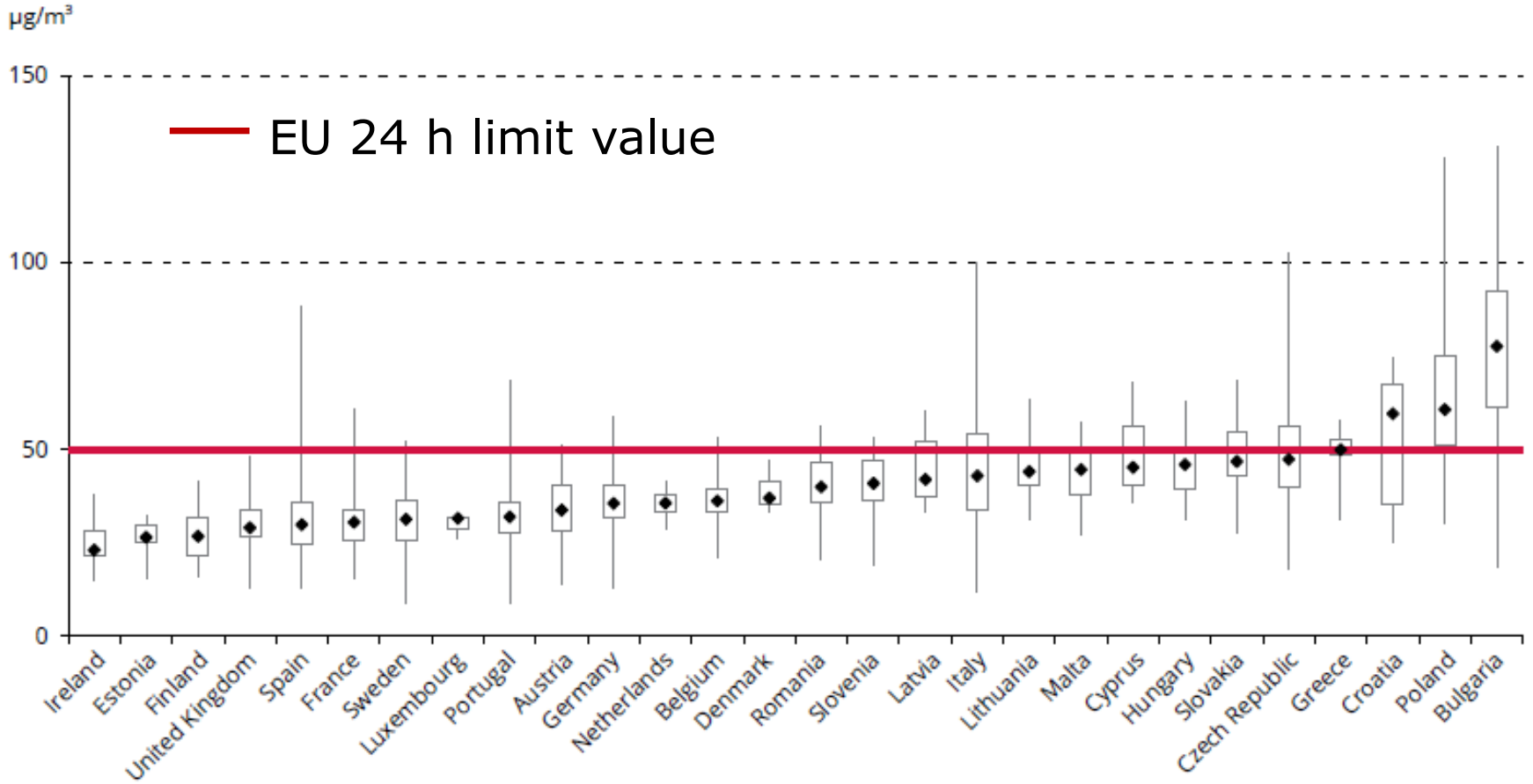
Motivation

- $PM_{2.5}$ and PM_{10} ambient concentration levels are still a major environmental problem in several urban areas in the E.U.
- New evidence of particulate matter long term impacts on human health continues to emerge.
- The Commission of E.C. was moving towards the implementation of the Thematic Strategy on Air Pollution

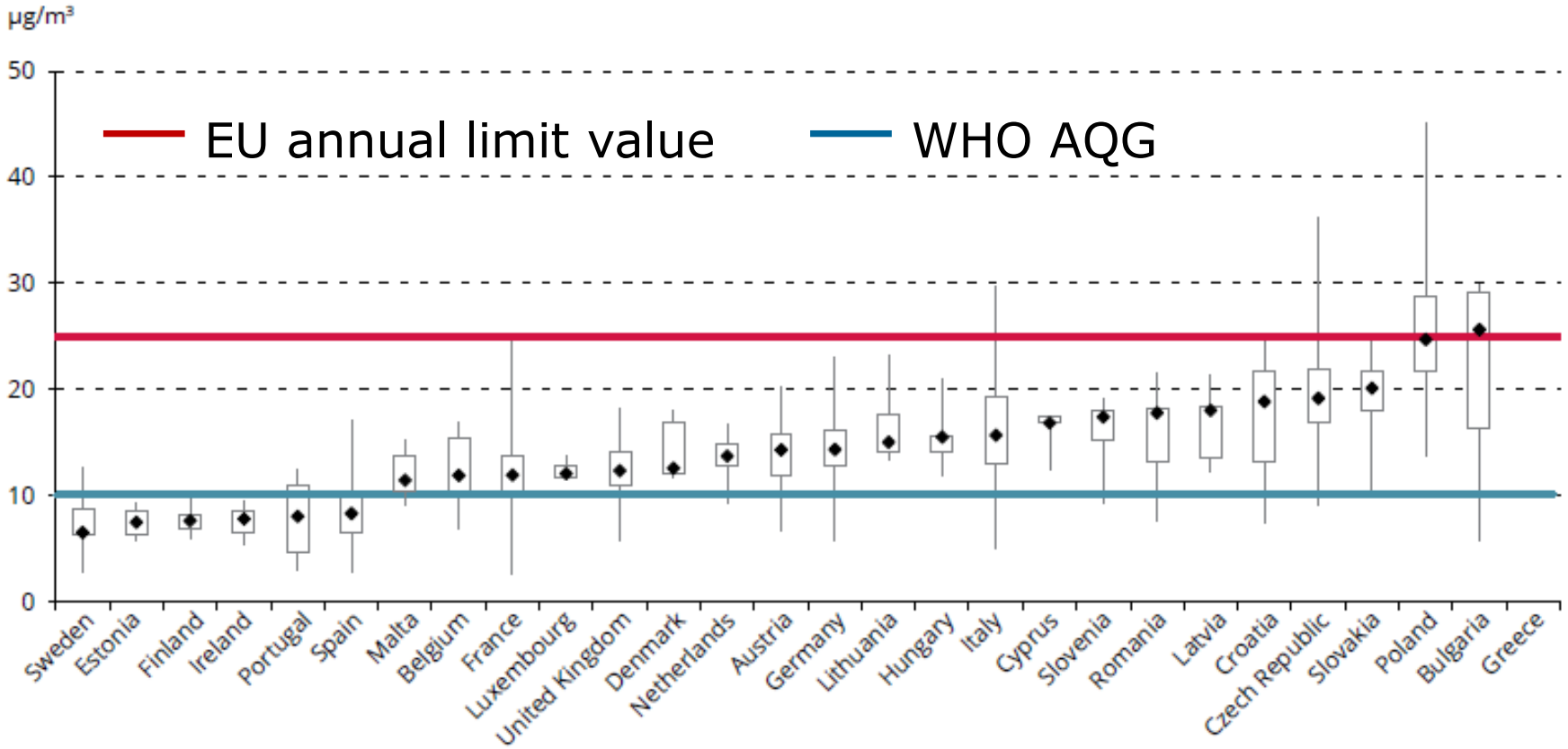
- National authorities will have to re-evaluate their environmental strategies as requirements of lower limit values for PM in air may arise.

PM_{10} concentrations in relation to the 24h limit value in 2014 in the EU-28



Source: EEA, 2016

$PM_{2.5}$ concentrations in relation to the target value in 2014 in the EU-28



Source: EEA, 2016

EU urban population exposed to harmful levels of air pollutants (2012-2014)

	EU limits/target values	WHO guidelines
$PM_{2.5}$	8–12 %	85–91 %
PM_{10}	16–21 %	50–63 %
O_3	8–17 %	96–98 %
NO_2	7–9 %	7–9 %
BaP	20–24 %	88–91 %
SO_2	<1 %	35–49 %

Source: EEA, 2016

Project beneficiaries:

- **NCSR "Demokritos"**
- **Aristotle University of Thessaloniki**
- **University of Thessaly**
- **Technical University of Crete**
- **AXON Envirogroup Ltd.**

Duration:

09/2010 – 08/2014

Areas of implementation:

Athens
Thessaloniki
Volos

ACEPT-AIR objective was to create a Tool which

- Contains a database of PM concentrations, source apportionment studies results and emission inventories
- Creates a historical record of control measures / changes in emissions and provide results in measured concentration reductions apportioned to changes in every accounted source
- Allows the policy makers to evaluate the effects of control measures applied on specific emission sources as well as plan new ones.

Ministry of Environment, Energy & Climate Change

The Regional Unit of Magnesia and N. Sporades

Coalition of 21 Local Authorities in Athens

The Municipality of Thessaloniki

Major activities

Measurement campaigns

Chemical characterisation

Source Apportionment

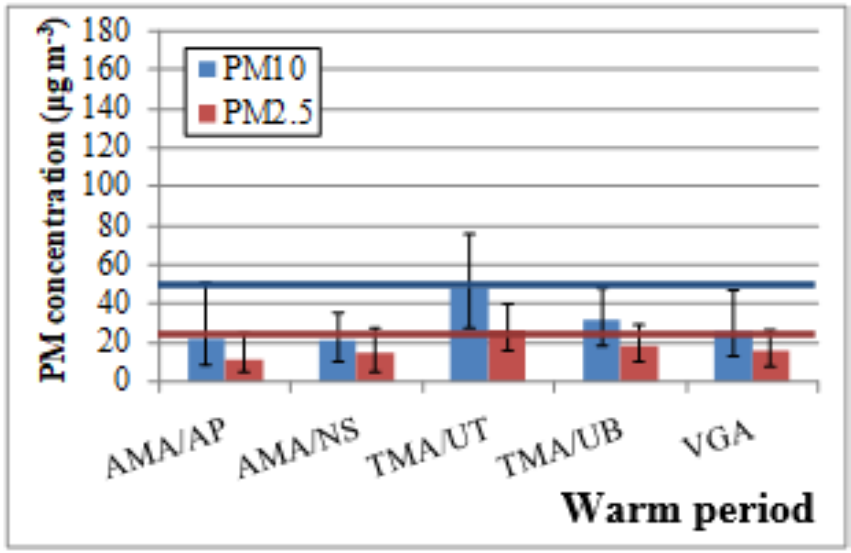
Emission inventories

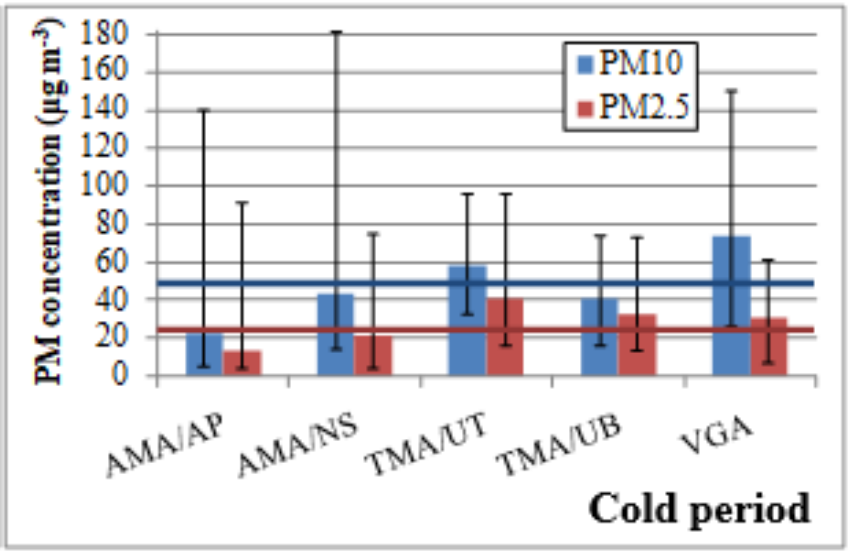
ACEPT-AIR Policy Tool

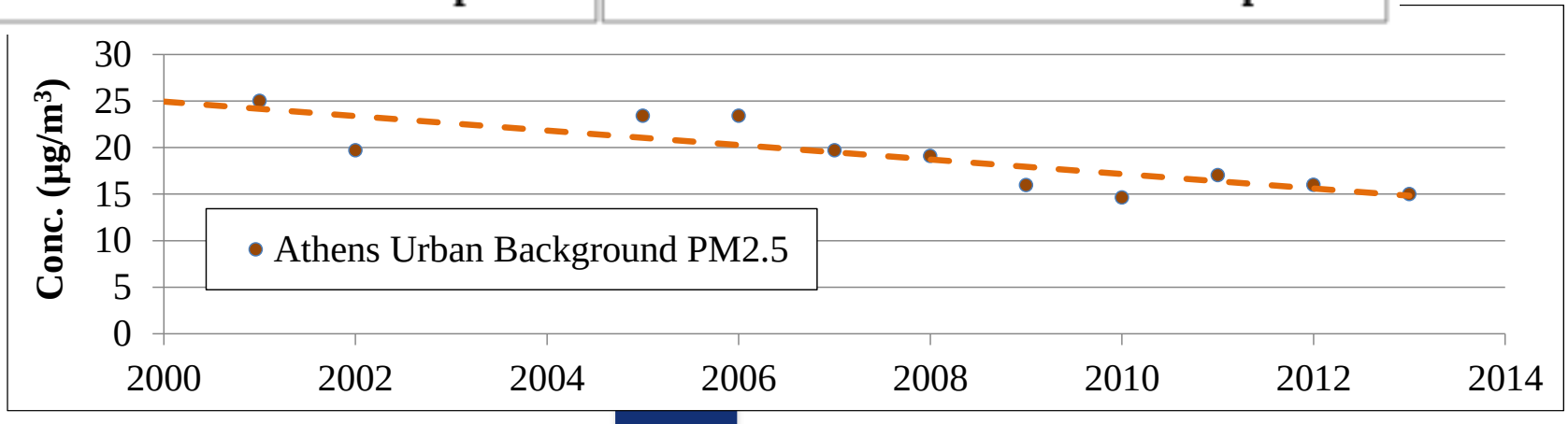
Measurement campaigns

Warm period: 6–9/2011
Cold period: 1-4/2012

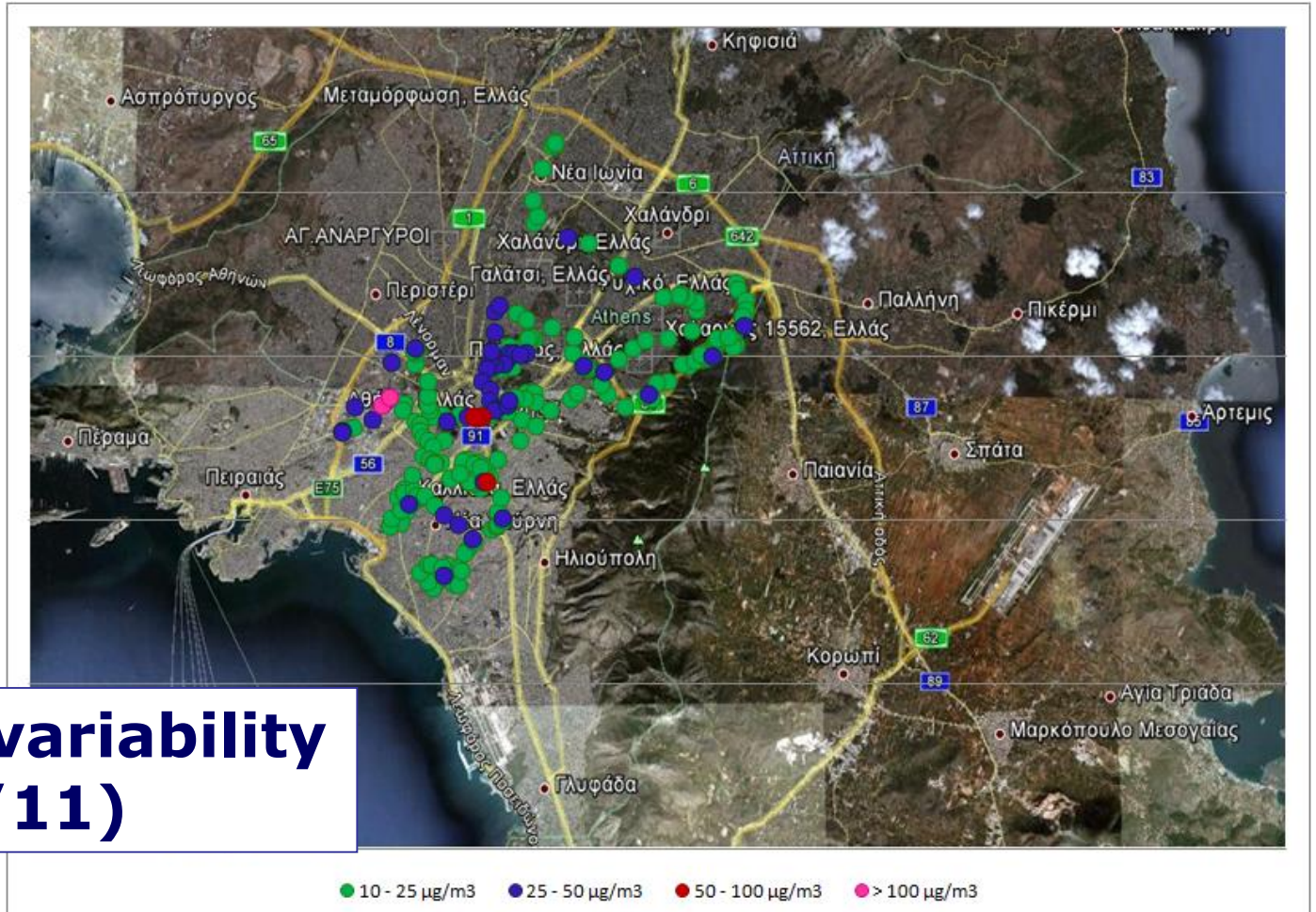
Measurement campaigns







Measurement campaigns



PM_{10} spatial variability (14/9/11)

Measurement campaigns

Chemical characterisation

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Emission Inventories

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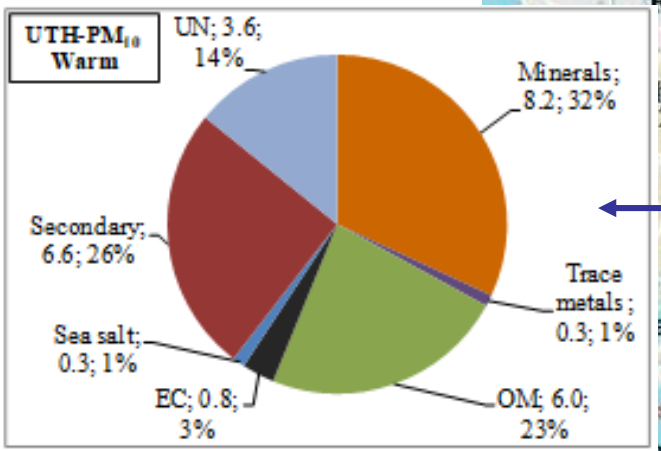
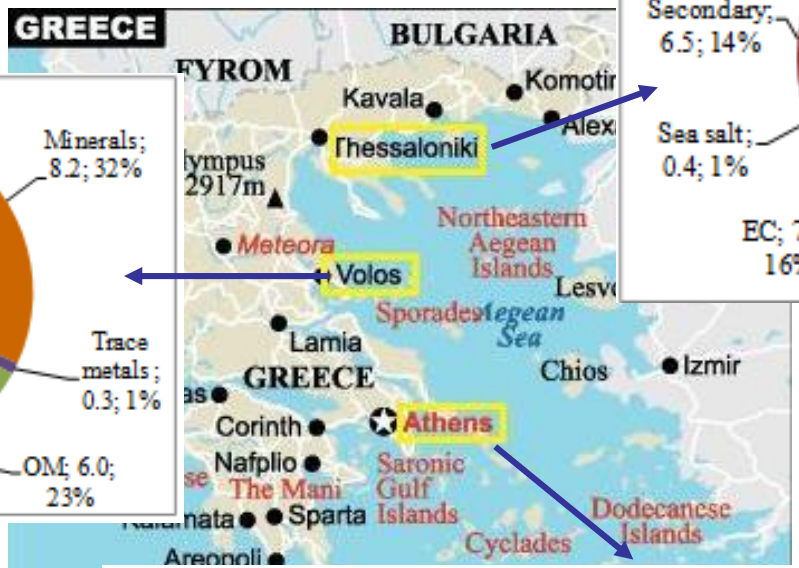
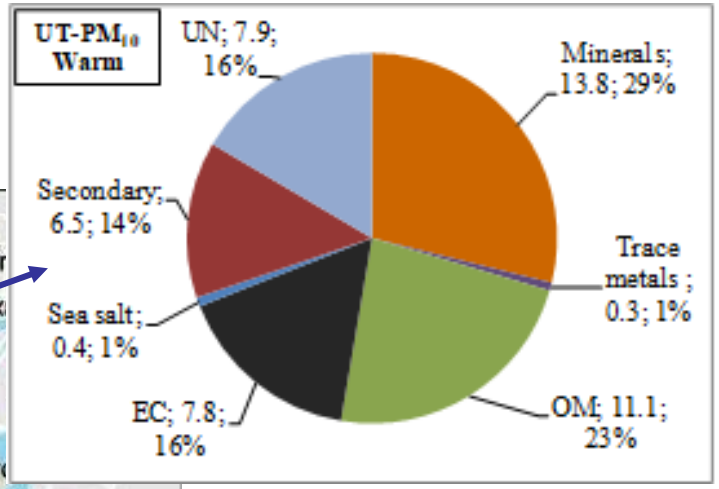
Analysis for major PM components:

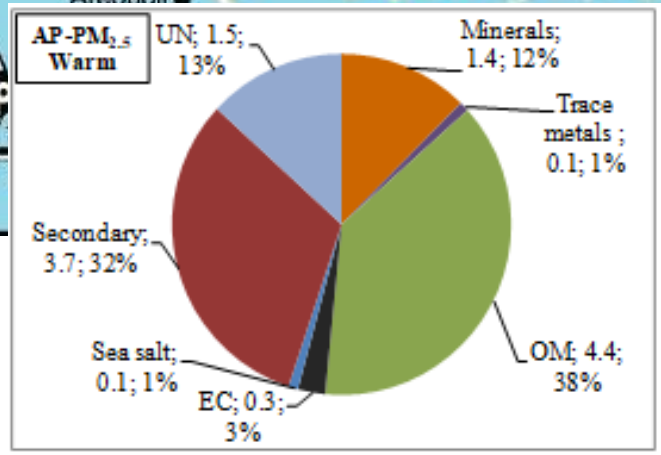
- OC/EC
- Ions
- Major and trace elements

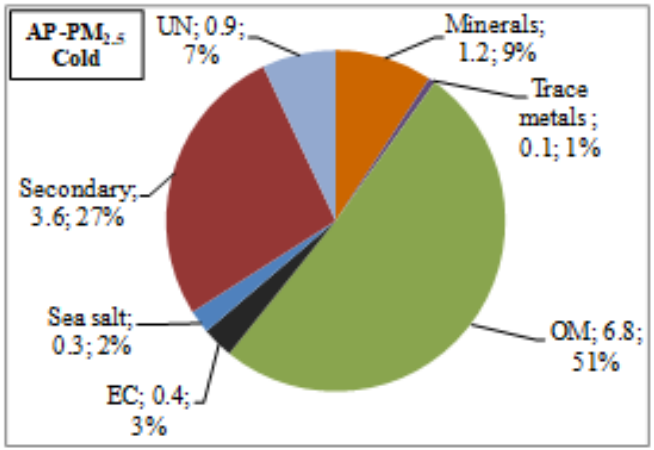
Chemical characterisation

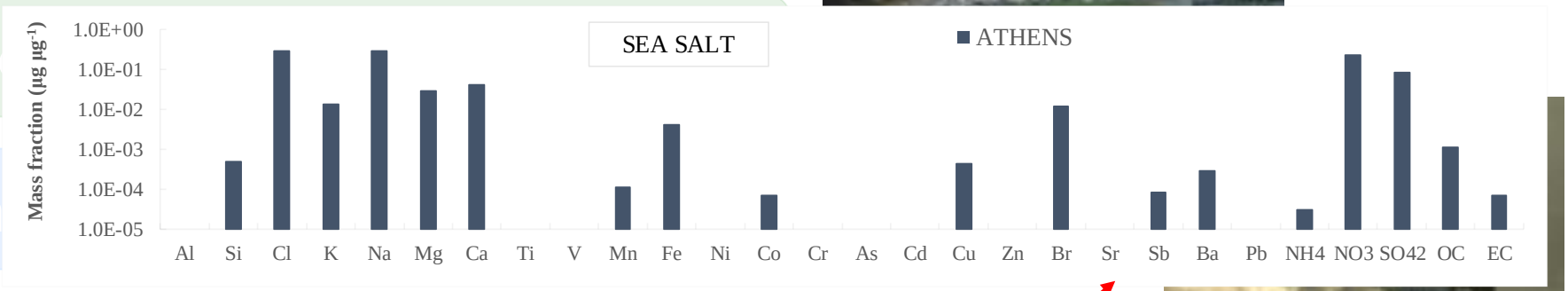


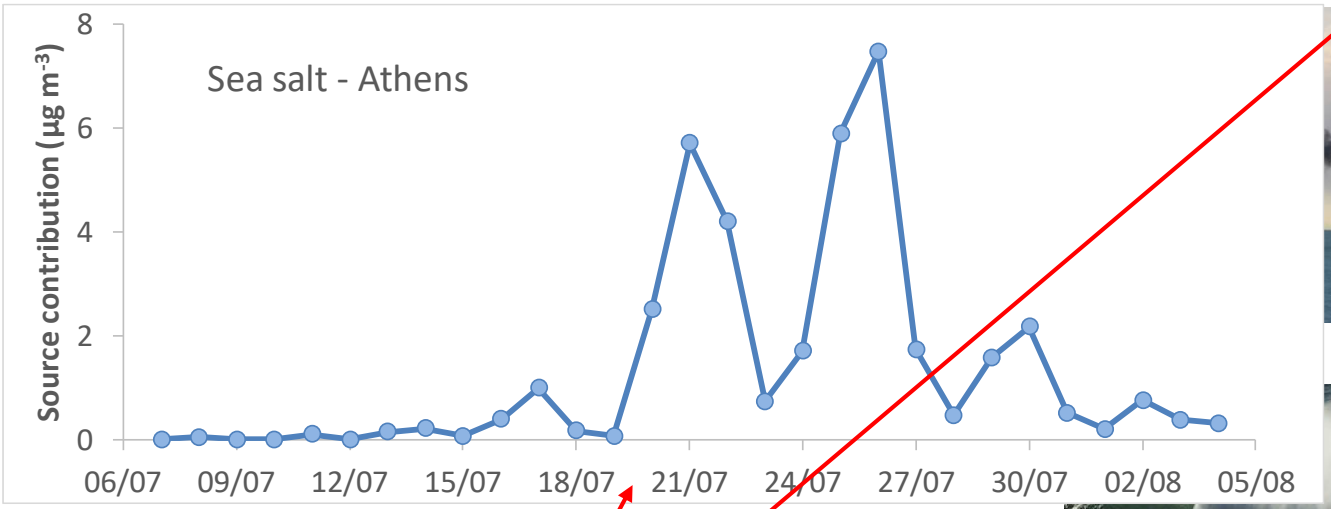




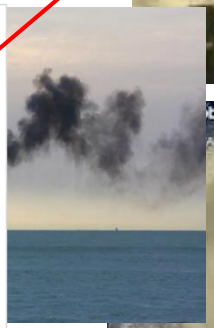


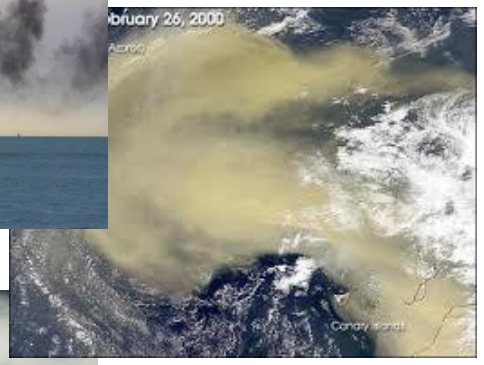


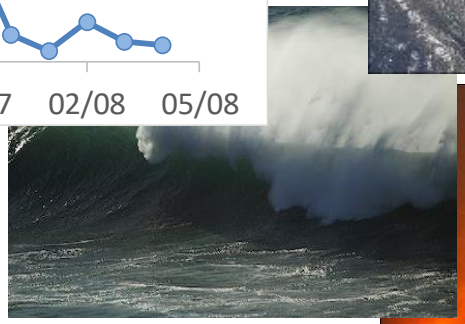




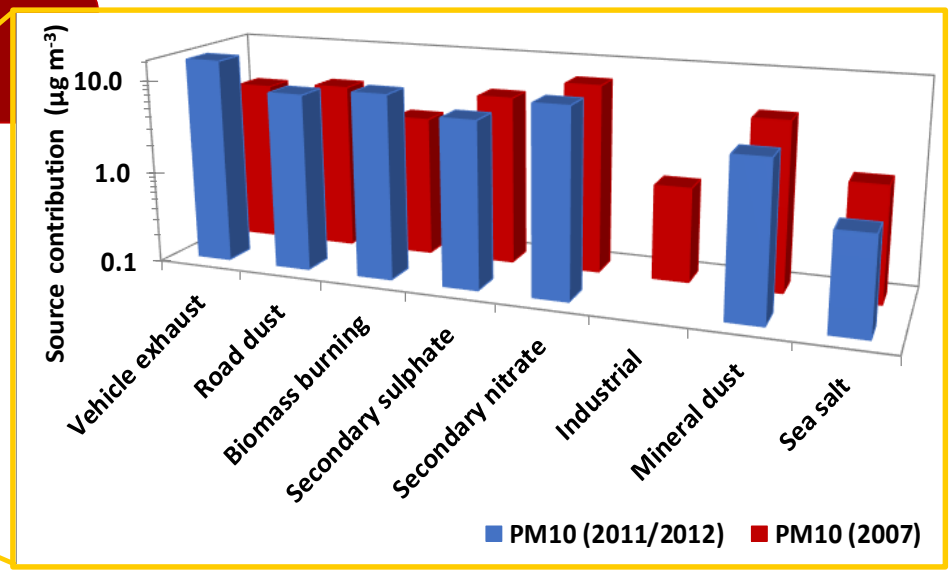
$$C_{ij} = \sum_{k=1}^{p} g_{ik} \cdot f_{kj} + e_{ij}$$

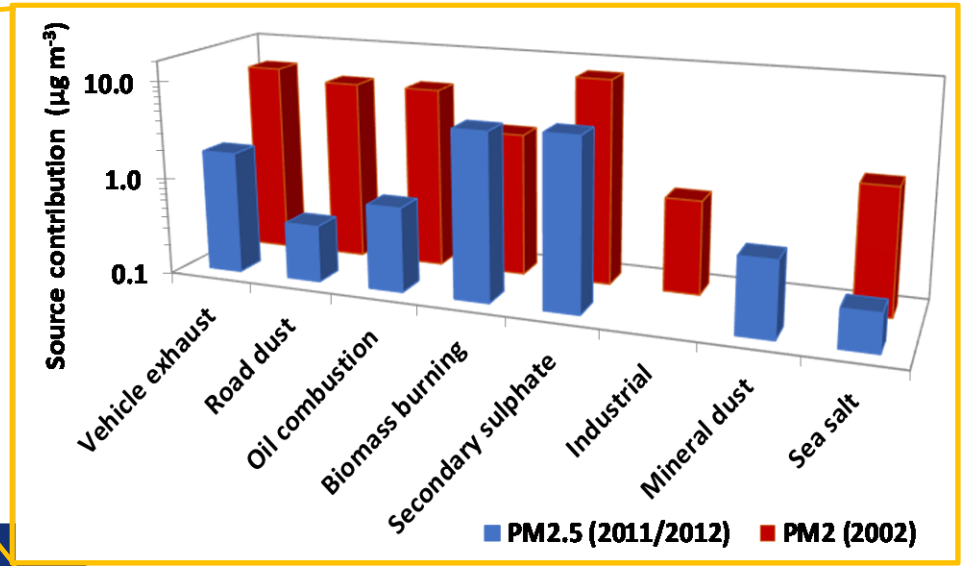






Source Apportionment





Measurement campaigns

Chemical characterisation

Source Apportionment

Emission Inventories

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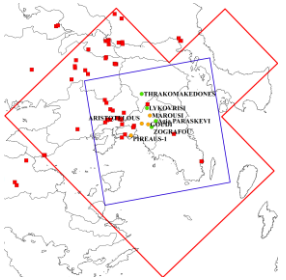
Years: 2000 - 2013

Athens Metropolitan area (AMA)



Thessaloniki Metropolitan area (TMA)

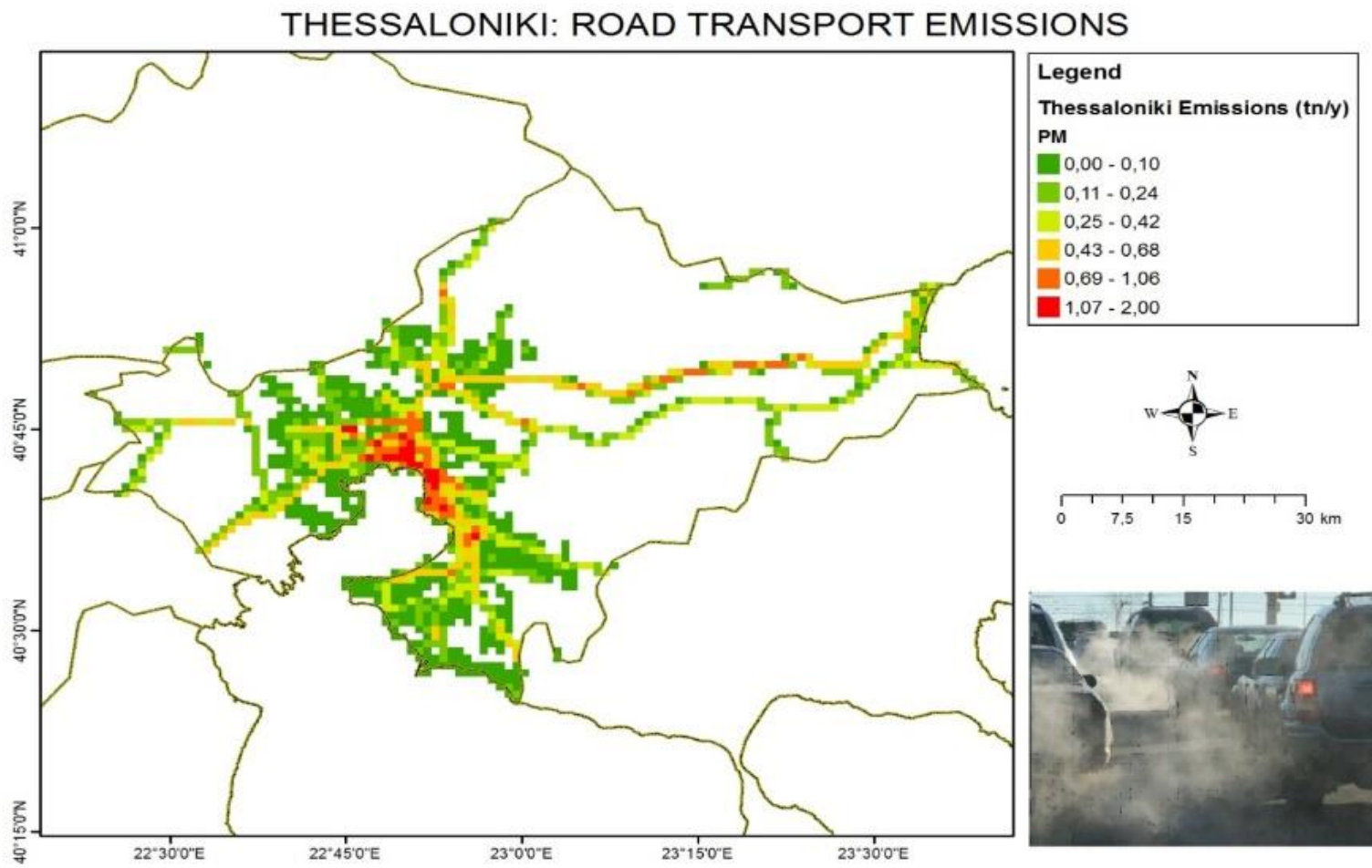
Greater Volos area (GVA)

Domain covering conurbation; used in spatial disaggregation

Area of Interest

- LPS
- Traffic station
- Industrial station
- Background station

Emission Inventories



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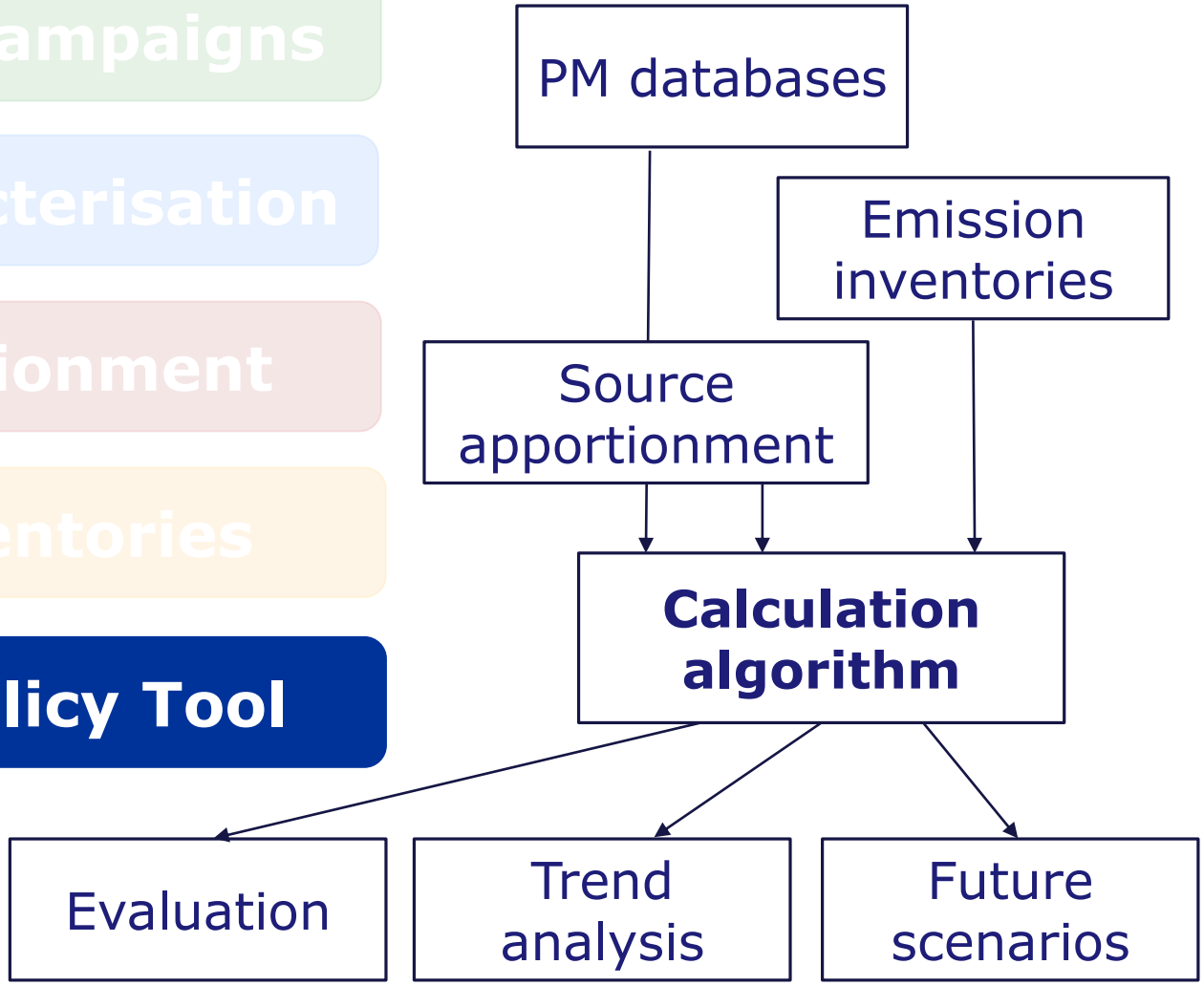

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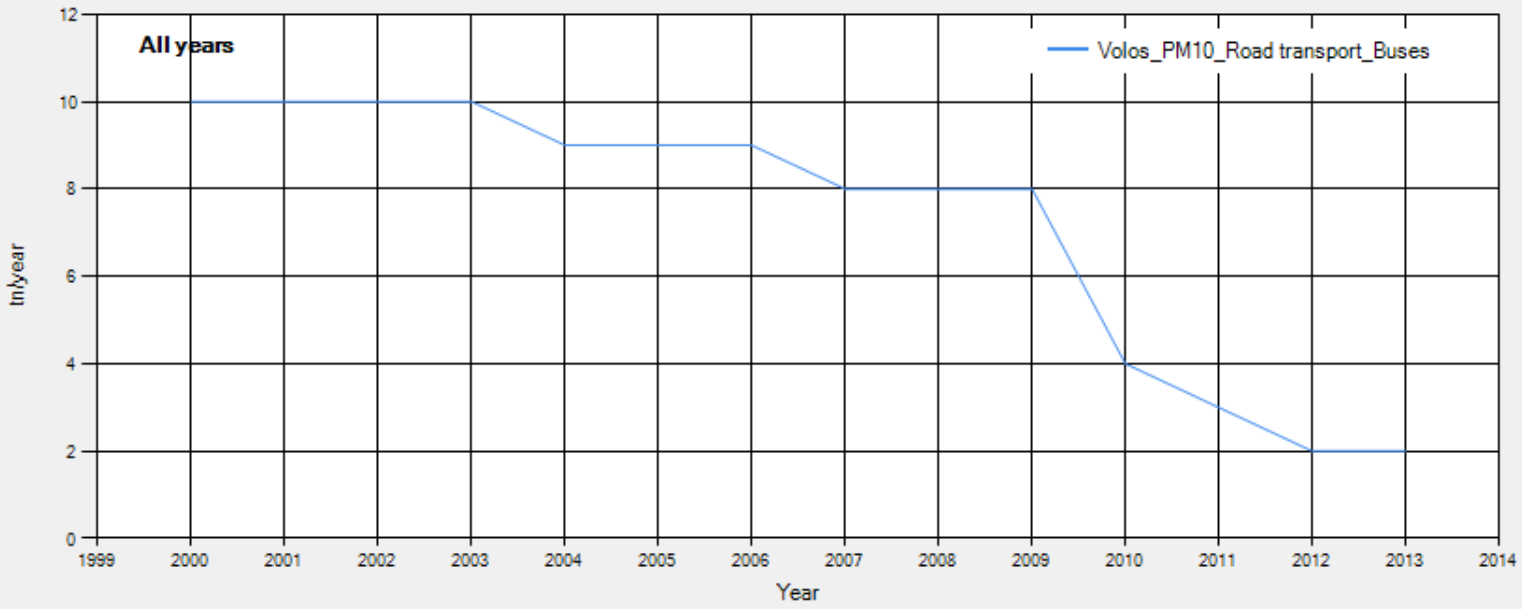
Emissions - Time series

Data Info

Region: Volos | Source: Road transport | All years

Pollutant: PM10 | SubSource: Buses | Monthly variation for year: | Data recall

GraphResults



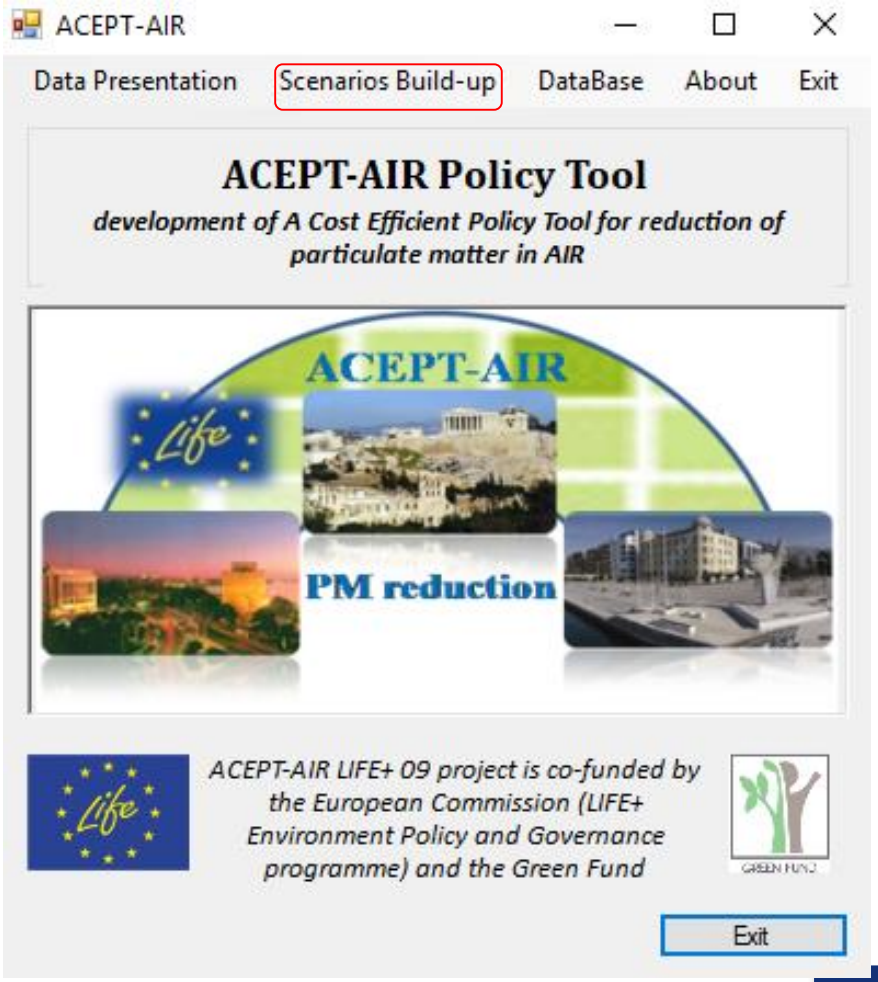
Data export

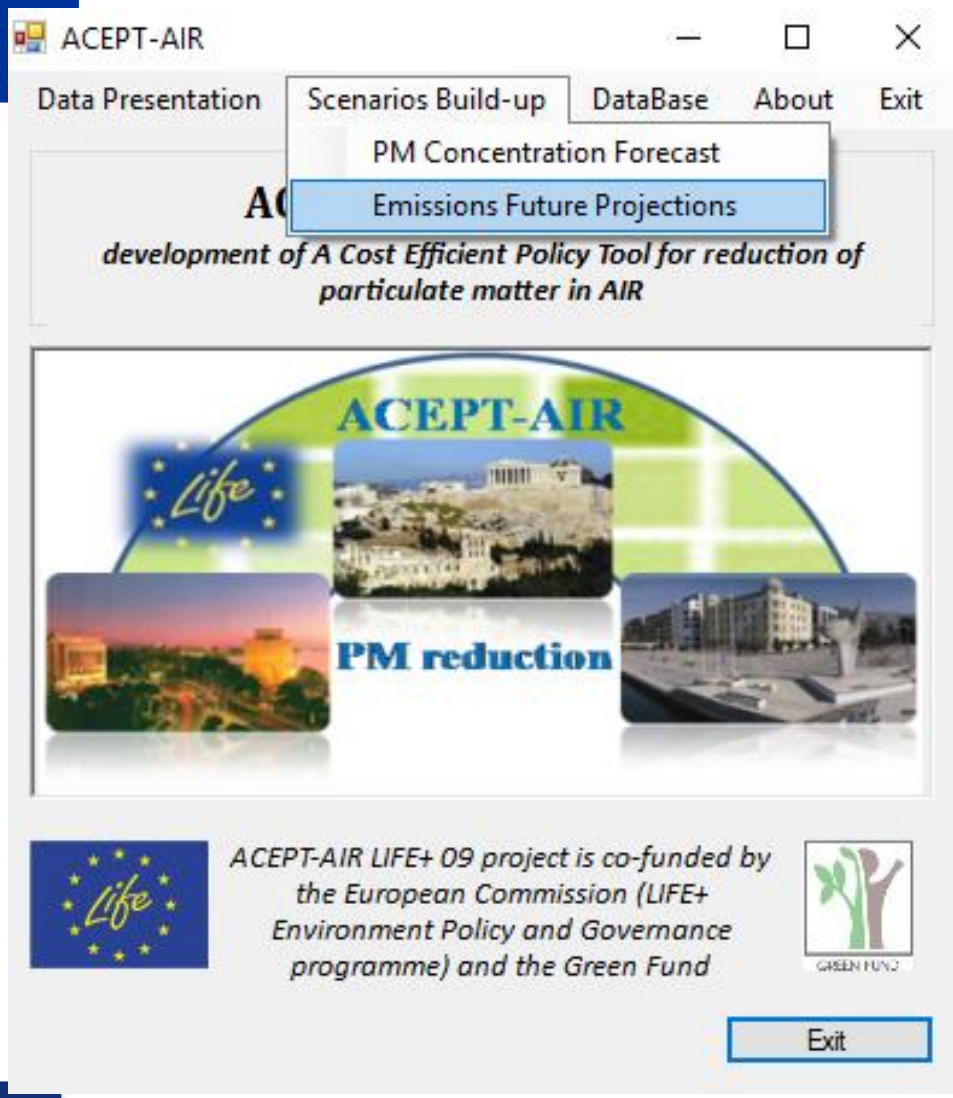
Filename: Volos_PM10_Road transport_Buses.xlsx

in: C:\LIFE Progs\ACEPT-AIR | Change folder | Save

Close

ACEPT-AIR Policy Tool





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PM Concentration Forecast
(based on emission scenarios and PM contribution of emission sources)

Data Info

Region: Thessaloniki | Year: 2013 | Pollutant: PM2.5

Scenario build-up

Annual average pollutant concentration (μg/m3): 100

% change in [(+) for increase / (-) for decrease)] emissions from:

R11	-10	ROAD DUST FROM TRAFFIC
R21	-10	VEHICLE EXHAUST
R31	0	RESIDENTIAL HEATING FROM FOSSIL FUEL
R32	0	INDUSTRIAL COMBUSTION
R61	0	BIOMASS BURNING
R71	0	INDUSTRIAL PROCESSES
R91	0	WASTE BURNING
R101	0	PORT
R111	0	-
R121	0	-

ΔC from background in μg/m3 (see user's guide): 0

Source Apportionment Data — Area Type: Urban Traffic | Year: 2012

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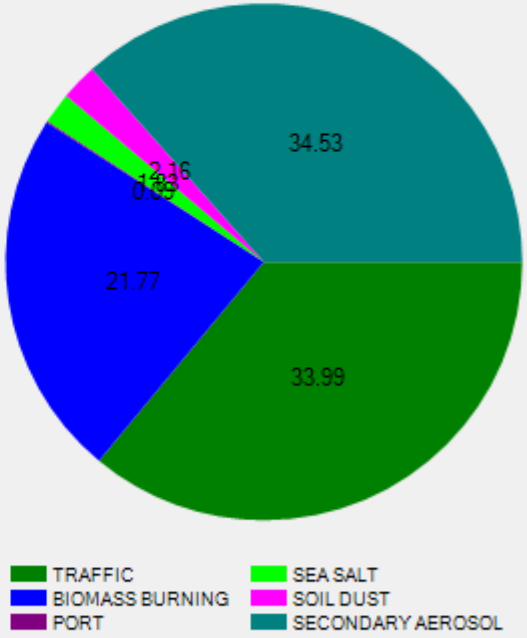
Results

Change in pollutant concentration (μg/m3): -5.727119

New pollutant concentration (μg/m3): 94.27288

New PM concentration distribution



Data export

Filename: Scenario_The_PM2.5_2013.xlsx

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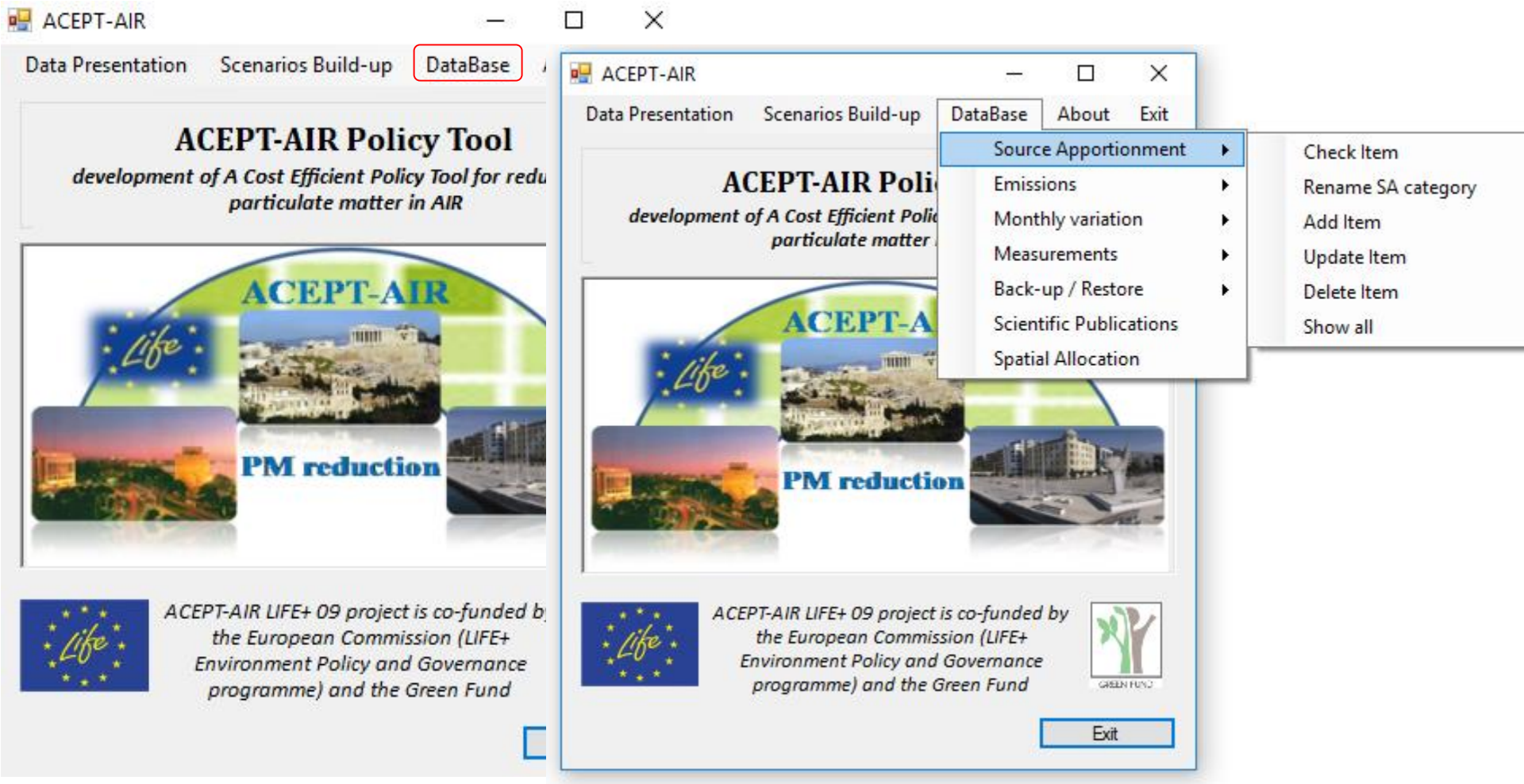

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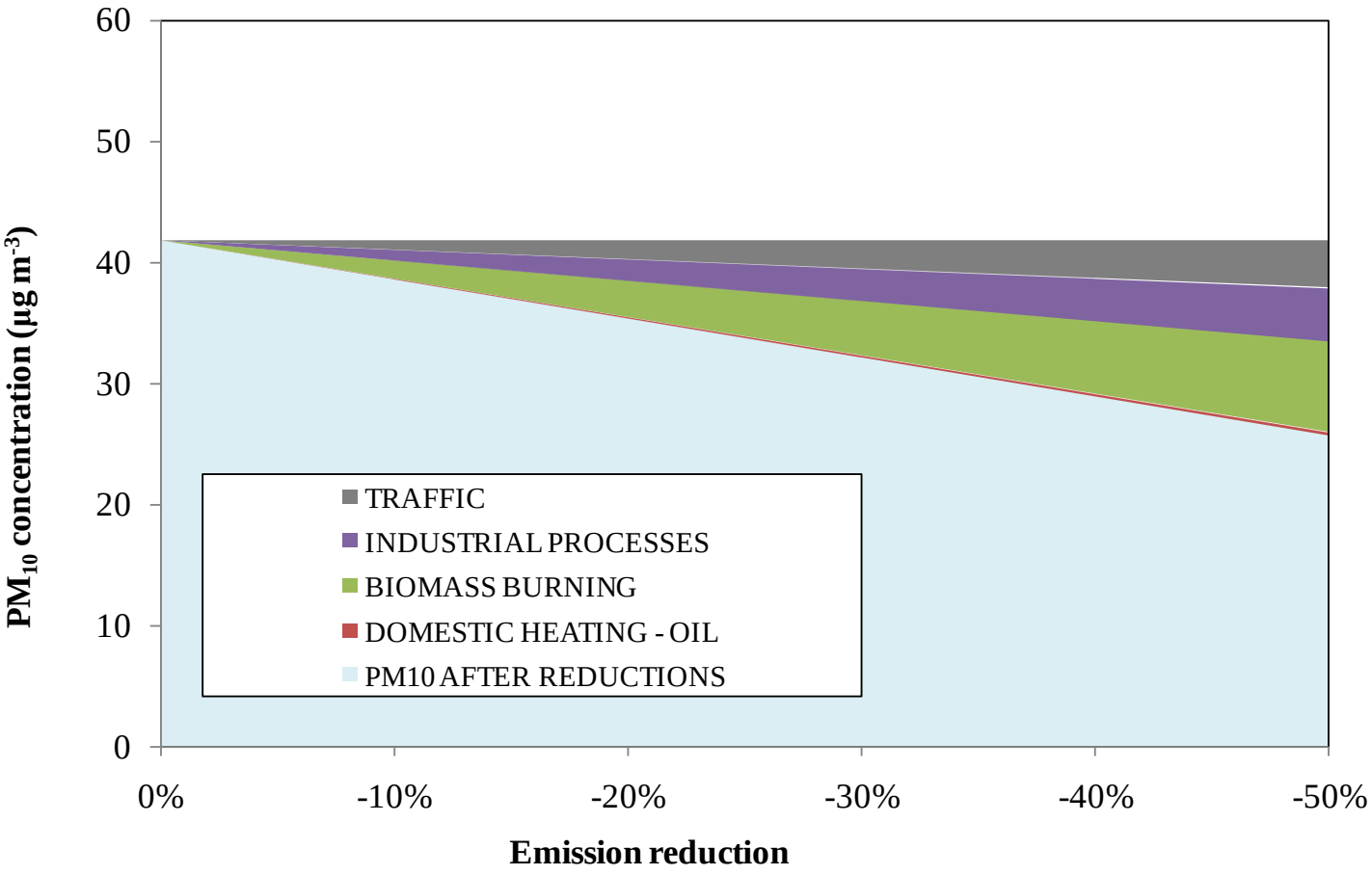
Athens – Urban background area



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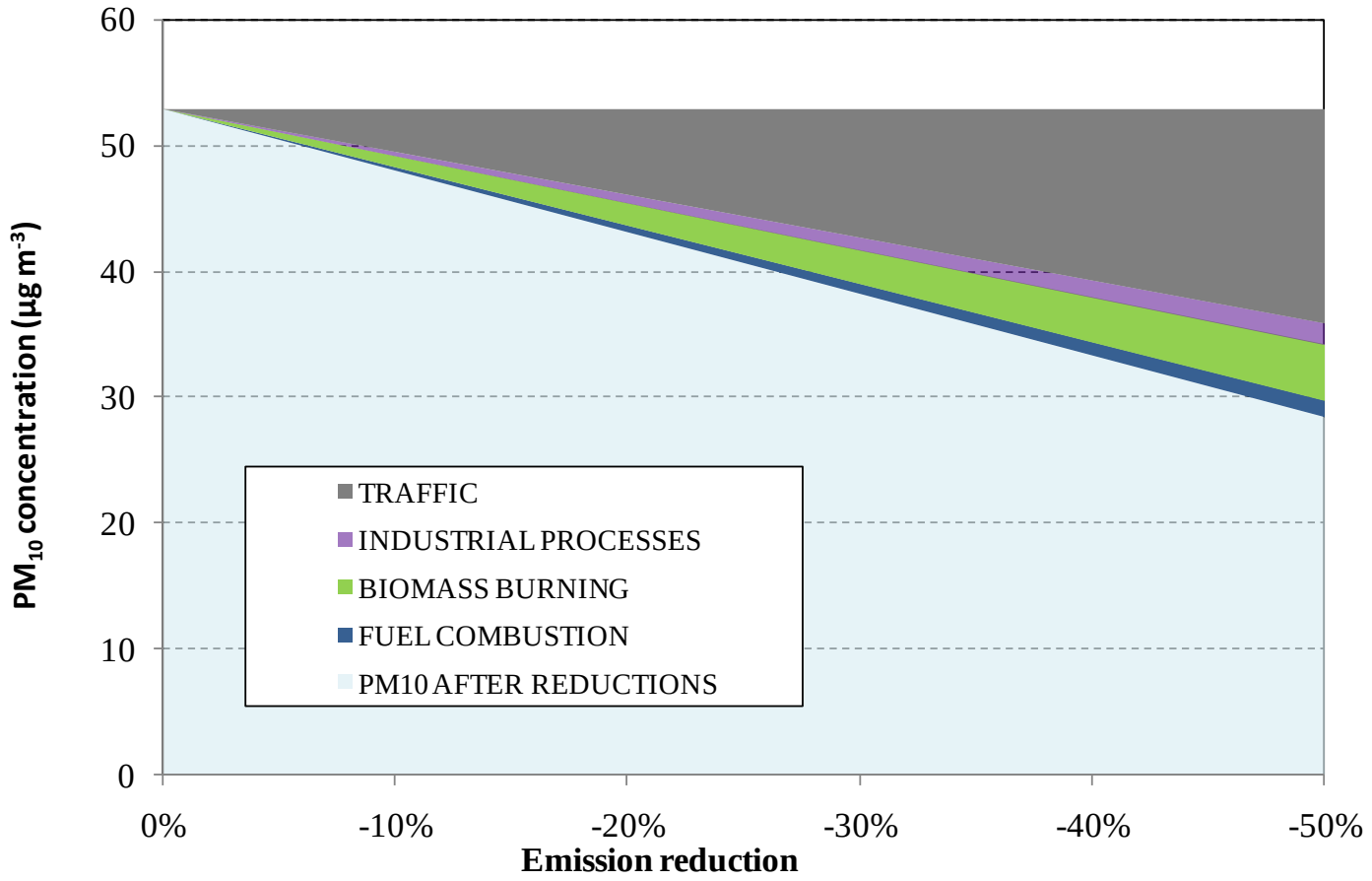
Thessaloniki – Urban traffic area



Transfer of knowledge to stakeholders

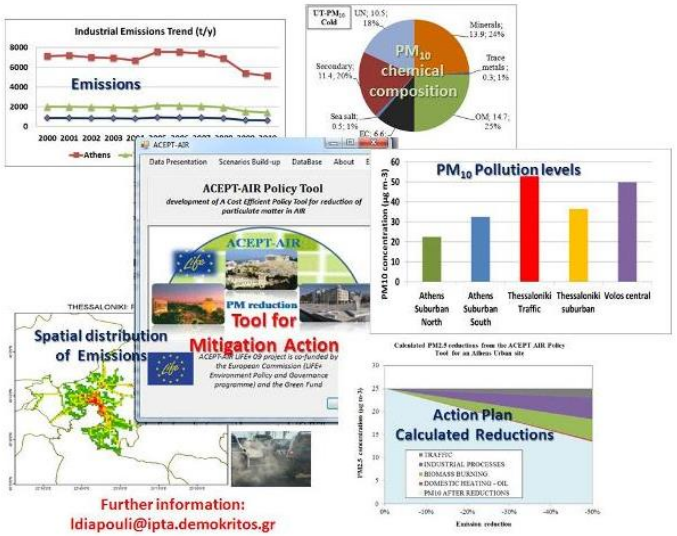
- Yearly informative meetings
- Close interaction during the development of the ACEPT-AIR Policy Tool
- Training on the use of the Tool
- Guidelines for the formulation of Action Plans
  - Provide a characterisation of air quality in relation to PM in Greek urban centres
  - Propose specific mitigation measures

Stakeholders

International conference

Secondary education teachers

Thank you for your attention!



http://www2.ipta.demokritos.gr/acept-air