



LIFE ACEPT-AIR

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

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INRASTES, NCSR Demokritos



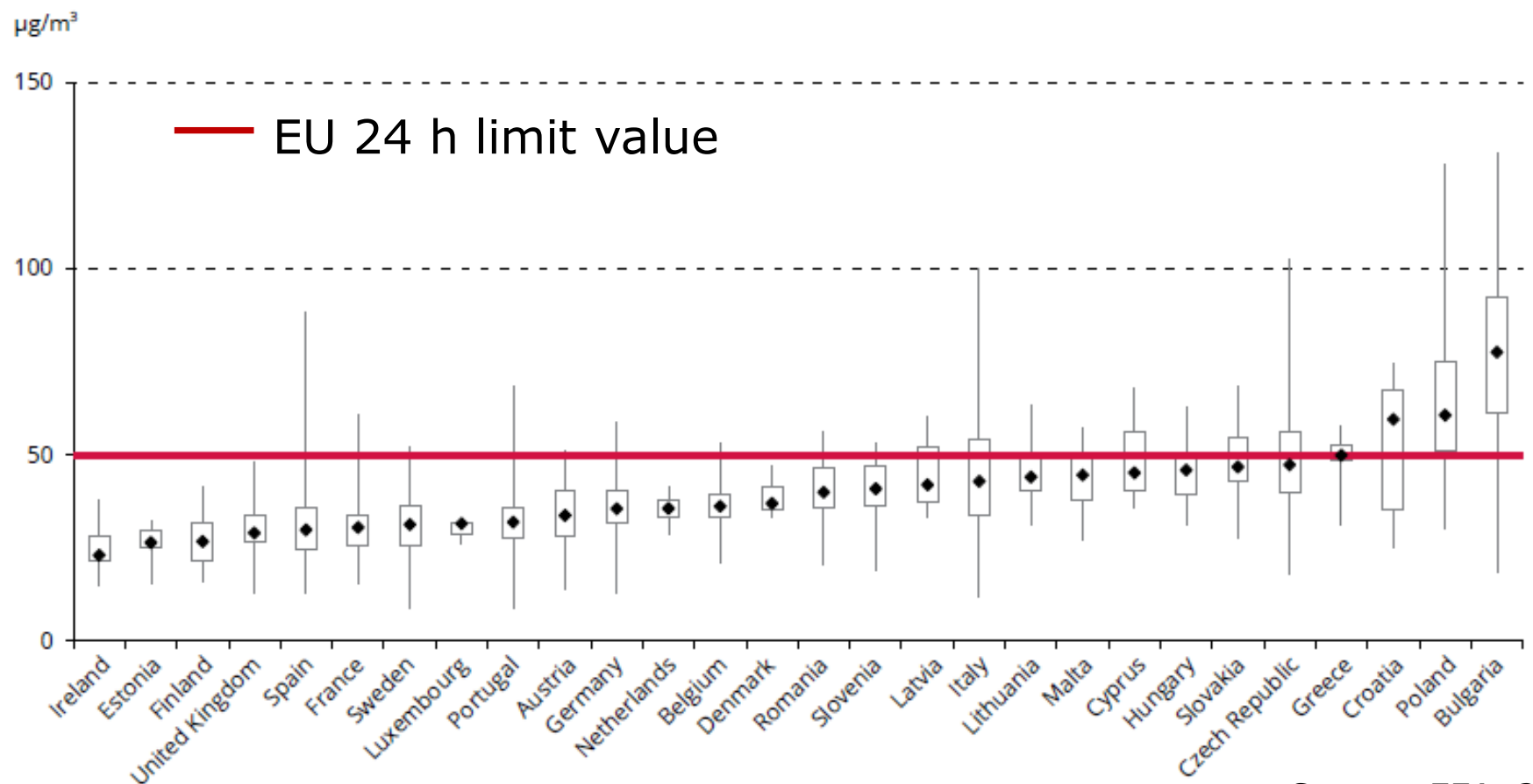
***5th Hellenic Forum - 25 years of LIFE: Innovative tools & technologies for Nature,
Environmental Protection and Climate Action, Athens 6/7/2017***

Motivation

- ✚ PM_{2.5} and PM₁₀ 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.

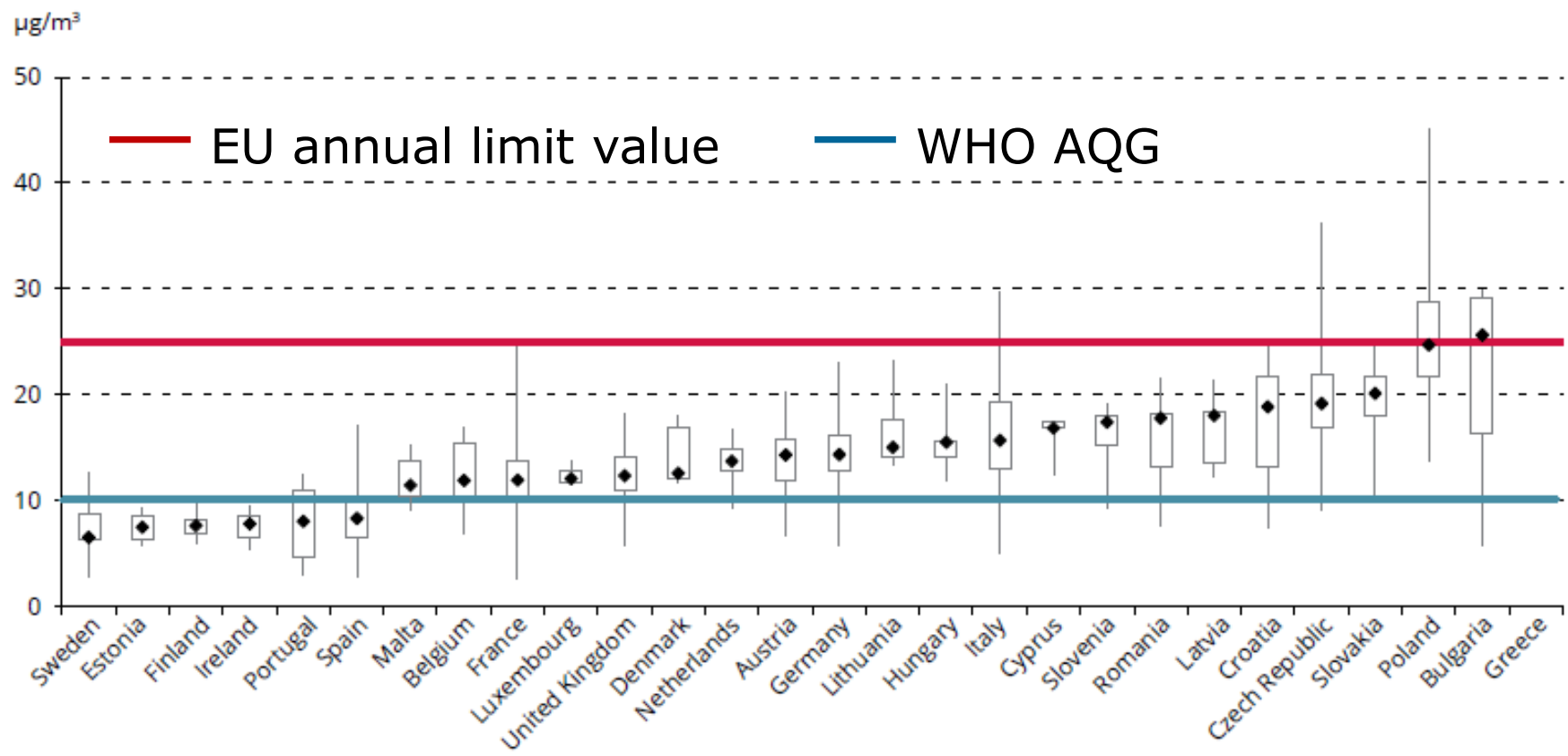


PM₁₀ concentrations in relation to the daily limit value in 2014 in the EU-28





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





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 %



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



ACCEPT-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





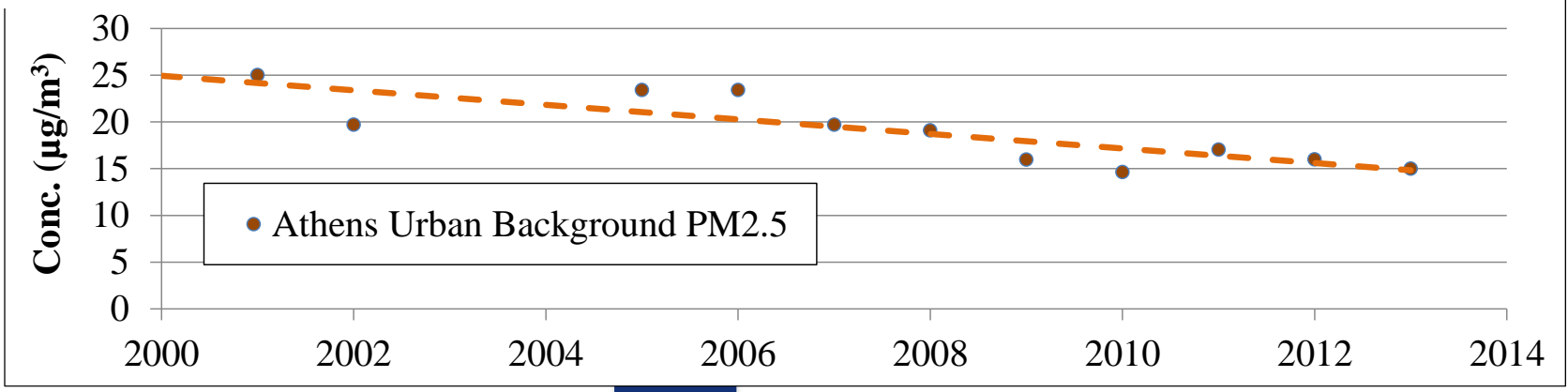
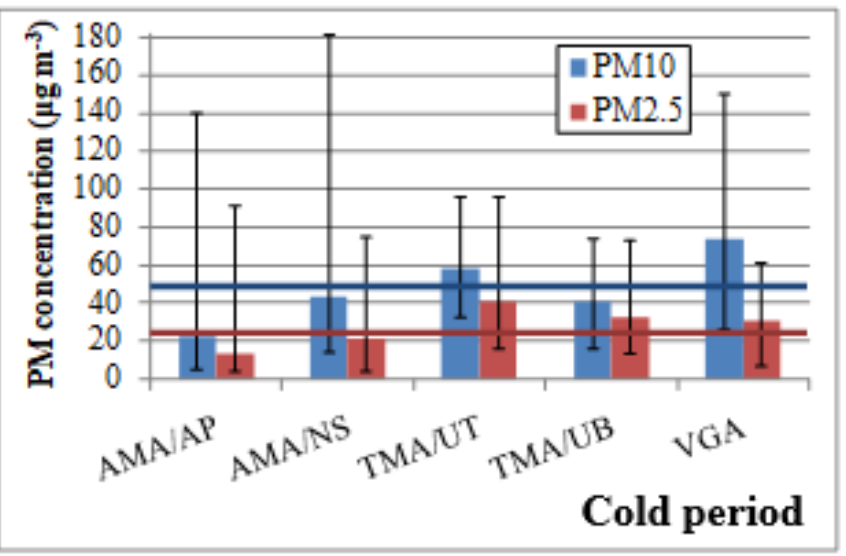
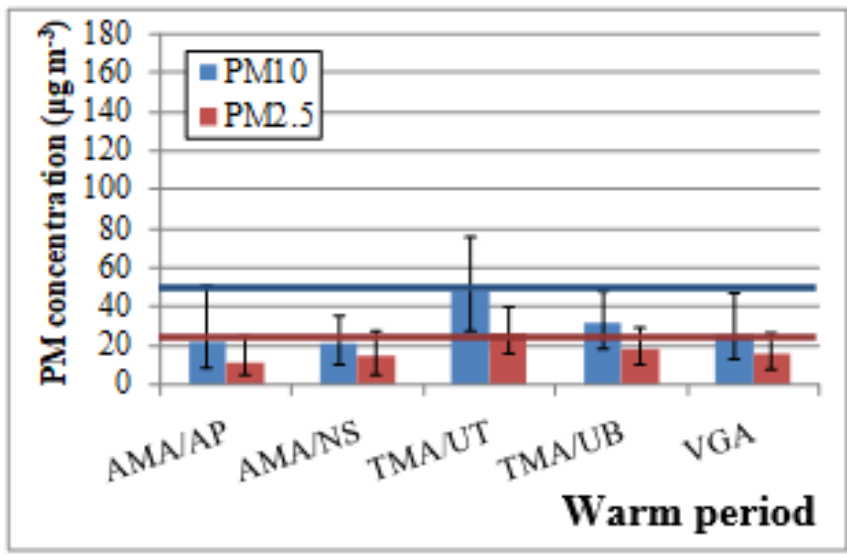
Measurement campaigns

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



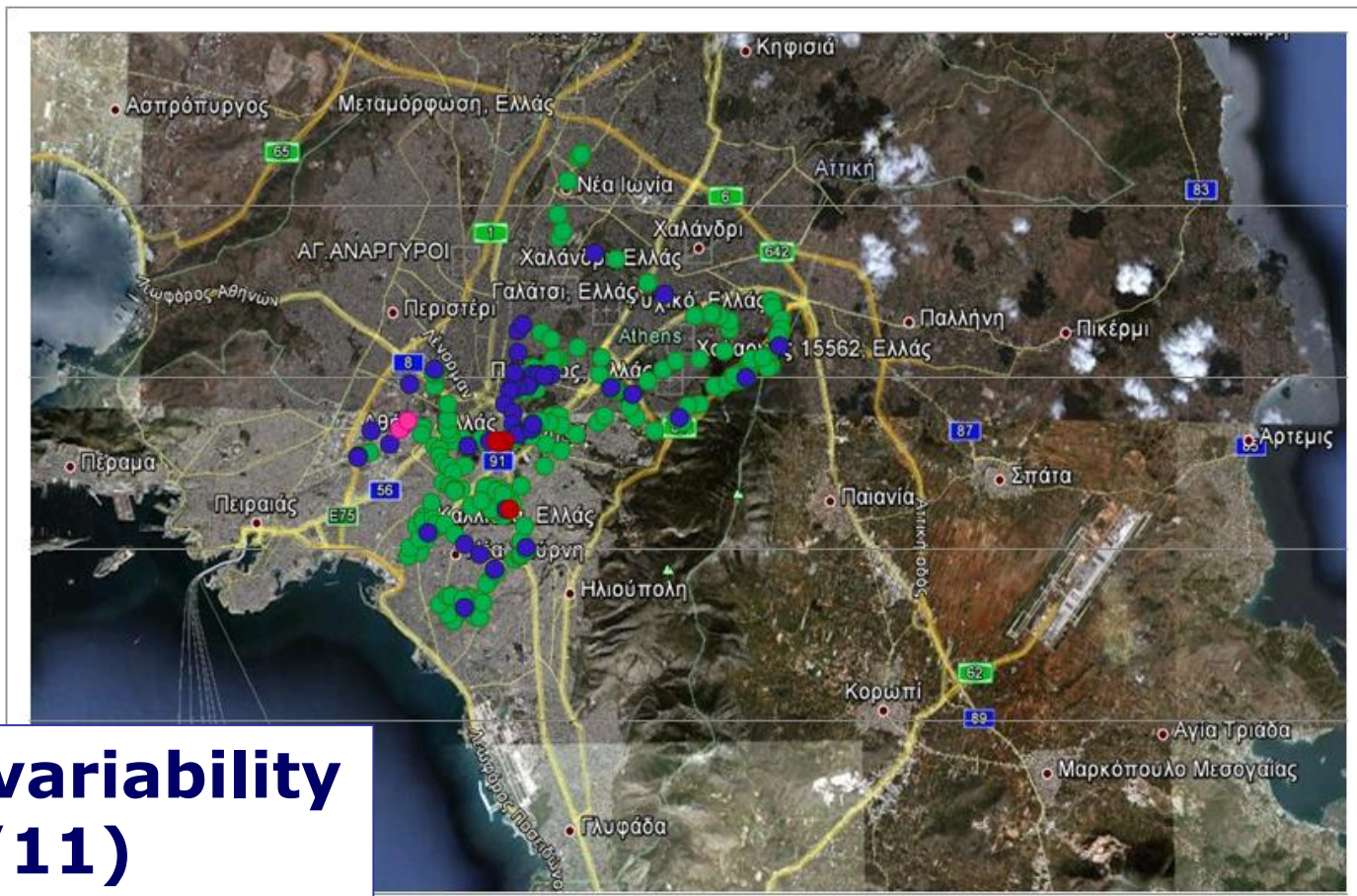


Measurement campaigns





Measurement campaigns



PM₁₀ spatial variability (14/9/11)

● 10 - 25 µg/m³ ● 25 - 50 µg/m³ ● 50 - 100 µg/m³ ● > 100 µg/m³



Measurement campaigns

Chemical characterisation

Source Apportionment

Emission Inventories

ACEPT-AIR Policy Tool

Analysis for major PM components:

OC/EC

Ions

Major and trace elements

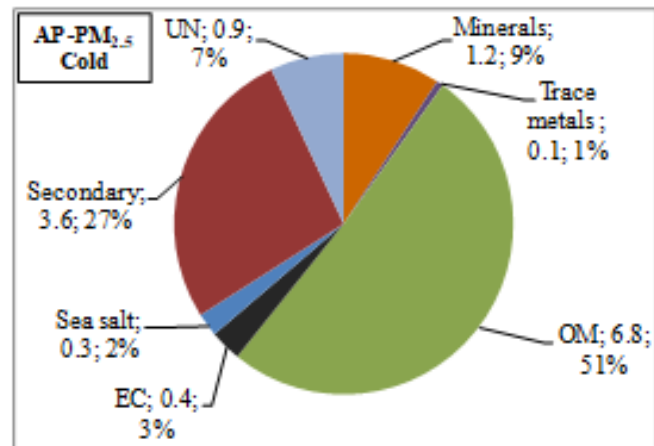
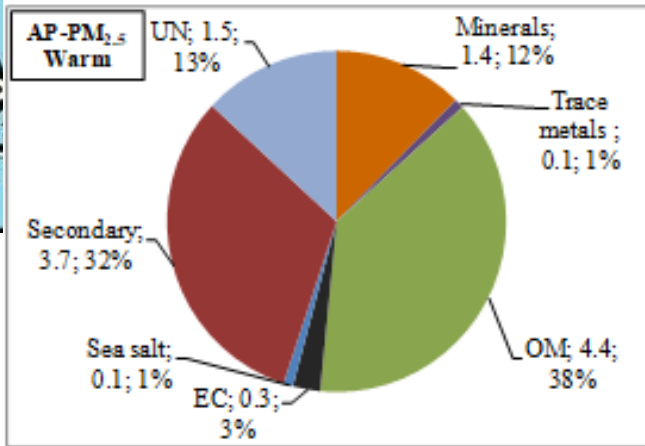
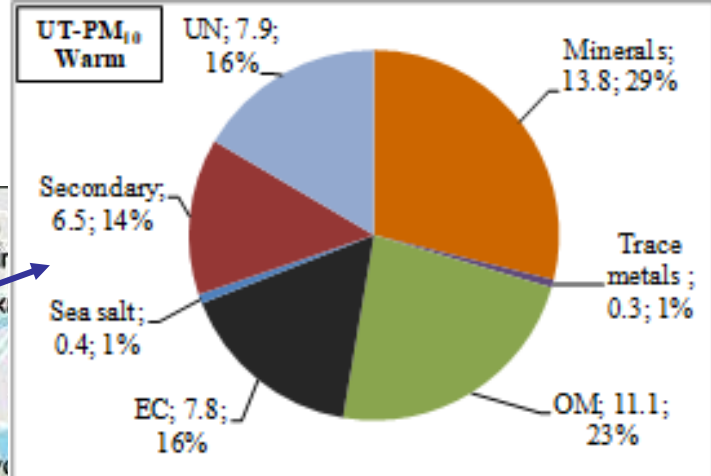
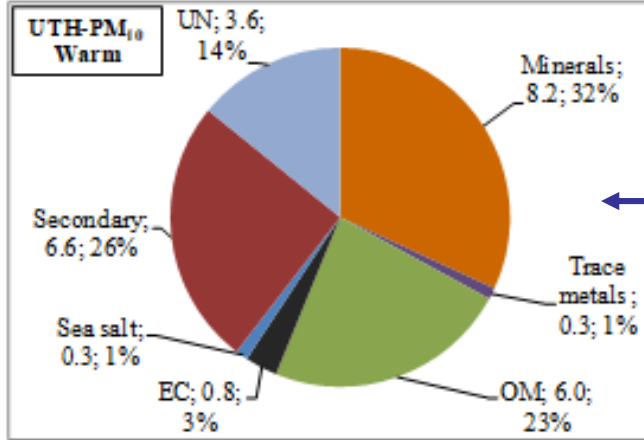




European Commission

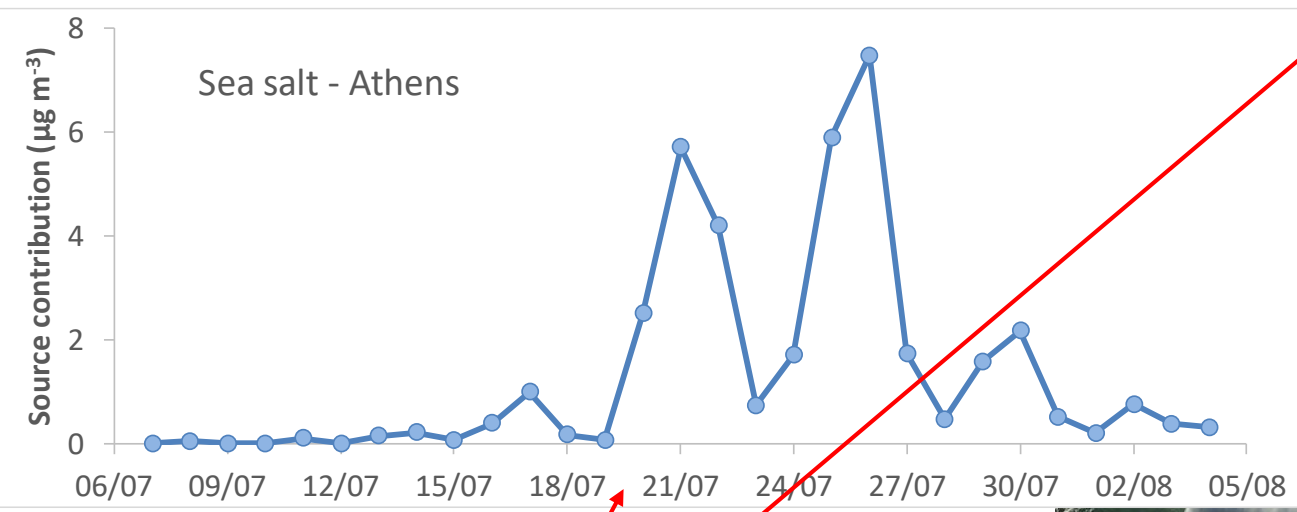
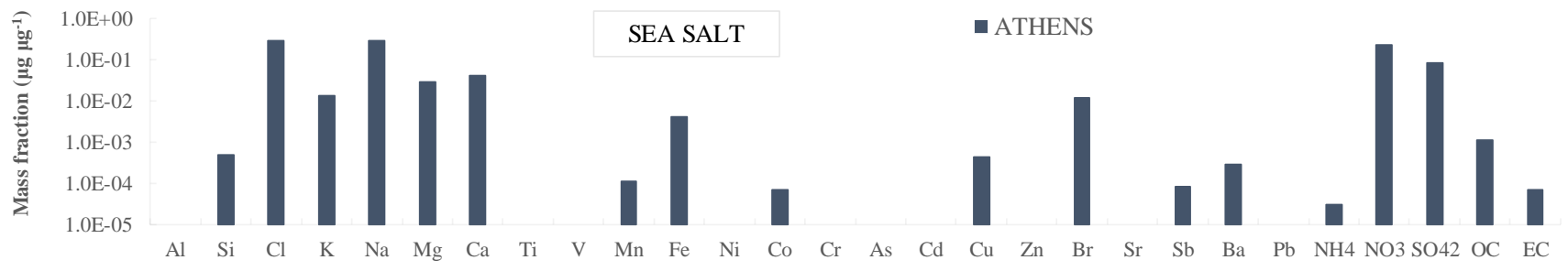


Chemical characterisation

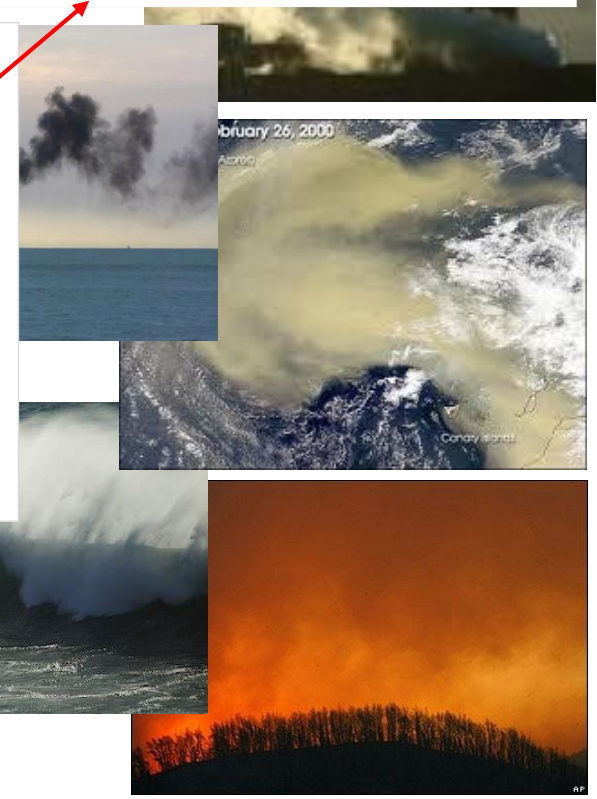




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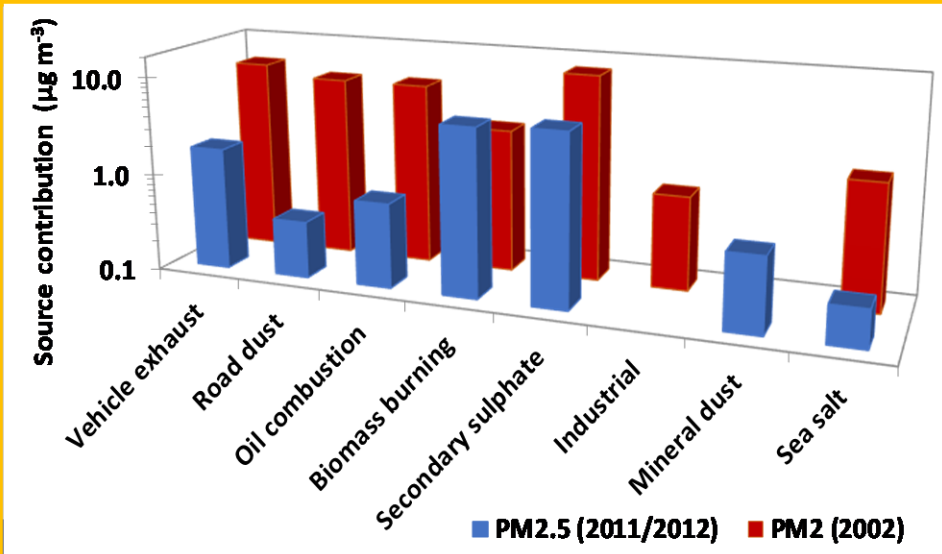
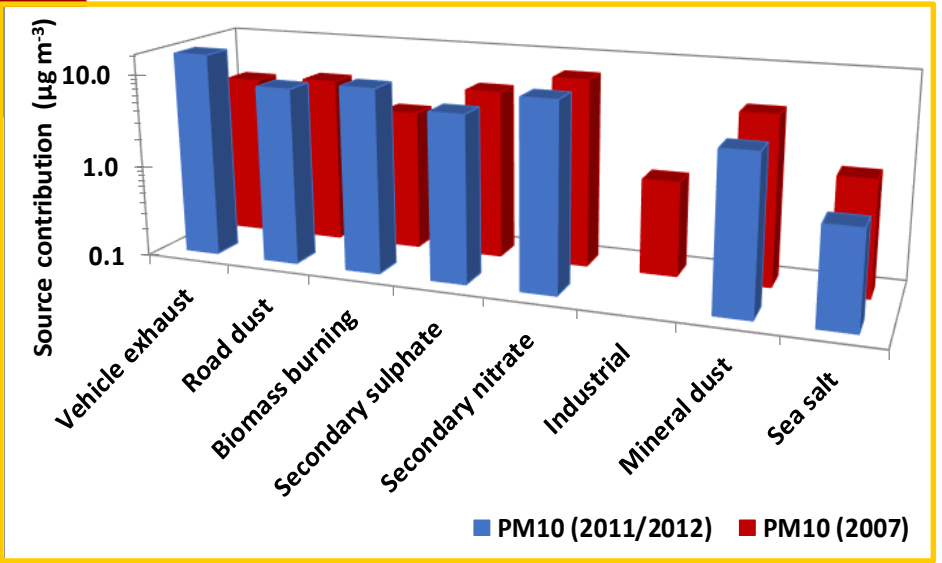


$$C_{ij} = \sum_{k=1}^p g_{ik} \cdot f_{kj} + e_{ij}$$





Source Apportionment





Measurement campaigns

Chemical characterisation

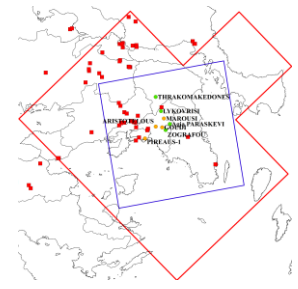
Source Apportionment

Emission Inventories

ACEPT-AIR Policy Tool

Years: 2000 - 2013

Athens Metropolitan area (AMA)



Thessaloniki Metropolitan area (TMA)



Greater Volos area (GVA)



Domain covering conurbation; used in spatial disaggregation

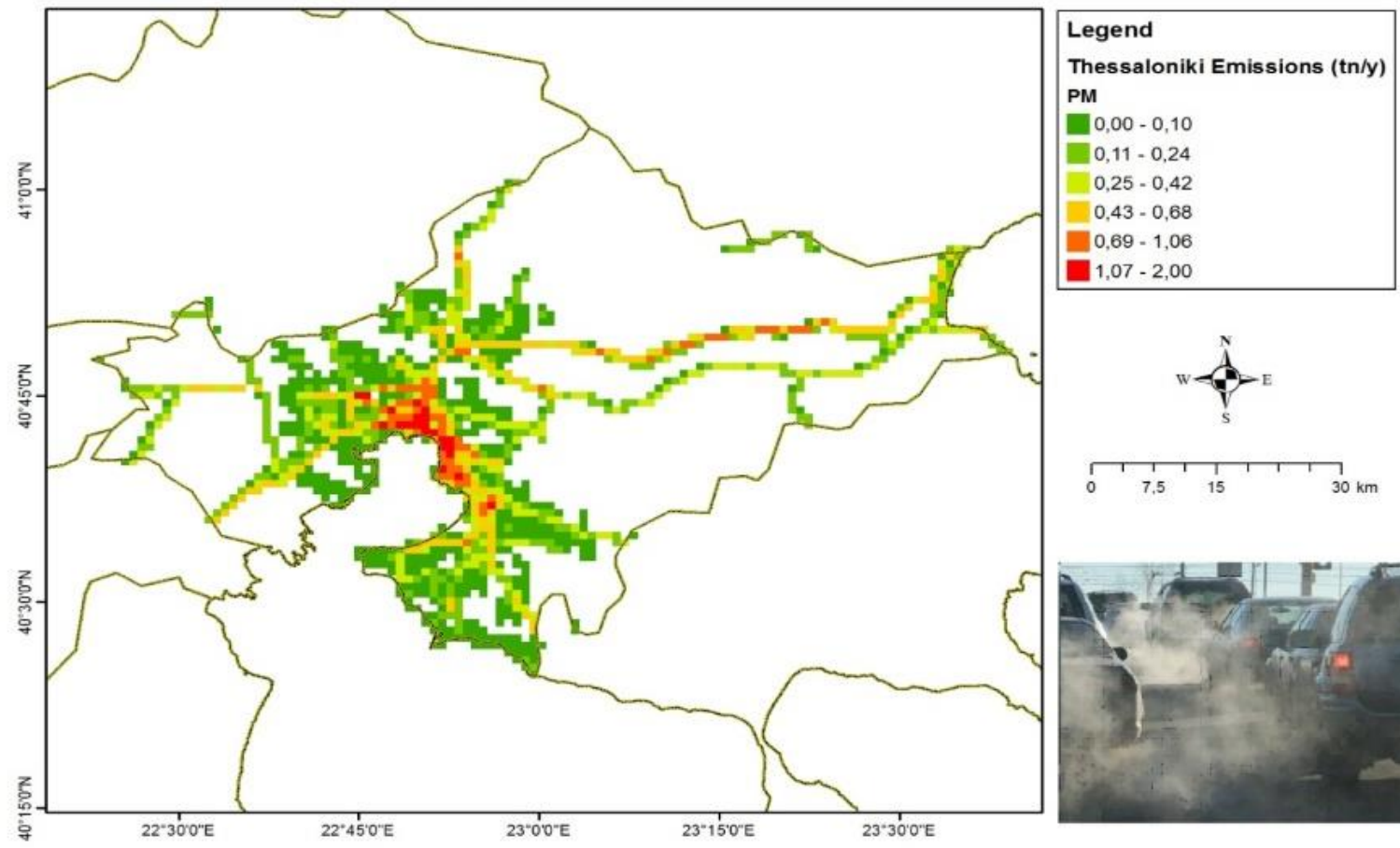
Area of Interest

- LPS
- Traffic station
- Industrial station
- Background station



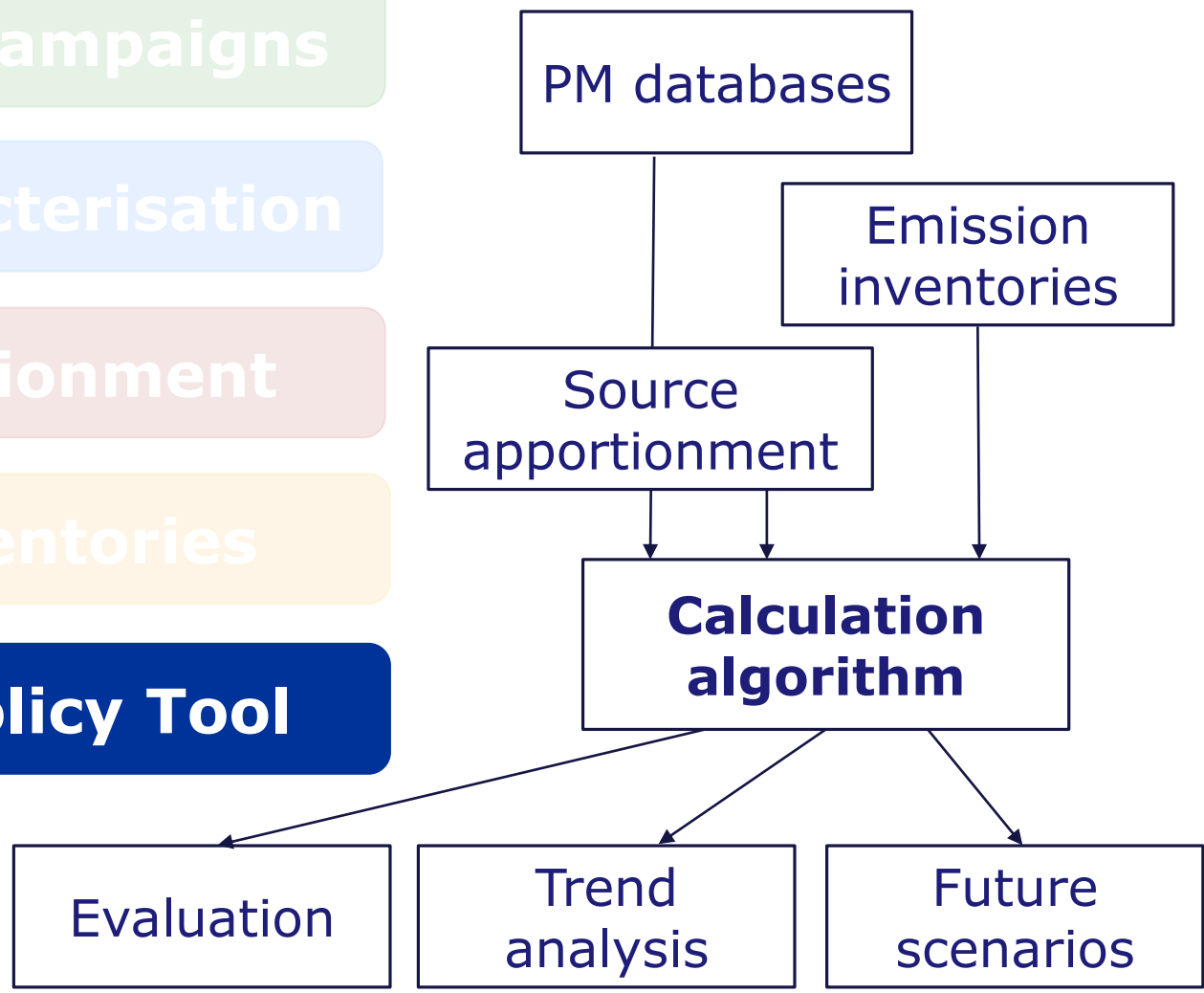
Emission Inventories

THESSALONIKI: ROAD TRANSPORT EMISSIONS





- Measurement campaigns
- Chemical characterisation
- Source Apportionment
- Emission Inventories
- ACEPT-AIR Policy Tool**








ACCEPT-AIR Policy Tool

ACCEPT-AIR

Data Presentation | Scenarios Build-up | DataBase | About | Exit

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development of A Cost Efficient Policy Tool for reduction of particulate matter in AIR



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- Pollutant Measurements
- Emissions**
- Source Apportionment
- Scientific Publications

- Distributions
- Time Series
- Spatial Allocation
- Daily Variation



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Emissions - Time series

Data Info

Region: Volos

Source: Road transport

All years

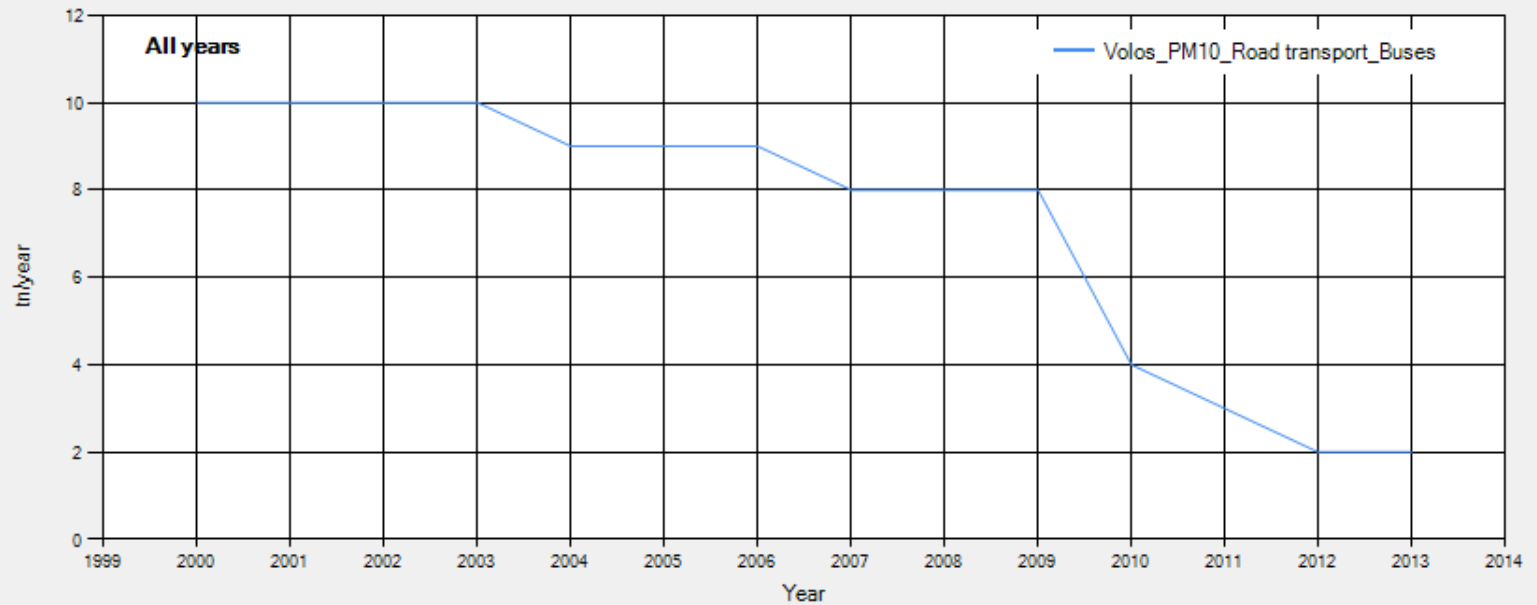
Pollutant: PM10

SubSource: Buses

Monthly variation for year:

Data recall

GraphResults



Data export

Filename: Volos_PM10_Road transport_Buses.xlsx

in: C:\LIFE Progs\ACCEPT-AIR

Change folder

Save

Close



ACEPT-AIR Policy Tool

ACEPT-AIR

Data Presentation **Scenarios Build-up** DataBase About Exit

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Data Presentation Scenarios Build-up **DataBase** About Exit

- PM Concentration Forecast
- Emissions Future Projections**

development of A Cost Efficient Policy Tool for reduction of particulate matter in AIR



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PM Concentration Forecast

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

Data Info

Region: Year: Pollutant:

Scenario build-up

Annual average pollutant concentration ($\mu\text{g}/\text{m}^3$):

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

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

ΔC from background in $\mu\text{g}/\text{m}^3$ (see user's guide):

Area Type:

Source Apportionment Data

Year:

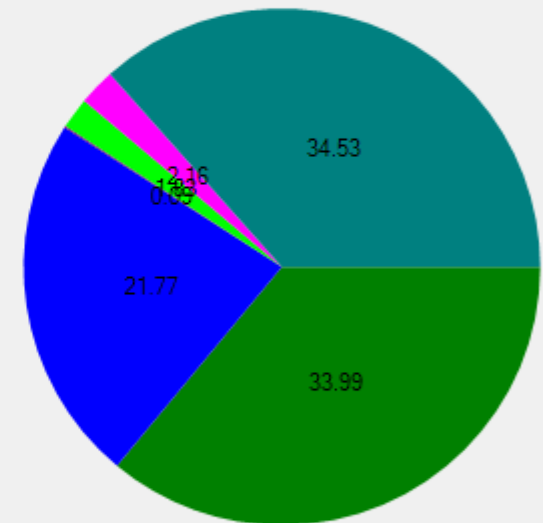


Results

Change in pollutant concentration ($\mu\text{g}/\text{m}^3$):

New pollutant concentration ($\mu\text{g}/\text{m}^3$):

New PM concentration distribution



- TRAFFIC
- BIOMASS BURNING
- SEA SALT
- SOIL DUST
- PORT
- SECONDARY AEROSOL

Data export

Filename:

in:

ACCEPT



European Commission



ACEPT-AIR Policy Tool

The screenshot shows the ACEPT-AIR software interface. The main window has a title bar with 'ACEPT-AIR' and standard window controls. Below the title bar are tabs for 'Data Presentation', 'Scenarios Build-up', and 'DataBase' (which is highlighted with a red box). The main content area displays the title 'ACEPT-AIR Policy Tool' and a subtitle 'development of A Cost Efficient Policy Tool for reducing particulate matter in AIR'. Below this is a large graphic with the ACEPT-AIR logo, 'Life' logo, and 'PM reduction' text, along with images of a city and a building. At the bottom, there is a text block stating 'ACEPT-AIR LIFE+ 09 project is co-funded by the European Commission (LIFE+ Environment Policy and Governance programme) and the Green Fund' with logos for 'Life' and 'GREEN FUND'. A secondary window is open over the main one, showing the 'DataBase' menu with options: 'Source Apportionment', 'Emissions', 'Monthly variation', 'Measurements', 'Back-up / Restore', 'Scientific Publications', and 'Spatial Allocation'. A sub-menu for 'Source Apportionment' is also visible, listing: 'Check Item', 'Rename SA category', 'Add Item', 'Update Item', 'Delete Item', and 'Show all'. An 'Exit' button is located at the bottom right of the secondary window.






ACEPT-AIR Policy Tool

ACCEPT-AIR

Data Presentation Scenarios Build-up DataBase **About** Exit

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About

ACEPT-AIR Policy Tool
 Program Ver. : 2.5
 Date : November 2014



Project Partners

 DEMOKRITOS <small>NATIONAL CENTER FOR SCIENTIFIC RESEARCH</small>	N.C.S.R. "Demokritos"
	University of Thessaly
	Aristotle University of Thessaloniki
	Axon Envirogroup Ltd.
	Technical University of Crete

Contact Details

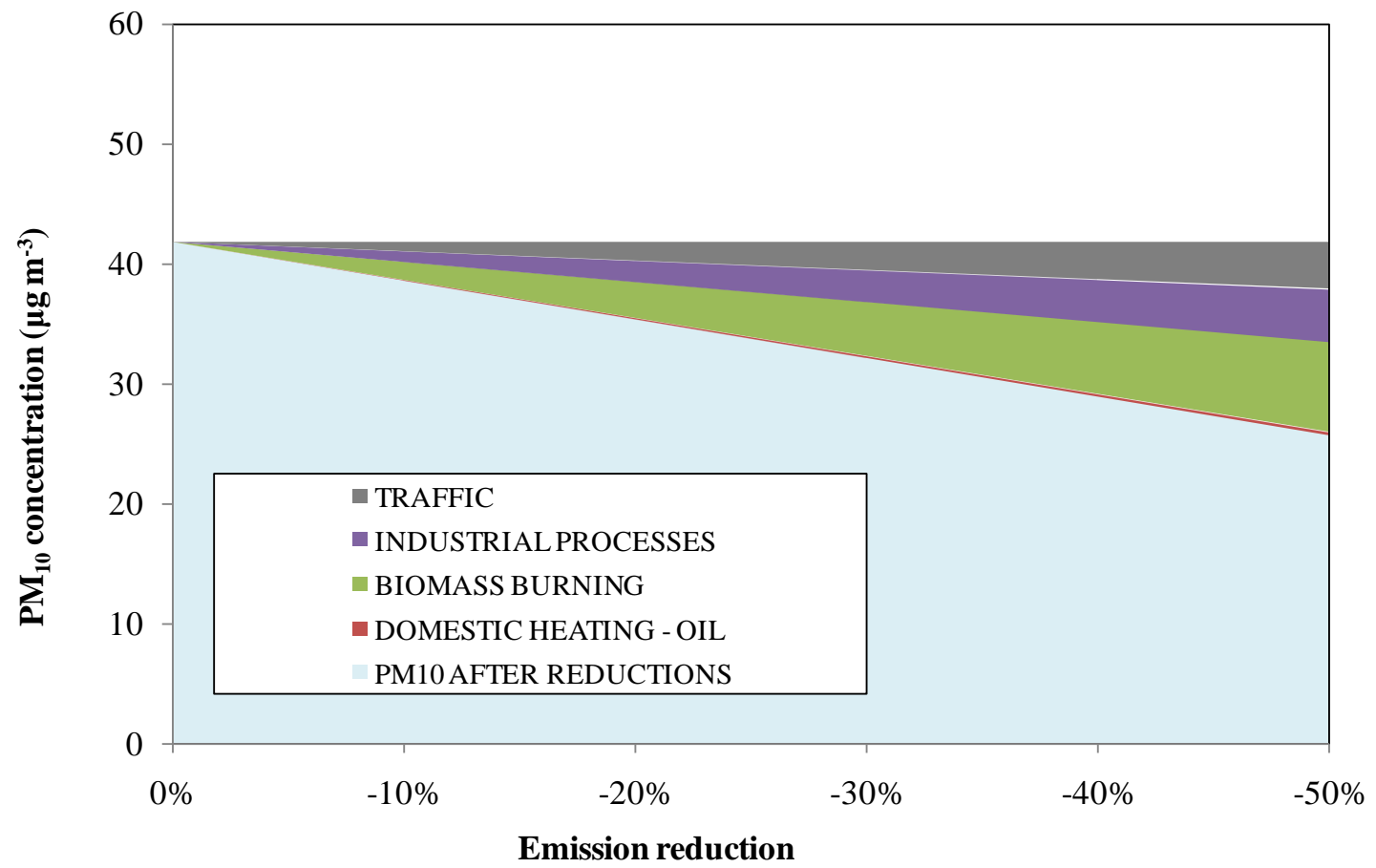
K. Eleftheriadis, Coordinator
 elefther@ipta.demokritos.gr

Close



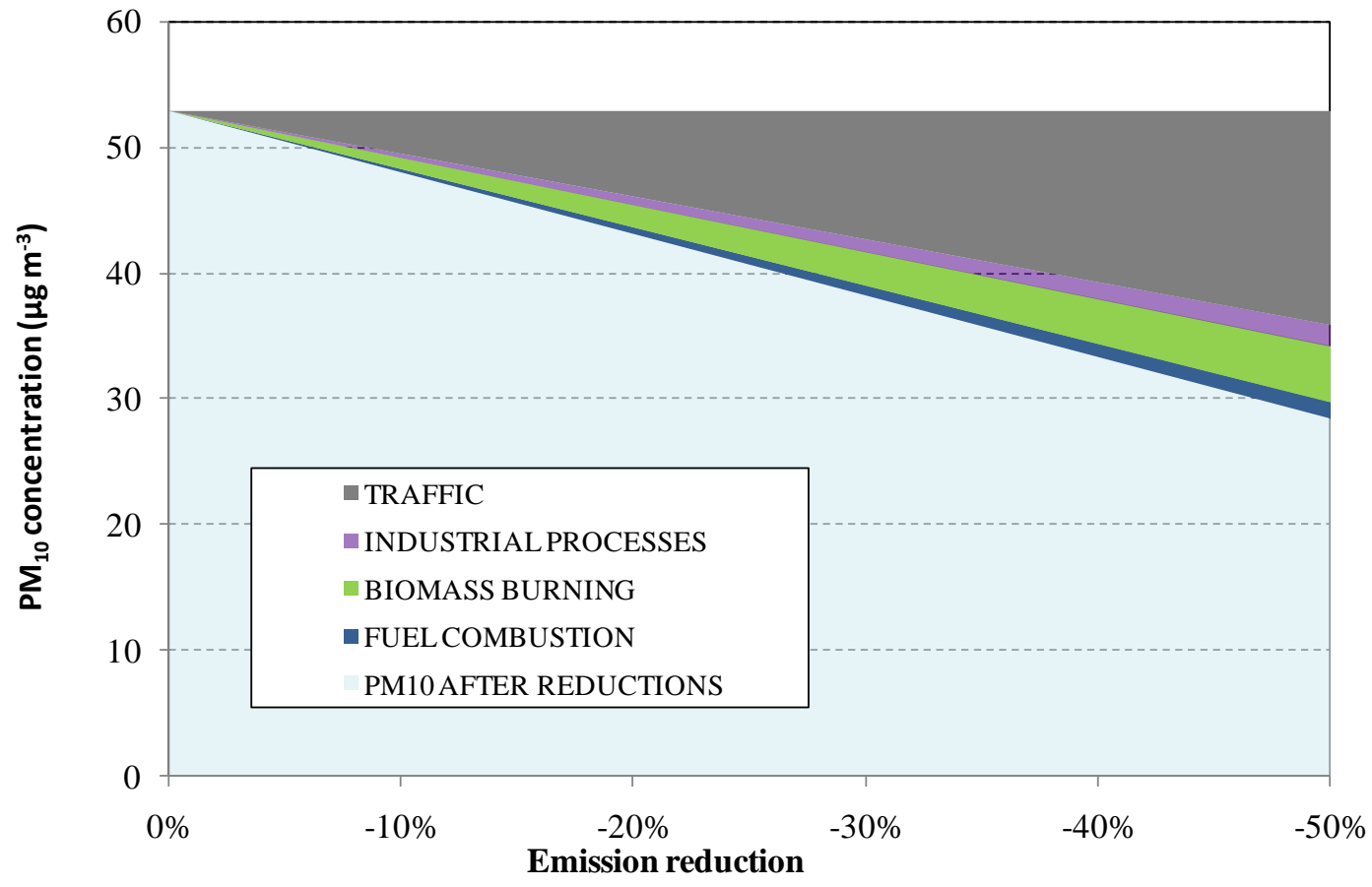
ACEPT-AIR Policy Tool

Athens – Urban background area



ACCEPT-AIR Policy Tool

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



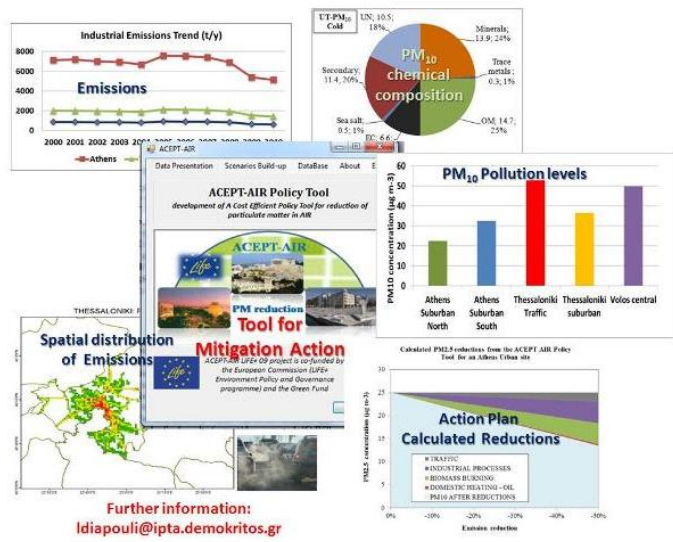
International conference



Secondary education teachers



Thank you for your attention!



<http://www2.ipta.demokritos.gr/accept-air>