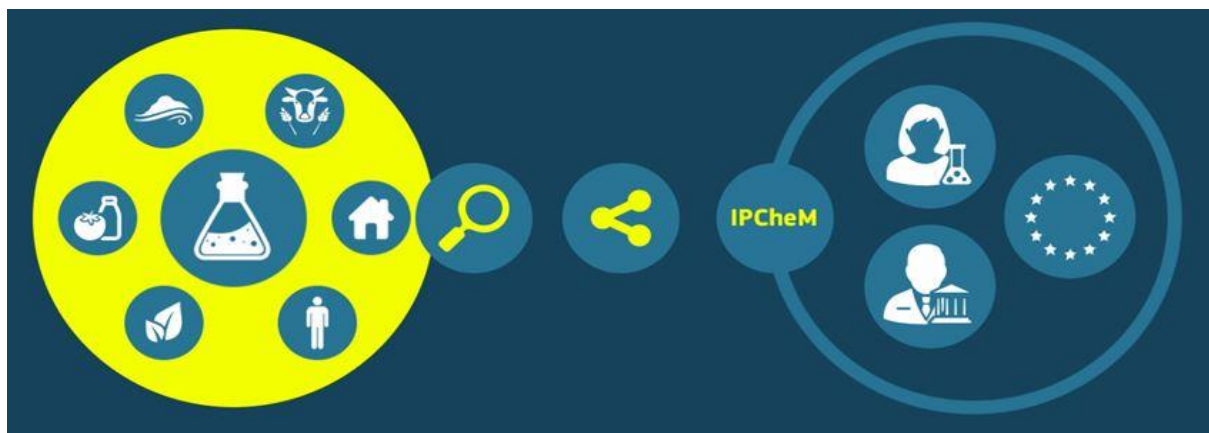


IPCHEM - Information Platform for Chemicals Monitoring

Case study 2 – PM₁₀ in ambient air

Version 2 (December 2018)



<https://ipchem.jrc.ec.europa.eu>

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1 BACKGROUND

To protect human health and the environment as a whole, it is particularly important to reduce emissions of pollutants at source and to identify and implement the most effective emission reduction measures at local, national and European level. Therefore, emissions of harmful air pollutants should be avoided, prevented or reduced and appropriate objectives set for ambient air quality taking into account relevant World Health Organisation standards, guidelines and programmes.

In the *DIRECTIVE 2008/50/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 May 2008 on ambient air quality and cleaner air for Europe*, the EU has set two limit values for particulate matter (PM₁₀) for the protection of human health: the PM₁₀ daily mean value may not exceed 50 micrograms per cubic metre (µg/m³) more than 35 times in a year and the PM₁₀ annual mean value may not exceed 40 micrograms per cubic metre (µg/m³). These limit values are in force since 1st of January 2005.

2 CASE STUDY 2

The case study is focused on the identification of areas in Romania in which the annual mean value for PM₁₀ has exceeded 40 µg/m³ in 2008. The analysis has been undertaken for rural, suburban and urban areas, using the data available in IPCHEM and the tools and functionalities of the platform.

Compound (chemical)	PM₁₀
Medium	Ambient (outdoor) air
Area (region) of interest	Romania: -rural -sub-urban -urban
Limit value	40 µg m⁻³
Time period of interest	2008

3 OPERATIONAL STEPS

3.1 Selection of chemical

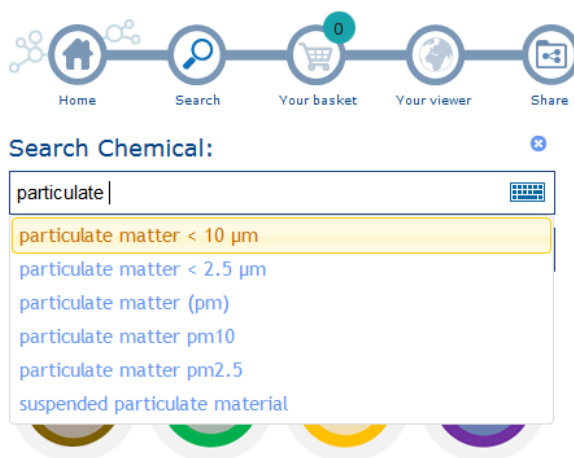
Starting from the IPCHEM home page, click on the search tool 'Search data by Chemical, Media and Country'



Search data by Chemical,
Media and Country

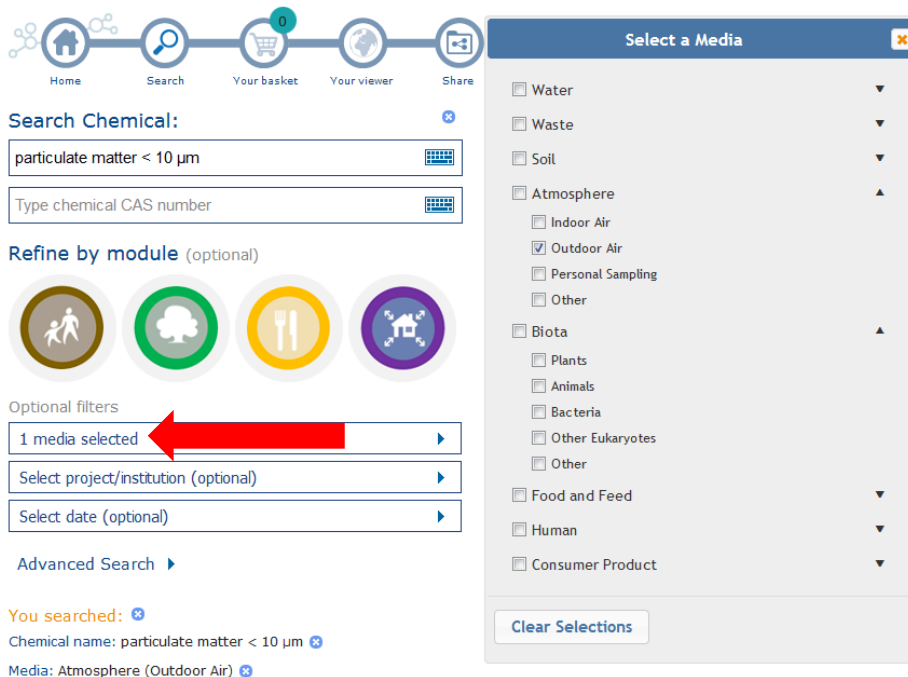
Then follow the steps described below:

→ Type the name of 'particulate matter < 10 μm ' in the field called 'Type chemical name/synonymous', and select the name from the list box.



3.2 Selection of media

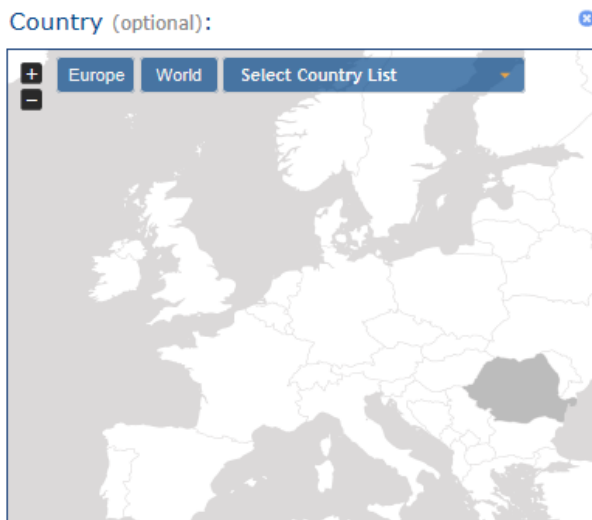
→ Click on the 'Select media (optional)' and choose 'Outdoor air' from the check box list under the check box category named 'Atmosphere'.



The screenshot displays the search interface of the Information Platform for Chemical Monitoring data. At the top, there are navigation icons for Home, Search, Your basket (with a '0' notification), Your viewer, and Share. Below these, the search section includes a 'Search Chemical:' field with the text 'particulate matter < 10 µm' and a 'Type chemical CAS number' field. A 'Refine by module (optional)' section features four circular icons representing different modules. Underneath, 'Optional filters' include '1 media selected' (highlighted with a red arrow), 'Select project/institution (optional)', and 'Select date (optional)'. An 'Advanced Search' link is also present. On the right, a 'Select a Media' panel lists various media types with checkboxes and expand/collapse arrows. The 'Atmosphere' category is expanded, showing 'Outdoor Air' selected. A 'Clear Selections' button is at the bottom of this panel. Below the search filters, the text 'You searched:' is followed by 'Chemical name: particulate matter < 10 µm' and 'Media: Atmosphere (Outdoor Air)'.

3.3 Selection of country

→ Select 'Romania' by clicking directly on the map of Romania or by selecting from the drop-down list of countries.



The screenshot shows the 'Country (optional)' filter section. It features a map of Europe with a dropdown menu labeled 'Select Country List'. The map is currently zoomed out, showing the entire continent. The dropdown menu is open, and the text 'Select Country List' is visible. There are also '+' and '-' icons for zooming in and out of the map.

The results of the query are displayed into the search page: all the data collections available in IPCHEM, which include data on PM₁₀ measured outdoors in Romania, are listed in the same page.

You searched:

Chemical name: particulate matter < 10 µm

Media: Atmosphere (Outdoor Air)

Country: Romania

sorted by displaying 1 to 2 out of 2 results Show entries

< 1 >

AIRBASE
European air quality database

European Environment Agency (EEA) [Metadata Info](#) Data Access:

Chemical Name: particulate matter < 10 µm | CAS Number: null | Media: Atmosphere (Outdoor Air) Environmental

AIRQUALITY
European air quality database

European Environment Agency (EEA) [Metadata Info](#) User Rights:

Chemical Name: particulate matter < 10 µm | CAS Number: null | Media: Atmosphere (Outdoor Air) Environmental

3.4 Selection of the database of interest

→ Select the 'AIRBASE–European air quality database' data collection to access the related data by clicking on the corresponding title in the databases list. By selecting the AIRBASE database, the specific Database Console appears.

→ Select 'Show all sample sites' to display all sampling data sources onto the map.

AIRBASE Data Access:
European air quality database

Click HERE to start bounding

Type of Area

Sampling Matrix

Statistic Name

Statistics Average Group

You are searching:

Chemical Name :

CAS Number :

Media :

Country Name :

Show sample sites by page
 Show all sample sites
 Show sample sites by location

Pick Row(s) or Request Full Table Request Full Table

Page size: Showing 1-10 of 1218

<input type="checkbox"/>	Location	Sample Source	Sampling Date	Conc. Value	Unit of Measure	LOD	LOQ	Media/Setting	Level of Aggregation		
<input type="checkbox"/>	Country: Romania Name: BREASTA Position: exact	Code: R00082A Name: DJ-5	2006	549	µg/m3			Media: Atmosphere (Outdoor Air) Sampling Matrix: aerosol	Statistic Name: maximum Aggregation Period: year Statistics Average Group: hour Statistics Number Valid: 5038 Statistics Percentage Valid: 57,511		

Concentration measurements data are displayed in tabular format (the so-called '*Master Table*') and onto the map, where the coloured points represent the sampling source locations.

3.5 Selection of specific 'filter criteria'

→ Choose some specific filter criteria of '*AIRBASE*', available on the top-right part of the Database Console to narrow the data selection in the following order:

Filter	Value
Type of area	urban
Sampling matrix	aerosol
Statistic Name	annual mean
Statistics Average Group	day
Filter by concentration range	40.5 – 79.142 $\mu\text{g m}^{-3}$ (40 is the limit value for PM_{10} as annual mean)

3.6 Selection of data records

→ According to the performed spatial selection, change the number of data records displayed into the Master table from the '*Page size*' pull down list. By default the page size is set to '10' rows.



If the previous step is omitted only the first 10 rows will be by default selected to store and process their corresponding data into the Basket.

→ Setting the page size to 100 from the drop-down list, the 87 data records matching the filter criteria are displayed into the Master Table.

AIRBASE Data Access: **Public**
European air quality database

Click HERE to start bounding

Type of Area: urban
Sampling Matrix: aerosol
Statistic Name: annual mean
Statistics Average Group: day

You are searching:
Chemical Name: particulate matter < 10 µ
CAS Number:
Media: Atmosphere (Outdoor Air)
Country Name: Romania

Filter by Concentration:
Unit of Measure: µg/m3
Value Range: 40.506 - 79.142

Exclude Non-Detects: LOD LOQ none
Exclude QA Issues: yes no

Show sample sites by page Show all sample sites Show sample sites by location

Pick Row(s) or Request Full Table Request Full Table

Page size: 100 Showing 1-87 of 87

<input type="checkbox"/>	Location	Sample Source	Sampling Date	Conc. Value	Unit of Measure	LOD	LOQ	Media/Setting	Level of Aggregation
<input type="checkbox"/>	Country: Romania Name: TG. MURES Position: exact	Code: RO0042A Name: Sediul APM Targu Mures	2006	79.142	µg/m3			Media: Atmosphere (Outdoor Air) Sampling Matrix: aerosol	Statistic Name: annual mean Aggregation Period: year Statistics Average Group: day Statistics Number Valid: 120 Statistics Percentage Valid: 32.877

→ Select all 87 records to store them into the IPCHEM Basket by picking-up the top box of the first column (indicated by the red arrow in the figure below).

Pick Row(s) or Request Full Table Pick 87 Row(s)

Page size: 100 Showing 1-87 of 87

<input checked="" type="checkbox"/>	Location	Sample Source	Sampling Date	Conc. Value	Unit of Measure	LOD	LOQ	Media/Setting	Level of Aggregation
<input checked="" type="checkbox"/>	Country: Romania Name: TG. MURES Position: exact	Code: RO0042A Name: Sediul APM Targu Mures	2006	79.142	µg/m3			Media: Atmosphere (Outdoor Air) Sampling Matrix: aerosol	Statistic Name: annual mean Aggregation Period: year Statistics Average Group: day Statistics Number Valid: 120 Statistics Percentage Valid: 32.877

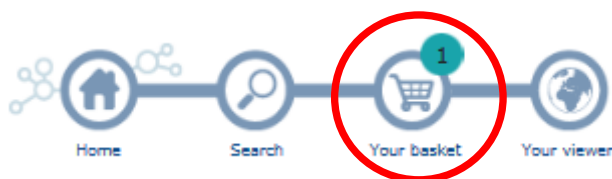
→ Click on 'Pick 87 Row(s)', the white text next to the small shopping basket icon:

Pick 87 Row(s) Showing 1-87 of 87

that will turn into:

Request Full Table Showing 1-87 of 87

The number '1' appears at the top of the screen, next to the shopping basket icon, indicating that one sub-set of selected (picked-up) data has been added to the IPCHEM Basket.




→ Repeat all steps from the beginning of section 3.6, this time changing only the filter '*Type of Area*' on the top right of the screen first to '*sub-urban*' and then to '*rural*'. Each time the concentration filter should be set at $40 \mu\text{g}/\text{m}^3$.

Upon completion of these steps, the 3 selected picked-up data selections of the '*AIRBASE*' database for each type of area (i.e. '*Urban*', '*Sub-urban*' and '*Rural*') are stored into the IPCHEM Basket.



3.7 Visualisation of selected data

→ Select the shopping basket icon of the menu bar and enter into the IPCHEM Basket tool.

→ Pick up the three datasets and click on the  '*Processing*' icon (indicated by the red circle in the figure below) to process the selected data and prepare a zip folder to download for offline data analysis.

Your Basket

		Chemical name	CAS	Country	Database	Criteria	Status	Viewer
1	<input checked="" type="checkbox"/>	particulate matter < 10 µm		Romania	AIRBASE	+	to process (pick) [87]	
2	<input checked="" type="checkbox"/>	particulate matter < 10 µm		Romania	AIRBASE	+	to process (pick) [8]	
3	<input checked="" type="checkbox"/>	particulate matter < 10 µm		Romania	AIRBASE	+	to process (pick) [2]	

Showing 1 to 3 of 3 entries



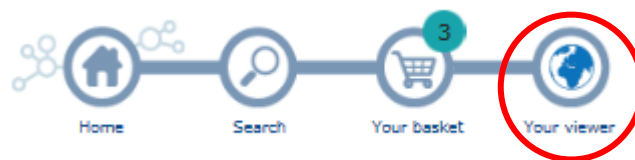
1 European air quality database
European Environment Agency (EEA)

[Metadata Info](#)

Picked Measures

Chemical Name	CAS Number	Country Code	Country Name	Sample Source Code	Sample Source Name	Concentration Value	Unit of Measure	Sampling Date	LOD	LOQ	Media	Samp Mat
particulate matter < 10 µm	null	ROU	Romania	RO0042A	Sediul APM Targu Mures	79.142	µg/m3	2006	null	null	Atmosphere (Outdoor Air)	aeros
particulate matter < 10 µm	null	ROU	Romania	RO0067A	B3 Mihai Bravu	75.809	µg/m3	2004	null	null	Atmosphere (Outdoor Air)	aeros
particulate matter < 10 µm	null	ROU	Romania	RO0042A	Sediul APM Targu Mures	75.702	µg/m3	2003	null	null	Atmosphere (Outdoor Air)	aeros

→ Select the 'Viewer/globe' icon to enter the IPCHEM Viewer tool:



Each of the selected data that were saved into the IPCHEM Basket tool is also available as spatial layer in the IPCHEM Viewer.

→ Pick-up the check-box in the 'Actions' column and then click on the “+” button to open the IPCHEM Editor Console.



The screenshot shows the IPCHEM Editor Console interface. At the top, there is a search bar labeled "Enter location" and a toolbar with icons for map navigation and PDF export. Below the search bar is a map of Europe with several blue dots representing data points. The map includes labels for countries like Belarus, Ukraine, and Romania, and cities like Minsk, Kyiv, and Bucharest. Below the map is a "Query results" table with the following columns: Database, Chemical name, CAS, Country, Media, and Actions.

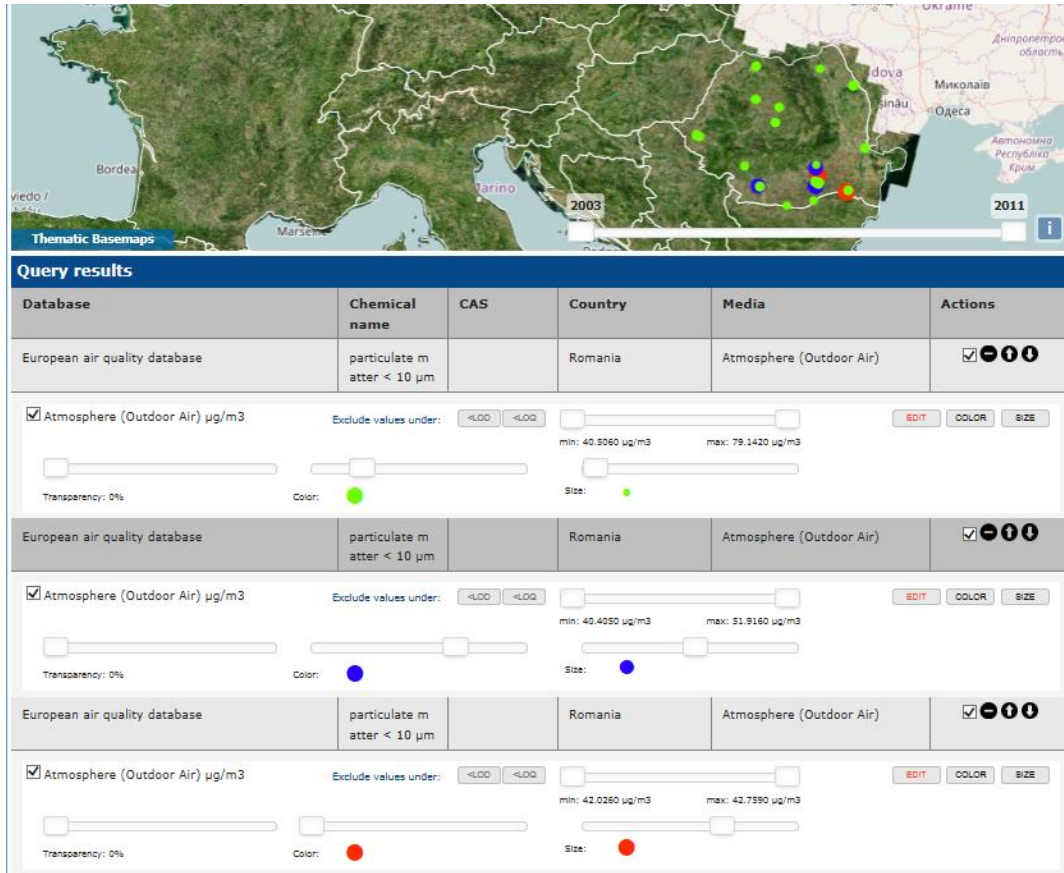
Database	Chemical name	CAS	Country	Media	Actions
European air quality database	particulate matter < 10 µm		Romania	Atmosphere (Outdoor Air)	<input checked="" type="checkbox"/> + - ↕

Below the table, there is a filter section for "Atmosphere (Outdoor Air) µg/m3" with a checked checkbox. It includes a range slider for "Exclude values under:" with a minimum value of 40.5060 µg/m3 and a maximum value of 79.1420 µg/m3. There are also buttons for "EDIT", "COLOR", and "SIZE".

→ By selecting 'EDIT' from the IPCHEM Editor Console it is possible to change the 'colour', 'size' and transparency of the data (points) which are displayed onto the map.

The screenshot shows the "EDIT" panel for the data points. It includes a checked checkbox for "Atmosphere (Outdoor Air) µg/m3" and a range slider for "Exclude values under:" with a minimum value of 40.5060 µg/m3 and a maximum value of 79.1420 µg/m3. There are buttons for "EDIT", "COLOR", and "SIZE". Below these are three sliders: "Transparency: 0%", "Color: [green dot]", and "Size: [small dot]".

→ Edit the three layers and choose the desired colour for each type of area (e.g. for rural=green colour; for urban= blue colour; for sub-urban=red colour).



Database	Chemical name	CAS	Country	Media	Actions
European air quality database	particulate matter < 10 µm		Romania	Atmosphere (Outdoor Air)	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Atmosphere (Outdoor Air) µg/m3 Exclude values under: <LOD <LOQ min: 40.5060 µg/m3 max: 79.1420 µg/m3 Transparency: 0% Color: ● Size: ●					
European air quality database	particulate matter < 10 µm		Romania	Atmosphere (Outdoor Air)	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Atmosphere (Outdoor Air) µg/m3 Exclude values under: <LOD <LOQ min: 40.4080 µg/m3 max: 51.9160 µg/m3 Transparency: 0% Color: ● Size: ●					
European air quality database	particulate matter < 10 µm		Romania	Atmosphere (Outdoor Air)	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Atmosphere (Outdoor Air) µg/m3 Exclude values under: <LOD <LOQ min: 42.0260 µg/m3 max: 42.7590 µg/m3 Transparency: 0% Color: ● Size: ●					

→ Select the time-period (2008) and fine tune the data selection by moving the time-slider accordingly.



The following results appear on the map:

Your Viewer

Database	Chemical name	CAS	Country	Media	Actions
European air quality database	particulate matter < 10 µm		Romania	Atmosphere (Outdoor Air)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

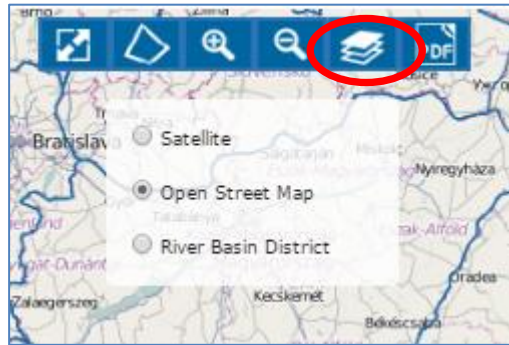
Atmosphere (Outdoor Air) µg/m3 Exclude values under: <LOQ <LOQ min: 40.5060 µg/m3 max: 79.1420 µg/m3
 Transparency: 0% Color: ● Size: ●

To show the size of the spots proportionally to the concentration of PM₁₀, select the 'size' button in the right side of the IPChem Editor Console.

The following result appears on the map:

Your Viewer

→ Choose 'Open Street Map' as Basemap layer in the tool bar menu of the IPCHEM Viewer, to identify the name of the specific sampling data source location of interest.



The outcome of this specific search performed in the context of Case Study 2 showed that:

- None of the monitored rural areas exceeded the annual mean of $40 \mu\text{g}/\text{m}^3$ of PM_{10} in 2008.
- 8 urban areas exceeded the annual mean of $40 \mu\text{g}/\text{m}^3$ of PM_{10} in 2008.
- 2 sub-urban areas exceeded the annual mean of $40 \mu\text{g}/\text{m}^3$ of PM_{10} in 2008.