IPCheM - Information Platform for Chemicals Monitoring

Case study 2 – PM$_{10}$ in ambient air

Version 01 (26.07.2016)

https://ipchem.jrc.ec.europa.eu
TABLE OF CONTENTS:

1 Background ................................................................................................................................. 4
2 Case Study 2 ............................................................................................................................... 4
3 operational steps ......................................................................................................................... 5
  3.1 Selection of Chemical .............................................................................................................. 5
  3.2 Selection of media .................................................................................................................... 5
  3.3 Selection of Country ............................................................................................................... 6
  3.4 Selection of the database of interest ....................................................................................... 7
  3.5 Selection of specific ‘filter criteria’ ....................................................................................... 7
  3.6 Selection of data records ....................................................................................................... 8
  3.7 Visualisation of selected data ................................................................................................ 10
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 DIREKTIVE 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 (PM\textsubscript{10}) for the protection of human health: the PM\textsubscript{10} daily mean value may not exceed 50 micrograms per cubic metre (µg/m\textsuperscript{3}) more than 35 times in a year and the PM\textsubscript{10} annual mean value may not exceed 40 micrograms per cubic metre (µg/m\textsuperscript{3}). The limit values are in force since 1\textsuperscript{st} 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 PM\textsubscript{10} has exceeded 40 µg/m\textsuperscript{3} in 2008. Analysis conducted for rural, suburban and urban areas, using the data available in IPCheM and the tools and functionalities of the platform.

<table>
<thead>
<tr>
<th>Compound (Chemical)</th>
<th>PM\textsubscript{10}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>Ambient (outdoor) Air</td>
</tr>
<tr>
<td>Area (region) of interest</td>
<td>Romania:</td>
</tr>
<tr>
<td></td>
<td>- Rural</td>
</tr>
<tr>
<td></td>
<td>- Sub-urban</td>
</tr>
<tr>
<td></td>
<td>- Urban</td>
</tr>
<tr>
<td>Limit value</td>
<td>40 µg m\textsuperscript{3} (annual mean)</td>
</tr>
<tr>
<td>Time period of interest</td>
<td>2008</td>
</tr>
</tbody>
</table>
3  OPERATIONAL STEPS

3.1  Selection of Chemical

→ Select 'particulate matter <10 µm' from the 'Search Chemical by name' box.

3.2  Selection of media

→ Select 'outdoor air' from the 'by media' check box list.
3.3 Selection of Country

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

The results of the query are displayed on the search page: all the data collections available in IPCheM, which include data on PM$_{10}$ measured outdoors in Romania, are listed in the same page. In this case only the AIRBASE database fulfils the requested criteria.
### 3.4 Selection of the database of interest

→ Select the AIRBASE 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.

Concentration measurements data are displayed in tabular format (the so-called ‘Master Table’) and into the map, where points represent the sampling source locations.

![AIRBASE Database Console](image)

### 3.5 Selection of specific 'filter criteria'

→ Set the specific to the AIRBASE database filter criteria, available on the top-right part of the Database Console to narrow the data selection in the following way:

<table>
<thead>
<tr>
<th>Filter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling matrix</td>
<td>Aerosol</td>
</tr>
<tr>
<td>Type of area</td>
<td>Urban</td>
</tr>
<tr>
<td>Filter by concentration range</td>
<td>40 – 79.142 µg m⁻³</td>
</tr>
<tr>
<td></td>
<td>(40 is the limit value for PM10 as annual mean)</td>
</tr>
</tbody>
</table>
3.6 Selection of data records

→ According to the performed spatial selection, change the number or 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 95 data records matching the filter criteria are displayed into the Master Table.

→ Select all 95 records to store them into the Basket by “picking-up” the top box of the first column (indicated by the red arrow in the figure below).
→ Click on the white text near to the small Shopping Basket icon:

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

→ Repeat all steps from the beginning of section 3.6, this time changing the filter “Type of Area” on the top right of the screen first to 'sub-urban' and then to 'rural'.

When finished 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 Basket.

Note: each time the concentration filter should be set at 40 µg/m$^3$. 
3.7 Visualisation of selected data

→ Select the globe symbol from the tool bar menu of IPCheM and enter into the IPCheM viewer. Each of the selected data that were saved into the 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’.

By selecting “Edit” from the Editor Console it is possible to change the colour, size and transparency of the data (points) which are displayed on the map.

→ Edit the three layers and choose the desired colour for each type of area (rural, urban, suburban).

→ Select the time-period and fine tune the data selection (2008) by moving the time-slider accordingly.
The following result appear on the map:

To show the size of the spots proportionally to the concentration of PM$_{10}$ select the 'size' button.

The following result appears on the map:
Choose “Open Street Map” as Basemap layer in the tool bar menu of the 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 µg/m³ of PM$_{10}$ in 2008.
- 7 urban areas exceeded the annual mean of 40 µg/m³ of PM$_{10}$ in 2008.
- 2 sub-urban areas exceeded the annual mean of 40 µg/m³ of PM$_{10}$ in 2008.