AirExplorer
Web-Based Air Quality Data Visualization & Access Tool

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Outline

• Quick comparison of AirExplorer to other publicly available EPA data visualization / data access tools
• Descriptions of the AirExplorer menu options and example outputs
• FYI – Things you should know
• Feedback

http://epa.gov/airexplorer
Air Explorer

When you want to ‘see’ air pollution data, you have choices!

AQS

AirNow

AirData

AirExplorer
When you want to ‘see’ air pollution data, you have choices!

The AQS client is the alpha source for ambient data
It has a powerful query facility (standard reports & ‘design your own’)
But … An account is required; there are no graphics / maps; and no ‘processed’ data

Each choice has advantages & disadvantages!
AirExplorer

When you want to ‘see’ air pollution data, you have choices!
Air Explorer

When you want to ‘see’ air pollution data, you have choices!

AIRNow

• AIRNow is the media favorite pollution data dissemination tool
• It shows the most current monitoring data in map form
• But … It only contains ozone and PM2.5 data; the data are not ‘certified’; the PM2.5 data aren’t FRM/FEM; and there is no public access data extraction utility

Each choice has advantages & disadvantages!
AirExplorer

When you want to ‘see’ air pollution data, you have choices!
AirData is the most popular public access data extraction and mapping tool.

- You can get all types of ambient data (criteria, PAMS, HAPS, meteorological); a plethora of site/monitor meta data; and it also provides emission inventories.
- It is well-supported.
- But, the data are not ‘real-time’, and there are no ‘processed’ data available.
Air Explorer

When you want to ‘see’ air pollution data, you have choices!
When you want to ‘see’ air pollution data, you have choices!

Each choice has advantages & disadvantages!

**AirExplorer**

- Designed primarily to help data analysts access / visualize / explore air quality data to answer routine questions.
- It generates unique interactive/portable maps and graphs.
- It allows quick-n-easy download of popular air pollution data sets … including ‘processed’ PM2.5 speciation data.
- But, the data are not ‘real-time’ and not all ambient data are available.
Map One Day
Generate a three-dimensional, interactive map of daily pollutant concentrations

Step 1: Select Pollutant
Select Pollutant

Step 2: Select Date
JAN 01 2005

Step 3: Select Options
Include Exceptional Events?
Yes ☐ No ☑
Interactive Graph?
Yes ☑ No ☐

Install the plug-in to view interactive graphics on this site.

Step 4: Submit Selections
After map is generated, right-click to display interactive controls and help options.

Submit

- Generates a 3-D interactive map of daily pollutant-specific AQI values.
- Aggregates by MSA – highest concentration in area used.
- Available pollutants: CO, SO₂, Ozone (max 8-hr), PM₁₀, PM₂.₅
- Include or exclude exceptional event data.
- Interactive option.
Examples outputs: Maps – Map One Day

PM2.5 AQI Values by MSA on 01/01/2000

- Bar (column) color and height correspond to AQI level
- Interactive / portable features include: cursor over for ID info, rotate, move, zoom, subset, and reset
Map Several Days
Generate an animated series of daily concentration maps for a specific time period

Step 1: Select Pollutant
- CO

Step 2: Select Dates
From
- JAN
- 01
- 2005
To
- JAN
- 01
- 2005

Step 3: Select Options
Include Exceptional Events?
- Yes
- No

Step 4: Submit Selections
Larger data sets take longer to process.
Submit

- Generates an animated series of daily site-level, pollutant-specific AQI values (for criteria pollutants) or concentration ranges (for key PM2.5 species)
- Available pollutants: CO, SO$_2$, Ozone (max 8-hr), PM$_{10}$, PM$_{2.5}$, carbon, nitrate, sulfate
- Ten years of available data (currently, 1996 – 2005)
- Include or exclude exceptional event data
Example outputs: Maps – Map Several Days (Example 1)

PM2.5 AQI Values by site on 07/04/2002

- For criteria pollutants, dot color corresponds to AQI level
- Animation is portable.
- Useful for identifying episodes and associated scales

Source: EPA’s Air Explorer (http://www.epa.gov/airexplorer)
Generated on: 31OCT06
Example outputs: Maps – Map Several Days (Example 2)

Carbon Concentrations by site on 07/04/2002

• For PM$_{2.5}$ species (e.g., carbon), dot color corresponds to concentration range.
• Animation is portable.
• Useful for identifying episodes and associated scales
Descriptions of the menu options: Maps – Tile AQI Values

- Plots daily AQI values for a specific location (county or MSA) and time period (year)
- Available pollutants: CO, SO2, Ozone (max 8-hr), PM10, PM2.5.
- Ten years of available data (currently, 1996 – 2005)
- Include or exclude exceptional event data
Example outputs: Maps - Tile AQI Values

Daily Ozone AQI Levels in 2002
Los Angeles—Long Beach, CA

- Shows pollutant-specific AQI value ranges (highest in area) for each day of a year.
  Each day is represented by a color tile.
- Rows are day-of-week (7); columns are weeks (52 or 53)
- Useful for identifying seasonal and day-of-week patterns
Descriptions of the menu options: Graphs – Plot Concentrations

- Generates a time series plot for a specific location (one or more sites) and time period.
- Available pollutants: Pb, CO, SO2, NO2, Ozone (max 8-hr), PM10, PM2.5.
- Tool shows available sites by county or MSA. Pick one, multiple, or ‘all’ sites.
- Ten years of available data (currently, 1996 – 2005)
- Include or exclude exceptional event data
- Interactive option
**AirExplorer**  
Example outputs: Graphs – Plot Concentrations

Daily Pb Concentrations from 01/01/05 to 12/31/05

**STATE_NAME=Missouri**  **COUNTY_NAME=Jefferson**  **MSA_NAME=St, Louis,MO-IL**  **SITE=290990016**  **POC=1**

- Plots daily concentration levels for specified time period.
- Multiple sites are plotted separately.
- Uses same y-scale for multiple site plots.
- Interactive / portable features include: cursor over for ID info, move, zoom, subset, and reset.
**Air Explorer**

**Descriptions of the menu options:**
**Graphs – Plot AQI Values**

- Plots PM2.5 and ozone AQI values for a specific location (MSA) and time period.
- Aggregates by MSA – highest concentrations (for PM2.5 & O3) in area for each day.
- Ten years of available data (currently, 1996 – 2005)
- Include or exclude exceptional event data
- Include/exclude y-axis labels and category counts
Example outputs: Graphs – Plot AQI Values

Daily Ozone and PM2.5 AQI Values from 01/01/05 to 12/31/05
Pittsburgh, PA

- Ozone plotted as circles, PM2.5 as dots
- Same y-scale used for all plots
Plot Speciation Data
Plot daily PM2.5 speciation data for a specific location and time period.

- Plots daily PM2.5 speciation data (key components) for a specific location (MSA or County) and time period.
- Include or exclude exceptional event data.
- Multiple sites in an area are plotted separately.
- All STN data (2001 ->) available.
Example outputs: Graphs – Plot Speciation Data

Daily PM2.5 Concentrations from 01/01/04 to 12/31/04

STATE_NAME= Montana, COUNTY_NAME= Lincoln, USA_NAME= Not in a USA SITE= SC0090018 POC= 5

- Plots: Total PM2.5 mass (black); sulfate (yellow); nitrate (red), ammonium (green); total carbon (grey); crustal (brown)

Descriptions of the menu options: Graphs – Plot Benzene Data

- Option produces boxplot time series.
- Maps show location of sites with valid data.
- Plot annual or quarterly averages.
- Uses all available 24-hr benzene data from 1999 >
- Select by State; all sites in State plotted (separately).
Example outputs: Graphs – Plot Benzene Data

**Annual Benzene Concentrations**

SITE=060371901  POC=2  CITY_NAME=Pico Rivera  NSA_NAME=Los Angeles-Long Beach, CA

- Box depicts interquartile range and median; whiskers depict 5th and 95th percentiles; dots identify averages (annual or quarterly); number of observations shown on top.

Source: EPA's Air Explorer (http://www.epa.gov/airexplorer/)
Generated on: DIMY98

- Box depicts interquartile range and median; whiskers depict 5th and 95th percentiles; dots identify averages (annual or quarterly); number of observations shown on top.
Descriptions of the menu options: Data – Query Concentrations

- View 24-hr criteria pollutant data online or download in .csv format.
- Available pollutants: Pb, CO, SO2, NO2, Ozone (max 8-hr), PM10, PM2.5.
- Tool shows available sites by county or MSA. Pick one, multiple, or ‘all’ sites.
- Ten years of available data (currently, 1996 – 2005)
- Include or exclude exceptional event data
## Example outputs: Data – Query Concentrations

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<th>PCTOBS</th>
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- Fields: Date, SITE, POC, Concentration, FLAG, NOBS, PCTOBS, STATE_NAME, COUNTY_NAME, CITY, CITY_NAME, ADDRESS, AQCR, AQCR_NAME, UAR, UAR_NAME, LAND_USE, LOCATION, LATITUDE, LONGITUDE, UTM_ZONE, UTM_NORTHING, UTM_EASTING, ELEVATION, REGION, MSA, POP, MSA_NAME
Descriptions of the menu options:
Data – Query Speciation Data

Query Speciation Data
View or download daily PM2.5 speciation data for a specific location and time period

New!
SANDWICH’ed speciation data now available!

- View speciation data online or download in .csv format.
- Choose ‘traditional’ processed ambient data or SANDWICH estimates.
- All STN data (2001 ->) available in traditional format; subset available as SANDIWHICH estimates.
- Select ‘all sites’ in the country or pick by county, MSA, or EPA Region.

The SANDWICH technique uses the speciation data to provide estimates of the PM2.5 components as they might be measured by the PM2.5 reference method.
[In general,
Example outputs: Data – Query Speciation Data

‘Traditional' processed data …"Ambient PM2.5 Speciation Data (All measured and computed components)"

<table>
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<th>zinc</th>
<th>strontium</th>
<th>sulfur</th>
<th>tantalum</th>
<th>terbium</th>
<th>rubidium</th>
<th>potassium</th>
<th>yttrium</th>
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<th>wolfram</th>
<th>AMMONIUM</th>
<th>Sodium Ion</th>
<th>potassium Ion</th>
<th>Organic Carbon as measured (NIOSH)</th>
<th>Organic C: Blank Adj</th>
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- Fields: DATE, SITE, POC, STATE_NAME, COUNTY_NAME, CITY, CITY_NAME, ADDRESS, AQCR, AQCR_NAME,, UAR, UAR_NAME, LAND_USE, LOCATION, LATITUDE, LONGITUDE, UTM_ZONE, UTM_NORTHING, UTM_EASTING, UNITS, UNIT_DESC, TYPE, REGION, MSA, MSA_NAME, stype, FLAG, Min Amb Temp, Max Amb Temp, Avg Amb Temp, Min BP, Max BP, Avg BP, PM2.5 Mass Collocated FRM, PM2.5 Mass, Antimony, arsenic, aluminum, barium, bromine, cadmium, calcium, chromium, cobalt, copper, chlorine, cerium, cesium, europium, gallium, iron, hafnium, lead, indium, manganese, iridium, molybdenum, nickel, magnesium, mercury, gold, lanthanum, niobium, phosphorus, selenium, tin, titanium, samarium, scandium, vanadium, silicon, silver, zinc, strontium, sulfur, tantalum, terbium, rubidium, potassium, yttrium, sodium, zirconium, wolfram, AMMONIUM, Sodium Ion, potassium Ion, Organic Carbon as measured (NIOSH), Organic Carbon Blank Adjusted, Organic Carbon Mass (k=1.4), NITRATE, Elemental Carbon, Carbonate Carbon, Volatile Nitrate, Non Volatile nitrate, SULFATE, Total Carbonaceous Mass, CRUSTAL, RCFM_urban, FN_ammsulfate_sulfate, FN_ammnitrate (NO3*1.29), heiregion, dayofweek
Remember:  http://epa.gov/airexplorer

• Criteria pollutant and speciation data were updated last week!
• In the future, plan to link directly to the source data (e.g., AQS), eliminating the need to update manually. Also, plan to provide access to other data sets (e.g., design values, emissions inventories).
• Need to hear status updates for AQS Data Mart & AirQuest!
• Contacts:
  • David Mintz:  mintz.david@epa.gov (919) 541-5224.
  • Mark Schmidt:  schmidt.mark@epa.gov (919) 541-2416.
AirExplorer - Feedback

• Comments?
• Suggestions?
• Betting tips?