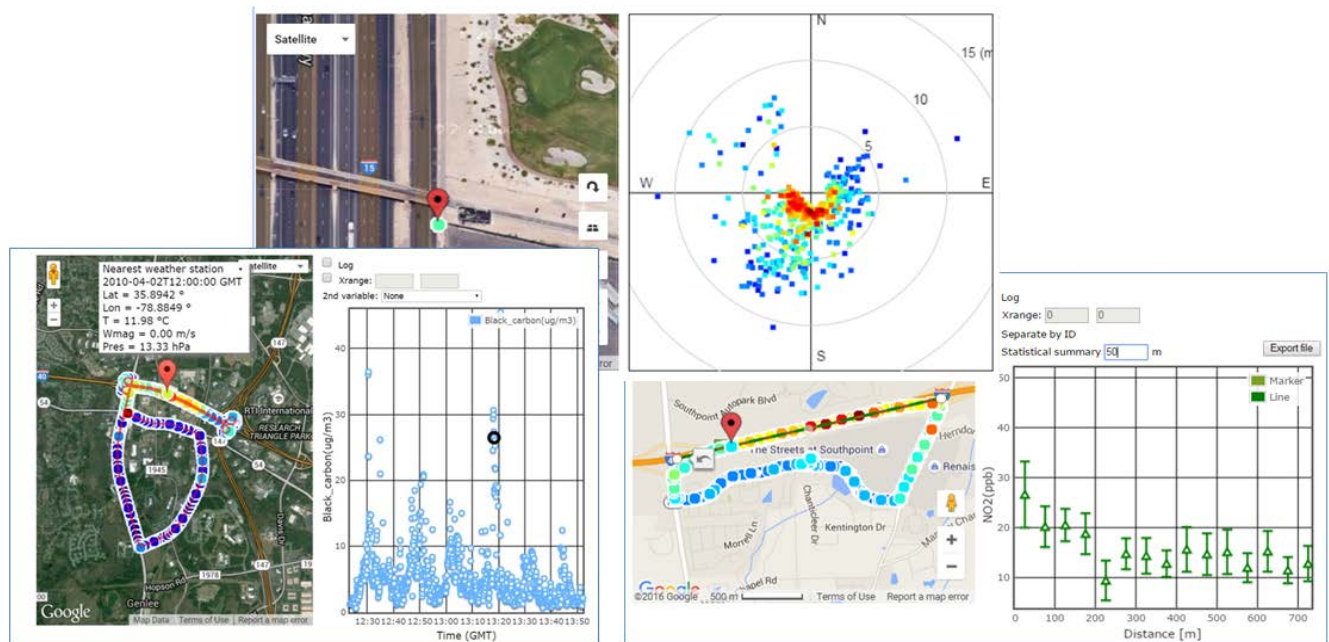


REAL-TIME GEOSPATIAL DATA VIEWER (RETIGO) AN ENVIRONMENTAL PROTECTION AGENCY WEB-BASED TOOL FOR RESEARCHERS AND CITIZEN SCIENTISTS TO EXPLORE THEIR MEASUREMENTS



Screenshots showing RETIGO in action, where different example data sets are displayed on a map, as a time series, as a function of wind direction, and as 50 meter spatial averages relative to the distance from a highway.

Visualizing measurement data gets easier

Environmental measurements are now being conducted by more and more individuals and groups, as new technologies are available that are less costly, easier to use, and more portable. In the air quality field, air measurements can now be conducted in stationary positions using small sensor packages. Other air measurements are conducted in a mobile fashion, such as placing sensors on a bicycle, car, or hand-carrying a small monitor.

Whether using low-cost or high-end measurement equipment,

visualizing and exploring air pollution data can be challenging. Some desirable graphics to produce, such as how pollution varies by location and during the time of day (time and space), or how pollution levels change with wind speed and direction, can require significant time to develop. This is where RETIGO can help.

What is RETIGO and why was it created?

RETIGO is a web-based tool developed by the U.S. Environmental Protection Agency and designed to reduce technical barriers to visualize

collected air quality data, enabling users to explore geospatial air data over time and space. The program is publically available and designed to be easy to use by professional researchers and citizen scientists.

What are the benefits of using RETIGO?

RETIGO is a “plug and play” type tool that enables users to input large and complex data such as pollution concentrations, wind speed and other meteorological conditions, time of day, and location (global positioning). They can then plot

the data on a map and on several graph options to observe trends.

How does RETIGO help me explore my data?

Once your data are uploaded to RETIGO, you can overlay the data on a map, plot as a function of time, plot as a function of distance to location you select on the map (e.g., a highway), or, if your data set includes wind measurements, you can also plot your pollution as a function of wind speed and direction.

If your data has multiple pollutants, you can toggle between pollutant types to change what is displayed on the map and graphs. If you want to focus on data collected for part of the mapped area, you have an option to manually draw a box on the map to isolate only the location of interest.

When I upload my data, is it being stored by RETIGO or the EPA?

It is your choice. The default option allows RETIGO to run entirely on your local browser. In this mode, your data never leaves your computer and are not uploaded to the EPA server.

When you are done using RETIGO, close the browser and the data are only available in your local computer memory. In addition, RETIGO now offers an option to upload your data to an open access data repository, where you and your team members can retrieve the data for visualization. This option is designed to support data sharing for research teams—EPA does

not provide any quality assurance nor endorse the data uploaded to the RETIGO repository.

Does RETIGO allow me to bring in any other data for exploration?

When you import your data, you can opt to obtain a summary of nearby weather conditions, matching your data set time period, available through the World Meteorological Organization. You can also choose to import particulate matter or ozone data from regulatory stations, retrieved through AirNow, a multi-agency online service by EPA and others that offers air quality data and the Air Quality Index.

What if I have a very large data set, such as over 200,000 measurements?

RETIGO can handle it! The program will easily import small and very large data sets. Since seeing so many data points on a map at the same time can create a very crowded map, the tool gives you options to view the data in blocks of 1,000 points or choose to have the data time-averaged to reduce to a maximum of 1,000 averages shown.

How do I have to format my data to use RETIGO? Does it have to be a certain time resolution? Can I only upload pollution data?

RETIGO uses a simple and flexible data format—a space or comma delimited file that includes your data time and

location (latitude, longitude), and allows for a flexible amount of other numeric variables to be included. The data do not need to be of any set time resolution to use RETIGO—the program just looks for a time and location to plot the data on maps and graphs. RETIGO has a module that helps you format your time to an international standard. Any numeric data—whether it be pollution readings, walking speed, or temperature readings—with an associated time and location can be visualized with RETIGO.

Does RETIGO only work for certain locations?

RETIGO is built upon the Google Maps API and therefore can display data over any area in the world that are shown on Google Maps. The satellite image resolution, access to street-level images, and availability of external data sources will vary from one location to another.

LEARN MORE

RETIGO website, with tutorials and access to the data visualization tool:
<http://www.epa.gov/retigo/>

CONTACT

Heidi Paulsen, US EPA,
Environmental Modeling and
Visualization Laboratory, 919-
541-1834,
paulsen.heidi@epa.gov

Gayle Hagler, Ph.D., US EPA,
Office of Research and
Development, 919-541-2827,
hagler.gayle@epa.gov

[February 2016](#)