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1. Data Set Description:

This data set provides Particulate Matter Composition Data of the following types. Significant descriptions of methods and processing are contained within the respective data files and in the references provided below.

- PM2.5 nitrate and PM2.5 sulfate.
- Semi-Continuous Organic and Elemental Carbon Measurements.
- Air concentrations of water soluble PM2.5 aerosol species and water soluble gases, as measured with the CMU steam sampler - IC combination.
- Manual filter-based PM2.5 element measurements from microwave decomposition of filters followed by Inductively Coupled Plasma Mass Spectrometer analysis.
- Manual filter-based PM10 element measurements from microwave decomposition of filters and Inductively Coupled Plasma Mass Spectrometer analysis.
- Manual filter-based PM2.5 inorganic composition with analysis performed using ion chromatography.
- Manual filter-based PM2.5 organic and elemental carbon measurements with analysis performed using a Thermal Optical Transmission carbon analyzer.
- Measurements of PM composition size distributions using a MOUDI cascade impactor.
- PM2.5 organic and elemental carbon concentrations from an activated carbon denuder/quartz filter/charcoal impregnated fibre filter backup combination. Quartz filters analyzed using a Thermal/Optical transmittance carbon analyzer.
- Fog chemistry data

The **Pittsburgh Air Quality Study (PAQS)** was a comprehensive, multi-disciplinary investigation to characterize the ambient PM in the Pittsburgh region. An overview of the program including a comprehensive list of all the data that were collected is described in Wittig, A. E.; Anderson, N.; Khlystov, A. Y.; Pandis, S. N.; Davidson, C. I.; Robinson, A. L., Pittsburgh Air Quality Study Overview. Atmospheric Environment 2004, 38, (20), 3107-3125.

The Pittsburgh Supersite was designed to achieve several objectives: to determine the physical and chemical characteristics of PM in the Pittsburgh region; to develop and evaluate the next generation of atmospheric aerosol monitoring techniques; to update emission profiles for important regional sources; to quantify the impact of the various sources on the local PM concentrations; and to predict changes in the PM characteristics due to proposed changes in emissions. The last objective was based on concurrent modeling studies and was designed to support the development of regulations. These objectives were addressed through four components of the research: (1) ambient monitoring at a central site and a set of satellite sites in the region; (2) an instrument development and evaluation study; (3) a data analysis and synthesis component; and (4) a comprehensive modeling component.

The central Supersite was located on a grassy hill in a large urban park adjacent to the Carnegie Mellon University campus, approximately 6km east of downtown Pittsburgh. It was separated from the city in the predominant upwind direction (south and west) by roughly 1km of parkland. It was at least several hundred meters from any other major source of air pollution: the site was positioned approximately 50m past the end of a dead end street, and several hundred meters from the nearest heavily traveled street. Five additional sites were operated as Satellite sites to character the spatial variation of the PM. The measurement campaign lasted for 14 months (July 2001-September 2002). Intensive monitoring was performed during two periods, from 1 July to 3 August, 2001 (ESP01) and 1 January to 15 January, 2002 (ESP02). Baseline monitoring was conducted for the rest of the study. Baseline measurements included daily filter samples for fine particle mass and composition (OC/EC, major ions, elemental composition).

The Pittsburgh Air Quality Study, which was supported by the US Environmental Protection Agency under contract R82806101 and the US Department of Energy National Energy Technology Laboratory under contract DEFC26-01NT41017.

The [U.S. EPA Particulate Matter \(PM\) Supersites Program](#) was an ambient air monitoring research program from 1999-2004 designed to provide information of value to the atmospheric sciences, and human health and exposure research communities. Eight geographically diverse projects were chosen to specifically address these EPA research priorities: (1) to characterize PM, its constituents, precursors, co-pollutants, atmospheric transport, and its source categories that affect the PM in any region; (2) to address the research questions and

scientific uncertainties about PM source-receptor and exposure-health effects relationships; and (3) to compare and evaluate different methods of characterizing PM including testing new and emerging measurement methods. Data collected by these projects are publicly available at the NARSTO Permanent Data Archive, NASA Langley DAAC. Data users should acknowledge the U.S. EPA Particulate Matter (PM) Supersites Program and the project investigator(s) listed below.

The data set should be cited as follows:

Pandis, Spyros, Cliff Davidson, and Allen Robinson. 2007. NARSTO EPA_SS_PITTSBURGH Particulate Matter Composition Data. Available on-line via [NARSTO Data and Information](#) at the Atmospheric Science Data Center at NASA Langley Research Center, Hampton, Virginia, U.S.A.

More information see [The Pittsburgh Air Quality Study Overview](#) (PDF).

2. Sample Data Record/Data Format:

Data files are in the NARSTO Data Exchange Standard (DES) format that is described in detail on the [NARSTO Quality Systems Science Center \(QSSC\) web site](#). The files follow a tabular layout and are stored as ASCII comma-separated values files (.csv). The DES does not rely on row position to identify specific information, but uses a tag to describe the information contained in the row. The DES is a self-documenting format with three main sections: the header contains information about the contents of the file and the data originator; the middle section contains metadata tables that describe/define sites, flags, and other codified fields; and the final section is the main data table that contains key sampling and analysis information and the data values. Descriptions of the standardized metadata fields are also available on the QSSC web site.

Time-Series Plots

Time-series plots are included for all of the numeric variables in each of the data files. These plots are useful for screening for outliers and visualization of values less than the detection limit and values with other quality flags. [[Companion time-series plots](#) (ZIP)]

- Please note that some but not all of the plots were visually examined for possible outliers and other issues.

Data Format Note

Users writing computer codes to read these data should be aware that some variables have formatting that differs from the format indicated in the *TABLE COLUMN FORMAT TYPE or *TABLE COLUMN FORMAT FOR DISPLAY key phrases. For example, values or missing codes for a "Decimal" variable may not have a decimal point.

3. References:

- Cabada, J. C.; Rees, S. L.; Takahama, S.; Khlystov, A.; Pandis, S. N.; Davidson, C. I.; Robinson, A. L., Mass size distributions and size resolved chemical composition of fine particulate matter at the Pittsburgh supersite. *Atmospheric Environment* 2004, 38, 3127-3141.
- Khlystov, A.; Zhang, Q.; Jimenez, J. L.; Stanier, C.; Pandis, S. N.; Canagaratna, M. R.; Fine, P.; Misra, C.; Sioutas, C., In situ concentration of semi-volatile aerosol using water-condensation technology. *Journal of Aerosol Science* 2005, 36, (7), 866-880.
- Pekney, N. J.; Davidson, C. I., Determination of trace elements in ambient aerosol samples. *Analytica Chimica Acta* 2005, 540, (2), 269-277.
- Polidori, A.; Turpin, B. J.; Lim, H. J.; Cabada, J. C.; Subramanian, R.; Robinson, A. L.; Pandis, S. N., Secondary organic aerosol formation in the Pittsburgh area using semi-continuous OC and EC measurements. *Aerosol Science & Technology* 2005, submitted.
- Subramanian, R.; Khlystov, A. Y.; Cabada, J. C.; Robinson, A. L., Positive and Negative Artifacts in Particulate Organic Carbon Measurements with Denuded and Undenuded Sampler Configurations. *Aerosol Science & Technology* 2004, 38, (S1), 27-48.
- Subramanian, R.; Khlystov, A. Y.; Robinson, A. L., Effect of peak inert-mode temperature on Elemental Carbon measured using Thermal-Optical Analysis. *Aerosol Science and Technology* 2006, 40, (10), 763-780.
- Wittig, A. E.; Anderson, N.; Khlystov, A. Y.; Pandis, S. N.; Davidson, C. I.; Robinson, A. L., Pittsburgh Air Quality Study Overview. *Atmospheric Environment* 2004, 38, (20), 3107-3125.
- Wittig, A. E.; Takahama, S.; Khlystov, A. Y.; Pandis, S. N.; Hering, S.; Kirby, B.; Davidson, C., Semi-continuous PM_{2.5} inorganic composition measurements during the Pittsburgh air quality study. *Atmospheric Environment* 2004, 38, (20), 3201-3213.



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Data Center:

The User and Data Services Office at the Langley Atmospheric Science Data Center is involved throughout the system to monitor the quality of data on ingest, to ensure prompt replies to user questions, to verify media orders prior to filling them, and to ensure that the needs of the users are being met.

If you have a problem finding what you need, trouble accessing the system, or need an answer to a question concerning the data or how to obtain data, please contact the User and Data Services staff.

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URL: <http://eosweb.larc.nasa.gov>

5. Acknowledgement:

When data from the Langley Atmospheric Science Data Center are used in a publication, we request the following acknowledgment be included: "These data were obtained from the NASA Langley Research Center Atmospheric Science Data Center".

The Langley Data Center requests a reprint of any published papers or reports or a brief description of other uses (e.g., posters, oral presentations, etc.) of data that we have distributed. This will help us determine the use of data that we distribute, which is helpful in optimizing product development. It also helps us to keep our product-related references current.

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