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1. Data Set Description:

During a month in the summer of 2000, individual aerosol particles were sized and analyzed using a Rapid Single-particle Mass Spectrometer (RSMS) in Houston. RSMS aerodynamically focuses one particle size at a time to the source region of a mass spectrometer and employs a 193 nm excimer laser to desorb and ionize the particle components. The ions are analyzed in a single time-of-flight mass spectrometer and the spectrum is digitally recorded. Spectra are only saved if the ion peak in the spectrum is above a threshold level. Background spectra were determined and flagged. Particle size scans were initiated periodically and each size was sampled until 30 particle hits were obtained, unless the sampling time became excessive. Aerodynamic particle sizes ranged from about 40 to 1300 nm and were partitioned into nine discrete size classes logarithmically spaced, roughly, over the range. Single particle data are valuable because for instance a) they are collected and analyzed real time so have excellent temporal resolution, b) the particle-to-particle composition variations (external mixing properties) can be assessed, and c) key particle sources are easily identified since the particles retain source characteristics. The data resulting from these measurements consist of an aerodynamic particle size and a positive mass spectrum of the components for each particle, along with the date and time of measurement and other incidental measurement parameters such as the laser pulse energy. Support for RSMS measurements has been provided by the EPA Supersite program and additional funding from the U.S. EPA.

More information about the [Texas Air Quality Study](#).

The data set should be cited as follows:

Wexler, Anthony S. and Murray V. Johnston. 2002. NARSTO EPA_SS_HOUSTON Rapid Single-Particle Mass Spectrometer 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.

The [Houston Supersite](#) is one of several Supersites that was established in urban areas within the United States by the U.S. Environmental Protection Agency (EPA) to better understand the measurement, sources, and health effects of suspended particulate matter (PM). The overall goals were to characterize the composition and identify the sources of particulate matter in Southeastern Texas, to develop and test new methods for characterizing fine particulate matter, and to collect data on the physical and chemical characterization of fine particulate matter that can be used to support exposure and health effects studies.

Specific objectives were to: 1) Collect physicochemical data on fine PM over a 16 month sampling period (August 2000 - November 2001) in Southeastern Texas; use the data to identify sources and to characterize spatial and temporal variability in fine PM source contributions and composition. 2) Compare the spatial and temporal variability in fine PM source contributions and composition in southeastern Texas to variability throughout the United States. 3) Examine the physical and chemical processes that govern PM formation and transformation in Southeastern Texas. 4) Develop a combined database on PM, gas phase air pollutants and meteorological variables, suitable for testing models of the formation and fate of fine PM; this objective was achieved by coordinating with a large, integrated ozone and PM field study conducted during the summer of 2000.

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 Atmospheric Science Data Center. Data users should acknowledge the U.S. EPA Particulate Matter (PM) Supersites Program and the project investigator(s) listed below.

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.

3. References:

- Phares, D.J., K.P. Rhoads, and A.S. Wexler. 2002. Performance of a single ultrafine particle mass spectrometer. *Aerosol Sci. Tech.* 36:583-592.
- Phares, D.J., K.P. Rhoads, A.S. Wexler, and M.V. Johnston. 2001. Size resolved ultrafine particle composition analysis Part 2: Houston. *J. Geophys. Res.* In press.
- Rhoads, K.P., D.J. Phares, A.S. Wexler, and M.V. Johnston. 2001. Size-resolved ultrafine particle composition analysis Part1: Atlanta. *J. Geophys. Res.* In press.

4. Contact Information:

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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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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".

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