1. Data Set Description:

During 7 months starting in May 2002, individual aerosol particles were sized and analyzed using a Rapid Single-particle Mass Spectrometer (RSMS) in Baltimore. 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 dual 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 and negative 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 Supersites program and additional funding from the EPA.

The data set should be cited as follows:

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.

Data File User Notes

*TABLE COLUMN OBSERVATION TYPE:

In these Baltimore RSMS data files, *TABLE COLUMN OBSERVATION TYPE values for the following columns have a value of "Not applicable". The preferred value for all of these columns is HqSupplementary data".

This minor inconsistency does not impact the quality or interpretation of the RSMS data. For consistency with other RSMS data files and other data types, these OBSERVATION TYPE values could be replaced with "Supplementary data" as the data files are being processed.
RSMS:

*TABLE COLUMN NAME, Site ID: standard, Instrument co-location ID, Date start: local time, Time start: local time, Date end: local time, Time end: local time, Time zone: local, Date start: UTC, Time start: UTC, Date end: UTC, Time end: UTC, Flag: NARSTO sample-level, Flag: study sample-level,

RSMS:

*TABLE COLUMN OBSERVATION TYPE, Not applicable, "Not applicable", "Not applicable", "Not applicable", "Not applicable", "Not applicable", "Not applicable", "Particles", "Particles", "Not applicable", "Not applicable", "Not applicable", "Not applicable";

The preferred value for all of these columns is "Supplementary data".

*SAMPLING INTERVAL:

In these Baltimore RSMS data files, *SAMPLING INTERVAL and *SAMPLING FREQUENCY values are both "Variable".

RSMS:

*SAMPLING INTERVAL AS REPORTED IN MAIN TABLE, Variable,
*SAMPLING FREQUENCY OF DATA IN MAIN TABLE, Variable,

Preferred values:

*SAMPLING INTERVAL AS REPORTED IN MAIN TABLE Variable interval
*SAMPLING FREQUENCY OF DATA IN MAIN TABLE Variable frequency
or
*SAMPLING FREQUENCY OF DATA IN MAIN TABLE Same as sampling interval

This minor inconsistency does not impact the quality or interpretation of the RSMS data. For consistency with other RSMS data files and other data types, these *SAMPLING INTERVAL and *SAMPLING FREQUENCY values could be replaced with "Variable interval" and "Same as sampling interval", respectively, as the data files are being processed.

An Important User Note is Included in These Data Files:

Users should evaluate the time range of data files of interest for applicability and note that the data files may contain both background and ambient samples. Check User Note 3 for applicable date range. For example:

*TABLE USER NOTE3

From 09/20/01 to 05/09/02, plastic tubing connected the rotary valve to the critical orifice manifold. Due to the volatility of the tubing plasticizer, a background signal was observed and sustained inside the instrument during this period. Any single particle mass spectrum reported that has been flagged with the 'BKG' code in the 'Flags: study' field should be interpreted as a signature of this background signal and not as a single particle spectrum. Please note that even for those spectra flagged as 'AMB', it is likely that many still contain some degree of background and that no measures have been taken to identify or remove it. To avoid a false interpretation of these spectra, it is essential to take this into account when using the data. On 05/09/02, the plastic tubing was replaced with copper and the interior of RSMS-3 cleaned. As a result, single particle spectra collected after this date no longer contain the background signal.

A Note on Date Inconsistencies Related to Data File Processing:

All of the single particle data were last modified by the data provider on 2005/08/23 and this date is accurately reported in the data files.

*DATE OF LAST MODIFICATION TO DATA IN MAIN TABLE 2005/08/23

However, the file generation date was not updated at that time, so it is not consistent with the modified date. For instance,

*DATE THIS FILE GENERATED/ARCHIVE VERSION NUMBER 2004/08/24 1

This minor inconsistency in no way effects the quality or usefulness of the single particle data.
3. References:


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.

Telephone: (757) 864-8656
FAX: (757) 864-8807
E-mail: support-asdc@earthdata.nasa.gov
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.

Please contact us at support-asdc@earthdata.nasa.gov for instructions on mailing reprints.

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