NARSTO EPA_SS_FRESNO TEOM Particulate Mass Concentration Data

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1. Data Set Description:

This data set contains measurements taken from two TEOMs that have been operated at the Fresno supersite from July 10, 1999 to present. One TEOM samples through an impactor size-selective inlet to collect particles with aerodynamic diameters less than 10 µm at a flow rate of 16.7 liters/min. The other TEOM samples through a cyclone size-selective inlet to collect particles with aerodynamic diameters less than 2.5 µm at a flow rate of 16.7 liters/ min. Both TEOMs are operated with inlets heated to 50 °C to remove water vapor and other volatile species so that the measured concentrations are for the dry ambient aerosol. Both TEOMs report 5 minute samples.

The Rupprecht & Patashnick Tapered-Element Oscillating Microbalance (TEOM) model 1400a measures the amount of mass collected from an air sample at a nearly continuous rate. The ambient aerosol is collected on the end of a hollow tapered element, which has its other end fixed. The vibrational frequency of the element changes as mass accumulates on the free end in direct proportion to the mass. The amount of mass collected ambient sample is calculated from the change in frequency of the element over a fixed period of time. The flow rate for the TEOM is controlled by two mass flow controllers: one for the sample flow of approximately 3 std liters/min and the other for an auxiliary flow to match the specifications of the sample inlet design. The concentration of the aerosol is determined from the mass collected, the flow rate of the sample, and the time of sample collection and expressed as concentration at standard conditions of 25 °C and one atmosphere.

The **Fresno 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 site is located at 3425 First St., approximately 1 km north of the downtown commercial district. First Street is a four-lane artery with moderate traffic levels. Commercial establishments, office buildings, churches, and schools are located north and south of the monitor. Medium-density single-family homes and some apartments are located in the blocks to the east and west of First Street. The Fresno Supersite began operation in May of 1999 and continues today. More information can be found in the Quality Assurance Project Plan (PDF).

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.

The data set should be cited as follows: Watson, John G. and Judith C. Chow. 2003. NARSTO EPA_SS_Fresno TEOM Particulate Mass Concentration Data. Available on-line via NARSTO Data and Informaton at Atmospheric Science Data Center at the NASA Langley Research Center, Hampton, Virginia, U.S.A.

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:

- Watson, J.G.; Chow, J.C. A wintertime PM2.5 episode at the Fresno, CA, supersite; Atmos. Environ. 2002, 36(3), 465-475.
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- Watson, J.G.; Chow, J.C. Comparison and evaluation of in-situ and filter carbon measurements at the Fresno Supersite; J. Geophys. Res. 2002, 107(D21), ICC 3-1-ICC 3-15, doi: 10.1029/2001JD000573.
- Watson, J.G.; Chow, J.C.; Hering, S.V.; Fitz, D.R. Final report for Phase I of Fresno supersite measurements; prepared for Cooperative Institute for Atmospheric Sciences and Terrestrial Applications, Las Vegas, NV, by Desert Research Institute: Reno, NV, 2002.
- Watson, J.G.; Chow, J.C.; Lowenthal, D.H.; Stolzenburg, M.R.; Kreisberg, N.M.; Hering, S.V. Particle size relationships at the Fresno supersite; JAWMA 2002, 52(7), 822-827.
- Watson, J.G.; Chow, J.C.; Fitz, D.R. Quality assurance project plan - Fresno Supersite (Revision 0); prepared for U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, by Desert Research Institute: Reno, NV, 2000.
- Watson, J.G.; Chow, J.C. Zone of representation for the Fresno, CA supersite; JAWMA 2002, in preparation.

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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".

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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