NARSTO EPA_SS_FRESNO PM2.5 Organic and Elemental Carbon Data

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1. Data Set Description:

This data set contains measurements taken from an continuous carbon monitor (Model R&P5400C) that has been operated at the Fresno supersite from January 13, 2000 to March 31, 2005. The sample collection time is 1 hour; the sample analysis time is one hour. Data are output once an hour, two hours after the start of sample collection.

Publishing history:

The PM25_OC_EC data set was originally published in 2003, with data from January 13, 2000 through April 28, 2003. The data provider later replaced the first of these files with a similar file containing the same data but with minor differences in metadata and study flags. The data provider also sent additional files extending the data from April 28, 2003 through March 31, 2005. The QSSC is republishing this data set in August 2008. The replacement files are now Version 2 (V2) files. The additional (V1) files are added, and plots are also now added for all of the files.

The V2 files have these minor differences from the original V1 files:
- Study flagging conventions have been revised; and
- Organization and Network names have been updated.

The data values themselves were not changed.

The last replacement file, NARSTO_EPA_SS_FRESNO_RP5400C_1HR_20030101_20031231_V2.csv, contains eight months of additional data compared to the file it replaces (NARSTO_EPA_SS_FRESNO_RP5400C-1HR_20030101_20030428_V1.csv).

The Rupprecht & Patashnick Ambient Carbon Particulate Monitor, model 5400, measures the amount of organic and elemental carbon in an air sample at an averaging time as short as one hour. The ambient aerosol is collected by impaction on one of two collector plates. At the end of sample collection, the air flow is switched to a second collector while the sampled aerosol on the first collector is analyzed. During the analysis phase, the collector with the sample is made part of a closed gas circulating loop that includes an afterburner, non-dispersive infrared (NDIR) CO2 analyzer, and pump. The analyzer first measures the CO2 concentration in the loop to determine the baseline for the subsequent analysis. The temperature of the collector is then raised to 340 °C for a period of 480 seconds to oxidize the more volatile carbon species associated with the organic fraction and the CO2 concentration is measured. The temperature of the collector is then raised to 750 °C for 180 seconds to burn off the high temperature carbon and the CO2 concentration is measured. An afterburner at 750 °C follows the collector in the circulating loop to oxidize any of the lighter carbonaceous materials that might escape from the collector without being oxidize. Prior to sample collection the sampled air passes through a PM2.5 sharp cut cyclone to remove larger particles from the air stream. The collector controls the sample flow rate to approximately 16.7 l/min. A mass flow meter measures the flow rate and converts it to ambient conditions using the average temperature and pressure at the site. The concentrations of the organic carbon and the total carbon in the aerosol sample are determined from the CO2 concentrations in the loop during the two burn periods and the flow rate and time of sample collection. Concentrations are expressed at the annual average ambient temperature and pressure conditions. More information can be found in the Quality Assurance Project Plan (PDF).

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.

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:
Watson, John G. and Judith C. Chow. 2003. NARSTO EPA_SS_FRESNO PM2.5 Organic and Elemental Carbon Data. Available on-line via NARSTO Data and Informaton at the Atmospheric Scinces Data Center at 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.

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

Data File Names	Links to Time-Series Plots (PDF)
NARSTO_EPA_SS_FRESNO_RP5400C-1HR_20000113_20001231_V2.csv	View RP5400C-1HR_20000113_20001231_V2
NARSTO_EPA_SS_FRESNO_RP5400C-1HR_20010101_20011231_V1.csv	View RP5400C-1HR_20010101_20011231_V1
NARSTO_EPA_SS_FRESNO_RP5400C-1HR_20020101_20021231_V1.csv	View RP5400C-1HR_20020101_20021231_V1
NARSTO_EPA_SS_FRESNO_RP5400C-1HR_20030101_20031231_V2.csv	View RP5400C-1HR_20030101_20031231_V2
NARSTO_EPA_SS_FRESNO_RP5400C_1HR_20040101_20040630_V1.csv	View RP5400C_1HR_20040101_20040630_V1
NARSTO_EPA_SS_FRESNO_RP5400C_1HR_20040701_20041231_V1.csv	View RP5400C_1HR_20040701_20041231_V1
NARSTO_EPA_SS_FRESNO_RP5400C_1HR_20050101_20050331_V1.csv	View RP5400C_1HR_20050101_20050331_V1

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.
- Watson, J.G.; Chow, J.C.; Bowen, J.L.; Lowenthal, D.H.; Hering, S.V.; Ouchida, P.; Oslund, W. Air quality measurements from the Fresno supersite; JAWMA 2000, 50(8), 1321-1334.
- 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.

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
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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.

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