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AMAZE-08 Aerosol Characterization and Meteorological Data, Central Amazon Basin: 2008

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Documentation Revision Date: 2016-08-01

Data Set Version: V1

Summary

This data set provides measurements from the Amazonian Aerosol Characterization Experiment (AMAZE-08) carried out during the wet season from February 4 to March 21, 2008 in the central Amazon Basin. Aerosol and atmospheric samples and measurements were collected at Tower TT34 located 60 km NNW of downtown Manaus, and at Tower K34, located 1.6 km from the TT34 site. Physical characterization of aerosols included size, mass, and number distributions and light scattering properties. Chemical characterization included mass concentrations of organics, major anions and cations, and trace metals. Aerosol sources were estimated with measurements of black carbon and biogenic particles. Meteorological and atmospheric conditions including relative humidity, temperature, wind speed and direction, rain, photosynthetically active radiation (PAR), downward and upward solar irradiance, and condensation nuclei were measured. Atmospheric trace gases and volatile organic compounds (VOCs) were sampled and analyzed.

During this intensive campaign, multiple investigators from several institutions fielded similar/related instruments that yielded comparable and complementary results. Please read the data file descriptions carefully and refer to Martin et al. (2010a) for clarifying instrument, sampling, and analysis details.

There are 36 data files in comma-separated (.csv) format with this data set.

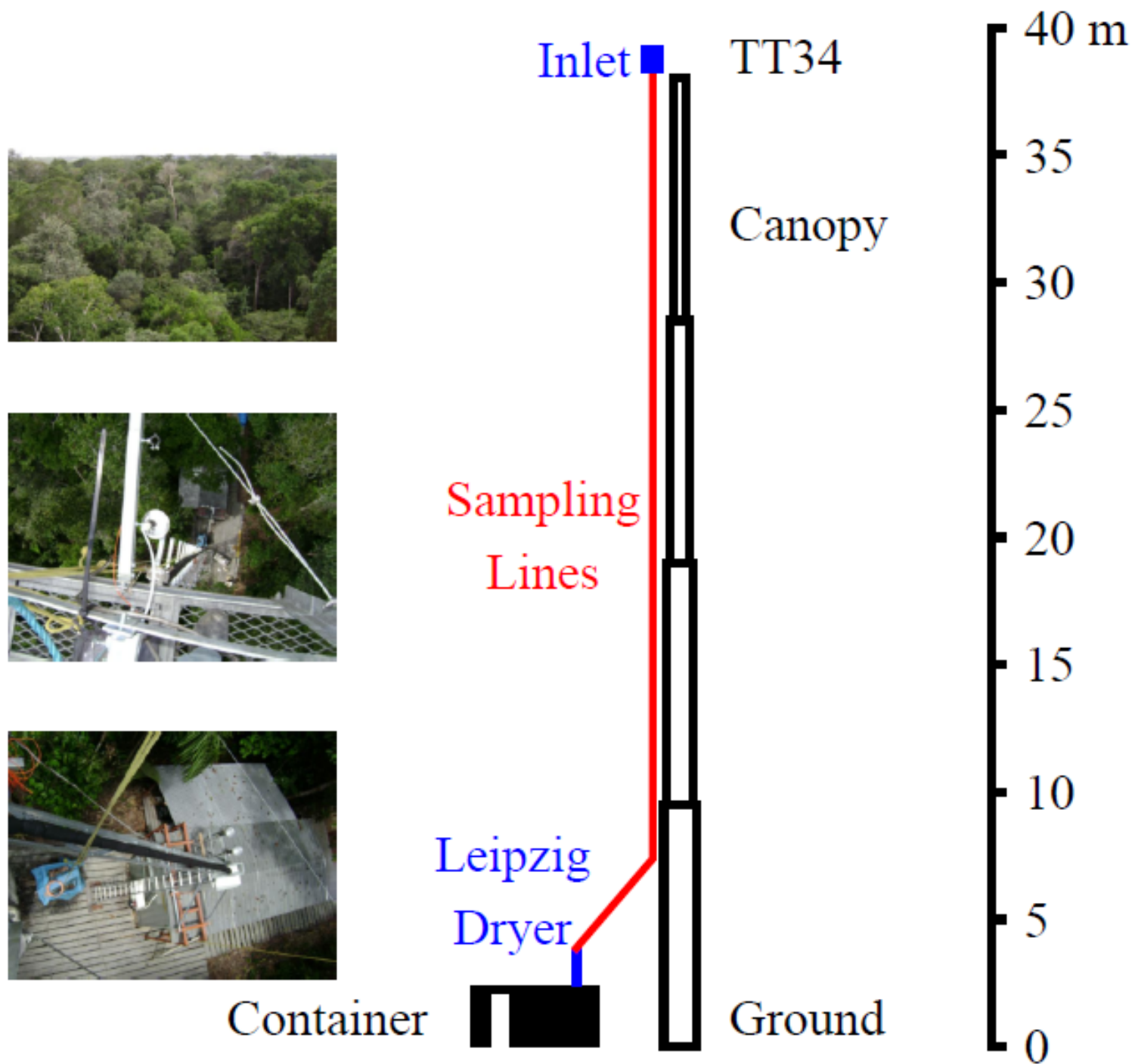


Figure 1. View from Tower TT34 and diagram of sampling line and tower heights.

Citation

Martin, S.T., P.E. Artaxo, Q. Chen, A.B. Guenther, S.S. Gunthe, J.L. Jimenez, A. Manzi, K.L. Prenni, U. Poschl, J. Schneider, and E. Swietlicki. 2016. AMAZE-08 Aerosol Characterization and Meteorological Data, Central Amazon Basin: 2008. ORNL DAAC, Oak Ridge, Tennessee, USA. <http://dx.doi.org/10.3334/ORNLDAAC/1308>

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1. Data Set Overview

Project: The Large-Scale Biosphere-Atmosphere Experiment in Amazonia (LBA)

The Amazon Basin provides an excellent environment for studying the sources, transformations, and properties of natural aerosol particles and the resulting links between biological processes and climate. With this framework in mind, AMAZE-08, carried out from 7 February – 14 March 2008 during the wet season in the central Amazon Basin, sought to understand the formation, transformations, and cloud-forming properties of fine- and coarse-mode biogenic aerosol particles, especially as related to their effects on cloud activation and regional climate. Special foci included: The production mechanisms of secondary organic components at a pristine continental site, including the factors regulating their temporal variability. And, predicting and understanding the cloud-forming properties of biogenic particles at such a site.

For additional research results, please refer to the Atmospheric Chemistry and Physics special issue (http://www.atmos-chem-phys.net/special_issue141.html) which brings together a collection of publications on measurements of the Amazonian Aerosol Characterization Experiment 2008 (AMAZE-08). In particular, see the overview article for AMAZE-08 (Martin et al., 2010a).

Acknowledgements: Support was received from the US National Science Foundation, the Brazil LBA Millennium Institute, the Max Planck Society, the Brazilian Large-Scale Biosphere-Atmosphere Experiment, the European Integrated project on Aerosol Cloud Climate and Air Quality Interactions (EUCAARI), and the US National Aeronautics and Space Administration.

Implementation of the LBA Data and Publication Policy by Data Users:

The LBA Data and Publication Policy [http://daac.ornl.gov/LBA/lba_data_policy.html] is in effect for a period of five (5) years from the date of archiving and should be followed by data users who have obtained LBA data sets from the ORNL DAAC. Users who download LBA data in the five years after data have been archived must contact the investigators who collected the data, per provisions 6 and 7 in the Policy.

This data set was archived in May of 2016. Users who download the data between May 2016 and April 2020 must comply with the LBA Data and Publication Policy.

Data users should use the Investigator contact information in this document to communicate with the data provider. Alternatively, the LBA Web Site [<http://lbaeco-archive.ornl.gov/>] in Brazil will have current contact information.

Data users should use the Data Set Citation and other applicable references provided in this document to acknowledge use of the data.

LBA was an intensive scientific investigation of the tropical rainforest of Brazil and portions of adjacent countries. This project used intensive remote-sensing techniques and ground-based experiments to investigate the atmosphere-biosphere-hydrosphere dynamics of this large tropical region. The LBA Project encompasses several scientific disciplines, or components. The LBA-ECO component focuses on the question: "How do tropical forest conversion, regrowth, and selective logging influence carbon storage, nutrient dynamics, trace gas fluxes, and the prospect for sustainable land use in Amazonia?"

2. Data Characteristics

Spatial Coverage: Central Amazon Basin northwest of Manaus, Brazil

Spatial Resolution: Point. Tower-based measurements

Temporal Coverage: 20080204 to 20080421

Temporal Resolution: Varies by instrument

Site boundaries: (All latitude and longitude given in degrees and fractions)

Site (Region)	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude
Central Amazon Basin	-60.36782	-60.02723	-2.42820	-2.75745

Data Descriptions

There are 36 comma-separated data files (.csv) with this data set. The data files are named according to the sampling/measuring instrument, affiliation, or variable abbreviation, as appropriate, and also the individual data provider.

All measurements were made at the tower TT34, with the exception of the pyranometer and PAR measurements which were made at tower K34.

This table lists the 36 data files in the order they are described below.

File Names

1	AMAZE08_Aethelometer_ARTAXO.csv
2	AMAZE08_Filter_Dichotomous_ICandOCanalysis_FineCoarse_ARTAXO.csv
3	AMAZE08_Filter_ICanalysis_SFU_FineCoarse_ARTAXO.csv
4	AMAZE08_Filter_ICanalysis_Total_ARTAXO.csv
5	AMAZE08_Filter_PIXEanalysis_SFU_fine_coarse_ARTAXO.csv
6	AMAZE08_Filter_PIXEanalysis_Total_ARTAXO.csv
7	AMAZE08_MAAP_ARTAXO.csv
8	AMAZE08_Nephelometer_ARTAXO.csv
	AMAZE08_CCN_KappaValue_ActivationDiam_0_10_SS_POESCHL.csv
	AMAZE08_CCN_KappaValue_ActivationDiam_0_19_SS_POESCHL.csv
9-13	AMAZE08_CCN_KappaValue_ActivationDiam_0_28_SS_POESCHL.csv
	AMAZE08_CCN_KappaValue_ActivationDiam_0_46_SS_POESCHL.csv
	AMAZE08_CCN_KappaValue_ActivationDiam_0_82_SS_POESCHL.csv
14	AMAZE08_UVAPS_POESCHL.csv
15	AMAZE08_Environmental_tower_ground_Martin.csv
16	AMAZE08_Harvard_Enviro_SamplingLine_Martin.csv
17	AMAZE08_SunTimes_Martin.csv
18	AMAZE08_Rainfall_MARTIN.csv
19	AMAZE08_AMS_Harvard_ElementalRatios_Martin.csv
20	AMAZE08_AMS_Harvard_MassConcentrations_Martin.csv
21	AMAZE08_AMS_Harvard_PMFfactorLoadings.csv
22	AMAZE08_AMS_Harvard_SonicAnemometer_Jimenez.csv
23	AMAZE08_OPC_WELAS_TopTower_Schneider.csv
24	AMAZE08_OPC_WELAS_ResearchTrailer_Schneider.csv
25	AMAZE08_OPC_GRIMM_Schneider.csv

26	AMAZE08_CPC_SCHNEIDER.csv
27	AMAZE08_AMS_MPI_MassConcentrations_Schneider.csv
28	AMAZE08_SMPS_Diameters_SWIETLICKI.csv
29	AMAZE08_SMPS_Concentrations_SWIETLICKI.csv
30	AMAZE08_SMPS_IntegratedQuantities_SWIETLICKI.csv
31	AMAZE08_SonicAnemometer_GUENTHER.csv
32	AMAZE08_TraceGases_GUENTHER.csv
33	AMAZE08_MixingRatios_GUENTHER.csv
34	AMAZE08_Pyranometer_MANZI.csv
35	AMAZE08_PAR_MANZI.csv
36	AMAZE08_CFDC_PRENNI.csv

Data File Format

Each file has several header rows with general information about the data and the file contents that precedes the data rows. For example:

```

[Header Rows]

Data file name: AMAZE08_AMS_Harvard_MassConcentrations_Martin.csv
Version: Sun 31 Jan 2016 12:46:45
Contact: Scot Martin
Instrument: Harvard aerosol mass spectrometer (AMS)
Measurement reported: organic; nitrates; ammonium; sulfate; and chloride mass concentrations-Finalized to STP (273.15K-10^5 Pa)
Data reporting frequency: 5 minutes
Units: ug m^-3

[Column Name Row] Site,Date_utc,Time_utc,Seconds_since_1Jan1900,Organic,Nitrate,Sulfate,Ammonium,Chloride
[Units/format Row],yyyy-mm-dd,hh:mm:ss,Seconds,ug m^-3,ug m^-3,ug m^-3,ug m^-3,ug m^-3

[Data Begins]

TT34,2008-02-07,00:32:47,3411333167,0.21158,-0.00114272,0.00440575,0.000557228,-0.00113304
TT34,2008-02-07,00:38:00,3411333480,0.142021,0.00242696,0.00624897,0.000804011,-0.00173924
TT34,2008-02-07,00:43:12,3411333792,0.0749638,0.00186215,0.00415197,0.000331082,0.00015173
...
    
```

Data Descriptions

```

Data file name: AMAZE08_Aethelometer_ARTAXO.csv
    
```

Instrument: Aethelometer (affiliation: Univ of Sao Paulo (USP))

Measurements reported: Black carbon concentration as derived from aerosol light absorption at listed wavelengths (nm) from an aethelometer for the period February 11, 2008 - March 14, 2008 at Tower TT34.

Data reporting frequency: Hourly (60 min average)

Column Name	Units/format	Description
Site		Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	second	Time of measurement in seconds since 1 Jan 1900
450_nm	ng m ⁻³	black carbon concentration
571_nm	ng m ⁻³	black carbon concentration
590_nm	ng m ⁻³	black carbon concentration
615_nm	ng m ⁻³	black carbon concentration
660_nm	ng m ⁻³	black carbon concentration
880_nm	ng m ⁻³	black carbon concentration
950_nm	ng m ⁻³	black carbon concentration

Data file name: AMAZE08_Filter_Dichotomous_ICandOCanalysis_FineCoarse_ARTAXO.csv

Instrument: Rupprecht Virtual Dichotomous sampler in coarse mode (2 to 10 um) and fine mode (<2-um).

Measurements reported: Analysis of filters collected at TT34 tower with a Rupprecht Virtual Dichotomous sampler, ground level sampling, in coarse mode (2 to 10-um), and fine mode (<2-um).

Data reporting frequency: One time per day for each mode

Column Name	Units/format	Description
Site		Tower TT34 or Tower K34
label		Sample label (coarse or fine)
Start_date_utc	yyyy-mm-dd	Start date of measurement
Start_time_utc	hh:mm:ss	Start time of measurement
Start_seconds_since_1Jan1900	Seconds	Start time of measurement in seconds since 1 Jan 1900
Stop_date_utc	yyyy-mm-dd	Stop date of measurement
Stop_time_utc	hh:mm:ss	Stop time of measurement
Stop_seconds_since_1Jan1900	Seconds_since_1Jan1900	Stop time of measurement in seconds since 1Jan1900
mass	ug m ⁻³	Aerosol sample mass
OC	ug m ⁻³	Organic carbon
EC	ug m ⁻³	Elemental carbon
Cl	ug m ⁻³	chloride
NO3	ug m ⁻³	nitrate
PO43	ug m ⁻³	phosphate
SO42	ug m ⁻³	sulfate
#NAME?	ug m⁻³	NAME?
Na	ug m ⁻³	sodium
NH4	ug m ⁻³	ammonium
K	ug m ⁻³	potassium
Mg	ug m ⁻³	magnesium

Ca	ug m ⁻³	calcium
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Data file name: AMAZE08_Filter_ICanalysis_SFU_FineCoarse_ARTAXO.csv

Instrument: Stacked filter unit (SFU) in coarse mode (2 to 10 um) and fine mode (<2um).

Measurements reported: Mass measurements of ions collected with the SFU, fine and coarse modes. Made at the TT34 tower at 10-m for 11 days during February 10, 2008 – March 21, 2008 (every 3-4 days).

Data reporting frequency: One time per day for each mode

Missing Values reported as "none" are represented as -9999

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
label		Sample label
Coarse_Fine		Coarse or fine mode
volume	m ³	Sample volume
Start_date_utc	yyyy-mm-dd	Start date of measurement
Start_time_utc	hh:mm:ss	Start time of measurement
Start_seconds_since_1Jan1900	seconds	Start time of measurement in seconds since 1Jan1900
Stop_date_utc	yyyy-mm-dd	Stop date of measurement
Stop_time_utc	hh:mm:ss	Stop time of measurement
Stop_seconds_since_1Jan1900	seconds	Stop time of measurement in seconds since 1Jan1900
NH4	ug m ⁻³	ammonium
Na	ug m ⁻³	sodium
K	ug m ⁻³	potassium

Mg2	ug m ⁻³	magnesium
Ca2	ug m ⁻³	calcium
F	ug m ⁻³	fluoride
CH3COO	ug m ⁻³	acetate
HCOO	ug m ⁻³	formate
Cl	ug m ⁻³	chloride
Br	ug m ⁻³	bromide
NO3	ug m ⁻³	nitrate
SO42	ug m ⁻³	sulfate
PO43	ug m ⁻³	phosphate

Data file name: AMAZE08_Filter_ICanalysis_Total_ARTAXO.csv

Instrument: Harvard aerosol mass spectrometer (AMS)

Measurements reported: Total filter mass of ions from samples collected from the turbulent inlet at the top of tower TT34, for 11 days during February 10, 2008 – March 21, 2008 (every 3-4 days).

Data reporting frequency: One time per day for each mode

Missing Values reported as "none" are represented as -9999

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
label		Sample label
volume	m ³	Sample volume
Start_date_utc	yyyy-mm-dd	Start date of measurement

Start_time_utc	hh:mm:ss	Start time of measurement
Start_seconds_since_1Jan1900	seconds	Start time of measurement in seconds since 1Jan1900
Stop_date_utc	yyyy-mm-dd	Stop date of measurement
Stop_time_utc	hh:mm:ss	Stop time of measurement
Stop_seconds_since_1Jan1900	seconds	Stop time of measurement in seconds since 1Jan1900
NH4	ug m ⁻³	ammonium
Na	ug m ⁻³	sodium
K	ug m ⁻³	potassium
Mg2	ug m ⁻³	magnesium
Ca2	ug m ⁻³	calcium
F	ug m ⁻³	fluoride
CH3COO	ug m ⁻³	acetate
HCOO	ug m ⁻³	formate
Cl	ug m ⁻³	chloride
Br	ug m ⁻³	bromide
NO3	ug m ⁻³	nitrate
SO42	ug m ⁻³	sulfate
PO43	ug m ⁻³	phosphate

Data file name: AMAZE08_Filter_PIXEanalysis_SFU_fine_coarse_ARTAXO.csv

Instrument: Metals were analyzed by particle induced x-ray emission (PIXE).

Measurements reported: Aerosol samples were collected at the TT34 tower at 10-m with a stacked filter unit (SFU) in coarse mode (2 to 10 μ m), and fine mode (<2 μ m), for the period February 10, 2008 - March 21, 2008

Data reporting frequency: One time per day for each mode every 3-4 days

Missing Values reported as "none" are represented as -9999

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
label		Sample label
Coarse_Fine		Coarse or fine mode
volume	m ³	Sample volume
Start_date_utc	yyyy-mm-dd	Start date of measurement
Start_time_utc	hh:mm:ss	Start time of measurement
Start_seconds_since_1Jan1900	seconds	Start time of measurement in seconds since 1Jan1900
Stop_date_utc	yyyy-mm-dd	Stop date of measurement
Stop_time_utc	hh:mm:ss	Stop time of measurement
Stop_seconds_since_1Jan1900	seconds	Stop time of measurement in seconds since 1Jan1900
mass	ug m ⁻³	Aerosol sample mass
Ce	ug m ⁻³	cerium
Al	ug m ⁻³	aluminum
Si	ug m ⁻³	silicon
P	ug m ⁻³	phosphorus
S	ug m ⁻³	sulfur
Cl	ug m ⁻³	chlorine
K	ug m ⁻³	potassium
Ca	ug m ⁻³	calcium
Ti	ug m ⁻³	titanium

V	ug m ⁻³	vanadium
Cr	ug m ⁻³	chromium
Mn	ug m ⁻³	manganese
Fe	ug m ⁻³	iron
Ni	ug m ⁻³	nickel
Cu	ug m ⁻³	copper
Zn	ug m ⁻³	zinc
Br	ug m ⁻³	bromine

Data file name: AMAZE08_Filter_PIXEanalysis_Total_ARTAXO.csv

Instrument: Harvard aerosol mass spectrometer (AMS) and metals analysis by particle induced x-ray emission (PIXE).

Measurements reported: Aerosol samples were collected by total filter from the turbulent inlet at the top of Tower TT34 for the period February 10, 2008 - March 21, 2008. Total mass of aerosols and metal constituents are reported.

Data reporting frequency: One time per day for each mode every 3-4 days

Missing Values reported as "none" are represented as -9999

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
label		Sample label
volume	m ³	Sample volume
Start_date_utc	yyyy-mm-dd	Start date of measurement
Start_time_utc	hh:mm:ss	Start time of measurement
Start_seconds_since_1Jan1900	seconds	Start time of measurement in seconds since 1Jan1900

Stop_date_utc	yyyy-mm-dd	Stop date of measurement
Stop_time_utc	hh:mm:ss	Stop time of measurement
Stop_seconds_since_1Jan1900	seconds	Stop time of measurement in seconds since 1Jan1900
mass	ug m ⁻³	Aerosol sample mass
Ce	ug m ⁻³	cerium
Al	ug m ⁻³	aluminum
Si	ug m ⁻³	silicon
P	ug m ⁻³	phosphorus
S	ug m ⁻³	sulfur
Cl	ug m ⁻³	chlorine
K	ug m ⁻³	potassium
Ca	ug m ⁻³	calcium
Ti	ug m ⁻³	titanium
V	ug m ⁻³	vanadium
Cr	ug m ⁻³	chromium
Mn	ug m ⁻³	manganese
Fe	ug m ⁻³	iron
Ni	ug m ⁻³	nickel
Cu	ug m ⁻³	copper
Zn	ug m ⁻³	zinc
Br	ug m ⁻³	bromine

Data File name: AMAZE08_MAAP_ARTAXO.csv

Instrument used: Multi-angle absorption photometer (MAAP)

Measurements reported: Black carbon equivalent concentrations from light absorption of deposited particles at 673 nm for the period February 8, 2008 - March 14, 2008 at Tower TT34.

Data reporting frequency: 60 min

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	seconds	Time of measurement in seconds since 1Jan1900
BC_Equiv_Conc	ug m ⁻³	black carbon equivalent concentrations

Data file name: AMAZE08_Nephelometer_ARTAXO.csv

Instrument: Nephelometer (affiliation: Univ of Sao Paulo (USP))

Measurements reported: aerosol light scattering-backscattering at multiple wavelengths or the period February 17, 2008 - March 12, 2008 at Tower TT34.

Reporting frequency: 5 min

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement

Seconds_since_1Jan1990	seconds	Time of measurement in seconds since 1Jan1900
Scat_Blue_450nm	1/m	scattering-backscattering at specified wavelengths
Scat_Green_550nm	1/m	scattering-backscattering at specified wavelengths
Scat_Red_700nm	1/m	scattering-backscattering at specified wavelengths
Backscatter_Blue	1/m	scattering-backscattering at specified wavelengths
Backscatter_Green	1/m	scattering-backscattering at specified wavelengths
Backscatter_Red	1/m	scattering-backscattering at specified wavelengths
Pressure	mbar	Sampling conditions, atmospheric pressure
Sample_Temp	degrees C	Sampling conditions, temperature
Inlet_Temp	degrees C	Sampling conditions, inlet temperature
RH	%	Sampling conditions, relative humidity
Ang_Coef_RG	unitless	
Ang_Coef_RB	unitless	
Ang_Coef_GB	unitless	
Ang_Coef_Avg	unitless	

There are five (5) data files for Cloud Condensation Nuclei (CCN) with supersaturation (SS) as given in file name.

Data files names:

- AMAZE08_CCN_KappaValue_ActivationDiam_0_10_SS_POESCHL.csv**
- AMAZE08_CCN_KappaValue_ActivationDiam_0_19_SS_POESCHL.csv**
- AMAZE08_CCN_KappaValue_ActivationDiam_0_28_SS_POESCHL.csv**
- AMAZE08_CCN_KappaValue_ActivationDiam_0_46_SS_POESCHL.csv**
- AMAZE08_CCN_KappaValue_ActivationDiam_0_82_SS_POESCHL.csv**

Instrument: Differential mobility analyzer with Max Planck Institute (MPI) CCNC & CPC.

Measurements reported: Cloud condensation nuclei (CCN) data approximately every 3 hours (hourly on some dates) for the period February 14, 2008 – March 12, 2008 at Tower TT34.

Supersaturation (SS) = 0.10%, 0.19%, 0.28%, 0.46%, and 0.82%

Kappa value: MPI CCNC (SS as specified) -- Kappa value corresponding to SS value and observed dry diameter (taken as equal to RH30% diameter) of 50% activation.

Diameter D50: MPI CCNC (SS as specified) -- diameter of 50% activation.

Data reporting frequency: approximately every 3 hours (hourly on some dates)

Format of five CCN data files:

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
Kappa_value		Kappa value corresponding to SS value and observed dry diameter (taken as equal to RH30% diameter) of 50% activation
Diameter_D50	nm	Diameter D50: MPI CCNC (SS as specified) -- diameter of 50% activation

Data file name: AMAZE08_UVAPS_POESCHL.csv

Instrument: ultraviolet aerodynamic particle sizer (UV-APS) (affiliation - Max Planck Institute for Chemistry)

Measurements reported: The number-size distribution of coarse-mode fluorescent biological aerosol particles (size range (0.5–10 um)) for the period February 7, 2008 – February 22, 2008 at Tower TT34. Refer to Huffman et al., 2012 for additional details.

Data reporting frequency: 5 minutes

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34

Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
Total_Conc	# cm ⁻³	Number concentration of total aerosol particles
Bio_Conc	# cm ⁻³	Number concentration of biological aerosol particles

Data file name: AMAZE08_Environmental_tower_ground_Martin.csv

Instrument: No details provided

Measurements reported: Temperature (Temp) and relative humidity (RH) measurements from the tower and ground for the period February 11 – March 14, 2008 at Tower TT34.

Data reporting frequency: 5 min average on 10 sec data

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
RH_Ground	percent	Relative humidity measured at ground level
Temp_Ground	C	Temperature, in degrees C, measured at ground level
RH_Tower	percent	Relative humidity measured from instrument on the tower
Temp_Tower	C	Temperature, degrees C, measured from instrument on the tower

Data file name: AMAZE08_Harvard_Enviro_SamplingLine_Martin.csv

Instrument: None provided

Measurements reported: Pressure, temperature (Temp) and relative humidity (RH) measurements made at the TT34 tower. The measurements are 5 minute averages for the period February 7, 2008 - March 13, 2008.

Data reporting frequency: 5 min

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
Pressure	torr	
Temp	degrees C	Temperature, in degrees C, measured at ground level
RH	%	

Data file name: AMAZE08_SunTimes_Martin.csv

Instrument: Clock

Measurements reported: times for sunrise; sun noon; and sunset in UTC or the period February 5, 2008 - March 15, 2008.

Data reporting frequency: Daily

Column Name	Units/format	Description
Sunrise_date	yyyy-mm-dd	Sunrise date, UTC
Sunrise_time	hh:mm:ss	Sunrise time, UTC
Sunrise_seconds	seconds	Time in seconds since 1Jan1900

Sun_noon_date	yyyy-mm-dd	Sun noon date, UTC
Sun_noon_time	hh:mm:ss	Sun noon time, UTC
Sun_noon_seconds	seconds	Time in seconds since 1Jan1900
Sunset_date	yyyy-mm-dd	Sunset date, UTC
Sunset_time	hh:mm:ss	Sunset time, UTC
Sunset_seconds	seconds	Time in seconds since 1Jan1900

File name: AMAZE08_Rainfall_MARTIN.csv

Instrument: None provided

Measurements reported: Lodging rain data as counts for the period February 7, 2008 – March 13, 2008

Data reporting frequency: 5 minutes

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
Counts	???	Counts
Accumulated_Counts	???	Accumulated_Counts

Data file name: AMAZE08_AMS_Harvard_ElementalRatios_Martin.csv

Instrument: aerosol mass spectrometer (AMS) (affiliation-Harvard)

Measurements reported: oxygen to carbon (O:C); hydrogen to carbon (H:C); and nitrogen to carbon (N:C) ratios of the organic particle-phase material for the period February 7, 2008 - March 13, 2008 at Tower TT34.

Data reporting frequency: 5 minute

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
O_C_ratio_organic_mass		Oxygen to carbon (O:C) ratio of the organic particle-phase material
H_C_ratio_organic_mass		Hydrogen to carbon (H:C) ratio of the organic particle-phase material
N_C_ratio_organic_mass		nitrogen to carbon (N:C) ratio of the organic particle-phase material

Data file name: AMAZE08_AMS_Harvard_MassConcentrations_Martin.csv

Instrument: Harvard aerosol mass spectrometer (AMS)

Measurement reported: organic; nitrates; ammonium; sulfate; and chloride mass concentrations - finalized to STP (273.15 K and 10⁵ Pa) for the period February 7, 2008 - March 13, 2008 at Tower TT34.

Data reporting frequency: 5 minutes

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement

Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
Organic	ug m ⁻³	Organic mass concentration
Nitrate	ug m ⁻³	Nitrate mass concentration
Sulfate	ug m ⁻³	Ammonium mass concentration
Ammonium	ug m ⁻³	Sulfate mass concentration
Chloride	ug m ⁻³	Chloride mass concentration

Data file name: AMAZE08_AMS_Harvard_PMFfactorLoadings.csv

Instrument: None provided

Measurement reported: Positive-matrix factorization of the time series of particle mass spectra of organic mass for the period February 7, 2008 - March 13, 2008. The column headings are the four statistical factors identified which accounted for 99% of the variance in the signal intensities of the organic constituents from PMF.

The first factor was identified as associated with regional and local pollution and labeled “**HOA**” for its hydrocarbon-like characteristics. A second factor was associated with long range transport and labeled “**OOA1**” for its oxygenated characteristics. A third factor, labeled “**OOA2**,” was implicated as associated with the reactive uptake of isoprene oxidation products, especially of epoxydiols to acidic haze, fog, or cloud droplets. A fourth factor, labeled “**OOA3**,” was consistent with an association with the fresh production of secondary organic material (SOM) by the mechanism of gas-phase oxidation of biogenic volatile organic precursors followed by gas-to-particle conversion of the oxidation products. The suffixes 1, 2, and 3 on the OOA labels signify ordinal ranking with respect to the extent of oxidation represented by the factor (Chen et al., 2015).

Data reporting frequency: 5-minute average

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
HOA	ug m ⁻³	First factor, HOA
OOA1	ug m ⁻³	Second factor, OOA1

OOA2	ug m ⁻³	Third factor, OOA3
OOA3	ug m ⁻³	Fourth factor, OOA3

Data file name: AMAZE08_AMS_Harvard_SonicAnemometer_Jimenez.csv

Instrument: Harvard-CU sonic anemometer

Measurements reported: wind speed; wind direction; and temperature at 40 meters on TT34 tower. Measurements are for the period February 6, 2008 - March 13, 2008.

Data Reporting frequency: 5 min average

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	seconds	Time of measurement in seconds since 1Jan1900
Wind_direction	deg with 0 N	Wind direction
Wind_speed	m/s	Wind speed
Temp	degrees C	Temperature

File name: AMAZE08_OPC_WELAS_TopTower_Schneider.csv

Measuring instrument: WELAS white-light optical particle counter (affiliation- Max Planck Institute)

Measurements reported: Number-size distribution of particles (mean and mode diameter) made from top of at Tower TT34 for the period February 26 – March 3, 2008

Data reporting frequency: 5 minutes

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
Num_Conc	#cm ⁻³	Aerosol number concentrations provided in cm ⁻³
Mean_Diameter	um	Mean particle diameter
Mode_Diameter	um	Mode particle diameter
PM0_6	#cm ⁻³	Number concentration of particles, particle diameter smaller than 0.6µm (using n = 1.59 & rho = 1.0)
PM1_0	#cm ⁻³	Number concentration of particles, particle diameter smaller than 1.0 µm (using n = 1.59 & rho = 1.0)
PM2_5	#cm ⁻³	Number concentration of particles, particle diameter smaller than 2.5 µm (using n = 1.59 & rho = 1.0)
PM10	#cm ⁻³	Number concentration of particles, particle diameter smaller than 10 µm (using n = 1.59 & rho = 1.0)

File name: AMAZE08_OPC_WELAS_ResearchTrailer_Schneider.csv

Measuring instrument: WELAS white-light optical particle counter (affiliation- Max Planck Institute)

Measurements reported: Number-size distribution of particles (mean and mode diameter) made for the period February 7 – February 24, 2008 at Tower TT34.

Data reporting frequency: 5 minutes

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement

Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
Num_Conc	#cm ⁻³	Aerosol number concentrations provided in cm ⁻³
Mean_Diameter	um	Mean particle diameter
Mode_Diameter	um	Mode particle diameter
PM0_6	#cm ⁻³	Number concentration of particles, particle diameter smaller than 0.6µm (using n = 1.59 & rho = 1.0)
PM1_0	#cm ⁻³	Number concentration of particles, particle diameter smaller than 1.0 µm (using n = 1.59 & rho = 1.0)
PM2_5	#cm ⁻³	Number concentration of particles, particle diameter smaller than 2.5 µm (using n = 1.59 & rho = 1.0)
PM10	#cm ⁻³	Number concentration of particles, particle diameter smaller than 10 µm (using n = 1.59 & rho = 1.0)

File name: AMAZE08_OPC_GRIMM_Schneider.csv

Instrument: GRIMM 1.108 laser source optical particle counter

Measurements reported: Number-size distribution of particles (environmental mode) for the period February 7 – March 14, 2008 at Tower TT34.

Data reporting frequency: 5 minutes

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
Num_Conc	#cm ⁻³	Aerosol number concentrations provided in cm ⁻³

Mean_Diameter	um	Mean particle diameter
Mode_Diameter	um	Mode particle diameter
PM0_6	#cm ⁻³	Number concentration of particles, particle diameter smaller than 0.6µm (using n = 1.59 & rho = 1.0)
PM1_0	#cm ⁻³	Number concentration of particles, particle diameter smaller than 1.0 µm (using n = 1.59 & rho = 1.0)
PM2_5	#cm ⁻³	Number concentration of particles, particle diameter smaller than 2.5 µm (using n = 1.59 & rho = 1.0)
PM10	#cm ⁻³	Number concentration of particles, particle diameter smaller than 10 µm (using n = 1.59 & rho = 1.0)

Data file name: AMAZE08_CPC_SCHNEIDER.csv

Instrument: Condensation particle counter (CPC) -TSI 3010

Measurements reported: Aerosol particle (>0.01 um) number concentrations for the period February 7, 2008 - March 14, 2008 at Tower TT34.

Data reporting frequency: 60 sec

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	seconds	Time of measurement in seconds since 1Jan1900
Conc	# cm ⁻³	Particle number concentrations

Data file name: AMAZE08_AMS_MPI_MassConcentrations_Schneider.csv

Instrument: Aerosol mass spectrometer (MPI)

Measurements reported: organic; nitrate; ammonium; sulfate; and chloride mass concentrations for the period February 7 – March 14, 2008 at Tower TT34.

Data reporting frequency: Approx every 2.5 minutes

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	second	Time of measurement in seconds since 1Jan1900
Organic	ug m ⁻³	
Nitrate	ug m ⁻³	
Sulfate	ug m ⁻³	
Ammonium	ug m ⁻³	
Chloride	ug m ⁻³	

Data file name: AMAZE08_SMPS_Diameters_SWIETLICKI.csv

Instrument: Lund scanning mobility particle sizer (SMPS)

Measurements reported: diameters for SMPS bins (29 columns) for the period February 21 - March 14 at Tower TT34.

Data reporting frequency: 5 minute

Note: These are SMPS diameters for respective Particle Size Concentrations reported in **AMAZE08_SMPS_Concentrations_SWIETLICKI.csv**. Note that diameters are constant across bins over time – all rows have the same diameter values.

Column Name	Units/format	Description
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Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	seconds	Time of measurement in seconds since 1Jan1900
Diameters	nm	Diameters for SMPS bins (29 columns)

Data file name: AMAZE08_SMPS_Concentrations_SWIETLICKI.csv

Instrument: Lund scanning mobility particle sizer (SMPS)

Measurements reported: particle size concentrations for each SMPS diameter bin (29 columns) for the period February 21 - March 14 at Tower TT34.

Data reporting frequency: 5 minutes

Note: These are the SMPS Particle Size Concentrations for the respective diameters reported in **AMAZE08_SMPS_Diameters_SWIETLICKI.csv**.

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	seconds	Time of measurement in seconds since 1Jan1900
Conc	dN/dlogD	Particle size concentrations for each SMPS diameter bin (29 columns)

Data file name: AMAZE08_SMPS_IntegratedQuantities_SWIETLICKI.csv

Instrument: Lund scanning mobility particle sizer (SMPS)

Measurements reported: integrated particle number; surface; and volume concentrations for the period February 21 - March 14 at Tower TT34.

Data reporting frequency: 5 minutes

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	seconds	Time of measurement in seconds since 1Jan1900
Integrated_Num_Conc	# cm ⁻³	Integrated particle number concentration
Integrated_Surf_Conc	um ² cm ⁻³	Integrated particle surface concentration
Integrated_Vol_Conc	um ³ cm ⁻³	Integrated particle volume concentration

Data file name: AMAZE08_SonicAnemometer_GUENTHER.csv

Instrument: NCAR sonic anemometer

Measurements reported: Scalar and vector wind speed and direction made at the TT34 tower. Measurements are for the period February 9, 2008 - February 27, 2008.

Data reporting frequency: 5 min averages

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	second	Time of measurement in seconds since 1Jan1900

Scalar_wind_speed	u in m/s	Scalar wind speed
sigma_u	m/s	Scalar wind speed, standard deviation
Wind_direction	deg with 0 N	Wind direction
Sigma_wind_direction	deg	Wind direction, standard deviation
Vector_wind_speed	m/s	Vector wind speed
u_star	m/s	u*
H	W m ⁻²	Sensible heat flux

Data file name: AMAZE08_TraceGases_GUENTHER.csv

Instrument: gas adsorption cartridges were analyzed by thermal desorption gas chromatography mass spectrometry (affiliation-NCAR)

Measurements reported: ozone and nitrogen oxides at 40 meters made at tower TT34 at 40 meters for the period February 9, 2008 – February 27, 2008.

Data reporting frequency: 5 min averages

Missing Values reported as "none" are represented as -9999

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
Ozone	ppbv	Ozone
NO	ppbv	Nitric oxide
NOx	ppbv	Oxides of nitrogen

Data file name: AMAZE08_MixingRatios_GUENTHER.csv

Instrument: proton-transfer mass spectrometer (affiliation- NCAR)

Measurements reported: VOCs for the period February 9, 2008 - February 27, 2008 at Tower TT34.

Data reporting frequency: 2 minutes

Missing Values reported as "none" are represented as -9999

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
Isoprene	ppb	Isoprene
MVK_MACR	ppb	Methyl vinyl ketone and methacrolein
Hydroxyacetone	ppb	Hydroxyacetone
MT	ppb	MT
SQT_best_est	ppb	Sesquiterpenes
Methanol	ppb	Methanol
Acetonitrile	ppb	Acetonitrile
Acetaldehyde	ppb	Acetaldehyde
Acetone	ppb	Acetone
Acetic_acid	ppb	Acetic_acid
Benzene	ppb	Benzene

LT	ppb	LT
SQT_lower_limit	ppb	SQT_lower_limit
SQT_upper_limit	ppb	SQT_upper_limit

Data file name: AMAZE08_Pyranometer_MANZI.csv

Instrument: pyranometer (affiliation- INPA)

Measurements reported: downward and upward radiation fluxes on Tower K34 for the period February 7, 2008 - 15 March, 2008

Data reporting frequency: 30 minutes

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	seconds	Time of measurement in seconds since 1Jan1900
Radiation_Flux_Down	W m ⁻²	Radiation flux down
Radiation_Flux_Up	W m ⁻²	Radiation flux up

Data file name: AMAZE08_PAR_MANZI.csv

Instrument: None provided

Measurement reported: photosynthetically active radiation (PAR) on tower K34 (affiliation- INPA) for the period February 7, 2008 - March 15, 2008.

Data reporting frequency: 30 minutes

Missing Values reported as "none" are represented as -9999

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Seconds_since_1Jan1900	second	Time of measurement
PAR	W m ⁻²	Time of measurement in seconds since 1Jan1900

Data file name: AMAZE08_CFDC_PRENNI.csv

Instrument: continuous flow diffusion chamber (CFDC)

Measurements reported: Ice nuclei data for the period February 9, 2008 - March 9, 2008 at Tower TT34.

Data reporting frequency: approximately every 10 minutes

Column Name	Units/format	Description
Site		Either Tower TT34 or Tower K34
Date_utc	yyyy-mm-dd	Date of measurement
Time_utc	hh:mm:ss	Time of measurement
Seconds_since_1Jan1900	Seconds	Time of measurement in seconds since 1Jan1900
Processing_Temp	degrees C	Processing temperature
Ice_nuclei	# cm ⁻³	Ice nuclei

Data Center Processing Notes:

- The ORNL DAAC reformatted two data elements for consistency with archiving best practices: (1) the provided "Time & Date (UTC)" column, with values formatted as "Mon 11 Feb 2008 00:22:30", was transformed to two columns: "Date_utc" and "Time_utc", with values formatted as "yyyy-mm-dd" and "hh:mm:ss", respectively. "Seconds_since_1Jan1900" was retained as provided. (2) Missing Values for numeric variables that were provided as "None" were changed to -9999. No measurement data values were changed and the file version date and time were not changed.
- The ORNL DAAC also transformed the files from the space delimited to comma delimited, comma separate value (*.csv) format.

- The ORNL DAAC combined pairs of data files with identical row order and structure, including the Poeschl CCN activation diameter and Kappa value files, and the Artaxo fine and coarse mode filter analysis results files.

All original *.txt files are available by request from the ORNL DAAC.

3. Application and Derivation

The Amazon Basin provides an excellent environment for studying the sources, transformations, and properties of natural aerosol particles and the resulting links between biological processes and climate. With this framework in mind, AMAZE-08 carried out from 07 February – 14 March 2008 during the wet season in the central Amazon Basin sought to understand the formation, transformations, and cloud-forming properties of fine- and coarse-mode biogenic aerosol particles, especially as related to their effects on cloud activation and regional climate. Special foci included: The production mechanisms of secondary organic components at a pristine continental site, including the factors regulating their temporal variability. And, predicting and understanding the cloud-forming properties of biogenic particles at such a site.

For additional research results, please refer to the Atmospheric Chemistry and Physics special issue (http://www.atmos-chem-phys.net/special_issue141.html) which brings together a collection of publications on measurements of the Amazonian Aerosol Characterization Experiment 2008 (AMAZE-08). In particular, see the overview article for AMAZE-08 (Martin et al., 2010a).

4. Quality Assessment

The varied instrumentation was associated with several organizations. The accuracy of the measurements would depend on the instruments as well as the site conditions. Refer to Martin et al (2010a) for additional information.

5. Data Acquisition, Materials, and Methods

Site description:

The principal measurement site of AMAZE-08 was tower TT34 located in the central Amazon Basin, 60 km NNW of downtown Manaus and 40 km from the metropolis Marchgins (Martin et al., 2010a). The site, accessed by a 34-km unpaved road, was within a pristine terra firme rainforest in the Reserva Biologica do Cuieiras and managed by the Instituto Nacional de Pesquisas da Amazonia (INPA) and the Large-Scale Biosphere-Atmosphere Experiment in Amazonia (LBA). The base of tower TT34 was on a ridge, and the scale of hill-valley relief near the tower was ca. 50 m. The forest canopy height near the tower varied between 30 and 35 m. In addition to TT34, PAR measurements were made at Tower K34 1.6 km from the TT34 site. Tower K34 (54-m height) housed several instruments directly at its top level (Ahlm et al., 2009). Measurements were also taken at site K23 and Silvicultura site, however, there are no data included with this data set from those sites.

In this region of the Amazon Basin, the thickness of the convective planetary boundary layer (PBL) typically varies from 100-200-m at night to 1 to 2 km when fully developed in the mid afternoon. The development of the boundary-layer structure at night was driven by the formation of a nocturnal PBL that had a height comparable to the local topographical relief, which was 50 to 100-m around TT34. Local pollution (both at day and night) arrived at times from metropolitan Manaus, and affected some of the measurement periods at TT34, especially at night (Martin et al., 2010a and Martin et al., 2010b).

Sampling Methods:

At tower TT34, air was entrained into three inlets fixed at 38.75-m to the top of the tower. The air was brought by sampling lines to a ground-level container (2.2 × 5.9 × 2.5-m³). The inlet for gases consisted of a screen-covered inverted funnel. The inlet for turbulent-flow aerosol sampling was a screen-covered open tube that was placed very close to a sonic anemometer and positioned in the direction of predominant wind flow. An inlet with an aerodynamic cutoff nominally of PM₁₀ but actually of PM₇ for our flow conditions was used for laminar-flow aerosol sampling. The sampling lines running from these inlets to the container included a 6.4-mm (1/400 OD) Teflon line for gas sampling, a 12.7-mm (1/2 inch OD; 10.9-mm ID) stainless steel line for turbulent-flow aerosol sampling, and a 19-mm (3/4 inch OD; 17.3-mm ID) stainless steel line for laminar-flow aerosol sampling. From the sampling height to the container, the three lines were wrapped together and encased by sections of heating tape and insulation. Feedback control was used to maintain the temperature at 30±1 degrees C to avoid water condensation in the sampling lines (Martin et al., 2010b).



Figure 2. View from the top of tower TT34 looking down on sampling line.

Most of the particle instrumentation in the container sampled from the laminar line. For the dimensions and flow of the laminar sampling line, the Reynolds number varied from 1,200 to 2,000 during the period of measurements. The upper limit of the aerodynamic cutoff was therefore calculated to range from 5 to 7- μm for the range of flow rates employed during AMAZE-08. Therefore, the lower and upper limits of transmission of the inlet-sampling line assembly were calculated as 4 nm to 7- μm , respectively, for the condition of laminar flow.



Figure 3. Close-up view of the lower part of tower looking at horizontal connector of sampling line.

A self-regenerating automatic dryer was placed on the top of the container and intercepted the laminar sampling line prior to entrance into the container. The dryer consisted of two diffusion dryers in parallel, one drying the aerosol flow while the other was bypassed and regenerated by dry air (Tuch et al., 2009). The flow was switched from one dryer to the other at a threshold of 40% RH. By this sequence, the RH was kept between 20 and 40% when measured by an in-line sensor. The cabinet housing the dryer on top of the container was consistently several degrees warmer than inside the container. The RH therefore increased by up to 20% in the distribution lines inside the container prior to sampling by instruments. The set point of the air-conditioning inside the container was 23 degrees C, although the temperature was warmer by three degrees C or more near some of the instruments (Martin et al., 2010b).

The turbulent sampling line was dried to 40 to 70% relative humidity by use of a Nafion RH-exchange tube that intercepted the sampling line on the roof of the container just prior to entrance. The partial pressure of water in the outer flow around the Nafion material (with the aerosol in the inner flow) was reduced by expansion through a critical orifice, with under pressure provided by a vacuum pump. The turbulent sampling line was operated at a Reynolds number of 5,000 to 10,000, and the corresponding diffusional, gravitational, and inertial deposition losses suggest 50% transmission cutoffs of 17 nm and 3.1 μm , with 100% transmission between these cutpoints. The line for gas sampling entered the container without interception (Martin et al., 2010a). For some gas measurements, additional sampling lines were temporarily placed at various heights along the tower (Karl et al., 2009).

Analyses:

Please refer to Martin et al. (2010b) for additional details regarding the analysis and instrumentation.

For additional articles regarding the AMAZE-08 research, refer to http://www.atmos-chem-phys.net/special_issue141.html

6. Data Access

These data are available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

[AMAZE-08 Aerosol Characterization and Meteorological Data, Central Amazon Basin: 2008](#)

Contact for Data Center Access Information:

- E-mail: uso@daac.ornl.gov
- Telephone: +1 (865) 241-3952

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