

NITRIC ACID, AMMONIA AND ATMOSPHERIC PARTICULATE
MATTER CONCENTRATIONS IN THE SOUTH COAST AIR BASIN,
30-31 August 1982

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Nitric Acid, Ammonia and Atmospheric Particulate
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This report archives the complete results of the experiment conducted on August 30-31, 1982, in the Los Angeles, California, air basin as described in Acquisition of Regional Air Quality Model Validation Data for Nitrate, Sulfate, Ammonium Ion and Their Precursors, Atmospheric Environment, 18, 1815-1827 (Appendix A of this report). It is suggested that before using this report, one be familiar with that paper to better understand the techniques used to obtain the data that follow, the locations of the monitoring sites, and the uncertainties on experimental measurements. A brief discussion of the experiment is included here to help explain how the results are tabulated.

As noted, the experiment was conducted in the Los Angeles basin during the period 30-31 August 1982. The sampling network operated for 48 consecutive hours from midnight (PDT) preceding 30 August to midnight (PDT) following 31 August and consisted of ten sampling sites, of which seven were co-located with South Coast Air Quality Management District (SCAQMD) monitoring locations, two on university campuses, and one at a California Air Resources Board (CARB) monitoring station. The ten monitoring station names, numbers, and locations were:

STATION NAME	STATION NUMBER	STATION LOCATION
Pasadena	1	Keck Laboratories, California Institute of Technology, Pasadena, CA
Azusa	2	SCAQMD site 803 N. Loren Ave. Azusa, CA
Upland	3	CARB site 1350 San Bernardino Rd. Upland, CA
Rubidoux	4	SCAQMD site 5888 Mission Blvd. Rubidoux, CA
Anaheim	5	SCAQMD site 1010 S. Harbor Blvd. Anaheim, CA
Long Beach	6	SCAQMD site 3648 N. Long Beach Blvd. Long Beach, CA
Downtown Los Angeles	7	SCAQMD site 1630 N. Main Los Angeles, CA
West Los Angeles	8	SCAQMD site 1535 S. Robertson Blvd. Los Angeles, CA
Lennox	9	SCAQMD site 11408 La Cienega Blvd. Los Angeles, CA
UCR	10	University of California at Riverside campus. Riverside, CA

The station numbers above correspond to those used in the following tables. Nominal two-hour and four-hour average measurements were obtained at each site for major ionic aerosol species, nitric acid gas, and ammonia gas. Over each measurement period, six filters were

exposed; their codes, types, and associated measured species are:

FILTER CODE	FILTER TYPE	COMMENTS
T1	47 mm Membrana Zefluor, Teflon filter, 1 μm pore size	Preceded nylon, BN, filter and was used to strip aerosols.
BN	47 mm, GHIA, Nylasorb, 1 μm pore size	Followed T1 and was used to measure $\text{HNO}_3(\text{g})$ after aerosol nitrate was collected.
T2	47 mm Membrana Zefluor, Teflon, 1 μm pore size	Used to collect ionic aerosol constituents. NO_3^- , SO_4^{2-} , Cl^- , Ca^{++} , Na^+ , K^+ , Mg^{++} , NH_4^+ measurements obtained from T2.
Ox	Oxalic acid impregnated 47 mm Gelman AE glass fiber filter	Followed Teflon, T2 filter and was used to collect $\text{NH}_3(\text{g})$ after aerosol ammonium was stripped.
ND	47 mm, GHIA, Nylasorb, 1 μm pore size nylon:	Followed nitric acid gas denuder. Used to collect nitrate aerosol. See comments in Aquisition of Regional Air Quality Model Validation Data for Nitrate, Sulfate, Ammonium Ion and Their Precursors regarding aerosol losses in denuder. We believe that these denuder data may be biased and should not be used.

Total nitrate can be calculated by adding aerosol nitrate from filter T2 and nitric acid from BN. The sixth filter (a nylon total filter)

from each period was analyzed on occasion to check the total inorganic nitrate values obtained by addition of filters T2 and BN. The filter codes described above are used in the following tables to identify the filter from which the data are taken and to identify the actual pollutant species measured.

Temperatures noted were measured on site by standard methods supplemented by data obtained from U.S. Weather Service observations at nearby airports and from other meteorological measurement stations. Humidity data were obtained from local meteorological stations and then interpolated to give the reported RH values.

The following report is subdivided into a number of small tables reporting the experimental results for each station during each time period, starting with station 1. The data are shown chronologically for each station. In the first line of the table are the station number, corresponding to the list above, the period, and the sampling time. The period number identifies the container in which the filter was stored and does not necessarily correspond to the order in which the filters were used. Period number is used only as an interval identification number and should be ignored by the reader. Instead, the reader should focus on the sampling time which gives the nominal start and stop times (PDT) for each filter and the date. Temperature and relative humidity, averaged over the sampling time, are found on the second line. Lines 3, 4, and 5 are headers for the table and pertain to the columns underneath. Starting with column 1 the station number is given, which repeats the station number found in

row 1. Column 2 gives the time or period, also found in row 1, and is not used. The filter type is given in column 3: the filter code indicates the filter type as discussed above. The fourth column states the species being measured. Finally, the fifth through eighth columns give the species concentrations and measurement uncertainties. Data are given in both ppb units and $\mu\text{g m}^{-3}$ where one ppb is equivalent to $0.0407 \mu\text{ moles m}^{-3}$. Mass units reported are for the species as listed, except that both NH_3 and NH_4^+ are given in $\mu\text{g m}^{-3} \text{ N}$ and HNO_3 is given in $\mu\text{g m}^{-3} \text{ NO}_3^-$.

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STATION 1 PERIOD 7 SAMPLING TIME 0- 4 AUG 30
TEMPERATURE = 290.5 K RELATIVE HUMIDITY= 82.8%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	7	T2	NO3-	2.58	6.50	0.55	1.39
1	7	T2	SO4=	1.71	6.68	0.47	1.85
1	7	T2	CL-	0.10	0.14	0.40	0.57
1	7	T2	NH4+	0.61	0.35	0.31	0.18
1	7	T2	NA+	0.00	0.00	0.72	0.67
1	7	T2	CA++	0.51	0.83	0.85	1.38
1	7	T2	MG++	0.17	0.17	0.71	0.71
1	7	T2	K+	0.27	0.43	0.49	0.78
1	7	ND	NO3-	2.55	6.42	0.48	1.22
1	7	BN	HNO3	0.50	1.26	0.31	0.78
1	7	OX	NH3	1.17	0.66	0.55	0.31

STATION 1 PERIOD 8 SAMPLING TIME 4- 8 AUG 30
TEMPERATURE = 290.8 K RELATIVE HUMIDITY= 81.7%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	8	T2	NO3-	0.49	1.24	0.41	1.02
1	8	T2	SO4=	0.47	1.82	0.41	1.59
1	8	T2	CL-	0.10	0.14	0.40	0.57
1	8	T2	NH4+	0.59	0.34	0.31	0.17
1	8	T2	NA+	0.00	0.00	0.72	0.67
1	8	T2	CA++	0.30	0.48	0.84	1.38
1	8	T2	MG++	0.00	0.00	0.71	0.71
1	8	T2	K+	0.00	0.00	0.49	0.78
1	8	ND	NO3-	1.94	4.89	0.42	1.05
1	8	BN	HNO3	0.60	1.51	0.31	0.79
1	8	OX	NH3	4.11	2.34	0.96	0.55

STATION 1 PERIOD 9 SAMPLING TIME 8- 12 AUG 30
TEMPERATURE = 297.5 K RELATIVE HUMIDITY= 60.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	9	T2	NO3-	1.30	3.27	0.44	1.12
1	9	T2	SO4=	1.78	6.94	0.46	1.87
1	9	T2	CL-	0.07	0.10	0.40	0.57
1	9	T2	NH4+	2.14	1.21	0.51	0.29
1	9	T2	NA+	0.00	0.00	0.72	0.67
1	9	T2	CA++	1.25	2.04	0.87	1.42
1	9	T2	MG++	0.26	0.26	0.72	0.71
1	9	T2	K+	0.00	0.00	0.49	0.78
1	9	ND	NO3-	4.02	10.12	0.67	1.68
1	9	BN	HNO3	3.45	8.68	0.59	1.49
1	9	OX	NH3	4.88	2.77	1.10	0.62

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STATION 1 PERIOD 10
 TEMPERATURE = 304.0 K
 FILTER ID

SAMPLING TIME 12- 16 AUG 30
 RELATIVE HUMIDITY= 38.9%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	10	T2	NO3-	1.13	2.85	0.43	1.09
1	10	T2	SO4=	1.16	4.54	0.44	1.70
1	10	T2	CL-	0.00	0.00	0.40	0.57
1	10	T2	NH4+	1.01	0.57	0.35	0.20
1	10	T2	NA+	0.07	0.07	0.72	0.68
1	10	T2	CA++	0.81	1.31	0.86	1.39
1	10	T2	MG++	0.26	0.26	0.72	0.71
1	10	T2	K+	0.00	0.00	0.49	0.78
1	10	ND	NO3-	4.19	10.57	0.69	1.74
1	10	BN	HNO3	6.14	15.45	0.96	2.41
1	10	DX	NH3	9.66	5.49	2.00	1.13

STATION 1 PERIOD 11
 TEMPERATURE = 300.0 K
 FILTER ID

SAMPLING TIME 16- 20 AUG 30
 RELATIVE HUMIDITY= 48.1%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	11	T2	NO3-	0.84	2.12	0.42	1.06
1	11	T2	SO4=	0.80	3.11	0.42	1.63
1	11	T2	CL-	0.00	0.00	0.40	0.57
1	11	T2	NH4+	0.75	0.43	0.32	0.18
1	11	T2	NA+	0.26	0.24	0.72	0.68
1	11	T2	CA++	0.59	0.96	0.85	1.38
1	11	T2	MG++	0.25	0.25	0.72	0.71
1	11	T2	K+	0.26	0.41	0.49	0.78
1	11	ND	NO3-	2.01	5.07	0.42	1.07
1	11	BN	HNO3	2.51	6.33	0.48	1.21
1	11	DX	NH3	2.44	1.39	0.70	0.40

STATION 1 PERIOD 12
 TEMPERATURE = 293.0 K
 FILTER ID

SAMPLING TIME 20- 24 AUG 30
 RELATIVE HUMIDITY= 69.6%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	12	T2	NO3-	1.46	3.68	0.46	1.15
1	12	T2	SO4=	0.79	3.07	0.42	1.63
1	12	T2	CL-	0.46	0.66	0.41	0.59
1	12	T2	NH4+	0.90	0.51	0.34	0.19
1	12	T2	NA+	0.91	0.85	0.73	0.69
1	12	T2	CA++	0.84	1.37	0.86	1.40
1	12	T2	MG++	0.48	0.47	0.72	0.71
1	12	T2	K+	0.05	0.08	0.49	0.78
1	12	ND	NO3-	2.68	6.74	0.50	1.25
1	12	BN	HNO3	0.71	1.78	0.32	0.80
1	12	DX	NH3	3.07	1.75	0.79	0.45

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STATION 1 PERIOD 13 SAMPLING TIME 0- 2 AUG 31
TEMPERATURE = 290.8 K RELATIVE HUMIDITY= 78.8%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	13	T2	NO3-	0.79	1.98	0.42	1.05
1	13	T2	SO4=	0.49	1.92	0.41	1.59
1	13	T2	CL-	0.21	0.30	0.40	0.57
1	13	T2	NH4+	0.83	0.47	0.33	0.19
1	13	T2	NA+	0.48	0.45	0.72	0.68
1	13	T2	CA++	1.18	1.92	0.87	1.42
1	13	T2	MG++	0.26	0.26	0.72	0.71
1	13	T2	K+	1.09	1.73	0.53	0.84
1	13	ND	NO3-	2.81	7.07	0.51	1.29
1	13	BN	HNO3	0.51	1.29	0.31	0.78
1	13	OX	NH3	4.06	2.31	0.95	0.54

STATION 1 PERIOD 14 SAMPLING TIME 2- 4 AUG 31
TEMPERATURE = 290.4 K RELATIVE HUMIDITY= 80.6%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	14	T2	NO3-	0.55	1.38	0.41	1.03
1	14	T2	SO4=	0.31	1.21	0.40	1.57
1	14	T2	CL-	0.00	0.00	0.40	0.57
1	14	T2	NH4+	0.98	0.56	0.34	0.20
1	14	T2	NA+	0.00	0.00	0.72	0.67
1	14	T2	CA++	0.88	1.44	0.86	1.40
1	14	T2	MG++	0.14	0.14	0.71	0.71
1	14	T2	K+	0.02	0.03	0.49	0.78
1	14	ND	NO3-	2.12	5.34	0.43	1.09
1	14	BN	HNO3	0.66	1.67	0.32	0.80
1	14	OX	NH3	0.90	0.51	0.53	0.30

STATION 1 PERIOD 15 SAMPLING TIME 4- 6 AUG 31
TEMPERATURE = 290.1 K RELATIVE HUMIDITY= 82.2%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	15	T2	NO3-	0.57	1.44	0.41	1.03
1	15	T2	SO4=	1.10	4.30	0.43	1.69
1	15	T2	CL-	0.00	0.00	0.40	0.57
1	15	T2	NH4+	1.23	0.70	0.38	0.21
1	15	T2	NA+	0.21	0.19	0.72	0.68
1	15	T2	CA++	0.36	0.58	0.85	1.38
1	15	T2	MG++	0.11	0.11	0.71	0.71
1	15	T2	K+	0.00	0.00	0.49	0.78
1	15	ND	NO3-	1.57	3.96	0.38	0.96
1	15	BN	HNO3	0.73	1.83	0.32	0.80
1	15	OX	NH3	4.43	2.52	1.02	0.58

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STATION 1 PERIOD 16 SAMPLING TIME 6- 8 AUG 31
 TEMPERATURE = 291.1 K RELATIVE HUMIDITY= 76.9%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	16	T2	NO3-	1.26	3.16	0.44	1.11
1	16	T2	SO4=	2.10	8.21	0.51	1.98
1	16	T2	CL-	0.11	0.16	0.40	0.57
1	16	T2	NH4+	1.59	0.91	0.43	0.24
1	16	T2	NA+	0.28	0.26	0.72	0.68
1	16	T2	CA++	2.15	3.50	0.93	1.51
1	16	T2	MG++	0.65	0.64	0.72	0.72
1	16	T2	K+	0.28	0.45	0.49	0.78
1	16	ND	NO3-	1.47	3.71	0.37	0.93
1	16	BN	HNO3	0.89	2.24	0.33	0.83
1	16	DX	NH3	3.41	1.94	0.85	0.48

STATION 1 PERIOD 17 SAMPLING TIME 8- 10 AUG 31
 TEMPERATURE = 295.7 K RELATIVE HUMIDITY= 56.0%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	17	T2	NO3-	2.76	6.95	0.57	1.44
1	17	T2	SO4=	3.05	11.93	0.60	2.36
1	17	T2	CL-	0.00	0.00	0.40	0.57
1	17	T2	NH4+	2.16	1.23	0.52	0.29
1	17	T2	NA+	0.40	0.37	0.72	0.68
1	17	T2	CA++	2.36	3.85	0.95	1.54
1	17	T2	MG++	0.65	0.65	0.72	0.72
1	17	T2	K+	0.33	0.53	0.49	0.78
1	17	ND	NO3-	2.73	6.87	0.50	1.27
1	17	BN	HNO3	2.04	5.14	0.43	1.07
1	17	DX	NH3	4.93	2.80	1.11	0.63

STATION 1 PERIOD 18 SAMPLING TIME 10- 12 AUG 31
 TEMPERATURE = 301.5 K RELATIVE HUMIDITY= 40.4%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	18	T2	NO3-	0.49	1.22	0.41	1.02
1	18	T2	SO4=	0.48	1.86	0.41	1.59
1	18	T2	CL-	0.00	0.00	0.40	0.57
1	18	T2	NH4+	0.82	0.50	0.33	0.19
1	18	T2	NA+	0.00	0.00	0.72	0.67
1	18	T2	CA++	0.11	0.18	0.84	1.37
1	18	T2	MG++	0.09	0.09	0.71	0.71
1	18	T2	K+	0.00	0.00	0.49	0.78
1	18	ND	NO3-	2.09	5.26	0.43	1.09
1	18	BN	HNO3	2.76	6.96	0.51	1.28
1	18	DX	NH3	5.03	2.86	1.12	0.64

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STATION 1 PERIOD 19 SAMPLING TIME 12- 14 AUG 31
TEMPERATURE = 307.3 K RELATIVE HUMIDITY= 26.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	19	T2	NO3-	0.84	2.12	0.42	1.06
1	19	T2	SO4=	0.19	0.72	0.40	1.57
1	19	T2	CL-	0.00	0.00	0.40	0.57
1	19	T2	NH4+	0.97	0.55	0.34	0.19
1	19	T2	NA+	0.00	0.00	0.72	0.67
1	19	T2	CA++	0.62	1.01	0.85	1.39
1	19	T2	MG++	0.10	0.10	0.71	0.71
1	19	T2	K+	0.20	0.33	0.49	0.78
1	19	ND	NO3-	1.91	4.81	0.41	1.04
1	19	BN	HNO3	4.99	12.57	0.80	2.01
1	19	DX	NH3	5.42	3.08	1.19	0.68

STATION 1 PERIOD 20 SAMPLING TIME 14- 16 AUG 31
TEMPERATURE = 308.5 K RELATIVE HUMIDITY= 20.6%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	20	T2	NO3-	0.66	1.66	0.41	1.04
1	20	T2	SO4=	0.35	1.37	0.40	1.58
1	20	T2	CL-	0.00	0.00	0.40	0.57
1	20	T2	NH4+	3.11	1.77	0.68	0.39
1	20	T2	NA+	1.17	1.09	0.74	0.69
1	20	T2	CA++	1.08	1.75	0.86	1.41
1	20	T2	MG++	0.78	0.77	0.73	0.72
1	20	T2	K+	0.00	0.00	0.49	0.78
1	20	ND	NO3-	10.34	26.03	1.56	3.93
1	20	BN	HNO3	7.44	18.74	1.14	2.86
1	20	DX	NH3	2.09	1.19	0.65	0.37

STATION 1 PERIOD 21 SAMPLING TIME 16- 18 AUG 31
TEMPERATURE = 305.5 K RELATIVE HUMIDITY= 21.4%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
1	21	T2	NO3-	2.10	5.29	0.51	1.28
1	21	T2	SO4=	3.10	12.10	0.61	2.38
1	21	T2	CL-	0.46	0.65	0.41	0.59
1	21	T2	NH4+	3.52	2.00	0.76	0.43
1	21	T2	NA+	0.92	0.86	0.73	0.69
1	21	T2	CA++	0.61	0.99	0.85	1.39
1	21	T2	MG++	0.38	0.38	0.72	0.71
1	21	T2	K+	0.31	0.50	0.49	0.78
1	21	ND	NO3-	3.12	7.85	0.55	1.39
1	21	BN	HNO3	4.13	10.41	0.68	1.72
1	21	DX	NH3	13.42	7.63	2.73	1.55

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STATION 1 PERIOD 22 SAMPLING TIME 18- 20 AUG 31
 TEMPERATURE = 301.2 K RELATIVE HUMIDITY= 32.9%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY (UG/M**3)
STATION	TIME	TYPE		(PPB)	(UG/M**3)	
1	22	T2	NO3-	1.12	2.81	0.43
1	22	T2	SO4=	2.14	8.34	0.51
1	22	T2	CL-	0.29	0.41	0.41
1	22	T2	NH4+	1.71	0.97	0.44
1	22	T2	NA+	0.21	0.20	0.72
1	22	T2	CA++	1.08	1.77	0.87
1	22	T2	MG++	0.43	0.43	0.72
1	22	T2	K+	0.24	0.39	0.49
1	22	ND	NO3-	1.53	3.86	0.38
1	22	BN	HNO3	2.51	6.33	0.48
1	22	DX	NH3	6.94	3.94	1.48

STATION 1 PERIOD 23 SAMPLING TIME 20- 22 AUG 31
 TEMPERATURE = 297.1 K RELATIVE HUMIDITY= 36.2%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY (UG/M**3)
STATION	TIME	TYPE		(PPB)	(UG/M**3)	
1	23	T2	NO3-	0.63	1.57	0.41
1	23	T2	SO4=	0.41	1.58	0.40
1	23	T2	CL-	0.63	0.90	0.42
1	23	T2	NH4+	0.74	0.42	0.32
1	23	T2	NA+	0.02	0.02	0.72
1	23	T2	CA++	0.60	0.98	0.85
1	23	T2	MG++	0.31	0.31	0.72
1	23	T2	K+	0.12	0.19	0.49
1	23	ND	NO3-	2.14	5.40	0.44
1	23	BN	HNO3	1.34	3.37	0.36
1	23	DX	NH3	7.26	4.12	1.54

STATION 1 PERIOD 24 SAMPLING TIME 22- 24 AUG 31
 TEMPERATURE = 295.4 K RELATIVE HUMIDITY= 40.2%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY (UG/M**3)
STATION	TIME	TYPE		(PPB)	(UG/M**3)	
1	24	T2	NO3-	0.80	2.00	0.42
1	24	T2	SO4=	0.51	1.99	0.41
1	24	T2	CL-	0.18	0.26	0.40
1	24	T2	NH4+	1.12	0.63	0.36
1	24	T2	NA+	0.30	0.29	0.72
1	24	T2	CA++	0.84	1.37	0.86
1	24	T2	MG++	1.18	1.17	0.75
1	24	T2	K+	0.37	0.59	0.49
1	24	ND	NO3-	2.10	5.28	0.43
1	24	BN	HNO3	1.13	2.85	0.34
1	24	DX	NH3	7.78	4.42	1.63

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STATION 2 PERIOD 7 SAMPLING TIME 0- 4 AUG 30
 TEMPERATURE = 292.6 K RELATIVE HUMIDITY= 72.6%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY
				(PPB)	(UG/M**3)	
2	7	T2	NO3-	2.97	7.48	0.59
2	7	T2	SO4=	5.17	20.21	0.87
2	7	T2	CL-	0.58	0.82	0.42
2	7	T2	NH4+	6.31	3.58	1.29
2	7	T2	NA+	1.70	1.59	0.76
2	7	T2	CA++	0.91	1.49	0.86
2	7	T2	MG++	0.16	0.16	0.71
2	7	T2	K+	0.60	0.95	0.50
2	7	ND	NO3-	0.94	2.36	0.33
2	7	BN	HNO3	0.46	1.16	0.31
2	7	DX	NH3	5.90	3.35	1.28
						0.73

STATION 2 PERIOD 8 SAMPLING TIME 4- 8 AUG 30
 TEMPERATURE = 291.5 K RELATIVE HUMIDITY= 78.1%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY
				(PPB)	(UG/M**3)	
2	8	T2	NO3-	3.03	7.63	0.60
2	8	T2	SO4=	3.94	15.40	0.71
2	8	T2	CL-	0.97	1.38	0.46
2	8	T2	NH4+	6.15	3.49	1.26
2	8	T2	NA+	1.62	1.51	0.76
2	8	T2	CA++	1.19	1.94	0.87
2	8	T2	MG++	0.17	0.17	0.71
2	8	T2	K+	0.51	0.82	0.71
2	8	ND	NO3-	0.87	2.18	0.50
2	8	BN	HNO3	0.48	1.21	0.33
2	8	DX	NH3	2.50	1.42	0.31
						0.71
						0.40

STATION 2 PERIOD 9 SAMPLING TIME 8- 12 AUG 30
 TEMPERATURE = 300.1 K RELATIVE HUMIDITY= 51.3%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY
				(PPB)	(UG/M**3)	
2	9	T2	NO3-	6.07	15.29	0.99
2	9	T2	SO4=	5.76	22.50	0.94
2	9	T2	CL-	0.67	0.95	0.43
2	9	T2	NH4+	9.07	5.15	1.84
2	9	T2	NA+	0.91	0.85	0.73
2	9	T2	CA++	5.13	8.36	1.26
2	9	T2	MG++	0.71	0.70	0.73
2	9	T2	K+	0.91	1.45	0.52
2	9	ND	NO3-	2.33	5.86	0.46
2	9	BN	HNO3	1.12	2.83	0.34
2	9	DX	NH3	4.56	2.59	1.04
						0.59

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STATION 2 PERIOD 10 SAMPLING TIME 12- 16 AUG 30
 TEMPERATURE = 306.1 K RELATIVE HUMIDITY= 34.5%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
2	10	T2	NO3-	4.03	10.16	0.72	1.81
2	10	T2	SO4=	4.30	16.80	0.75	2.94
2	10	T2	CL-	0.04	0.06	0.40	0.57
2	10	T2	NH4+	5.51	3.13	1.14	0.65
2	10	T2	NA+	1.48	1.39	0.75	0.71
2	10	T2	CA++	2.98	4.85	1.00	1.63
2	10	T2	MG++	1.19	1.18	0.75	0.74
2	10	T2	K+	0.27	0.43	0.49	0.78
2	10	ND	NO3-	1.39	3.50	0.36	0.92
2	10	BN	HNO3	2.53	6.38	0.48	1.21
2	10	OX	NH3	10.36	5.89	2.13	1.21

STATION 2 PERIOD 11 SAMPLING TIME 16- 20 AUG 30
 TEMPERATURE = 302.1 K RELATIVE HUMIDITY= 42.5%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
2	11	T2	NO3-	2.38	6.00	0.53	1.34
2	11	T2	SO4=	2.78	10.86	0.57	2.24
2	11	T2	CL-	0.17	0.24	0.40	0.57
2	11	T2	NH4+	3.14	1.78	0.69	0.39
2	11	T2	NA+	1.23	1.16	0.74	0.70
2	11	T2	CA++	1.34	2.18	0.88	1.43
2	11	T2	MG++	0.22	0.22	0.72	0.71
2	11	T2	K+	0.03	0.05	0.49	0.78
2	11	ND	NO3-	0.70	1.75	0.32	0.80
2	11	BN	HNO3	1.45	3.66	0.37	0.93
2	11	OX	NH3	6.67	3.90	1.46	0.63

STATION 2 PERIOD 12 SAMPLING TIME 20- 24 AUG 30
 TEMPERATURE = 296.1 K RELATIVE HUMIDITY= 57.5%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
2	12	T2	NO3-	3.32	8.35	0.63	1.60
2	12	T2	SO4=	3.35	13.08	0.64	2.49
2	12	T2	CL-	0.81	1.15	0.44	0.62
2	12	T2	NH4+	4.68	2.66	0.98	0.56
2	12	T2	NA+	1.94	1.81	0.78	0.73
2	12	T2	CA++	1.45	2.37	0.88	1.44
2	12	T2	MG++	0.36	0.36	0.72	0.71
2	12	T2	K+	0.22	0.35	0.49	0.78
2	12	ND	NO3-	1.18	2.98	0.35	0.88
2	12	BN	HNO3	0.48	1.22	0.31	0.76
2	12	OX	NH3	7.84	4.46	1.65	0.94

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STATION 2 PERIOD 13 SAMPLING TIME 0- 2 AUG 31
TEMPERATURE = 293.1 K RELATIVE HUMIDITY= 67.9%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
2	13	T2	NO3-	2.99	7.53	0.60	1.50
2	13	T2	SO4=	2.14	8.37	0.51	2.00
2	13	T2	CL-	0.53	0.76	0.42	0.59
2	13	T2	NH4+	4.11	2.34	0.87	0.49
2	13	T2	NA+	3.37	3.15	0.88	0.82
2	13	T2	CA++	1.22	1.98	0.87	1.42
2	13	T2	MG++	0.01	0.01	0.71	0.71
2	13	T2	K+	0.16	0.26	0.49	0.78
2	13	ND	NO3-	1.23	3.09	0.35	0.88
2	13	BN	HNO3	0.56	1.41	0.31	0.78
2	13	OX	NH3	10.62	6.04	2.18	1.24

STATION 2 PERIOD 14 SAMPLING TIME 2- 4 AUG 31
TEMPERATURE = 292.1 K RELATIVE HUMIDITY= 72.2%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
2	14	T2	NO3-	2.34	5.88	0.53	1.33
2	14	T2	SO4=	1.20	4.70	0.44	1.71
2	14	T2	CL-	0.56	0.80	0.42	0.60
2	14	T2	NH4+	3.15	1.79	0.69	0.39
2	14	T2	NA+	3.33	3.12	0.87	0.82
2	14	T2	CA++	0.78	1.27	0.85	1.39
2	14	T2	MG++	0.02	0.02	0.71	0.71
2	14	T2	K+	0.82	1.31	0.51	0.81
2	14	ND	NO3-	1.08	2.72	0.34	0.86
2	14	JN	HNO3	0.31	0.77	0.30	0.76
2	14	OX	NH3	10.63	6.04	2.18	1.24

STATION 2 PERIOD 15 SAMPLING TIME 4- 6 AUG 31
TEMPERATURE = 291.6 K RELATIVE HUMIDITY= 74.5%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
2	15	T2	NO3-	2.18	5.48	0.51	1.29
2	15	T2	SO4=	1.09	4.27	0.43	1.69
2	15	T2	CL-	0.39	0.56	0.41	0.58
2	15	T2	NH4+	3.15	1.79	0.69	0.39
2	15	T2	NA+	0.73	0.69	0.73	0.68
2	15	T2	CA++	0.81	1.31	0.86	1.39
2	15	T2	MG++	0.00	0.00	0.71	0.71
2	15	T2	K+	0.00	0.00	0.49	0.78
2	15	ND	NO3-	0.88	2.21	0.33	0.82
2	15	BN	HNO3	0.34	0.87	0.30	0.77
2	15	OX	NH3	9.99	5.67	2.06	1.17

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STATION 2 PERIOD 16 SAMPLING TIME 6- 8 AUG 31
 TEMPERATURE = 291.1 K RELATIVE HUMIDITY= 76.9%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
2	16	T2	NO3-	4.21	10.61	0.74	1.87
2	16	T2	SO4=	2.75	10.74	0.57	2.23
2	16	T2	CL-	0.47	0.67	0.41	0.59
2	16	T2	NH4+	4.50	2.55	0.94	0.54
2	16	T2	NA+	1.19	1.11	0.74	0.69
2	16	T2	CA++	1.45	2.37	0.88	1.44
2	16	T2	MG++	1.44	1.43	0.76	0.75
2	16	T2	K+	0.24	0.38	0.49	0.78
2	16	ND	NO3-	0.88	2.22	0.33	0.82
2	16	BN	HNO3	0.42	1.07	0.31	0.77
2	16	DX	NH3	11.92	6.78	2.44	1.38

STATION 2 PERIOD 17 SAMPLING TIME 8- 10 AUG 31
 TEMPERATURE = 299.1 K RELATIVE HUMIDITY= 45.5%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
2	17	T2	NO3-	5.40	13.61	0.90	2.26
2	17	T2	SO4=	3.28	12.82	0.63	2.46
2	17	T2	CL-	1.01	1.44	0.46	0.65
2	17	T2	NH4+	5.88	3.34	1.21	0.69
2	17	T2	NA+	1.14	1.07	0.74	0.69
2	17	T2	CA++	3.91	6.38	1.10	1.80
2	17	T2	MG++	0.45	0.44	0.72	0.71
2	17	T2	K+	0.22	0.36	0.49	0.78
2	17	ND	NO3-	1.48	3.73	0.37	0.94
2	17	BN	HNO3	0.91	2.29	0.33	0.83
2	17	DX	NH3	6.56	3.73	1.40	0.80

STATION 2 PERIOD 18 SAMPLING TIME 10- 12 AUG 31
 TEMPERATURE = 304.6 K RELATIVE HUMIDITY= 33.7%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
2	18	T2	NO3-	9.13	23.00	1.41	3.56
2	18	T2	SO4=	3.54	13.81	0.66	2.58
2	18	T2	CL-	3.94	5.61	0.97	1.38
2	18	T2	NH4+	7.53	4.28	1.53	0.87
2	18	T2	NA+	1.18	1.10	0.74	0.69
2	18	T2	CA++	3.63	5.91	1.07	1.74
2	18	T2	MG++	0.00	0.00	0.71	0.71
2	18	T2	K+	0.37	0.58	0.49	0.79
2	18	ND	NO3-	2.35	5.91	0.46	1.16
2	18	BN	HNO3	1.40	3.52	0.36	0.92
2	18	DX	NH3	3.81	2.16	0.91	0.52

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STATION 2 PERIOD 19
TEMPERATURE = 306.1 K
FILTER ID

SAMPLING TIME 12- 14 AUG 31
RELATIVE HUMIDITY= 27.8%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
2	19	T2	NO3-	3.02	7.60	0.60	1.51
2	19	T2	SO4=	2.79	10.89	0.58	2.25
2	19	T2	CL-	0.68	0.97	0.43	0.61
2	19	T2	NH4+	4.29	2.44	0.90	0.51
2	19	T2	NA+	0.85	0.79	0.73	0.69
2	19	T2	CA++	3.39	5.53	1.04	1.70
2	19	T2	MG++	0.15	0.15	0.71	0.71
2	19	T2	K+	0.11	0.17	0.49	0.78
2	19	ND	NO3-	1.26	3.18	0.35	0.89
2	19	BN	HNO3	2.94	7.40	0.53	1.33
2	19	DX	NH3	9.03	5.13	1.87	1.06

STATION 2 PERIOD 20
TEMPERATURE = 309.1 K
FILTER ID

SAMPLING TIME 14- 16 AUG 31
RELATIVE HUMIDITY= 19.9%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
2	20	T2	NO3-	6.66	16.77	1.07	2.68
2	20	T2	SO4=	2.89	11.30	0.59	2.29
2	20	T2	CL-	0.90	1.29	0.45	0.64
2	20	T2	NH4+	8.34	4.74	1.69	0.96
2	20	T2	NA+	2.28	2.14	0.80	0.75
2	20	T2	CA++	2.86	4.66	0.99	1.61
2	20	T2	MG++	0.01	0.01	0.71	0.71
2	20	T2	K+	0.68	1.08	0.51	0.80
2	20	ND	NO3-	3.27	8.25	0.57	1.44
2	20	BN	HNO3	4.15	10.45	0.68	1.72
2	20	DX	NH3	15.34	8.71	3.11	1.77

STATION 2 PERIOD 21
TEMPERATURE = 307.1 K
FILTER ID

SAMPLING TIME 16- 18 AUG 31
RELATIVE HUMIDITY= 19.5%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
2	21	T2	NO3-	1.02	2.57	0.43	1.08
2	21	T2	SO4=	0.45	1.78	0.41	1.58
2	21	T2	CL-	0.09	0.13	0.40	0.57
2	21	T2	NH4+	1.09	0.62	0.36	0.20
2	21	T2	NA+	0.13	0.12	0.72	0.68
2	21	T2	CA++	0.55	0.90	0.85	1.38
2	21	T2	MG++	0.01	0.01	0.71	0.71
2	21	T2	K+	0.00	0.00	0.49	0.78
2	21	ND	NO3-	1.14	2.86	0.34	0.87
2	21	BN	HNO3	1.89	4.76	0.41	1.03
2	21	DX	NH3	14.01	7.96	2.85	1.62

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STATION 2 PERIOD 22 SAMPLING TIME 18- 20 AUG 31
 TEMPERATURE = 302.6 K RELATIVE HUMIDITY= 30.3%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
2	22	T2	NO3-	2.18	5.49	0.51	1.30
2	22	T2	SO4=	1.79	7.01	0.48	1.88
2	22	T2	CL-	0.12	0.17	0.40	0.57
2	22	T2	NH4+	2.55	1.45	0.58	0.33
2	22	T2	NA+	3.43	3.21	0.88	0.83
2	22	T2	CA++	0.80	1.31	0.86	1.39
2	22	T2	MG++	0.02	0.02	0.71	0.71
2	22	T2	K+	0.00	0.00	0.49	0.78
2	22	ND	NO3-	0.79	2.00	0.32	0.81
2	22	BN	HNO3	1.13	2.85	0.34	0.87
2	22	OX	NH3	8.97	5.10	1.86	1.06

STATION 2 PERIOD 23 SAMPLING TIME 20- 22 AUG 31
 TEMPERATURE = 299.1 K RELATIVE HUMIDITY= 32.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
2	23	T2	NO3-	3.32	8.36	0.63	1.60
2	23	T2	SO4=	2.41	9.41	0.54	2.09
2	23	T2	CL-	1.48	2.10	0.52	0.74
2	23	T2	NH4+	3.32	1.89	0.72	0.41
2	23	T2	NA+	3.04	2.84	0.85	0.80
2	23	T2	CA++	1.80	2.93	0.90	1.47
2	23	T2	MG++	0.07	0.07	0.71	0.71
2	23	T2	K+	1.45	2.30	0.56	0.88
2	23	ND	NO3-	0.80	2.03	0.32	0.81
2	23	BN	HNO3	0.60	1.51	0.31	0.79
2	23	OX	NH3	11.48	6.53	2.35	1.34

STATION 2 PERIOD 24 SAMPLING TIME 22- 24 AUG 31
 TEMPERATURE = 297.1 K RELATIVE HUMIDITY= 36.1%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
2	24	T2	NO3-	2.91	7.32	0.59	1.48
2	24	T2	SO4=	2.05	8.01	0.50	1.96
2	24	T2	CL-	1.31	1.87	0.50	0.71
2	24	T2	NH4+	2.67	1.52	0.60	0.34
2	24	T2	NA+	2.52	2.36	0.81	0.76
2	24	T2	CA++	1.62	2.65	0.89	1.46
2	24	T2	MG++	0.00	0.00	0.71	0.71
2	24	T2	K+	0.00	0.00	0.49	0.78
2	24	ND	NO3-	0.97	2.45	0.33	0.84
2	24	BN	HNO3	0.49	1.25	0.31	0.78
2	24	OX	NH3	12.13	6.89	2.48	1.41

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STATION 3 PERIOD 7 SAMPLING TIME 0- 4 AUG 30
 TEMPERATURE = 290.1 K RELATIVE HUMIDITY= 84.9%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
3	7	T2	NO3-	4.37	11.01	0.76	1.92
3	7	T2	SO4=	4.06	15.84	0.72	2.82
3	7	T2	CL-	0.00	0.00	0.40	0.57
3	7	T2	NH4+	7.47	4.25	1.52	0.86
3	7	T2	NA+	0.46	0.43	0.72	0.68
3	7	T2	CA++	1.02	1.67	0.86	1.41
3	7	T2	MG++	0.01	0.01	0.71	0.71
3	7	T2	K+	0.00	0.00	0.49	0.78
3	7	ND	NO3-	1.55	3.92	0.38	0.95
3	7	BN	HNO3	0.42	1.05	0.31	0.77
3	7	DX	NH3	2.66	1.52	0.73	0.42

STATION 3 PERIOD 8 SAMPLING TIME 4- 8 AUG 30
 TEMPERATURE = 296.1 K RELATIVE HUMIDITY= 58.5%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
3	8	T2	NO3-	5.63	14.18	0.93	2.33
3	8	T2	SO4=	3.37	13.17	0.64	2.50
3	8	T2	CL-	0.44	0.62	0.41	0.59
3	8	T2	NH4+	7.22	4.10	1.47	0.84
3	8	T2	NA+	0.20	0.19	0.72	0.68
3	8	T2	CA++	2.12	3.46	0.93	1.51
3	8	T2	MG++	0.15	0.15	0.71	0.71
3	8	T2	K+	0.00	0.00	0.49	0.78
3	8	ND	NO3-	1.87	4.70	0.41	1.03
3	8	BN	HNO3	0.36	0.90	0.30	0.77
3	8	DX	NH3	6.72	3.82	1.43	0.81

STATION 3 PERIOD 9 SAMPLING TIME 8- 12 AUG 30
 TEMPERATURE = 303.1 K RELATIVE HUMIDITY= 43.1%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
3	9	T2	NO3-	10.78	27.16	1.65	4.15
3	9	T2	SO4=	4.21	16.44	0.74	2.90
3	9	T2	CL-	0.14	0.20	0.40	0.57
3	9	T2	NH4+	12.69	7.21	2.55	1.45
3	9	T2	NA+	0.38	0.35	0.72	0.68
3	9	T2	CA++	2.56	4.17	0.96	1.57
3	9	T2	MG++	0.24	0.24	0.72	0.71
3	9	T2	K+	0.00	0.00	0.49	0.78
3	9	ND	NO3-	1.68	4.23	0.39	0.98
3	9	BN	HNO3	1.17	2.96	0.35	0.87
3	9	DX	NH3	10.75	6.11	2.21	1.25

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STATION 3 PERIOD 10 SAMPLING TIME 12- 16 AUG 30
 TEMPERATURE = 302.1 K RELATIVE HUMIDITY= 43.3%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	10	T2	NO3-	3.36	8.47	0.64	1.61
3	10	T2	SO4=	2.77	10.81	0.57	2.24
3	10	T2	CL-	0.22	0.31	0.40	0.57
3	10	T2	NH4+	4.01	2.28	0.85	0.48
3	10	T2	NA+	1.14	1.07	0.74	0.69
3	10	T2	CA++	1.64	2.68	0.89	1.46
3	10	T2	MG++	0.30	0.29	0.72	0.71
3	10	T2	K+	0.42	0.67	0.50	0.79
3	10	ND	NO3-	1.35	3.39	0.36	0.91
3	10	BN	HNO3	2.72	6.85	0.50	1.27
3	10	DX	NH3	2.23	1.27	0.67	0.38

STATION 3 PERIOD 11 SAMPLING TIME 16- 20 AUG 30
 TEMPERATURE = 296.1 K RELATIVE HUMIDITY= 60.7%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	11	T2	NO3-	3.25	8.19	0.63	1.58
3	11	T2	SO4=	2.03	7.94	0.50	1.96
3	11	T2	CL-	0.24	0.34	0.40	0.57
3	11	T2	NH4+	2.31	1.32	0.54	0.31
3	11	T2	NA+	1.17	1.09	0.74	0.69
3	11	T2	CA++	2.27	3.71	0.94	1.53
3	11	T2	MG++	0.20	0.20	0.72	0.71
3	11	T2	K+	0.22	0.35	0.49	0.78
3	11	ND	NO3-	1.35	3.39	0.36	0.91
3	11	BN	HNO3	1.51	3.82	0.37	0.94
3	11	DX	NH3	7.99	4.54	1.67	0.95

STATION 3 PERIOD 12 SAMPLING TIME 20- 24 AUG 30
 TEMPERATURE = 292.1 K RELATIVE HUMIDITY= 73.5%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	12	T2	NO3-	4.05	10.21	0.72	1.82
3	12	T2	SO4=	3.86	15.08	0.70	2.73
3	12	T2	CL-	0.00	0.00	0.40	0.57
3	12	T2	NH4+	4.70	2.67	0.98	0.56
3	12	T2	NA+	0.68	0.64	0.73	0.68
3	12	T2	CA++	1.62	2.64	0.89	1.45
3	12	T2	MG++	0.03	0.03	0.71	0.71
3	12	T2	K+	0.00	0.00	0.49	0.78
3	12	ND	NO3-	0.80	2.03	0.32	0.81
3	12	BN	HNO3	0.56	1.41	0.31	0.78
3	12	DX	NH3	6.62	3.76	1.42	0.80

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STATION 3 PERIOD 13 SAMPLING TIME 0- 2 AUG 31
 TEMPERATURE = 291.1 K RELATIVE HUMIDITY= 76.9%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	13	T2	NO3-	2.27	5.73	0.52	1.32
3	13	T2	SO4=	0.44	1.70	0.41	1.58
3	13	T2	CL-	0.00	0.00	0.40	0.57
3	13	T2	NH4+	1.43	0.81	0.40	0.23
3	13	T2	NA+	0.22	0.21	0.72	0.68
3	13	T2	CA++	1.73	2.82	0.90	1.47
3	13	T2	MG++	0.01	0.01	0.71	0.71
3	13	T2	K+	0.42	0.67	0.50	0.79
3	13	ND	NO3-	1.12	2.82	0.34	0.86
3	13	BN	HNO3	0.41	1.02	0.31	0.77
3	13	OX	NH3	2.84	1.61	0.76	0.43

STATION 3 PERIOD 14 SAMPLING TIME 2- 4 AUG 31
 TEMPERATURE = 291.1 K RELATIVE HUMIDITY= 76.9%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	14	T2	NO3-	3.60	9.06	0.67	1.68
3	14	T2	SO4=	1.77	6.90	0.48	1.87
3	14	T2	CL-	0.14	0.20	0.40	0.57
3	14	T2	NH4+	3.15	1.79	0.69	0.39
3	14	T2	NA+	0.67	0.63	0.73	0.68
3	14	T2	CA++	1.76	2.87	0.90	1.47
3	14	T2	MG++	0.02	0.02	0.71	0.71
3	14	T2	K+	0.07	0.12	0.49	0.78
3	14	ND	NO3-	1.16	2.92	0.35	0.87
3	14	BN	HNO3	0.44	1.10	0.31	0.77
3	14	OX	NH3	2.91	1.65	0.77	0.44

STATION 3 PERIOD 15 SAMPLING TIME 4- 6 AUG 31
 TEMPERATURE = 289.1 K RELATIVE HUMIDITY= 87.3%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	15	T2	NO3-	0.28	0.70	0.40	1.01
3	15	T2	SO4=	0.36	1.39	0.40	1.58
3	15	T2	CL-	0.00	0.00	0.40	0.57
3	15	T2	NH4+	0.24	0.13	0.29	0.16
3	15	T2	NA+	0.00	0.00	0.72	0.67
3	15	T2	CA++	0.29	0.48	0.84	1.36
3	15	T2	MG++	0.00	0.00	0.71	0.71
3	15	T2	K+	0.09	0.14	0.49	0.78
3	15	ND	NO3-	0.40	1.00	0.31	0.77
3	15	BN	HNO3	0.45	1.13	0.31	0.77
3	15	OX	NH3	3.07	1.75	0.79	0.45

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STATION 3 PERIOD 16 SAMPLING TIME 6- 8 AUG 81
TEMPERATURE = 295.1 K RELATIVE HUMIDITY= 60.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	16	T2	NO3-	5.62	14.16	0.92	2.33
3	16	T2	SO4=	4.35	16.99	0.76	2.96
3	16	T2	CL-	0.92	1.30	0.45	0.64
3	16	T2	NH4+	5.41	3.08	1.12	0.64
3	16	T2	NA+	0.98	0.91	0.74	0.69
3	16	T2	CA++	0.00	0.01	0.84	1.37
3	16	T2	MG++	0.79	0.79	0.73	0.72
3	16	T2	K+	0.65	1.03	0.50	0.80
3	16	ND	NO3-	1.94	4.90	0.42	1.05
3	16	BN	HNO3	0.48	1.22	0.31	0.78
3	16	OX	NH3	1.72	0.98	0.61	0.34

STATION 3 PERIOD 17 SAMPLING TIME 8- 10 AUG 81
TEMPERATURE = 299.1 K RELATIVE HUMIDITY= 45.5%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	17	T2	NO3-	5.77	14.54	0.95	2.38
3	17	T2	SO4=	3.25	12.70	0.63	2.45
3	17	T2	CL-	0.48	0.68	0.41	0.59
3	17	T2	NH4+	5.56	3.16	1.15	0.65
3	17	T2	NA+	0.51	0.48	0.73	0.68
3	17	T2	CA++	7.09	11.55	1.54	2.51
3	17	T2	MG++	0.17	0.17	0.71	0.71
3	17	T2	K+	2.01	3.20	0.61	0.97
3	17	ND	NO3-	2.91	7.33	0.53	1.32
3	17	BN	HNO3	0.78	1.96	0.32	0.81
3	17	OX	NH3	5.57	3.16	1.22	0.69

STATION 3 PERIOD 18 SAMPLING TIME 10- 12 AUG 81
TEMPERATURE = 302.1 K RELATIVE HUMIDITY= 38.9%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	18	T2	NO3-	8.05	20.28	1.26	3.17
3	18	T2	SO4=	2.58	10.06	0.55	2.16
3	18	T2	CL-	0.00	0.00	0.40	0.57
3	18	T2	NH4+	8.92	5.07	1.81	1.03
3	18	T2	NA+	0.43	0.40	0.72	0.68
3	18	T2	CA++	3.84	6.26	1.09	1.78
3	18	T2	MG++	0.02	0.02	0.71	0.71
3	18	T2	K+	0.00	0.00	0.49	0.78
3	18	ND	NO3-	3.66	9.22	0.62	1.56
3	18	BN	HNO3	1.70	4.27	0.39	0.99
3	18	OX	NH3	16.91	9.61	3.42	1.94

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STATION 3 PERIOD 19 SAMPLING TIME 12- 14 AUG 31
 TEMPERATURE = 305.1 K RELATIVE HUMIDITY= 29.4%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	19	T2	NO3-	2.48	6.26	0.54	1.37
3	19	T2	SO4=	0.26	1.02	0.40	1.57
3	19	T2	CL-	0.00	0.00	0.40	0.57
3	19	T2	NH4+	1.91	1.09	0.48	0.27
3	19	T2	NA+	0.17	0.16	0.72	0.68
3	19	T2	CA++	2.73	4.45	0.98	1.59
3	19	T2	MG++	0.02	0.02	0.71	0.71
3	19	T2	K+	0.00	0.00	0.49	0.78
3	19	ND	NO3-	3.37	8.49	0.58	1.47
3	19	BN	HNO3	3.23	8.14	0.57	1.42
3	19	DX	NH3	25.02	14.21	5.03	2.86

STATION 3 PERIOD 20 SAMPLING TIME 14- 16 AUG 31
 TEMPERATURE = 304.1 K RELATIVE HUMIDITY= 26.3%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	20	T2	NO3-	1.67	4.20	0.47	1.18
3	20	T2	SO4=	0.56	2.17	0.41	1.60
3	20	T2	CL-	0.00	0.00	0.40	0.57
3	20	T2	NH4+	0.44	0.25	0.30	0.17
3	20	T2	NA+	0.97	0.90	0.74	0.69
3	20	T2	CA++	2.26	3.68	0.94	1.53
3	20	T2	MG++	0.02	0.02	0.71	0.71
3	20	T2	K+	0.04	0.07	0.49	0.78
3	20	ND	NO3-	1.50	3.77	0.37	0.94
3	20	BN	HNO3	3.26	8.22	0.57	1.43
3	20	DX	NH3	6.79	3.86	1.45	0.82

STATION 3 PERIOD 21 SAMPLING TIME 16- 18 AUG 31
 TEMPERATURE = 300.1 K RELATIVE HUMIDITY= 29.1%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	21	T2	NO3-	3.89	9.81	0.70	1.77
3	21	T2	SO4=	1.17	4.57	0.44	1.70
3	21	T2	CL-	0.00	0.00	0.40	0.57
3	21	T2	NH4+	4.43	2.52	0.93	0.53
3	21	T2	NA+	0.23	0.22	0.72	0.68
3	21	T2	CA++	2.52	4.11	0.96	1.56
3	21	T2	MG++	0.02	0.02	0.71	0.71
3	21	T2	K+	0.43	0.68	0.50	0.79
3	21	ND	NO3-	3.28	8.26	0.57	1.44
3	21	BN	HNO3	3.27	8.24	0.57	1.44
3	21	DX	NH3	1.77	1.00	0.61	0.35

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STATION 3 PERIOD 22 SAMPLING TIME 18- 20 AUG 31
TEMPERATURE = 297.1 K RELATIVE HUMIDITY= 41.9%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	22	T2	NO3-	1.95	4.92	0.49	1.24
3	22	T2	SO4=	0.80	3.12	0.42	1.63
3	22	T2	CL-	0.00	0.00	0.40	0.57
3	22	T2	NH4+	1.91	1.09	0.48	0.27
3	22	T2	NA+	0.00	0.00	0.72	0.67
3	22	T2	CA++	2.81	4.59	0.99	1.61
3	22	T2	MG++	0.01	0.01	0.71	0.71
3	22	T2	K+	0.00	0.00	0.49	0.78
3	22	ND	NO3-	1.25	3.14	0.35	0.89
3	22	BN	HNO3	1.64	4.13	0.39	0.97
3	22	OX	NH3	7.65	4.35	1.61	0.91

STATION 3 PERIOD 23 SAMPLING TIME 20- 22 AUG 31
TEMPERATURE = 295.1 K RELATIVE HUMIDITY= 40.7%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	23	T2	NO3-	3.52	8.86	0.66	1.66
3	23	T2	SO4=	3.11	12.15	0.61	2.38
3	23	T2	CL-	0.00	0.00	0.40	0.57
3	23	T2	NH4+	5.13	2.92	1.06	0.61
3	23	T2	NA+	0.60	0.56	0.73	0.68
3	23	T2	CA++	3.71	6.04	1.08	1.76
3	23	T2	MG++	0.01	0.01	0.71	0.71
3	23	T2	K+	0.22	0.35	0.49	0.78
3	23	ND	NO3-	1.35	3.40	0.36	0.91
3	23	BN	HNO3	0.83	2.10	0.32	0.82
3	23	OX	NH3	9.85	5.60	2.03	1.15

STATION 3 PERIOD 24 SAMPLING TIME 22- 24 AUG 31
TEMPERATURE = 295.1 K RELATIVE HUMIDITY= 40.7%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
3	24	T2	NO3-	4.51	11.36	0.78	1.96
3	24	T2	SO4=	3.13	12.21	0.61	2.39
3	24	T2	CL-	0.28	0.40	0.40	0.58
3	24	T2	NH4+	4.32	2.45	0.91	0.52
3	24	T2	NA+	0.84	0.79	0.73	0.68
3	24	T2	CA++	5.46	8.91	1.30	2.12
3	24	T2	MG++	0.20	0.20	0.72	0.71
3	24	T2	K+	0.38	0.61	0.49	0.79
3	24	ND	NO3-	1.83	4.61	0.40	1.02
3	24	BN	HNO3	1.02	2.58	0.34	0.85
3	24	OX	NH3	10.63	6.04	2.18	1.24

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STATION 4 PERIOD 7 SAMPLING TIME 0- 4 AUG 30
 TEMPERATURE = 291.4 K RELATIVE HUMIDITY= 78.5%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	7	T2	NO3-	10.33	26.01	1.58	3.99
4	7	T2	SO4=	6.34	24.75	1.02	3.99
4	7	T2	CL-	1.31	1.87	0.50	0.71
4	7	T2	NH4+	6.28	3.57	1.29	0.73
4	7	T2	NA+	0.78	0.73	0.73	0.68
4	7	T2	CA++	13.94	22.73	2.67	4.35
4	7	T2	MG++	0.49	0.48	0.72	0.71
4	7	T2	K+	0.00	0.00	0.49	0.78
4	7	ND	NO3-	9.56	24.07	1.45	3.65
4	7	BN	HNO3	0.50	1.25	0.31	0.78
4	7	OX	NH3	43.40	24.66	8.69	4.94

STATION 4 PERIOD 8 SAMPLING TIME 4- 8 AUG 30
 TEMPERATURE = 292.1 K RELATIVE HUMIDITY= 74.9%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	8	T2	NO3-	9.02	22.71	1.40	3.52
4	8	T2	SO4=	6.49	25.37	1.04	4.07
4	8	T2	CL-	1.20	1.71	0.48	0.69
4	8	T2	NH4+	11.07	6.29	2.23	1.27
4	8	T2	NA+	0.46	0.43	0.72	0.68
4	8	T2	CA++	17.32	28.23	3.26	5.31
4	8	T2	MG++	0.00	0.00	0.71	0.71
4	8	T2	K+	1.13	1.79	0.53	0.84
4	8	ND	NO3-	10.94	27.56	1.65	4.16
4	8	BN	HNO3	0.68	1.71	0.32	0.80
4	8	OX	NH3	40.60	23.07	8.14	4.62

STATION 4 PERIOD 9 SAMPLING TIME 8- 12 AUG 30
 TEMPERATURE = 301.1 K RELATIVE HUMIDITY= 48.4%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	9	T2	NO3-	10.33	26.03	1.58	3.99
4	9	T2	SO4=	5.23	20.43	0.87	3.41
4	9	T2	CL-	0.55	0.78	0.42	0.60
4	9	T2	NH4+	8.95	5.09	1.81	1.03
4	9	T2	NA+	1.21	1.14	0.74	0.70
4	9	T2	CA++	14.48	23.60	2.76	4.50
4	9	T2	MG++	0.76	0.75	0.73	0.72
4	9	T2	K+	0.98	1.56	0.52	0.83
4	9	ND	NO3-	13.35	33.64	2.00	5.05
4	9	BN	HNO3	2.95	7.44	0.53	1.34
4	9	OX	NH3	32.52	18.48	6.52	3.71

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STATION 4 PERIOD 10 SAMPLING TIME 12- 14 AUG 30
 TEMPERATURE = 307.1 K RELATIVE HUMIDITY= 35.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	10	T2	NO3-	7.54	19.00	1.19	2.99
4	10	T2	SO4=	4.40	17.21	0.77	2.99
4	10	T2	CL-	3.52	5.02	0.88	1.26
4	10	T2	NH4+	8.65	4.91	1.75	1.00
4	10	T2	NA+	3.27	3.06	0.87	0.81
4	10	T2	CA++	4.65	7.58	1.19	1.94
4	10	T2	MG++	0.39	0.39	0.72	0.71
4	10	T2	K+	1.81	2.88	0.59	0.94
4	10	ND	NO3-	5.50	13.86	0.87	2.19
4	10	BN	HNO3	2.49	6.28	0.48	1.20
4	10	OX	NH3	79.71	45.29	15.95	9.06

STATION 4 PERIOD 11 SAMPLING TIME 14- 16 AUG 30
 TEMPERATURE = 308.3 K RELATIVE HUMIDITY= 30.7%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	11	T2	NO3-	5.53	13.93	0.91	2.30
4	11	T2	SO4=	3.34	13.03	0.64	2.49
4	11	T2	CL-	1.36	1.94	0.50	0.72
4	11	T2	NH4+	7.47	4.24	1.52	0.86
4	11	T2	NA+	1.00	0.94	0.74	0.69
4	11	T2	CA++	5.11	8.33	1.25	2.04
4	11	T2	MG++	0.00	0.00	0.71	0.71
4	11	T2	K+	1.36	2.16	0.55	0.87
4	11	ND	NO3-	6.31	15.89	0.98	2.48
4	11	BN	HNO3	3.64	9.17	0.62	1.56
4	11	OX	NH3	72.15	40.99	14.44	8.20

STATION 4 PERIOD 12 SAMPLING TIME 16- 18 AUG 30
 TEMPERATURE = 306.6 K RELATIVE HUMIDITY= 33.5%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	12	T2	NO3-	4.44	11.19	0.77	1.94
4	12	T2	SO4=	2.14	8.34	0.51	1.99
4	12	T2	CL-	2.38	3.40	0.67	0.95
4	12	T2	NH4+	3.23	1.83	0.71	0.40
4	12	T2	NA+	4.51	4.23	0.98	0.92
4	12	T2	CA++	4.77	7.77	1.21	1.97
4	12	T2	MG++	0.00	0.00	0.71	0.71
4	12	T2	K+	0.97	1.54	0.52	0.83
4	12	ND	NO3-	2.35	5.92	0.46	1.16
4	12	BN	HNO3	2.75	6.92	0.51	1.27
4	12	OX	NH3	56.58	32.15	11.33	6.44

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STATION 4 PERIOD 13 SAMPLING TIME 18- 20 AUG 30
 TEMPERATURE = 299.3 K RELATIVE HUMIDITY= 50.1%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	13	T2	NO3-	9.68	24.39	1.49	3.76
4	13	T2	SO4=	3.94	15.39	0.71	2.77
4	13	T2	CL-	1.82	2.59	0.57	0.81
4	13	T2	NH4+	9.87	5.61	1.99	1.13
4	13	T2	NA+	4.22	3.95	0.96	0.89
4	13	T2	CA++	5.15	8.40	1.26	2.05
4	13	T2	MG++	0.34	0.33	0.72	0.71
4	13	T2	K+	0.88	1.40	0.52	0.82
4	13	ND	NO3-	6.17	15.53	0.96	2.42
4	13	BN	HNO3	1.79	4.51	0.40	1.01
4	13	OX	NH3	48.99	27.84	9.81	5.57

STATION 4 PERIOD 14 SAMPLING TIME 20- 22 AUG 30
 TEMPERATURE = 297.5 K RELATIVE HUMIDITY= 63.3%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	14	T2	NO3-	3.67	9.24	0.68	1.70
4	14	T2	SO4=	0.72	2.80	0.41	1.62
4	14	T2	CL-	2.03	2.89	0.60	0.86
4	14	T2	NH4+	2.92	1.66	0.65	0.37
4	14	T2	NA+	1.27	1.19	0.75	0.70
4	14	T2	CA++	4.75	7.75	1.21	1.97
4	14	T2	MG++	0.25	0.25	0.72	0.71
4	14	T2	K+	0.93	1.48	0.52	0.82
4	14	ND	NO3-	7.94	20.01	1.22	3.06
4	14	BN	HNO3	1.27	3.20	0.35	0.89
4	14	OX	NH3	42.60	24.20	8.53	4.85

STATION 4 PERIOD 15 SAMPLING TIME 22- 24 AUG 30
 TEMPERATURE = 296.1 K RELATIVE HUMIDITY= 57.5%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	15	T2	NO3-	5.17	13.02	0.86	2.18
4	15	T2	SO4=	1.58	6.18	0.46	1.81
4	15	T2	CL-	0.00	0.00	0.40	0.57
4	15	T2	NH4+	4.01	2.28	0.85	0.48
4	15	T2	NA+	0.81	0.76	0.73	0.68
4	15	T2	CA++	3.60	5.86	1.07	1.74
4	15	T2	MG++	0.00	0.00	0.71	0.71
4	15	T2	K+	1.48	2.35	0.56	0.89
4	15	ND	NO3-	6.06	15.26	0.95	2.39
4	15	BN	HNO3	0.98	2.47	0.33	0.84
4	15	OX	NH3	82.57	46.91	16.52	9.39

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STATION 4 PERIOD 16 SAMPLING TIME 0- 6 AUG 31
 TEMPERATURE = 291.1 K RELATIVE HUMIDITY= 76.9%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	16	T2	NO3-	4.22	10.63	0.74	1.87
4	16	T2	SO4=	2.31	9.04	0.53	2.06
4	16	T2	CL-	0.61	0.87	0.42	0.60
4	16	T2	NH4+	4.77	2.71	0.99	0.57
4	16	T2	NA+	0.45	0.42	0.72	0.68
4	16	T2	CA++	3.77	6.14	1.09	1.77
4	16	T2	MG++	0.00	0.00	0.71	0.71
4	16	T2	K+	0.49	0.77	0.50	0.79
4	16	ND	NO3-	5.23	13.18	0.83	2.10
4	16	BN	HNO3	0.86	2.16	0.33	0.82
4	16	DX	NH3	26.97	15.32	5.42	3.08

From NH3 31.74

STATION 4 PERIOD 18 SAMPLING TIME 6- 8 AUG 31
 TEMPERATURE = 291.5 K RELATIVE HUMIDITY= 75.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	18	T2	NO3-	4.61	11.62	0.79	2.00
4	18	T2	SO4=	1.25	4.90	0.44	1.72
4	18	T2	CL-	0.91	1.30	0.45	0.64
4	18	T2	NH4+	2.30	1.31	0.54	0.31
4	18	T2	NA+	2.19	2.05	0.79	0.74
4	18	T2	CA++	16.98	27.68	3.20	5.21
4	18	T2	MG++	0.29	0.28	0.72	0.71
4	18	T2	K+	0.56	0.89	0.50	0.80
4	18	ND	NO3-	6.93	17.45	1.07	2.70
4	18	BN	HNO3	0.41	1.04	0.31	0.77
4	18	DX	NH3	47.70	27.10	9.55	5.43

STATION 4 PERIOD 19 SAMPLING TIME 8- 10 AUG 31
 TEMPERATURE = 300.6 K RELATIVE HUMIDITY= 41.7%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	19	T2	NO3-	6.71	16.91	1.07	2.70
4	19	T2	SO4=	4.16	16.25	0.74	2.87
4	19	T2	CL-	0.41	0.58	0.41	0.58
4	19	T2	NH4+	1.65	0.94	0.43	0.25
4	19	T2	NA+	0.80	0.75	0.73	0.68
4	19	T2	CA++	54.34	88.57	9.91	16.15
4	19	T2	MG++	2.54	2.51	0.85	0.84
4	19	T2	K+	1.03	1.64	0.52	0.83
4	19	ND	NO3-	9.29	23.41	1.41	3.55
4	19	BN	HNO3	1.32	3.31	0.36	0.90
4	19	DX	NH3	24.62	13.99	4.95	2.81

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STATION 4 PERIOD 20
TEMPERATURE = 305.6 K
FILTER ID

SAMPLING TIME 10- 12 AUG 31
RELATIVE HUMIDITY= 31.9%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	20	T2	NO3-	4.28	10.79	0.75	1.89
4	20	T2	SO4=	0.96	3.75	0.42	1.66
4	20	T2	CL-	2.51	3.58	0.69	0.98
4	20	T2	NH4+	1.00	0.57	0.35	0.20
4	20	T2	NA+	2.06	1.93	0.78	0.73
4	20	T2	CA++	8.79	14.33	1.81	2.94
4	20	T2	MG++	0.17	0.17	0.71	0.71
4	20	T2	K+	1.62	2.57	0.57	0.91
4	20	ND	NO3-	5.99	15.10	0.94	2.36
4	20	BN	HNO3	3.70	9.31	0.62	1.57
4	20	OX	NH3	10.38	5.90	2.13	1.21

STATION 4 PERIOD 21
TEMPERATURE = 308.8 K
FILTER ID

SAMPLING TIME 12- 14 AUG 31
RELATIVE HUMIDITY= 23.9%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	21	T2	NO3-	0.94	2.37	0.42	1.07
4	21	T2	SO4=	0.28	1.08	0.40	1.57
4	21	T2	CL-	0.44	0.62	0.41	0.59
4	21	T2	NH4+	1.05	0.60	0.35	0.20
4	21	T2	NA+	0.16	0.15	0.72	0.68
4	21	T2	CA++	12.43	20.27	2.41	3.93
4	21	T2	MG++	0.00	0.00	0.71	0.71
4	21	T2	K+	0.55	0.87	0.50	0.79
4	21	ND	NO3-	3.05	7.67	0.54	1.37
4	21	BN	HNO3	1.78	4.49	0.40	1.01
4	21	OX	NH3	56.63	32.18	11.34	6.44

STATION 4 PERIOD 22
TEMPERATURE = 310.9 K
FILTER ID

SAMPLING TIME 14- 16 AUG 31
RELATIVE HUMIDITY= 18.1%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	22	T2	NO3-	4.47	11.26	0.77	1.95
4	22	T2	SO4=	0.80	3.12	0.42	1.63
4	22	T2	CL-	0.49	0.69	0.41	0.59
4	22	T2	NH4+	4.10	2.33	0.87	0.49
4	22	T2	NA+	0.35	0.33	0.72	0.68
4	22	T2	CA++	5.49	8.94	1.31	2.13
4	22	T2	MG++	0.08	0.08	0.71	0.71
4	22	T2	K+	0.14	0.23	0.49	0.78
4	22	ND	NO3-	10.42	26.24	1.57	3.96
4	22	BN	HNO3	3.70	9.32	0.63	1.58
4	22	OX	NH3	72.51	41.20	14.51	8.24

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STATION 4 PERIOD 23
 TEMPERATURE = 307.3 K
 FILTER ID

SAMPLING TIME 16- 18 AUG 31
 RELATIVE HUMIDITY= 19.4%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	23	T2	NO3-	11.84	29.83	1.80	4.54
4	23	T2	SO4=	4.33	16.90	0.76	2.95
4	23	T2	CL-	0.31	0.44	0.41	0.58
4	23	T2	NH4+	15.87	9.02	3.19	1.81
4	23	T2	NA+	1.22	1.14	0.74	0.70
4	23	T2	CA++	5.49	6.95	1.31	2.13
4	23	T2	MG++	0.53	0.52	0.72	0.71
4	23	T2	K+	1.11	1.76	0.53	0.84
4	23	ND	NO3-	15.17	38.20	2.27	5.72
4	23	BN	HNO3	5.29	13.32	0.84	2.11
4	23	OX	NH3	59.78	33.96	11.97	6.80

STATION 4 PERIOD 24
 TEMPERATURE = 303.1 K
 FILTER ID

SAMPLING TIME 18- 20 AUG 31
 RELATIVE HUMIDITY= 29.5%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	24	T2	NO3-	5.65	14.22	0.93	2.34
4	24	T2	SO4=	1.11	4.33	0.43	1.69
4	24	T2	CL-	1.55	2.21	0.53	0.75
4	24	T2	NH4+	4.96	2.82	1.03	0.59
4	24	T2	NA+	1.33	1.25	0.75	0.70
4	24	T2	CA++	7.27	11.85	1.57	2.55
4	24	T2	MG++	0.00	0.00	0.71	0.71
4	24	T2	K+	1.55	2.47	0.57	0.90
4	24	ND	NO3-	9.39	23.65	1.42	3.59
4	24	BN	HNO3	1.77	4.45	0.40	1.00
4	24	OX	NH3	89.01	50.58	17.81	10.12

STATION 4 PERIOD 2
 TEMPERATURE = 298.0 K
 FILTER ID

SAMPLING TIME 20- 22 AUG 31
 RELATIVE HUMIDITY= 34.2%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	2	T2	NO3-	5.37	13.51	0.89	2.24
4	2	T2	SO4=	1.25	4.88	0.44	1.72
4	2	T2	CL-	1.15	1.64	0.48	0.68
4	2	T2	NH4+	3.82	2.17	0.81	0.46
4	2	T2	NA+	0.81	0.76	0.73	0.68
4	2	T2	CA++	6.50	10.59	1.45	2.36
4	2	T2	MG++	0.00	0.00	0.71	0.71
4	2	T2	K+	0.00	0.00	0.49	0.78
4	2	ND	NO3-	8.29	20.89	1.27	3.19
4	2	BN	HNO3	1.12	2.82	0.34	0.86
4	2	OX	NH3	73.84	41.95	14.78	8.40

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STATION 4 PERIOD 1 SAMPLING TIME 22- 24 AUG 31
 TEMPERATURE = 296.4 K RELATIVE HUMIDITY= 37.7%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
4	1	T2	NO3-	4.12	10.38	0.73	1.84
4	1	T2	SO4=	3.20	12.51	0.62	2.43
4	1	T2	CL-	1.18	1.68	0.48	0.68
4	1	T2	NH4+	2.75	1.56	0.62	0.35
4	1	T2	NA+	1.86	1.75	0.77	0.72
4	1	T2	CA++	6.01	9.79	1.38	2.25
4	1	T2	MG++	0.00	0.00	0.71	0.71
4	1	T2	K+	0.00	0.00	0.49	0.78
4	1	ND	NO3-	7.52	18.94	1.15	2.91
4	1	BN	HN03	0.76	1.91	0.32	0.81
4	1	OX	NH3	96.99	55.11	19.40	11.03

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STATION 5 PERIOD 7 SAMPLING TIME 0- 4 AUG 30
 TEMPERATURE = 291.3 K RELATIVE HUMIDITY= 83.3%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	7	T2	NO3-	1.07	2.69	0.43	1.08
5	7	T2	SO4=	0.39	1.51	0.40	1.58
5	7	T2	CL-	0.30	0.43	0.41	0.58
5	7	T2	NH4+	0.15	0.09	0.28	0.16
5	7	T2	NA+	0.33	0.31	0.72	0.68
5	7	T2	CA++	0.28	0.45	0.84	1.38
5	7	T2	MG++	0.13	0.13	0.71	0.71
5	7	T2	K+	0.00	0.00	0.49	0.78
5	7	ND	NO3-	2.63	6.62	0.49	1.24
5	7	BN	HNO3	0.47	1.18	0.31	0.78
5	7	DX	NH3	5.03	2.86	1.12	0.64

STATION 5 PERIOD 8 SAMPLING TIME 4- 8 AUG 30
 TEMPERATURE = 291.0 K RELATIVE HUMIDITY= 84.7%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	8	T2	NO3-	2.05	5.16	0.50	1.27
5	8	T2	SO4=	1.44	5.64	0.45	1.77
5	8	T2	CL-	0.99	1.41	0.46	0.65
5	8	T2	NH4+	1.83	1.04	0.46	0.26
5	8	T2	NA+	1.09	1.02	0.74	0.69
5	8	T2	CA++	0.45	0.73	0.85	1.38
5	8	T2	MG++	0.38	0.38	0.72	0.71
5	8	T2	K+	0.00	0.00	0.49	0.78
5	8	ND	NO3-	3.10	7.81	0.55	1.38
5	8	BN	HNO3	0.50	1.25	0.31	0.78
5	8	DX	NH3	4.18	2.37	0.97	0.55

STATION 5 PERIOD 9 SAMPLING TIME 8- 12 AUG 30
 TEMPERATURE = 300.5 K RELATIVE HUMIDITY= 51.1%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	9	T2	NO3-	2.11	5.32	0.51	1.28
5	9	T2	SO4=	1.61	6.29	0.47	1.82
5	9	T2	CL-	0.01	0.02	0.40	0.57
5	9	T2	NH4+	0.91	0.52	0.34	0.19
5	9	T2	NA+	0.72	0.67	0.73	0.68
5	9	T2	CA++	0.77	1.25	0.85	1.39
5	9	T2	MG++	0.27	0.27	0.72	0.71
5	9	T2	K+	0.00	0.00	0.49	0.78
5	9	ND	NO3-	5.02	12.65	0.80	2.02
5	9	BN	HNO3	3.38	8.52	0.58	1.47
5	9	DX	NH3	6.26	3.56	1.35	0.77

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STATION 5 PERIOD 10
 TEMPERATURE = 302.8 K
 FILTER ID

SAMPLING TIME 12- 16 AUG 30
 RELATIVE HUMIDITY= 43.2%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	10	T2	NO3-	1.31	3.30	0.44	1.12
5	10	T2	SO4=	0.51	2.00	0.41	1.59
5	10	T2	CL-	0.34	0.48	0.41	0.58
5	10	T2	NH4+	0.00	0.00	0.28	0.16
5	10	T2	NA+	0.76	0.71	0.73	0.68
5	10	T2	CA++	0.60	0.98	0.85	1.39
5	10	T2	MG++	0.26	0.25	0.72	0.71
5	10	T2	K+	0.00	0.00	0.49	0.78
5	10	ND	NO3-	3.12	7.86	0.55	1.39
5	10	BN	HNO3	2.27	5.72	0.45	1.14
5	10	OX	NH3	4.08	2.32	0.96	0.54

STATION 5 PERIOD 11
 TEMPERATURE = 298.5 K
 FILTER ID

SAMPLING TIME 16- 20 AUG 30
 RELATIVE HUMIDITY= 54.6%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	11	T2	NO3-	1.22	3.07	0.44	1.11
5	11	T2	SO4=	3.63	14.20	0.67	2.62
5	11	T2	CL-	0.00	0.00	0.40	0.57
5	11	T2	NH4+	3.43	1.95	0.74	0.42
5	11	T2	NA+	2.48	2.32	0.81	0.76
5	11	T2	CA++	1.86	3.04	0.91	1.48
5	11	T2	MG++	1.71	1.69	0.78	0.77
5	11	T2	K+	0.12	0.19	0.49	0.78
5	11	ND	NO3-	4.15	10.46	0.68	1.73
5	11	BN	HNO3	1.68	4.23	0.39	0.98
5	11	OX	NH3	3.79	2.15	0.91	0.52

STATION 5 PERIOD 12
 TEMPERATURE = 294.1 K
 FILTER ID

SAMPLING TIME 20- 24 AUG 30
 RELATIVE HUMIDITY= 74.0%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	12	T2	NO3-	4.23	10.66	0.74	1.87
5	12	T2	SO4=	2.89	11.30	0.59	2.29
5	12	T2	CL-	0.74	1.05	0.43	0.62
5	12	T2	NH4+	3.80	2.16	0.81	0.46
5	12	T2	NA+	2.49	2.33	0.81	0.76
5	12	T2	CA++	1.08	1.75	0.86	1.41
5	12	T2	MG++	0.52	0.51	0.72	0.71
5	12	T2	K+	0.14	0.23	0.49	0.78
5	12	ND	NO3-	5.04	12.70	0.81	2.03
5	12	BN	HNO3	0.71	1.78	0.32	0.80
5	12	OX	NH3	9.51	5.40	1.97	1.12

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STATION 5 PERIOD 14 SAMPLING TIME 2- 4 AUG 31
 TEMPERATURE = 291.3 K RELATIVE HUMIDITY= 90.9%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	14	T2	NO3-	6.29	15.86	1.02	2.56
5	14	T2	SO4=	3.85	15.04	0.70	2.72
5	14	T2	CL-	1.02	1.45	0.46	0.66
5	14	T2	NH4+	9.13	5.19	1.85	1.05
5	14	T2	NA+	1.74	1.63	0.77	0.72
5	14	T2	CA++	0.61	1.00	0.85	1.39
5	14	T2	MG++	0.47	0.47	0.72	0.71
5	14	T2	K+	5.30	8.42	1.08	1.72
5	14	ND	NO3-	6.01	15.14	0.94	2.37
5	14	BN	HNO3	0.58	1.47	0.31	0.79
5	14	DX	NH3	19.46	11.06	3.92	2.23

STATION 5 PERIOD 15 SAMPLING TIME 4- 6 AUG 31
 TEMPERATURE = 291.1 K RELATIVE HUMIDITY= 88.8%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	15	T2	NO3-	1.61	4.05	0.47	1.17
5	15	T2	SO4=	0.34	1.32	0.40	1.57
5	15	T2	CL-	0.00	0.00	0.40	0.57
5	15	T2	NH4+	0.93	0.53	0.34	0.19
5	15	T2	NA+	0.02	0.02	0.72	0.67
5	15	T2	CA++	0.28	0.46	0.84	1.38
5	15	T2	MG++	0.00	0.00	0.71	0.71
5	15	T2	K+	0.00	0.00	0.49	0.78
5	15	ND	NO3-	5.60	14.11	0.88	2.22
5	15	BN	HNO3	0.53	1.33	0.31	0.78
5	15	DX	NH3	16.38	9.31	3.31	1.88

STATION 5 PERIOD 16 SAMPLING TIME 6- 8 AUG 31
 TEMPERATURE = 294.3 K RELATIVE HUMIDITY= 73.1%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	16	T2	NO3-	4.83	12.16	0.82	2.07
5	16	T2	SO4=	3.25	12.70	0.63	2.45
5	16	T2	CL-	0.69	0.98	0.43	0.61
5	16	T2	NH4+	4.85	2.75	1.01	0.57
5	16	T2	NA+	1.03	0.96	0.74	0.69
5	16	T2	CA++	1.22	2.00	0.87	1.42
5	16	T2	MG++	0.22	0.22	0.72	0.71
5	16	T2	K+	2.90	4.60	0.72	1.14
5	16	ND	NO3-	4.45	11.20	0.72	1.82
5	16	BN	HNO3	0.72	1.81	0.32	0.80
5	16	DX	NH3	14.66	8.33	2.97	1.69

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STATION 5 PERIOD 17 SAMPLING TIME 8- 10 AUG 31
TEMPERATURE = 299.9 K RELATIVE HUMIDITY= 54.0%

FILTER ID
STATION TIME TYPE SPECIES CONCENTRATION (PPB) (UG/M**3) (PPB) UNCERTAINTY (UG/M**3)

5	17	T2	NO3-	6.40	16.12	1.03	2.59
5	17	T2	SO4=	2.78	10.86	0.57	2.24
5	17	T2	CL-	0.03	0.05	0.40	0.57
5	17	T2	NH4+	6.54	3.72	1.34	0.76
5	17	T2	NA+	1.10	1.03	0.74	0.69
5	17	T2	CA++	0.93	1.52	0.86	1.40
5	17	T2	MG++	0.16	0.15	0.71	0.71
5	17	T2	K+	0.00	0.00	0.49	0.78
5	17	ND	NO3-	9.90	24.95	1.50	3.78
5	17	BN	HNO3	1.53	3.86	0.38	0.95
5	17	OX	NH3	16.37	9.30	3.31	1.88

STATION 5 PERIOD 18 SAMPLING TIME 10- 12 AUG 31
TEMPERATURE = 303.6 K RELATIVE HUMIDITY= 44.4%

FILTER ID
STATION TIME TYPE SPECIES CONCENTRATION (PPB) (UG/M**3) (PPB) UNCERTAINTY (UG/M**3)

5	18	T2	NO3-	6.23	15.70	1.01	2.54
5	18	T2	SO4=	3.20	12.49	0.62	2.42
5	18	T2	CL-	0.52	0.74	0.42	0.59
5	18	T2	NH4+	5.77	3.28	1.19	0.67
5	18	T2	NA+	1.26	1.18	0.74	0.70
5	18	T2	CA++	0.89	1.45	0.86	1.40
5	18	T2	MG++	0.05	0.05	0.71	0.71
5	18	T2	K+	0.13	0.21	0.49	0.78
5	18	ND	NO3-	10.61	26.72	1.60	4.03
5	18	BN	HNO3	5.02	12.65	0.80	2.02
5	18	OX	NH3	15.85	9.01	3.21	1.82

STATION 5 PERIOD 19 SAMPLING TIME 12- 14 AUG 31
TEMPERATURE = 306.0 K RELATIVE HUMIDITY= 38.7%

FILTER ID
STATION TIME TYPE SPECIES CONCENTRATION (PPB) (UG/M**3) (PPB) UNCERTAINTY (UG/M**3)

5	19	T2	NO3-	3.21	8.09	0.62	1.57
5	19	T2	SO4=	0.75	2.92	0.42	1.62
5	19	T2	CL-	0.00	0.00	0.40	0.57
5	19	T2	NH4+	1.03	0.58	0.35	0.20
5	19	T2	NA+	1.01	0.95	0.74	0.69
5	19	T2	CA++	1.54	2.51	0.89	1.45
5	19	T2	MG++	0.37	0.36	0.72	0.71
5	19	T2	K+	0.00	0.00	0.49	0.78
5	19	ND	NO3-	7.60	19.14	1.17	2.94
5	19	BN	HNO3	10.12	25.49	1.53	3.86
5	19	OX	NH3	15.31	8.70	3.10	1.76

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STATION 5 PERIOD 20 SAMPLING TIME 14- 16 AUG 31
 TEMPERATURE = 304.1 K RELATIVE HUMIDITY= 40.8%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	20	T2	NO3-	5.34	13.44	0.89	2.23
5	20	T2	SO4=	5.00	19.54	0.84	3.29
5	20	T2	CL-	0.00	0.00	0.40	0.57
5	20	T2	NH4+	4.31	2.45	0.91	0.52
5	20	T2	NA+	3.57	3.34	0.89	0.84
5	20	T2	CA++	2.52	4.10	0.96	1.56
5	20	T2	MG++	0.42	0.42	0.72	0.71
5	20	T2	K+	0.00	0.00	0.49	0.78
5	20	ND	NO3-	7.34	18.48	1.13	2.84
5	20	BN	HNO3	7.65	19.27	1.17	2.96
5	20	OX	NH3	10.91	6.20	2.24	1.27

STATION 5 PERIOD 21 SAMPLING TIME 16- 18 AUG 31
 TEMPERATURE = 301.9 K RELATIVE HUMIDITY= 46.4%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	21	T2	NO3-	1.65	4.15	0.47	1.18
5	21	T2	SO4=	0.28	1.08	0.40	1.57
5	21	T2	CL-	0.00	0.00	0.40	0.57
5	21	T2	NH4+	0.21	0.12	0.29	0.16
5	21	T2	NA+	0.40	0.37	0.72	0.68
5	21	T2	CA++	0.61	0.99	0.85	1.39
5	21	T2	MG++	0.04	0.04	0.71	0.71
5	21	T2	K+	0.00	0.00	0.49	0.78
5	21	ND	NO3-	2.72	6.85	0.50	1.27
5	21	BN	HNO3	1.87	4.72	0.41	1.03
5	21	OX	NH3	9.87	5.61	2.04	1.16

STATION 5 PERIOD 22 SAMPLING TIME 18- 20 AUG 31
 TEMPERATURE = 298.4 K RELATIVE HUMIDITY= 55.0%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	22	T2	NO3-	5.06	12.75	0.85	2.14
5	22	T2	SO4=	0.90	3.53	0.42	1.65
5	22	T2	CL-	0.00	0.00	0.40	0.57
5	22	T2	NH4+	0.95	0.54	0.34	0.19
5	22	T2	NA+	1.17	1.09	0.74	0.69
5	22	T2	CA++	1.92	3.12	0.91	1.49
5	22	T2	MG++	0.27	0.26	0.72	0.71
5	22	T2	K+	0.00	0.00	0.49	0.78
5	22	ND	NO3-	2.69	6.79	0.50	1.26
5	22	BN	HNO3	1.64	4.14	0.39	0.97
5	22	OX	NH3	10.61	6.03	2.18	1.24

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STATION 5 PERIOD 23 SAMPLING TIME 20- 22 AUG 31
 TEMPERATURE = 295.7 K RELATIVE HUMIDITY= 65.7%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	23	T2	NO3-	3.29	8.28	0.63	1.59
5	23	T2	SO4=	0.97	3.79	0.43	1.66
5	23	T2	CL-	4.26	6.06	1.03	1.47
5	23	T2	NH4+	1.62	0.92	0.43	0.24
5	23	T2	NA+	1.23	1.15	0.74	0.70
5	23	T2	CA++	2.85	4.65	0.99	1.61
5	23	T2	MG++	0.44	0.43	0.72	0.71
5	23	T2	K+	0.00	0.00	0.49	0.78
5	23	ND	NO3-	3.32	8.36	0.58	1.45
5	23	BN	HNO3	0.81	2.03	0.32	0.81
5	23	OX	NH3	16.36	9.30	3.31	1.88

STATION 5 PERIOD 24 SAMPLING TIME 22- 24 AUG 31
 TEMPERATURE = 293.9 K RELATIVE HUMIDITY= 74.8%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
5	24	T2	NO3-	9.23	23.25	1.43	3.59
5	24	T2	SO4=	0.60	2.33	0.41	1.60
5	24	T2	CL-	1.45	2.07	0.52	0.73
5	24	T2	NH4+	0.88	0.50	0.33	0.19
5	24	T2	NA+	2.96	2.77	0.84	0.79
5	24	T2	CA++	3.89	6.34	1.10	1.79
5	24	T2	MG++	0.30	0.29	0.72	0.71
5	24	T2	K+	0.00	0.00	0.49	0.78
5	24	ND	NO3-	4.82	12.13	0.77	1.95
5	24	BN	HNO3	0.86	2.18	0.33	0.82
5	24	OX	NH3	11.00	6.25	2.26	1.28

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STATION 6 PERIOD 7 SAMPLING TIME 0- 4 AUG 30
TEMPERATURE = 292.0 K RELATIVE HUMIDITY= 79.5%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	7	T2	NO3-	1.72	4.34	0.47	1.20
6	7	T2	SO4=	1.54	6.00	0.46	1.80
6	7	T2	CL-	0.81	1.15	0.44	0.63
6	7	T2	NH4+	0.39	0.22	0.29	0.17
6	7	T2	NA+	1.07	1.01	0.74	0.69
6	7	T2	CA++	0.73	1.19	0.85	1.39
6	7	T2	MG++	0.17	0.17	0.71	0.71
6	7	T2	K+	0.32	0.51	0.49	0.78
6	7	ND	NO3-	4.60	11.59	0.75	1.88
6	7	BN	HNO3	0.44	1.10	0.31	0.77
6	7	OX	NH3	3.14	1.79	0.80	0.46

STATION 6 PERIOD 8 SAMPLING TIME 4- 8 AUG 30
TEMPERATURE = 292.0 K RELATIVE HUMIDITY= 79.5%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	8	T2	NO3-	1.58	3.97	0.46	1.17
6	8	T2	SO4=	2.15	8.38	0.51	2.00
6	8	T2	CL-	1.17	1.66	0.48	0.68
6	8	T2	NH4+	1.73	0.99	0.45	0.25
6	8	T2	NA+	2.16	2.03	0.79	0.74
6	8	T2	CA++	0.50	0.81	0.85	1.38
6	8	T2	MG++	0.43	0.43	0.72	0.71
6	8	T2	K+	0.45	0.72	0.50	0.79
6	8	ND	NO3-	3.58	9.01	0.61	1.54
6	8	BN	HNO3	0.43	1.09	0.31	0.77
6	8	OX	NH3	2.72	1.55	0.74	0.42

STATION 6 PERIOD 9 SAMPLING TIME 8- 12 AUG 30
TEMPERATURE = 298.7 K RELATIVE HUMIDITY= 56.9%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	9	T2	NO3-	2.93	7.37	0.59	1.49
6	9	T2	SO4=	2.38	9.28	0.53	2.08
6	9	T2	CL-	3.84	5.48	0.95	1.35
6	9	T2	NH4+	0.87	0.49	0.33	0.19
6	9	T2	NA+	4.14	3.88	0.95	0.89
6	9	T2	CA++	2.01	3.27	0.92	1.50
6	9	T2	MG++	0.88	0.87	0.73	0.72
6	9	T2	K+	0.52	0.83	0.50	0.79
6	9	ND	NO3-	2.73	6.86	0.50	1.27
6	9	BN	HNO3	0.48	1.21	0.31	0.78
6	9	OX	NH3	0.74	0.42	0.52	0.30

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STATION 6 PERIOD 10 SAMPLING TIME 12- 16 AUG 30
 TEMPERATURE = 300.9 K RELATIVE HUMIDITY= 48.2%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	10	T2	NO3-	3.39	8.53	0.64	1.62
6	10	T2	SO4=	3.85	15.06	0.70	2.73
6	10	T2	CL-	1.18	1.68	0.48	0.68
6	10	T2	NH4+	2.79	1.58	0.63	0.36
6	10	T2	NA+	2.11	1.98	0.79	0.74
6	10	T2	CA++	2.63	4.29	0.97	1.58
6	10	T2	MG++	0.58	0.57	0.72	0.71
6	10	T2	K+	0.26	0.41	0.49	0.78
6	10	ND	NO3-	4.62	11.65	0.75	1.89
6	10	BN	HNO3	0.59	1.47	0.31	0.79
6	10	OX	NH3	5.58	3.17	1.22	0.69

STATION 6 PERIOD 11 SAMPLING TIME 16- 20 AUG 30
 TEMPERATURE = 297.6 K RELATIVE HUMIDITY= 57.7%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	11	T2	NO3-	3.06	7.72	0.61	1.52
6	11	T2	SO4=	2.83	11.05	0.58	2.26
6	11	T2	CL-	0.98	1.39	0.46	0.65
6	11	T2	NH4+	2.69	1.53	0.61	0.35
6	11	T2	NA+	1.46	1.37	0.75	0.70
6	11	T2	CA++	0.93	1.52	0.86	1.40
6	11	T2	MG++	0.37	0.36	0.72	0.71
6	11	T2	K+	0.45	0.71	0.50	0.79
6	11	ND	NO3-	1.15	2.89	0.34	0.87
6	11	BN	HNO3	0.50	1.27	0.31	0.78
6	11	OX	NH3	3.38	1.92	0.84	0.48

STATION 6 PERIOD 12 SAMPLING TIME 20- 24 AUG 30
 TEMPERATURE = 293.7 K RELATIVE HUMIDITY= 75.7%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	12	T2	NO3-	3.22	8.12	0.62	1.57
6	12	T2	SO4=	3.01	11.74	0.60	2.34
6	12	T2	CL-	2.57	3.66	0.70	1.00
6	12	T2	NH4+	3.41	1.94	0.74	0.42
6	12	T2	NA+	2.75	2.57	0.83	0.78
6	12	T2	CA++	0.81	1.32	0.86	1.39
6	12	T2	MG++	0.52	0.51	0.72	0.71
6	12	T2	K+	1.69	2.69	0.58	0.92
6	12	ND	NO3-	1.89	4.75	0.41	1.03
6	12	BN	HNO3	0.40	1.00	0.31	0.77
6	12	OX	NH3	2.12	1.20	0.65	0.37

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STATION 6 PERIOD 13 SAMPLING TIME 0- 2 AUG 31
 TEMPERATURE = 293.1 K RELATIVE HUMIDITY= 81.1%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	13	T2	NO3-	1.58	3.99	0.46	1.17
6	13	T2	SO4=	1.41	5.49	0.45	1.76
6	13	T2	CL-	2.32	3.30	0.65	0.93
6	13	T2	NH4+	1.36	0.77	0.39	0.22
6	13	T2	NA+	1.54	1.44	0.76	0.71
6	13	T2	CA++	0.67	1.09	0.85	1.39
6	13	T2	MG++	0.14	0.14	0.71	0.71
6	13	T2	K+	0.57	0.91	0.50	0.80
6	13	ND	NO3-	1.19	2.99	0.35	0.88
6	13	BN	HNO3	0.34	0.84	0.30	0.77
6	13	OX	NH3	2.28	1.30	0.68	0.38

STATION 6 PERIOD 14 SAMPLING TIME 2- 4 AUG 31
 TEMPERATURE = 292.6 K RELATIVE HUMIDITY= 84.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	14	T2	NO3-	2.22	5.60	0.52	1.31
6	14	T2	SO4=	1.02	3.99	0.43	1.67
6	14	T2	CL-	2.74	3.90	0.73	1.04
6	14	T2	NH4+	1.11	0.63	0.36	0.20
6	14	T2	NA+	2.25	2.11	0.79	0.74
6	14	T2	CA++	0.63	1.03	0.85	1.39
6	14	T2	MG++	0.30	0.30	0.72	0.71
6	14	T2	K+	0.00	0.00	0.49	0.78
6	14	ND	NO3-	1.09	2.74	0.34	0.86
6	14	BN	HNO3	0.36	0.91	0.30	0.77
6	14	OX	NH3	2.53	1.44	0.71	0.40

STATION 6 PERIOD 15 SAMPLING TIME 4- 6 AUG 31
 TEMPERATURE = 292.6 K RELATIVE HUMIDITY= 84.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	15	T2	NO3-	4.68	11.79	0.80	2.02
6	15	T2	SO4=	0.95	3.72	0.42	1.66
6	15	T2	CL-	0.55	0.79	0.42	0.60
6	15	T2	NH4+	1.94	1.10	0.48	0.27
6	15	T2	NA+	1.92	1.80	0.78	0.73
6	15	T2	CA++	0.91	1.49	0.86	1.40
6	15	T2	MG++	0.21	0.21	0.72	0.71
6	15	T2	K+	0.20	0.31	0.49	0.78
6	15	ND	NO3-	2.64	6.65	0.49	1.24
6	15	BN	HNO3	0.30	0.76	0.30	0.76
6	15	OX	NH3	4.04	2.29	0.95	0.54

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STATION 6 PERIOD 16 SAMPLING TIME 6- 8 AUG 31
 TEMPERATURE = 294.3 K RELATIVE HUMIDITY= 73.1%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	16	T2	NO3-	3.45	8.68	0.65	1.63
6	16	T2	SO4=	2.32	9.06	0.53	2.06
6	16	T2	CL-	4.74	6.75	1.13	1.61
6	16	T2	NH4+	3.81	2.17	0.81	0.46
6	16	T2	NA+	3.37	3.15	0.88	0.82
6	16	T2	CA++	1.60	2.62	0.89	1.45
6	16	T2	MG++	0.50	0.49	0.72	0.71
6	16	T2	K+	0.00	0.00	0.49	0.78
6	16	ND	NO3-	1.20	3.02	0.35	0.88
6	16	BN	HNO3	0.37	0.93	0.30	0.77
6	16	OX	NH3	6.83	3.88	1.45	0.83

STATION 6 PERIOD 17 SAMPLING TIME 8- 10 AUG 31
 TEMPERATURE = 299.3 K RELATIVE HUMIDITY= 56.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	17	T2	NO3-	8.76	22.07	1.36	3.43
6	17	T2	SO4=	5.26	20.55	0.88	3.42
6	17	T2	CL-	2.56	3.64	0.70	0.99
6	17	T2	NH4+	9.87	5.61	1.99	1.13
6	17	T2	NA+	3.19	2.98	0.86	0.81
6	17	T2	CA++	2.13	3.47	0.93	1.51
6	17	T2	MG++	0.42	0.41	0.72	0.71
6	17	T2	K+	0.79	1.26	0.51	0.81
6	17	ND	NO3-	4.04	10.18	0.67	1.69
6	17	BN	HNO3	0.47	1.18	0.31	0.78
6	17	OX	NH3	9.45	5.37	1.95	1.11

STATION 6 PERIOD 18 SAMPLING TIME 10- 12 AUG 31
 TEMPERATURE = 301.5 K RELATIVE HUMIDITY= 50.1%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	18	T2	NO3-	12.41	31.25	1.88	4.74
6	18	T2	SO4=	10.60	41.40	1.62	6.34
6	18	T2	CL-	1.85	2.63	0.57	0.82
6	18	T2	NH4+	14.86	8.44	2.99	1.70
6	18	T2	NA+	2.84	2.66	0.83	0.78
6	18	T2	CA++	4.14	6.75	1.13	1.84
6	18	T2	MG++	0.68	0.67	0.72	0.72
6	18	T2	K+	0.00	0.00	0.49	0.78
6	18	ND	NO3-	3.96	9.98	0.66	1.66
6	18	BN	HNO3	0.76	1.90	0.32	0.81
6	18	OX	NH3	6.40	3.64	1.37	0.78

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STATION 6 PERIOD 19 SAMPLING TIME 12- 14 AUG 31
TEMPERATURE = 305.4 K RELATIVE HUMIDITY= 40.1%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	19	T2	NO3-	5.99	15.08	0.97	2.45
6	19	T2	SO4=	8.16	31.89	1.28	4.98
6	19	T2	CL-	2.30	3.27	0.65	0.93
6	19	T2	NH4+	9.59	5.45	1.94	1.10
6	19	T2	NA+	3.59	3.36	0.90	0.84
6	19	T2	CA++	4.97	8.10	1.23	2.01
6	19	T2	MG++	0.61	0.60	0.72	0.72
6	19	T2	K+	0.00	0.00	0.49	0.78
6	19	ND	NO3-	3.32	8.36	0.58	1.45
6	19	BN	HNO3	1.51	3.81	0.37	0.94
6	19	OX	NH3	8.51	4.83	1.77	1.01

STATION 6 PERIOD 20 SAMPLING TIME 14- 16 AUG 31
TEMPERATURE = 303.1 K RELATIVE HUMIDITY= 43.1%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	20	T2	NO3-	3.57	9.00	0.66	1.67
6	20	T2	SO4=	2.55	9.94	0.55	2.15
6	20	T2	CL-	0.98	1.40	0.46	0.65
6	20	T2	NH4+	2.75	1.56	0.62	0.35
6	20	T2	NA+	1.13	1.06	0.74	0.69
6	20	T2	CA++	3.05	4.98	1.01	1.64
6	20	T2	MG++	0.28	0.28	0.72	0.71
6	20	T2	K+	0.28	0.45	0.49	0.78
6	20	ND	NO3-	1.79	4.51	0.40	1.01
6	20	BN	HNO3	0.72	1.81	0.32	0.80
6	20	OX	NH3	9.20	5.23	1.91	1.08

STATION 6 PERIOD 21 SAMPLING TIME 16- 18 AUG 31
TEMPERATURE = 299.3 K RELATIVE HUMIDITY= 54.1%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	21	T2	NO3-	2.11	5.31	0.51	1.28
6	21	T2	SO4=	2.12	8.29	0.51	1.99
6	21	T2	CL-	1.20	1.71	0.48	0.69
6	21	T2	NH4+	2.06	1.17	0.50	0.28
6	21	T2	NA+	1.10	1.03	0.74	0.69
6	21	T2	CA++	1.58	2.57	0.89	1.45
6	21	T2	MG++	0.13	0.13	0.71	0.71
6	21	T2	K+	0.47	0.74	0.50	0.79
6	21	ND	NO3-	0.81	2.05	0.32	0.81
6	21	BN	HNO3	0.57	1.44	0.31	0.79
6	21	OX	NH3	5.93	3.37	1.29	0.73

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STATION 6 PERIOD 22 SAMPLING TIME 18- 20 AUG 31
 TEMPERATURE = 296.5 K RELATIVE HUMIDITY= 61.6%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	22	T2	NO3-	2.08	5.24	0.51	1.27
6	22	T2	SO4=	2.89	11.30	0.59	2.29
6	22	T2	CL-	1.59	2.26	0.53	0.76
6	22	T2	NH4+	1.81	1.03	0.46	0.26
6	22	T2	NA+	1.41	1.32	0.75	0.70
6	22	T2	CA++	1.51	2.47	0.89	1.44
6	22	T2	MG++	0.17	0.17	0.71	0.71
6	22	T2	K+	0.00	0.00	0.49	0.78
6	22	ND	NO3-	0.61	1.53	0.31	0.79
6	22	BN	HNO3	0.52	1.30	0.31	0.78
6	22	OX	NH3	5.20	2.95	1.15	0.66

STATION 6 PERIOD 23 SAMPLING TIME 20- 22 AUG 31
 TEMPERATURE = 294.8 K RELATIVE HUMIDITY= 69.4%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	23	T2	NO3-	2.62	6.61	0.56	1.41
6	23	T2	SO4=	1.32	5.15	0.45	1.74
6	23	T2	CL-	2.65	3.78	0.72	1.02
6	23	T2	NH4+	1.43	0.81	0.40	0.23
6	23	T2	NA+	1.88	1.76	0.77	0.72
6	23	T2	CA++	2.13	3.47	0.93	1.51
6	23	T2	MG++	0.14	0.14	0.71	0.71
6	23	T2	K+	0.38	0.61	0.49	0.79
6	23	ND	NO3-	1.24	3.12	0.35	0.89
6	23	BN	HNO3	0.44	1.11	0.31	0.77
6	23	OX	NH3	4.51	2.56	1.03	0.59

STATION 6 PERIOD 24 SAMPLING TIME 22- 24 AUG 31
 TEMPERATURE = 294.3 K RELATIVE HUMIDITY= 73.1%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
6	24	T2	NO3-	2.86	7.19	0.58	1.47
6	24	T2	SO4=	1.31	5.12	0.44	1.74
6	24	T2	CL-	2.08	2.96	0.61	0.87
6	24	T2	NH4+	1.27	0.72	0.38	0.22
6	24	T2	NA+	2.48	2.32	0.81	0.76
6	24	T2	CA++	1.63	2.65	0.89	1.46
6	24	T2	MG++	0.36	0.35	0.72	0.71
6	24	T2	K+	0.39	0.62	0.50	0.79
6	24	ND	NO3-	1.19	2.99	0.35	0.88
6	24	BN	HNO3	0.41	1.03	0.31	0.77
6	24	OX	NH3	3.28	1.86	0.82	0.47

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STATION 7 PERIOD 7 SAMPLING TIME 0- 4 AUG 30
 TEMPERATURE = 293.1 K RELATIVE HUMIDITY= 74.2%

STATION TIME TYPE			SPECIES	CONCENTRATION		(PPB)	UNCERTAINTY (UG/M**3)
STATION	TIME	TYPE		(PPB)	(UG/M**3)		
7	7	T2	NO3-	2.40	6.04	0.54	1.35
7	7	T2	SO4=	2.85	11.13	0.58	2.27
7	7	T2	CL-	1.45	2.07	0.52	0.73
7	7	T2	NH4+	3.56	2.02	0.77	0.44
7	7	T2	NA+	1.10	1.03	0.74	0.69
7	7	T2	CA++	2.02	3.29	0.92	1.50
7	7	T2	MG++	0.21	0.21	0.72	0.71
7	7	T2	K+	0.32	0.51	0.49	0.78
7	7	ND	NO3-	1.05	2.63	0.34	0.85
7	7	BN	HNO3	0.46	1.17	0.31	0.78
7	7	OX	NH3	13.84	7.86	2.81	1.60

STATION 7 PERIOD 8 SAMPLING TIME 4- 8 AUG 30
 TEMPERATURE = 293.1 K RELATIVE HUMIDITY= 74.2%

STATION TIME TYPE			SPECIES	CONCENTRATION		(PPB)	UNCERTAINTY (UG/M**3)
STATION	TIME	TYPE		(PPB)	(UG/M**3)		
7	8	T2	NO3-	1.68	4.23	0.47	1.19
7	8	T2	SO4=	2.75	10.73	0.57	2.23
7	8	T2	CL-	0.70	1.00	0.43	0.61
7	8	T2	NH4+	3.34	1.90	0.73	0.41
7	8	T2	NA+	0.54	0.51	0.73	0.68
7	8	T2	CA++	2.46	4.01	0.95	1.55
7	8	T2	MG++	0.06	0.06	0.71	0.71
7	8	T2	K+	0.25	0.39	0.49	0.78
7	8	ND	NO3-	1.66	4.19	0.39	0.98
7	8	BN	HNO3	0.36	0.90	0.30	0.77
7	8	OX	NH3	10.20	5.79	2.10	1.19

STATION 7 PERIOD 9 SAMPLING TIME 8- 12 AUG 30
 TEMPERATURE = 299.8 K RELATIVE HUMIDITY= 53.3%

STATION TIME TYPE			SPECIES	CONCENTRATION		(PPB)	UNCERTAINTY (UG/M**3)
STATION	TIME	TYPE		(PPB)	(UG/M**3)		
7	9	T2	NO3-	7.27	18.30	1.15	2.90
7	9	T2	SO4=	5.08	19.86	0.85	3.33
7	9	T2	CL-	0.39	0.56	0.41	0.58
7	9	T2	NH4+	9.75	5.54	1.97	1.12
7	9	T2	NA+	0.97	0.91	0.74	0.69
7	9	T2	CA++	2.83	4.61	0.99	1.61
7	9	T2	MG++	0.22	0.21	0.72	0.71
7	9	T2	K+	0.00	0.00	0.49	0.78
7	9	ND	NO3-	5.03	12.66	0.80	2.02
7	9	BN	HNO3	1.06	2.67	0.34	0.85
7	9	OX	NH3	7.96	4.52	1.67	0.95

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STATION 7 PERIOD 10 SAMPLING TIME 12- 16 AUG 30
 TEMPERATURE = 302.0 K RELATIVE HUMIDITY= 45.2%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
7	10	T2	NO3-	2.28	5.74	0.52	1.32
7	10	T2	SO4=	1.80	7.01	0.48	1.88
7	10	T2	CL-	0.15	0.21	0.40	0.57
7	10	T2	NH4+	1.34	0.76	0.39	0.22
7	10	T2	NA+	1.04	0.97	0.74	0.69
7	10	T2	CA++	2.26	3.69	0.94	1.53
7	10	T2	MG++	0.12	0.12	0.71	0.71
7	10	T2	K+	0.13	0.20	0.49	0.78
7	10	ND	NO3-	3.95	9.94	0.66	1.66
7	10	BN	HNO3	1.84	4.64	0.41	1.02
7	10	DX	NH3	6.56	3.73	1.40	0.80

STATION 7 PERIOD 11 SAMPLING TIME 16- 20 AUG 30
 TEMPERATURE = 296.5 K RELATIVE HUMIDITY= 61.6%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
7	11	T2	NO3-	1.85	4.66	0.49	1.22
7	11	T2	SO4=	2.08	8.12	0.50	1.97
7	11	T2	CL-	0.64	0.91	0.42	0.61
7	11	T2	NH4+	1.76	1.00	0.45	0.26
7	11	T2	NA+	0.91	0.85	0.73	0.69
7	11	T2	CA++	1.65	2.69	0.89	1.46
7	11	T2	MG++	0.14	0.14	0.71	0.71
7	11	T2	K+	0.74	1.17	0.51	0.81
7	11	ND	NO3-	1.02	2.58	0.34	0.85
7	11	BN	HNO3	0.75	1.88	0.32	0.81
7	11	DX	NH3	4.19	2.38	0.98	0.55

STATION 7 PERIOD 12 SAMPLING TIME 20- 24 AUG 30
 TEMPERATURE = 294.3 K RELATIVE HUMIDITY= 73.1%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
7	12	T2	NO3-	2.17	5.46	0.51	1.29
7	12	T2	SO4=	1.04	4.05	0.43	1.67
7	12	T2	CL-	1.29	1.84	0.49	0.70
7	12	T2	NH4+	1.07	0.61	0.36	0.20
7	12	T2	NA+	1.74	1.63	0.77	0.72
7	12	T2	CA++	1.70	2.77	0.90	1.46
7	12	T2	MG++	0.28	0.27	0.72	0.71
7	12	T2	K+	0.45	0.72	0.50	0.79
7	12	ND	NO3-	1.34	3.38	0.36	0.91
7	12	BN	HNO3	0.61	1.53	0.31	0.79
7	12	DX	NH3	2.01	1.14	0.64	0.36

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STATION 7 PERIOD 13 SAMPLING TIME 0- 2 AUG 31
TEMPERATURE = 293.1 K RELATIVE HUMIDITY= 81.1%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
7	13	T2	NO3-	1.81	4.55	0.48	1.21
7	13	T2	SO4=	0.79	3.09	0.42	1.63
7	13	T2	CL-	1.62	2.31	0.54	0.77
7	13	T2	NH4+	1.12	0.63	0.36	0.20
7	13	T2	NA+	2.54	2.38	0.81	0.76
7	13	T2	CA++	3.02	4.92	1.01	1.64
7	13	T2	MG++	0.01	0.01	0.71	0.71
7	13	T2	K+	0.51	0.81	0.50	0.79
7	13	ND	NO3-	1.10	2.76	0.34	0.86
7	13	BN	HNO3	0.38	0.96	0.31	0.77
7	13	OX	NH3	10.53	5.98	2.16	1.23

STATION 7 PERIOD 14 SAMPLING TIME 2- 4 AUG 31
TEMPERATURE = 293.1 K RELATIVE HUMIDITY= 81.1%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
7	14	T2	NO3-	2.05	5.16	0.50	1.27
7	14	T2	SO4=	1.14	4.45	0.43	1.70
7	14	T2	CL-	1.20	1.71	0.48	0.69
7	14	T2	NH4+	1.32	0.75	0.39	0.22
7	14	T2	NA+	1.22	1.14	0.74	0.70
7	14	T2	CA++	3.90	6.36	1.10	1.79
7	14	T2	MG++	0.00	0.00	0.71	0.71
7	14	T2	K+	0.37	0.59	0.49	0.79
7	14	ND	NO3-	1.30	3.27	0.36	0.90
7	14	BN	HNO3	0.60	1.51	0.31	0.79
7	14	OX	NH3	14.77	8.39	3.00	1.70

STATION 7 PERIOD 15 SAMPLING TIME 4- 6 AUG 31
TEMPERATURE = 293.1 K RELATIVE HUMIDITY= 78.3%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
7	15	T2	NO3-	2.34	5.90	0.53	1.33
7	15	T2	SO4=	2.17	8.49	0.51	2.01
7	15	T2	CL-	0.38	0.54	0.41	0.58
7	15	T2	NH4+	2.47	1.40	0.57	0.32
7	15	T2	NA+	1.30	1.22	0.75	0.70
7	15	T2	CA++	3.90	6.36	1.10	1.79
7	15	T2	MG++	0.00	0.00	0.71	0.71
7	15	T2	K+	0.92	1.46	0.52	0.82
7	15	ND	NO3-	0.67	1.69	0.32	0.80
7	15	BN	HNO3	0.34	0.85	0.30	0.77
7	15	OX	NH3	10.11	5.74	2.08	1.18

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STATION 7 PERIOD 16 SAMPLING TIME 6- 8 AUG 31
TEMPERATURE = 293.1 K RELATIVE HUMIDITY= 78.3%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
7	16	T2	NO3-	1.50	3.78	0.46	1.15
7	16	T2	SO4=	1.03	4.04	0.43	1.67
7	16	T2	CL-	0.09	0.12	0.40	0.57
7	16	T2	NH4+	0.83	0.47	0.33	0.19
7	16	T2	NA+	0.38	0.35	0.72	0.68
7	16	T2	CA++	4.52	7.37	1.18	1.92
7	16	T2	MG++	0.00	0.00	0.71	0.71
7	16	T2	K+	0.10	0.16	0.49	0.78
7	16	ND	NO3-	0.93	2.35	0.33	0.83
7	16	BN	HNO3	0.30	0.76	0.30	0.76
7	16	OX	NH3	10.13	5.75	2.09	1.19

STATION 7 PERIOD 17 SAMPLING TIME 8- 10 AUG 31
TEMPERATURE = 298.1 K RELATIVE HUMIDITY= 59.9%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
7	17	T2	NO3-	2.85	7.17	0.58	1.46
7	17	T2	SO4=	1.00	3.92	0.43	1.67
7	17	T2	CL-	0.36	0.51	0.41	0.58
7	17	T2	NH4+	2.49	1.42	0.57	0.33
7	17	T2	NA+	0.10	0.09	0.72	0.68
7	17	T2	CA++	4.84	7.90	1.22	1.99
7	17	T2	MG++	0.00	0.00	0.71	0.71
7	17	T2	K+	0.00	0.00	0.49	0.78
7	17	ND	NO3-	1.69	4.26	0.39	0.99
7	17	BN	HNO3	0.68	1.70	0.32	0.80
7	17	OX	NH3	8.82	5.01	1.83	1.04

STATION 7 PERIOD 19 SAMPLING TIME 10- 12 AUG 31
TEMPERATURE = 301.5 K RELATIVE HUMIDITY= 50.1%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
7	19	T2	NO3-	4.49	11.31	0.78	1.96
7	19	T2	SO4=	3.38	13.20	0.64	2.51
7	19	T2	CL-	0.75	1.06	0.43	0.62
7	19	T2	NH4+	5.08	2.89	1.06	0.60
7	19	T2	NA+	0.96	0.90	0.74	0.69
7	19	T2	CA++	4.91	8.00	1.23	2.00
7	19	T2	MG++	0.00	0.00	0.71	0.71
7	19	T2	K+	1.38	2.20	0.55	0.88
7	19	ND	NO3-	1.86	4.69	0.41	1.03
7	19	BN	HNO3	2.26	5.68	0.45	1.13
7	19	OX	NH3	8.33	4.74	1.74	0.99

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STATION 7 PERIOD 18 SAMPLING TIME 12- 14 AUG 31
TEMPERATURE = 302.0 K RELATIVE HUMIDITY= 48.5%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
7	18	T2	NO3-	11.13	28.03	1.70	4.28
7	18	T2	SO4=	4.41	17.22	0.77	2.99
7	18	T2	CL-	1.04	1.48	0.46	0.66
7	18	T2	NH4+	11.12	6.32	2.24	1.27
7	18	T2	NA+	1.28	1.20	0.75	0.70
7	18	T2	CA++	5.24	8.55	1.27	2.07
7	18	T2	MG++	0.00	0.00	0.71	0.71
7	18	T2	K+	0.00	0.00	0.49	0.78
7	18	ND	NO3-	7.01	17.66	1.08	2.73
7	18	BN	HNO3	4.33	10.90	0.71	1.78
7	18	DX	NH3	3.78	2.15	0.91	0.51

STATION 7 PERIOD 20 SAMPLING TIME 14- 16 AUG 31
TEMPERATURE = 301.5 K RELATIVE HUMIDITY= 47.5%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
7	20	T2	NO3-	6.94	17.48	1.10	2.78
7	20	T2	SO4=	4.47	17.45	0.77	3.02
7	20	T2	CL-	0.06	0.09	0.40	0.57
7	20	T2	NH4+	9.99	5.68	2.02	1.15
7	20	T2	NA+	1.98	1.85	0.78	0.73
7	20	T2	CA++	4.59	7.48	1.19	1.93
7	20	T2	MG++	0.00	0.00	0.71	0.71
7	20	T2	K+	0.48	0.76	0.50	0.79
7	20	ND	NO3-	4.04	10.17	0.67	1.69
7	20	BN	HNO3	2.00	5.04	0.42	1.06
7	20	DX	NH3	23.25	13.21	4.68	2.66

STATION 7 PERIOD 21 SAMPLING TIME 16- 18 AUG 31
TEMPERATURE = 299.8 K RELATIVE HUMIDITY= 52.4%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
7	21	T2	NO3-	1.71	4.30	0.47	1.19
7	21	T2	SO4=	1.89	7.40	0.49	1.91
7	21	T2	CL-	0.00	0.00	0.40	0.57
7	21	T2	NH4+	1.90	1.08	0.47	0.27
7	21	T2	NA+	0.27	0.25	0.72	0.68
7	21	T2	CA++	3.67	5.98	1.07	1.75
7	21	T2	MG++	0.00	0.00	0.71	0.71
7	21	T2	K+	0.47	0.75	0.50	0.79
7	21	ND	NO3-	1.79	4.52	0.40	1.01
7	21	BN	HNO3	1.40	3.52	0.36	0.92
7	21	DX	NH3	14.07	7.99	2.86	1.62

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STATION 7 PERIOD 22 SAMPLING TIME 18- 20 AUG 31
TEMPERATURE = 297.6 K RELATIVE HUMIDITY= 57.7%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
7	22	T2	NO3-	0.87	2.20	0.42	1.06
7	22	T2	SO4=	1.96	7.65	0.49	1.93
7	22	T2	CL-	0.00	0.00	0.40	0.57
7	22	T2	NH4+	1.66	0.94	0.44	0.25
7	22	T2	NA+	1.29	1.21	0.75	0.70
7	22	T2	CA++	3.77	6.15	1.09	1.77
7	22	T2	MG++	0.00	0.00	0.71	0.71
7	22	T2	K+	0.73	1.16	0.51	0.81
7	22	ND	NO3-	0.80	2.02	0.32	0.81
7	22	BN	HNO3	0.82	2.08	0.32	0.82
7	22	OX	NH3	8.64	4.91	1.80	1.02

STATION 7 PERIOD 23 SAMPLING TIME 20- 22 AUG 31
TEMPERATURE = 295.4 K RELATIVE HUMIDITY= 67.1%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
7	23	T2	NO3-	2.64	6.65	0.56	1.41
7	23	T2	SO4=	2.24	8.76	0.52	2.03
7	23	T2	CL-	0.90	1.29	0.45	0.64
7	23	T2	NH4+	2.64	1.50	0.60	0.34
7	23	T2	NA+	3.65	3.41	0.90	0.84
7	23	T2	CA++	4.16	6.77	1.13	1.84
7	23	T2	MG++	0.00	0.00	0.71	0.71
7	23	T2	K+	1.22	1.94	0.54	0.85
7	23	ND	NO3-	1.11	2.81	0.34	0.86
7	23	BN	HNO3	0.50	1.26	0.31	0.78
7	23	OX	NH3	7.85	4.46	1.65	0.94

STATION 7 PERIOD 24 SAMPLING TIME 22- 24 AUG 31
TEMPERATURE = 294.8 K RELATIVE HUMIDITY= 70.7%

STATION TIME TYPE			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
7	24	T2	NO3-	0.90	2.28	0.42	1.06
7	24	T2	SO4=	0.37	1.44	0.40	1.58
7	24	T2	CL-	0.49	0.70	0.41	0.59
7	24	T2	NH4+	0.60	0.34	0.31	0.17
7	24	T2	NA+	0.80	0.75	0.73	0.68
7	24	T2	CA++	3.81	6.20	1.09	1.78
7	24	T2	MG++	0.00	0.00	0.71	0.71
7	24	T2	K+	0.79	1.26	0.51	0.81
7	24	ND	NO3-	1.28	3.22	0.36	0.89
7	24	BN	HNO3	0.34	0.87	0.30	0.77
7	24	OX	NH3	10.26	5.83	2.11	1.20

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STATION 8 PERIOD 7 SAMPLING TIME 0- 4 AUG 30
TEMPERATURE = 291.0 K RELATIVE HUMIDITY= 84.7%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	7	T2	NO3-	1.93	4.87	0.49	1.24
8	7	T2	SO4=	2.62	10.22	0.56	2.18
8	7	T2	CL-	1.91	2.73	0.59	0.83
8	7	T2	NH4+	2.52	1.43	0.58	0.33
8	7	T2	NA+	1.70	1.59	0.76	0.71
8	7	T2	CA++	0.41	0.67	0.85	1.38
8	7	T2	MG++	0.43	0.42	0.72	0.71
8	7	T2	K+	0.46	0.74	0.50	0.79
8	7	ND	NO3-	1.92	4.83	0.41	1.04
8	7	BN	HNO3	0.37	0.93	0.30	0.77
8	7	DX	NH3	7.83	4.45	1.64	0.93

STATION 8 PERIOD 8 SAMPLING TIME 4- 8 AUG 30
TEMPERATURE = 291.9 K RELATIVE HUMIDITY= 80.1%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	8	T2	NO3-	0.92	2.31	0.42	1.06
8	8	T2	SO4=	0.83	3.26	0.42	1.64
8	8	T2	CL-	0.30	0.43	0.41	0.58
8	8	T2	NH4+	1.04	0.59	0.35	0.20
8	8	T2	NA+	0.11	0.10	0.72	0.68
8	8	T2	CA++	0.18	0.29	0.84	1.37
8	8	T2	MG++	0.00	0.00	0.71	0.71
8	8	T2	K+	0.51	0.81	0.50	0.79
8	8	ND	NO3-	1.06	2.68	0.34	0.85
8	8	BN	HNO3	0.30	0.76	0.30	0.76
8	8	DX	NH3	4.08	2.32	0.96	0.54

STATION 8 PERIOD 9 SAMPLING TIME 8- 12 AUG 30
TEMPERATURE = 299.9 K RELATIVE HUMIDITY= 52.9%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	9	T2	NO3-	6.52	16.41	1.05	2.63
8	9	T2	SO4=	5.70	22.28	0.94	3.65
8	9	T2	CL-	0.82	1.17	0.44	0.63
8	9	T2	NH4+	9.38	5.33	1.90	1.08
8	9	T2	NA+	2.24	2.10	0.79	0.74
8	9	T2	CA++	1.34	2.19	0.88	1.43
8	9	T2	MG++	0.58	0.57	0.72	0.71
8	9	T2	K+	0.00	0.00	0.49	0.78
8	9	ND	NO3-	3.29	8.28	0.57	1.44
8	9	BN	HNO3	1.42	3.57	0.37	0.92
8	9	DX	NH3	2.95	1.67	0.77	0.44

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STATION 8 PERIOD 10 SAMPLING TIME 12- 16 AUG 30
TEMPERATURE = 305.1 K RELATIVE HUMIDITY= 37.8%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	10	T2	NO3-	2.59	6.51	0.55	1.40
8	10	T2	SO4=	1.78	6.97	0.48	1.87
8	10	T2	CL-	0.21	0.31	0.40	0.57
8	10	T2	NH4+	1.53	0.87	0.42	0.24
8	10	T2	NA+	1.68	1.58	0.76	0.71
8	10	T2	CA++	0.41	0.67	0.85	1.38
8	10	T2	MG++	0.33	0.33	0.72	0.71
8	10	T2	K+	0.04	0.06	0.49	0.78
8	10	ND	NO3-	1.51	3.80	0.37	0.94
8	10	BN	HNO3	1.56	3.93	0.38	0.95
8	10	OX	NH3	3.94	2.24	0.93	0.53

STATION 8 PERIOD 11 SAMPLING TIME 16- 20 AUG 30
TEMPERATURE = 298.1 K RELATIVE HUMIDITY= 55.8%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	11	T2	NO3-	2.13	5.38	0.51	1.28
8	11	T2	SO4=	2.39	9.34	0.53	2.09
8	11	T2	CL-	1.15	1.64	0.48	0.68
8	11	T2	NH4+	1.94	1.10	0.48	0.27
8	11	T2	NA+	2.84	2.66	0.84	0.78
8	11	T2	CA++	0.53	0.86	0.85	1.38
8	11	T2	MG++	0.70	0.70	0.73	0.72
8	11	T2	K+	0.13	0.21	0.49	0.78
8	11	ND	NO3-	1.49	3.75	0.37	0.94
8	11	BN	HNO3	0.81	2.03	0.32	0.81
8	11	OX	NH3	3.77	2.14	0.91	0.51

STATION 8 PERIOD 12 SAMPLING TIME 20- 24 AUG 30
TEMPERATURE = 291.1 K RELATIVE HUMIDITY= 88.7%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	12	T2	NO3-	2.14	5.40	0.51	1.29
8	12	T2	SO4=	1.74	6.81	0.48	1.86
8	12	T2	CL-	0.16	0.23	0.40	0.57
8	12	T2	NH4+	1.50	0.85	0.41	0.23
8	12	T2	NA+	3.92	3.66	0.93	0.87
8	12	T2	CA++	0.29	0.48	0.84	1.38
8	12	T2	MG++	0.96	0.95	0.74	0.73
8	12	T2	K+	0.20	0.31	0.49	0.78
8	12	ND	NO3-	1.27	3.19	0.35	0.89
8	12	BN	HNO3	0.37	0.94	0.31	0.77
8	12	OX	NH3	2.27	1.29	0.68	0.38

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STATION B PERIOD 13 SAMPLING TIME 0- 2 AUG 31
TEMPERATURE = 290.3 K RELATIVE HUMIDITY= 97.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	13	T2	NO3-	2.44	6.15	0.54	1.36
8	13	T2	SO4=	0.98	3.84	0.43	1.66
8	13	T2	CL-	2.34	3.33	0.66	0.94
8	13	T2	NH4+	1.39	0.79	0.40	0.23
8	13	T2	NA+	2.88	2.70	0.84	0.78
8	13	T2	CA++	0.13	0.21	0.84	1.37
8	13	T2	MG++	0.34	0.33	0.72	0.71
8	13	T2	K+	0.02	0.04	0.49	0.78
8	13	ND	NO3-	0.85	2.13	0.33	0.82
8	13	BN	HNO3	0.38	0.97	0.31	0.77
8	13	OX	NH3	4.75	2.70	1.07	0.61

STATION B PERIOD 14 SAMPLING TIME 2- 4 AUG 31
TEMPERATURE = 289.8 K RELATIVE HUMIDITY=100.3%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	14	T2	NO3-	1.16	2.93	0.44	1.10
8	14	T2	SO4=	0.77	3.00	0.42	1.62
8	14	T2	CL-	0.54	0.78	0.42	0.60
8	14	T2	NH4+	0.60	0.34	0.31	0.17
8	14	T2	NA+	1.78	1.67	0.77	0.72
8	14	T2	CA++	0.40	0.65	0.85	1.38
8	14	T2	MG++	0.00	0.00	0.71	0.71
8	14	T2	K+	0.00	0.00	0.49	0.78
8	14	ND	NO3-	0.96	2.43	0.33	0.84
8	14	BN	HNO3	0.41	1.04	0.31	0.77
8	14	OX	NH3	4.65	2.64	1.06	0.60

STATION B PERIOD 15 SAMPLING TIME 4- 6 AUG 31
TEMPERATURE = 289.7 K RELATIVE HUMIDITY= 97.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	15	T2	NO3-	1.02	2.56	0.43	1.08
8	15	T2	SO4=	1.58	6.18	0.46	1.81
8	15	T2	CL-	0.54	0.77	0.42	0.60
8	15	T2	NH4+	1.21	0.69	0.37	0.21
8	15	T2	NA+	1.39	1.30	0.75	0.70
8	15	T2	CA++	0.38	0.62	0.85	1.38
8	15	T2	MG++	2.18	2.16	0.82	0.81
8	15	T2	K+	0.04	0.06	0.49	0.78
8	15	ND	NO3-	0.74	1.87	0.32	0.80
8	15	BN	HNO3	0.30	0.76	0.30	0.76
8	15	OX	NH3	6.19	3.52	1.34	0.76

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STATION 8 PERIOD 16 SAMPLING TIME 6- 8 AUG 31
TEMPERATURE = 290.9 K RELATIVE HUMIDITY= 90.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY (UG/M**3)	
STATION	TIME	TYPE		(PPB)	(UG/M**3)		
8	16	T2	NO3-	1.38	3.48	0.45	1.13
8	16	T2	SO4=	2.01	7.86	0.50	1.95
8	16	T2	CL-	0.42	0.60	0.41	0.59
8	16	T2	NH4+	2.43	1.38	0.56	0.32
8	16	T2	NA+	1.59	1.49	0.76	0.71
8	16	T2	CA++	0.62	1.01	0.85	1.39
8	16	T2	MG++	0.00	0.00	0.71	0.71
8	16	T2	K+	0.00	0.00	0.49	0.78
8	16	ND	NO3-	0.88	2.23	0.33	0.82
8	16	BN	HNO3	0.47	1.19	0.31	0.78
8	16	OX	NH3	5.80	3.29	1.26	0.72

STATION 8 PERIOD 17 SAMPLING TIME 8- 10 AUG 31
TEMPERATURE = 295.9 K RELATIVE HUMIDITY= 68.4%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY (UG/M**3)	
STATION	TIME	TYPE		(PPB)	(UG/M**3)		
8	17	T2	NO3-	11.83	29.80	1.80	4.53
8	17	T2	SO4=	3.06	11.94	0.60	2.36
8	17	T2	CL-	1.08	1.53	0.47	0.66
8	17	T2	NH4+	5.83	3.31	1.20	0.68
8	17	T2	NA+	2.91	2.72	0.84	0.79
8	17	T2	CA++	1.09	1.77	0.87	1.41
8	17	T2	MG++	0.42	0.42	0.72	0.71
8	17	T2	K+	0.00	0.00	0.49	0.78
8	17	ND	NO3-	3.69	9.30	0.62	1.57
8	17	BN	HNO3	1.19	3.00	0.35	0.88
8	17	OX	NH3	9.62	5.47	1.99	1.13

STATION 8 PERIOD 18 SAMPLING TIME 10- 12 AUG 31
TEMPERATURE = 302.9 K RELATIVE HUMIDITY= 46.2%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY (UG/M**3)	
STATION	TIME	TYPE		(PPB)	(UG/M**3)		
8	18	T2	NO3-	8.30	20.91	1.29	3.26
8	18	T2	SO4=	3.96	15.46	0.71	2.77
8	18	T2	CL-	0.57	0.82	0.42	0.60
8	18	T2	NH4+	7.78	4.42	1.58	0.90
8	18	T2	NA+	3.01	2.82	0.85	0.79
8	18	T2	CA++	2.02	3.29	0.92	1.50
8	18	T2	MG++	0.54	0.54	0.72	0.71
8	18	T2	K+	0.00	0.00	0.49	0.78
8	18	ND	NO3-	3.29	8.28	0.57	1.44
8	18	BN	HNO3	1.90	4.79	0.41	1.04
8	18	OX	NH3	9.98	5.67	2.06	1.17

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STATION 8 PERIOD 19 SAMPLING TIME 12- 14 AUG 31
 TEMPERATURE = 304.1 K RELATIVE HUMIDITY= 43.0%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	19	T2	NO3-	13.05	32.87	1.98	4.98
8	19	T2	SO4=	5.15	20.11	0.86	3.37
8	19	T2	CL-	1.92	2.74	0.59	0.84
8	19	T2	NH4+	12.47	7.09	2.51	1.43
8	19	T2	NA+	5.04	4.72	1.04	0.97
8	19	T2	CA++	2.03	3.31	0.92	1.50
8	19	T2	MG++	0.70	0.70	0.73	0.72
8	19	T2	K+	1.11	1.76	0.53	0.84
8	19	ND	NO3-	4.01	10.10	0.67	1.68
8	19	BN	HNO3	1.40	3.54	0.37	0.92
8	19	OX	NH3	16.49	9.37	3.34	1.90

STATION 8 PERIOD 20 SAMPLING TIME 14- 16 AUG 31
 TEMPERATURE = 304.6 K RELATIVE HUMIDITY= 39.6%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	20	T2	NO3-	9.76	24.59	1.50	3.78
8	20	T2	SO4=	2.81	10.96	0.58	2.26
8	20	T2	CL-	0.79	1.13	0.44	0.62
8	20	T2	NH4+	11.37	6.46	2.29	1.30
8	20	T2	NA+	1.41	1.32	0.75	0.70
8	20	T2	CA++	0.61	0.99	0.85	1.39
8	20	T2	MG++	0.08	0.08	0.71	0.71
8	20	T2	K+	0.00	0.00	0.49	0.78
8	20	ND	NO3-	7.14	17.98	1.10	2.77
8	20	BN	HNO3	1.35	3.39	0.36	0.91
8	20	OX	NH3	40.89	23.23	8.19	4.66

STATION 8 PERIOD 21 SAMPLING TIME 16- 18 AUG 31
 TEMPERATURE = 302.1 K RELATIVE HUMIDITY= 45.7%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	21	T2	NO3-	2.17	5.47	0.51	1.29
8	21	T2	SO4=	0.70	2.74	0.41	1.61
8	21	T2	CL-	0.65	0.93	0.43	0.61
8	21	T2	NH4+	1.77	1.01	0.45	0.26
8	21	T2	NA+	2.19	2.05	0.79	0.74
8	21	T2	CA++	0.36	0.58	0.85	1.38
8	21	T2	MG++	0.03	0.03	0.71	0.71
8	21	T2	K+	0.00	0.00	0.49	0.78
8	21	ND	NO3-	3.21	8.09	0.56	1.42
8	21	BN	HNO3	1.37	3.46	0.36	0.91
8	21	OX	NH3	15.56	8.84	3.15	1.79

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STATION 8 PERIOD 22
TEMPERATURE = 297.4 K
FILTER ID

SAMPLING TIME 18- 20 AUG 31
RELATIVE HUMIDITY= 58.2%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	22	T2	NO3-	2.99	7.54	0.60	1.51
8	22	T2	SO4=	2.36	9.23	0.53	2.08
8	22	T2	CL-	2.69	3.83	0.72	1.03
8	22	T2	NH4+	2.96	1.68	0.66	0.37
8	22	T2	NA+	5.27	4.93	1.06	1.00
8	22	T2	CA++	0.82	1.34	0.86	1.39
8	22	T2	MG++	0.69	0.69	0.73	0.72
8	22	T2	K+	0.00	0.00	0.49	0.78
8	22	ND	NO3-	1.23	3.11	0.35	0.89
8	22	BN	HNO3	1.19	2.99	0.35	0.88
8	22	OX	NH3	8.75	4.97	1.82	1.03

STATION 8 PERIOD 23
TEMPERATURE = 293.6 K
FILTER ID

SAMPLING TIME 20- 22 AUG 31
RELATIVE HUMIDITY= 74.6%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	23	T2	NO3-	3.14	7.91	0.61	1.55
8	23	T2	SO4=	2.32	9.07	0.53	2.06
8	23	T2	CL-	0.30	0.43	0.41	0.58
8	23	T2	NH4+	1.95	1.11	0.48	0.27
8	23	T2	NA+	5.36	5.02	1.07	1.00
8	23	T2	CA++	0.64	1.04	0.85	1.39
8	23	T2	MG++	0.99	0.98	0.74	0.73
8	23	T2	K+	0.07	0.11	0.49	0.78
8	23	ND	NO3-	1.33	3.35	0.36	0.90
8	23	BN	HNO3	0.65	1.63	0.31	0.79
8	23	OX	NH3	5.79	3.29	1.26	0.72

STATION 8 PERIOD 24
TEMPERATURE = 293.1 K
FILTER ID

SAMPLING TIME 22- 24 AUG 31
RELATIVE HUMIDITY= 78.3%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
8	24	T2	NO3-	3.21	8.08	0.62	1.57
8	24	T2	SO4=	2.33	9.11	0.53	2.07
8	24	T2	CL-	0.00	0.00	0.40	0.57
8	24	T2	NH4+	0.00	0.00	0.28	0.16
8	24	T2	NA+	4.51	4.22	0.98	0.92
8	24	T2	CA++	0.83	1.35	0.86	1.40
8	24	T2	MG++	0.99	0.98	0.74	0.73
8	24	T2	K+	0.00	0.00	0.49	0.78
8	24	ND	NO3-	1.23	3.09	0.35	0.88
8	24	BN	HNO3	0.41	1.04	0.31	0.77
8	24	OX	NH3	7.41	4.21	1.56	0.89

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STATION 9 PERIOD 6 SAMPLING TIME 0- 4 AUG 30
 TEMPERATURE = 292.5 K RELATIVE HUMIDITY= 77.3%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	6	T2	NO3-	0.94	2.37	0.42	1.07
9	6	T2	SO4=	1.08	4.23	0.43	1.68
9	6	T2	CL-	4.97	7.09	1.18	1.68
9	6	T2	NH4+	0.91	0.51	0.34	0.19
9	6	T2	NA+	4.29	4.02	0.96	0.90
9	6	T2	CA++	0.70	1.14	0.85	1.39
9	6	T2	MG++	1.14	1.13	0.74	0.74
9	6	T2	K+	0.55	0.88	0.50	0.80
9	6	ND	NO3-	1.34	3.37	0.36	0.91
9	6	BN	HNO3	0.34	0.87	0.30	0.77
9	6	DX	NH3	7.25	4.12	1.53	0.87

STATION 9 PERIOD 7 SAMPLING TIME 4- 8 AUG 30
 TEMPERATURE = 292.0 K RELATIVE HUMIDITY= 79.5%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	7	T2	NO3-	1.77	4.46	0.48	1.21
9	7	T2	SO4=	0.90	3.50	0.42	1.65
9	7	T2	CL-	2.42	3.44	0.67	0.96
9	7	T2	NH4+	3.55	2.02	0.76	0.43
9	7	T2	NA+	1.99	1.86	0.78	0.73
9	7	T2	CA++	1.14	1.85	0.87	1.41
9	7	T2	MG++	0.58	0.57	0.72	0.71
9	7	T2	K+	0.00	0.00	0.49	0.78
9	7	ND	NO3-	0.67	1.69	0.32	0.80
9	7	BN	HNO3	1.04	2.63	0.34	0.85
9	7	DX	NH3	15.32	8.71	3.10	1.76

STATION 9 PERIOD 8 SAMPLING TIME 8- 12 AUG 30
 TEMPERATURE = 298.2 K RELATIVE HUMIDITY= 58.5%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	8	T2	NO3-	9.40	23.67	1.45	3.65
9	8	T2	SO4=	3.26	12.72	0.63	2.45
9	8	T2	CL-	1.42	2.03	0.51	0.73
9	8	T2	NH4+	5.30	3.01	1.10	0.62
9	8	T2	NA+	4.65	4.35	1.00	0.93
9	8	T2	CA++	1.74	2.84	0.90	1.47
9	8	T2	MG++	1.04	1.03	0.74	0.73
9	8	T2	K+	0.43	0.69	0.50	0.79
9	8	ND	NO3-	1.93	4.86	0.41	1.04
9	8	BN	HNO3	0.69	1.73	0.32	0.80
9	8	DX	NH3	12.69	7.21	2.59	1.47

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STATION 9 PERIOD 9 SAMPLING TIME 12- 16 AUG 30
TEMPERATURE = 298.2 K RELATIVE HUMIDITY= 56.7%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	9	T2	NO3-	3.08	7.75	0.61	1.53
9	9	T2	SO4=	2.42	9.47	0.54	2.10
9	9	T2	CL-	1.26	1.80	0.49	0.70
9	9	T2	NH4+	2.28	1.29	0.54	0.30
9	9	T2	NA+	3.20	2.99	0.86	0.81
9	9	T2	CA++	1.52	2.48	0.89	1.45
9	9	T2	MG++	0.97	0.96	0.74	0.73
9	9	T2	K+	0.66	1.05	0.50	0.80
9	9	ND	NO3-	0.99	2.49	0.33	0.84
9	9	BN	HNO3	0.60	1.50	0.31	0.79
9	9	DX	NH3	7.16	4.07	1.52	0.86

STATION 9 PERIOD 10 SAMPLING TIME 16- 20 AUG 30
TEMPERATURE = 294.8 K RELATIVE HUMIDITY= 68.2%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	10	T2	NO3-	2.29	5.77	0.52	1.32
9	10	T2	SO4=	1.69	6.59	0.47	1.84
9	10	T2	CL-	1.65	2.36	0.54	0.78
9	10	T2	NH4+	0.93	0.53	0.34	0.19
9	10	T2	NA+	2.67	2.50	0.82	0.77
9	10	T2	CA++	0.76	1.24	0.85	1.39
9	10	T2	MG++	0.64	0.64	0.72	0.72
9	10	T2	K+	0.00	0.00	0.49	0.78
9	10	ND	NO3-	0.95	2.39	0.33	0.83
9	10	BN	HNO3	0.48	1.22	0.31	0.78
9	10	DX	NH3	5.43	3.09	1.20	0.68

STATION 9 PERIOD 11 SAMPLING TIME 20- 24 AUG 30
TEMPERATURE = 292.8 K RELATIVE HUMIDITY= 80.1%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	11	T2	NO3-	2.07	5.21	0.50	1.27
9	11	T2	SO4=	1.72	6.73	0.47	1.85
9	11	T2	CL-	3.30	4.71	0.84	1.20
9	11	T2	NH4+	2.42	1.38	0.56	0.32
9	11	T2	NA+	3.72	3.49	0.91	0.85
9	11	T2	CA++	0.62	1.01	0.85	1.39
9	11	T2	MG++	0.93	0.92	0.73	0.73
9	11	T2	K+	0.00	0.00	0.49	0.78
9	11	ND	NO3-	0.92	2.33	0.33	0.83
9	11	BN	HNO3	0.36	0.90	0.30	0.77
9	11	DX	NH3	5.14	2.92	1.14	0.65

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STATION 9 PERIOD 12 SAMPLING TIME 0- 2 AUG 31
 TEMPERATURE = 292.7 K RELATIVE HUMIDITY= 83.5%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	12	T2	NO3-	2.27	5.71	0.52	1.32
9	12	T2	SO4=	1.64	6.41	0.47	1.83
9	12	T2	CL-	4.35	6.19	1.05	1.50
9	12	T2	NH4+	1.94	1.10	0.48	0.27
9	12	T2	NA+	8.08	7.57	1.40	1.31
9	12	T2	CA++	0.43	0.71	0.85	1.38
9	12	T2	MG++	0.67	0.66	0.72	0.72
9	12	T2	K+	0.02	0.03	0.49	0.78
9	12	ND	NO3-	1.12	2.82	0.34	0.86
9	12	BN	HNO3	0.32	0.80	0.30	0.76
9	12	OX	NH3	6.18	3.51	1.33	0.76

STATION 9 PERIOD 13 SAMPLING TIME 2- 4 AUG 31
 TEMPERATURE = 292.1 K RELATIVE HUMIDITY= 86.4%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	13	T2	NO3-	2.18	5.49	0.51	1.30
9	13	T2	SO4=	1.16	4.52	0.44	1.70
9	13	T2	CL-	2.91	4.14	0.76	1.09
9	13	T2	NH4+	1.72	0.98	0.44	0.25
9	13	T2	NA+	5.91	5.53	1.14	1.06
9	13	T2	CA++	0.78	1.27	0.85	1.39
9	13	T2	MG++	0.43	0.42	0.72	0.71
9	13	T2	K+	0.64	1.01	0.50	0.80
9	13	ND	NO3-	0.91	2.30	0.33	0.83
9	13	BN	HNO3	0.40	1.00	0.31	0.77
9	13	OX	NH3	5.71	3.25	1.25	0.71

STATION 9 PERIOD 14 SAMPLING TIME 4- 6 AUG 31
 TEMPERATURE = 292.5 K RELATIVE HUMIDITY= 81.5%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	14	T2	NO3-	2.44	6.15	0.54	1.36
9	14	T2	SO4=	1.48	5.79	0.46	1.76
9	14	T2	CL-	3.68	5.24	0.92	1.30
9	14	T2	NH4+	1.85	1.05	0.47	0.26
9	14	T2	NA+	4.64	4.34	1.00	0.93
9	14	T2	CA++	0.97	1.59	0.86	1.40
9	14	T2	MG++	0.88	0.87	0.73	0.72
9	14	T2	K+	1.04	1.65	0.52	0.83
9	14	ND	NO3-	0.97	2.44	0.33	0.84
9	14	BN	HNO3	0.33	0.84	0.30	0.77
9	14	OX	NH3	5.97	3.39	1.30	0.74

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STATION 9 PERIOD 15 SAMPLING TIME 6- 8 AUG 31
 TEMPERATURE = 293.3 K RELATIVE HUMIDITY= 77.4%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	15	T2	NO3-	2.51	6.32	0.55	1.38
9	15	T2	SO4=	2.27	8.85	0.52	2.04
9	15	T2	CL-	4.78	6.82	1.14	1.63
9	15	T2	NH4+	0.69	0.39	0.31	0.18
9	15	T2	NA+	6.80	6.36	1.24	1.16
9	15	T2	CA++	1.88	3.07	0.91	1.48
9	15	T2	MG++	1.23	1.22	0.75	0.74
9	15	T2	K+	0.00	0.00	0.49	0.78
9	15	ND	NO3-	1.47	3.70	0.37	0.93
9	15	BN	HNO3	0.38	0.95	0.31	0.77
9	15	DX	NH3	6.82	3.88	1.45	0.83

STATION 9 PERIOD 16 SAMPLING TIME 8- 10 AUG 31
 TEMPERATURE = 297.9 K RELATIVE HUMIDITY= 60.8%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	16	T2	NO3-	7.55	19.02	1.19	3.00
9	16	T2	SO4=	3.70	14.45	0.68	2.65
9	16	T2	CL-	3.17	4.52	0.81	1.16
9	16	T2	NH4+	8.71	4.95	1.76	1.00
9	16	T2	NA+	3.90	3.65	0.92	0.86
9	16	T2	CA++	2.31	3.77	0.94	1.53
9	16	T2	MG++	0.57	0.57	0.72	0.71
9	16	T2	K+	2.18	3.46	0.63	1.00
9	16	ND	NO3-	2.93	7.38	0.53	1.33
9	16	BN	HNO3	0.47	1.17	0.31	0.78
9	16	DX	NH3	4.39	2.49	1.01	0.57

STATION 9 PERIOD 17 SAMPLING TIME 10- 12 AUG 31
 TEMPERATURE = 299.2 K RELATIVE HUMIDITY= 57.3%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	17	T2	NO3-	10.26	25.83	1.57	3.96
9	17	T2	SO4=	4.98	19.45	0.84	3.28
9	17	T2	CL-	4.17	5.94	1.01	1.44
9	17	T2	NH4+	12.64	7.18	2.54	1.45
9	17	T2	NA+	5.82	5.44	1.12	1.05
9	17	T2	CA++	4.13	6.73	1.13	1.84
9	17	T2	MG++	1.20	1.18	0.75	0.74
9	17	T2	K+	0.00	0.00	0.49	0.78
9	17	ND	NO3-	4.30	10.83	0.70	1.78
9	17	BN	HNO3	0.63	1.58	0.31	0.79
9	17	DX	NH3	22.35	12.70	4.50	2.56

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STATION 9 PERIOD 18
 TEMPERATURE = 298.9 K
 FILTER ID

SAMPLING TIME 12- 14 AUG 31
 RELATIVE HUMIDITY= 58.2%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	18	T2	NO3-	8.76	22.06	1.36	3.42
9	18	T2	SO4=	4.88	19.07	0.83	3.23
9	18	T2	CL-	2.84	4.05	0.75	1.07
9	18	T2	NH4+	11.75	6.68	2.37	1.34
9	18	T2	NA+	4.26	3.99	0.96	0.90
9	18	T2	CA++	2.60	4.24	0.97	1.57
9	18	T2	MG++	0.92	0.91	0.73	0.73
9	18	T2	K+	1.21	1.92	0.54	0.85
9	18	ND	NO3-	4.43	11.15	0.72	1.82
9	18	BN	HNO3	0.50	1.25	0.31	0.78
9	18	DX	NH3	34.59	19.65	6.94	3.94

STATION 9 PERIOD 19
 TEMPERATURE = 298.1 K
 FILTER ID

SAMPLING TIME 14- 16 AUG 31
 RELATIVE HUMIDITY= 58.0%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	19	T2	NO3-	5.49	13.82	0.91	2.28
9	19	T2	SO4=	2.56	10.01	0.55	2.16
9	19	T2	CL-	1.14	1.62	0.47	0.68
9	19	T2	NH4+	6.78	3.85	1.39	0.79
9	19	T2	NA+	2.58	2.42	0.82	0.76
9	19	T2	CA++	1.93	3.14	0.91	1.49
9	19	T2	MG++	0.42	0.41	0.72	0.71
9	19	T2	K+	1.25	1.99	0.54	0.86
9	19	ND	NO3-	2.16	5.43	0.44	1.10
9	19	BN	HNO3	0.57	1.44	0.31	0.79
9	19	DX	NH3	10.40	5.91	2.14	1.22

STATION 9 PERIOD 20
 TEMPERATURE = 296.5 K
 FILTER ID

SAMPLING TIME 16- 18 AUG 31
 RELATIVE HUMIDITY= 63.8%

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	20	T2	NO3-	2.25	5.66	0.52	1.31
9	20	T2	SO4=	1.55	6.04	0.46	1.80
9	20	T2	CL-	1.06	1.52	0.47	0.66
9	20	T2	NH4+	2.96	1.68	0.66	0.37
9	20	T2	NA+	2.04	1.91	0.78	0.73
9	20	T2	CA++	0.72	1.18	0.85	1.39
9	20	T2	MG++	0.14	0.14	0.71	0.71
9	20	T2	K+	0.03	0.04	0.49	0.78
9	20	ND	NO3-	1.18	2.96	0.35	0.87
9	20	BN	HNO3	0.50	1.25	0.31	0.78
9	20	DX	NH3	13.22	7.51	2.69	1.53

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STATION 9 PERIOD 22 SAMPLING TIME 18- 20 AUG 31
TEMPERATURE = 294.2 K RELATIVE HUMIDITY= 70.9%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	22	T2	NO3-	0.00	0.00	0.40	1.01
9	22	T2	SO4=	0.00	0.00	0.40	1.56
9	22	T2	CL-	0.00	0.00	0.40	0.57
9	22	T2	NH4+	0.00	0.00	0.28	0.16
9	22	T2	NA+	0.00	0.00	0.72	0.67
9	22	T2	CA++	0.00	0.00	0.84	1.37
9	22	T2	MG++	0.01	0.01	0.71	0.71
9	22	T2	K+	0.00	0.00	0.49	0.78
9	22	ND	NO3-	0.03	0.07	0.30	0.76
9	22	BN	HNO3	0.30	0.76	0.30	0.76
9	22	OX	NH3	1.87	1.06	0.62	0.35

STATION 9 PERIOD 23 SAMPLING TIME 20- 22 AUG 31
TEMPERATURE = 293.4 K RELATIVE HUMIDITY= 75.6%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	23	T2	NO3-	2.76	6.95	0.57	1.44
9	23	T2	SO4=	2.33	9.11	0.53	2.07
9	23	T2	CL-	3.06	4.36	0.79	1.13
9	23	T2	NH4+	3.16	1.79	0.69	0.39
9	23	T2	NA+	4.43	4.14	0.98	0.91
9	23	T2	CA++	0.83	1.35	0.86	1.40
9	23	T2	MG++	0.78	0.78	0.73	0.72
9	23	T2	K+	0.00	0.00	0.49	0.78
9	23	ND	NO3-	1.07	2.70	0.34	0.86
9	23	BN	HNO3	0.35	0.89	0.30	0.77
9	23	OX	NH3	32.25	18.32	6.47	3.68

STATION 9 PERIOD 24 SAMPLING TIME 22- 24 AUG 31
TEMPERATURE = 293.8 K RELATIVE HUMIDITY= 75.2%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
9	24	T2	NO3-	3.12	7.86	0.61	1.54
9	24	T2	SO4=	2.20	8.61	0.52	2.02
9	24	T2	CL-	0.42	0.60	0.41	0.59
9	24	T2	NH4+	2.98	1.69	0.66	0.37
9	24	T2	NA+	7.09	6.64	1.28	1.19
9	24	T2	CA++	0.57	0.93	0.85	1.38
9	24	T2	MG++	0.78	0.77	0.73	0.72
9	24	T2	K+	0.00	0.00	0.49	0.78
9	24	ND	NO3-	1.08	2.71	0.34	0.86
9	24	BN	HNO3	0.35	0.87	0.30	0.77
9	24	OX	NH3	7.76	4.41	1.63	0.93

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STATION 10 PERIOD 7 SAMPLING TIME 5- 9 AUG 30
 TEMPERATURE = 292.0 K RELATIVE HUMIDITY= 75.4%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
10	7	T2	NO3-	6.41	16.14	1.03	2.60
10	7	T2	SO4=	2.78	10.85	0.57	2.24
10	7	T2	CL-	0.14	0.20	0.40	0.57
10	7	T2	NH4+	8.63	4.90	1.75	0.99
10	7	T2	NA+	0.00	0.00	0.72	0.67
10	7	T2	CA++	1.81	2.96	0.90	1.47
10	7	T2	MG++	0.48	0.48	0.72	0.71
10	7	T2	K+	0.28	0.44	0.49	0.78
10	7	ND	NO3-	0.00	0.00	0.30	0.76
10	7	BN	HNO3	0.00	0.00	0.30	0.76
10	7	DX	NH3	12.48	7.09	2.55	1.45

STATION 10 PERIOD 8 SAMPLING TIME 9- 13 AUG 30
 TEMPERATURE = 301.4 K RELATIVE HUMIDITY= 47.7%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
10	8	T2	NO3-	5.33	13.44	0.89	2.23
10	8	T2	SO4=	4.46	17.41	0.77	3.02
10	8	T2	CL-	0.02	0.03	0.40	0.57
10	8	T2	NH4+	8.77	4.98	1.78	1.01
10	8	T2	NA+	0.17	0.16	0.72	0.68
10	8	T2	CA++	2.58	4.21	0.96	1.57
10	8	T2	MG++	0.85	0.84	0.73	0.72
10	8	T2	K+	0.00	0.00	0.49	0.78
10	8	ND	NO3-	0.00	0.00	0.30	0.76
10	8	BN	HNO3	2.51	6.33	0.48	1.21
10	8	DX	NH3	14.50	8.24	2.94	1.67

STATION 10 PERIOD 9 SAMPLING TIME 13- 15 AUG 30
 TEMPERATURE = 304.4 K RELATIVE HUMIDITY= 38.0%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY (PPB)	UNCERTAINTY (UG/M**3)
				(PPB)	(UG/M**3)		
10	9	T2	NO3-	2.50	6.30	0.55	1.37
10	9	T2	SO4=	3.28	12.81	0.63	2.46
10	9	T2	CL-	0.00	0.00	0.40	0.57
10	9	T2	NH4+	4.50	2.56	0.94	0.54
10	9	T2	NA+	0.46	0.43	0.72	0.68
10	9	T2	CA++	2.58	4.20	0.96	1.57
10	9	T2	MG++	0.64	0.64	0.72	0.72
10	9	T2	K+	0.02	0.03	0.49	0.78
10	9	ND	NO3-	0.00	0.00	0.30	0.76
10	9	BN	HNO3	1.40	3.52	0.36	0.92
10	9	DX	NH3	33.83	19.22	6.78	3.85

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STATION 10 PERIOD 10 SAMPLING TIME 15- 17 AUG 30
TEMPERATURE = 303.9 K RELATIVE HUMIDITY= 39.2%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	10	T2	NO3-	2.04	5.13	0.50	1.26
10	10	T2	SO4=	0.90	3.53	0.42	1.65
10	10	T2	CL-	0.08	0.11	0.40	0.57
10	10	T2	NH4+	1.78	1.01	0.46	0.26
10	10	T2	NA+	0.42	0.39	0.72	0.68
10	10	T2	CA++	3.51	5.72	1.06	1.72
10	10	T2	MG++	0.86	0.85	0.73	0.72
10	10	T2	K+	0.11	0.18	0.49	0.78
10	10	ND	NO3-	0.00	0.00	0.30	0.76
10	10	BN	HNO3	1.77	4.45	0.40	1.00
10	10	OX	NH3	46.34	26.33	9.28	5.27

STATION 10 PERIOD 11 SAMPLING TIME 17- 19 AUG 30
TEMPERATURE = 300.4 K RELATIVE HUMIDITY= 47.2%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	11	T2	NO3-	1.60	4.03	0.47	1.17
10	11	T2	SO4=	1.28	5.00	0.44	1.73
10	11	T2	CL-	0.00	0.00	0.40	0.57
10	11	T2	NH4+	1.69	0.96	0.44	0.25
10	11	T2	NA+	0.34	0.32	0.72	0.68
10	11	T2	CA++	2.97	4.84	1.00	1.63
10	11	T2	MG++	0.75	0.74	0.73	0.72
10	11	T2	K+	0.00	0.00	0.49	0.78
10	11	ND	NO3-	0.00	0.00	0.30	0.76
10	11	BN	HNO3	1.13	2.86	0.34	0.87
10	11	OX	NH3	31.51	17.91	6.32	3.59

STATION 10 PERIOD 12 SAMPLING TIME 19- 21 AUG 30
TEMPERATURE = 296.4 K RELATIVE HUMIDITY= 67.8%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	12	T2	NO3-	1.65	4.15	0.47	1.18
10	12	T2	SO4=	0.33	1.28	0.40	1.57
10	12	T2	CL-	0.00	0.00	0.40	0.57
10	12	T2	NH4+	1.88	1.07	0.47	0.27
10	12	T2	NA+	0.75	0.71	0.73	0.68
10	12	T2	CA++	1.89	3.08	0.91	1.48
10	12	T2	MG++	0.46	0.45	0.72	0.71
10	12	T2	K+	0.01	0.02	0.49	0.78
10	12	ND	NO3-	0.00	0.00	0.30	0.76
10	12	BN	HNO3	0.81	2.03	0.32	0.81
10	12	OX	NH3	27.04	15.36	5.43	3.09

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STATION 10 PERIOD 13 SAMPLING TIME 21- 23 AUG 30
TEMPERATURE = 294.1 K RELATIVE HUMIDITY= 65.2%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	13	T2	NO3-	6.59	16.61	1.06	2.66
10	13	T2	SO4=	2.61	10.20	0.56	2.17
10	13	T2	CL-	1.12	1.60	0.47	0.67
10	13	T2	NH4+	6.42	3.65	1.31	0.75
10	13	T2	NA+	3.47	3.25	0.89	0.83
10	13	T2	CA++	3.64	5.93	1.07	1.75
10	13	T2	MG++	1.68	1.66	0.78	0.77
10	13	T2	K+	0.65	1.04	0.50	0.80
10	13	ND	NO3-	0.00	0.00	0.30	0.76
10	13	BN	HNO3	0.61	1.54	0.31	0.79
10	13	OX	NH3	30.79	17.50	6.18	3.51

STATION 10 PERIOD 14 SAMPLING TIME 23- 25 AUG 30
TEMPERATURE = 292.8 K RELATIVE HUMIDITY= 69.3%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	14	T2	NO3-	5.33	13.42	0.89	2.23
10	14	T2	SO4=	2.85	11.15	0.58	2.28
10	14	T2	CL-	0.05	0.07	0.40	0.57
10	14	T2	NH4+	6.51	3.70	1.33	0.76
10	14	T2	NA+	0.91	0.85	0.73	0.69
10	14	T2	CA++	2.36	3.84	0.95	1.54
10	14	T2	MG++	1.54	1.53	0.77	0.76
10	14	T2	K+	0.42	0.67	0.50	0.79
10	14	ND	NO3-	0.00	0.00	0.30	0.76
10	14	BN	HNO3	0.35	0.87	0.30	0.77
10	14	OX	NH3	18.76	10.66	3.79	2.15

STATION 10 PERIOD 15 SAMPLING TIME 1- 7 AUG 31
TEMPERATURE = 291.4 K RELATIVE HUMIDITY= 75.6%
FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	15	T2	NO3-	5.26	13.24	0.88	2.21
10	15	T2	SO4=	2.98	11.65	0.60	2.33
10	15	T2	CL-	0.29	0.42	0.41	0.58
10	15	T2	NH4+	6.79	3.86	1.39	0.79
10	15	T2	NA+	0.65	0.60	0.73	0.68
10	15	T2	CA++	1.82	2.96	0.90	1.47
10	15	T2	MG++	0.97	0.96	0.74	0.73
10	15	T2	K+	0.00	0.00	0.49	0.78
10	15	ND	NO3-	0.00	0.00	0.30	0.76
10	15	BN	HNO3	0.41	1.03	0.31	0.77
10	15	OX	NH3	13.67	7.77	2.78	1.58

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STATION 10 PERIOD 16 SAMPLING TIME 7- 8 AUG 31
 TEMPERATURE = 292.1 K RELATIVE HUMIDITY= 72.3%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	16	T2	NO3-	2.53	6.38	0.55	1.38
10	16	T2	SO4=	0.87	3.41	0.42	1.64
10	16	T2	CL-	0.00	0.00	0.40	0.57
10	16	T2	NH4+	2.47	1.40	0.57	0.32
10	16	T2	NA+	0.01	0.01	0.72	0.67
10	16	T2	CA++	1.91	3.11	0.91	1.48
10	16	T2	MG++	0.48	0.47	0.72	0.71
10	16	T2	K+	0.87	1.38	0.51	0.82
10	16	ND	NO3-	0.00	0.00	0.30	0.76
10	16	BN	HNO3	0.44	1.12	0.31	0.77
10	16	OX	NH3	14.08	8.00	2.86	1.63

STATION 10 PERIOD 18 SAMPLING TIME 8- 10 AUG 31
 TEMPERATURE = 298.4 K RELATIVE HUMIDITY= 47.5%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	18	T2	NO3-	5.00	12.58	0.84	2.12
10	18	T2	SO4=	2.61	10.18	0.56	2.17
10	18	T2	CL-	0.00	0.00	0.40	0.57
10	18	T2	NH4+	6.41	3.64	1.31	0.75
10	18	T2	NA+	0.54	0.50	0.73	0.68
10	18	T2	CA++	2.51	4.09	0.96	1.56
10	18	T2	MG++	0.84	0.83	0.73	0.72
10	18	T2	K+	1.15	1.83	0.53	0.85
10	18	ND	NO3-	0.00	0.00	0.30	0.76
10	18	BN	HNO3	1.31	3.31	0.36	0.90
10	18	OX	NH3	11.48	6.52	2.35	1.33

STATION 10 PERIOD 19 SAMPLING TIME 10- 12 AUG 31
 TEMPERATURE = 303.5 K RELATIVE HUMIDITY= 35.9%

FILTER ID			SPECIES	CONCENTRATION		UNCERTAINTY	
STATION	TIME	TYPE		(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	19	T2	NO3-	1.14	2.86	0.43	1.09
10	19	T2	SO4=	0.48	1.86	0.41	1.59
10	19	T2	CL-	0.00	0.00	0.40	0.57
10	19	T2	NH4+	0.64	0.36	0.31	0.18
10	19	T2	NA+	0.74	0.70	0.73	0.68
10	19	T2	CA++	1.75	2.85	0.90	1.47
10	19	T2	MG++	0.46	0.46	0.72	0.71
10	19	T2	K+	0.29	0.45	0.49	0.78
10	19	ND	NO3-	0.00	0.00	0.30	0.76
10	19	BN	HNO3	1.63	4.10	0.38	0.97
10	19	OX	NH3	9.11	5.18	1.89	1.07

CONTROL OF ATMOSPHERIC AEROSOL NITRATE AND NITRIC ACID CONCENTRATIONS
 FIELD EXPERIMENT DATA
 AUGUST 30 - 31, 1982

STATION 10 PERIOD 20 SAMPLING TIME 12- 15 AUG 31
 TEMPERATURE = 305.6 K RELATIVE HUMIDITY= 28.7%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	20	T2	NO3-	0.47	1.18	0.41	1.02
10	20	T2	SO4=	0.17	0.65	0.40	1.57
10	20	T2	CL-	0.07	0.10	0.40	0.57
10	20	T2	NH4+	0.20	0.11	0.29	0.16
10	20	T2	NA+	0.00	0.00	0.72	0.67
10	20	T2	CA++	1.36	2.22	0.88	1.43
10	20	T2	MG++	0.27	0.26	0.72	0.71
10	20	T2	K+	0.00	0.00	0.49	0.78
10	20	ND	NO3-	0.00	0.00	0.30	0.76
10	20	BN	HNO3	1.10	2.77	0.34	0.86
10	20	OX	NH3	27.67	15.72	5.56	3.16

STATION 10 PERIOD 21 SAMPLING TIME 15- 17 AUG 31
 TEMPERATURE = 306.0 K RELATIVE HUMIDITY= 20.7%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	21	T2	NO3-	1.26	3.17	0.44	1.11
10	21	T2	SO4=	0.02	0.07	0.40	1.56
10	21	T2	CL-	0.00	0.00	0.40	0.57
10	21	T2	NH4+	1.38	0.79	0.40	0.22
10	21	T2	NA+	0.03	0.02	0.72	0.67
10	21	T2	CA++	2.06	3.36	0.92	1.50
10	21	T2	MG++	0.67	0.67	0.72	0.72
10	21	T2	K+	0.00	0.00	0.49	0.78
10	21	ND	NO3-	0.00	0.00	0.30	0.76
10	21	BN	HNO3	1.85	4.67	0.41	1.02
10	21	OX	NH3	61.34	34.85	12.28	6.98

STATION 10 PERIOD 22 SAMPLING TIME 17- 19 AUG 31
 TEMPERATURE = 301.8 K RELATIVE HUMIDITY= 31.8%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	22	T2	NO3-	6.77	17.05	1.08	2.72
10	22	T2	SO4=	2.93	11.45	0.59	2.31
10	22	T2	CL-	0.96	1.37	0.45	0.65
10	22	T2	NH4+	8.75	4.97	1.77	1.01
10	22	T2	NA+	0.36	0.34	0.72	0.68
10	22	T2	CA++	3.13	5.10	1.02	1.66
10	22	T2	MG++	1.26	1.24	0.75	0.74
10	22	T2	K+	0.14	0.22	0.49	0.78
10	22	ND	NO3-	0.00	0.00	0.30	0.76
10	22	BN	HNO3	2.00	5.03	0.42	1.06
10	22	OX	NH3	32.73	18.60	6.57	3.73

CONTROL OF ATMOSPHERIC AEROSOL NITRATE AND NITRIC ACID CONCENTRATIONS
 FIELD EXPERIMENT DATA
 AUGUST 30 - 31, 1982

STATION 10 PERIOD 23 SAMPLING TIME 19- 21 AUG 31
 TEMPERATURE = 298.1 K RELATIVE HUMIDITY= 34.0%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	23	T2	NO3-	6.25	15.73	1.01	2.54
10	23	T2	SO4=	3.42	13.36	0.65	2.52
10	23	T2	CL-	0.00	0.00	0.40	0.57
10	23	T2	NH4+	7.46	4.24	1.52	0.86
10	23	T2	NA+	1.01	0.94	0.74	0.69
10	23	T2	CA++	3.93	6.41	1.10	1.80
10	23	T2	MG++	1.81	1.80	0.79	0.78
10	23	T2	K+	0.30	0.48	0.49	0.78
10	23	ND	NO3-	0.00	0.00	0.30	0.76
10	23	BN	HNO3	1.07	2.69	0.34	0.85
10	23	OX	NH3	28.84	16.39	5.79	3.29

STATION 10 PERIOD 24 SAMPLING TIME 21- 23 AUG 31
 TEMPERATURE = 296.2 K RELATIVE HUMIDITY= 38.2%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	24	T2	NO3-	3.86	9.72	0.70	1.76
10	24	T2	SO4=	1.67	6.54	0.47	1.84
10	24	T2	CL-	0.00	0.00	0.40	0.57
10	24	T2	NH4+	3.27	1.86	0.71	0.40
10	24	T2	NA+	0.52	0.48	0.73	0.68
10	24	T2	CA++	3.01	4.90	1.00	1.64
10	24	T2	MG++	1.17	1.15	0.74	0.74
10	24	T2	K+	0.81	1.29	0.51	0.81
10	24	ND	NO3-	0.00	0.00	0.30	0.76
10	24	BN	HNO3	0.71	1.79	0.32	0.80
10	24	OX	NH3	23.10	13.13	4.65	2.64

STATION 10 PERIOD 4 SAMPLING TIME 23- 24 AUG 31
 TEMPERATURE = 295.2 K RELATIVE HUMIDITY= 40.7%
 FILTER ID

STATION	TIME	TYPE	SPECIES	CONCENTRATION		UNCERTAINTY	
				(PPB)	(UG/M**3)	(PPB)	(UG/M**3)
10	4	T2	NO3-	2.16	5.43	0.51	1.29
10	4	T2	SO4=	0.89	3.49	0.42	1.65
10	4	T2	CL-	0.16	0.22	0.40	0.57
10	4	T2	NH4+	2.05	1.16	0.50	0.28
10	4	T2	NA+	0.40	0.37	0.72	0.68
10	4	T2	CA++	2.28	3.71	0.94	1.53
10	4	T2	MG++	0.33	0.33	0.72	0.71
10	4	T2	K+	0.06	0.09	0.49	0.78
10	4	ND	NO3-	0.00	0.00	0.30	0.76
10	4	BN	HNO3	0.67	1.69	0.32	0.80
10	4	OX	NH3	12.76	7.25	2.60	1.48

APPENDIX A

ACQUISITION OF REGIONAL AIR QUALITY MODEL VALIDATION DATA FOR NITRATE, SULFATE, AMMONIUM ION AND THEIR PRECURSORS

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Abstract—An intensive field study was conducted throughout California's South Coast Air Basin to acquire air quality model validation data for use with aerosol nitrate formation models. Aerosol nitrate, sulfate, ammonium, other major ionic aerosol species, nitric acid gas and ammonia were measured concurrently at ten sites for forty-eight consecutive hours during the period 30–31 August 1982. Ozone, NO and NO₂ were measured at all locations, and PAN was measured at Pasadena and Riverside, completing a nitrogen balance on the air masses studied.

The product of the measured nitric acid and ammonia concentrations ranged from less than 1 ppbv² to greater than 300 ppbv² during the experiment, providing a wide range of conditions over which comparisons can be drawn between chemical equilibrium calculations and experimental results. The ionic material in the aerosol phase was chemically more complex than is assumed by present theoretical models for the equilibrium between NH₃, HNO₃ and the aerosol phase, and included significant amounts of Na⁺, Ca²⁺, Mg²⁺, K⁺ and Cl⁻ in addition to NH₄⁺, SO₄²⁻ and NO₃⁻. Results of the experiment showed that aerosol nitrate levels in excess of 20 μg m⁻³ accumulated in near-coastal locations in the morning of 31 August, followed by subsequent transport across the air basin. Trajectory analysis showed that the afternoon aerosol nitrate peak observed inland at Rubidoux near Riverside was associated with the same air mass that contained the high morning nitrate levels near the coast, indicating that description of both transport and atmospheric chemical reactions is important in understanding regional nitrate dynamics.

1. INTRODUCTION

Ammonia and nitric acid vapor react to form ammonium nitrate aerosol. This is important because ammonium nitrate containing aerosols account for a significant fraction of local and regional visibility problems, particularly in Los Angeles and Denver (White and Roberts, 1977; Cass, 1979; Groblicki *et al.*, 1981). Nitric acid concentrations also are important because of their contribution to wet and dry acid deposition processes. Since NH₄NO₃ formation acts as an important sink for nitric acid, the formation of NH₄NO₃ must be understood if nitric acid levels are to be controlled in a deliberate fashion. Reliable air quality models are needed if emission control strategy development is to proceed. But before air quality models that compute aerosol nitrate and nitric acid concentrations are used for emission control strategy testing, the accuracy of their predictions must be evaluated.

An air quality model for NH₄NO₃ formation and transport recently has been developed (Russell *et al.*, 1983). The Caltech photochemical airshed model developed by McRae and Seinfeld (1983) is used to compute gaseous HNO₃ concentrations from reactive hydrocarbon and oxides of nitrogen emissions. An inventory of ammonia emissions is introduced into the model. Then NH₄NO₃ concentrations are computed at thermodynamic equilibrium between gaseous

HNO₃ and NH₃ using the approach outlined by Stelson and Seinfeld (1982a,b).

To date, this model has been tested in its trajectory form against the time series of gaseous ammonia, particulate ammonium ion and particulate nitrate ion concentration measurements at El Monte, California on a summer day during 1974. Although the model appears to perform well, the ability to confirm this conclusion is limited by the absence of field data on gaseous nitric acid during that event, and by the potential for artifact nitrate formation during sample collection by the measurement methods used in 1974. Better model validation data are needed.

Ideally, an air quality model validation data set for aerosol nitrate formation should provide measurements of all relevant gaseous species: NO, NO₂, HNO₃, NH₃, PAN (and O₃ if photochemical oxidant concentrations are to be checked as well). In addition, the concentration of the aerosol species NO₃⁻, SO₄²⁻, NH₄⁺ should be measured along with all other ionic species that are present in the aerosol. Temperature and relative humidity data are needed to compute the equilibrium dissociation constant that relates gaseous HNO₃ and NH₃ to the aerosol phase. Simultaneous measurements at a number of widely spaced monitoring sites are desirable if an Eulerian grid-based version of the aerosol nitrate formation model is to be tested. Two or more consecutive days of observation are required in Los Angeles if air is to be tracked from the

marine environment all of the way to the eastern end of the air basin near Riverside. Low artifact measurement methods are desired.

The purpose of this paper is to report on the acquisition of such an aerosol nitrate air quality model verification data set in southern California.

2. EXPERIMENTAL

A field experiment was conducted in the South Coast Air Basin (SCAB) that surrounds Los Angeles during the period 30-31 August 1982. Moderate levels of photochemical smog were encountered during the two days studied. Both days were warm with scattered clouds. Peak temperatures reached 35 and 37 C on 30 and 31 August, respectively at the eastern end of the Los Angeles basin. During the afternoons, onshore winds transported pollutants inland, with typical wind speeds of about 5 m s^{-1} . This combination of high temperatures and inland transport resulted in a peak 1-h average ozone concentration of 0.18 ppm on August 30, increasing to a 1-h average peak ozone level of 0.26 ppm in the Riverside area on 31 August.

Ten monitoring sites were established at the locations shown in Fig. 1. The sampling network operated for 48 consecutive hours from midnight at the start of the first day to midnight at the end of 31 August. Two-hour average and 4-h average measurements of $\text{HNO}_3(\text{g})$, $\text{NH}_3(\text{g})$, NO_3 , NH_4^+ , SO_4^{2-} and other major ionic species were obtained at each site. All sites except Riverside were co-located with a South Coast Air Quality Management District (SCAQMD) or California Air Resources Board (CARB) continuous air monitoring station, and 1-h average data on NO , NO_2 , O_3 and SO_2 were obtained by cooperation with these agencies. Site descriptions are given by the U.S. Environmental Protection Agency (1973, 1978 *et seq.*). PAN was measured by electron capture gas chromatography, and NO and NO_2 were measured by chemiluminescence by researchers at the University of California at Riverside (UCR). PAN also was measured by the same principle at Caltech in Pasadena.

The aerosol, nitric acid and ammonia sampling apparatus for this experiment is shown schematically in Fig. 2. Aerosol nitrate and nitric acid concentrations were measured both by dual filter method and by the denuder difference method. Gaseous ammonia was measured by a dual filter method using oxalic acid impregnated filters as a sink for NH_3 . Filter holders were of open-faced design so that any large particle nitrates would be collected. The sampling apparatus was surrounded by a bug screen and shaded by a sun shield to prevent nitrate volatilization through over-heating. Nine of the ten sampling sites shown in Fig. 1 were equipped as indicated in Fig. 2, while the 10th site at Riverside (UCR)

EXPERIMENTAL DESIGN

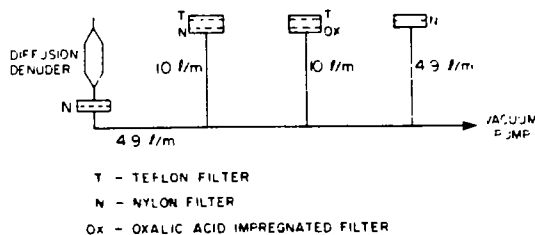


Fig. 2. Schematic of the sampling apparatus used at nine of the ten sites. The tenth station used only the two 10 l min^{-1} lines with dual filters.

consisted of only the two sampling lines that contained dual filter packs.

In the dual filter method for nitric acid determination, air was drawn at a rate of 10 l min^{-1} through a dual filter pack (Grosjean, 1983; Spicer *et al.*, 1982; Appel *et al.*, 1980). A Teflon prefilter (Membrana, Zefluor, 47 mm diameter, $1 \mu\text{m}$ pore size) first removed the aerosol phase constituents. Gaseous nitric acid that passed through the inert Teflon prefilter was collected as nitrate on a nylon after-filter (Ghia Corp., Nylasorb, 47 mm dia, $1 \mu\text{m}$ pore size). Filters, after exposure, were sealed immediately in petri dishes and chilled until analysis to minimize volatilization from the samples.

Water soluble material was extracted from these filters by mechanical shaking in distilled-deionized-distilled water for 1 h or more. Measured extraction efficiencies typically were above 97%. The extract was divided for subsequent chemical analysis. The aerosol material extracted from the Teflon prefilters was analyzed for nitrate, sulfate, chloride, potassium and sodium ions using Dionex Model 10 and Model 2120 ion chromatographs (Mueller *et al.*, 1978). Divalent cations (calcium and magnesium) were measured using a Varian Techtron model AA-6 atomic absorption spectrophotometer (Varian, 1975). Ammonium ion on the Teflon filters was determined by the phenol-hypochlorite method (Salorzano, 1967). Nitric acid concentrations were determined by extracting the nitrate ion collected on the nylon after-filters, with chemical analysis by ion chromatography as described above. Analytical uncertainties were assessed by analysis of reagent grade standards prepared in the range 0-5 ppm (wt/vol aqueous solution). Five replicate analyses of each of three standard solutions that span the concentration range of interest for each species were used to estimate the uncertainty associated with the laboratory procedures. The relative uncertainty associated with these measurements is shown in the first data column of Table 1. A contribution due to the

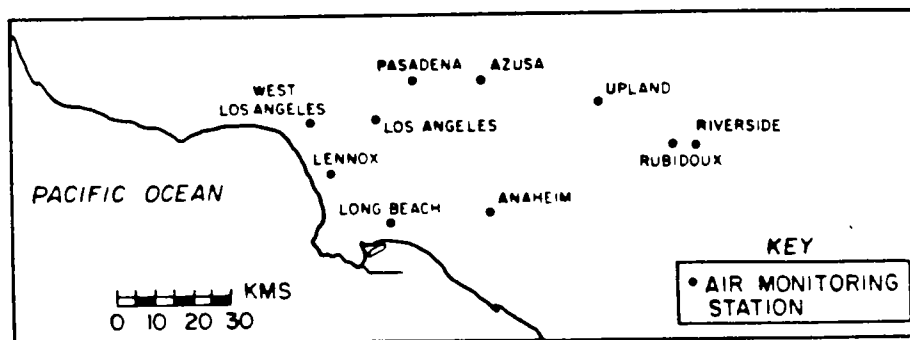


Fig. 1. Locations of nitrate monitoring sites in the South Coast Air Basin.

Table 1. Measurement uncertainties

Species	Uncertainty due to chemical analysis procedure* (%)	Uncertainty due to filter blank† ($\mu\text{g m}^{-3}$)
NO_3^-	15	1.0
SO_4^{2-}	15	1.6
Cl^-	22	0.6
NH_4^+	20	0.2
Ca^{2+}	18	1.4
Na^+	15	0.8
K^+	18	1.1
Mg^{2+}	18	0.5
HNO_3	15	0.8
NH_3	20	0.3

* One standard error, as % of nominally measured value.

† One standard error, stated in equivalent atmospheric concentration.

variability of the filter blanks was added to this analytical error. More than twenty blank filters of each type were taken into the field but not exposed. The average blank values from these filters were subtracted from the measured filter loadings. The contribution to the uncertainty in these measurements due to the variability of the filter blank also is shown in Table 1. This uncertainty in the filter blank governs the lowest quantifiable pollutant concentrations during this experiment. A complete listing of the data from this experiment and their associated uncertainties has been compiled (Russell and Cass, 1983).

The dual filter method for measuring aerosol nitrate and nitric acid has the advantage of simplicity, low cost, sensitivity and ability to produce both particulate and gaseous nitrate concentration data from the same air stream. Results from the nitric acid measurement method intercomparison (Spicer *et al.*, 1982) conducted in the SCAB showed that the dual filter measurements were highly correlated with the median value obtained by all competitive nitric acid measurement methods. One of the two groups of investigators that used a Teflon-nylon filter pair during the intercomparison study obtained results suggesting a small positive proportional bias, while a second group obtained results that suggest no significant bias when measuring nitric acid. Dual filter methods are susceptible to both positive and negative errors. Volatilization of ammonium nitrate would decrease measured nitrate aerosol (Appel *et al.*, 1980). Nitric acid may also react with collected aerosol increasing the measured nitrate aerosol (Appel *et al.*, 1980; Spicer and Schumacher, 1979).

The second method used for nitric acid determination during the present experiment was based on the diffusion denuder design described by Forrest *et al.* (1982), except that 10 sodium carbonate coated tubes 30 cm in length were contained within each denuder housing. At a total air flow rate of 4.9 l min^{-1} , laminar flow was achieved inside the denuder tubes at a nominal Reynolds number of 175 based on tube diameter. Air flowing through the denuder was stripped of nitric acid by reaction with the tube walls. Particulate nitrate (PN) penetrated the denuder and was collected on the nylon after-filter. A separate parallel sample line operating at 4.9 l min^{-1} contained a single nylon filter used to collect total inorganic nitrate (i.e. nitric acid plus aerosol nitrate). Nitric acid concentrations by the denuder difference method were obtained by subtracting the particulate nitrate concentration from the total inorganic nitrate concentration. Nitrate ion levels on these nylon filters were determined by water extraction and ion chromatography, with filter blank subtraction as described previously.

Nitrate measurements obtained by denuder also are susceptible to interferences. Large particle nitrate may be lost in the denuder by impaction. Laboratory experiments performed on the denuders used in this experiment show losses of about 30% for particles larger than $4 \mu\text{m}$ in diameter (Strand, 1983). Because of this measurable bias in the denuder system, nitric acid concentrations presented in this paper will be based on the dual filter method.

Gaseous ammonia concentrations were determined from the dual filter pack shown in Fig. 2 that contained an oxalic acid impregnated back-up filter. The aerosol phase containing ammonium ion first was removed by a Teflon prefilter (Membrana, Zefluor, 47 mm dia, $1.0 \mu\text{m}$ pore size). Ammonia gas remaining in the air stream was collected by reaction with an oxalic acid impregnated glass fiber filter (Gelman Type AE, 47 mm diameter) (Yoong, 1981; Appel *et al.*, 1980; Cadle *et al.*, 1980). After collection, filters were sealed and chilled as described previously. Ammonia concentrations were determined from the ammonium ion collected on the oxalic acid impregnated filters by a modified version of the phenol-hypochlorite method (Salorzano, 1967). The excess oxalate and acid on the glass fiber filters interfered significantly with the method of Salorzano (1967), so the method was modified, adding a phosphate buffer (Harwood and Kuhn, 1970) and additional hydroxide. The modified method is described by Russell (1983) and was found to give reproducible results with a correlation coefficient of $r = 0.99$. Standard deviations for recovery of NH_4^+ standards containing 1 and 0.5 ppm (N by wt) were 2.5 and 3.5%, respectively.

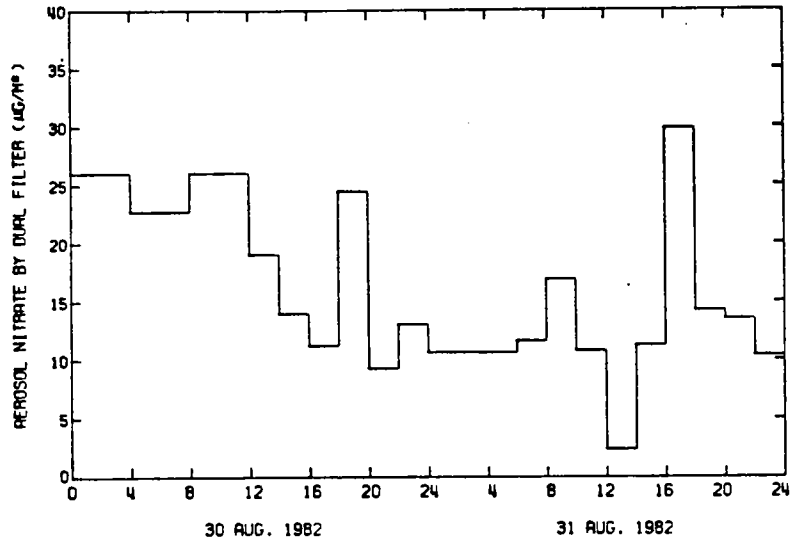
The calculated equilibrium dissociation constant for the $\text{HNO}_3\text{-NH}_3\text{-NH}_4\text{NO}_3$ system is highly dependent on ambient temperature and relative humidity. Temperature measurements to accompany each ambient sample were obtained from nearby weather monitoring stations, where possible, or from temperature measurements that were taken at the air monitoring site by the station operators using mercury thermometers. Instantaneous temperatures were taken each hour. Relative humidities were computed from measured dew point saturation temperatures that are monitored at a number of locations in the SCAB. Dew point temperatures were interpolated to the location of each monitoring site by the method of Goodin *et al.* (1979).

3. RESULTS

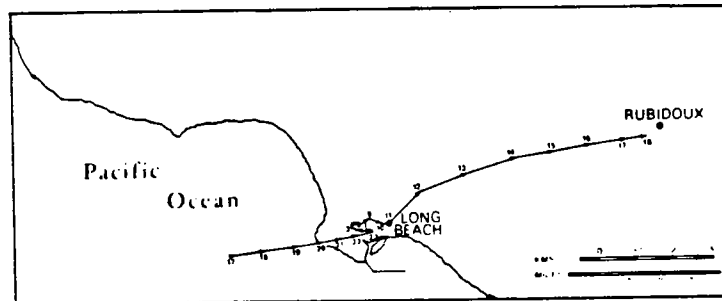
Based on previous descriptions of aerosol nitrate concentrations in the Los Angeles area (Appel *et al.*, 1978), high aerosol nitrate concentrations were expected in the Riverside area in the late afternoon due to production of nitric acid in the plume downwind of metropolitan Los Angeles. High aerosol nitrate levels (above $25 \mu\text{g m}^{-3}$) were observed at Rubidoux as expected, as is seen in Fig. 3(a). However, unexpectedly high nitrate levels also were observed at near-coastal sites like Lennox and Long Beach in the morning of 31 August, as seen in Fig. 3(c).

Hourly averaged data on surface wind speed and direction at 39 monitoring sites in Southern California were acquired from governmental agencies for the period 30–31 August 1982. A mass-consistent wind field defined over a $5 \text{ km} \times 5 \text{ km}$ grid system that covers the geographic area shown in Fig. 1 was developed for each hour by the method of Goodin *et al.* (1979). Air parcel trajectories were integrated over these gridded wind fields using 10 min time steps. Trajectory analysis shows that the peak nitrate concen-

NITRATE ION CONCENTRATION AT RUBIDOUX

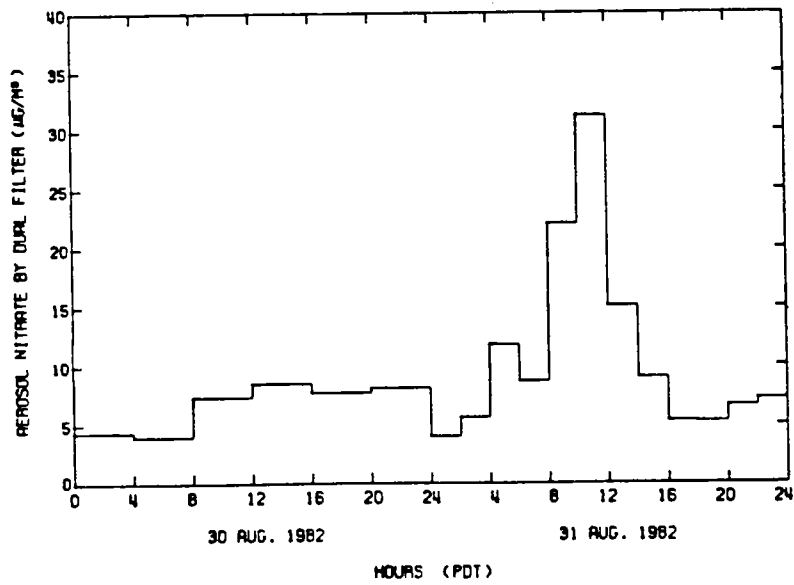


(a)



(b)

NITRATE ION CONCENTRATION AT LONG BEACH



(c)

Fig. 3. (a) Nitrate concentration observed at Rubidoux, 30-31 August 1982. (b) Trajectory of the air mass passing over the long Beach area at 1100 on 31 August and over the Rubidoux area at 1800 on 31 August 1982. (c) Nitrate concentrations at Long Beach, 30-31 August 1982.

tration at Rubidoux on the afternoon of 31 August is related to the coastal peak observed at Long Beach earlier that morning. A forward trajectory drawn from the nitrate peak in the Long Beach area at 1100 hours on the morning of 31 August passes within 3.5 km of Rubidoux between 1700 and 1800 hours in the late afternoon at the time of the nitrate peak in the eastern portion of the air basin [see Fig. 3(b)]. A backward trajectory drawn from Long Beach at 1100 hours on 31 August shows that that air mass first crossed the coastline during the sea breeze portion of the late afternoon of 30 August. At night, wind speeds dropped to less than 0.5 m s^{-1} with variable wind direction. The air mass stagnated overnight in Long Beach, an area of

high NO_x emissions (see Fig. 6 in Russell *et al.*, 1983). The high nitrate concentration observed at Long Beach in the morning of 31 August resulted from progressive aerosol accumulation within a largely stagnant and stable air mass. This nitrate-rich air parcel then was advected inland on the next day's sea breeze. It appears that transport may play as important a role as chemical reaction in accumulating high nitrate levels.

A balance on the ionic material in the samples taken at Long Beach is shown in Fig. 4. The major constituents are NH_4^+ , NO_3^- and SO_4^{2-} , but Na^+ , and Ca^{2+} often account for about one third of the cations present, suggesting sea salt and soil dust contributions

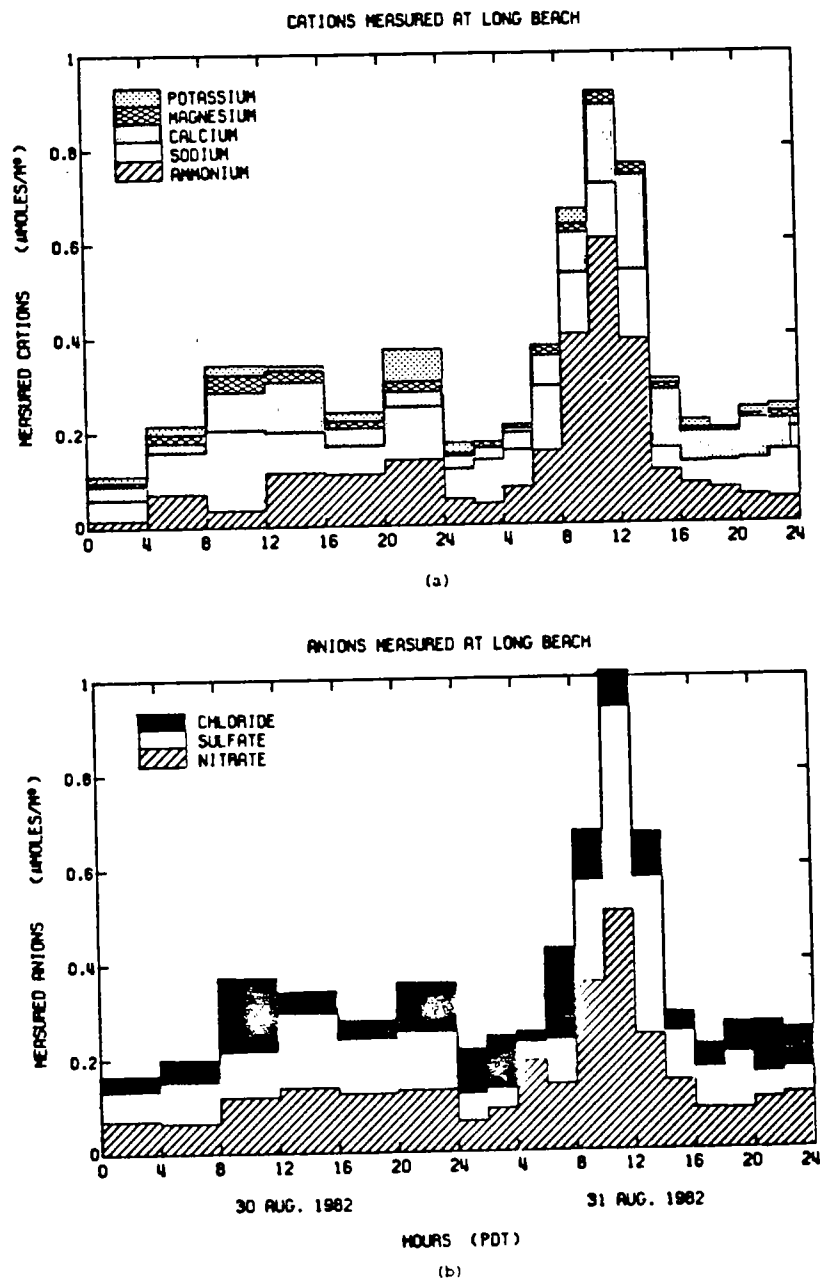


Fig. 4. Ionic species concentration at Long Beach. (a) Cations. (b) Anions.

to the aerosol samples. Na^+ usually is present in excess of Cl^- , suggesting that reaction with strong acids like H_2SO_4 or HNO_3 has displaced some of the chloride from the sea salt portion of the aerosol (Martens *et al.*, 1973; Duce, 1969; Robbins *et al.*, 1959; Hitchcock *et al.*, 1980). The ion balance is good in spite of the fact that CO_3^{2-} , OH^- and H^+ concentrations were not measured. Previous studies in the SCAB show the presence of very low carbonate carbon levels in the aerosol (Mueller *et al.*, 1972). Large amounts of hydrogen ion would not be expected because of the great excess of ammonia present during this experiment.

The composition of the aerosol observed inland at Riverside is shown in Fig. 5. The largest contributors to the ionic material are NH_4^+ and NO_3^- , but noticeable amounts of K^+ , Mg^{2+} , Ca^{2+} , Na^+ and Cl^- also are found. Note that Cl^- arrives with the aerosol between 1600 and 1800 hours on 31 August near the time of arrival of the trajectory from Long Beach discussed previously. The important point to note from these ion balances is that the ionic material in the actual aerosol is much more complex than the mixed sulfate, nitrate and ammonium salts that can be described by present theoretical models for the equilibrium between NH_3 , HNO_3 and the aerosol phase.

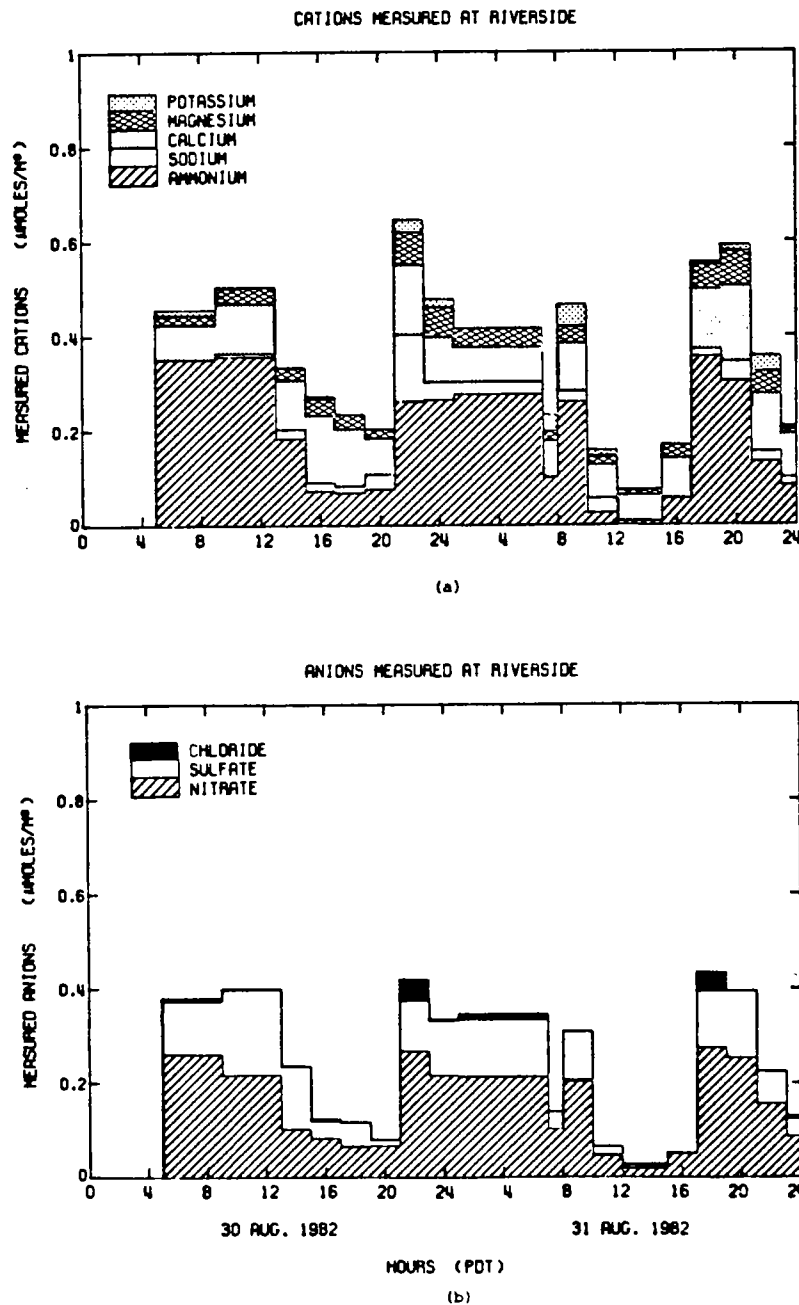


Fig. 5. Ionic species concentration at Riverside. (a) Cations. (b) Anions.

Gas phase HNO_3 concentrations are compared to aerosol NO_3^- at the polluted near-coastal sites at Long Beach and Lennox in Fig. 6. Nearly all of the inorganic nitrate is in the aerosol phase. In contrast, Fig. 7 shows that ammonia is partitioned about equally between $\text{NH}_3(\text{g})$ and aerosol NH_4^+ at Long Beach, while at Lennox ammonia gas concentrations often were quite elevated, suggesting an NH_3 source upwind of Lennox (possibly at a nearby refinery or at the nearby Hyperion sewage treatment plant).

Inland from the coast, gaseous nitric acid concentrations begin to increase in the late morning and early afternoon, due possibly to photochemical production

of HNO_3 or to volatilization of NH_4NO_3 . This can be seen in Fig. 8 at Anaheim (which is located between Long Beach and Riverside). By the time that the air parcel defined at Long Beach at 1100 hours on 31 August reaches Rubidoux between 1600 and 1800 hours, a tremendous increase in NH_3 in the air parcel has occurred [Fig. 9(b)], and most of the inorganic nitrate again is found in the aerosol phase [Fig. 9(a)]. This increase in NH_3 is consistent with estimates of the spatial distribution of NH_3 sources in the Los Angeles area given by Cass *et al.* (1982) and Russell *et al.* (1983), which shows that the largest source of NH_3 in the Los Angeles area arises from a large group of dairies and

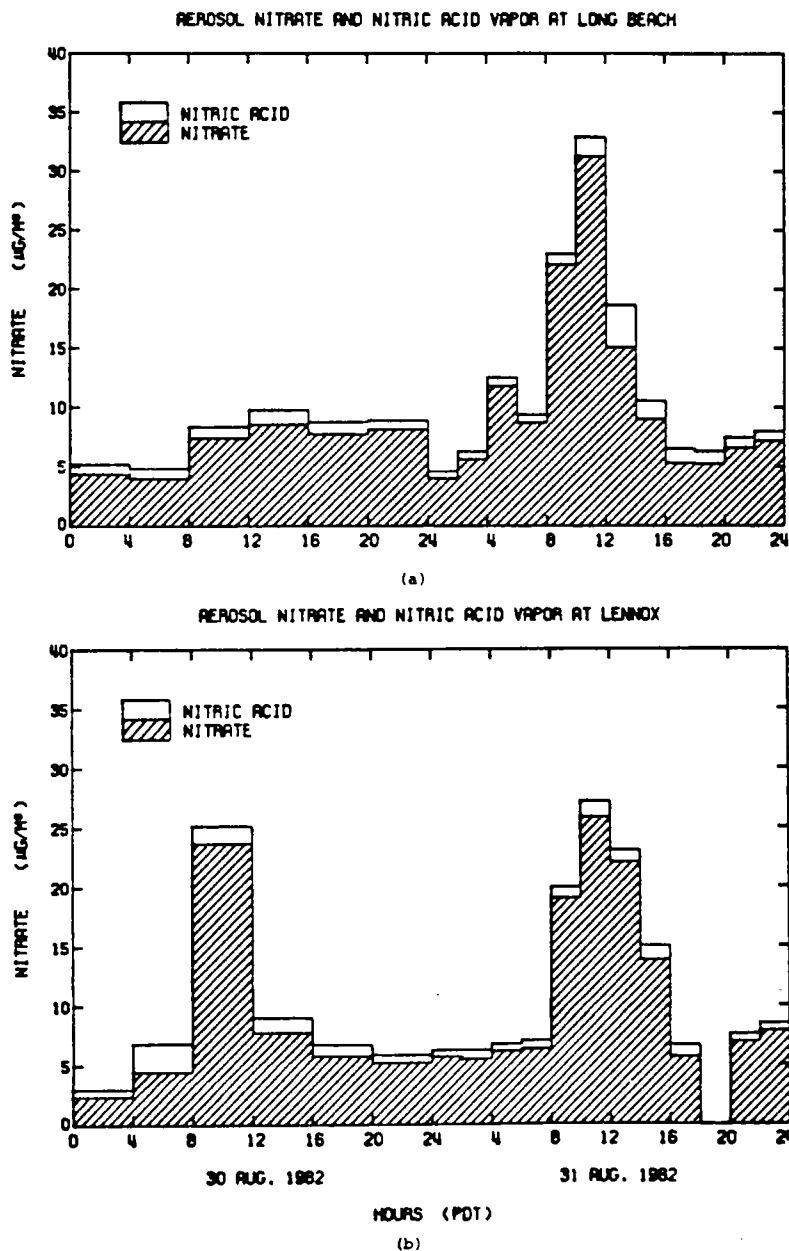


Fig. 6. Particulate nitrate and gaseous nitric acid concentrations ($\mu\text{g m}^{-3}$ as NO_3^-). (a) Long Beach. (b) Lennox.

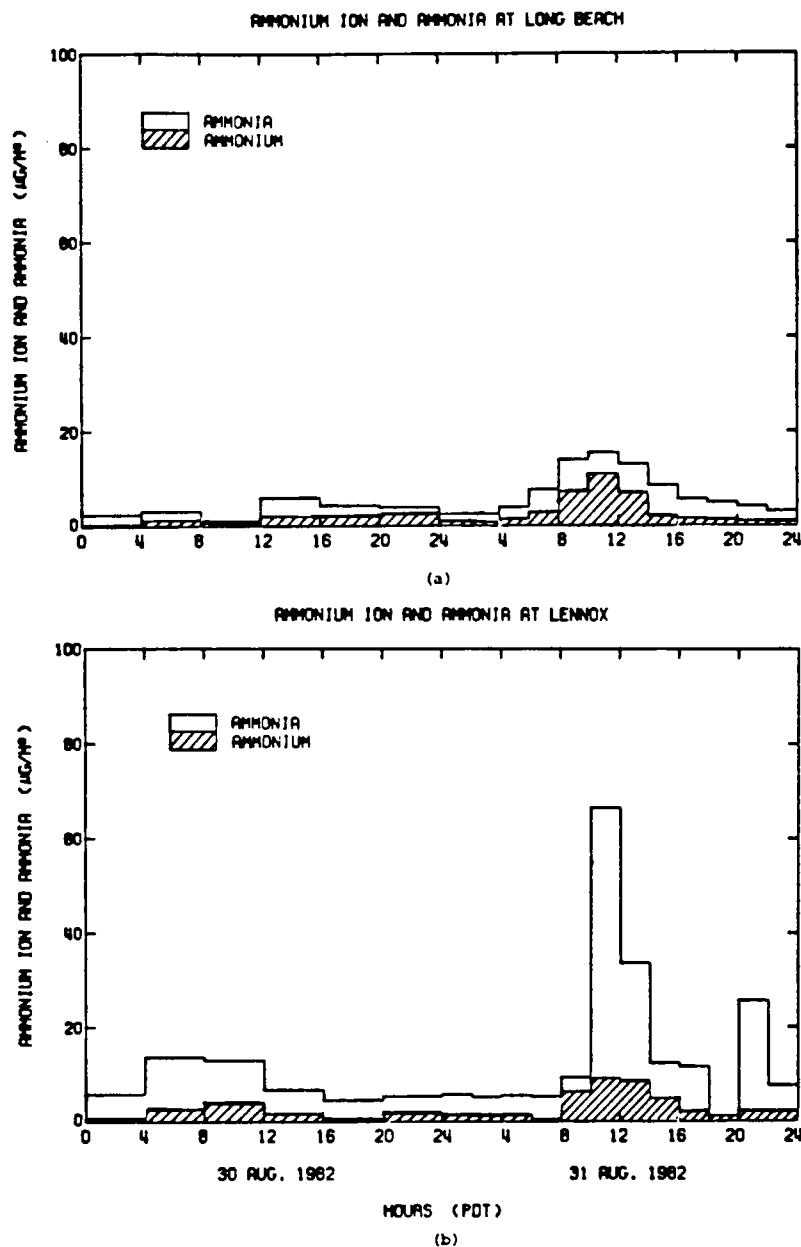


Fig. 7. Particulate ammonium and gaseous ammonia concentrations ($\mu\text{g m}^{-3}$ as NH_4^+).
(a) Long Beach. (b) Lennox.

animal husbandry operations in the Chino area just to the west of Riverside and Rubidoux.

The product of the measured concentrations of ammonia and nitric acid vapor is a key parameter that can be compared to the predictions of theoretical models for the ammonia and nitric acid concentrations expected at thermodynamic equilibrium with the aerosol phase. Nitric acid and ammonia concentration measurements were used to calculate their concentration product (CP) at each monitoring site. As seen in Fig. 10, the measured CP at Rubidoux varies from less than 20 to over 300 ppbv², and measured CP's at some monitoring sites were observed below 1 ppbv². A very

wide range of NH_3 and HNO_3 concentration product data thus have been acquired for use in verifying theoretical calculations. The hypothesis that aerosol nitrates were in equilibrium with gas phase nitric acid and ammonia during this experiment has been tested by Hildemann *et al.* (1984).

At two locations, Riverside and Pasadena, the major gaseous and aerosol species that evolve from NO_x emissions were measured. Fig. 11 shows that most of the pollutant oxides of nitrogen at these two sites were present as NO and NO_2 throughout this experiment. Only a small fractional conversion of NO emissions to HNO_3 and NH_4NO_3 is needed to explain the nitrate

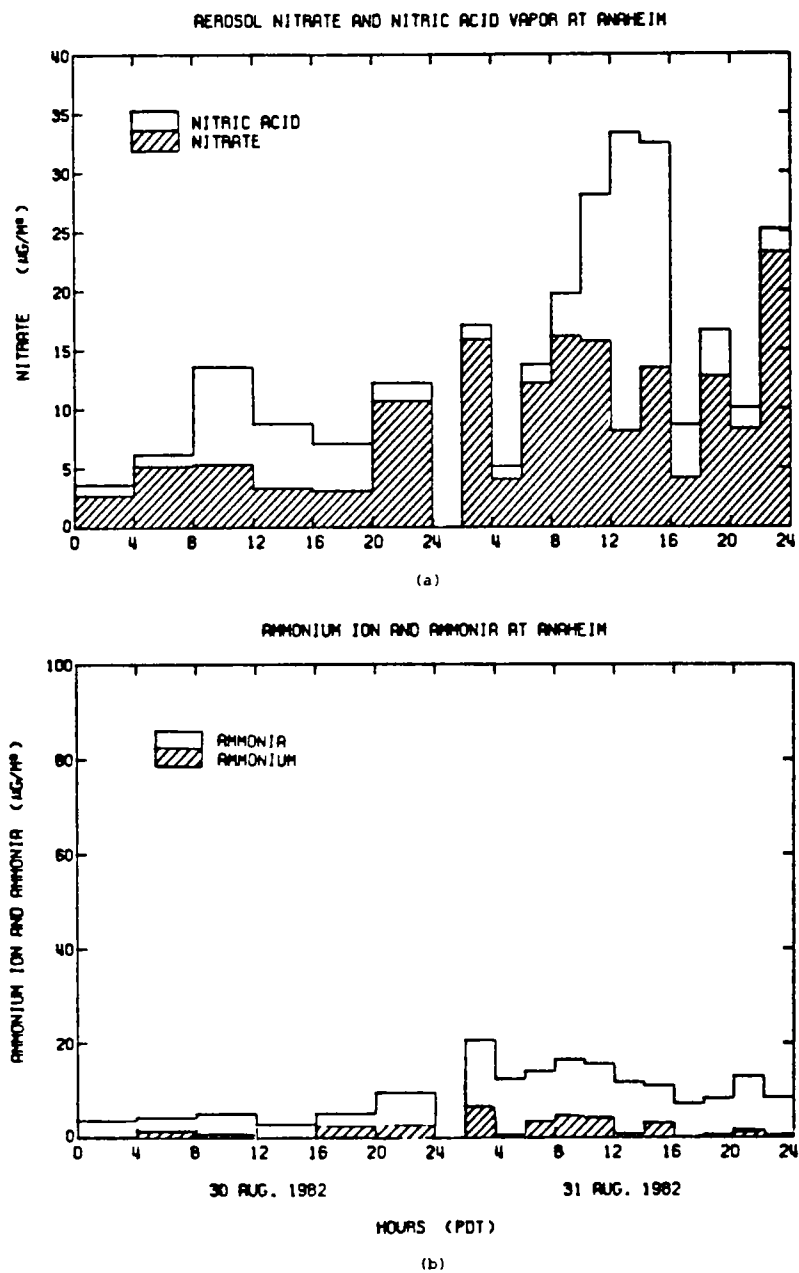


Fig. 8. (a) Particulate nitrate and gaseous nitric acid concentrations at Anaheim ($\mu\text{g m}^{-3}$ as NO_3^-). (b) Particulate ammonium and gaseous ammonia concentrations at Anaheim ($\mu\text{g m}^{-3}$ as NH_4^+).

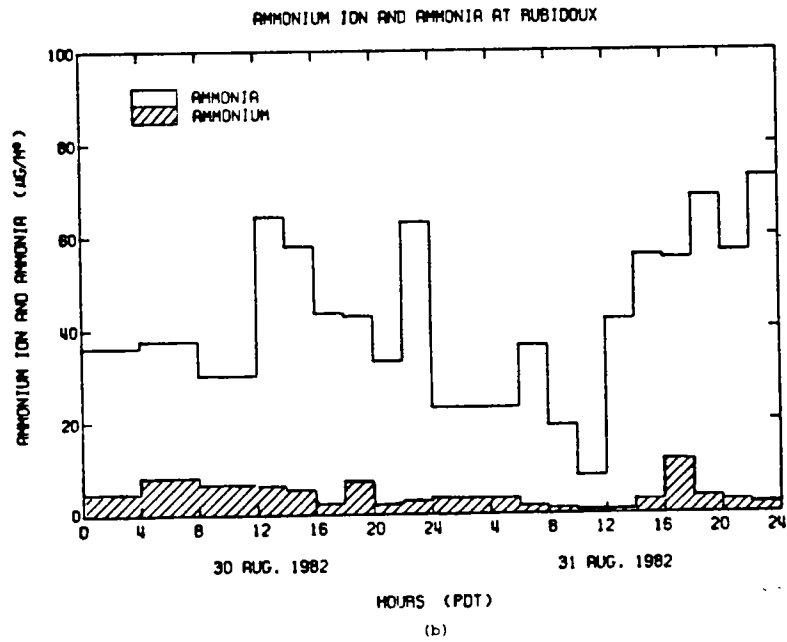
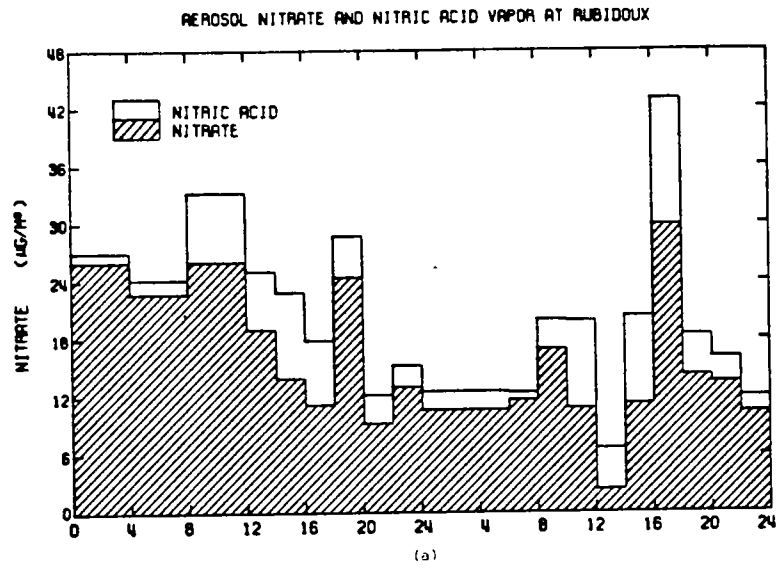


Fig. 9. (a) Particulate nitrate and gaseous nitric acid at Rubidoux ($\mu\text{g m}^{-3}$ as NO_3^-).
 (b) Particulate ammonium and gaseous ammonia concentrations at Rubidoux ($\mu\text{g m}^{-3}$ as NH_4^+).

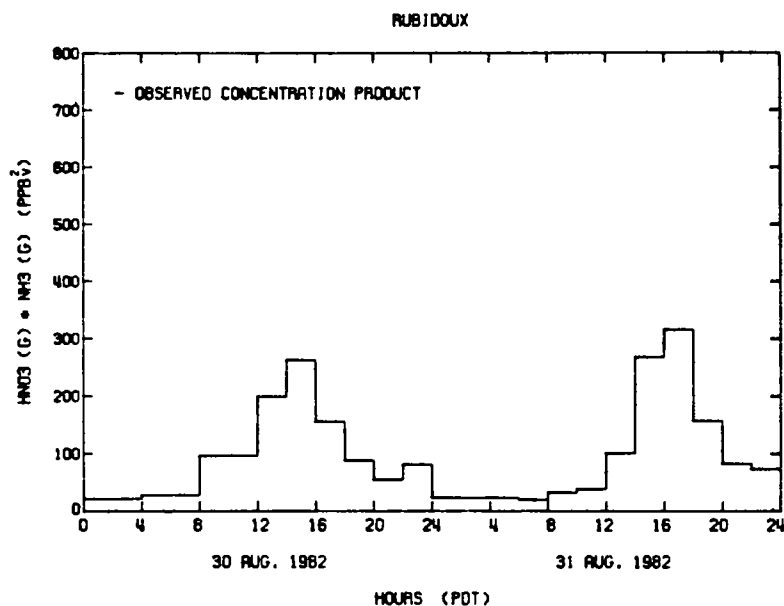


Fig. 10. Partial pressure concentration product of ammonia and nitric acid at Rubidoux.

concentrations observed. The fractional conversion of NO and NO₂ to nitrate species during this experiment is lower than observed during some other field measurement programs (Grosjean, 1983; Spicer, 1982) but this is consistent with the lower level of photochemical activity experienced during this 2-day experiment. On the days sampled, peak 1-h average O₃ concentrations exceeded 0.20 ppm at only a few monitoring sites, with the basin-wide 1-h O₃ peak within the region shown in Fig. 1 amounting to 0.26 ppm. In contrast, the O₃ concentration on the 1974 day modeled previously by Russell *et al.* (1983) exceeded 0.40 ppm with a correspondingly higher conversion of NO_x to HNO₃ and PAN.

4. CONCLUSIONS

Results from the field experiment show that the ionic material in the aerosol phase throughout the South Coast Air Basin is chemically complex. At most times, the bulk of the ionic aerosol is composed of nitrate, sulfate and ammonium ion. However there are significant amounts of Na⁺, Ca²⁺, Mg²⁺, K⁺, Cl⁻ and possibly CO₃²⁻, OH⁻ or H⁺ ions also present. The coastal nitrate-containing aerosol has a significant sea salt derived fraction, probably from the displacement of chloride by reaction with nitric acid. These multi-component aerosols are more complex than can be handled by present mathematical models for the equilibrium between HNO₃, NH₃ and a mixed sulfate, nitrate and ammonium containing aerosol.

Trajectory analysis has been used to judge the importance of transport in determining aerosol nitrate concentrations. Large amounts of nitrate were shown to accumulate in an air mass that stagnated near the coast at night. Later, this nitrate laden air mass was transported inland by the sea breeze. The time of the nitrate peak inland near Riverside coincided with the time that that nitrate laden air mass reached that area. This indicates that a description of transport characteristics as well as atmospheric chemistry is important in understanding the dynamics that govern the high nitrate levels observed in the eastern portion of the Los Angeles basin.

A nitrogen balance constructed at two locations in the Los Angeles basin shows that conversion of only a small fraction of the NO_x emissions to HNO₃ and NH₄NO₃ is sufficient to explain the aerosol nitrate and nitric acid observed. The two days studied here were both considered to have moderate smog (fairly typical of a summer day), and a correspondingly lower oxidation of NO_x to HNO₃ and PAN than would occur during an extreme air pollution episode in Los Angeles.

The data set derived from this experiment can be used in verification tests of aerosol nitrate formation models, and will challenge the predictive capability of current air quality models. The days sampled during this experiment exhibited both interesting transport patterns and evidence of chemical transformations that can be used to test both the transport and gas-to-particle conversion descriptions built into regional scale air quality models.

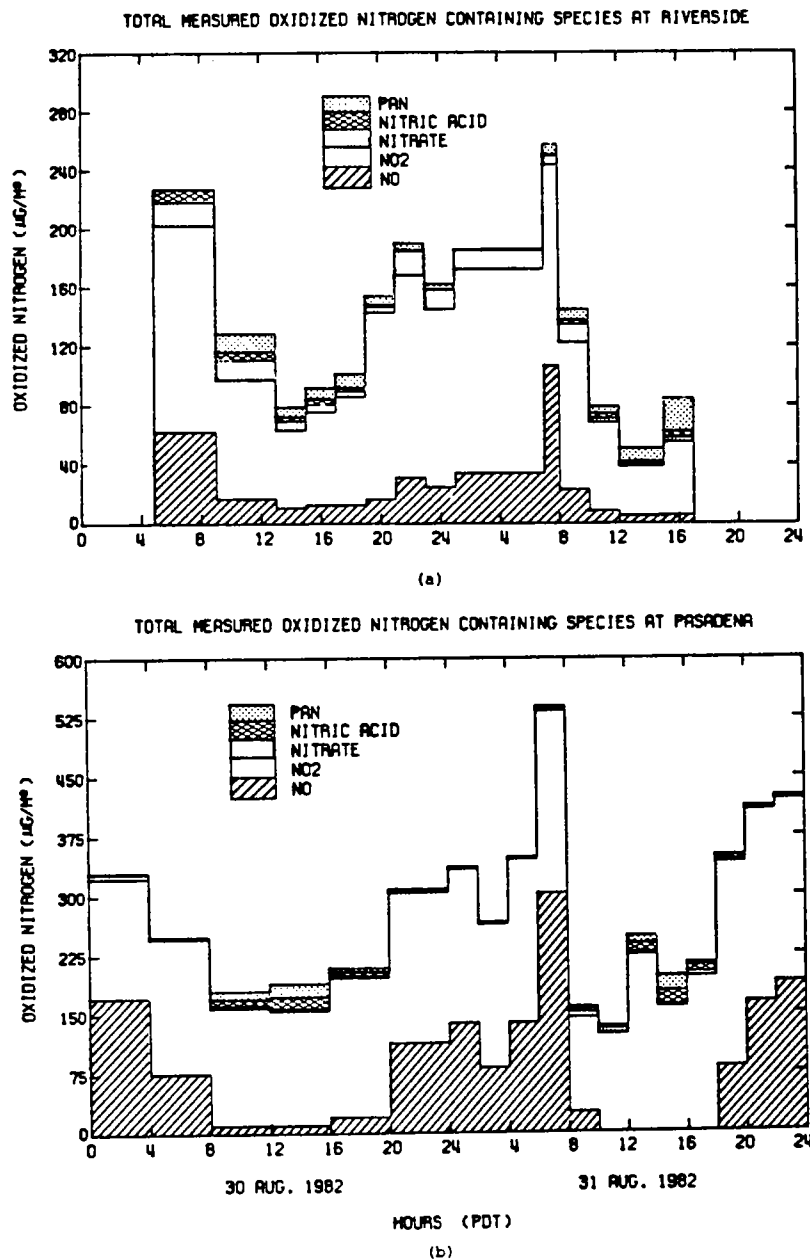


Fig. 11. Measured NO , NO_2 , HNO_3 , PAN and nitrate (in $\mu\text{g m}^{-3}$ stated as equivalent NO_3^-). (a) Pasadena. (b) Rubidoux.

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REFERENCES

- Appel B. R., Kothny E. L., Hoffer E. M., Hidy G. M. and Wesolowski J. J. (1978) Sulfate and nitrate data from the California Aerosol Characterization Experiment (ACHEX). *Envir. Sci. Technol.* **12**, 418-425.
- Appel B. R., Wall S. M., Tokiwa Y. and Haik M. (1980) Simultaneous nitric acid, particulate nitrate and acidity measurements in ambient air. *Atmospheric Environment* **14**, 549-554.
- Cadle S. H., Countess R. J. and Kelly N. A. (1980) Nitric acid and ammonia concentrations in urban and rural locations.

- Atmospheric Environment* **16**, 2501-2506.
- Cass G. R. (1979) On the relationship between sulfate air quality and visibility with examples in Los Angeles. *Atmospheric Environment* **13**, 1069-1084.
- Cass G. R., Gharib S., Peterson M. and Tilden J. W. (1982) The origin of ammonia emissions to the atmosphere in an urban area. Open File Report 82-6, Environmental Quality Laboratory, California Institute of Technology, Pasadena, CA.
- Duce R. A. (1969) On the source of gaseous chlorine in the marine atmosphere. *J. geophys. Res.* **70**, 1775-1779.
- Forrest J., Spandau D. J., Tanner R. L. and Newman L. (1982) Determination of atmospheric nitrate and nitric acid employing a diffusion denuder with a filter pack. *Atmospheric Environment* **16**, 1473-1485.
- Goodin W. R., McRae G. J. and Seinfeld J. H. (1979) A comparison of interpolation methods for sparse data: application to wind and concentration fields. *J. appl. Met.* **18**, 761-771.
- Groblicki P. J., Wolff G. T. and Countess R. J. (1981) Visibility-reducing species in the Denver "Brown Cloud"—I. Relationships between extinction and chemical composition. *Atmospheric Environment* **15**, 2473-2484.
- Grosjean D. (1983) Distribution of atmospheric nitrogenous pollutants at a Los Angeles area receptor site. *Envir. Sci. Technol.* **17**, 13-19.
- Harwood J. E. and Kuhn A. L. (1970) A colorimetric method for ammonia in natural waters. *Water Res.* **4**, 805-811.
- Hildemann L. M., Russell A. G. and Cass G. R. (1984) Ammonia and nitric acid concentrations in equilibrium with atmospheric aerosols: experiment vs theory. *Atmospheric Environment* **18**, 1737-1750.
- Hitchcock D. R., Spiller L. L., and Wilson W. E. (1980) Sulfuric acid aerosols and HCl release in coastal atmospheres: evidence of rapid transformation of sulphuric acid particulates. *Atmospheric Environment* **14**, 165-182.
- Martens C. S., Wesolowski J. J., Harriss R. C. and Kaifer R. (1973) Chlorine Loss from Puerto Rican and San Francisco Bay Area Marine Aerosols. *J. geophys. Res.* **78**, 8778-8792.
- McRae G. J. and Seinfeld J. H. (1983) Development of a second generation mathematical model for urban air pollution—II. Performance evaluation. *Atmospheric Environment* **17**, 501-523.
- Mueller P. K., Mendoza B. V., Collins J. C. and Wilgus E. S. (1978) Application of ion chromatography to the analysis of anions extracted from airborne particulate matter. In *Ion Chromatographic Analysis of Environmental Pollutants* (edited by Sawicki E., Mulik J. D. and Wittgenstein E.). Ann Arbor Science, Ann Arbor, MI.
- Mueller P. K., Mosley R. W. and Pierce L. B. (1972) Chemical composition of Pasadena aerosol by particle size and time of day. *J. Colloid Interface Sci.* **39**, 235-239.
- Robbins R. C., Cadle R. D. and Eckhardt D. L. (1959) The conversion of sodium chloride to hydrogen chloride in the atmosphere. *J. Met.* **16**, 53-56.
- Russell A. G. (1983) Analysis of oxalic acid impregnated filters for ammonia determination. Open File Report 83-1, Environmental Quality Laboratory, California Institute of Technology, Pasadena, CA.
- Russell A. G. and Cass G. R. (1983) Nitric acid, ammonia and atmospheric particulate matter concentrations in the South Coast Air Basin, 30-31 August 1982. Open File Report 83-3, Environmental Quality Laboratory, California Institute of Technology, Pasadena, CA.
- Russell A. G., McRae G. J. and Cass G. R. (1983) Mathematical modeling of the formation and transport of ammonium nitrate aerosol. *Atmospheric Environment* **17**, 949-964.
- Salorzano L. (1967) Determination of ammonia in natural waters by the phenolhypochlorite method. *Limnol Oceanogr.* **14**, 799-801.
- Spicer C. W. (1982) The distribution of oxidized nitrogen in urban air. *Sci. Tot. Envir.* **24**, 183-192.
- Spicer C. W., Howes J. E., Bishop T. A., Arnold L. H. and Stevens R. K. (1982) Nitric acid measurement methods: an intercomparison. *Atmospheric Environment* **16**, 1407-1500.
- Spicer C. W. and Schumacher P. M. (1979) Particulate nitrate: laboratory and field studies of major sampling interferences. *Atmospheric Environment* **13**, 543-552.
- Stelson A. W. and Seinfeld J. H. (1982a) Relative humidity and temperature dependence of the ammonium nitrate dissociation constant. *Atmospheric Environment* **16**, 983-992.
- Stelson A. W. and Seinfeld J. H. (1982b) Relative humidity and pH dependence of the vapor pressure of ammonium nitrate-nitric acid solutions at 25°C. *Atmospheric Environment* **16**, 993-1000.
- Strand S. R. (1983) Aerosol losses in diffusion denuders. Laboratory report, California Institute of Technology, Pasadena, CA.
- U.S. Environmental Protection Agency (1973) Directory of Air Quality Monitoring Sites—1972. Document EPA-450/2-73-006, U.S. Environmental Protection Agency, Research Triangle Park, NC.
- U.S. Environmental Protection Agency (1978) Directory of Air Quality Monitoring Sites Active in 1977. Document EPA-450/2-78-048, U.S. Environmental Protection Agency, Research Triangle Park, NC.
- Varian (1975) Instruction Manual for Model AA-6 Atomic Absorption Spectrophotometer. Varian Techtron, Melbourne, Australia.
- White W. H. and Roberts P. T. (1977) On the nature and origins of visibility reducing species in the Los Angeles Basin. *Atmospheric Environment* **11**, 803-812.
- Yoong M. (1981) Measurement of ambient ammonia concentrations in southern California. Rockwell International, Newbury Park, CA. Final Report to the California Air Resources Board under Contract No. A7-188-30. To be available from NTIS.