

Tekran Speciated Mercury Monitoring in New York and New Jersey

1135 Particulate Unit Pyrolysis Unit

Quartz Filter and Pyrolyzer (Quartz Chips)

50⁰ Collection – 650⁰ Desorption

1130 Reactive Gas Unit

Glass Denuder

50⁰ Collection – 500⁰ Desorption

Heated Inlet

Glass with size selective impactor (frit)

50⁰ Collection – 75⁰ Desorption

Heated Transfer Line

Maintained at 50⁰ C.

Stand not included



Computer with Serial Stream Capture

Instrument has no data logging capability

Argon Carrier Gas 99.999% Pure

Cylinder should not be used for He

Gold Trap Required

1130 Controller

Instrument Can't control sequence

2537A Analyzer

Elemental Vapor Analyzer

Two Gold Cartridges allow cont. Sampling

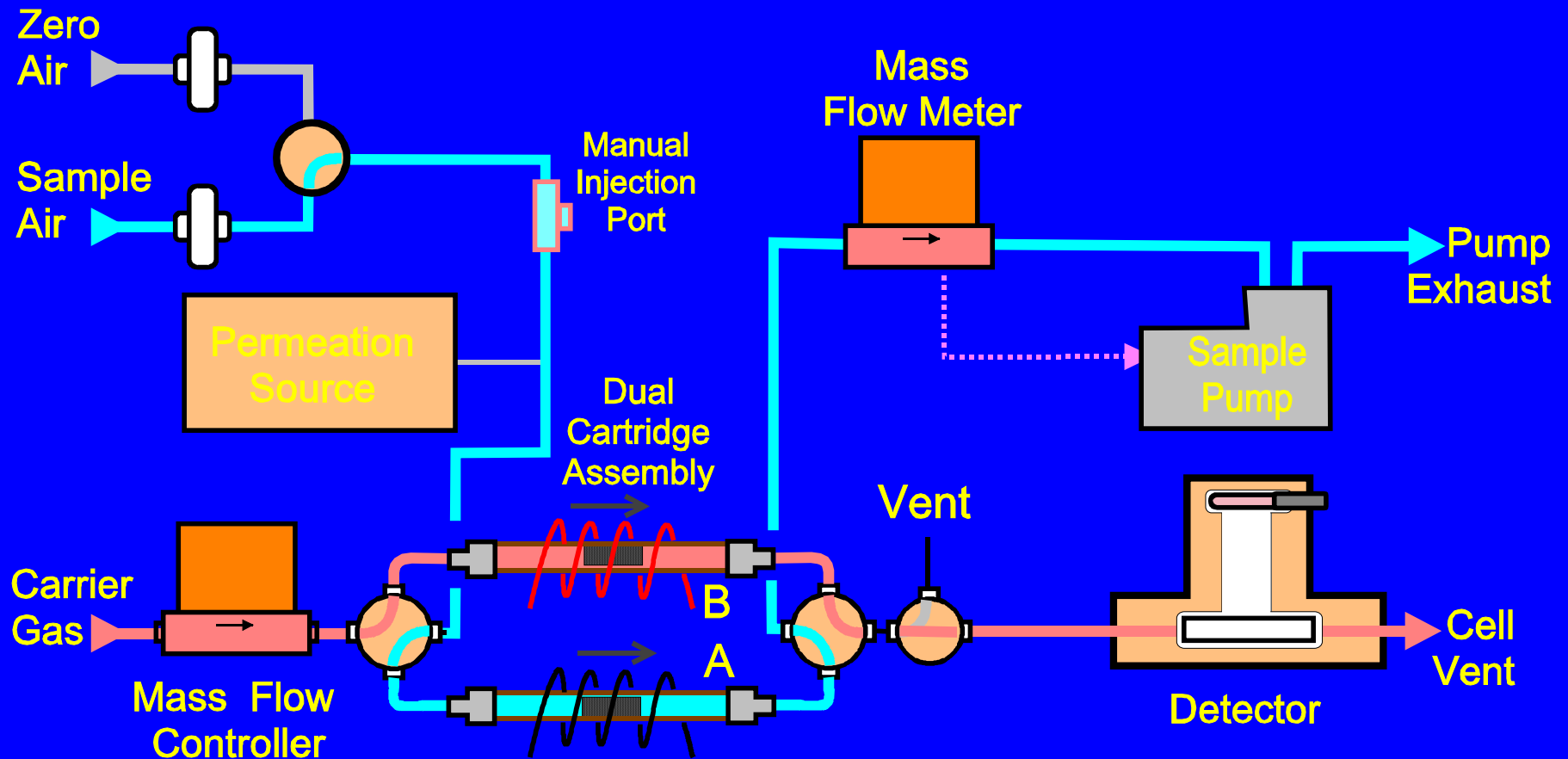
1130 Pump Module for Speciation Unit

9 L/m Required for Species Collection

Provides Zero air for Desorption Cycle



Flow Diagram of Model 2537A



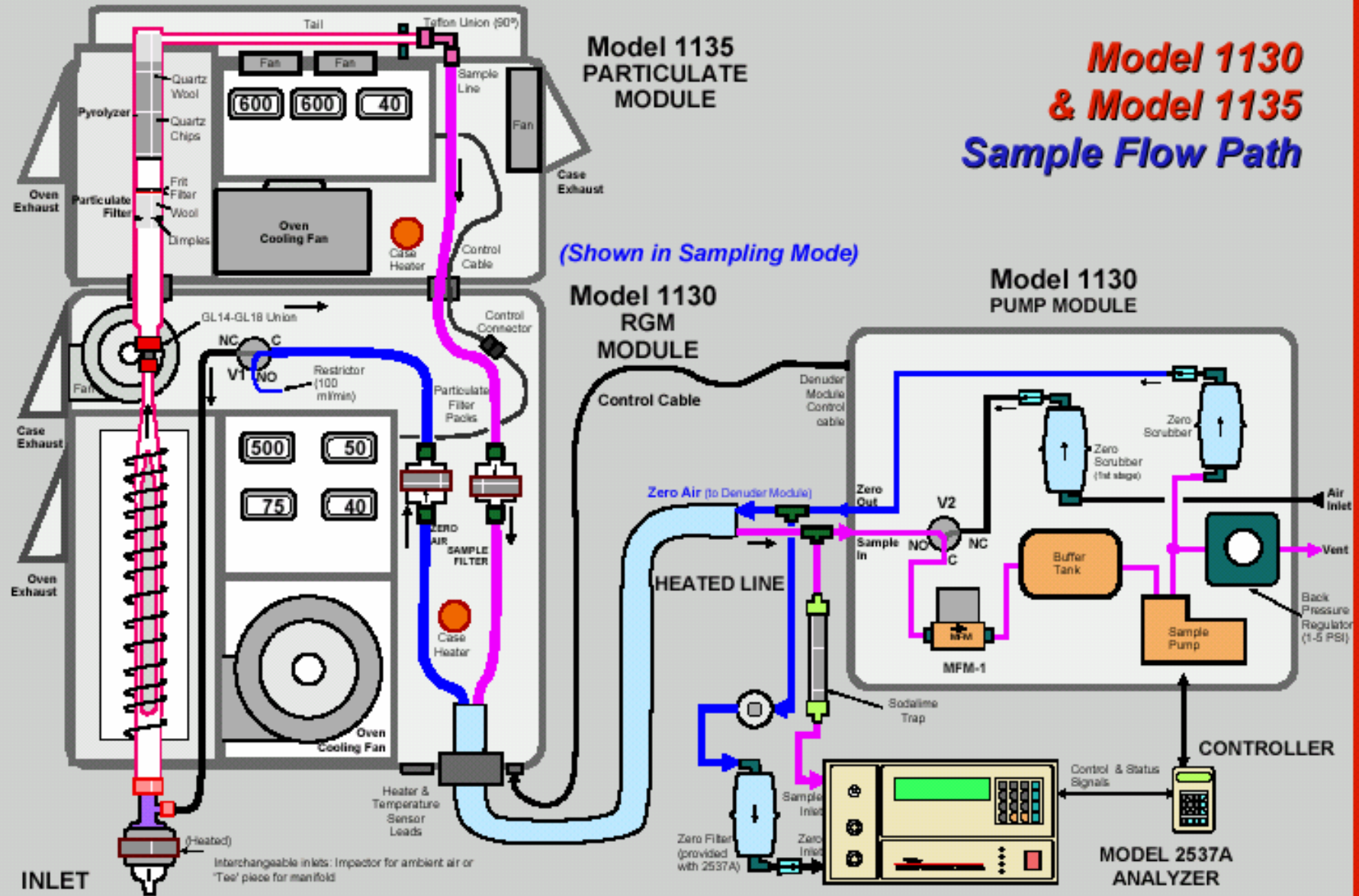
Model 1130 & Model 1135 Sample Flow Path

Model 1135 PARTICULATE MODULE

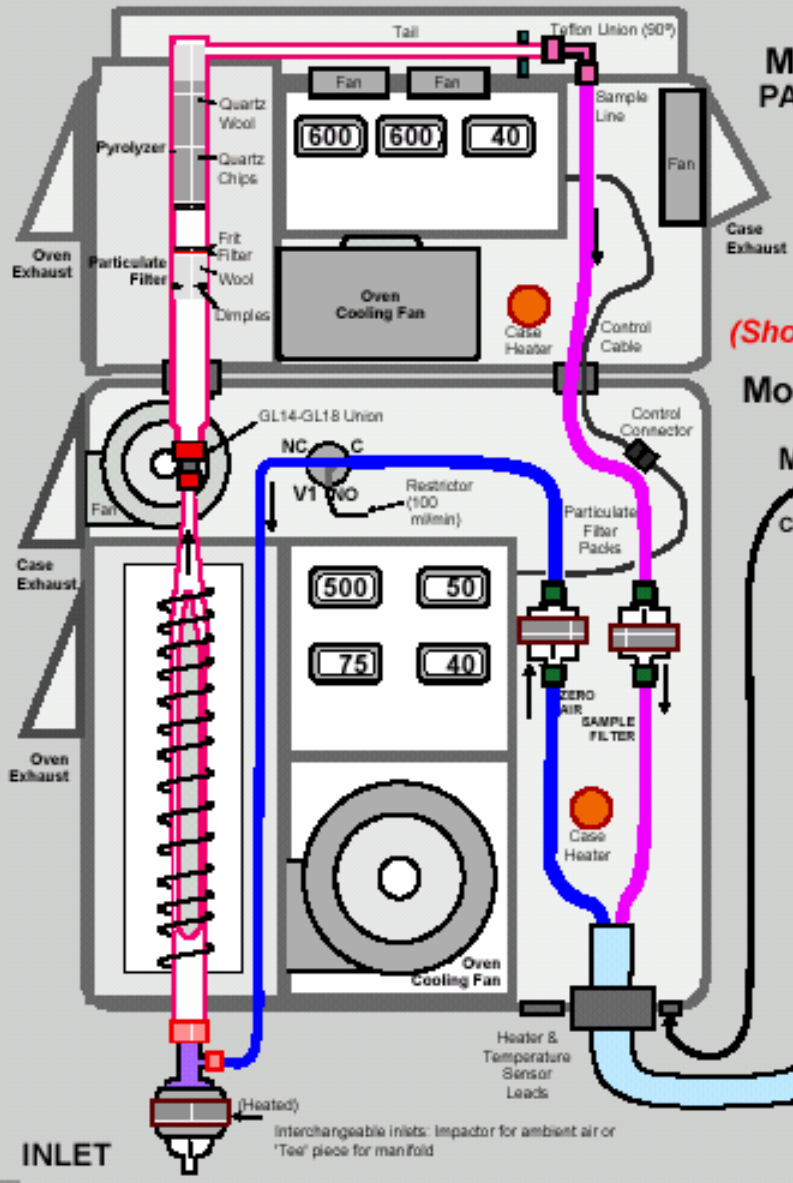
(Shown in Sampling Mode)

Model 1130 RGM MODULE

Model 1130 PUMP MODULE

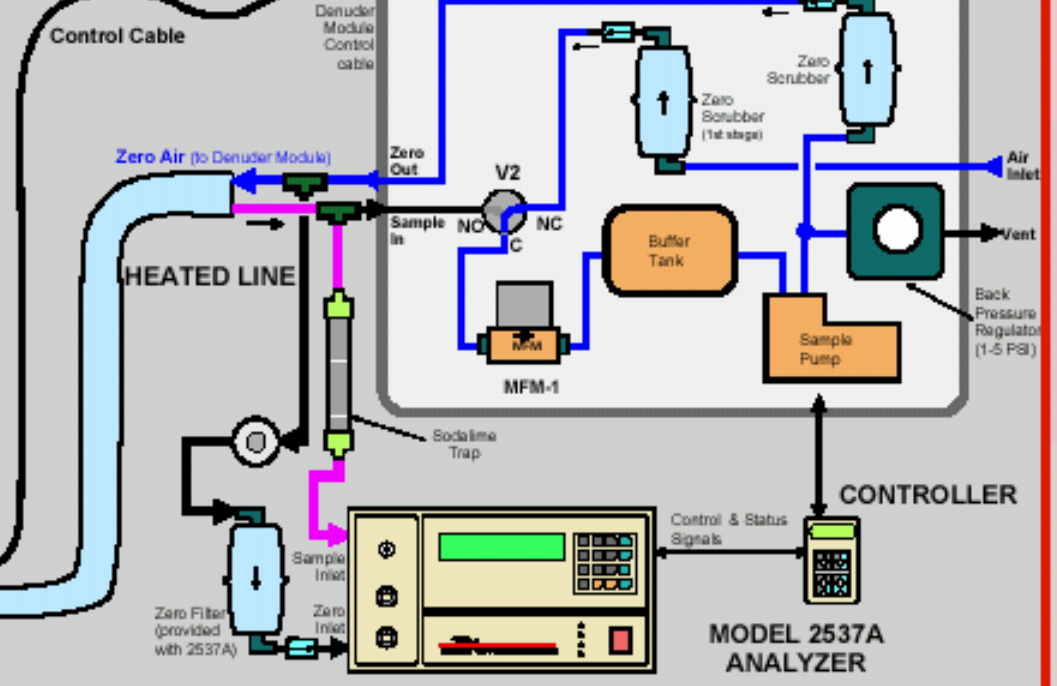


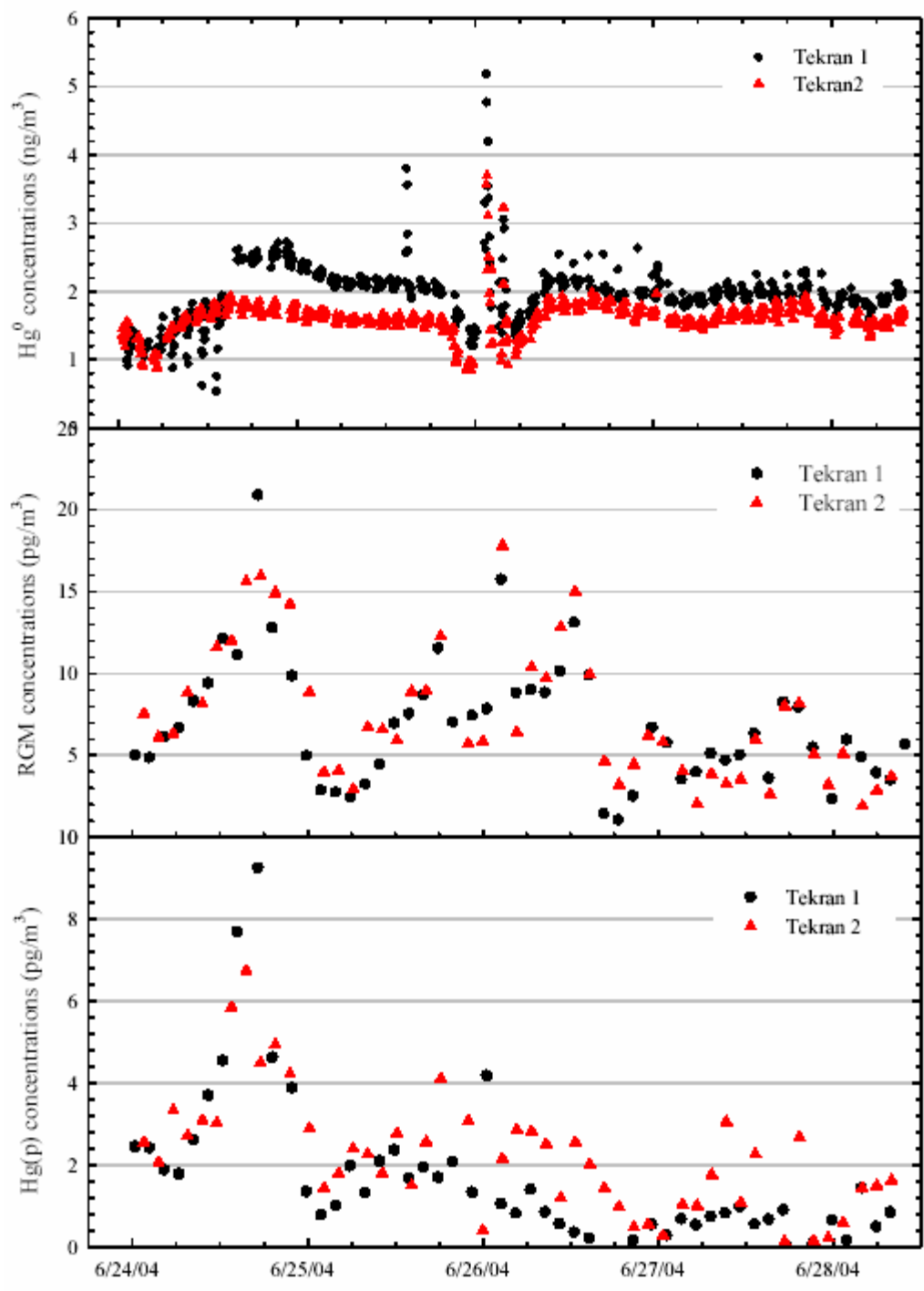
Model 1130 & Model 1135 Desorption Flow Path

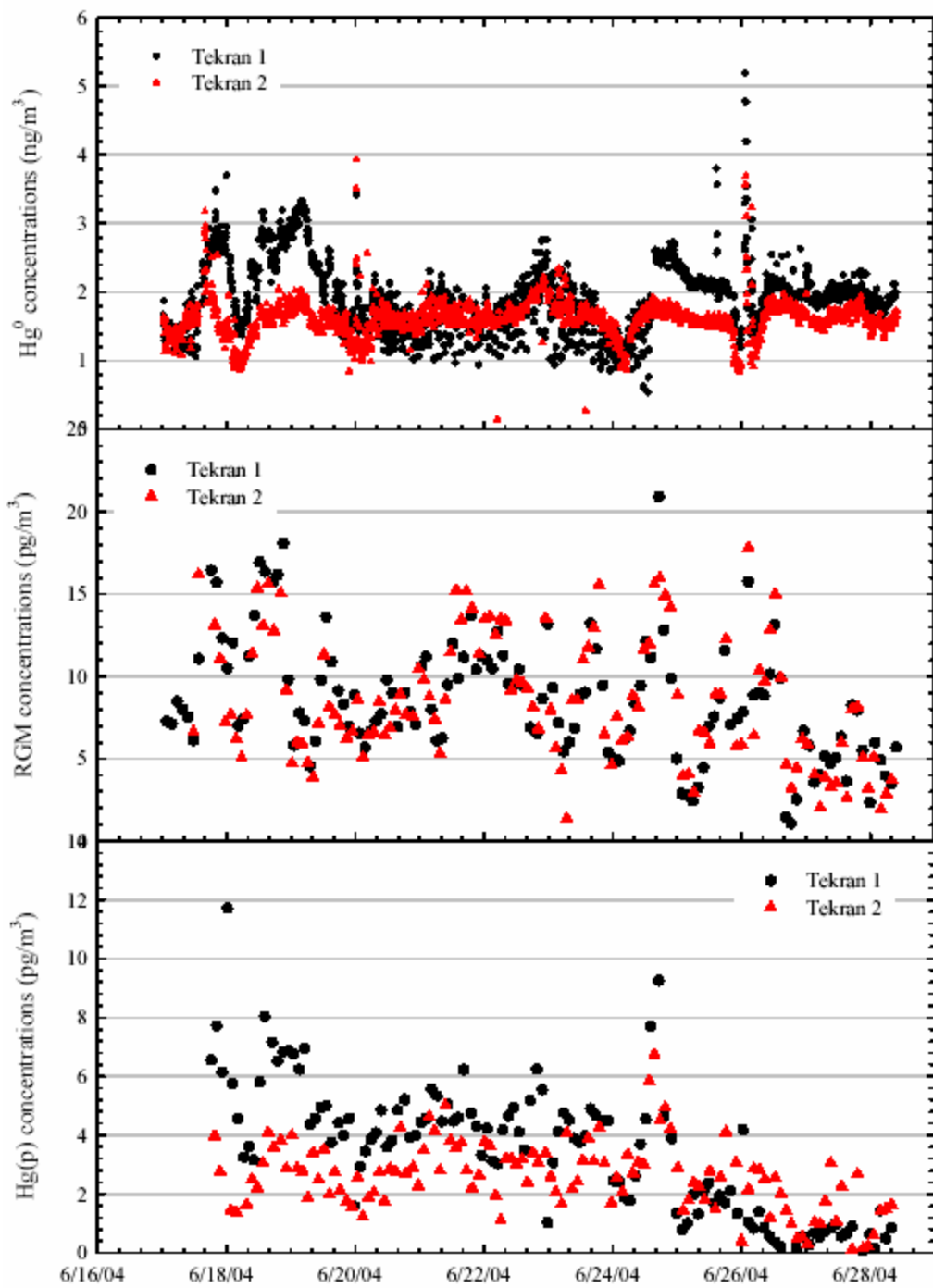


(Shown in Desorption Mode)

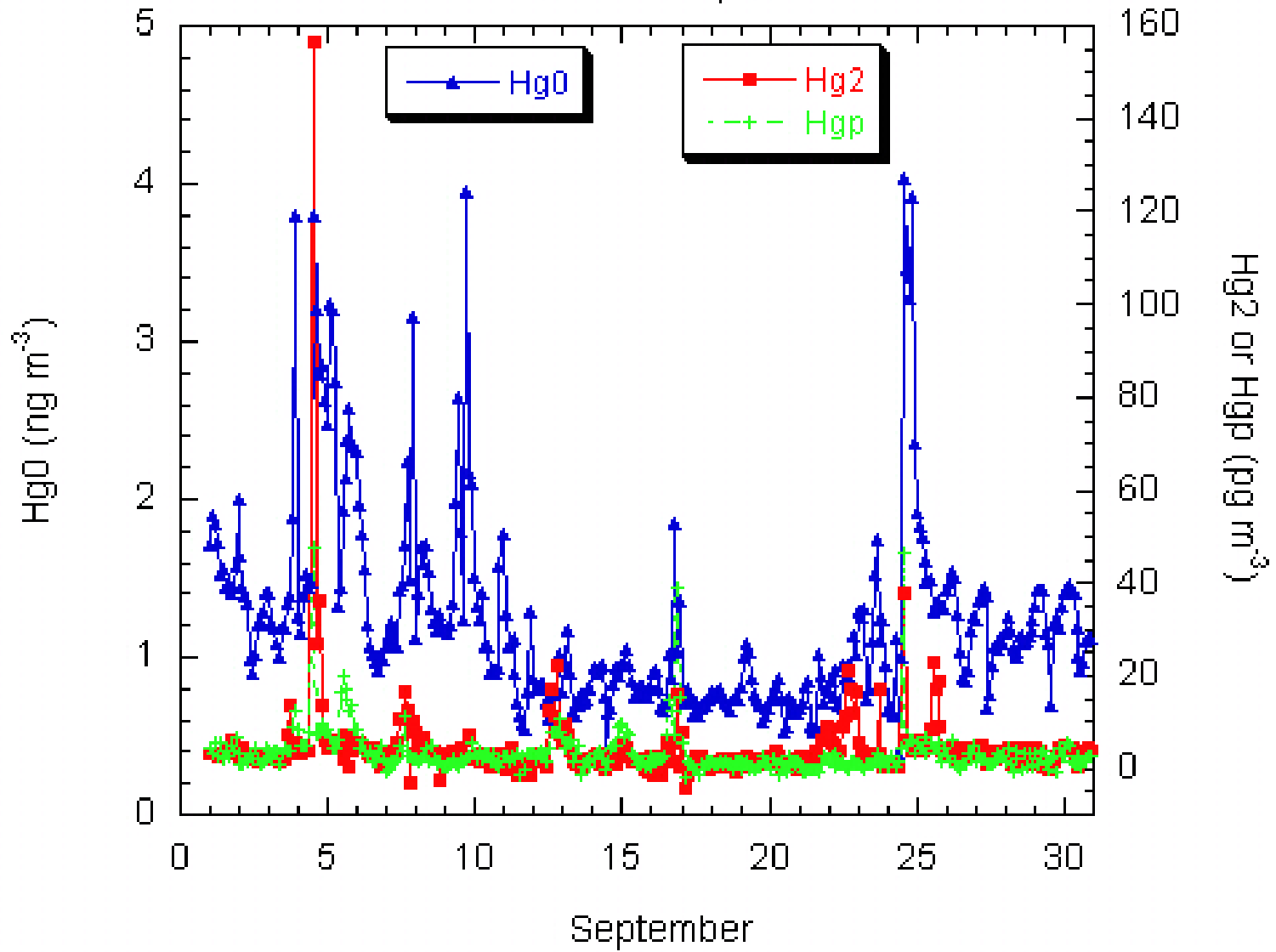
Model 1130 RGM MODULE







September 2004
Rochester, NY



RUN LOG

Date	Time	Typ	C	Stat	AdTim	Vol	Bl	BlDev	MaxV	Area	ng/m3	
00-04-17	04:33:40	CLN	A	NP	0	0	.00	0.206	.043	.000	0	0.000
00-04-17	04:37:14	CLN	B	NP	0	213	5.40	0.206	.071	.000	0	0.000
00-04-17	04:40:00	CONT	A	OK	0	300	7.48	0.206	.048	0.227	76760	1.769
00-04-17	04:45:00	CONT	B	OK	0	300	7.50	0.206	.056	0.227	77496	1.788
00-04-17	04:50:00	CONT	A	OK	0	300	7.50	0.206	.058	0.229	84351	1.938
00-04-17	04:55:00	CONT	B	OK	0	300	7.50	0.207	.047	0.230	87169	2.011
00-04-17	05:00:00	CONT	A	OK	0	300	7.50	0.207	.060	0.230	87586	2.012
00-04-17	05:05:00	CONT	B	OK	0	300	7.50	0.207	.057	0.230	85937	1.982
00-04-17	05:10:00	CONT	A	OK	0	300	7.50	0.207	.060	0.230	85297	1.959
00-04-17	05:15:00	CONT	B	OK	0	300	7.50	0.207	.049	0.230	85563	1.974
00-04-17	05:20:00	CONT	A	OK	0	300	7.50	0.207	.057	0.230	89695	2.060
00-04-17	05:25:00	CONT	B	OK	0	300	7.50	0.207	.052	0.231	87471	2.019
00-04-17	05:30:00	CONT	A	OK	0	300	7.50	0.207	.051	0.230	85708	1.969
00-04-17	05:35:00	CONT	B	OK	0	300	7.50	0.207	.055	0.230	86857	2.004
00-04-17	05:40:00	CONT	A	OK	0	300	7.50	0.207	.062	0.230	86674	1.991
00-04-17	05:45:00	CONT	B	OK	0	300	7.50	0.207	.063	0.231	91828	2.118
00-04-17	05:50:00	CONT	A	OK	0	300	7.50	0.207	.041	0.232	92522	2.125
00-04-17	05:55:00	CONT	B	OK	0	300	7.50	0.207	.062	0.232	92161	2.126
00-04-17	06:00:00	CONT	A	OK	0	300	7.50	0.207	.056	0.233	93876	2.156
00-04-17	06:05:00	CONT	B	OK	0	300	7.50	0.207	.055	0.233	97206	2.242
00-04-17	06:10:00	CONT	A	OK	0	300	7.50	0.207	.037	0.232	93221	2.141
00-04-17	06:15:00	CONT	B	OK	0	300	7.50	0.207	.068	0.231	88069	2.032
00-04-17	06:20:00	CONT	A	OK	0	300	7.50	0.207	.053	0.231	89700	2.060
00-04-17	06:25:00	CONT	B	OK	0	300	7.50	0.207	.036	0.233	96458	2.225
00-04-17	06:30:00	CONT	A	OK	0	300	7.50	0.207	.054	0.233	98391	2.260

Speciation Output Format

Input File: D:\TEKRAN\TRAINING\1135.DAT

Output File: D:\TEKRAN\TRAINING\1135.col

Number of columns= 4

Column 1 Field: ng/m3 Cart: AB Status: 0
 Column 2 Field: ng/m3 Cart: AB Status: 1
 Column 3 Field: ng/m3 Cart: AB Status: 2
 Column 4 Field: ng/m3 Cart: AB Status: 3

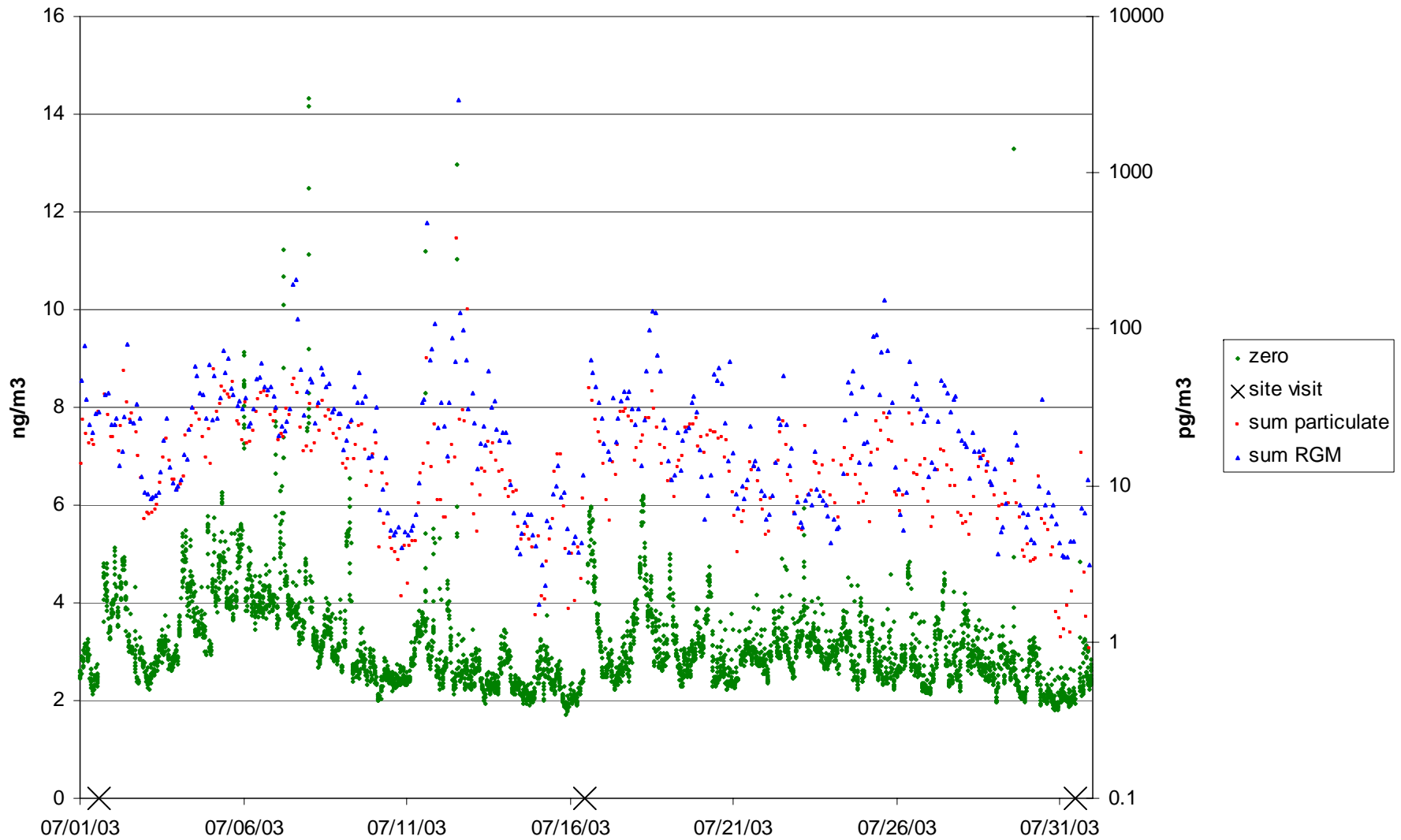
Hg ⁰	Blank	HgP	RGM
ng/m ³	pg/m ³	pg/m ³	pg/m ³

Date	Time	Typ	C	Stat	AdTim	Vol	Bl	BlDev	MaxV	Area	ng/m3	Column1	Column2	Column3	Column4
01-10-01	00:55:01	CONT	A	OK	0	300	6.25	0.107	.036	0.165	203582	5.606	5.606		
01-10-01	01:00:01	CONT	B	OK	0	300	6.25	0.107	.053	0.166	204356	5.622	5.622		
01-10-01	01:05:01	CONT	A	OK	0	300	6.25	0.107	.041	0.165	200855	5.530	5.530		
01-10-01	01:10:01	CONT	B	OK	0	300	6.25	0.107	.044	0.166	202105	5.561	5.561		
01-10-01	01:15:01	CONT	A	OK	0	300	6.25	0.108	.037	0.165	201903	5.560	5.560		
01-10-01	01:20:01	CONT	B	OKF	1	300	6.26	0.108	.024	0.112	13488	2.892		2.892	
01-10-01	01:25:01	CONT	A	NPF	1	300	6.25	0.108	.049	.000	0	.000		.000	
01-10-01	01:30:01	CONT	B	OKF	1	300	6.25	0.108	.029	0.108	1438	0.309		0.309	
01-10-01	01:35:01	CONT	A	OKF	2	300	6.25	0.108	.029	0.109	5205	1.120			1.120
01-10-01	01:40:01	CONT	B	OKF	2	300	6.25	0.108	.042	0.119	41463	8.914			8.914
01-10-01	01:45:01	CONT	A	OKF	2	300	6.25	0.107	.040	0.109	5696	1.226			1.226
01-10-01	01:50:01	CONT	B	OKF	2	300	6.25	0.108	.023	0.109	4865	1.046			1.046
01-10-01	01:55:01	CONT	A	OKF	3	300	6.25	0.108	.021	0.144	126103	27.124			27.124
01-10-01	02:00:01	CONT	B	OKF	3	300	6.25	0.108	.053	0.116	26556	5.709			5.709
01-10-01	02:05:01	CONT	A	OKF	3	300	6.25	0.105	.082	0.108	9549	2.054			2.054
01-10-01	02:10:01	CONT	B	OKF	1	300	6.25	0.105	.026	0.106	2561	0.550		0.550	
01-10-01	02:15:01	CONT	A	NPF	1	300	6.25	0.107	.037	.000	0	.000		.000	
01-10-01	02:20:01	CONT	B	OK	0	300	6.23	0.108	.050	0.165	197747	5.455	5.455		
01-10-01	02:25:01	CONT	A	OK	0	300	6.25	0.108	.025	0.165	198108	5.456	5.456		
01-10-01	02:30:01	CONT	B	OK	0	300	6.25	0.108	.047	0.165	199661	5.493	5.493		
01-10-01	02:35:01	CONT	A	OK	0	300	6.25	0.108	.032	0.164	198080	5.455	5.455		
01-10-01	02:40:01	CONT	B	OK	0	300	6.25	0.108	.063	0.165	197029	5.419	5.419		
01-10-01	02:45:01	CONT	A	OK	0	300	6.25	0.108	.043	0.164	194434	5.355	5.355		
01-10-01	02:50:01	CONT	B	OK	0	300	6.25	0.108	.032	0.164	196977	5.419	5.419		
01-10-01	02:55:01	CONT	A	OK	0	300	6.25	0.108	.024	0.164	195478	5.384	5.384		
01-10-01	03:00:01	CONT	B	OK	0	300	6.25	0.108	.052	0.165	198595	5.464	5.464		
01-10-01	03:05:01	CONT	A	OK	0	300	6.25	0.108	.041	0.163	193697	5.335	5.335		
01-10-01	03:10:01	CONT	B	OK	0	300	6.25	0.108	.064	0.164	194459	5.350	5.350		
01-10-01	03:15:01	CONT	A	OK	0	300	6.25	0.108	.037	0.164	194536	5.357	5.357		

04-04-20	02:45:01	CONT B NPF	1	300	5.00	0.169	.027	.000	0	.000
04-04-20	02:50:01	CONT A NPF	1	300	4.99	0.169	.045	.000	0	.000
04-04-20	02:55:01	CONT B NPF	1	300	4.99	0.169	.032	.000	0	.000
04-04-20	03:00:01	CONT A NPF	2	300	4.99	0.169	.028	.000	0	.000
04-04-20	03:05:01	CONT B OKF	2	300	4.99	0.169	.037	0.170	2031	3.250
04-04-20	03:10:01	CONT A NPF	2	300	4.99	0.169	.030	.000	0	.000
04-04-20	03:15:01	CONT B NPF	2	300	4.99	0.169	.028	.000	0	.000
04-04-20	03:20:01	CONT A OKF	3	300	4.99	0.169	.037	0.176	25784	37.808
04-04-20	03:25:01	CONT B NPF	3	300	4.99	0.169	.023	.000	0	.000
04-04-20	03:30:01	CONT A NPF	3	300	4.99	0.169	.037	.000	0	.000
04-04-20	03:35:01	CONT B NPF	1	300	4.99	0.169	.026	.000	0	.000
04-04-20	03:40:01	CONT A NPF	1	300	4.99	0.169	.028	.000	0	.000
04-04-20	03:45:01	CONT B OK	0	300	4.99	0.169	.025	0.174	15228	2.927
04-04-20	03:50:01	CONT A OK	0	300	4.99	0.169	.027	0.173	13571	2.388
04-04-20	03:55:01	CONT B OK	0	300	4.99	0.169	.028	0.173	14552	2.793
04-04-20	04:00:01	CONT A OK	0	300	4.99	0.169	.030	0.173	11372	2.001
04-04-20	04:05:01	CONT B OK	0	300	4.99	0.169	.033	0.173	13089	2.513
04-04-20	04:10:01	CONT A OK	0	300	4.99	0.169	.029	0.173	12017	2.114
04-04-20	04:15:01	CONT B OK	0	300	4.99	0.169	.032	0.173	12289	2.360
04-04-20	04:20:01	CONT A OK	0	300	4.99	0.169	.030	0.173	11468	2.017
04-04-20	04:25:01	CONT B OK	0	300	4.99	0.169	.027	0.173	11745	2.255
04-04-20	04:30:01	CONT A OK	0	300	4.99	0.169	.024	0.173	11096	1.952
04-04-20	04:35:01	CONT B OK	0	300	4.99	0.169	.029	0.173	12581	2.416
04-04-20	04:40:01	CONT A OK	0	300	4.99	0.169	.027	0.173	11592	2.040
04-04-20	04:45:01	CONT B NPF	1	300	5.00	0.169	.036	.000	0	.000
04-04-20	04:50:01	CONT A NPF	1	300	4.99	0.169	.023	.000	0	.000
04-04-20	04:55:01	CONT B NPF	1	300	4.99	0.169	.032	.000	0	.000
04-04-20	05:00:01	CONT A NPF	2	300	4.99	0.169	.033	.000	0	.000
04-04-20	05:05:01	CONT B OKF	2	300	4.99	0.169	.027	0.171	5022	8.035
04-04-20	05:10:01	CONT A NPF	2	300	4.99	0.169	.032	.000	0	.000
04-04-20	05:15:01	CONT B NPF	2	300	4.99	0.169	.040	.000	0	.000
04-04-20	05:20:01	CONT A OKF	3	300	4.99	0.169	.024	0.180	44300	64.976
04-04-20	05:25:01	CONT B NPF	3	300	4.99	0.169	.033	.000	0	.000
04-04-20	05:30:01	CONT A NPF	3	300	4.99	0.169	.027	.000	0	.000
04-04-20	05:35:01	CONT B NPF	1	300	4.99	0.169	.032	.000	0	.000
04-04-20	05:40:01	CONT A NPF	1	300	4.99	0.169	.034	.000	0	.000

Date	Time	Typ	C	Stat	AdTim	Vol	BI	BIDev	MaxV	Area	ng/m3	zero	blank	part	RGM
04/04/20	2:45	CONT	B	NPF	1	300	5	0.169	0.027	0	0	0	0		
04/04/20	2:50	CONT	A	NPF	1	300	4.99	0.169	0.045	0	0	0	0		
04/04/20	2:55	CONT	B	NPF	1	300	4.99	0.169	0.032	0	0	0	0		
04/04/20	3:00	CONT	A	NPF	2	300	4.99	0.169	0.028	0	0	0		0	
04/04/20	3:05	CONT	B	OKF	2	300	4.99	0.169	0.037	0.17	2031	3.25		3.25	
04/04/20	3:10	CONT	A	NPF	2	300	4.99	0.169	0.03	0	0	0		0	
04/04/20	3:15	CONT	B	NPF	2	300	4.99	0.169	0.028	0	0	0		0	
04/04/20	3:20	CONT	A	OKF	3	300	4.99	0.169	0.037	0.176	25784	37.808			37.808
04/04/20	3:25	CONT	B	NPF	3	300	4.99	0.169	0.023	0	0	0			0
04/04/20	3:30	CONT	A	NPF	3	300	4.99	0.169	0.037	0	0	0			0
04/04/20	3:35	CONT	B	NPF	1	300	4.99	0.169	0.026	0	0	0	0		
04/04/20	3:40	CONT	A	NPF	1	300	4.99	0.169	0.028	0	0	0	0		
04/04/20	3:45	CONT	B	OK	0	300	4.99	0.169	0.025	0.174	15228	2.927	2.927		
04/04/20	3:50	CONT	A	OK	0	300	4.99	0.169	0.027	0.173	13571	2.388	2.388		
04/04/20	3:55	CONT	B	OK	0	300	4.99	0.169	0.028	0.173	14552	2.793	2.793		
04/04/20	4:00	CONT	A	OK	0	300	4.99	0.169	0.03	0.173	11372	2.001	2.001		
04/04/20	4:05	CONT	B	OK	0	300	4.99	0.169	0.033	0.173	13089	2.513	2.513		
04/04/20	4:10	CONT	A	OK	0	300	4.99	0.169	0.029	0.173	12017	2.114	2.114		
04/04/20	4:15	CONT	B	OK	0	300	4.99	0.169	0.032	0.173	12289	2.36	2.36		
04/04/20	4:20	CONT	A	OK	0	300	4.99	0.169	0.03	0.173	11468	2.017	2.017		
04/04/20	4:25	CONT	B	OK	0	300	4.99	0.169	0.027	0.173	11745	2.255	2.255		
04/04/20	4:30	CONT	A	OK	0	300	4.99	0.169	0.024	0.173	11096	1.952	1.952		
04/04/20	4:35	CONT	B	OK	0	300	4.99	0.169	0.029	0.173	12581	2.416	2.416		
04/04/20	4:40	CONT	A	OK	0	300	4.99	0.169	0.027	0.173	11592	2.04	2.04		
04/04/20	4:45	CONT	B	NPF	1	300	5	0.169	0.036	0	0	0	0		
04/04/20	4:50	CONT	A	NPF	1	300	4.99	0.169	0.023	0	0	0	0		
04/04/20	4:55	CONT	B	NPF	1	300	4.99	0.169	0.032	0	0	0	0		
04/04/20	5:00	CONT	A	NPF	2	300	4.99	0.169	0.033	0	0	0		0	
04/04/20	5:05	CONT	B	OKF	2	300	4.99	0.169	0.027	0.171	5022	8.035		8.035	
04/04/20	5:10	CONT	A	NPF	2	300	4.99	0.169	0.032	0	0	0		0	
04/04/20	5:15	CONT	B	NPF	2	300	4.99	0.169	0.04	0	0	0		0	
04/04/20	5:20	CONT	A	OKF	3	300	4.99	0.169	0.024	0.18	44300	64.976			64.976
04/04/20	5:25	CONT	B	NPF	3	300	4.99	0.169	0.033	0	0	0			0
04/04/20	5:30	CONT	A	NPF	3	300	4.99	0.169	0.027	0	0	0			0
04/04/20	5:35	CONT	B	NPF	1	300	4.99	0.169	0.032	0	0	0	0		
04/04/20	5:40	CONT	A	NPF	1	300	4.99	0.169	0.034	0	0	0	0		

Camden Mercury July 2003



“An Analysis of Continuous
Mercury Air Pollution Data
Collected in Elizabeth and New
Brunswick, NJ.”

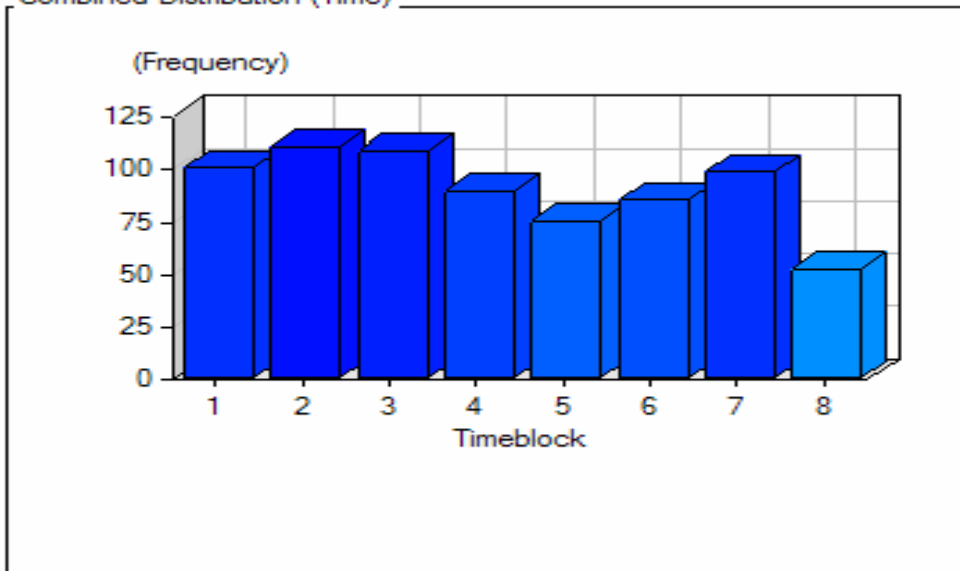
Presented By:
Fawn Hornsby &
Wilma “Billie” Jackson

Client: Mr. Charles Pietarinen
NJ Department of Environment

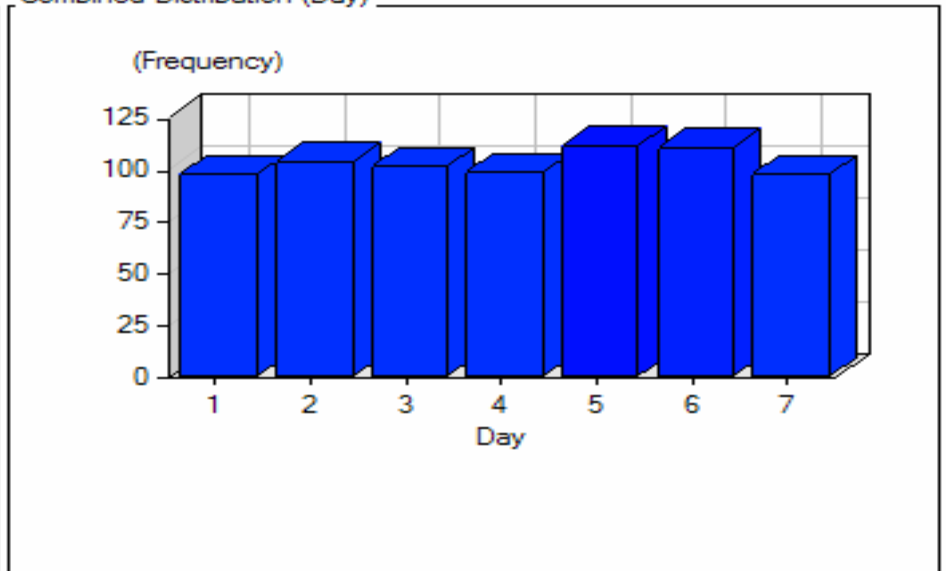
Methodology III

- The data for the three months is combined to get a better picture:
- In order to proceed with our analysis we must conclude that this distribution is “approximately” uniform, and therefore, assume that this data is sufficiently complete.

Combined Distribution (Time)

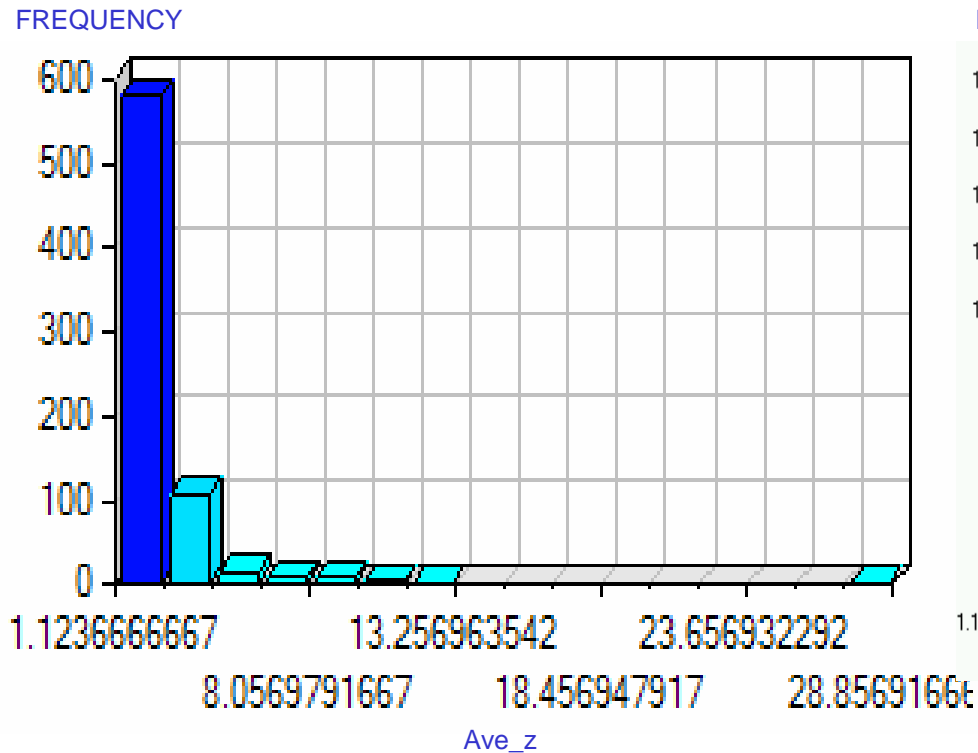


Combined Distribution (Day)

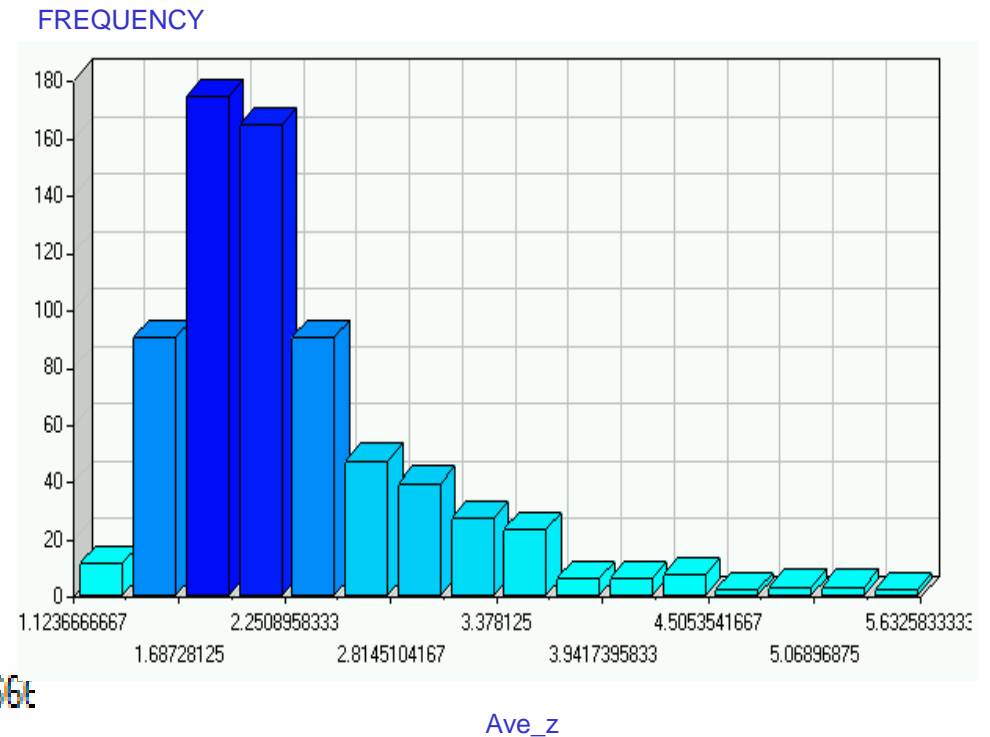


The Combined Distributions of Elemental Mercury:

Elemental Mercury Distribution With outliers:

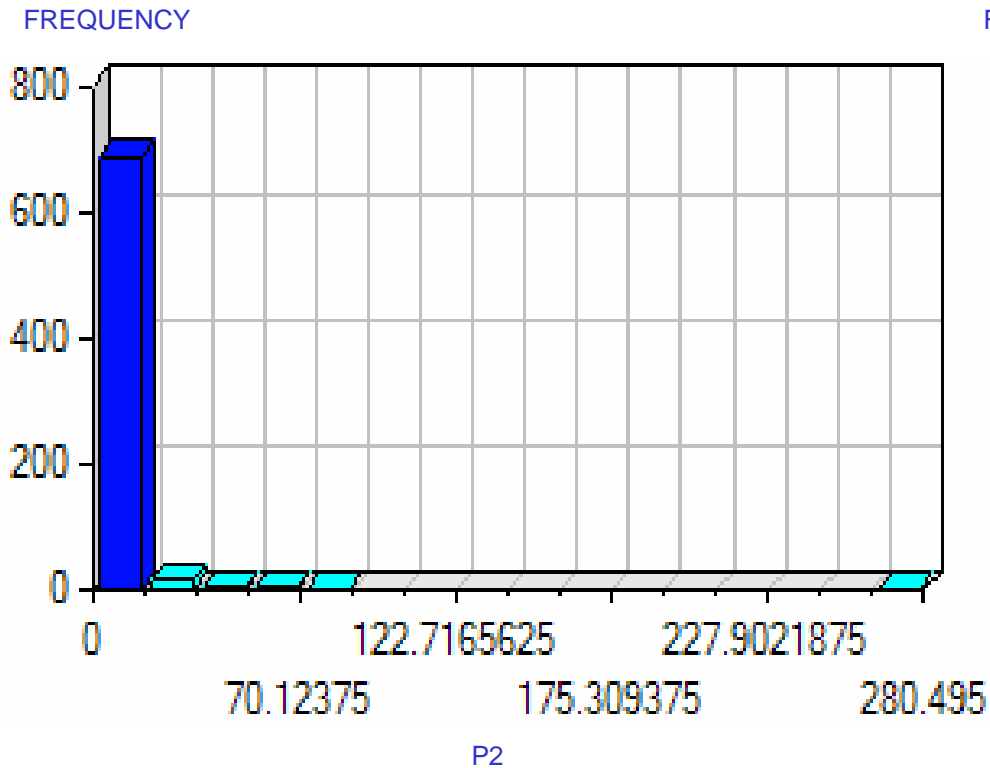


Elemental Mercury Distribution Without outliers:

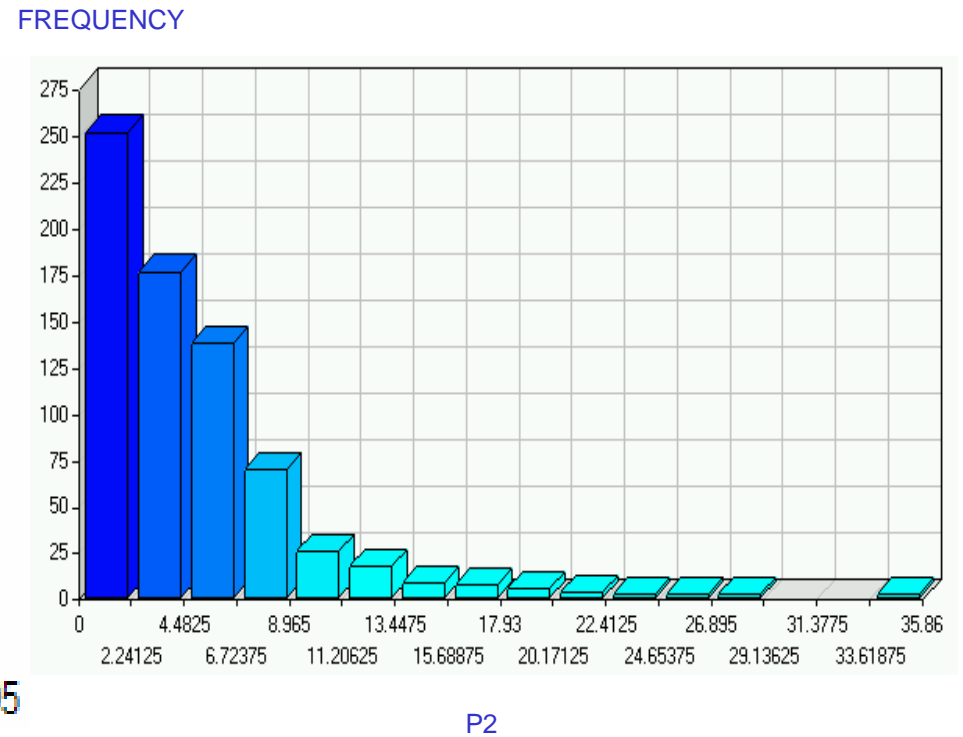


The Combined Distributions of Particle Mercury:

Particle Mercury Distribution With outliers:

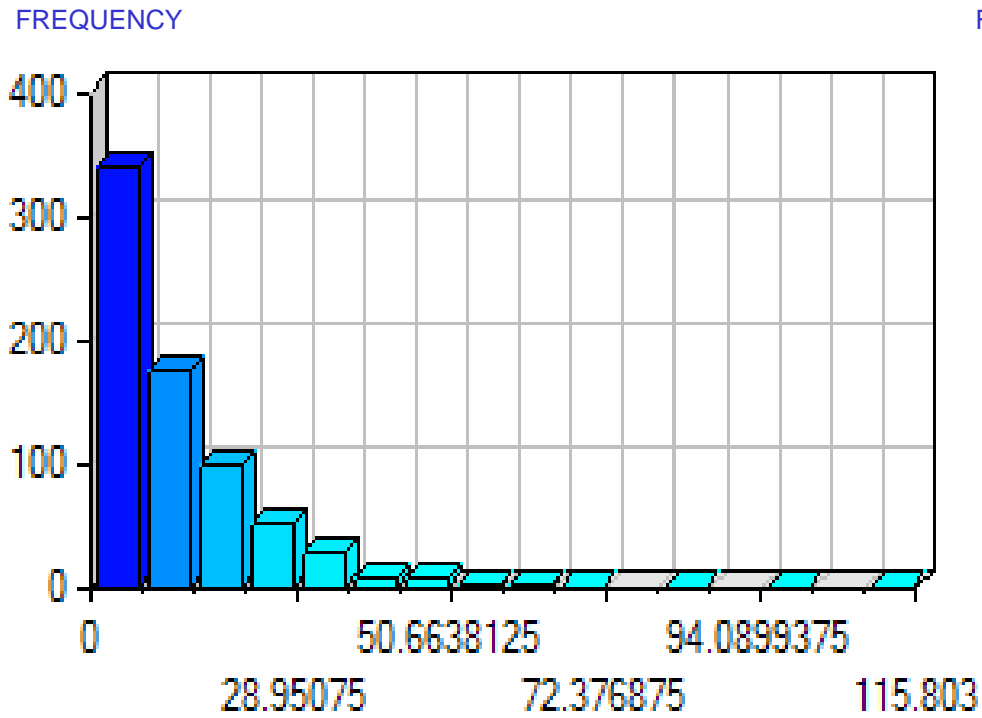


Particle Mercury Distribution Without outliers:

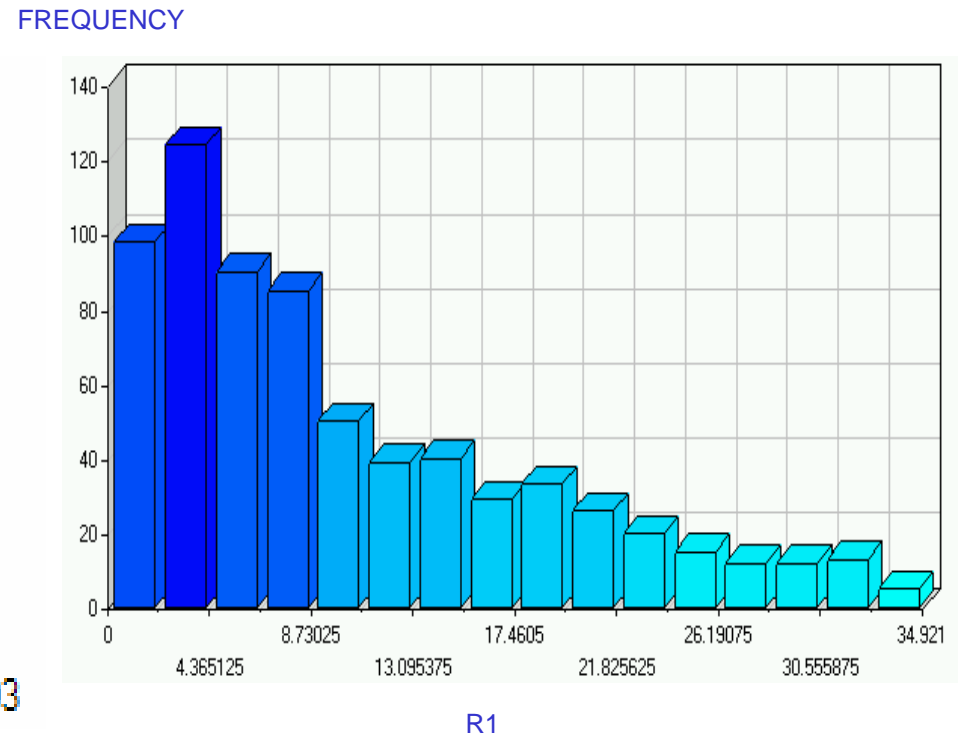


The Combined Distributions of Reactive Gas Mercury:

Reactive Gas Mercury Distribution With outliers:



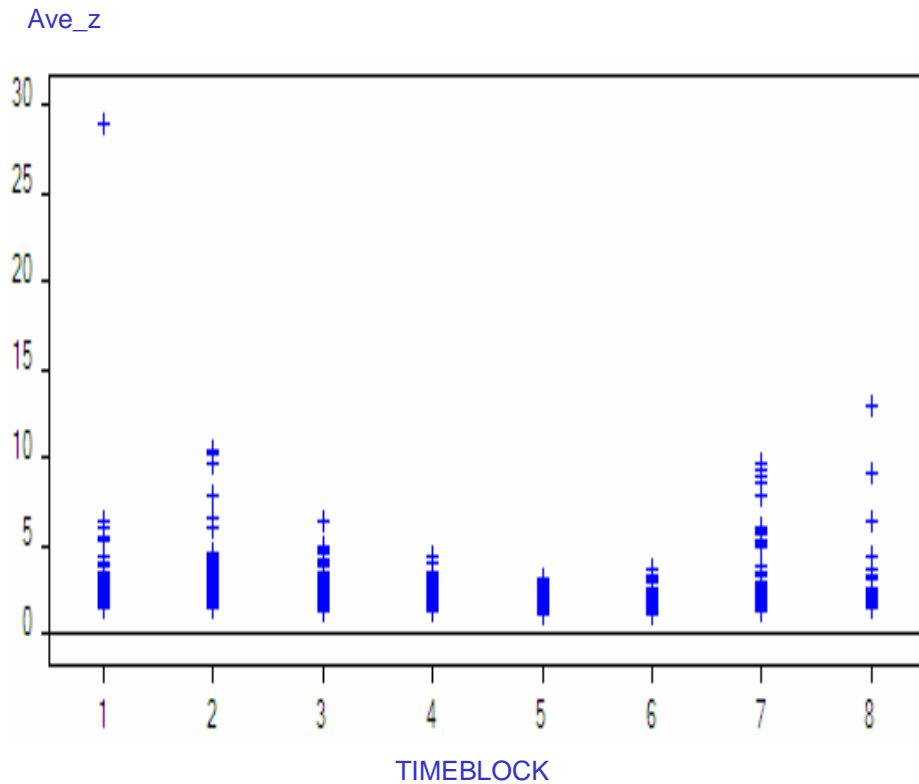
Reactive Gas Mercury Distribution Without outliers:



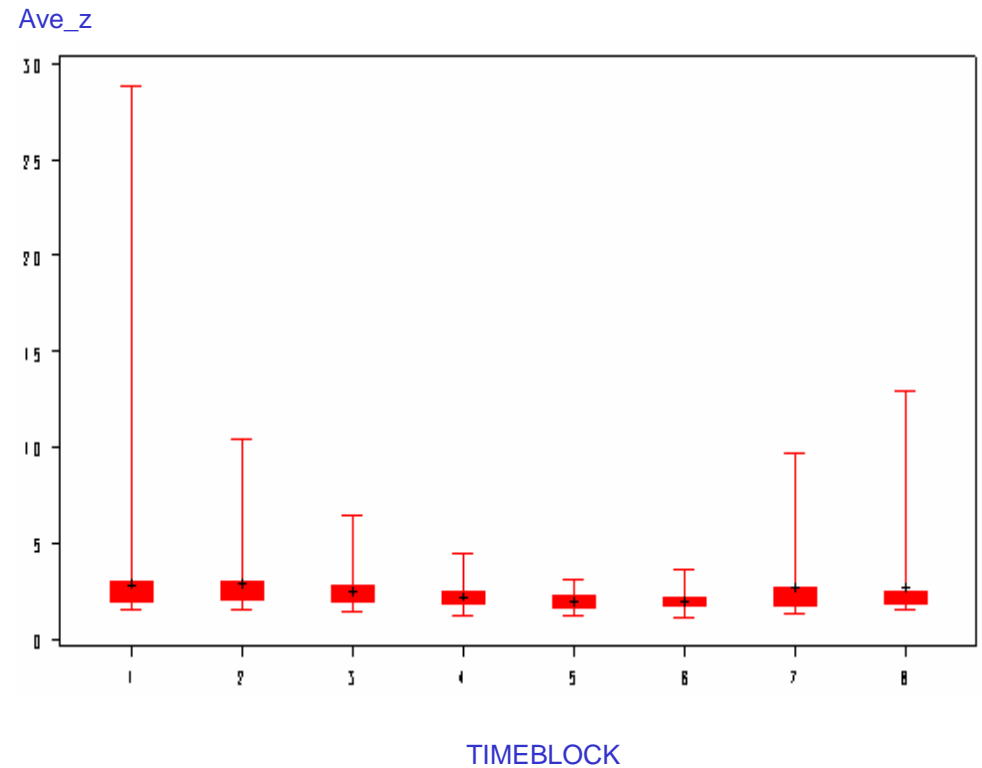
Elemental Mercury

The distributions of Elemental Mercury per time block

Scatter Plot:



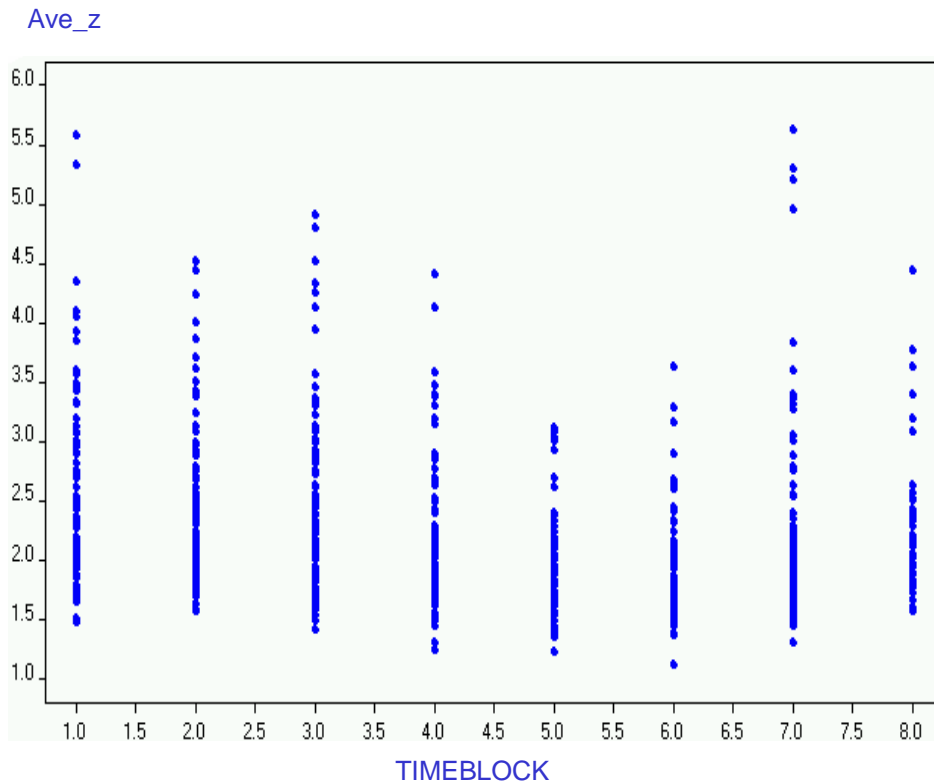
Box Plot:



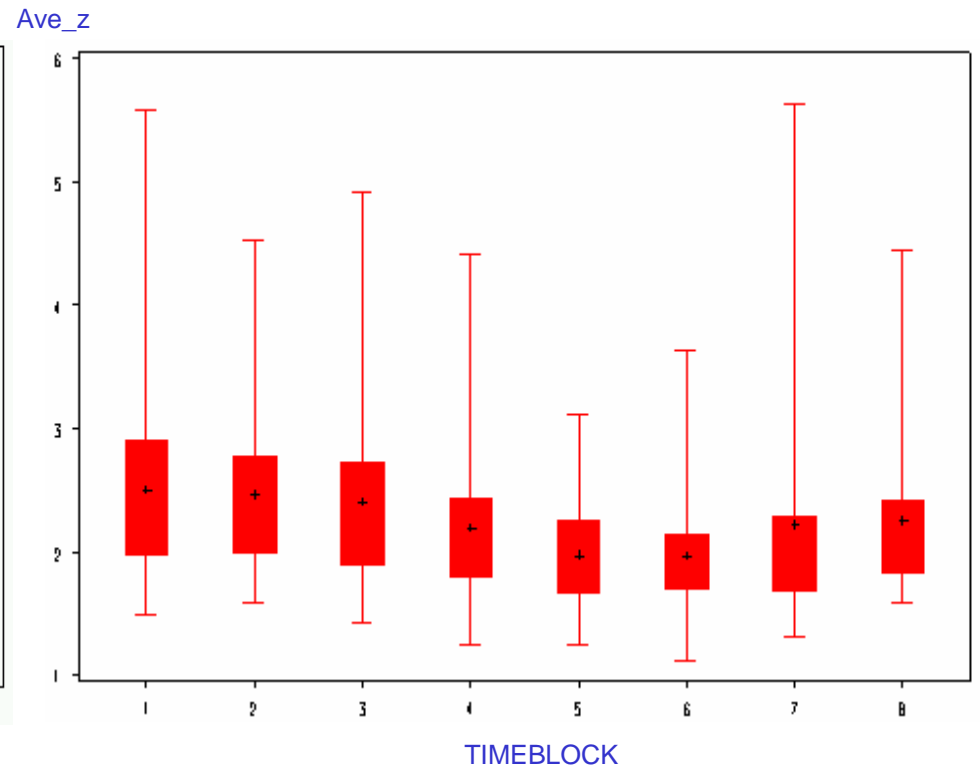
Elemental Mercury

The distributions of Elemental Mercury per time block omitting outliers

Scatter Plot:



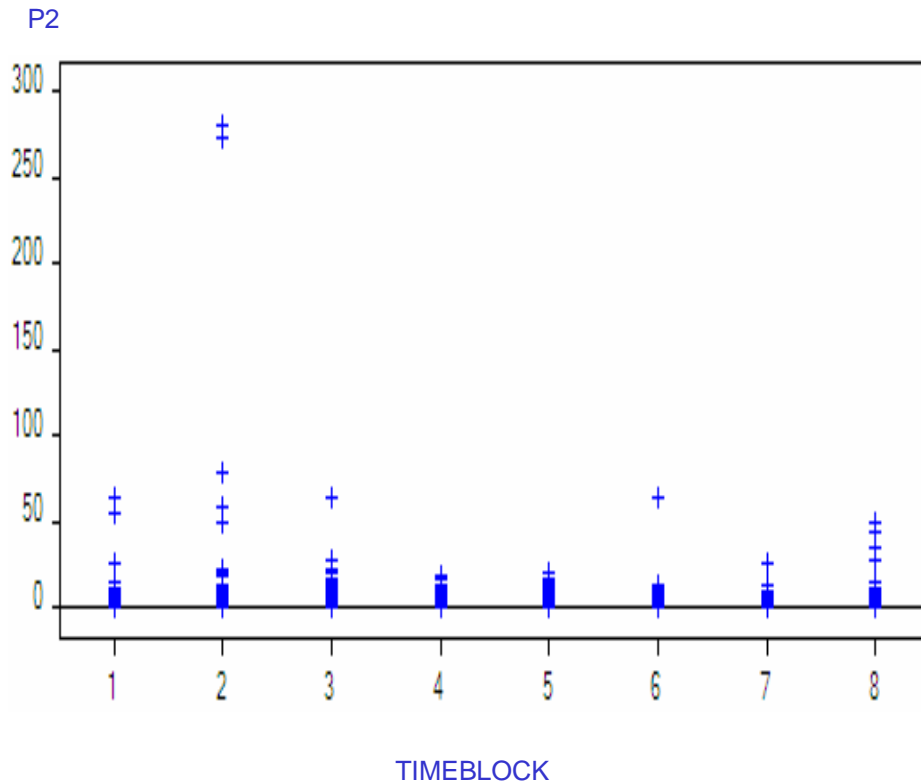
Box Plot:



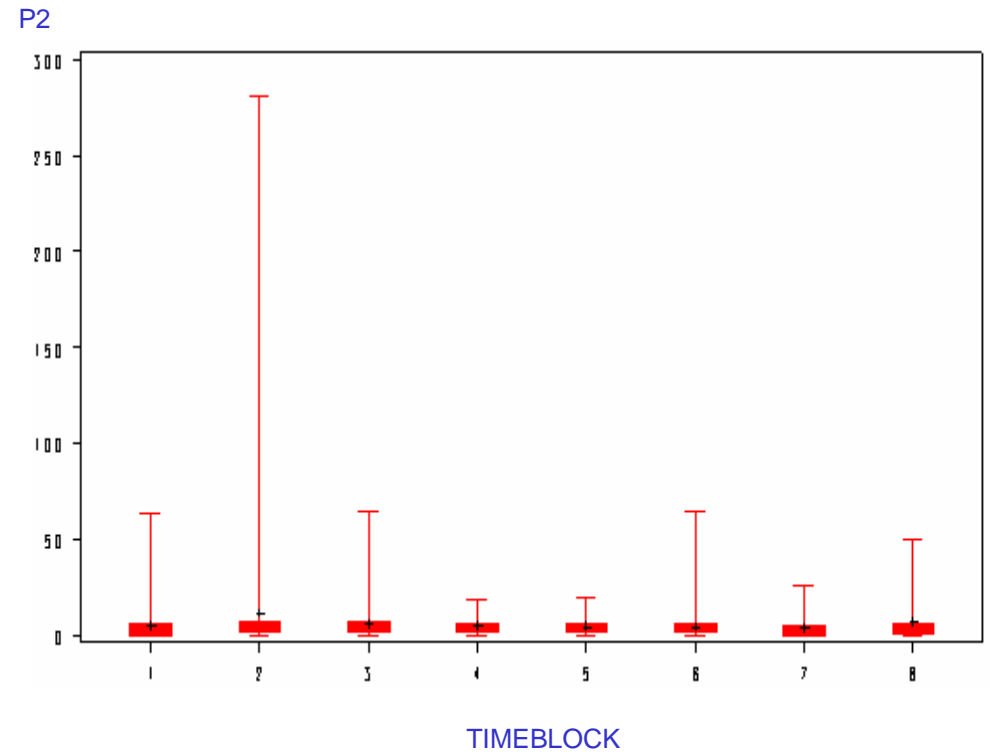
Particle Mercury

The distributions of Particle Mercury per time block

Scatter Plot:



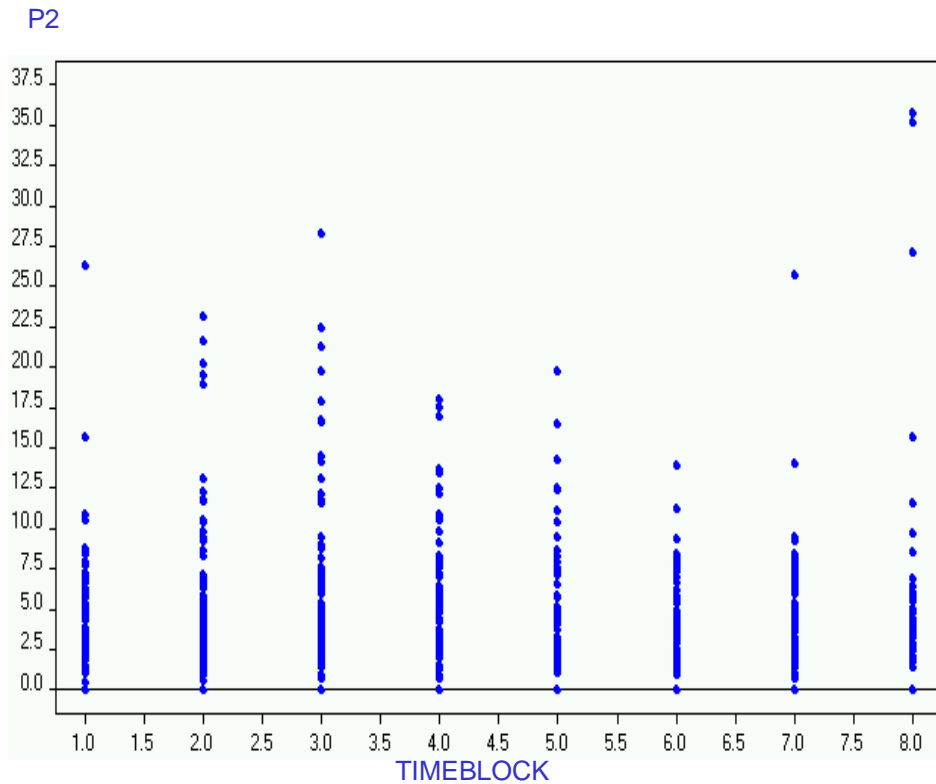
Box Plot:



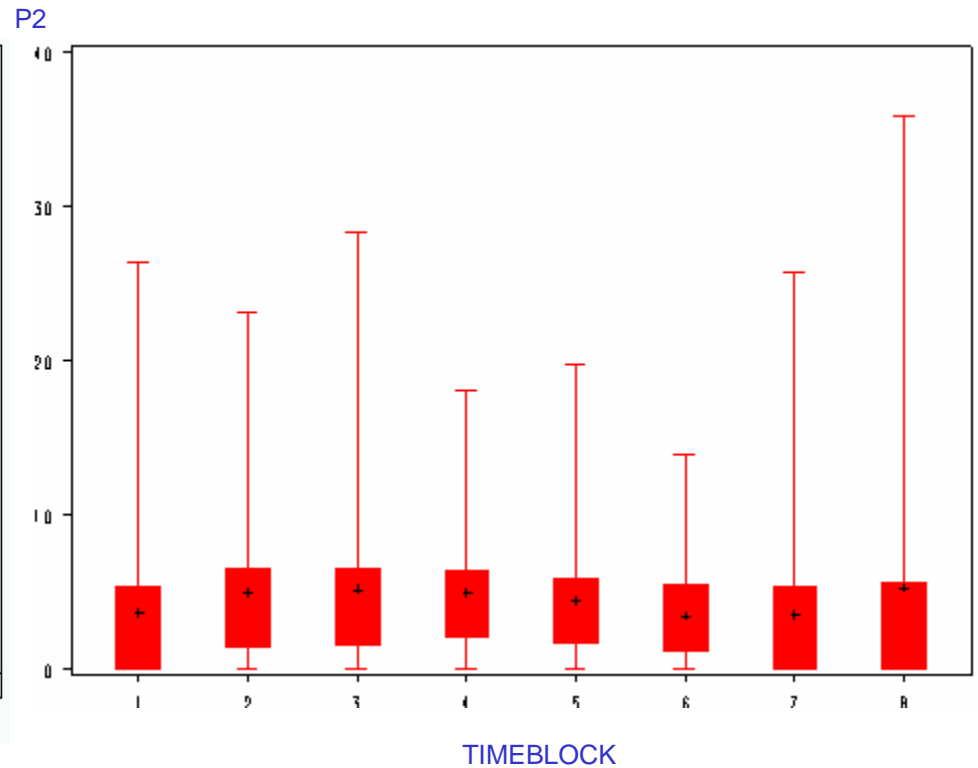
Particle Mercury

The distributions of Particle Mercury per time block omitting outliers

Scatter Plot:



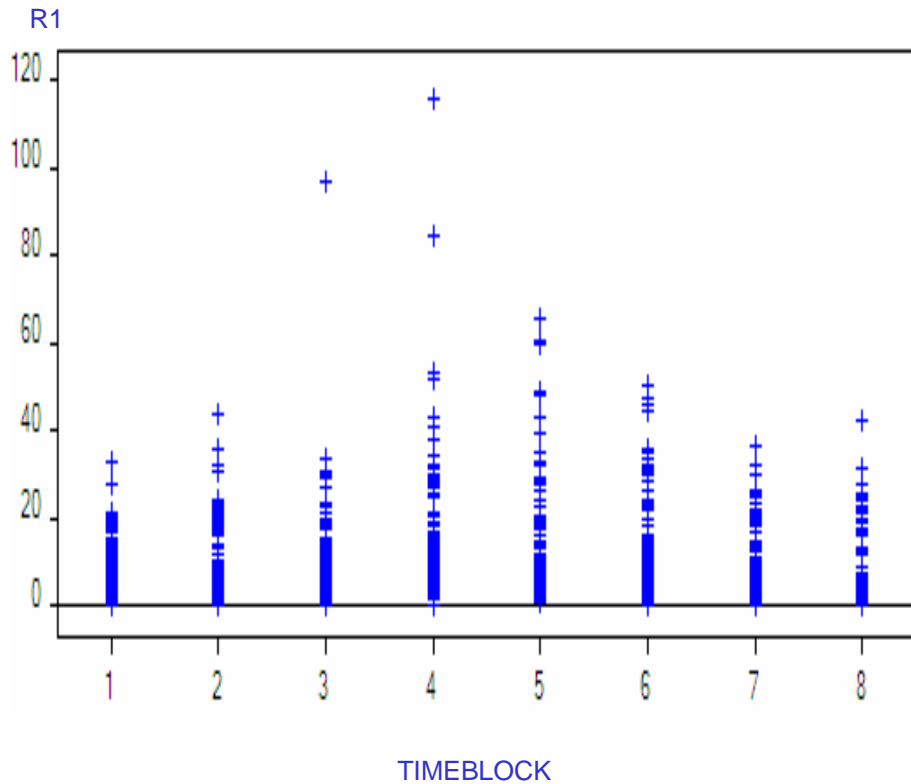
Box Plot:



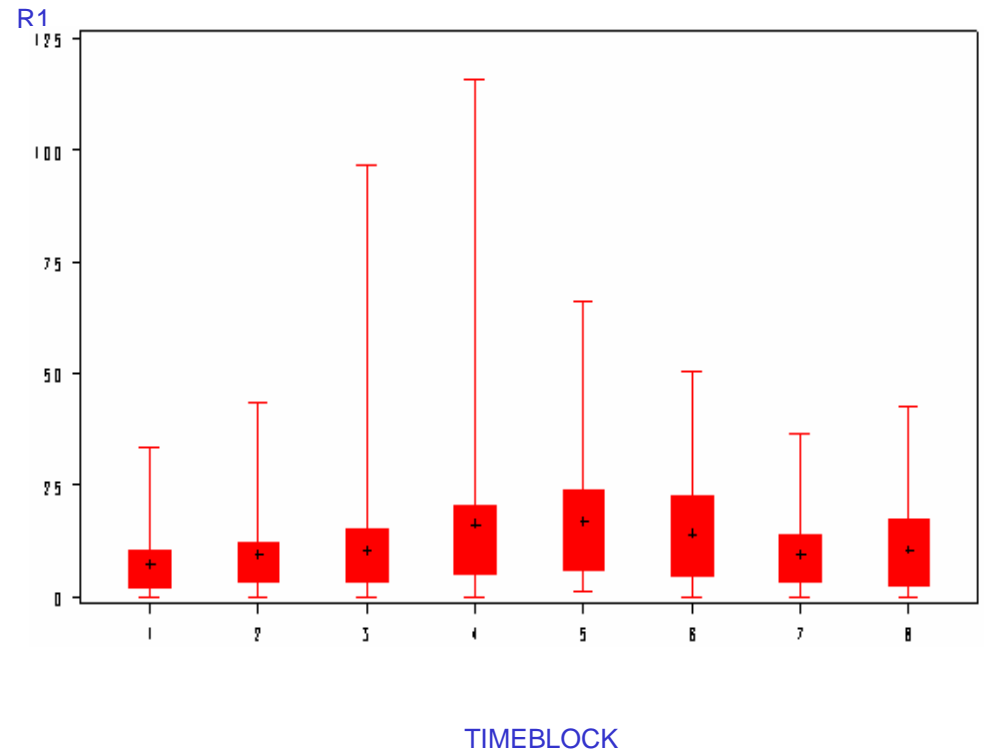
Reactive Gas Mercury

The distributions of Reactive Gas Mercury per time block

Scatter Plot:



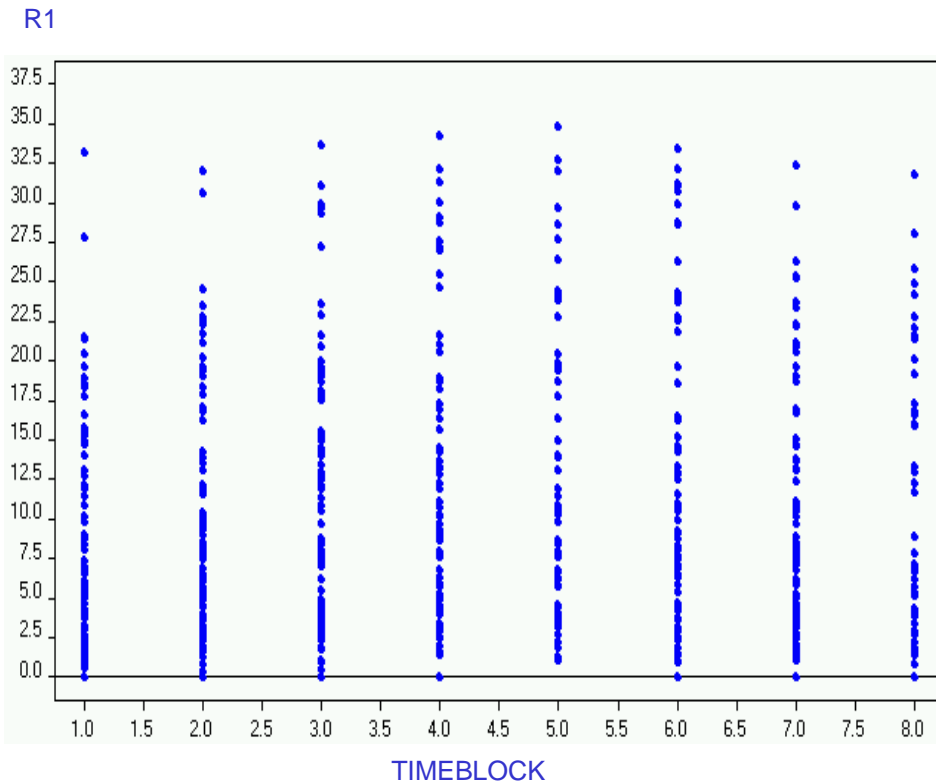
Box Plot:



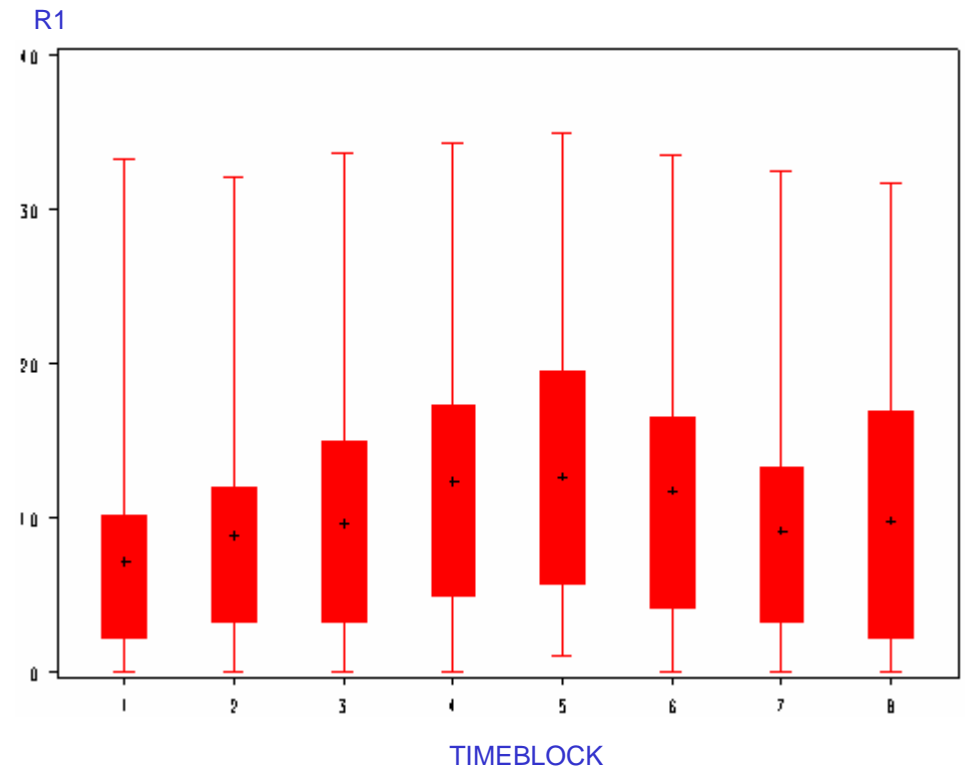
Reactive Gas Mercury

The distributions of Reactive Gas Mercury per time block omitting outliers

Scatter Plot:



Box Plot:



Preliminary data analyses

High values of Hg⁰, RGM, & particle Hg
and wind direction

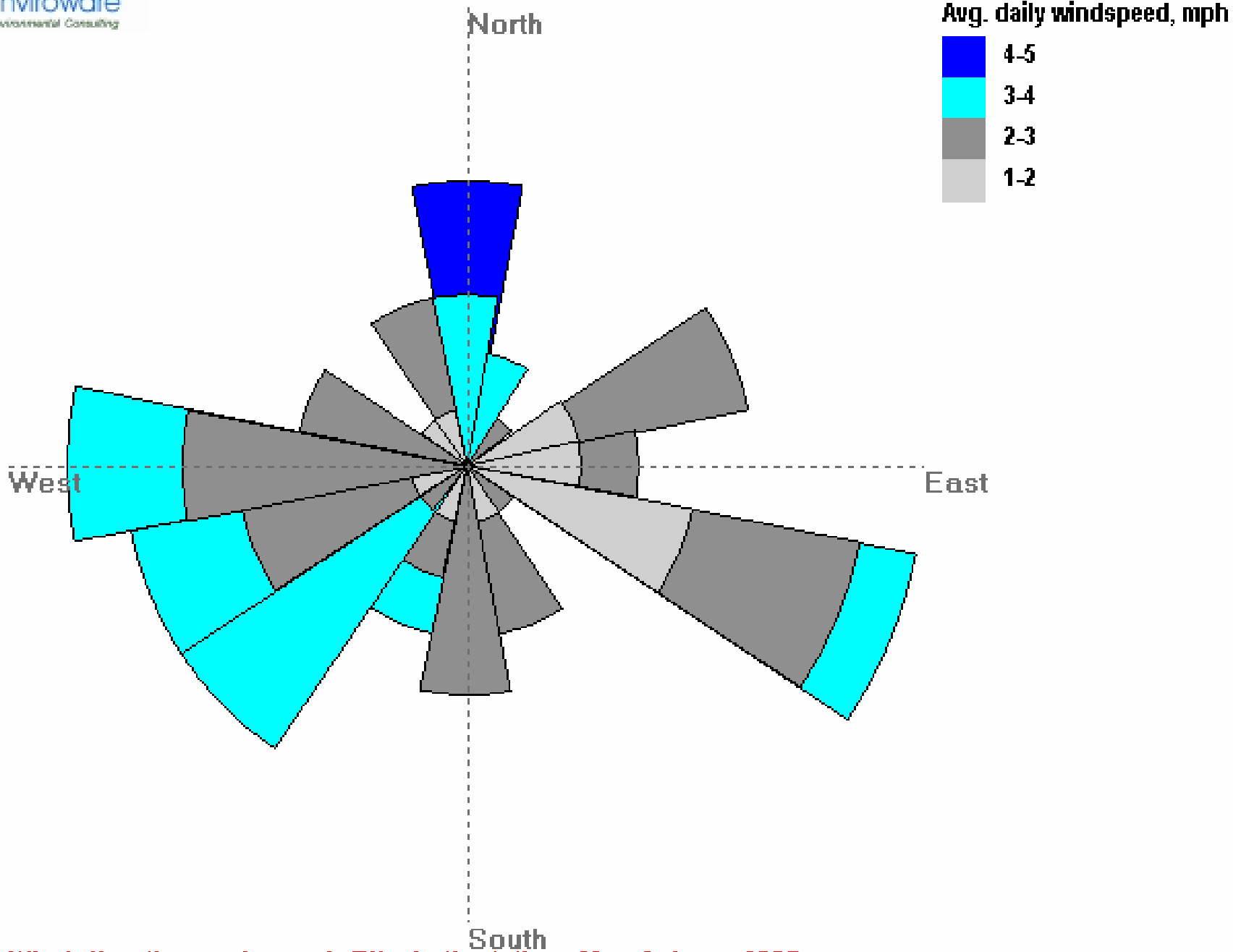
NJDEP Elizabeth air monitoring station,
May & June, 2005

Adriana Calle

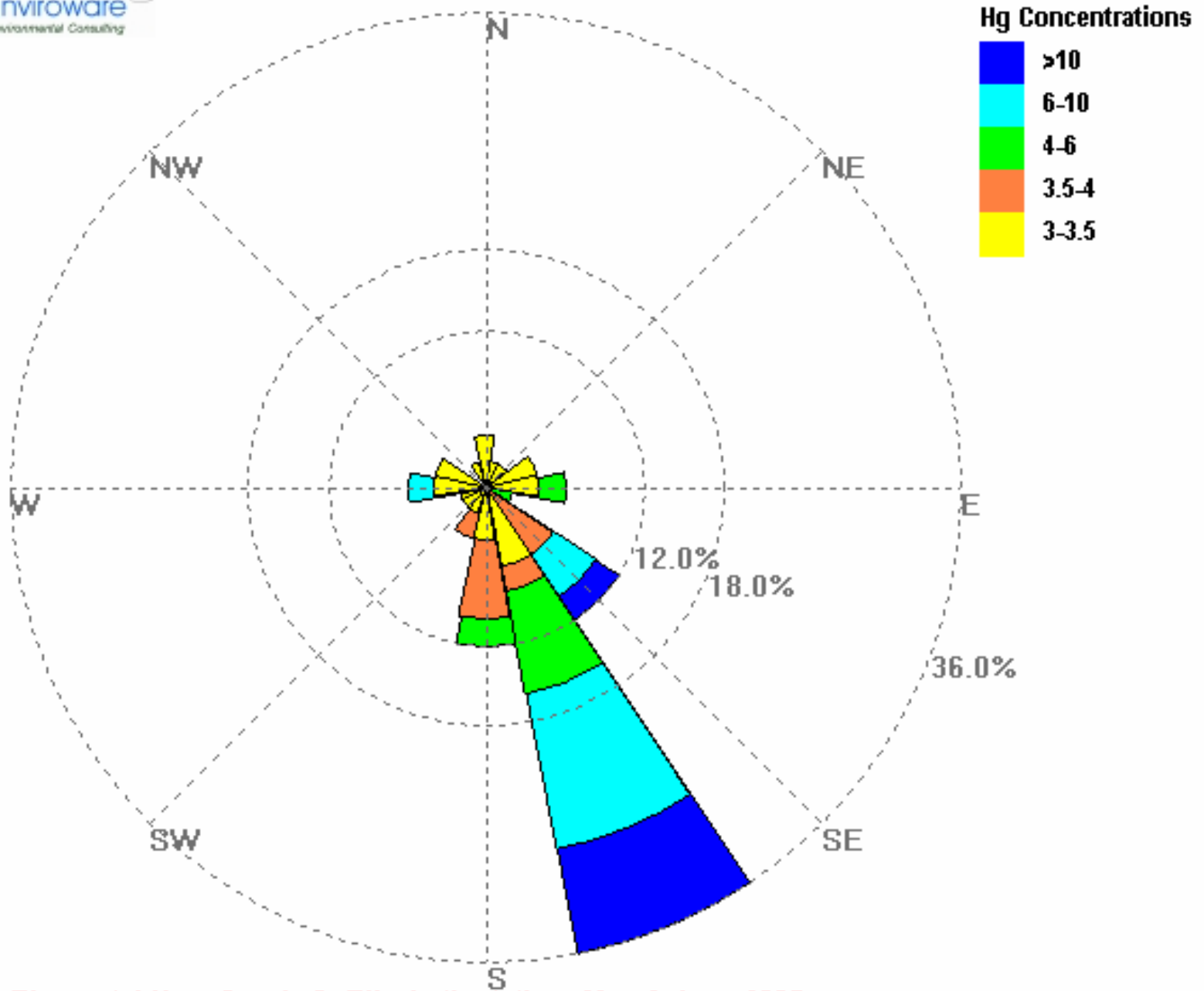
Mike Aucott

NJDEP Division of Science, Research & Technology

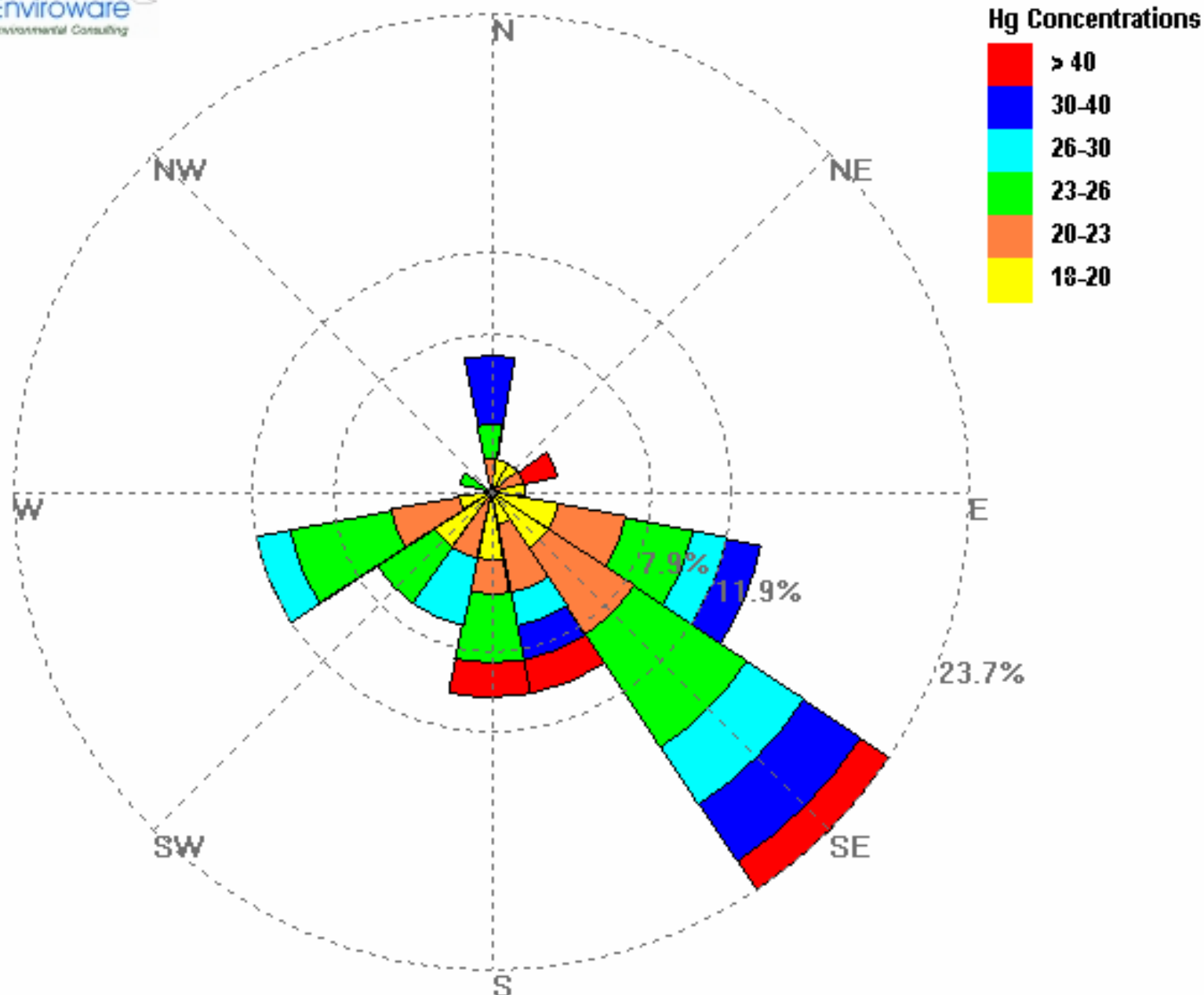
November 3, 2005



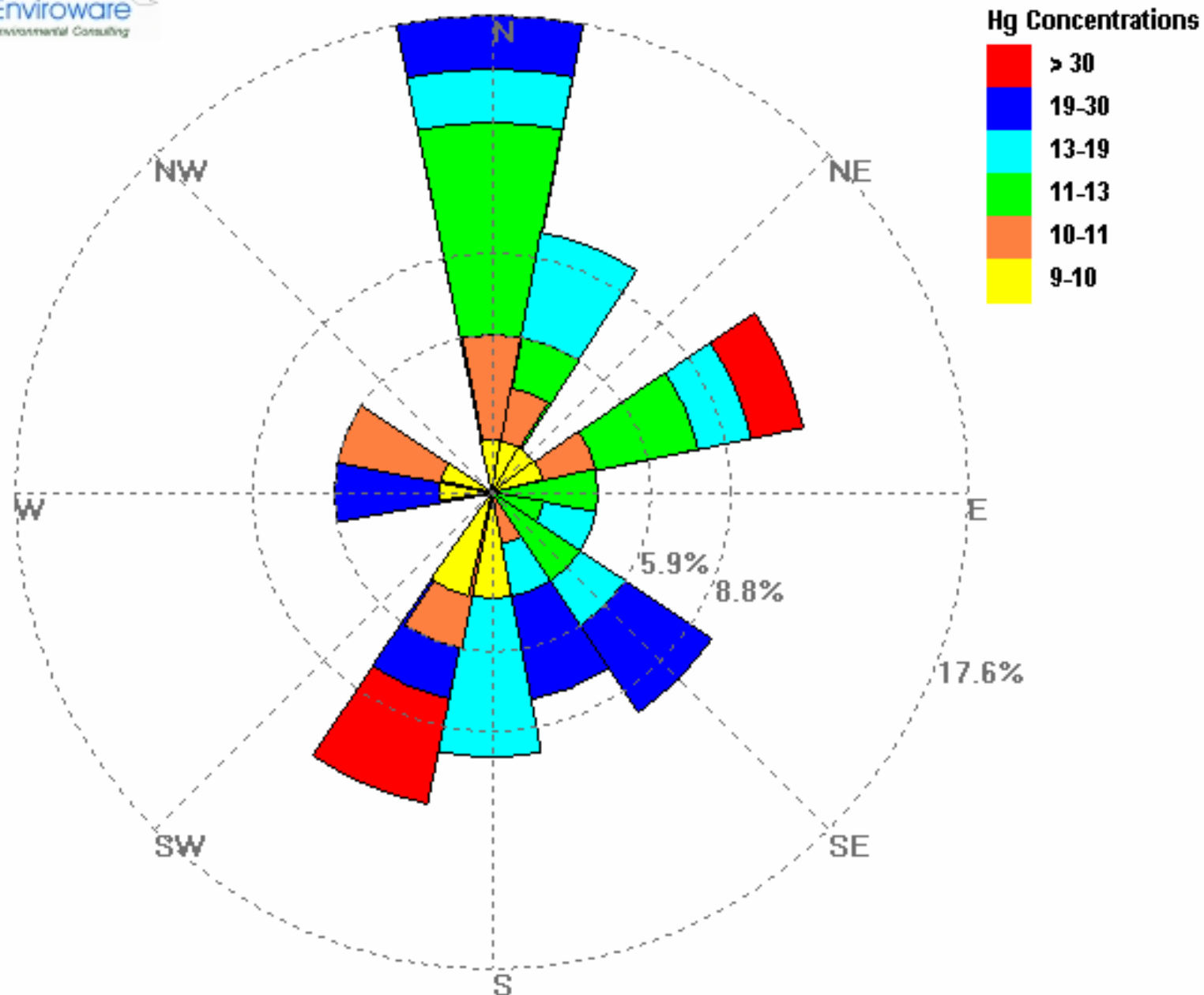
Wind direction and speed; Elizabeth station, May & June, 2005



Elemental Hg > 3 ng/m³, Elizabeth station, May & June 2005



RGM > 18 pg/m³, Elizabeth station, May & June 2005



Particle Hg > 9 pg/m³, Elizabeth station, May & June 2005