Reconciling Reported VOC Emissions with Ambient Measurements, Cont.

Jim Smith & John Jarvie

Southeast Texas Photochemical Modeling Technical Committee

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Recap of December Presentation

- **TCEQ modelers developed a methodology for reconciling reported emissions of HRVOCs (Ethene, Propene, Butenes, and 1,3-Butadiene) with measured ambient concentrations.**

- **Using hours with relatively "straight" winds, the Industrial Source Complex (ISC) model was used to predict concentrations at the monitors.**

- **Using the same hours as above, the Potential Source Contribution Function (PSCF) was used to associate source areas with measured pollutant levels.**

Recap of December Presentation (cont.)

- **The PSCF was then computed as before, but this time using the ISC-modeled concentrations instead of measured concentrations.**

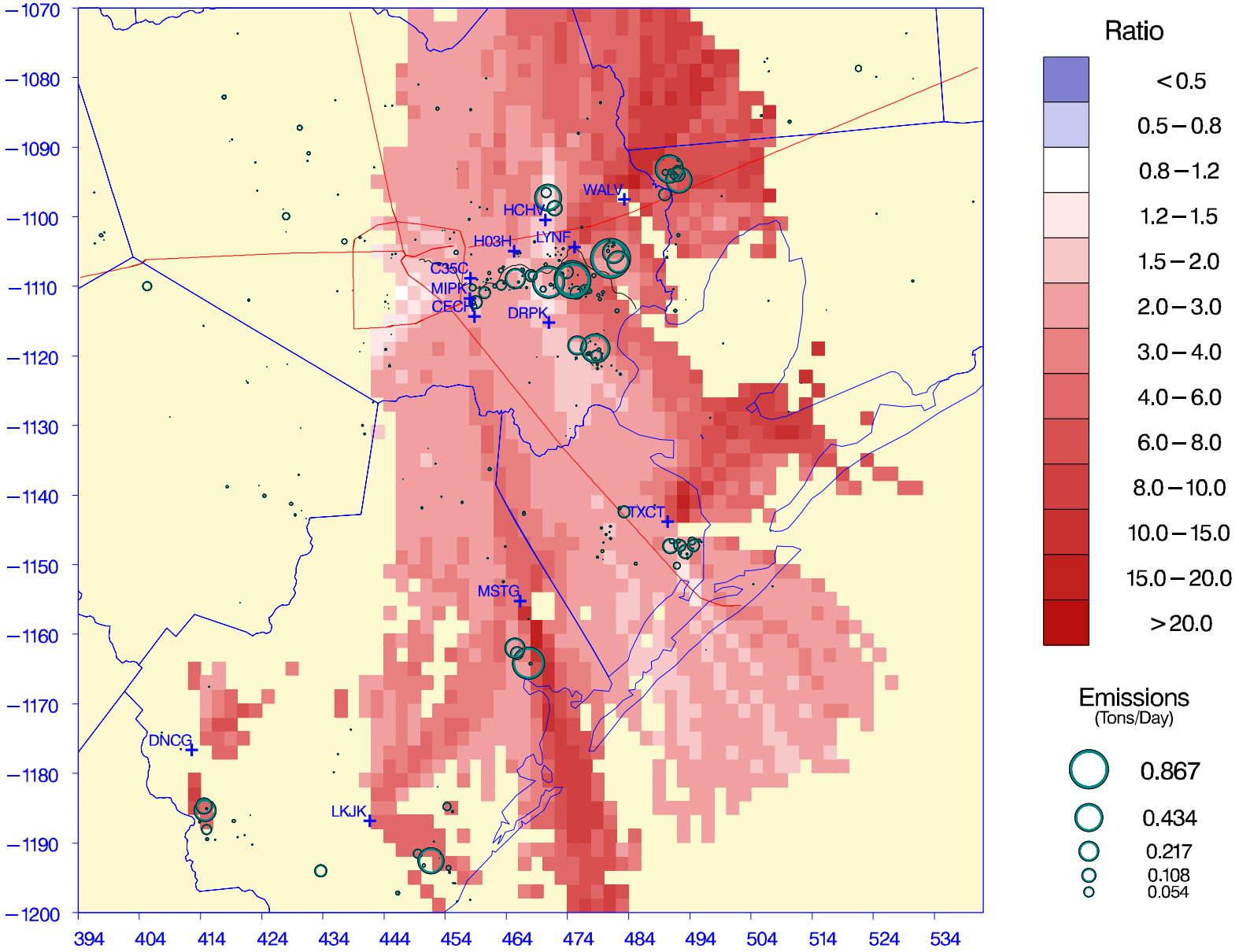
- **Taking the ratio of the two PSCF runs provides map showing source areas where reported emissions appear to be inconsistent with measured pollutant concentrations.**

- **Finally, the amount of emissions needed to reconcile reported emissions with ambient measurements was estimated for point sources only.**

PSCF Ratio (Mon/ISC) for Propene

Twelve HGB Area Sites

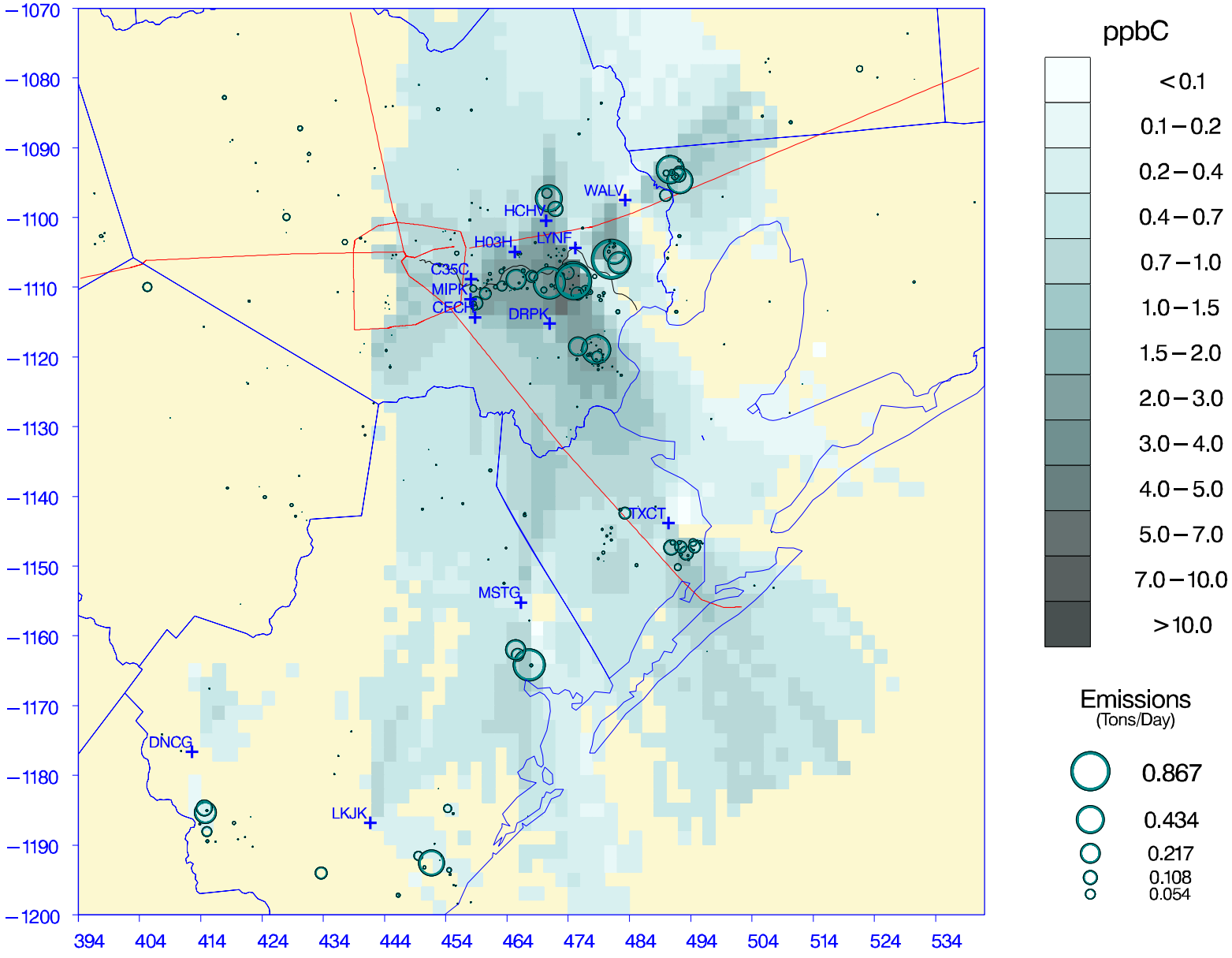
Cells with at least 300 Trajectory Points and Median Monitored Mixing Ratio > 1.0 ppbC



PSCF for ISC Modeled Propene

Twelve HGB Area Sites

Cells with at least 300 Trajectory Points and Median Monitored Mixing Ratio > 1.0 ppbC



PSCF Ratio (Mon/ISC) for Propene

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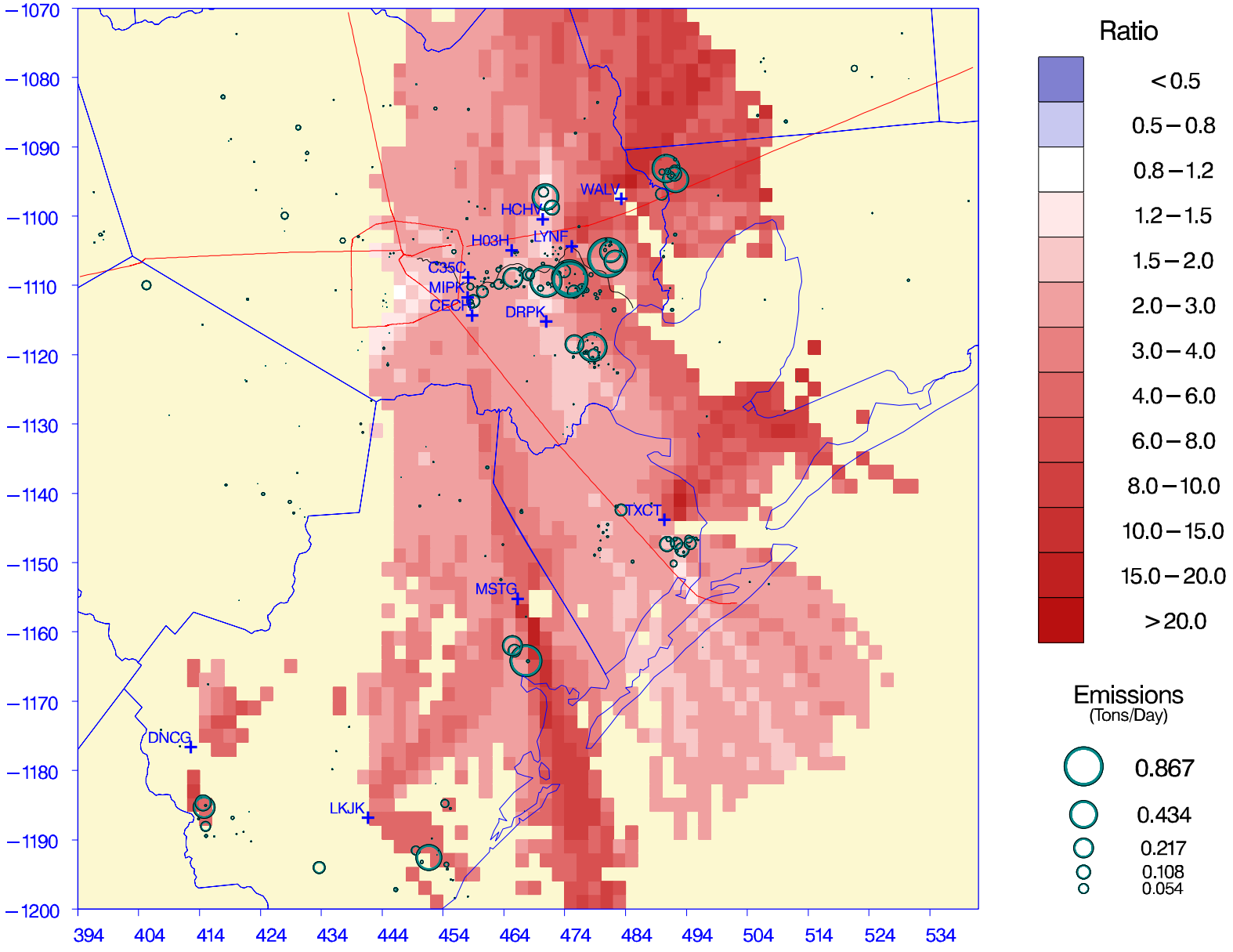


CAMx Ozone Modeling in SIP Development
The Big Picture

Base Case	**Day-specific emissions; replicate what actually happened**
Baseline Case	**Typical emissions; used in RRF to predict future design values**
Future Base Case	**Apply future growth + on-the-books controls to estimate future ozone**
Control Strategy Testing	**Determine control strategies that will effectively reduce ozone**
SIP	**Document modeling procedures**

What's New?

- **Reconciliation computed for <u>all</u> anthropogenic sources instead of just point sources.**

- **Evaluation of improvement due to reconciliation of emissions.**

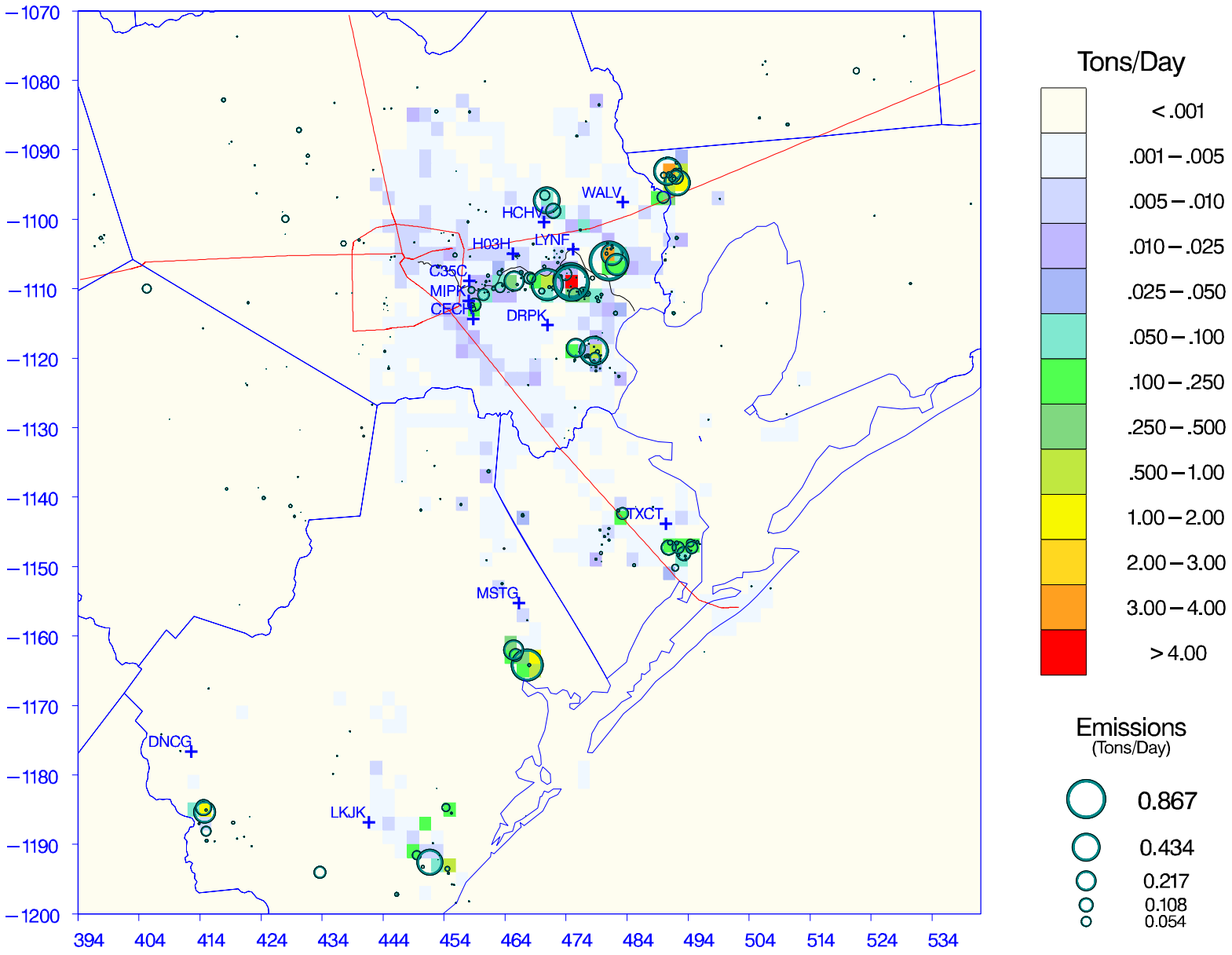
- **Preliminary runs of CAMx using reconciled emissions.**

Reconciled Emissions

- **Required additional emissions were calculated for each grid cell in the area (instead of only at point sources).**

Species	Reported Emissions	Reconciled Emissions	Est. Emiss. from unidentified sources
Ethene	16.813	32.241	15.428
Propene	12.078	40.628	28.55
1,3-Butadiene	2.673	3.841	1.168
1-Butene	3.322	6.787	3.465
c,2-Butene	0.904	1.68	0.776
t,2-Butene	1.146	3.553	2.407
isoButane	8.016	55.16	47.144
n-Butane	35.877	75.51	39.633

Source X 2005 Emissions of Propene



Evaluation of Improvement Due to Reconciliation of Emissions

- **To test the efficacy of the ISC/PSCF emission reconciliation, we re-ran ISC using the reconciled emissions.**
  - **For modeling purposes, all the Source X emissions were assumed to be ground-level sources.**

- **The new ISC-modeled concentrations at the monitors were compared with the measured and original (unreconciled) modeled concentrations.**

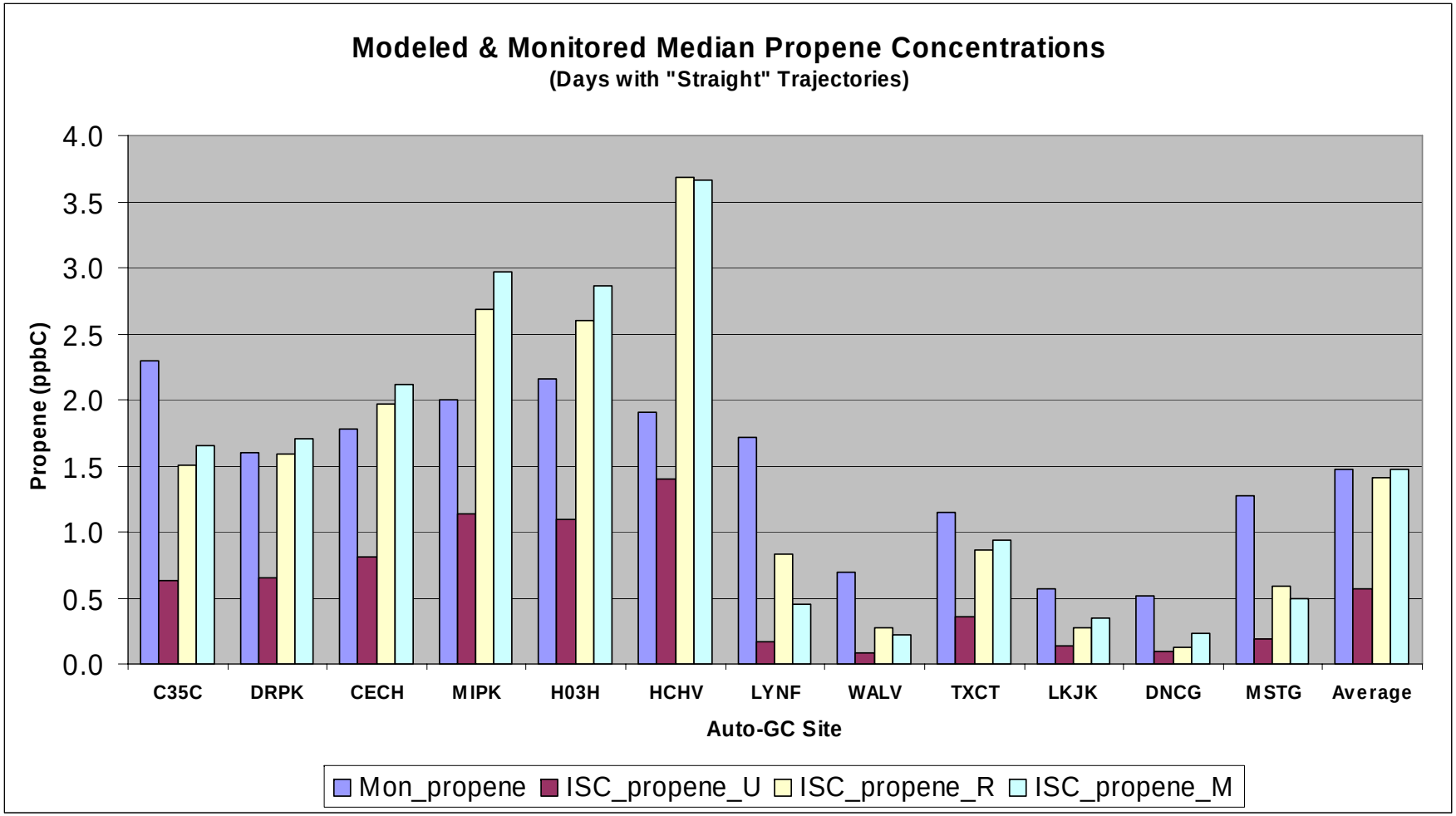
Evaluation of Improvement Due to Reconciliation of Emissions (cont.)

- **To see if the ISC/PSCF method is better than simply adjusting emissions uniformly, we also scaled the original (unreconciled) ISC modeled concentrations by:**

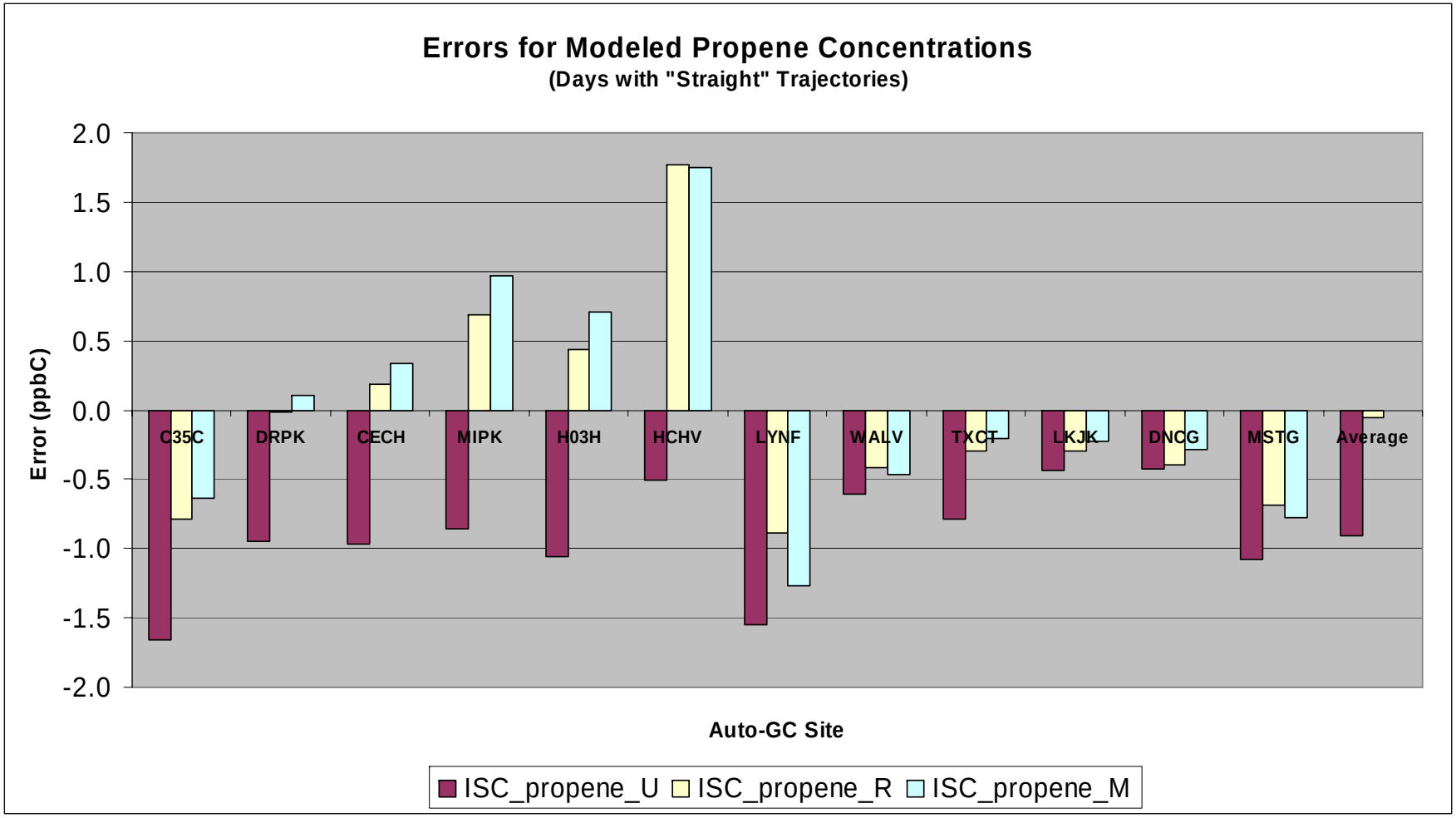
$$\frac{\text{Mean (over sites) Median Measured Pollutant Concentration}}{\text{Mean (over sites) Median ISC-Modeled Pollutant Concentration}}$$

  - **(Didn't need to re-run ISC since concentrations scale linearly with emissions)**

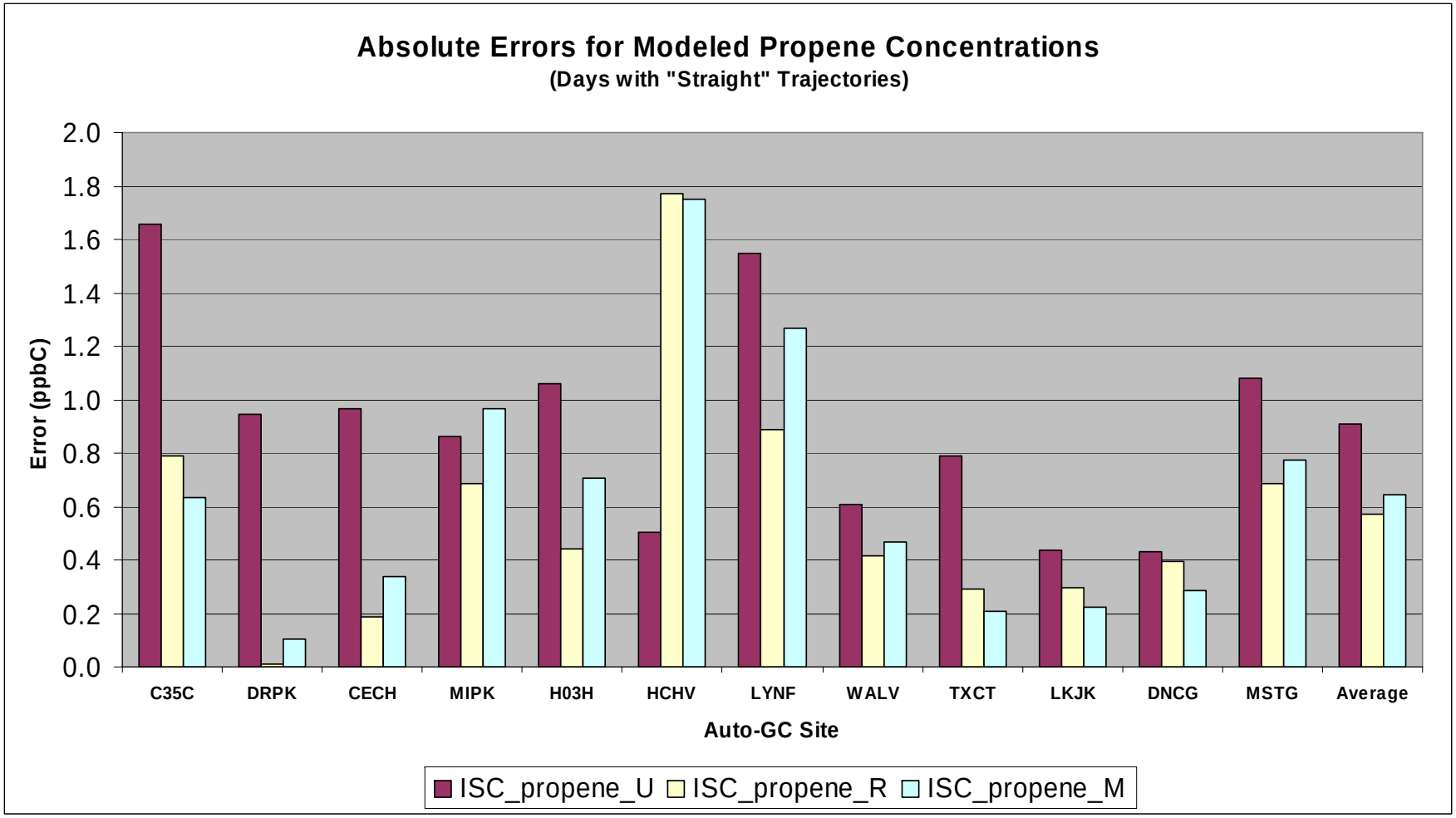
Evaluation of Improvement Due to Reconciliation of Emissions (cont.)



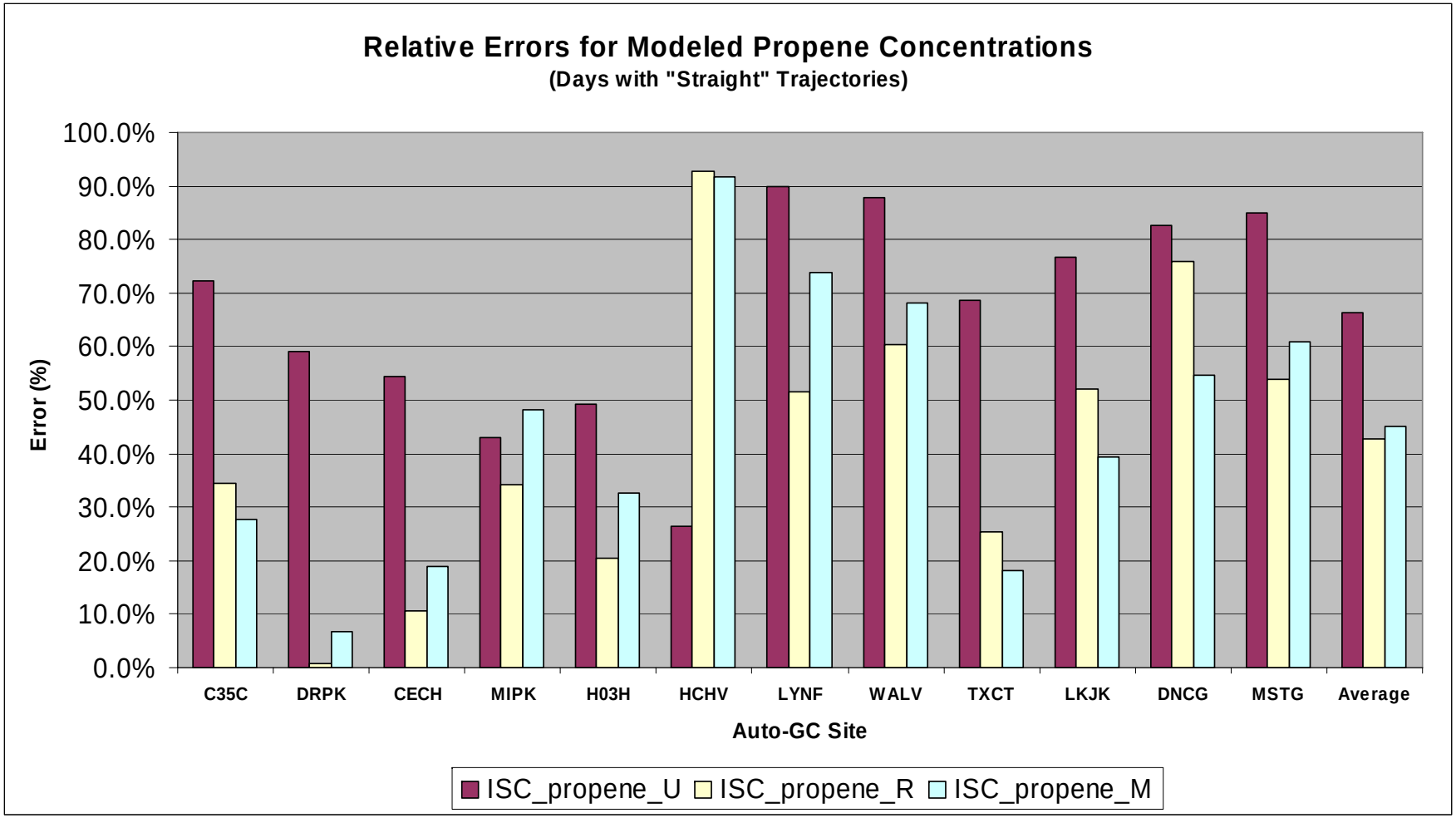
Evaluation of Improvement Due to Reconciliation of Emissions (cont.)



Evaluation of Improvement Due to Reconciliation of Emissions (cont.)



Evaluation of Improvement Due to Reconciliation of Emissions (cont.)



Evaluation of Improvement Due to Reconciliation of Emissions (cont.)

Pollutant	Mean Conc. at Monitoring Sites				Mean Error		
	Mon-itored	ISC-Unrec.	ISC-Rec.	ISC-Mult.	ISC-Unrec.	ISC-Rec.	ISC-Mult.
Ethene	1.808	0.980	1.614	1.808	-0.829	-0.195	0.000
Propene	1.472	0.565	1.415	1.472	-0.907	-0.057	0.000
1,3-Butadiene	0.366	0.133	0.254	0.366	-0.233	-0.112	0.000
1-Butene	0.376	0.202	0.356	0.376	-0.174	-0.020	0.000
c,2-Butene	0.255	0.069	0.180	0.255	-0.186	-0.075	0.000
isoButane	4.089	0.359	2.758	4.089	-3.730	-1.332	0.000
n-Butane	6.348	1.029	4.319	6.348	-5.318	-2.029	0.000

Pollutant	Mean Absolute Error			Mean Relative Error		
	ISC-Unrec.	ISC-Rec.	ISC-Mult.	ISC-Unrec.	ISC-Rec.	ISC-Mult.
Ethene	0.885	0.562	0.715	50.8%	33.5%	42.8%
Propene	0.907	0.572	0.644	66.3%	42.7%	45.1%
1,3-Butadiene	0.233	0.130	0.156	71.4%	47.2%	50.3%
1-Butene	0.174	0.078	0.102	53.2%	25.0%	33.0%
c,2-Butene	0.186	0.089	0.135	70.3%	41.1%	66.4%
isoButane	3.730	1.332	1.754	92.7%	42.0%	46.8%
n-Butane	5.318	2.243	2.238	85.9%	40.7%	43.8%

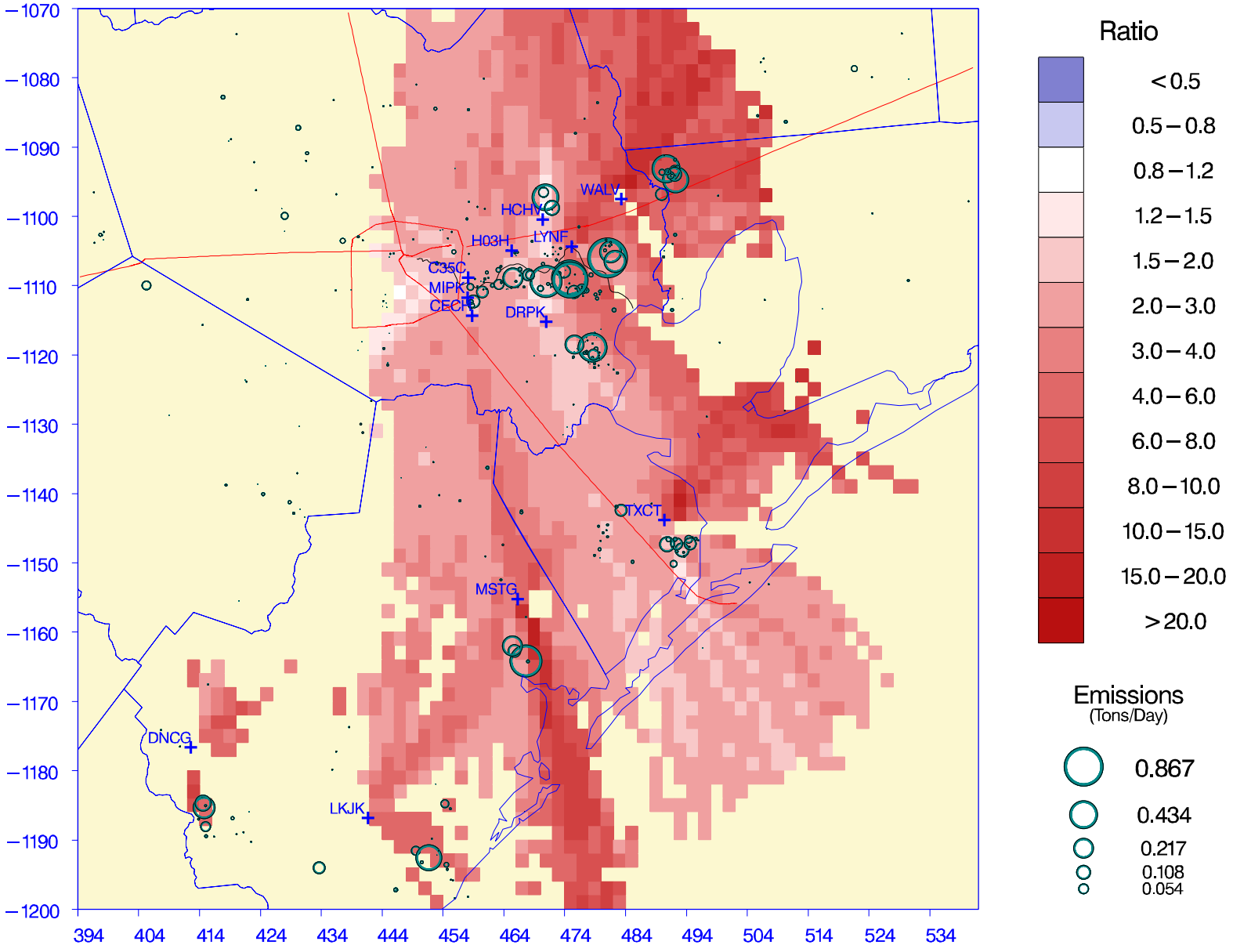
Evaluation of Improvement Due to Reconciliation of Emissions (cont.)

- **We also re-calculated the PSCF ratios using the new ISC-modeled concentrations (i.e. those calculated from the reconciled emissions).**
  - **Colors on tile plot should tend towards white if the technique is successful.**

PSCF Ratio (Mon/ISC) for Propene

Twelve HGB Area Sites

Cells with at least 300 Trajectory Points and Median Monitored Mixing Ratio > 1.0 ppbC



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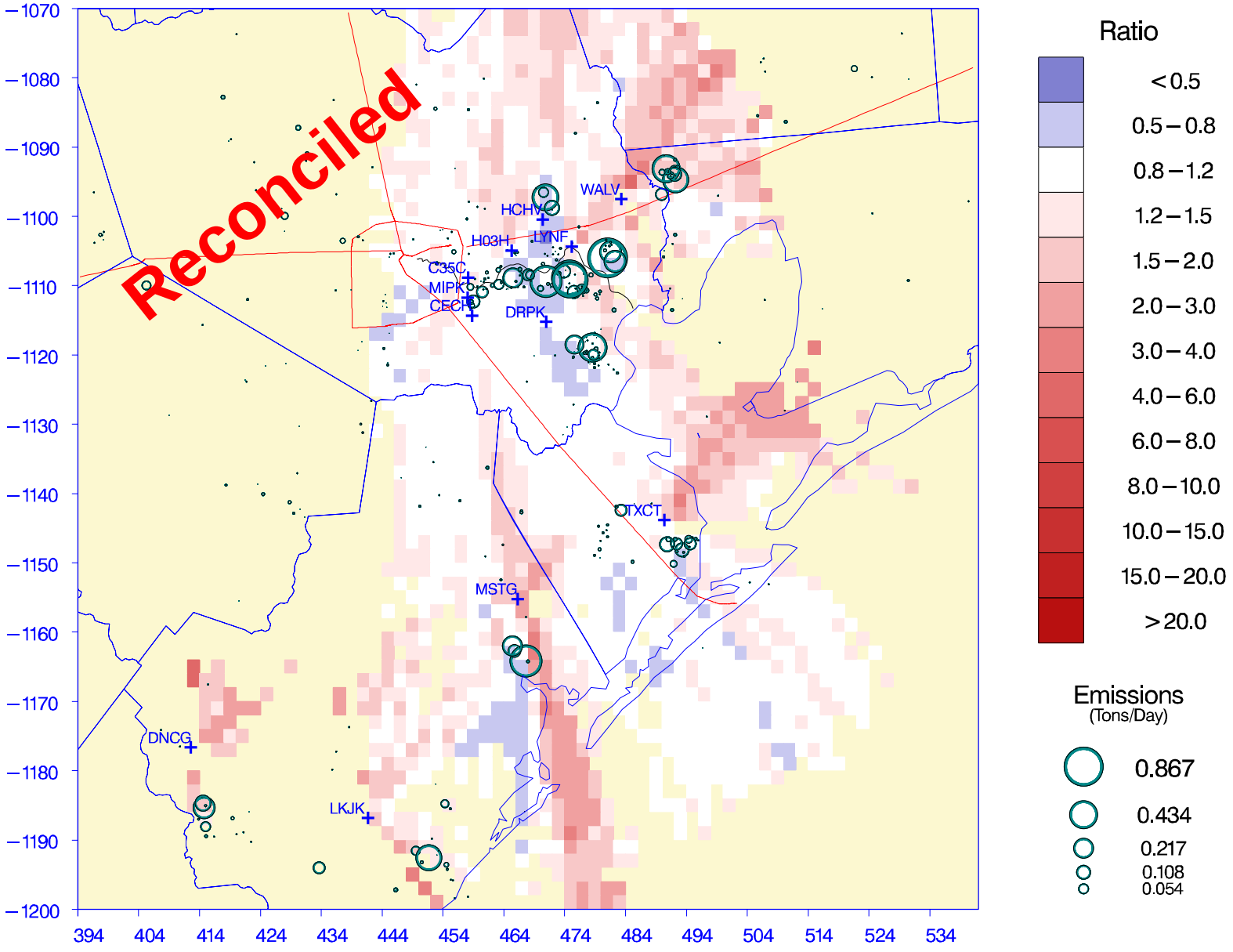


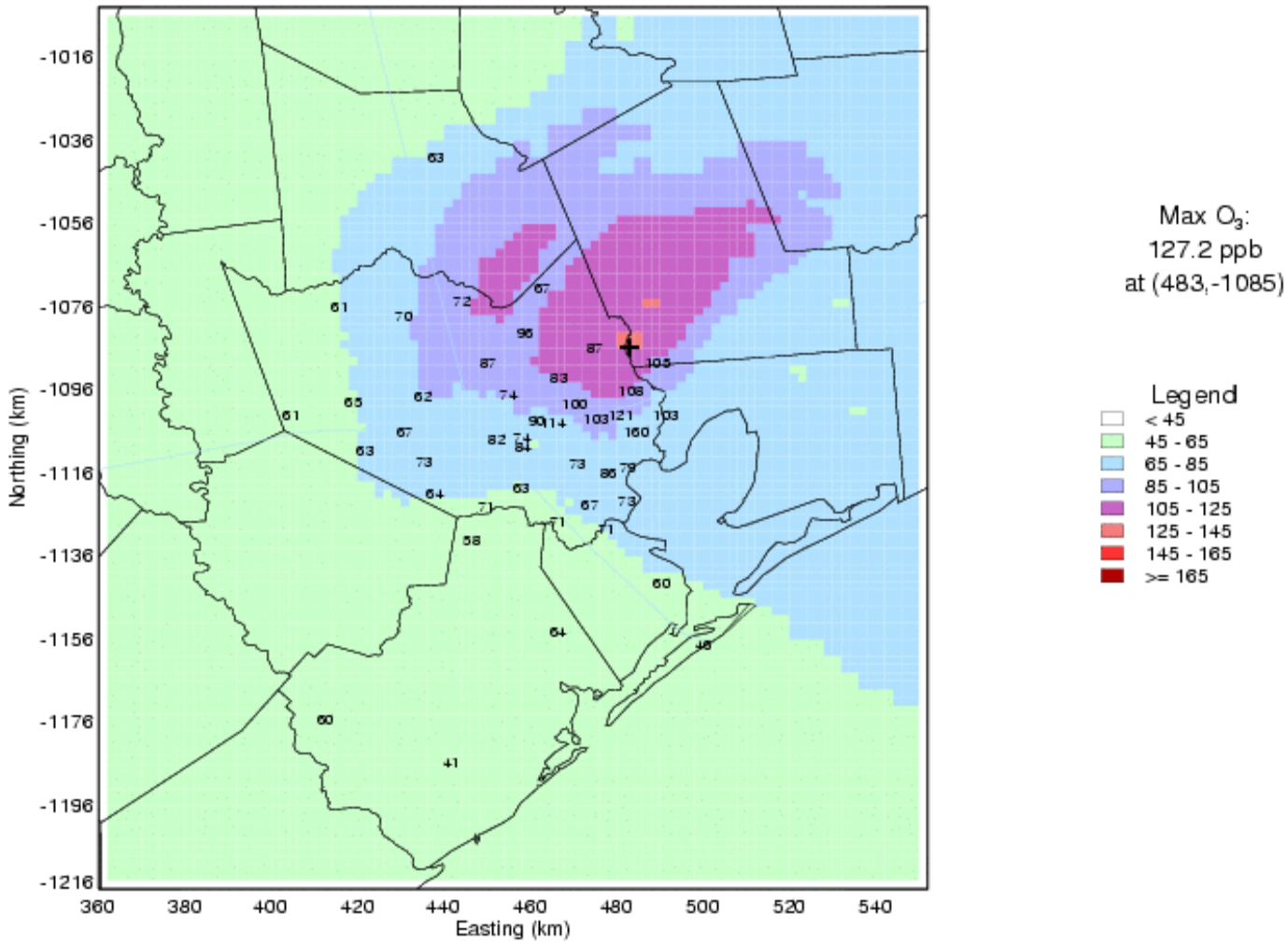
Preliminary Runs of CAMx Using Reconciled Emissions

- **We ran CAMx for the 3 2005 episodes using the reconciled emissions, and compared:**
  - **Peak ozone tileplots**
  - **Model performance statistics**
  - **Scatter plots**
  - **Time series**

Daily Maximum Hourly Average O_3 Concentrations (ppb) for **05/22/2005**

camx450_cb05.hgb8h2.bc05may.reg4_TFSfires.2005ep0_eta_fdda_ncepsst

Layer 1



Daily Maximum Hourly Average O_3 Concentrations (ppb) for **05/22/2005**

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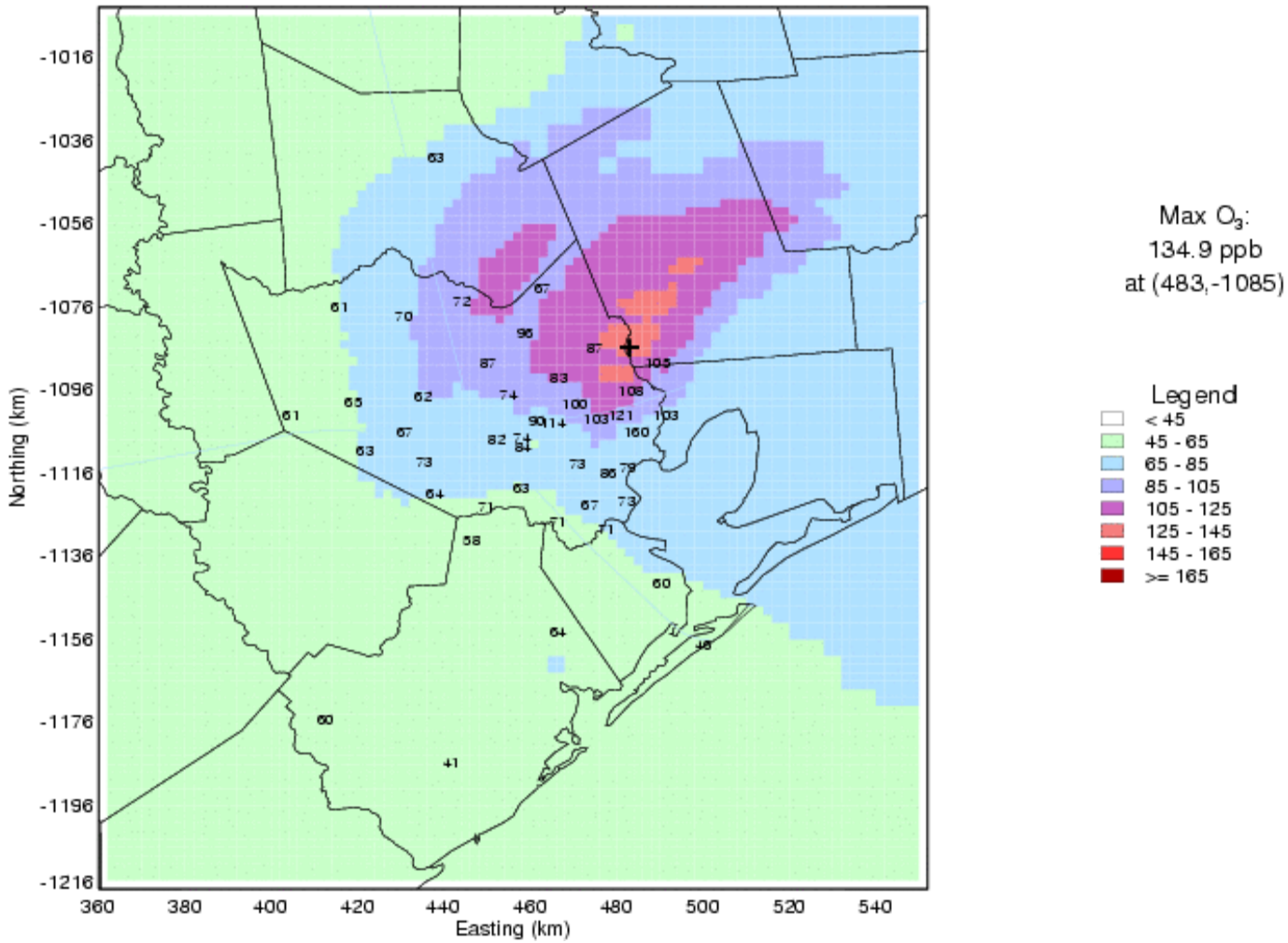
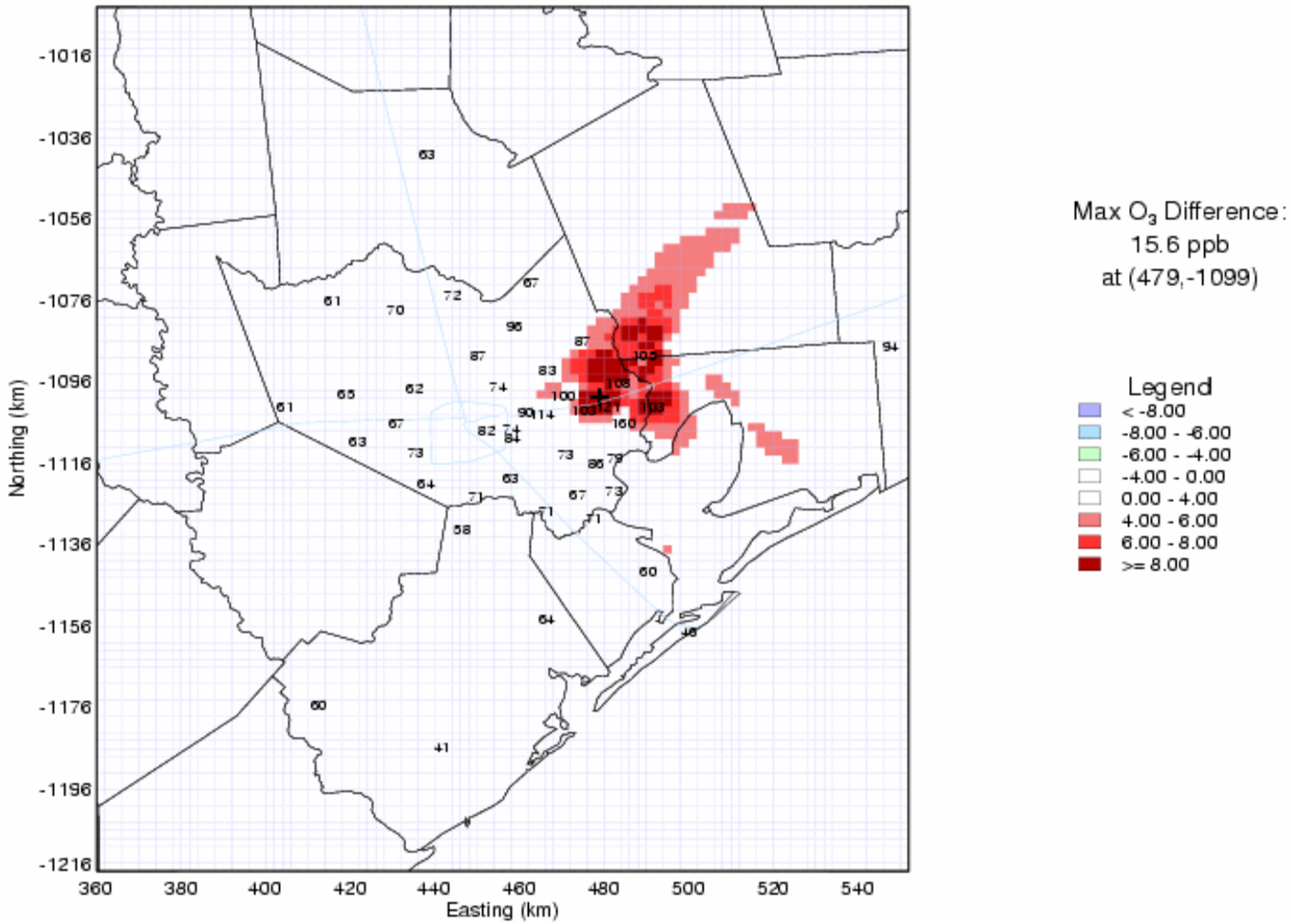
Layer 1



Difference of Daily Maximum Hourly Average O_3 Concentrations (ppb) for **05/22/2005**

b05.hgb8h2.bc05may.reg5_pscfv1.2005ep0_eta_fdda_ncepsst-camx450_cb05.hgb8h2.bc05may.reg4_TFSfires.2005ep0_eta_fd

Layer 1



Daily Maximum Hourly Average O_3 Concentrations (ppb) for **06/22/2005**

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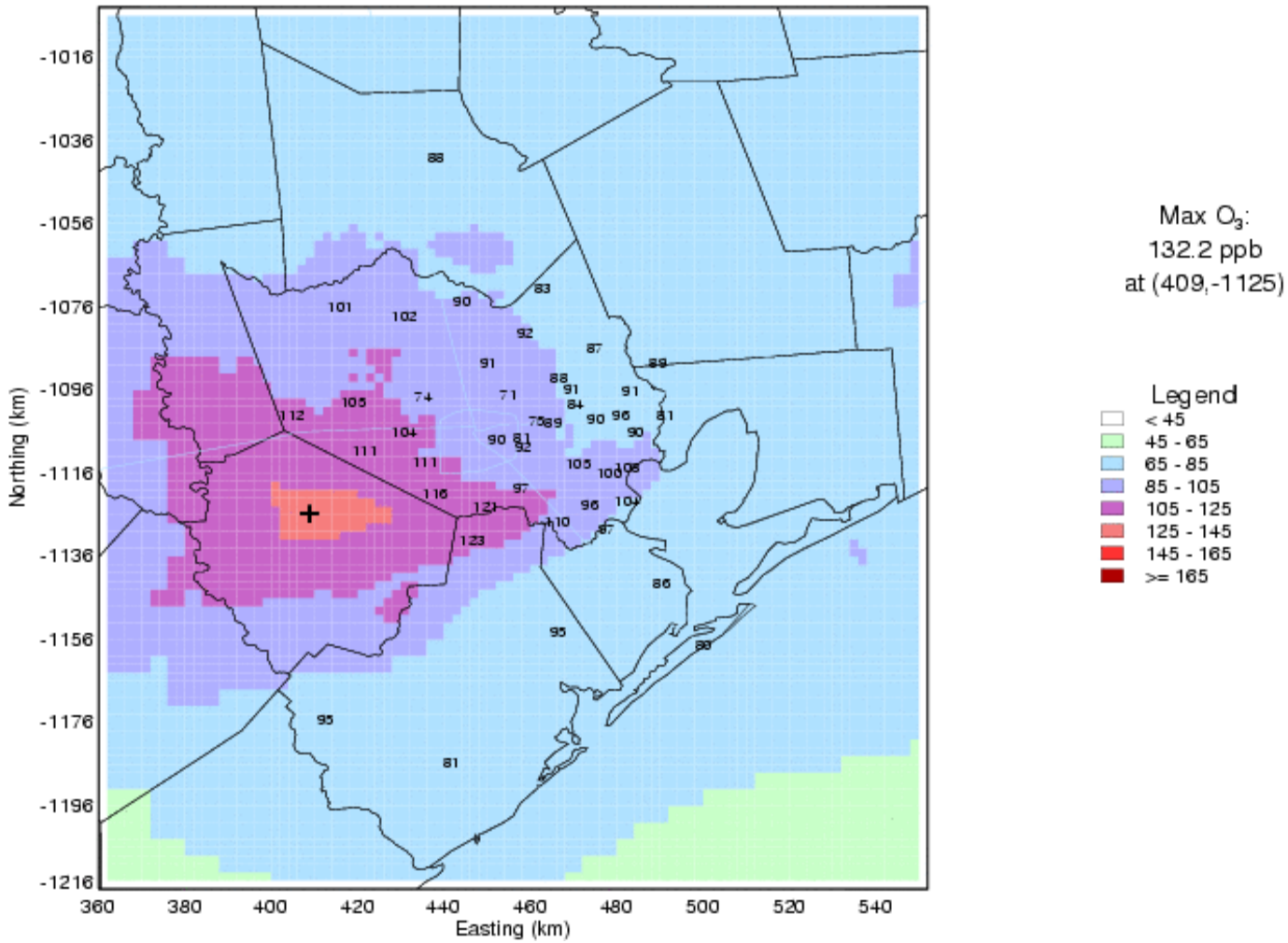
Layer 1



Daily Maximum Hourly Average O_3 Concentrations (ppb) for **06/22/2005**

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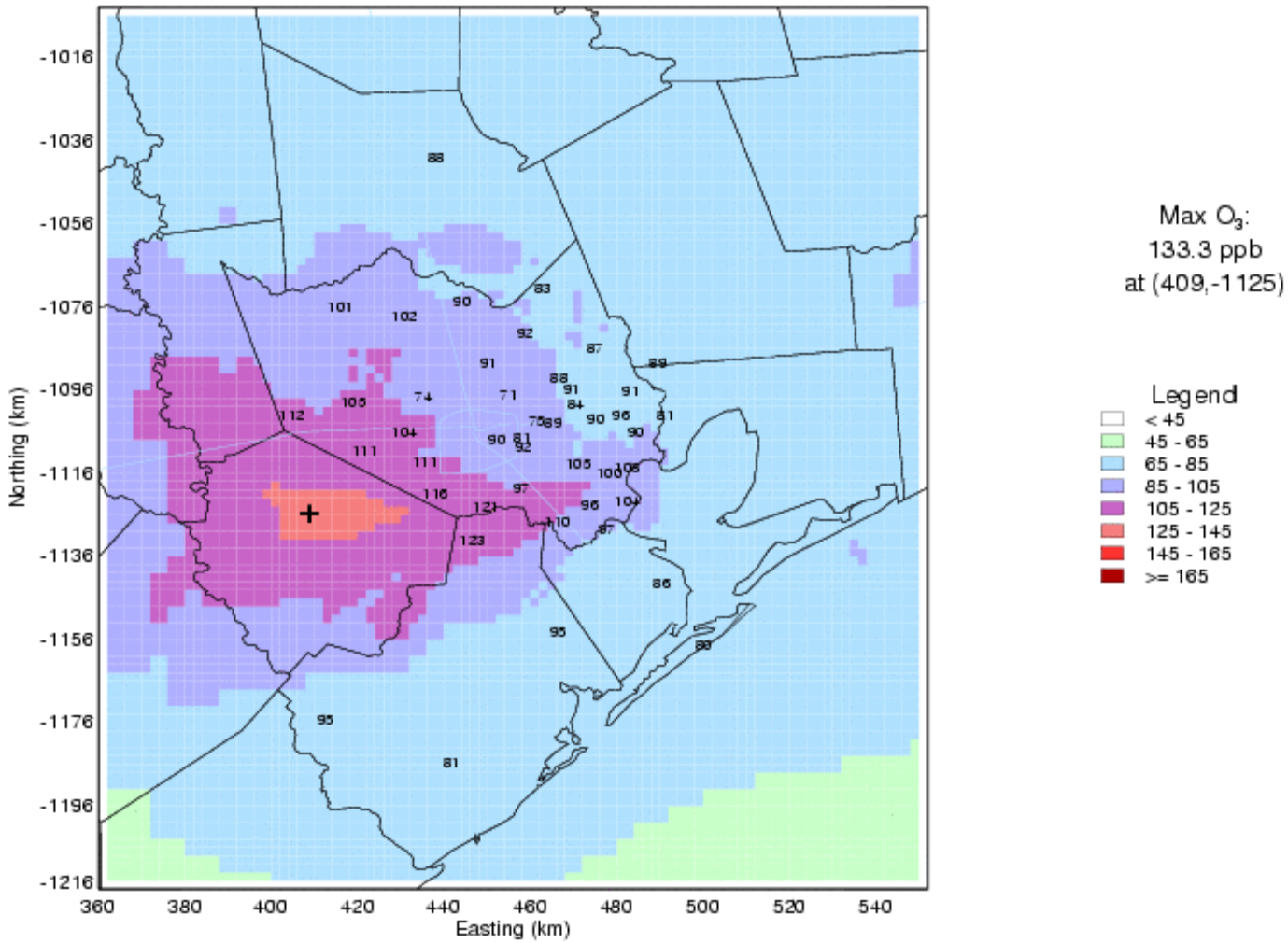

Difference of Daily Maximum Hourly Average O_3 Concentrations (ppb) for **06/22/2005**

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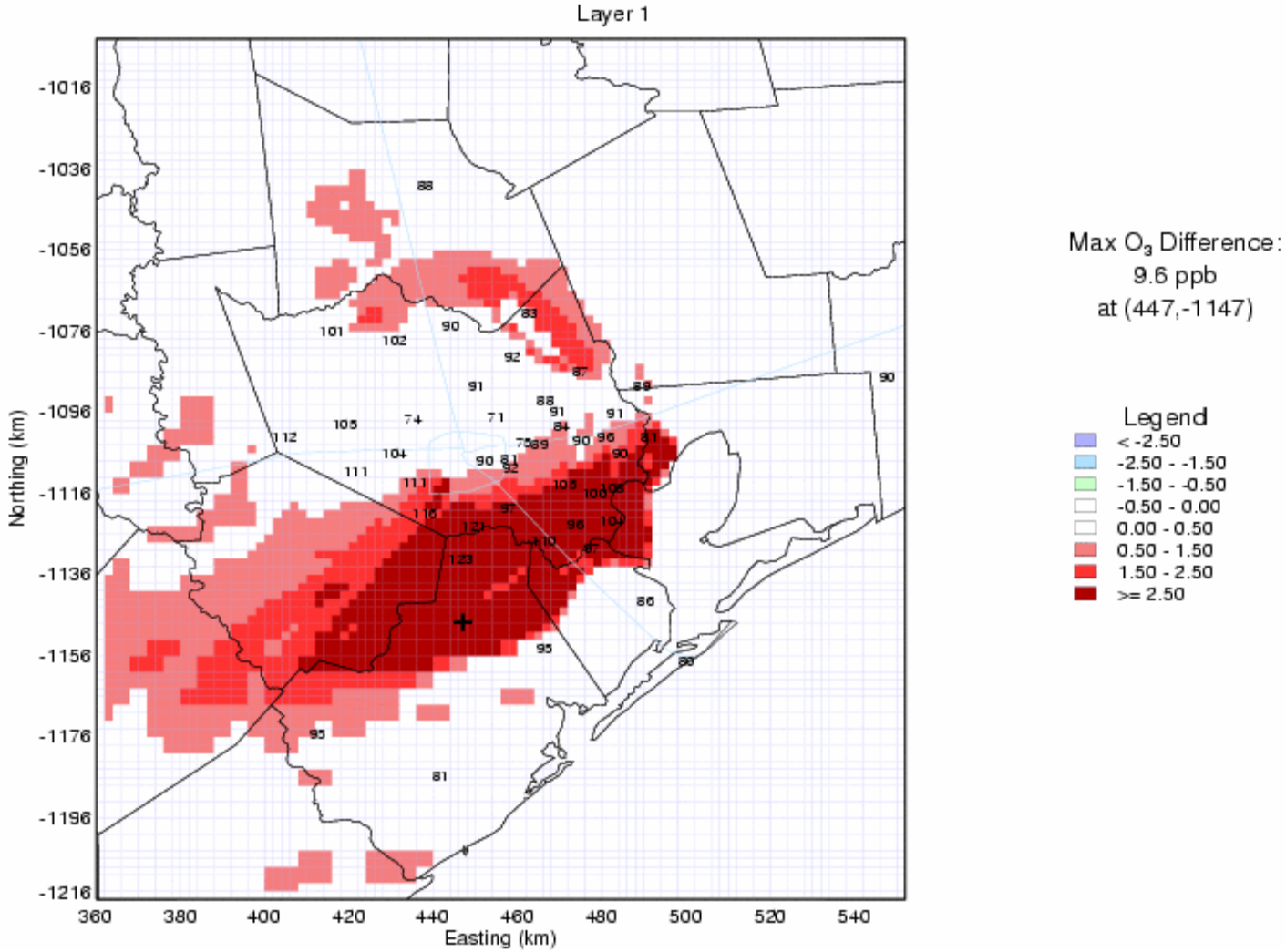

Daily Maximum Hourly Average O_3 Concentrations (ppb) for **08/02/2005**

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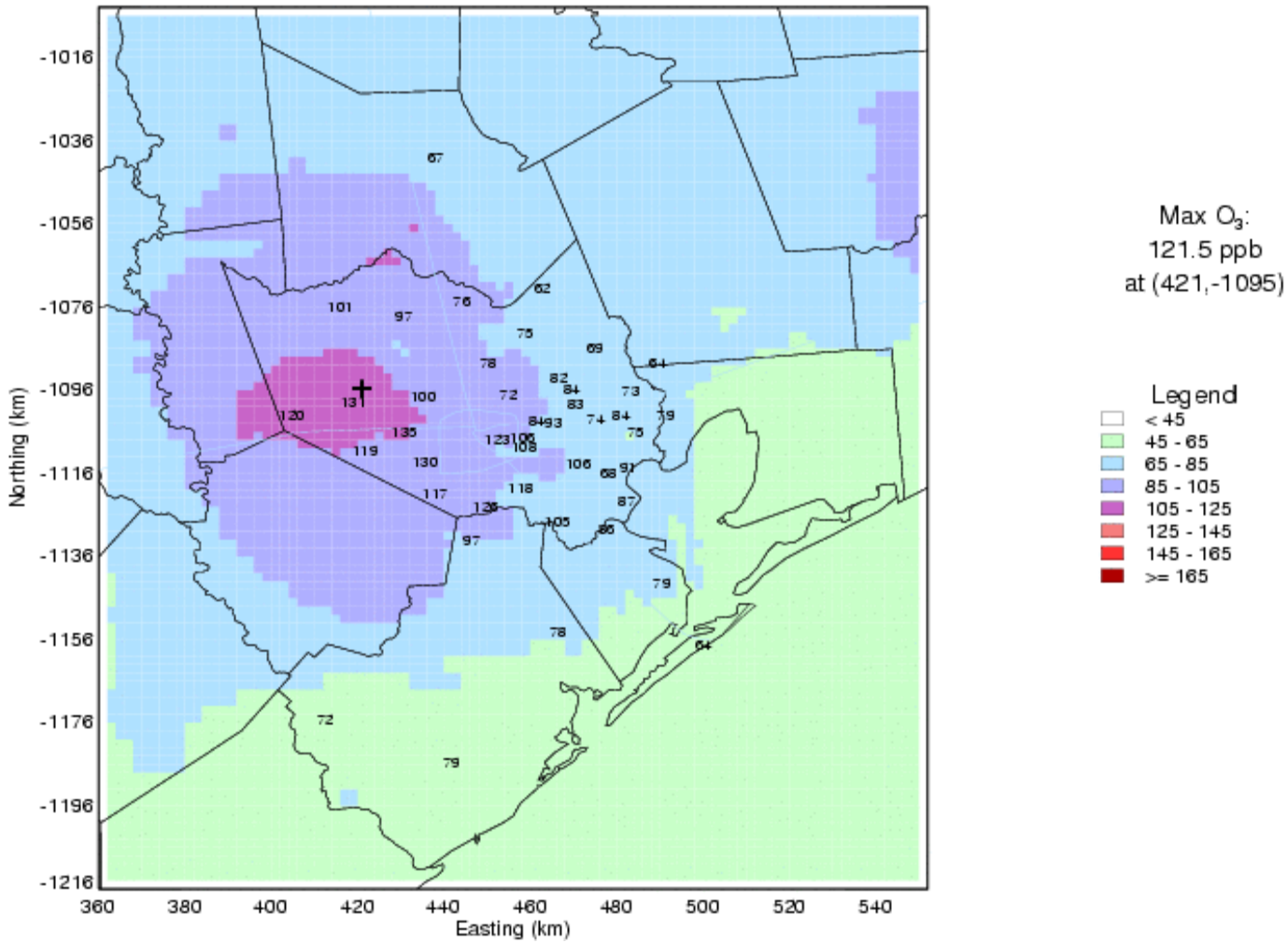
Layer 1



Daily Maximum Hourly Average O_3 Concentrations (ppb) for **08/02/2005**

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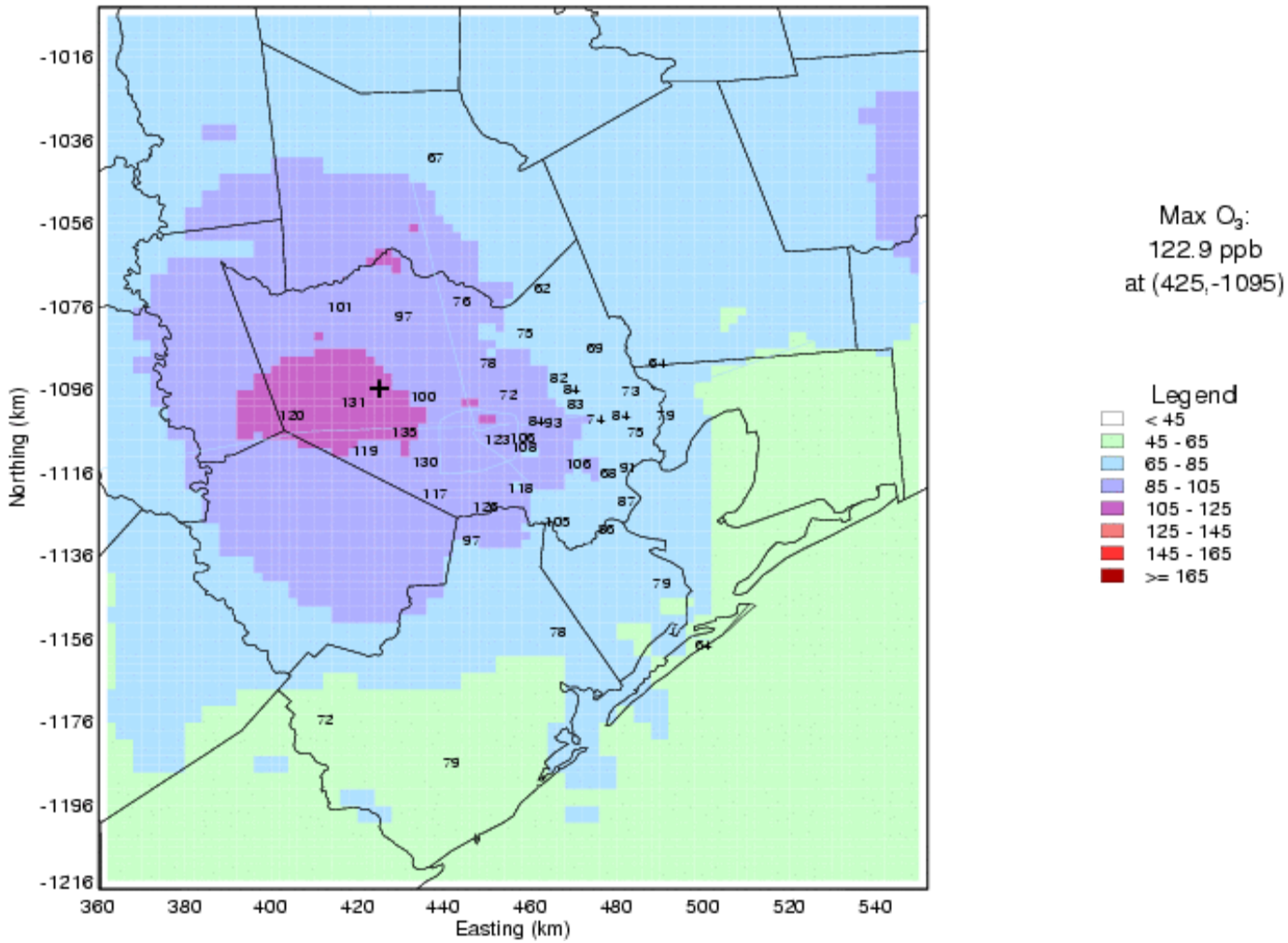
Layer 1



Difference of Daily Maximum Hourly Average O_3 Concentrations (ppb) for **08/02/2005**

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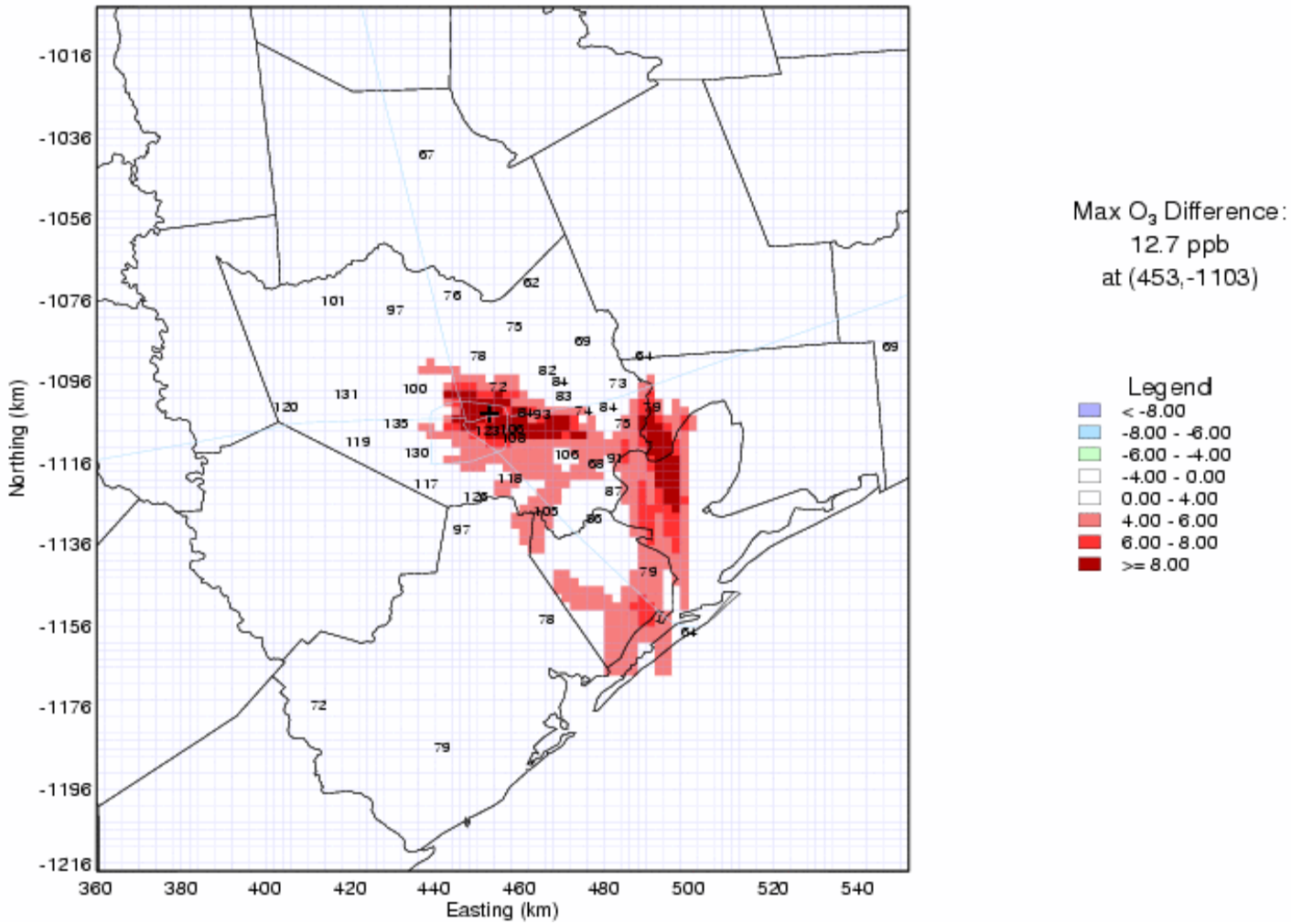
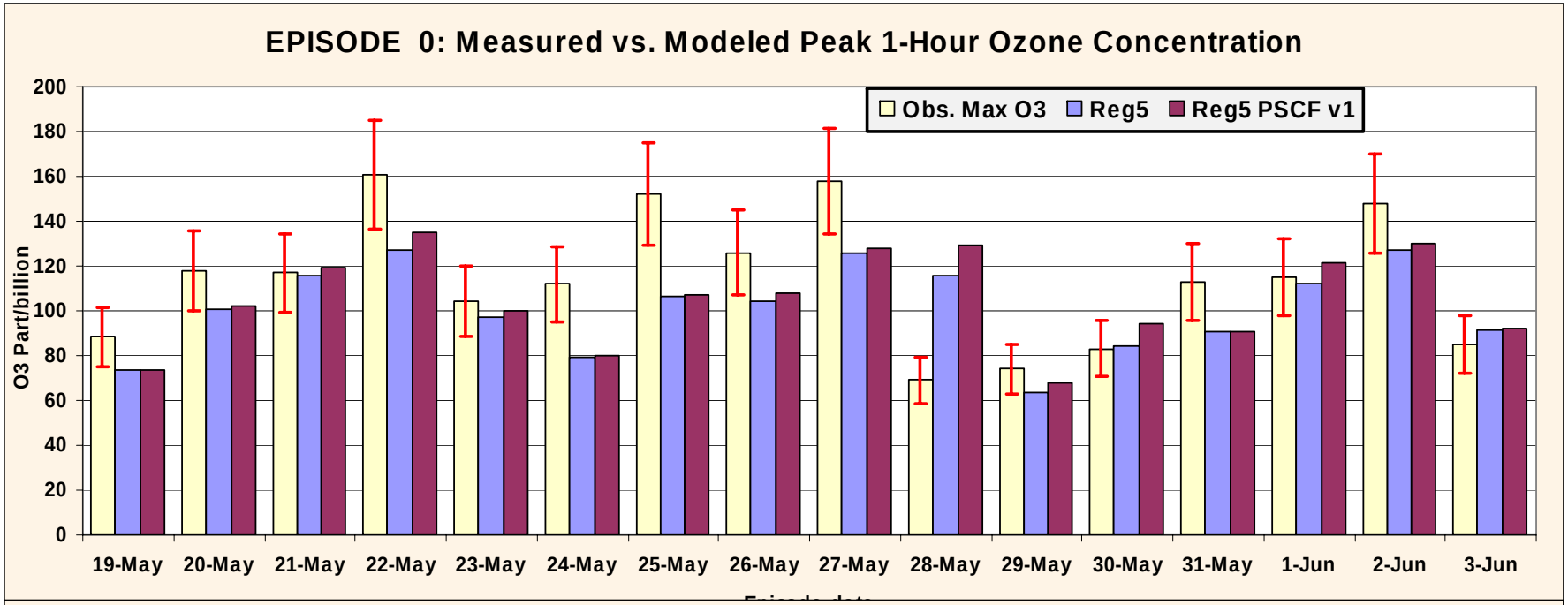
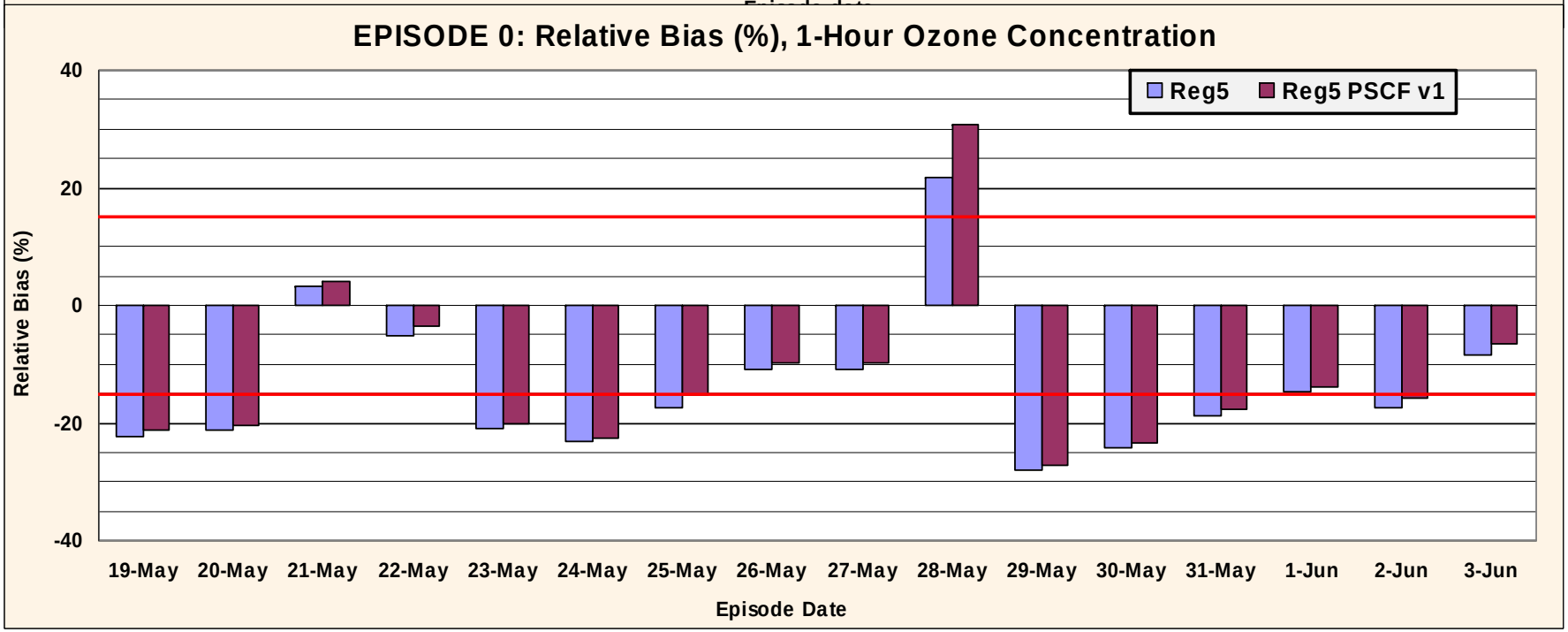
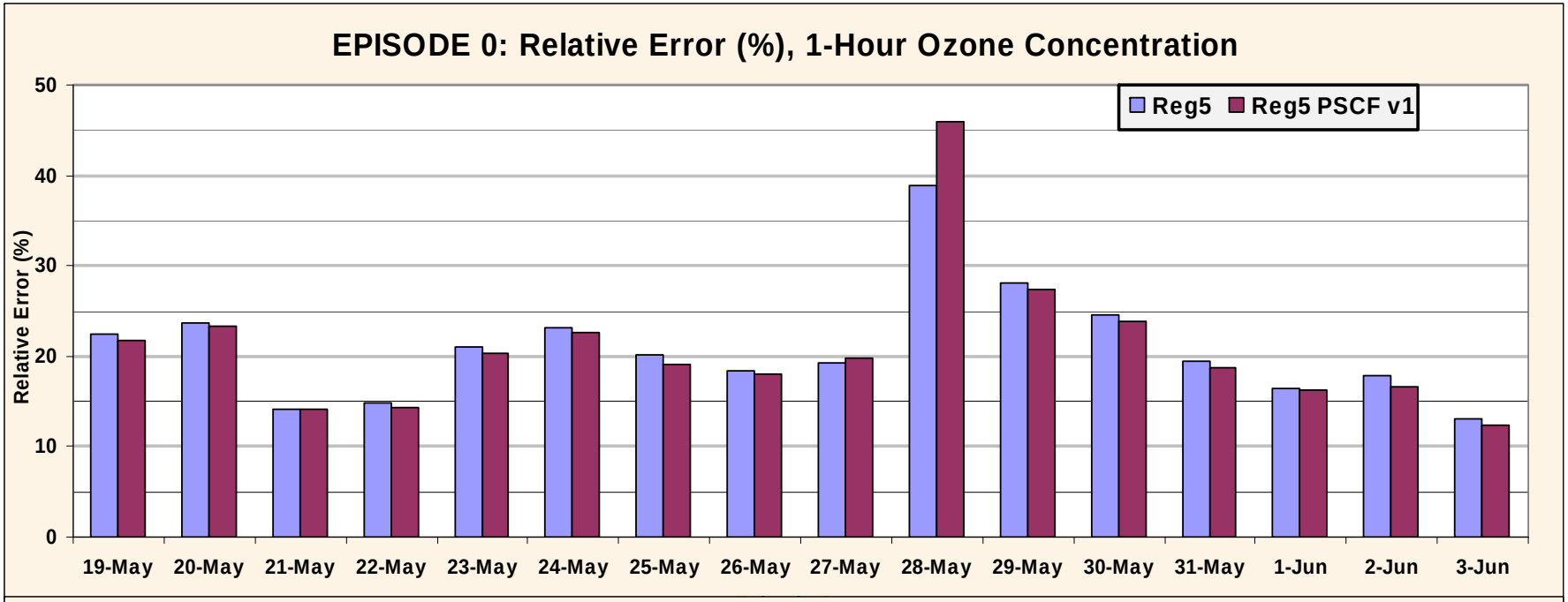
Layer 1




EPISODE 0: Measured vs. Modeled Peak 1-Hour Ozone Concentration
Obs. Max O3
Reg5
Reg5 PSCF v1
O3 Part/billion
200
180
160
140
120
100
80
60
40
20
0
19-May
20-May
21-May
22-May
23-May
24-May
25-May
26-May
27-May
28-May
29-May
30-May
31-May
1-Jun
2-Jun
3-Jun


EPISODE 0: Relative Bias (%), 1-Hour Ozone Concentration
Reg5
Reg5 PSCF v1
Relative Bias (%)
40
20
0
-20
-40
19-May
20-May
21-May
22-May
23-May
24-May
25-May
26-May
27-May
28-May
29-May
30-May
31-May
1-Jun
2-Jun
3-Jun
Episode Date


EPISODE 0: Relative Error (%), 1-Hour Ozone Concentration
Reg5
Reg5 PSCF v1
Relative Error (%)
0
10
20
30
40
50
19-May
20-May
21-May
22-May
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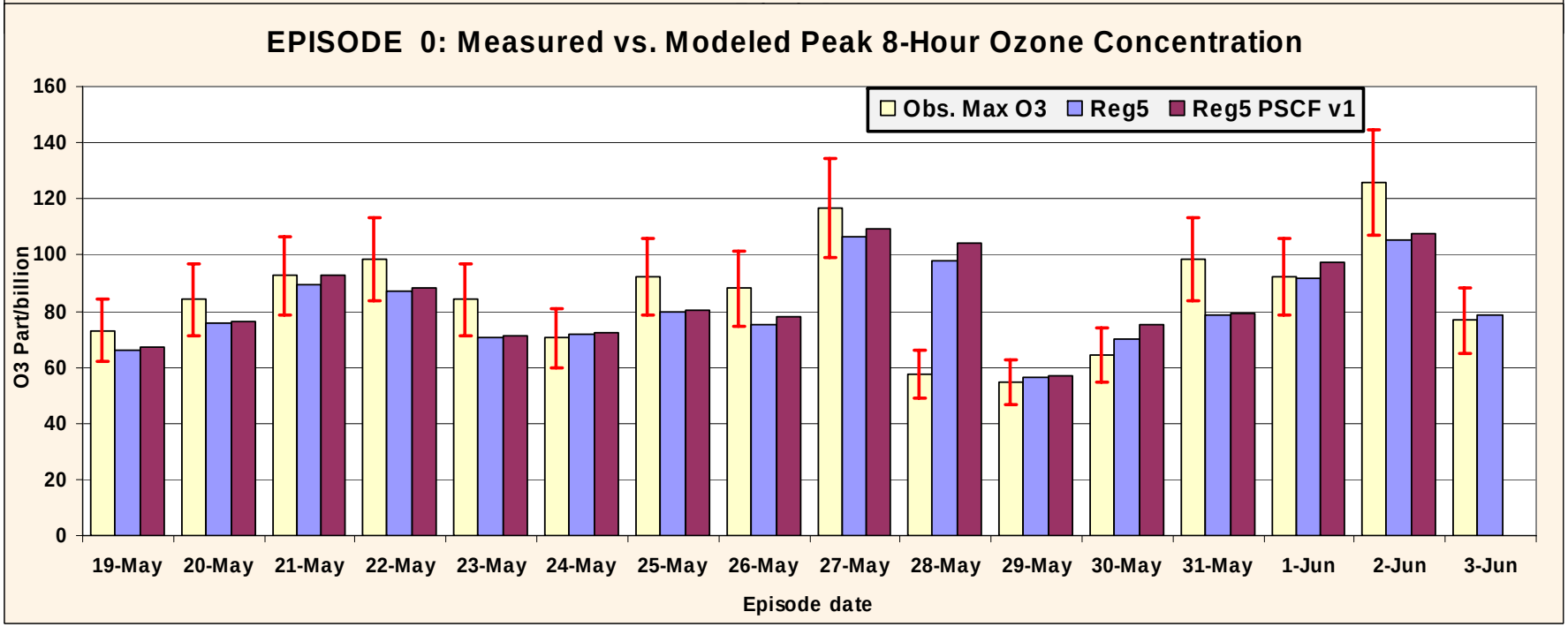
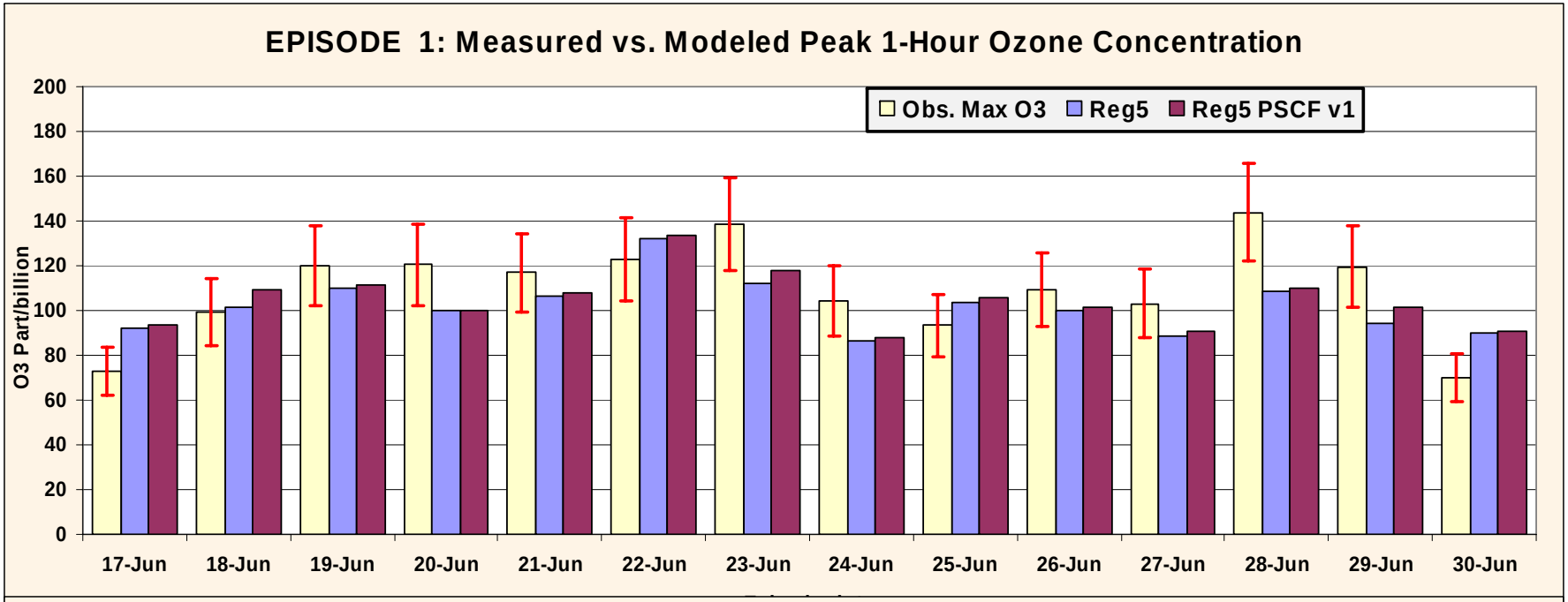
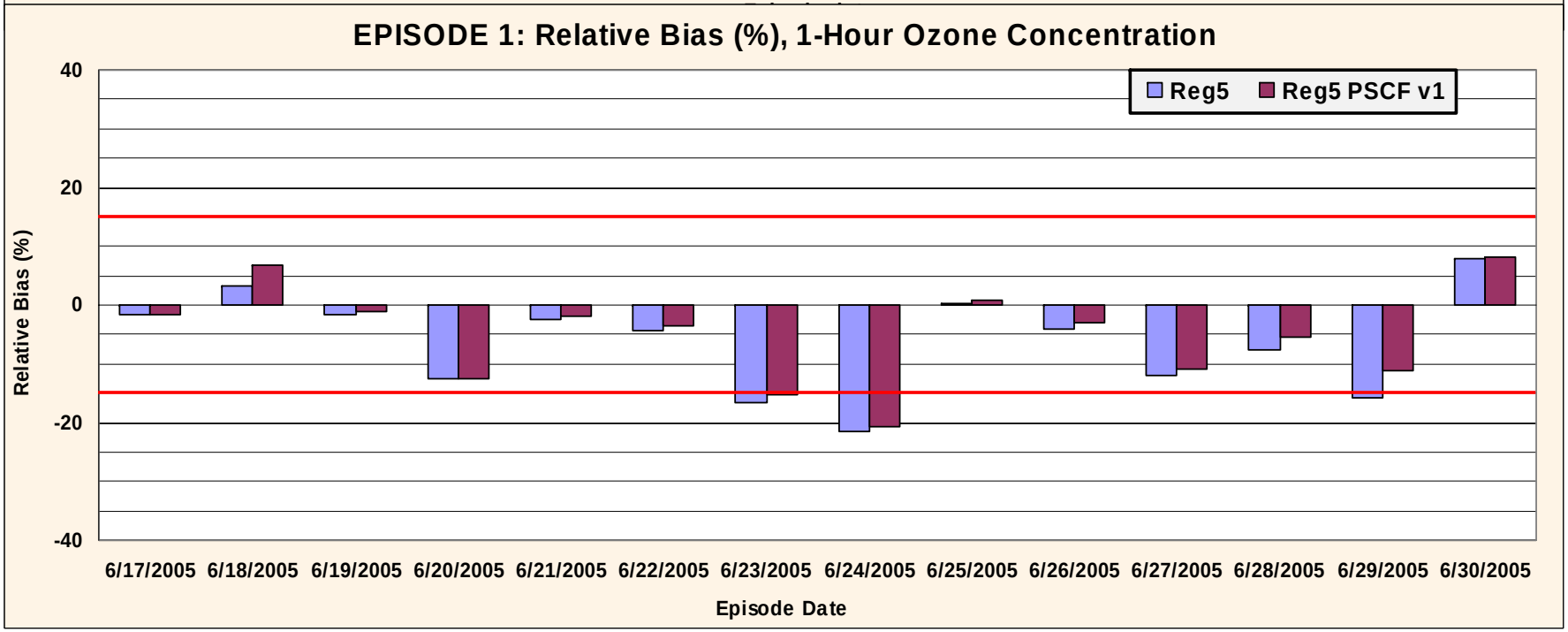
30-May
31-May
1-Jun
2-Jun
3-Jun


EPISODE 0: Measured vs. Modeled Peak 8-Hour Ozone Concentration
Obs. Max O3
Reg5
Reg5 PSCF v1
O3 Part/billion
0
20
40
60
80
100
120
140
160
19-May
20-May
21-May
22-May
23-May
24-May
25-May
26-May
27-May
28-May
29-May
30-May
31-May
1-Jun
2-Jun
3-Jun
Episode date


EPISODE 1: Measured vs. Modeled Peak 1-Hour Ozone Concentration
Obs. Max O3
Reg5
Reg5 PSCF v1
O3 Part/billion
200
180
160
140
120
100
80
60
40
20
0
17-Jun
18-Jun
19-Jun
20-Jun
21-Jun
22-Jun
23-Jun
24-Jun
25-Jun
26-Jun
27-Jun
28-Jun
29-Jun
30-Jun


EPISODE 1: Relative Bias (%), 1-Hour Ozone Concentration
Reg5
Reg5 PSCF v1
Relative Bias (%)
40
20
0
-20
-40
6/17/2005
6/18/2005
6/19/2005
6/20/2005
6/21/2005
6/22/2005
6/23/2005
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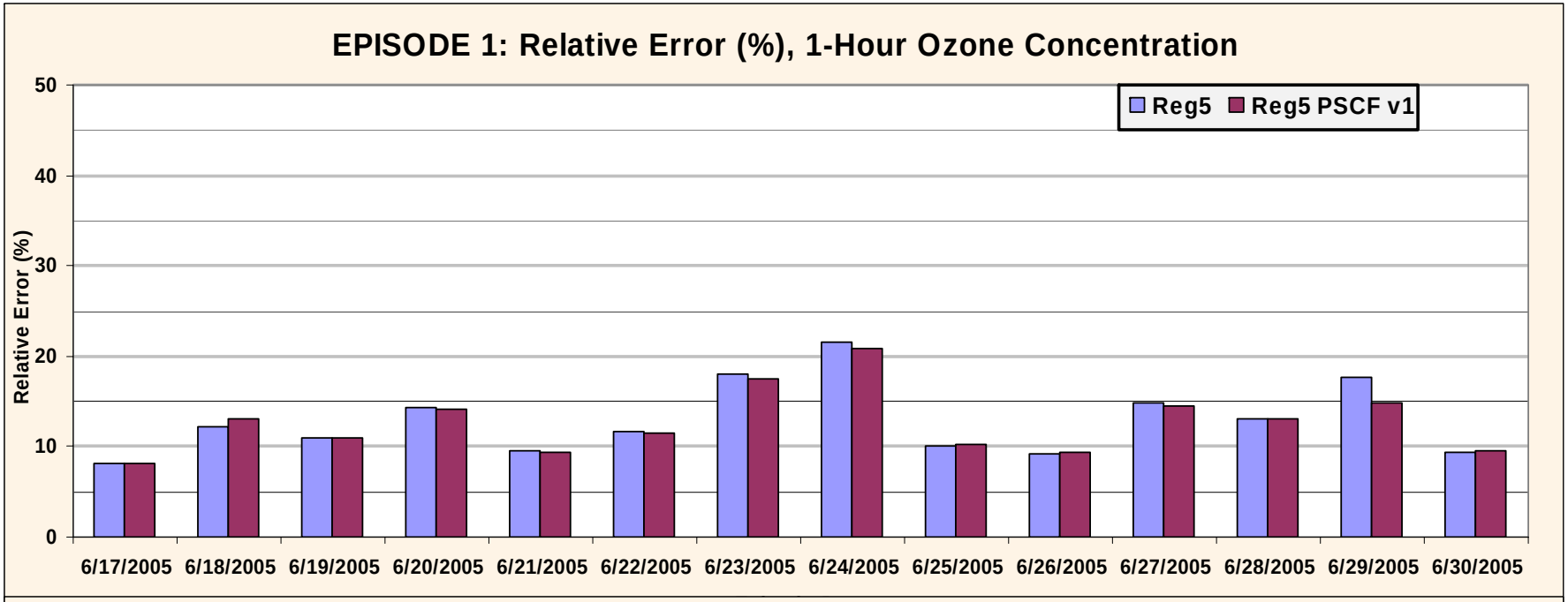
6/27/2005
6/28/2005
6/29/2005
6/30/2005
Episode Date


EPISODE 1: Relative Error (%), 1-Hour Ozone Concentration
Reg5
Reg5 PSCF v1
Relative Error (%)
50
40
30
20
10
0
6/17/2005
6/18/2005
6/19/2005
6/20/2005
6/21/2005
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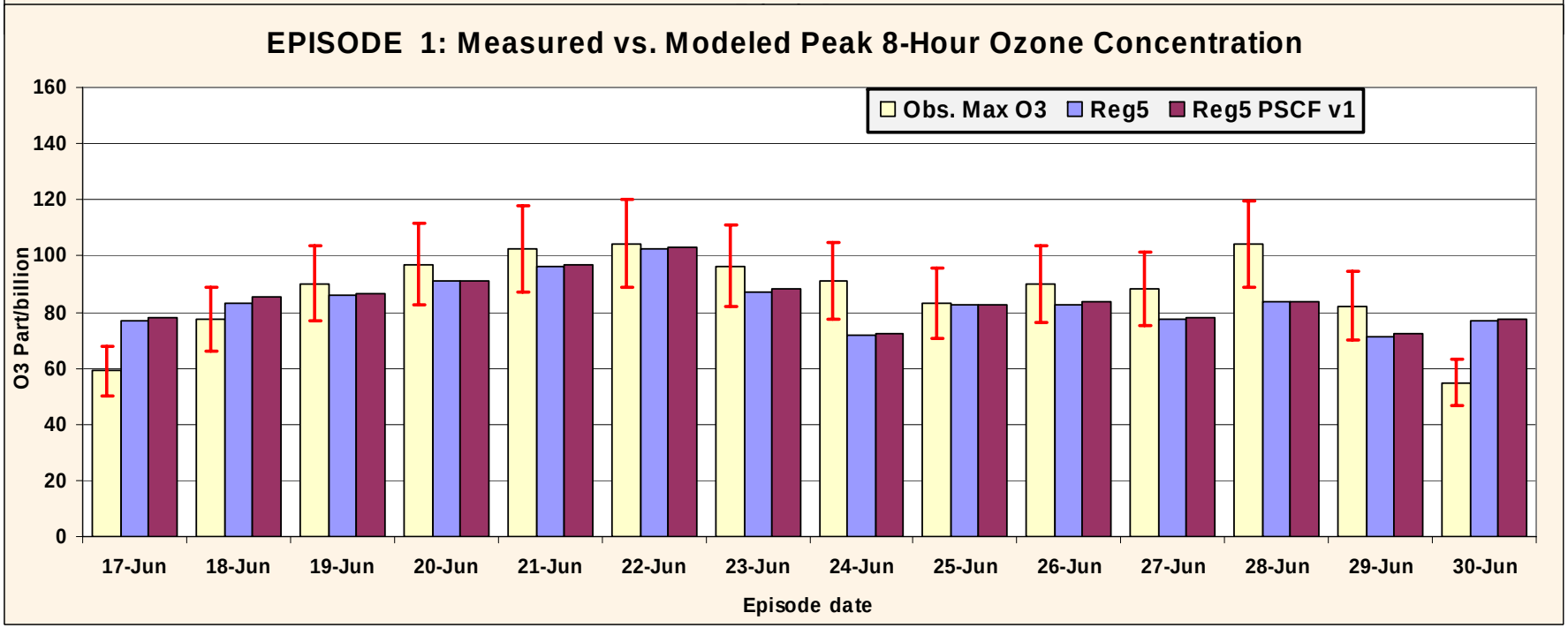
6/30/2005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Reg5
Reg5 PSCF v1
O3 Part/billion
160
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18-Jun
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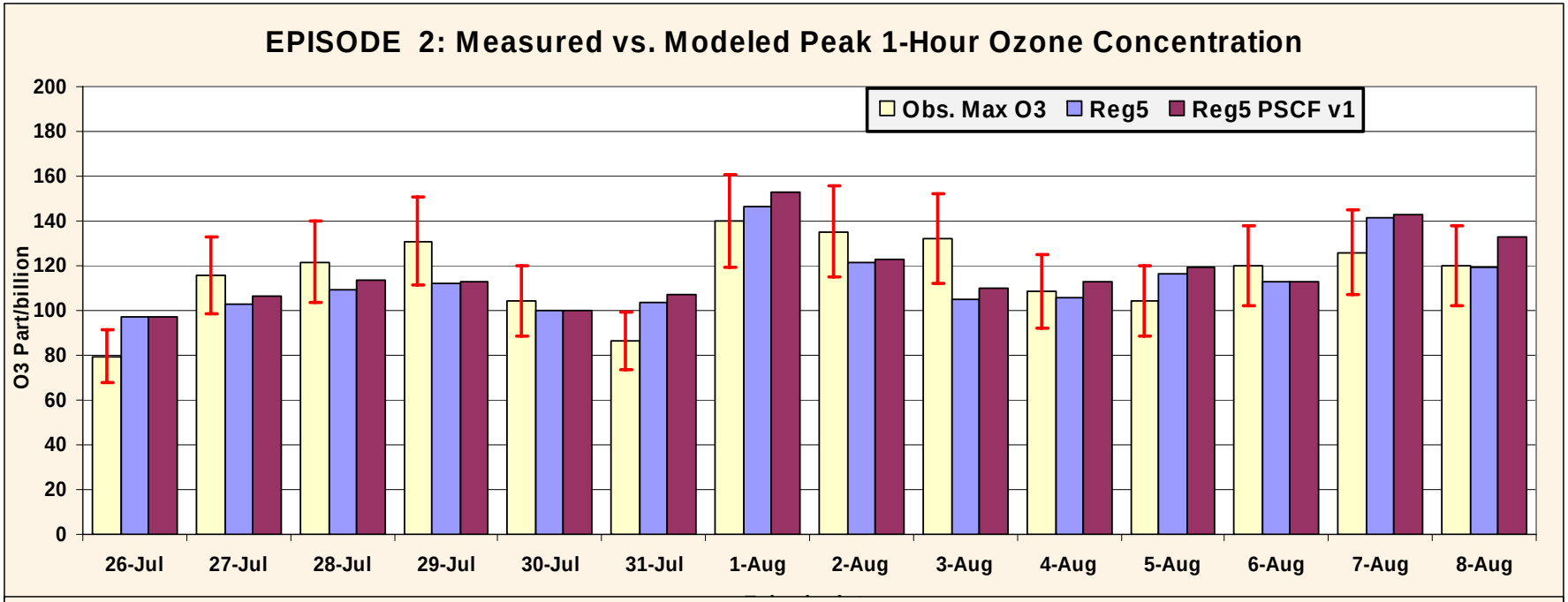
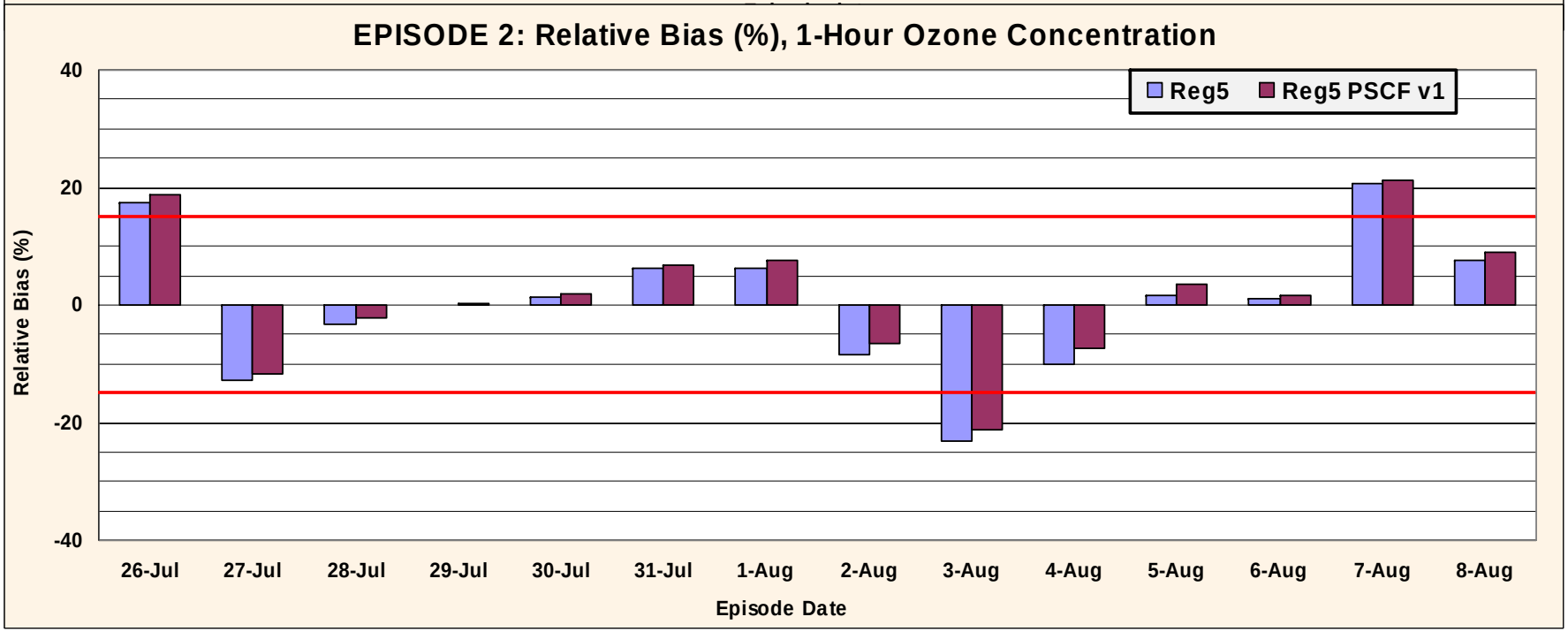
23-Jun
24-Jun
25-Jun
26-Jun
27-Jun
28-Jun
29-Jun
30-Jun
Episode date


EPISODE 2: Measured vs. Modeled Peak 1-Hour Ozone Concentration
Obs. Max O3
Reg5
Reg5 PSCF v1
O3 Part/billion
200
180
160
140
120
100
80
60
40
20
0
26-Jul
27-Jul
28-Jul
29-Jul
30-Jul
31-Jul
1-Aug
2-Aug
3-Aug
4-Aug
5-Aug
6-Aug
7-Aug
8-Aug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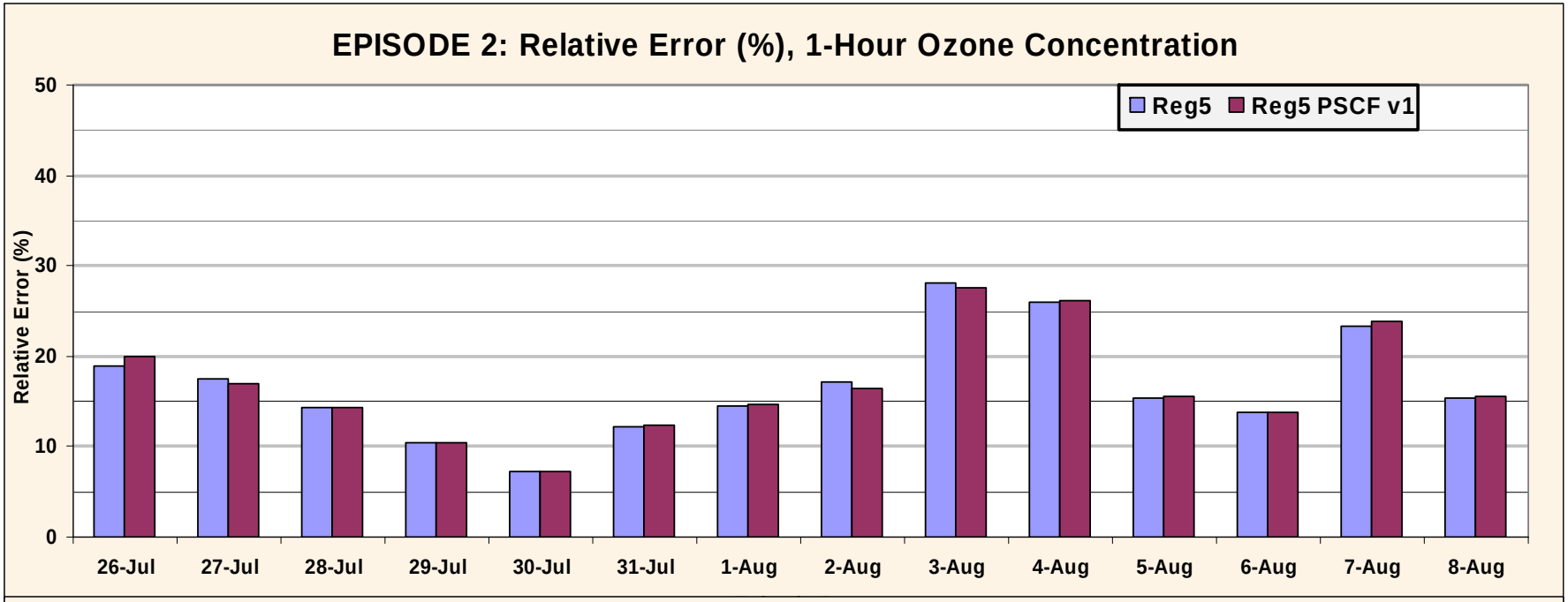
Reg5
Reg5 PSCF v1
Relative Bias (%)
40
20
0
-20
-40
26-Jul
27-Jul
28-Jul
29-Jul
30-Jul
31-Jul
1-Aug
2-Aug
3-Aug
4-Aug
5-Aug
6-Aug
7-Aug
8-Aug
Episode Date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Reg5
Reg5 PSCF v1
Relative Error (%)
0
10
20
30
40
50
26-Jul
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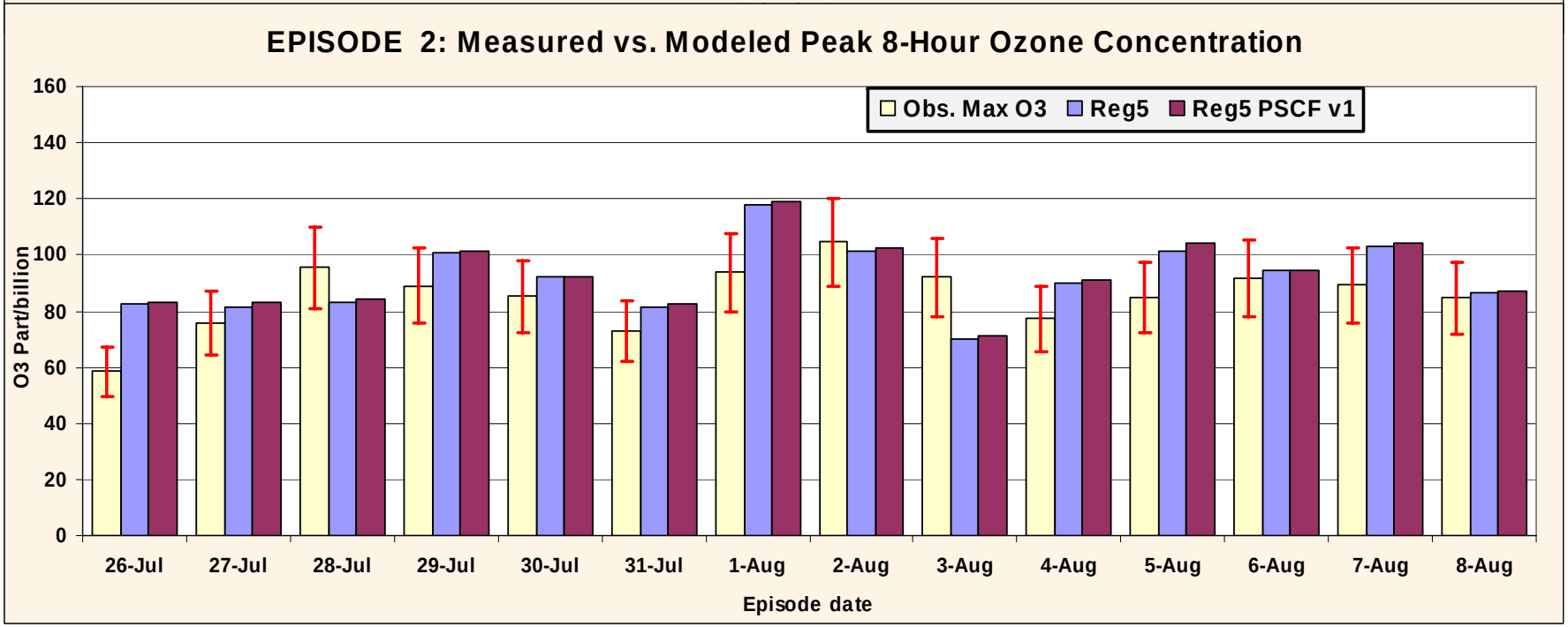
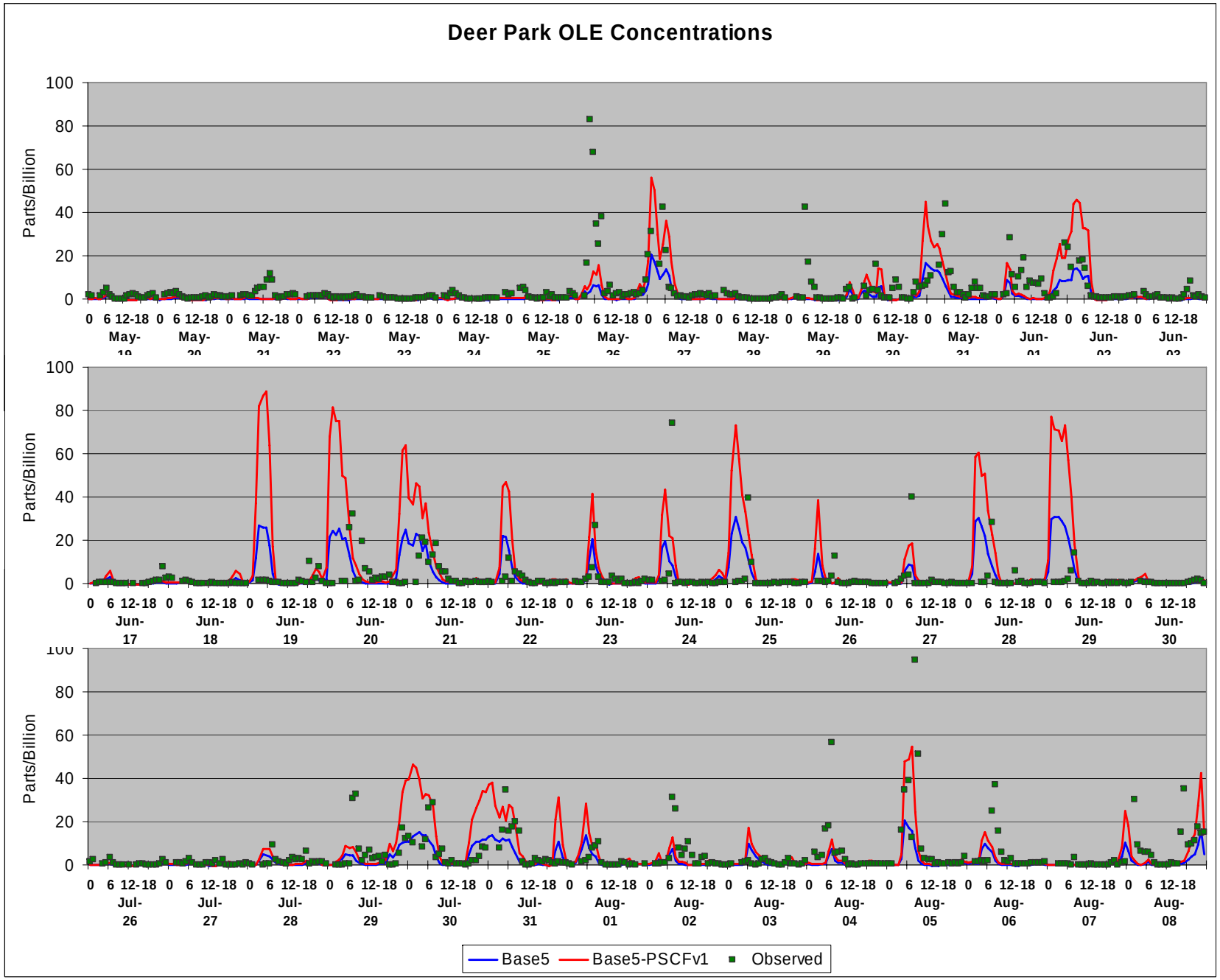
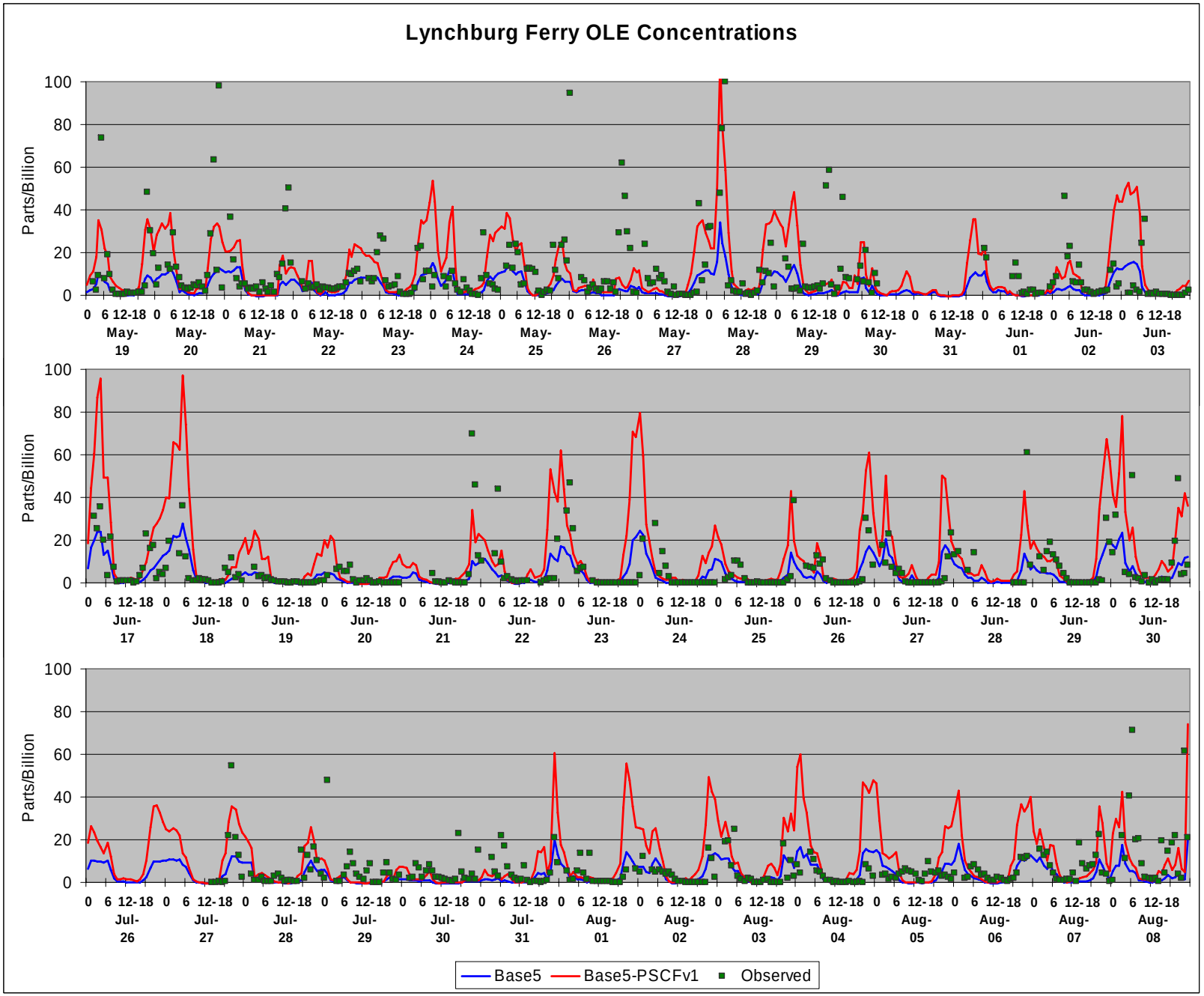
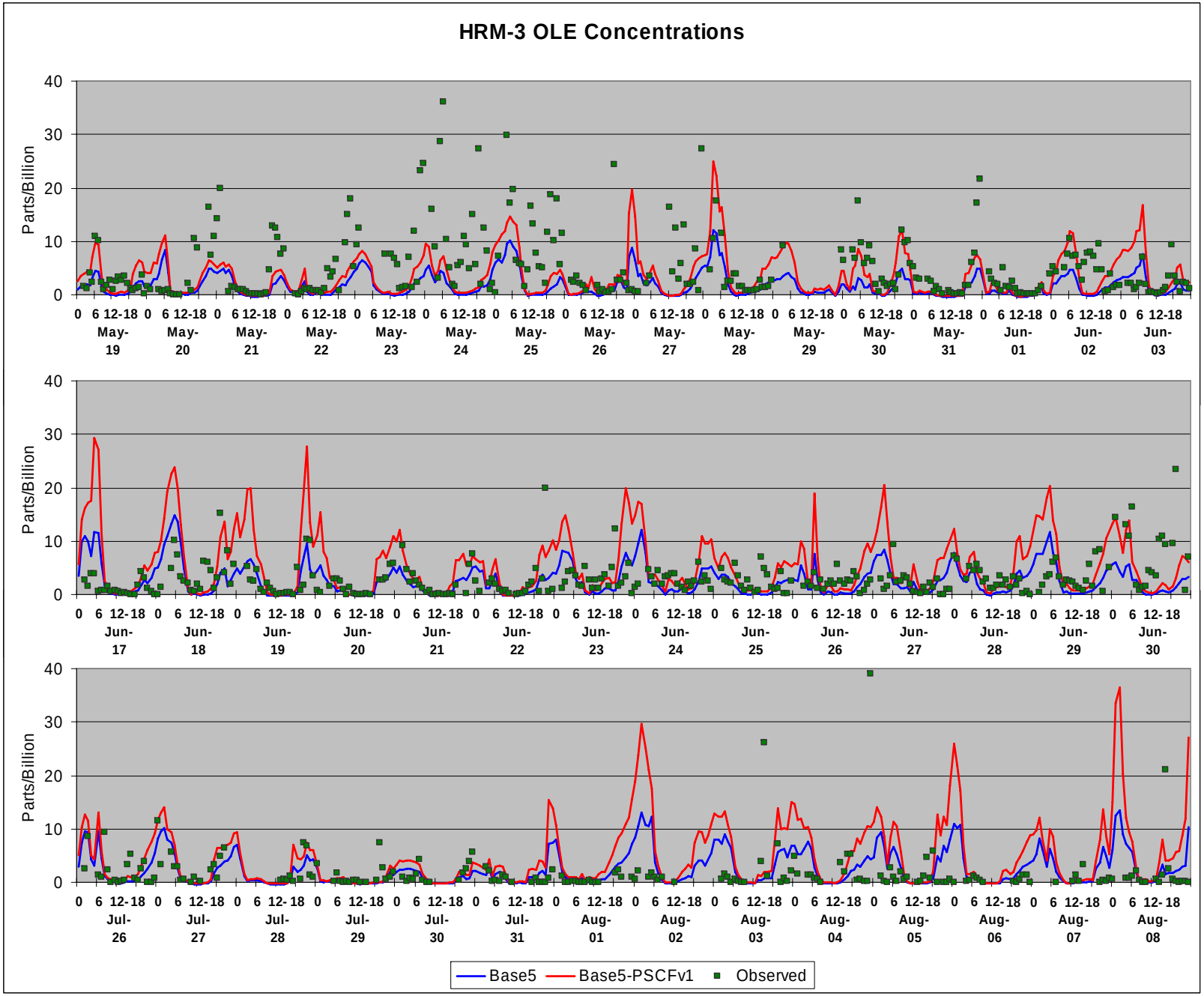
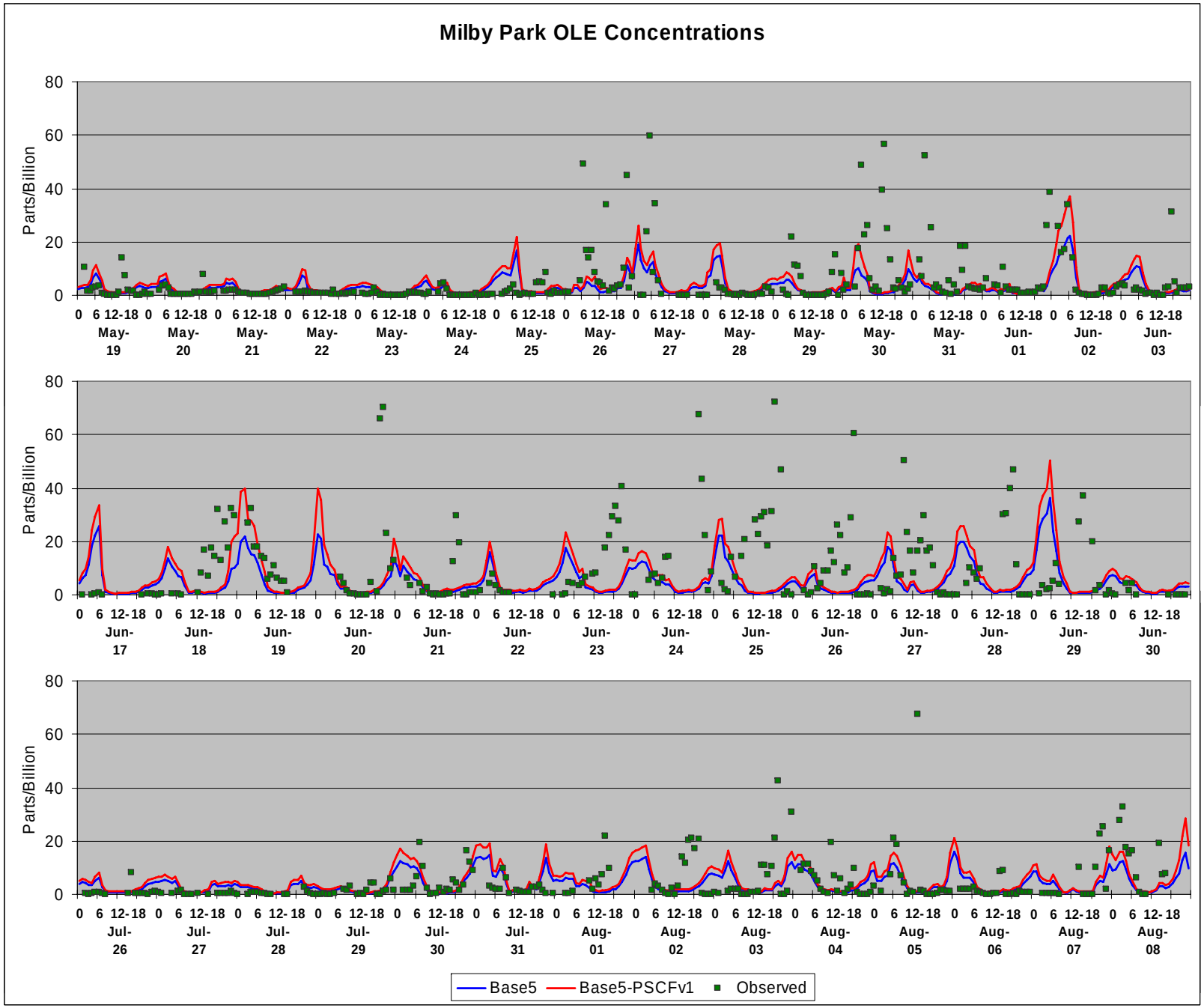
28-Jul
29-Jul
30-Jul
31-Jul
1-Aug
2-Aug
3-Aug
4-Aug
5-Aug
6-Aug
7-Aug
8-Aug

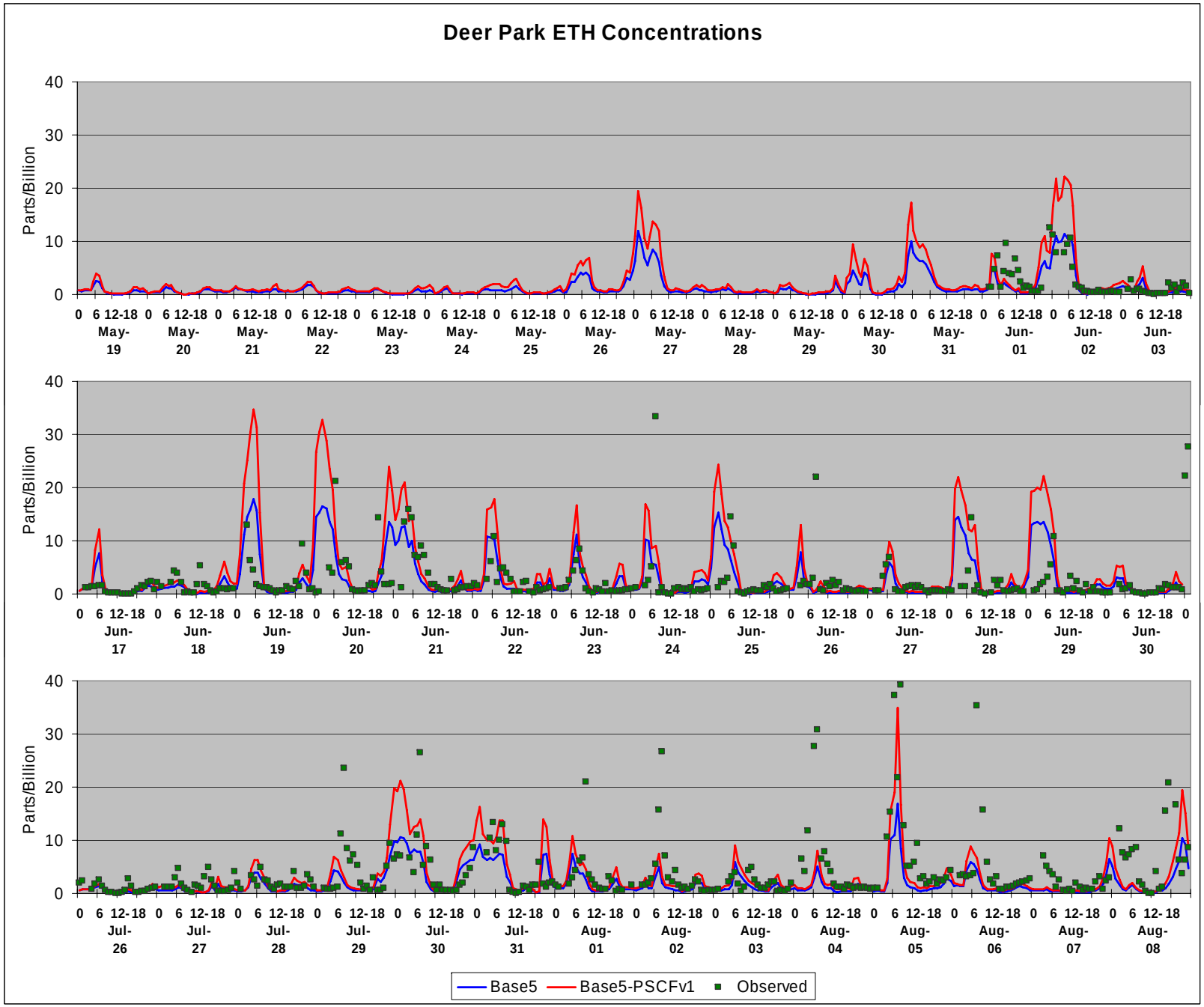

EPISODE 2: Measured vs. Modeled Peak 8-Hour Ozone Concentration
Obs. Max O3
Reg5
Reg5 PSCF v1
O3 Part/billion
0
20
40
60
80
100
120
140
160
26-Jul
27-Jul
28-Jul
29-Jul
30-Jul
31-Jul
1-Aug
2-Aug
3-Aug
4-Aug
5-Aug
6-Aug
7-Aug
8-Aug
Episode date

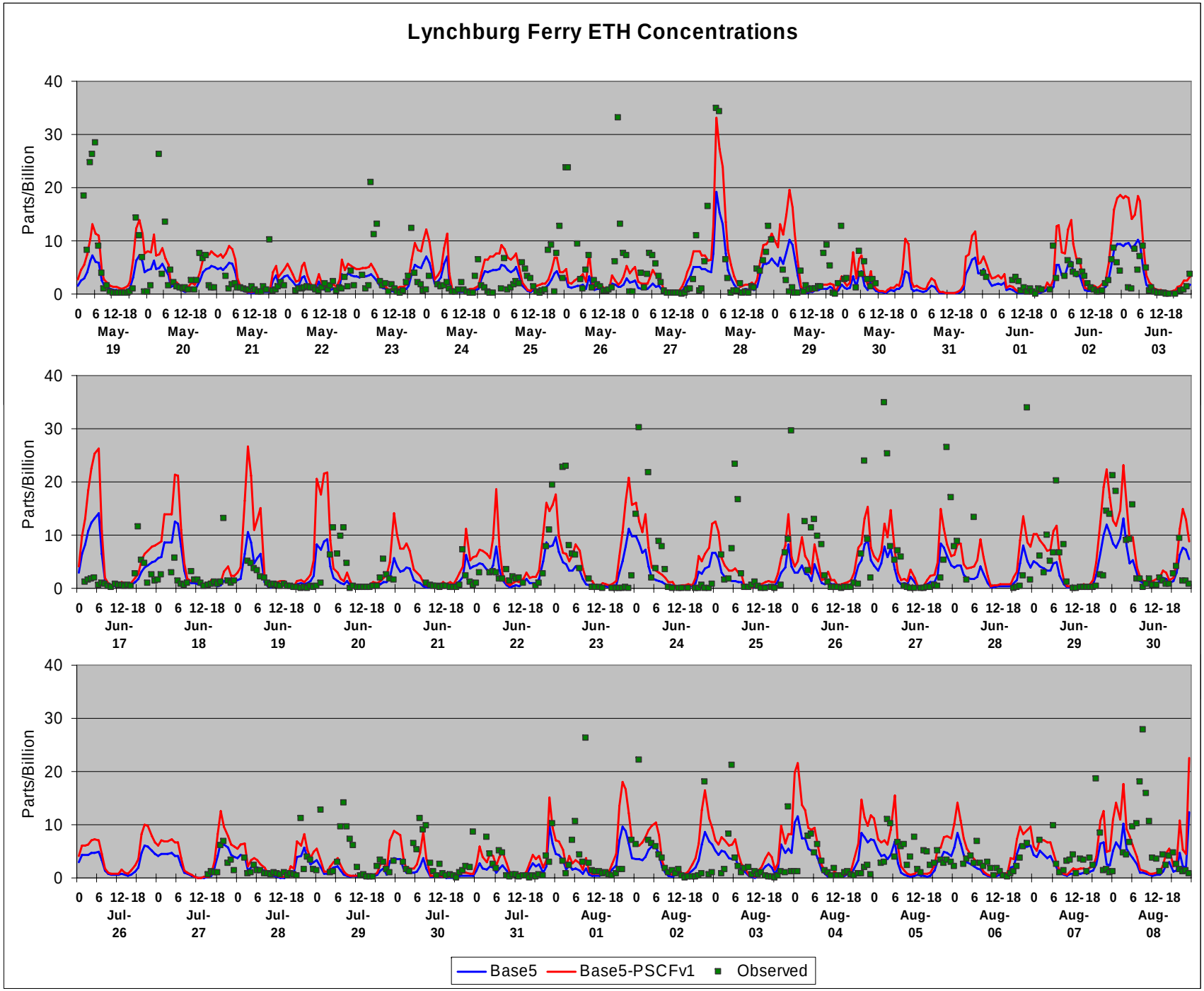

Deer Park OLE Concentrations
Parts/Billion
100
80
60
40
20
0
0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18
May-19 May-20 May-21 May-22 May-23 May-24 May-25 May-26 May-27 May-28 May-29 May-30 May-31 Jun-01 Jun-02 Jun-03
Jun-17 Jun-18 Jun-19 Jun-20 Jun-21 Jun-22 Jun-23 Jun-24 Jun-25 Jun-26 Jun-27 Jun-28 Jun-29 Jun-30
Jul-26 Jul-27 Jul-28 Jul-29 Jul-30 Jul-31 Aug-01 Aug-02 Aug-03 Aug-04 Aug-05 Aug-06 Aug-07 Aug-08
Base5
Base5-PSCFv1
Observed

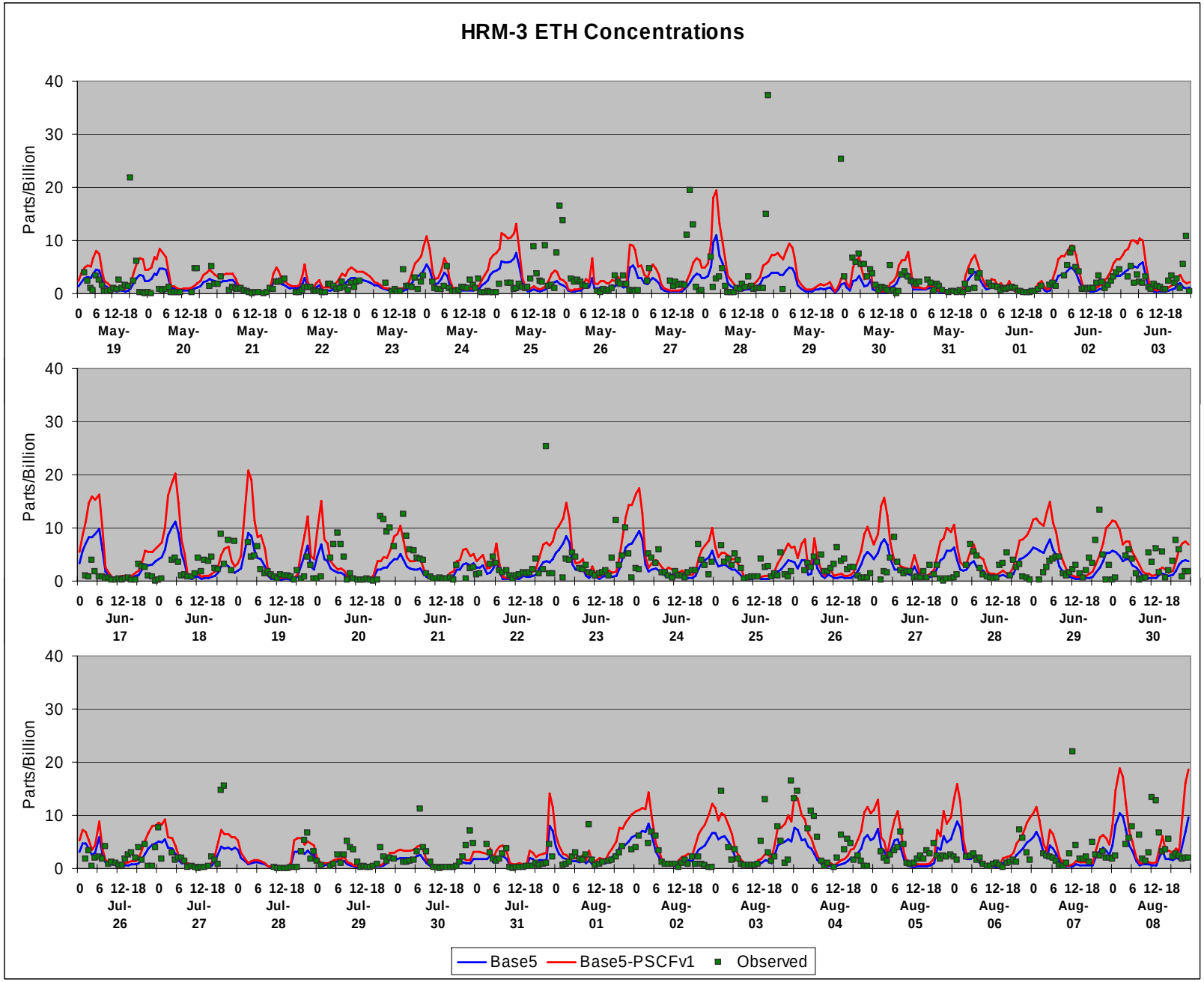

Lynchburg Ferry OLE Concentrations
Parts/Billion
100
80
60
40
20
0
0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18
May-19 May-20 May-21 May-22 May-23 May-24 May-25 May-26 May-27 May-28 May-29 May-30 May-31 Jun-01 Jun-02 Jun-03
Jun-17 Jun-18 Jun-19 Jun-20 Jun-21 Jun-22 Jun-23 Jun-24 Jun-25 Jun-26 Jun-27 Jun-28 Jun-29 Jun-30
Jul-26 Jul-27 Jul-28 Jul-29 Jul-30 Jul-31 Aug-01 Aug-02 Aug-03 Aug-04 Aug-05 Aug-06 Aug-07 Aug-08
Base5
Base5-PSCFv1
Observed

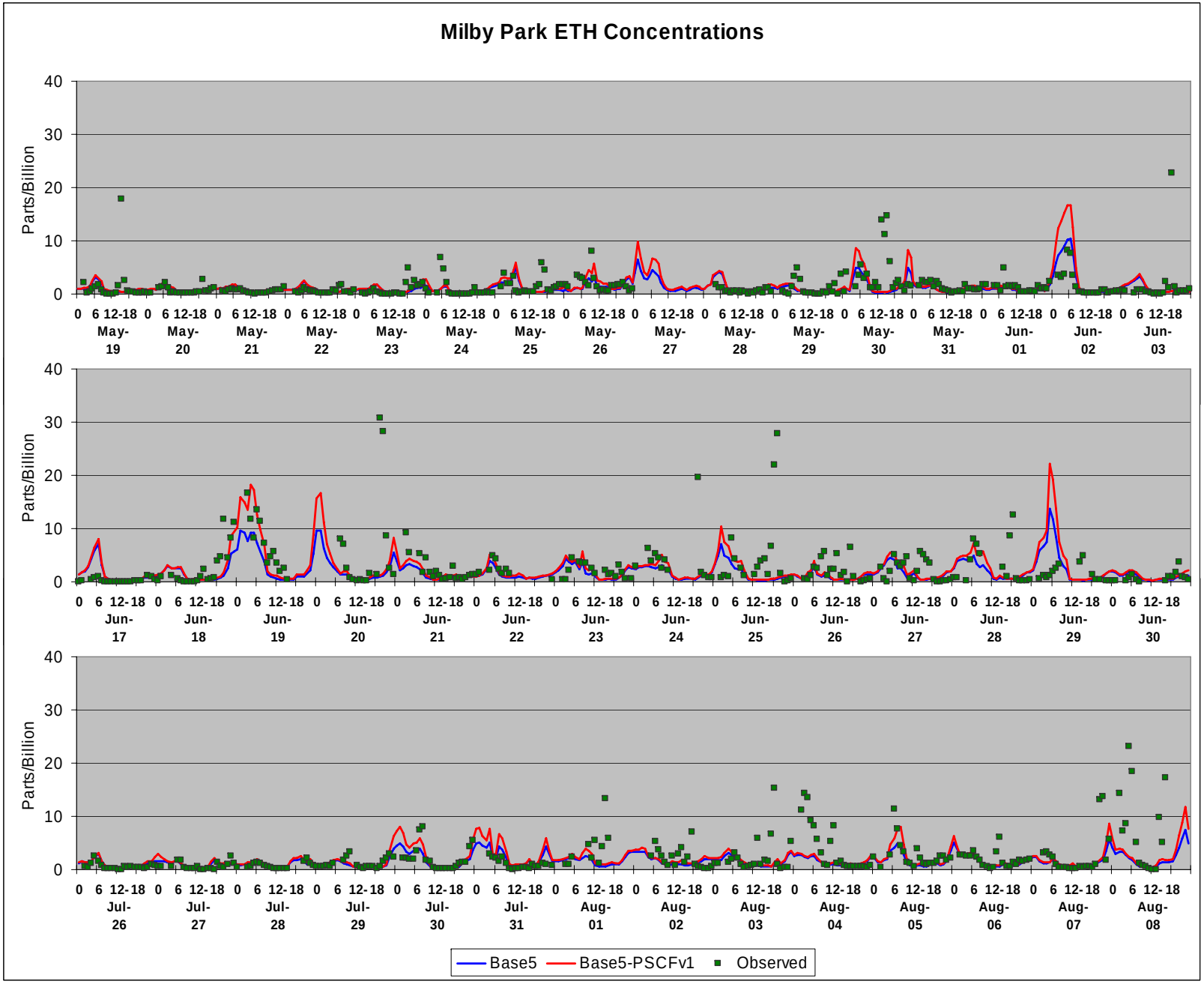

HRM-3 OLE Concentrations
Parts/Billion
40
30
20
10
0
0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18
May-19 May-20 May-21 May-22 May-23 May-24 May-25 May-26 May-27 May-28 May-29 May-30 May-31 Jun-01 Jun-02 Jun-03
Jun-17 Jun-18 Jun-19 Jun-20 Jun-21 Jun-22 Jun-23 Jun-24 Jun-25 Jun-26 Jun-27 Jun-28 Jun-29 Jun-30
Jul-26 Jul-27 Jul-28 Jul-29 Jul-30 Jul-31 Aug-01 Aug-02 Aug-03 Aug-04 Aug-05 Aug-06 Aug-07 Aug-08
Base5
Base5-PSCFv1
Observed

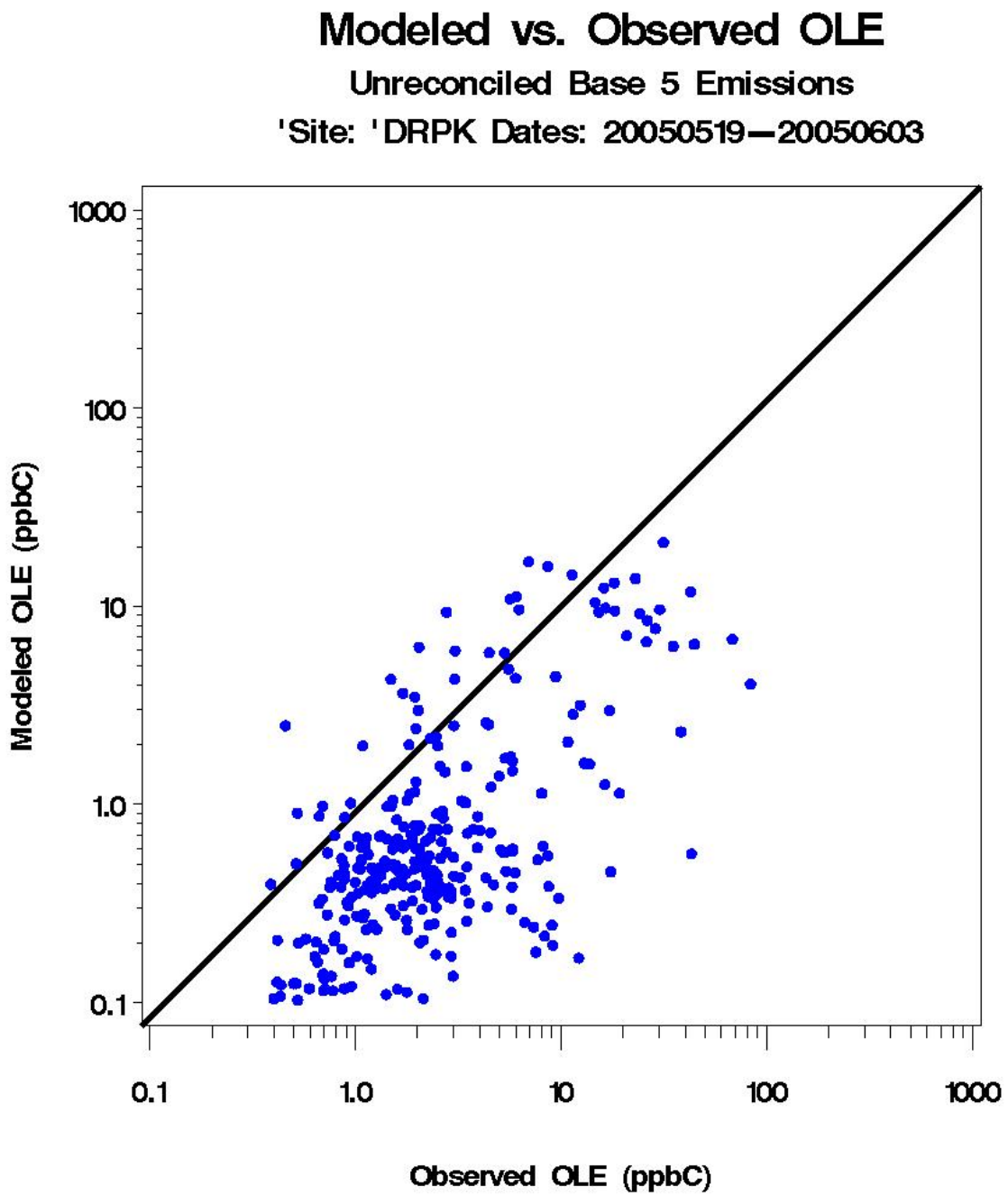

Milby Park OLE Concentrations
Parts/Billion
80
60
40
20
0
0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18
May-19 May-20 May-21 May-22 May-23 May-24 May-25 May-26 May-27 May-28 May-29 May-30 May-31 Jun-01 Jun-02 Jun-03
Jun-17 Jun-18 Jun-19 Jun-20 Jun-21 Jun-22 Jun-23 Jun-24 Jun-25 Jun-26 Jun-27 Jun-28 Jun-29 Jun-30
Jul-26 Jul-27 Jul-28 Jul-29 Jul-30 Jul-31 Aug-01 Aug-02 Aug-03 Aug-04 Aug-05 Aug-06 Aug-07 Aug-08
Base5
Base5-PSCFv1
Observed


Deer Park ETH Concentrations
Parts/Billion
40
30
20
10
0
0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18
May-19 May-20 May-21 May-22 May-23 May-24 May-25 May-26 May-27 May-28 May-29 May-30 May-31 Jun-01 Jun-02 Jun-03
Jun-17 Jun-18 Jun-19 Jun-20 Jun-21 Jun-22 Jun-23 Jun-24 Jun-25 Jun-26 Jun-27 Jun-28 Jun-29 Jun-30
Jul-26 Jul-27 Jul-28 Jul-29 Jul-30 Jul-31 Aug-01 Aug-02 Aug-03 Aug-04 Aug-05 Aug-06 Aug-07 Aug-08
Base5
Base5-PSCFv1
Observed


Lynchburg Ferry ETH Concentrations
Parts/Billion
40
30
20
10
0
0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18
May-19 May-20 May-21 May-22 May-23 May-24 May-25 May-26 May-27 May-28 May-29 May-30 May-31 Jun-01 Jun-02 Jun-03
Jun-17 Jun-18 Jun-19 Jun-20 Jun-21 Jun-22 Jun-23 Jun-24 Jun-25 Jun-26 Jun-27 Jun-28 Jun-29 Jun-30
Jul-26 Jul-27 Jul-28 Jul-29 Jul-30 Jul-31 Aug-01 Aug-02 Aug-03 Aug-04 Aug-05 Aug-06 Aug-07 Aug-08
Base5
Base5-PSCFv1
Observed


HRM-3 ETH Concentrations
Parts/Billion
40
30
20
10
0
0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18
May-19 May-20 May-21 May-22 May-23 May-24 May-25 May-26 May-27 May-28 May-29 May-30 May-31 Jun-01 Jun-02 Jun-03
Jun-17 Jun-18 Jun-19 Jun-20 Jun-21 Jun-22 Jun-23 Jun-24 Jun-25 Jun-26 Jun-27 Jun-28 Jun-29 Jun-30
Jul-26 Jul-27 Jul-28 Jul-29 Jul-30 Jul-31 Aug-01 Aug-02 Aug-03 Aug-04 Aug-05 Aug-06 Aug-07 Aug-08
Base5
Base5-PSCFv1
Observed

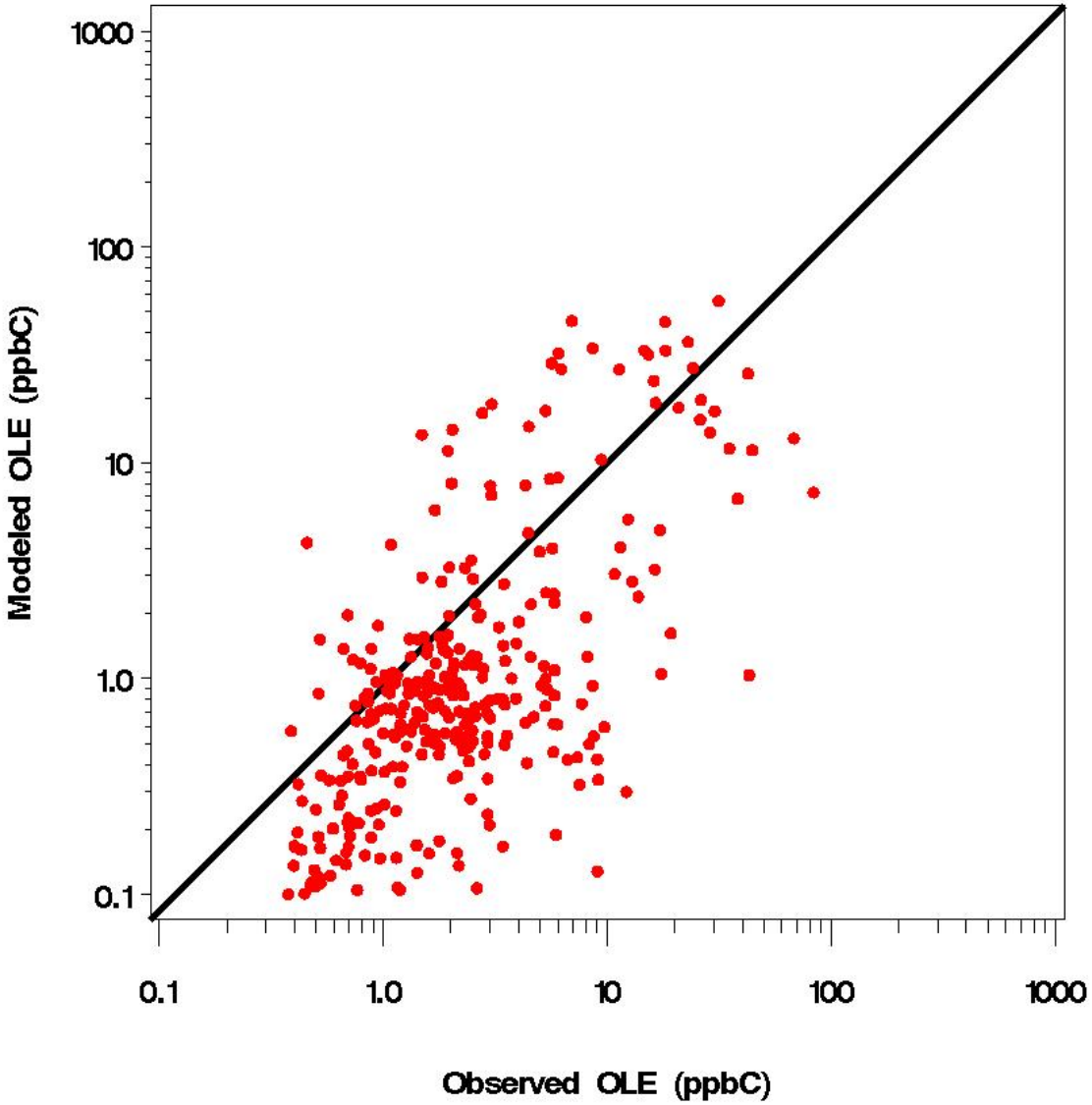

Milby Park ETH Concentrations
Parts/Billion
40
30
20
10
0
0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18
May-19 May-20 May-21 May-22 May-23 May-24 May-25 May-26 May-27 May-28 May-29 May-30 May-31 Jun-01 Jun-02 Jun-03
0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18
Jun-17 Jun-18 Jun-19 Jun-20 Jun-21 Jun-22 Jun-23 Jun-24 Jun-25 Jun-26 Jun-27 Jun-28 Jun-29 Jun-30
0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18 0 6 12-18
Jul-26 Jul-27 Jul-28 Jul-29 Jul-30 Jul-31 Aug-01 Aug-02 Aug-03 Aug-04 Aug-05 Aug-06 Aug-07 Aug-08
Base5
Base5-PSCFv1
Observed

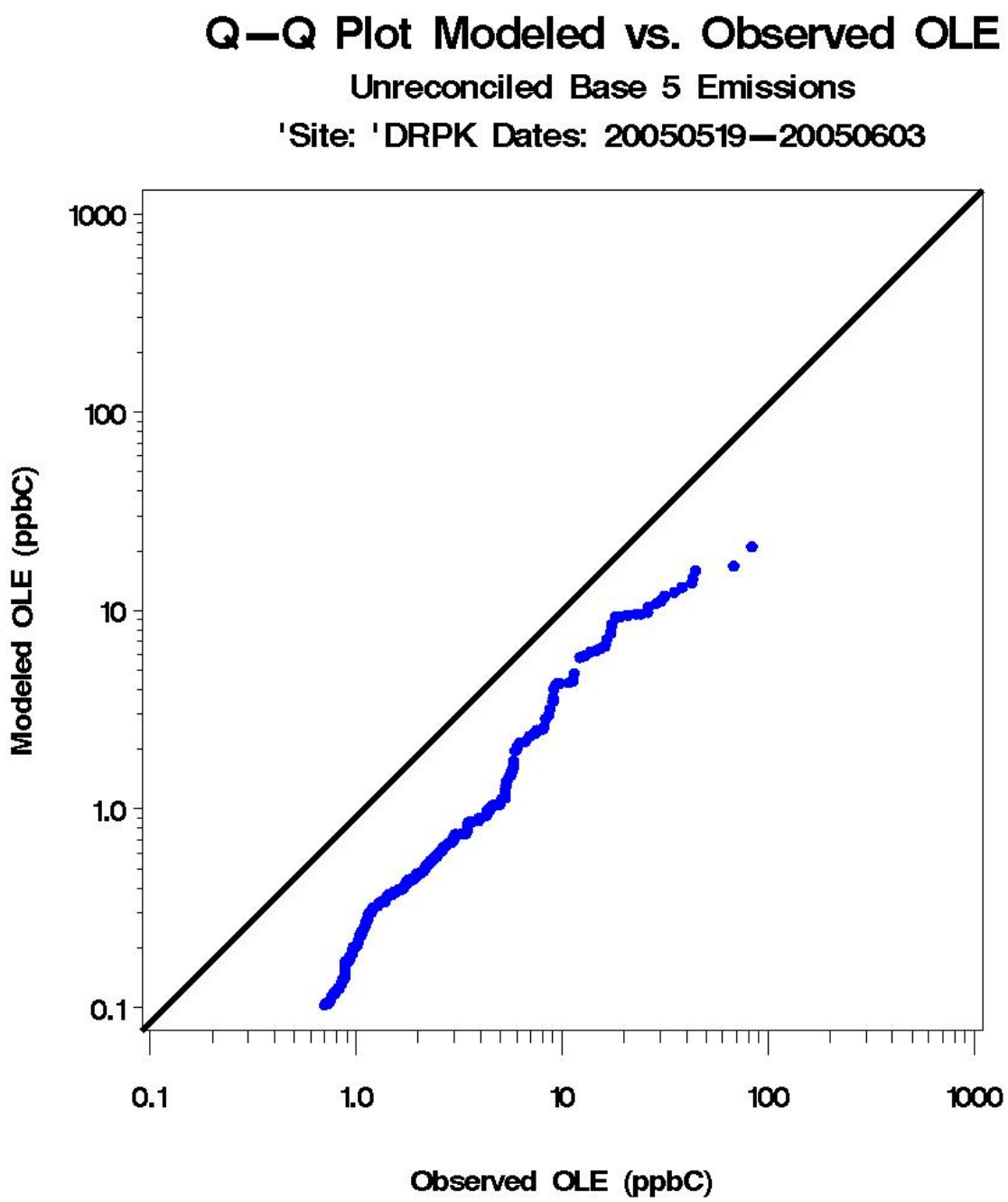

Modeled vs. Observed OLE
Unreconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050519—20050603
Modeled OLE (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed OLE (ppbC)

Modeled vs. Observed OLE

Reconciled Base 5 Emissions

'Site: 'DRPK Dates: 20050519—20050603

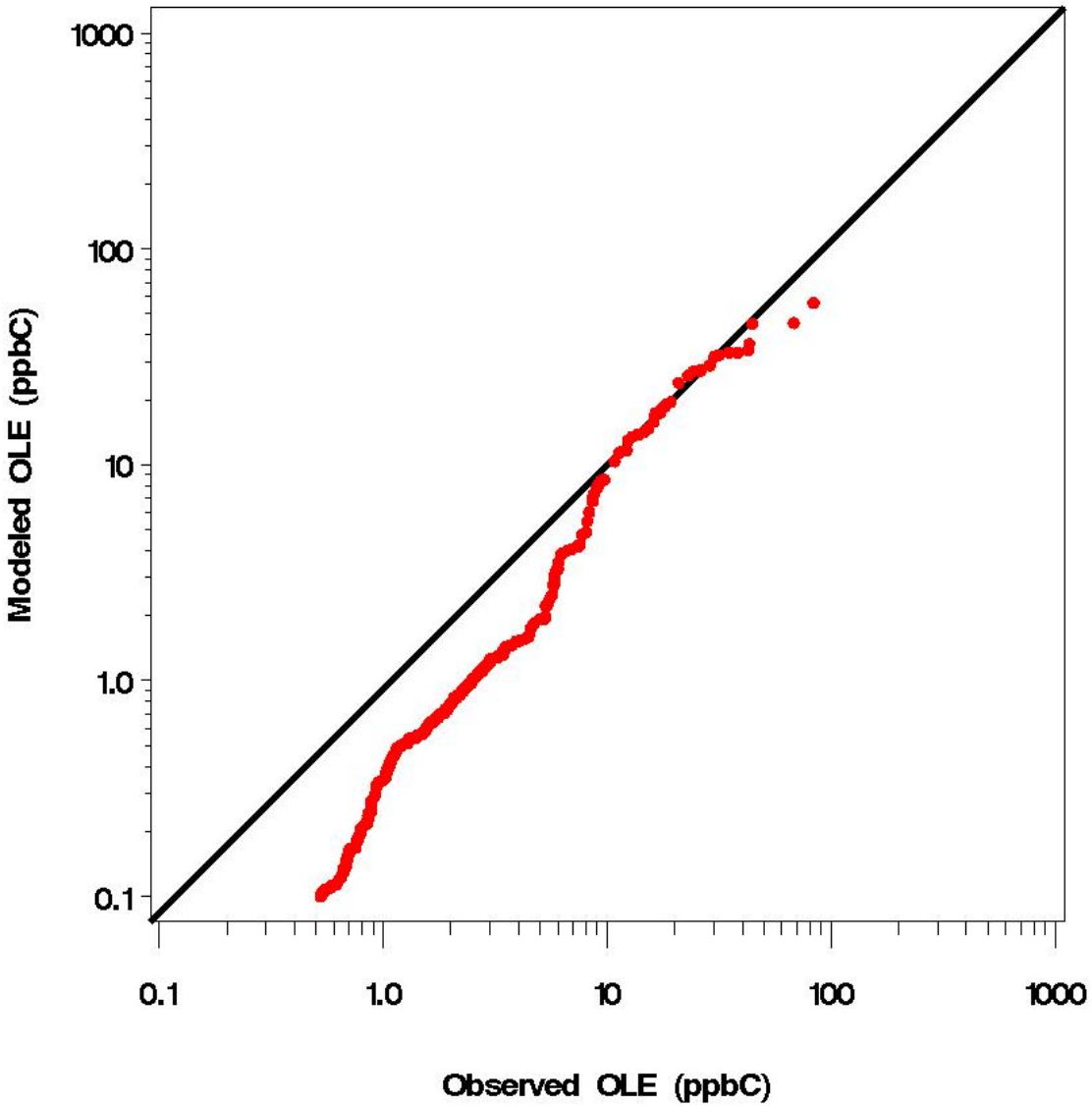


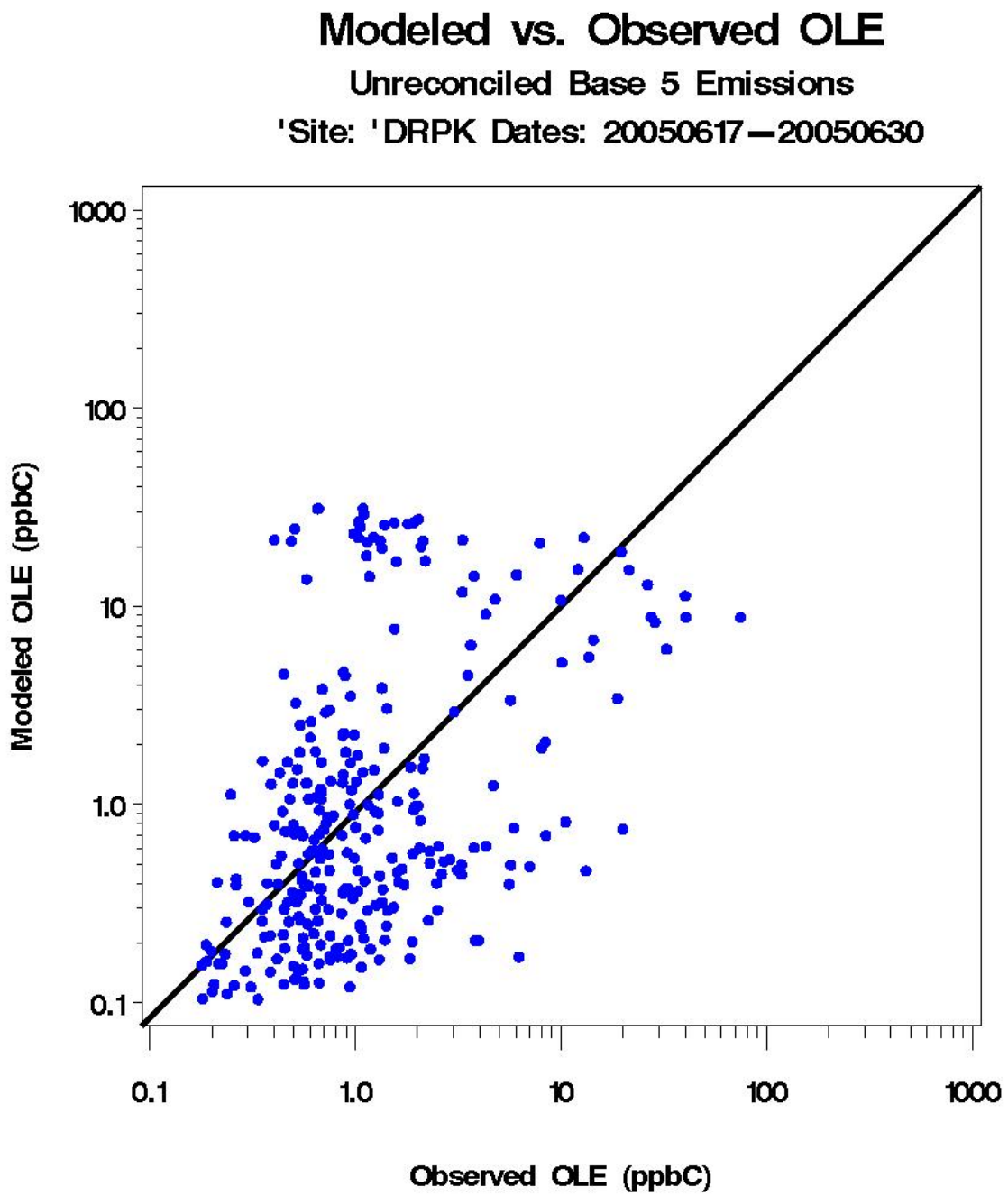

Q—Q Plot Modeled vs. Observed OLE
Unreconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050519—20050603
1000
100
10
1.0
0.1
Modeled OLE (ppbC)
0.1
1.0
10
100
1000
Observed OLE (ppbC)

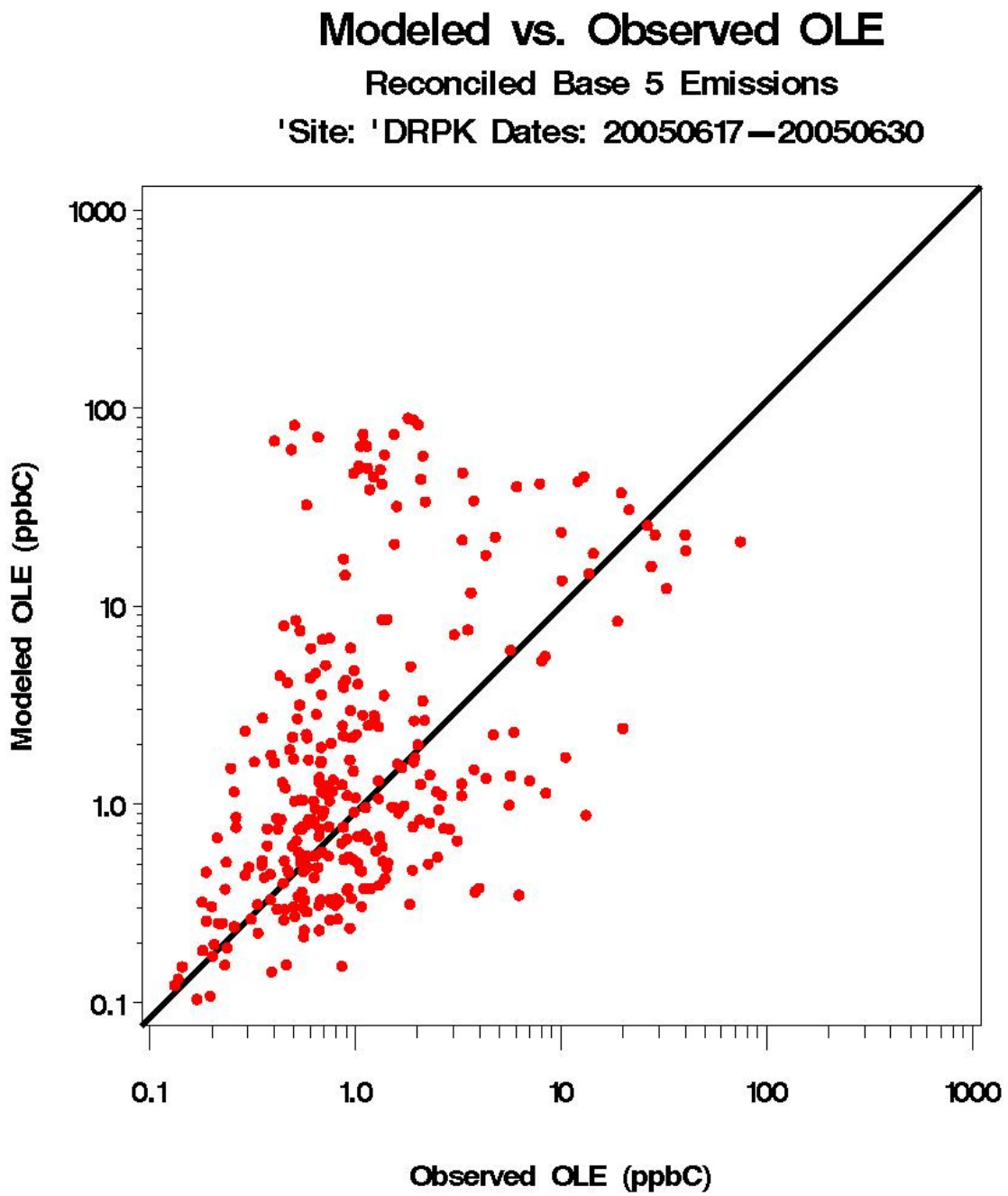
Q–Q Plot Modeled vs. Observed OLE

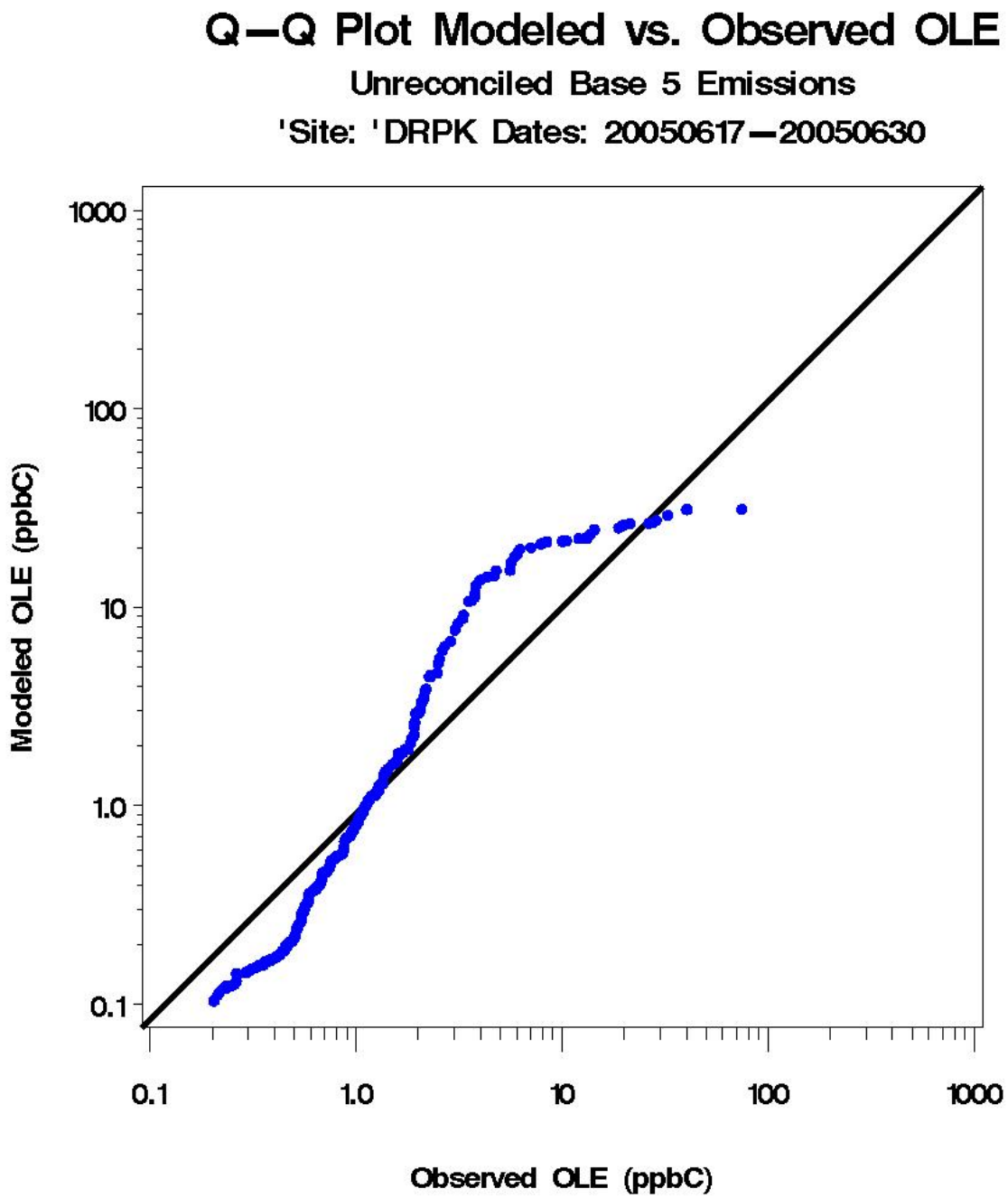
Reconciled Base 5 Emissions

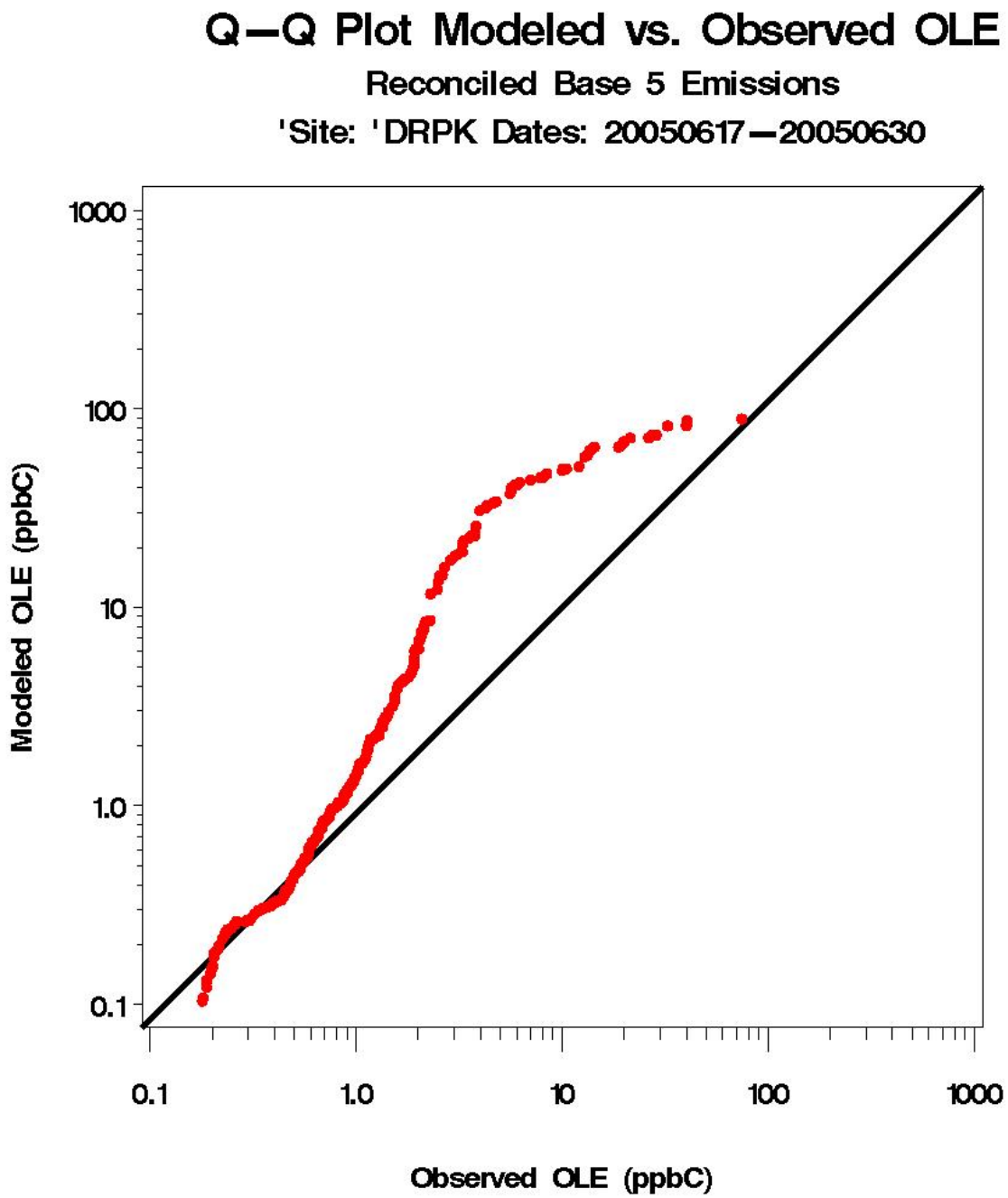
'Site: 'DRPK Dates: 20050519–20050603

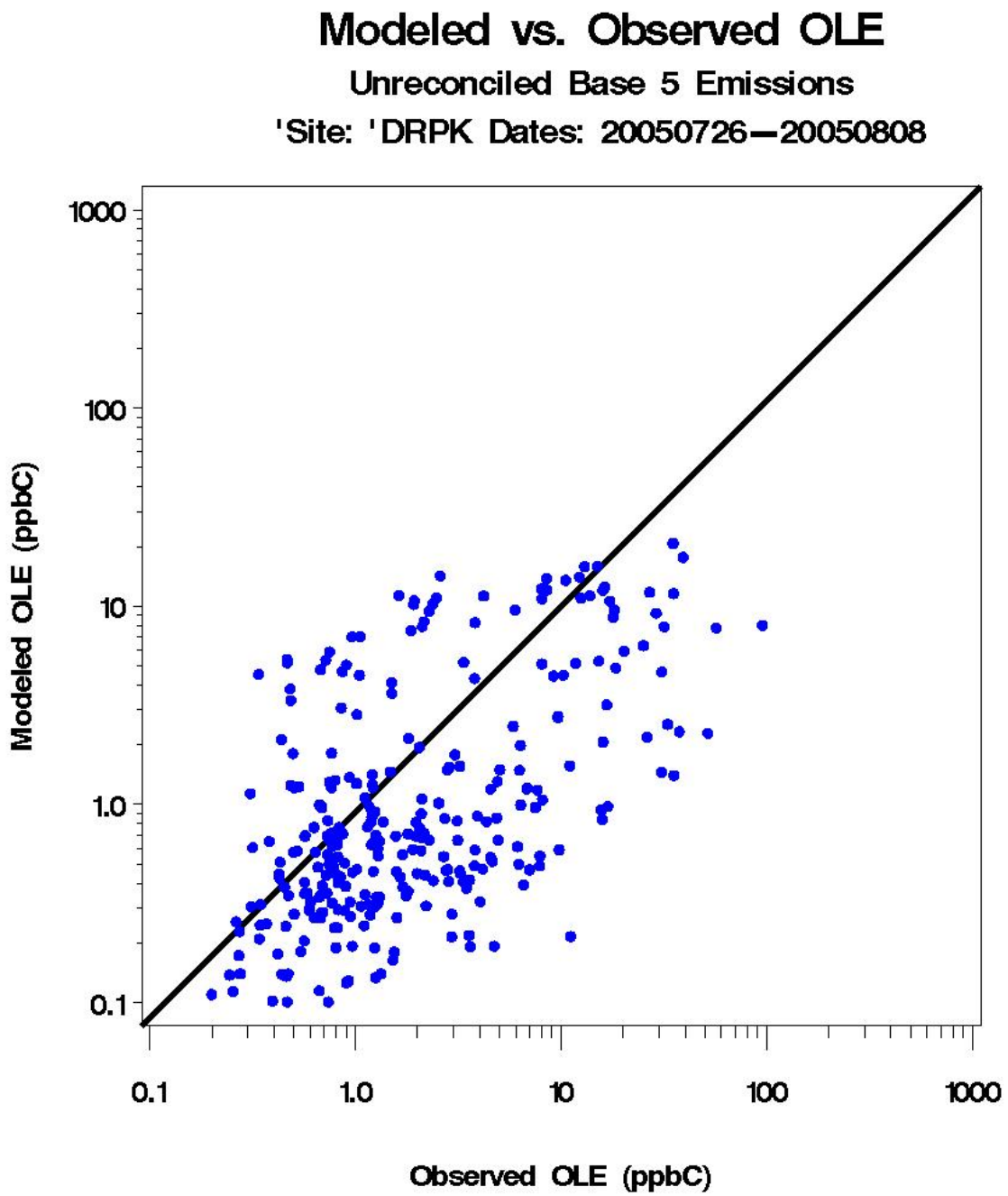



Modeled vs. Observed OLE
Unreconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050617—20050630
Modeled OLE (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed OLE (ppbC)


Modeled vs. Observed OLE
Reconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050617—20050630
Modeled OLE (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed OLE (ppbC)


Q—Q Plot Modeled vs. Observed OLE
Unreconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050617—20050630
Modeled OLE (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed OLE (ppbC)

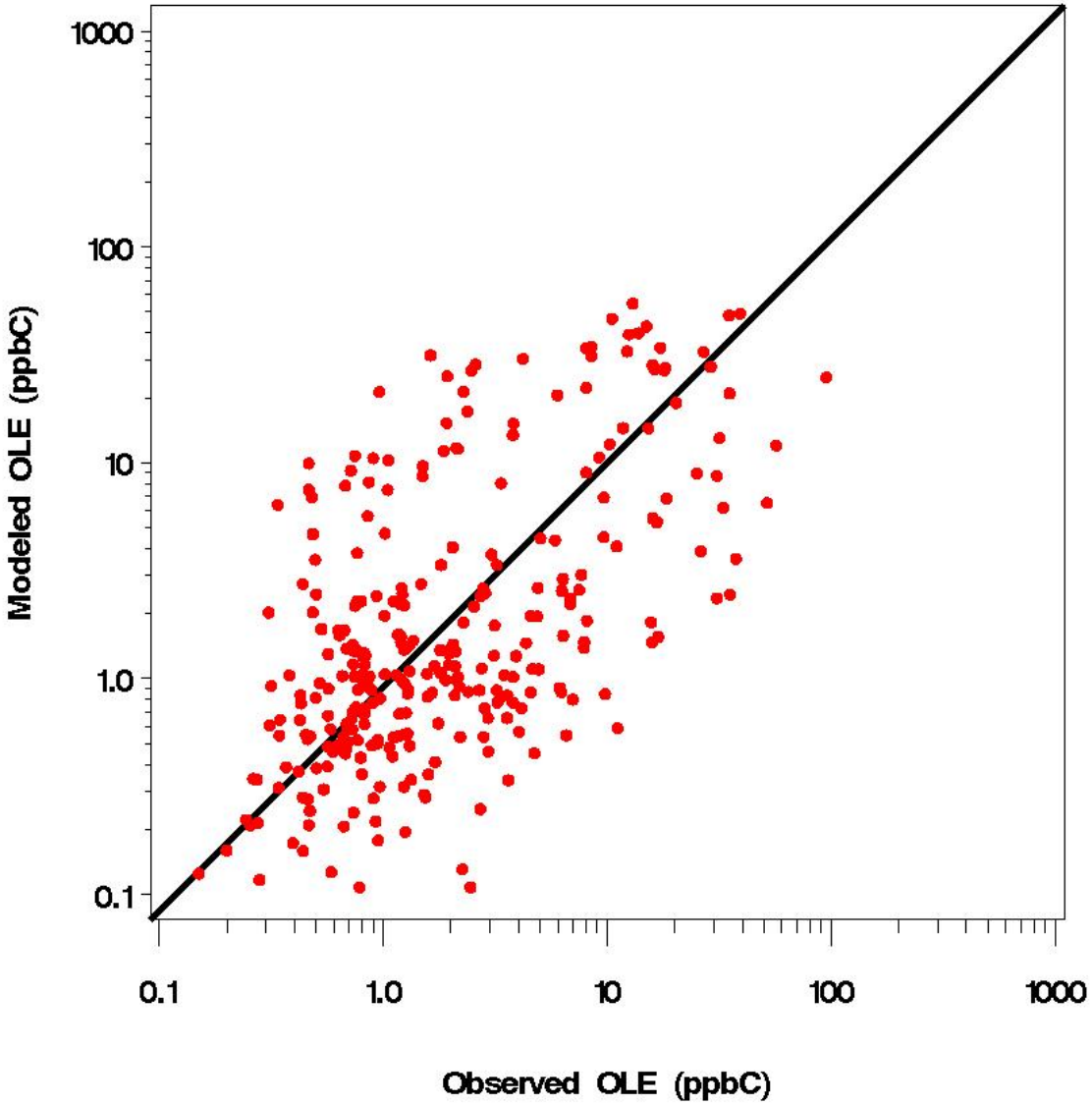

Q—Q Plot Modeled vs. Observed OLE
Reconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050617—20050630
Modeled OLE (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed OLE (ppbC)

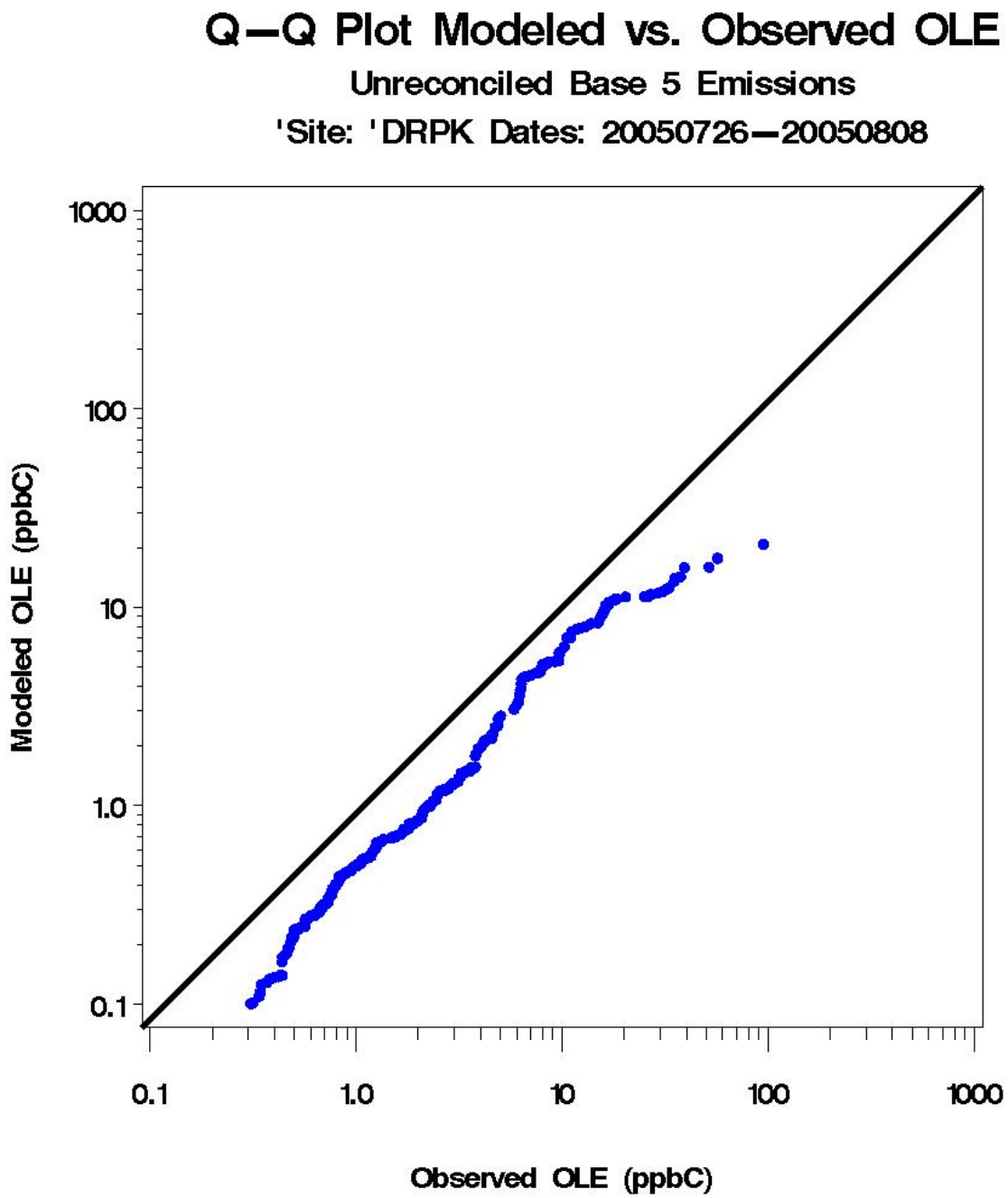

Modeled vs. Observed OLE
Unreconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050726—20050808
Modeled OLE (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed OLE (ppbC)

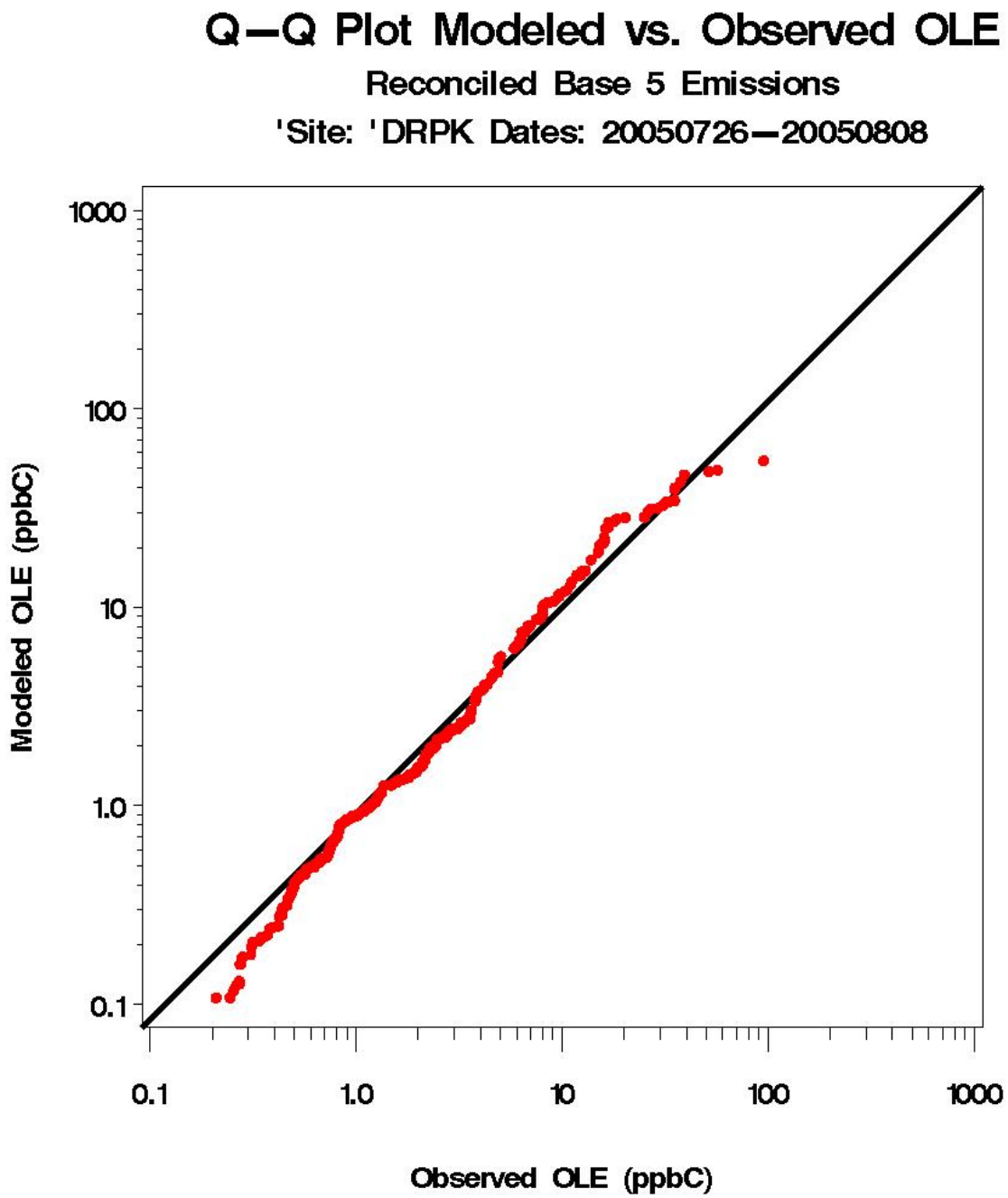
Modeled vs. Observed OLE

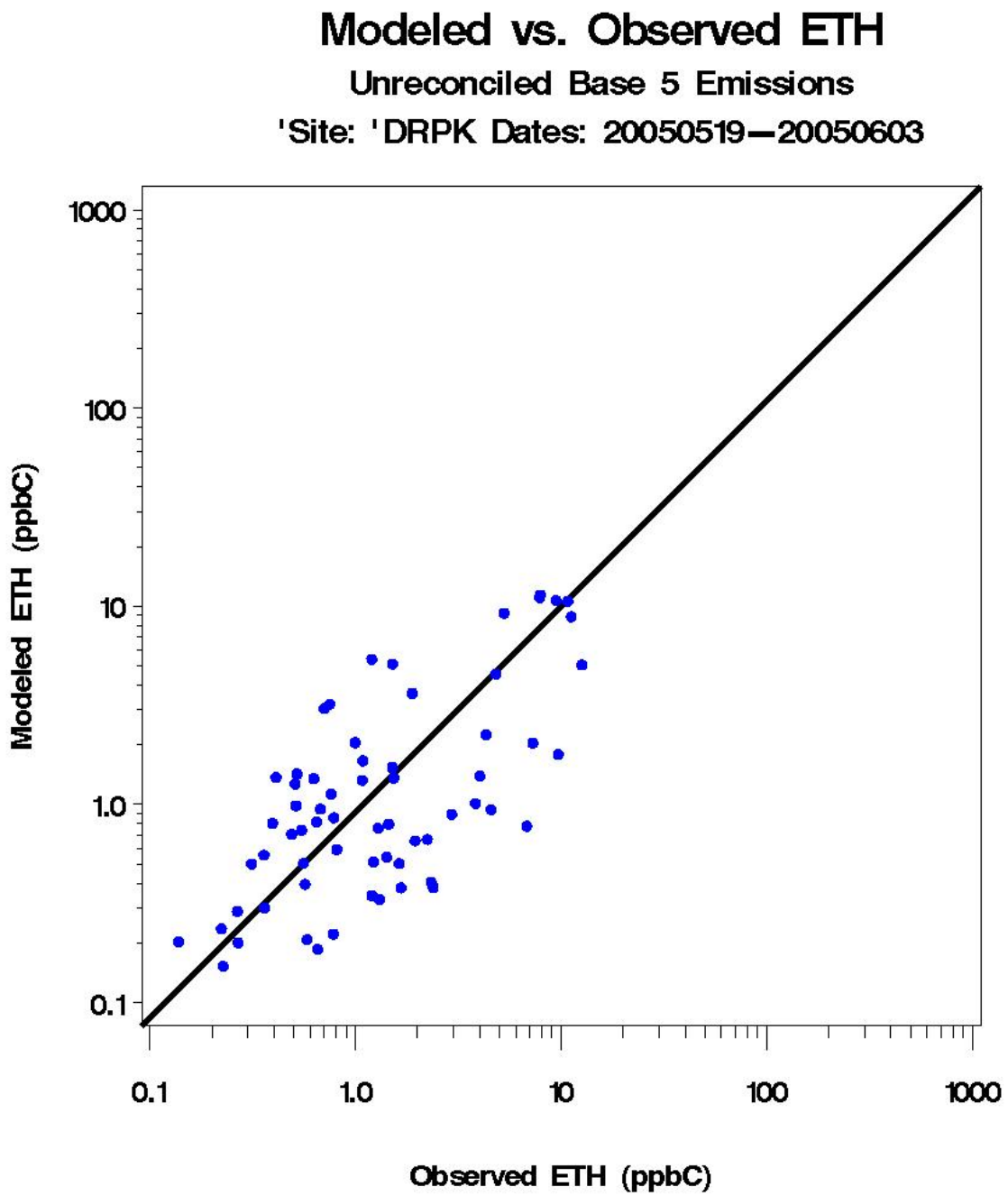
Reconciled Base 5 Emissions

'Site: 'DRPK Dates: 20050726—20050808




Q—Q Plot Modeled vs. Observed OLE
Unreconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050726—20050808
Modeled OLE (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed OLE (ppbC)

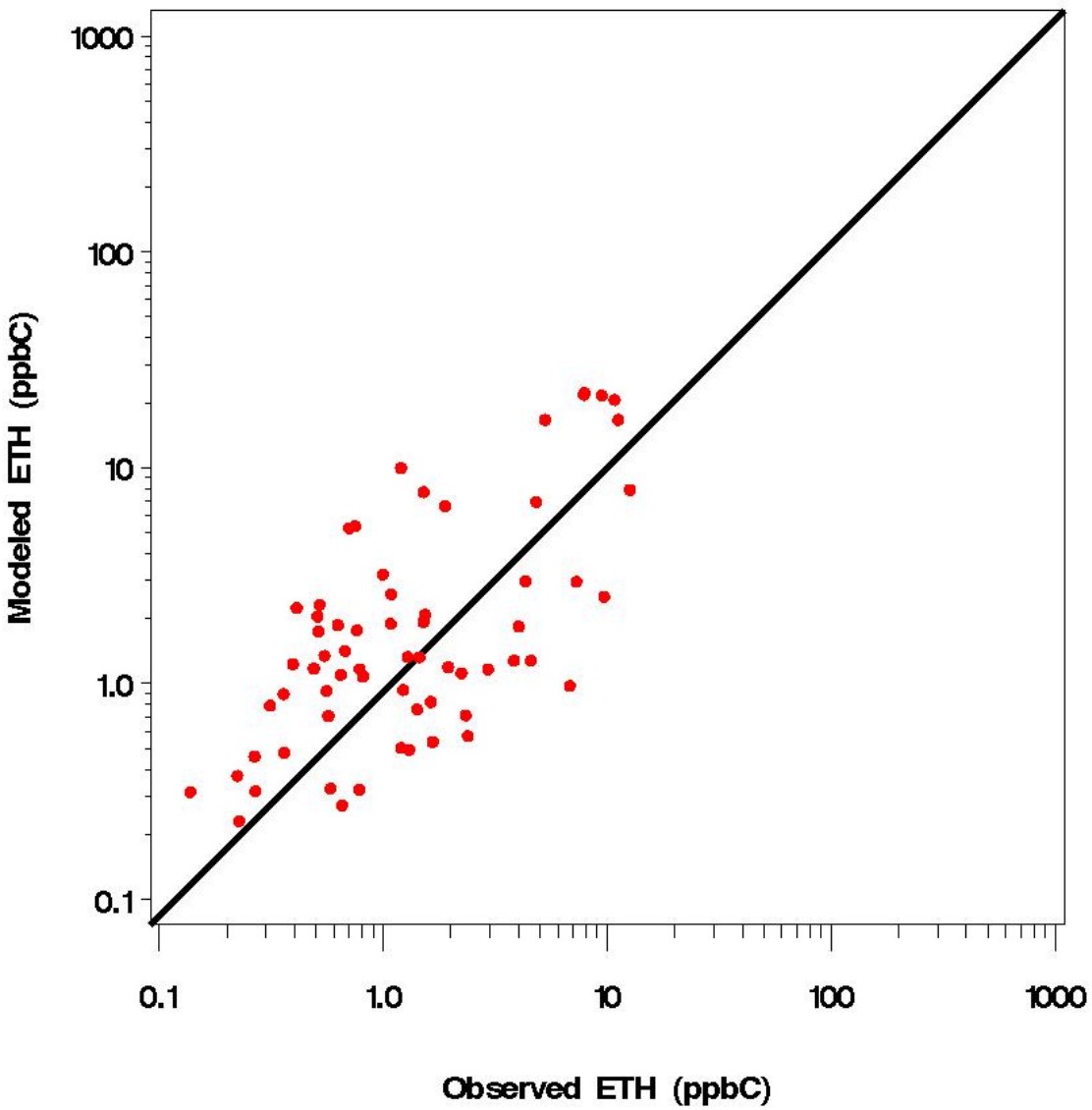

Q—Q Plot Modeled vs. Observed OLE
Reconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050726—20050808
Modeled OLE (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed OLE (ppbC)

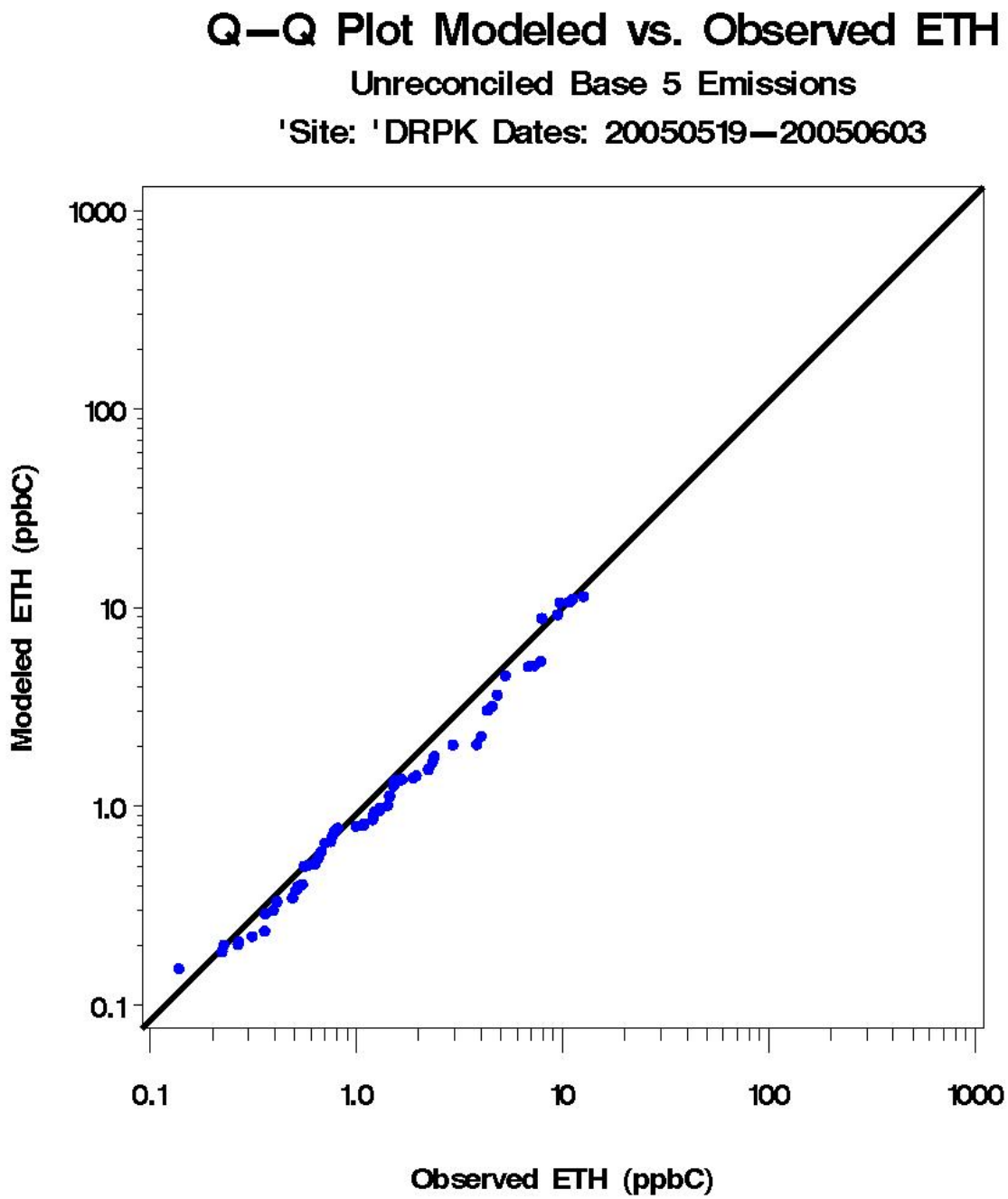

Modeled vs. Observed ETH
Unreconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050519—20050603
Modeled ETH (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed ETH (ppbC)

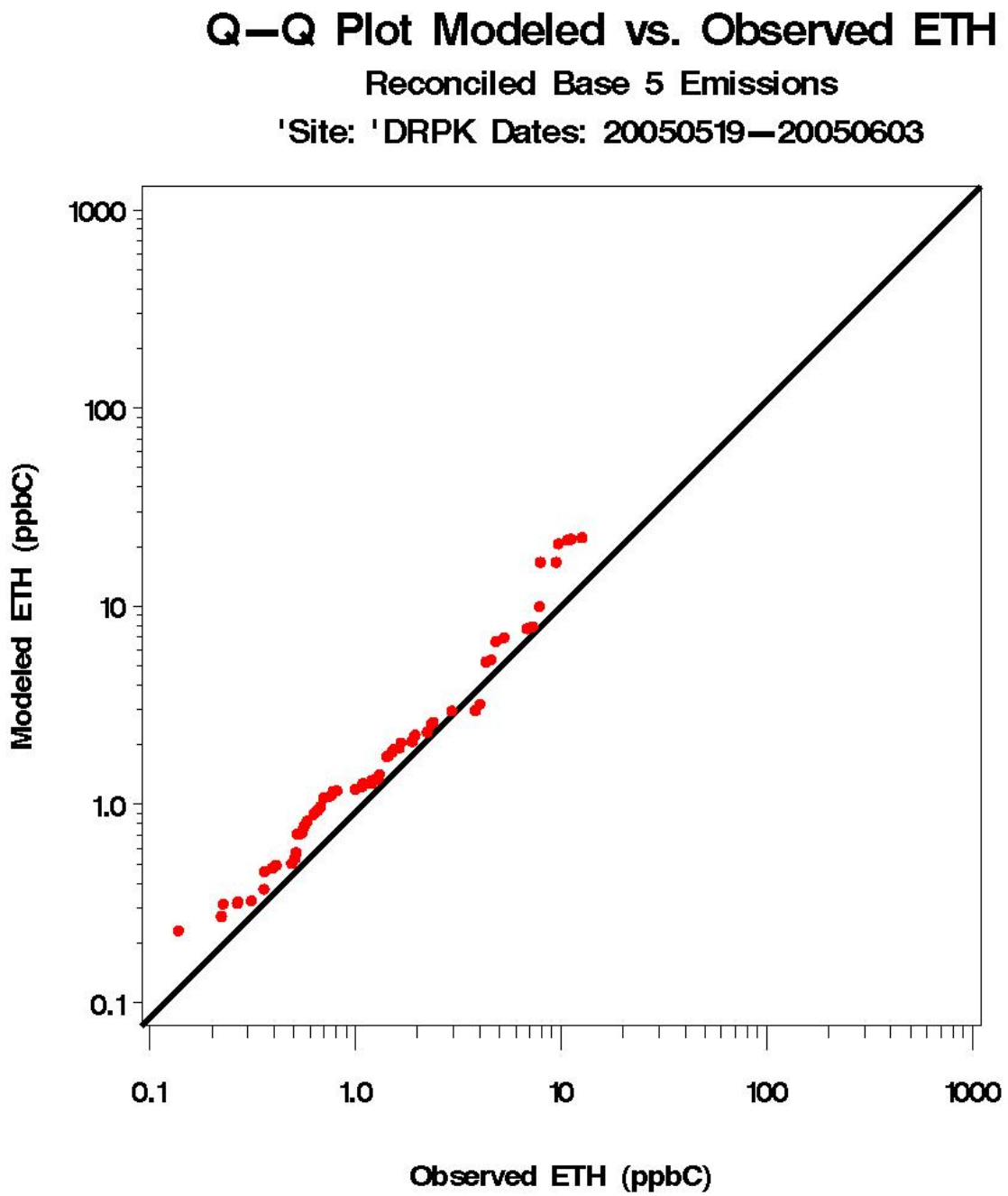
Modeled vs. Observed ETH

Reconciled Base 5 Emissions

'Site: 'DRPK Dates: 20050519—20050603



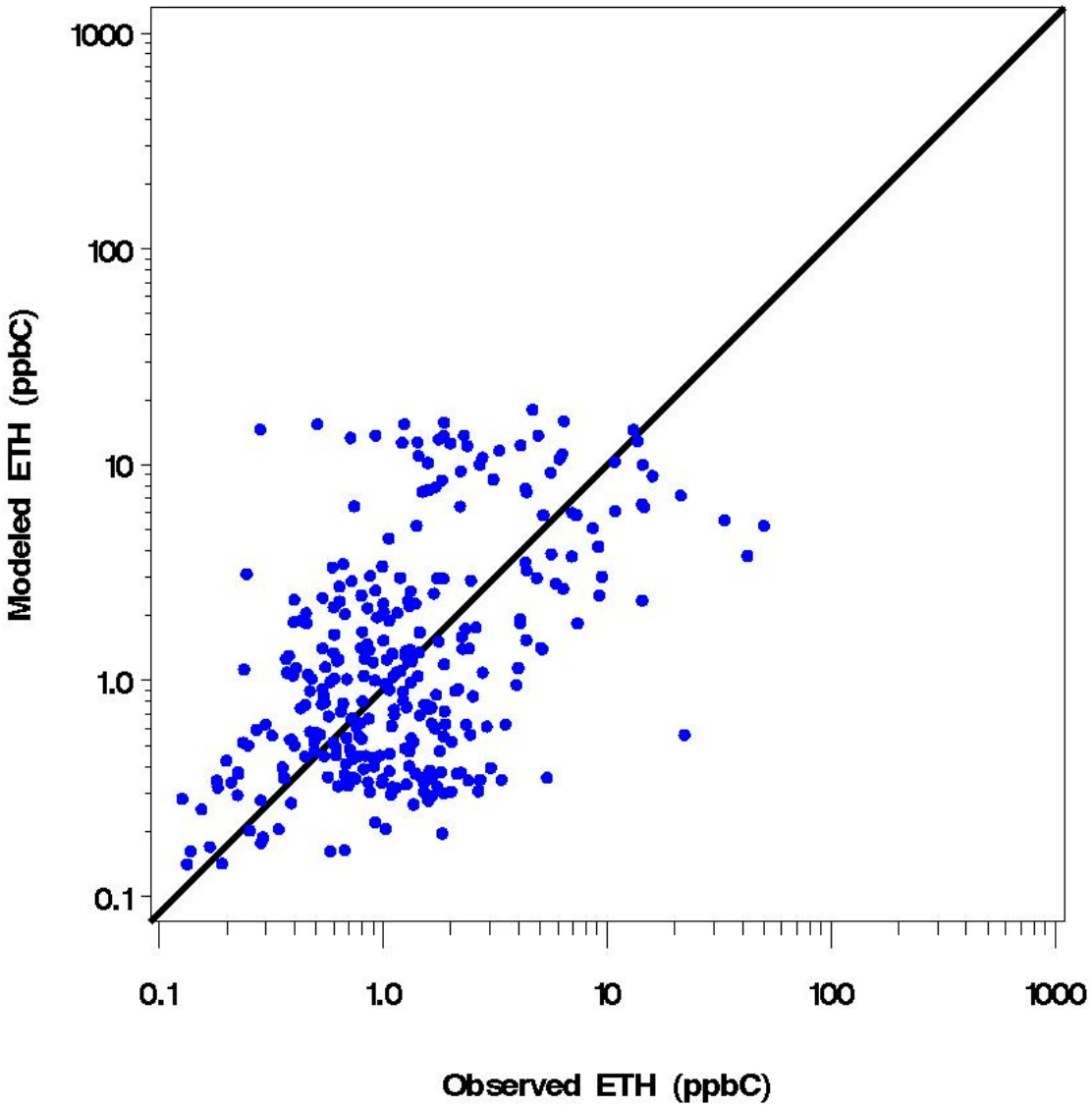

Q—Q Plot Modeled vs. Observed ETH
Unreconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050519—20050603
Modeled ETH (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed ETH (ppbC)


Q—Q Plot Modeled vs. Observed ETH
Reconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050519—20050603
Modeled ETH (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed ETH (ppbC)

Modeled vs. Observed ETH

Unreconciled Base 5 Emissions

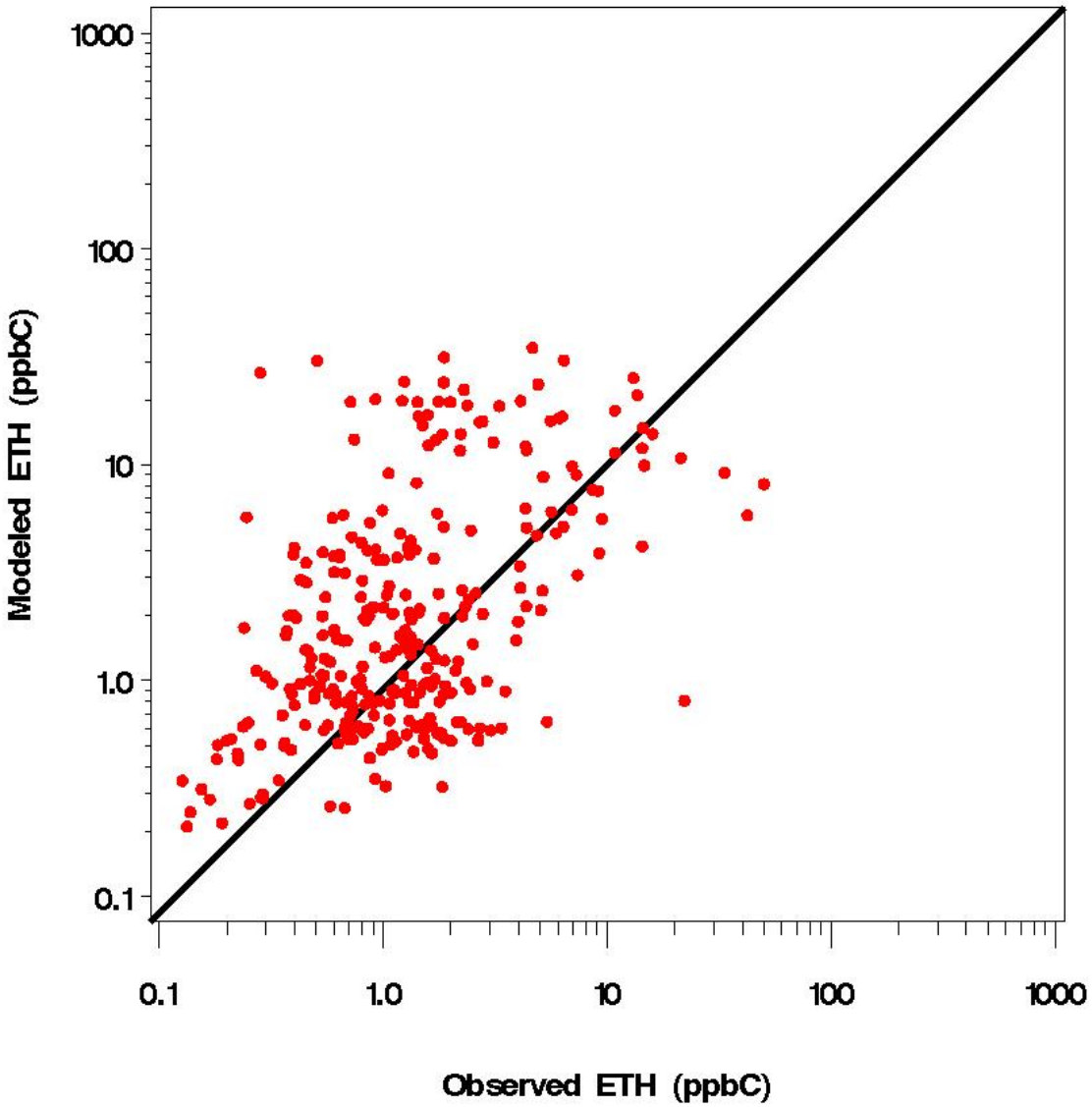
'Site: 'DRPK Dates: 20050617—20050630



Modeled vs. Observed ETH

Reconciled Base 5 Emissions

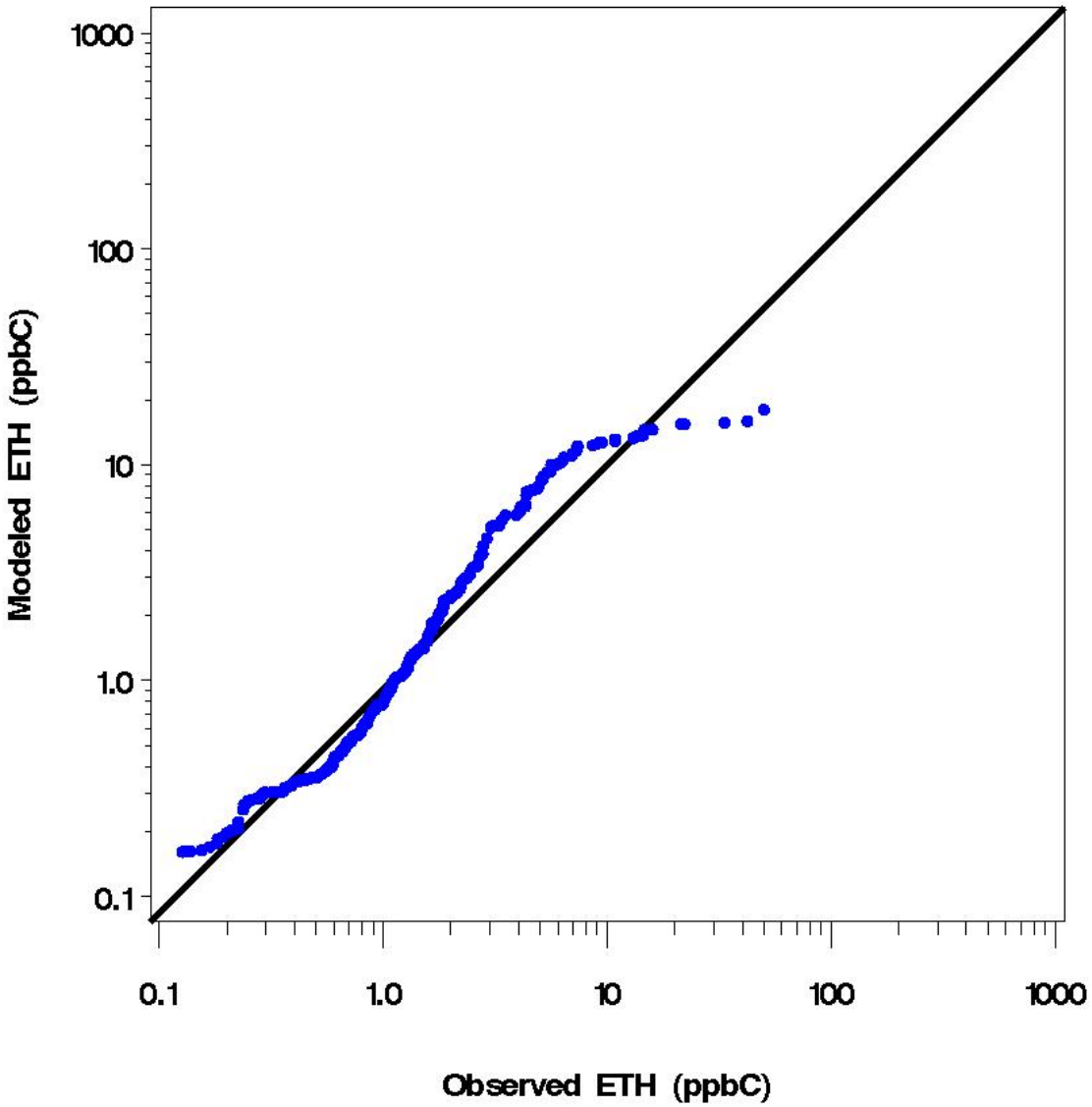
'Site: 'DRPK Dates: 20050617—20050630



Q—Q Plot Modeled vs. Observed ETH

Unreconciled Base 5 Emissions

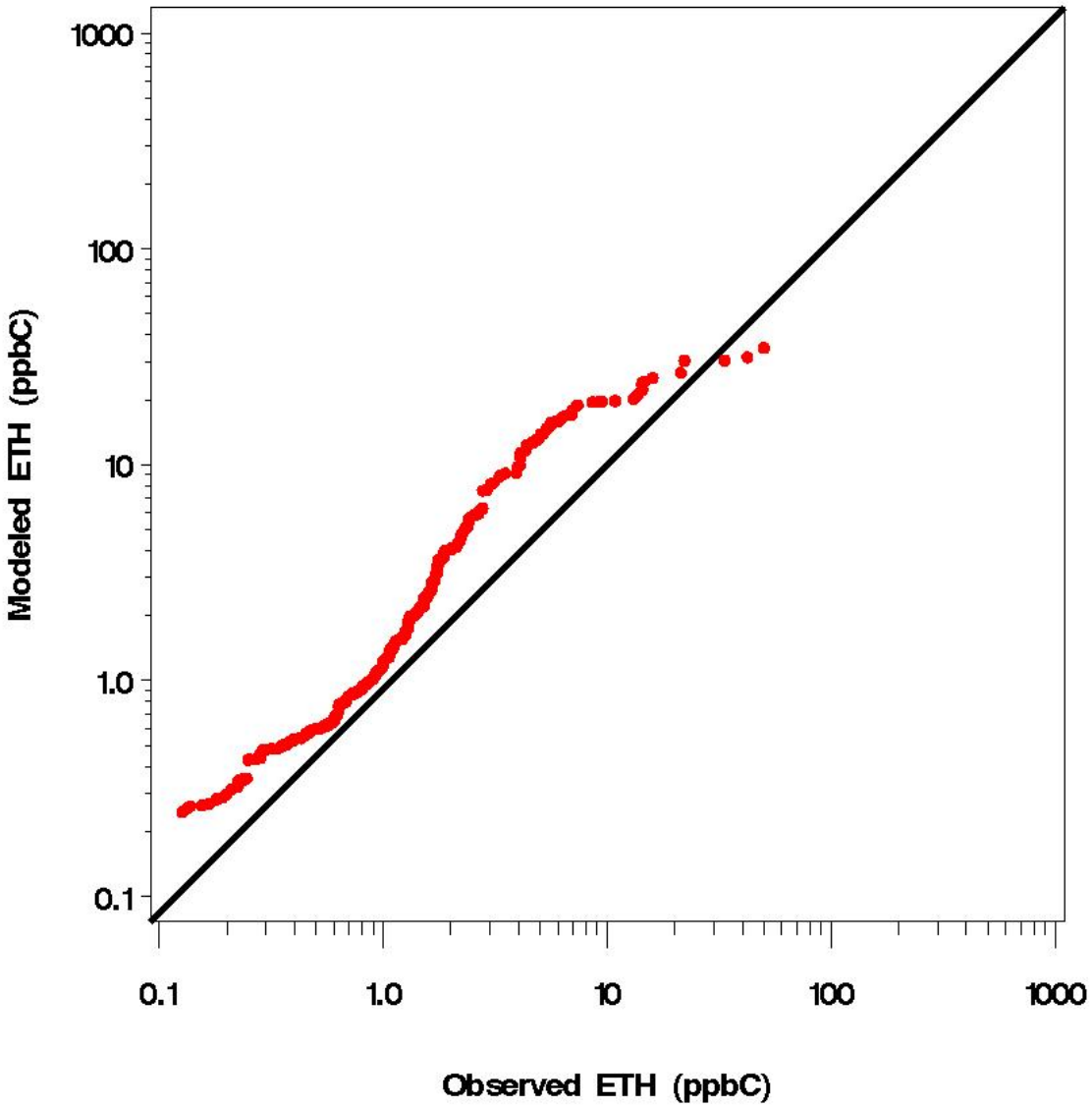
'Site: 'DRPK Dates: 20050617—20050630

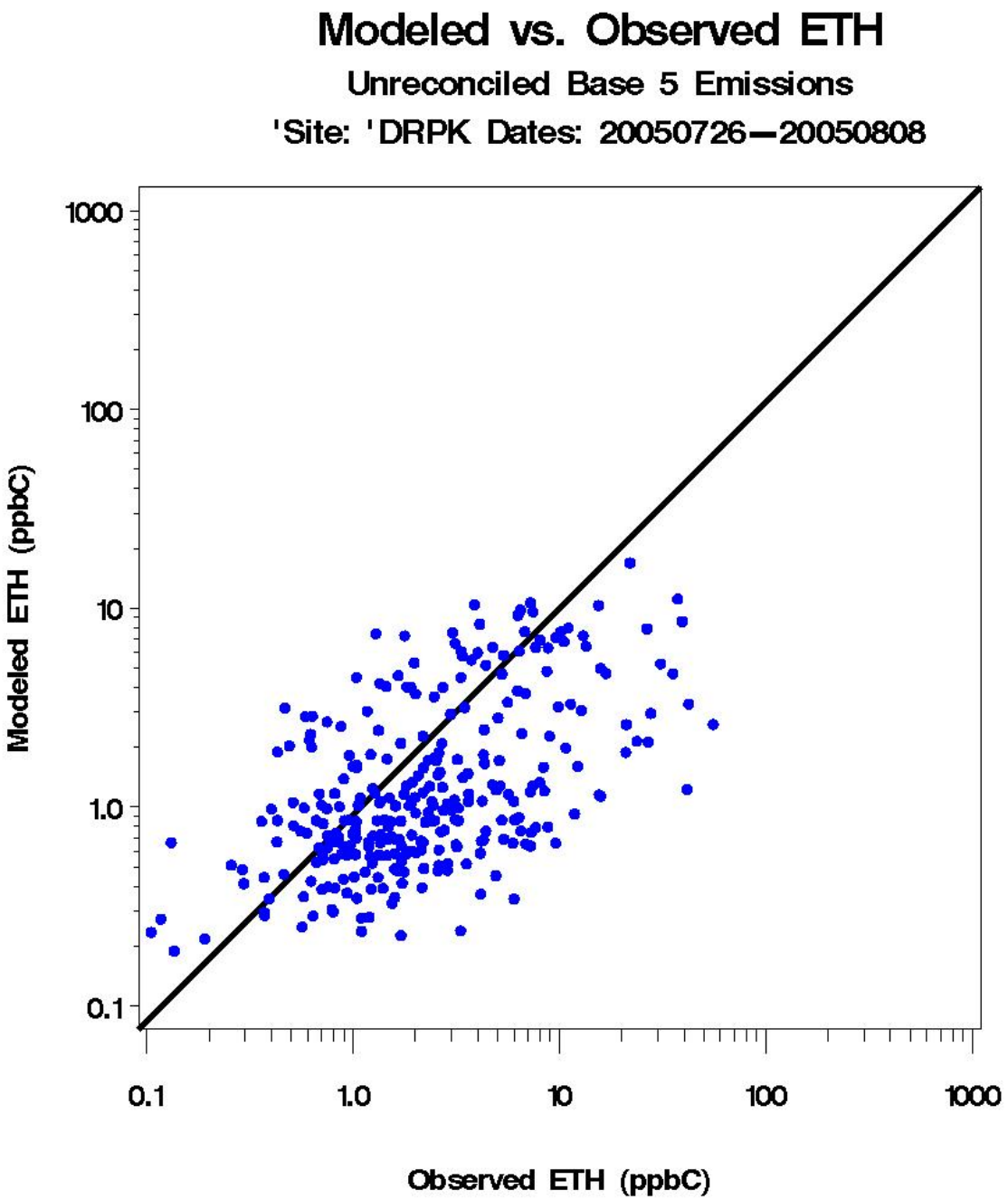


Q—Q Plot Modeled vs. Observed ETH

Reconciled Base 5 Emissions

'Site: 'DRPK Dates: 20050617—20050630

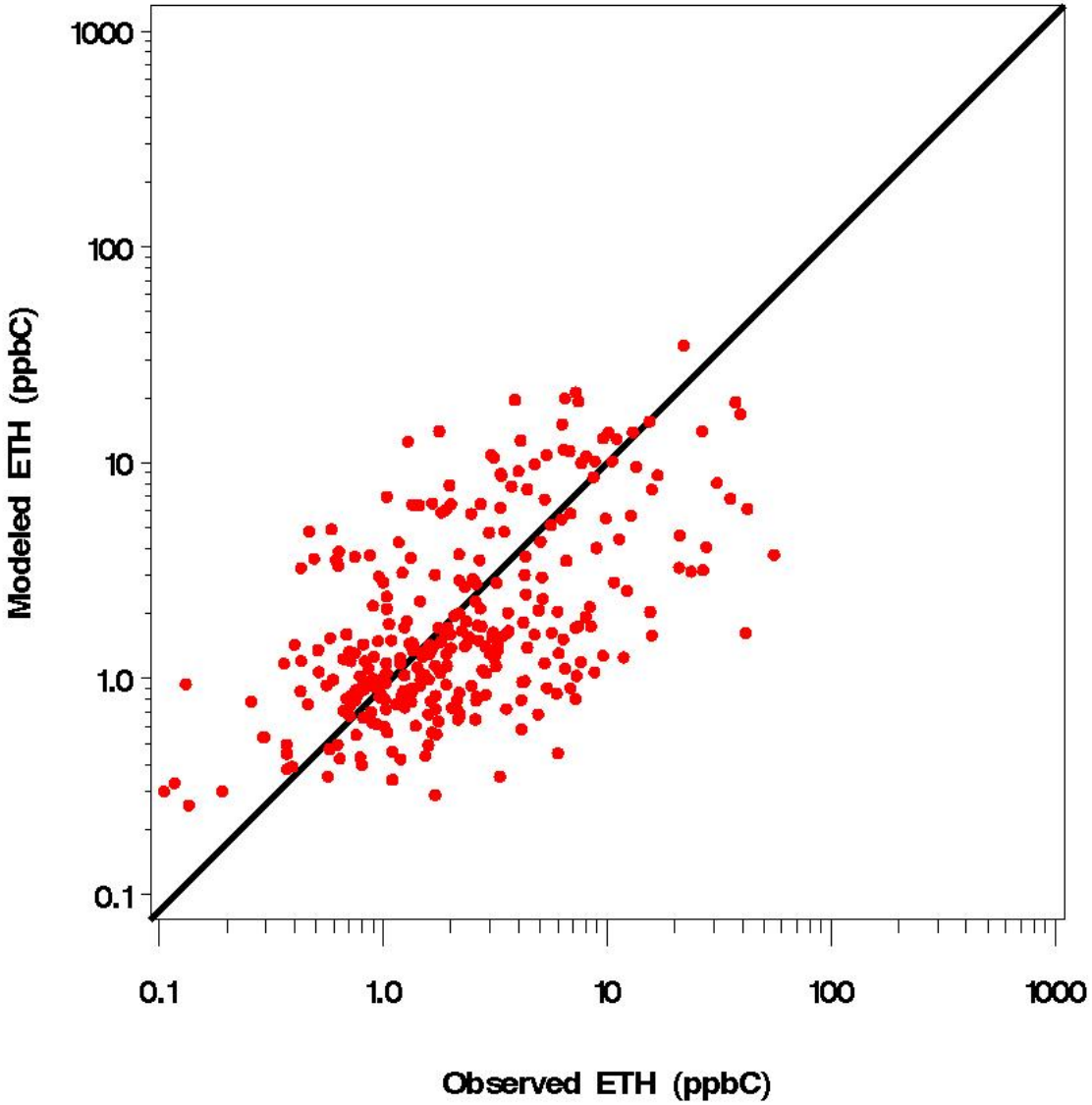


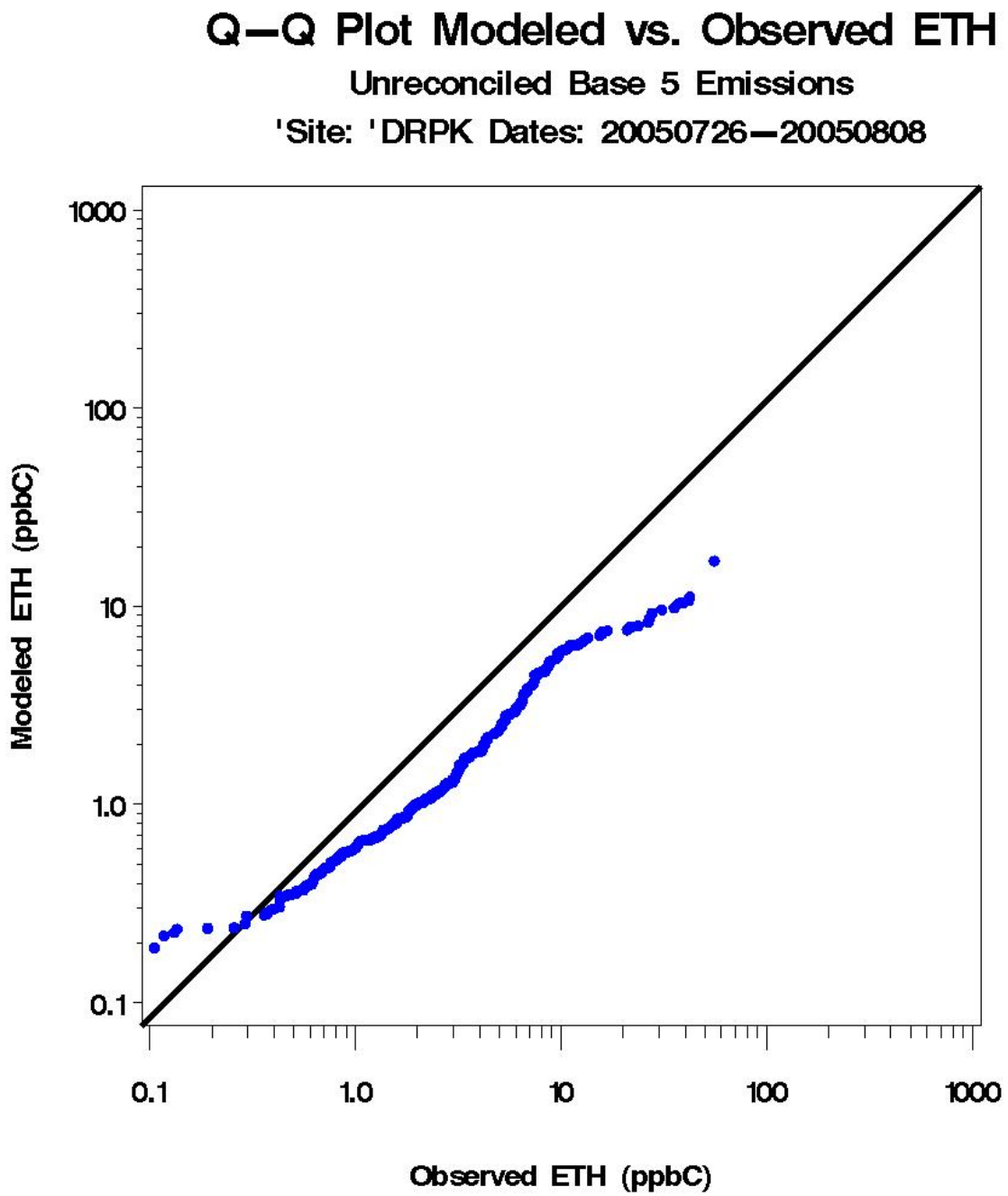

Modeled vs. Observed ETH
Unreconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050726—20050808
Modeled ETH (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed ETH (ppbC)

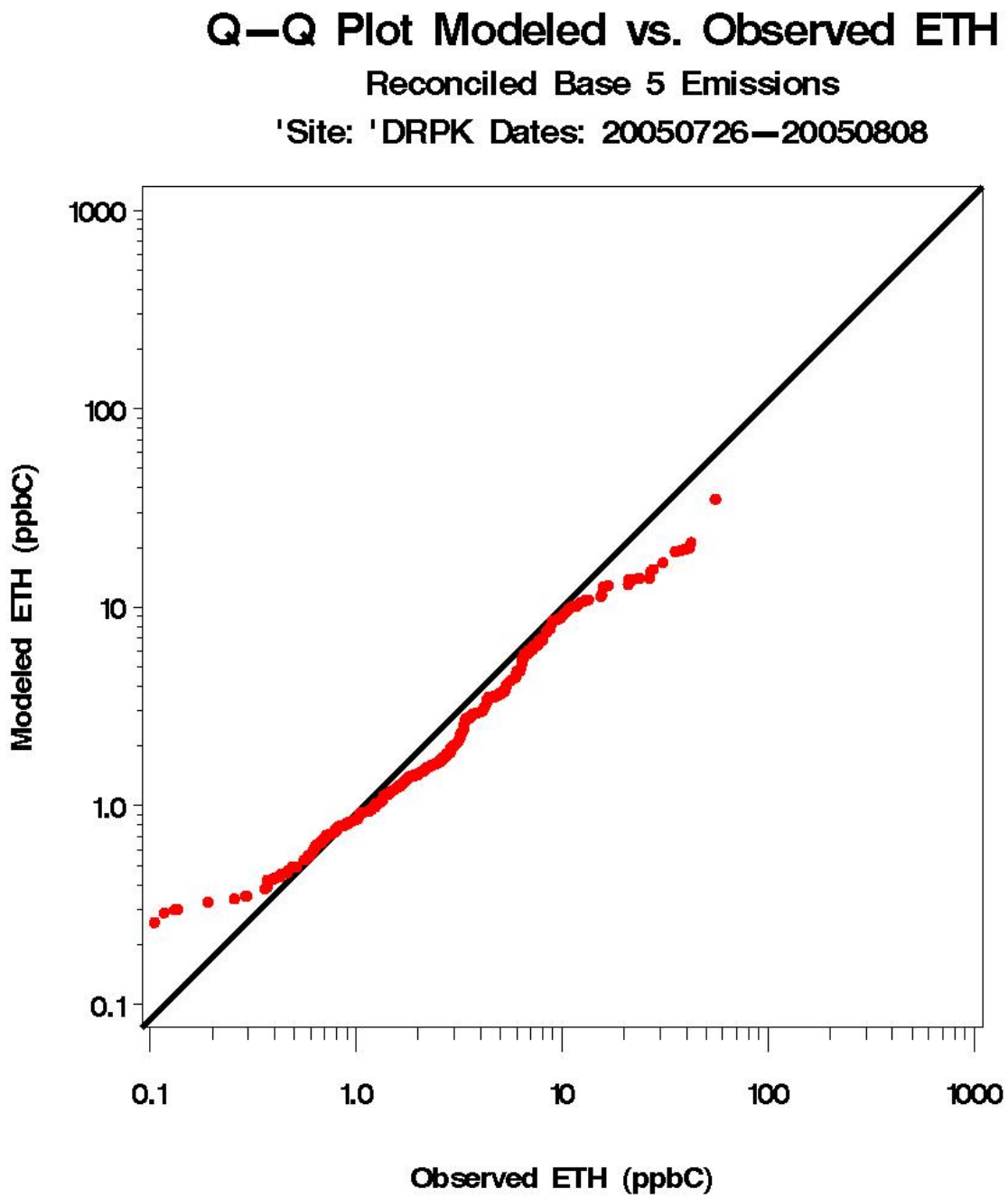
Modeled vs. Observed ETH

Reconciled Base 5 Emissions

'Site: 'DRPK Dates: 20050726—20050808




Q—Q Plot Modeled vs. Observed ETH
Unreconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050726—20050808
Modeled ETH (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed ETH (ppbC)


Q—Q Plot Modeled vs. Observed ETH
Reconciled Base 5 Emissions
'Site: 'DRPK Dates: 20050726—20050808
Modeled ETH (ppbC)
1000
100
10
1.0
0.1
0.1
1.0
10
100
1000
Observed ETH (ppbC)

Model Performance Summary

- **Reconciling the HRVOC emissions:**
  - **Increases peak ozone under the right conditions, but often the biggest increases do not coincide with the domain-wide peak.**
  - **Improves ozone performance slightly in the first two episodes. Effect on the July-August, 2005 episode is mixed.**
  - **Increases predicted concentrations of CB-05 olefins. At some sites, improves performance at the high range of measured concentrations.**

Next Steps

- **Repeat analysis for 2006 data.**
- **Run a second iteration of the method – re-do the entire process starting with the reconciled emissions.**
- **Continue analyzing preliminary results – look for seasonal or time-of-day differences, investigate using reactivity.**
- **Document methodology, explore publishing work in a journal.**