Appendix B.1

Phase 2 HGB Mid Course Review

Time Series Plots

Prepared by the

Technical Support Section

Technical Analysis Division

TCEQ

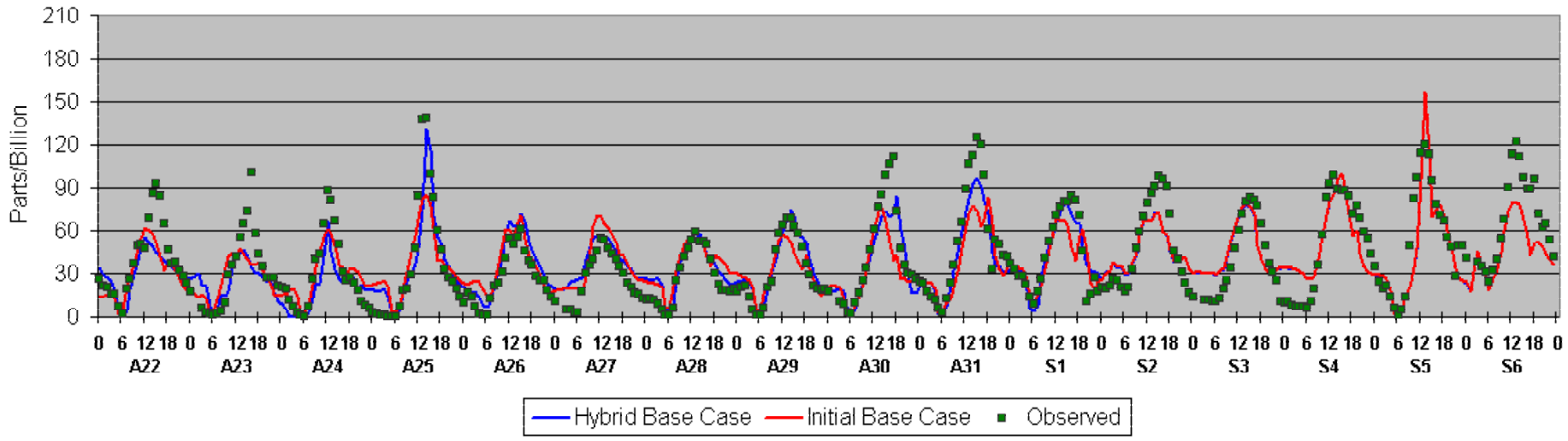
April, 2004

Houston-Galveston Time Series Plots

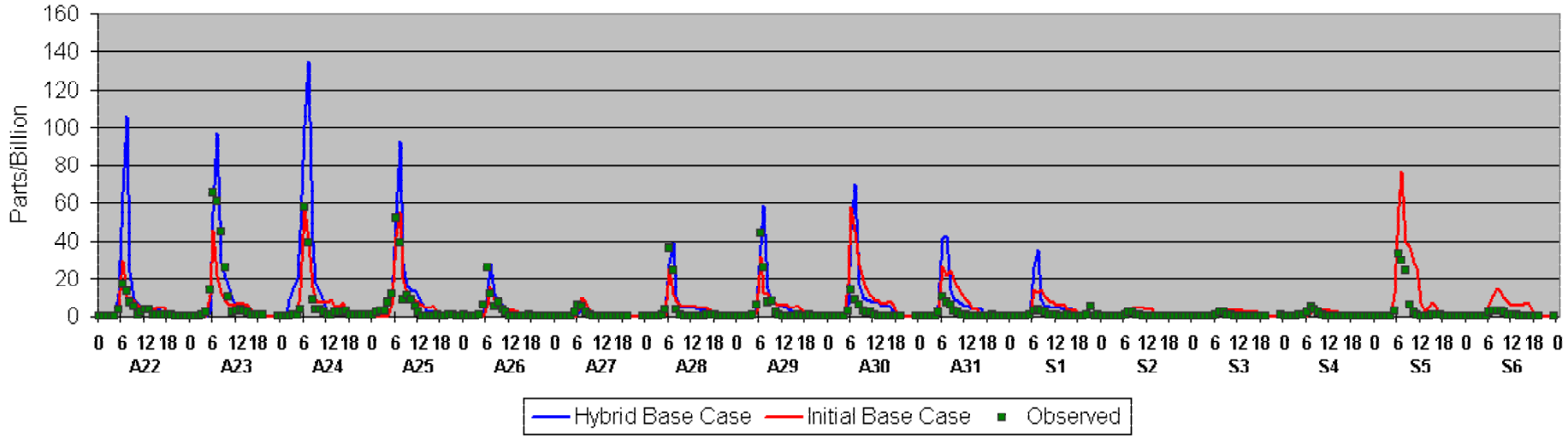
Organized by Monitoring Site

Bayland Park Time Series

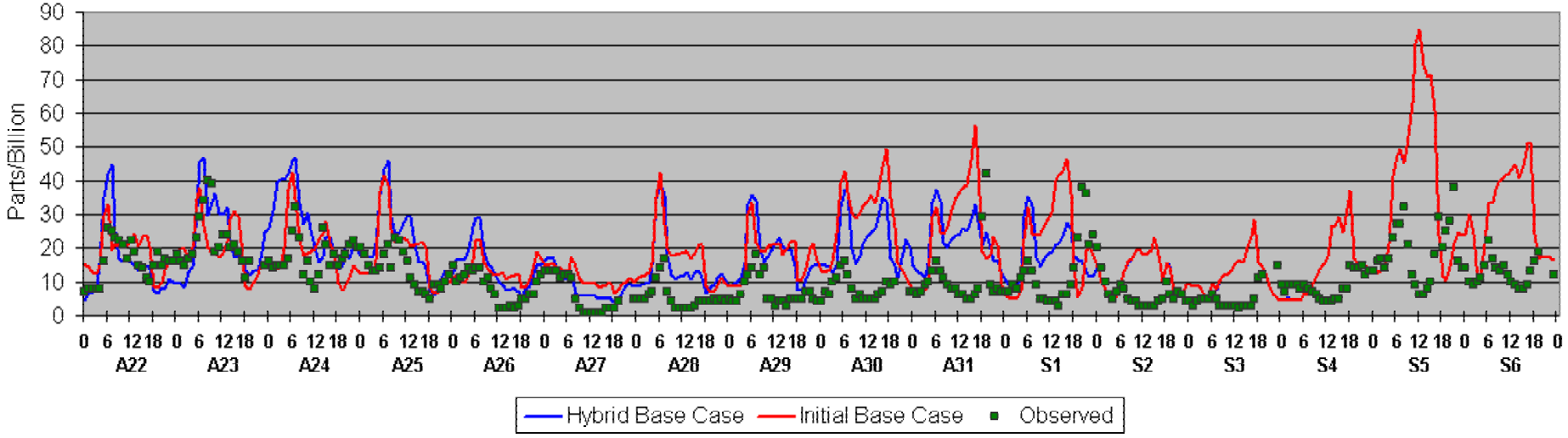
Bayland Park Ozone Concentrations



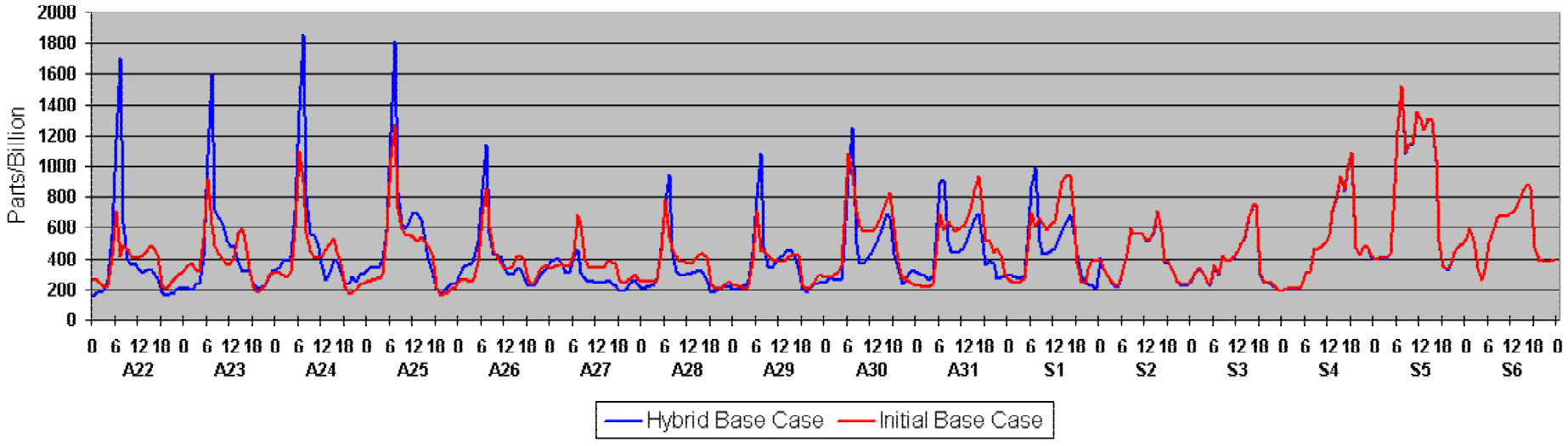
Bayland Park NO Concentrations

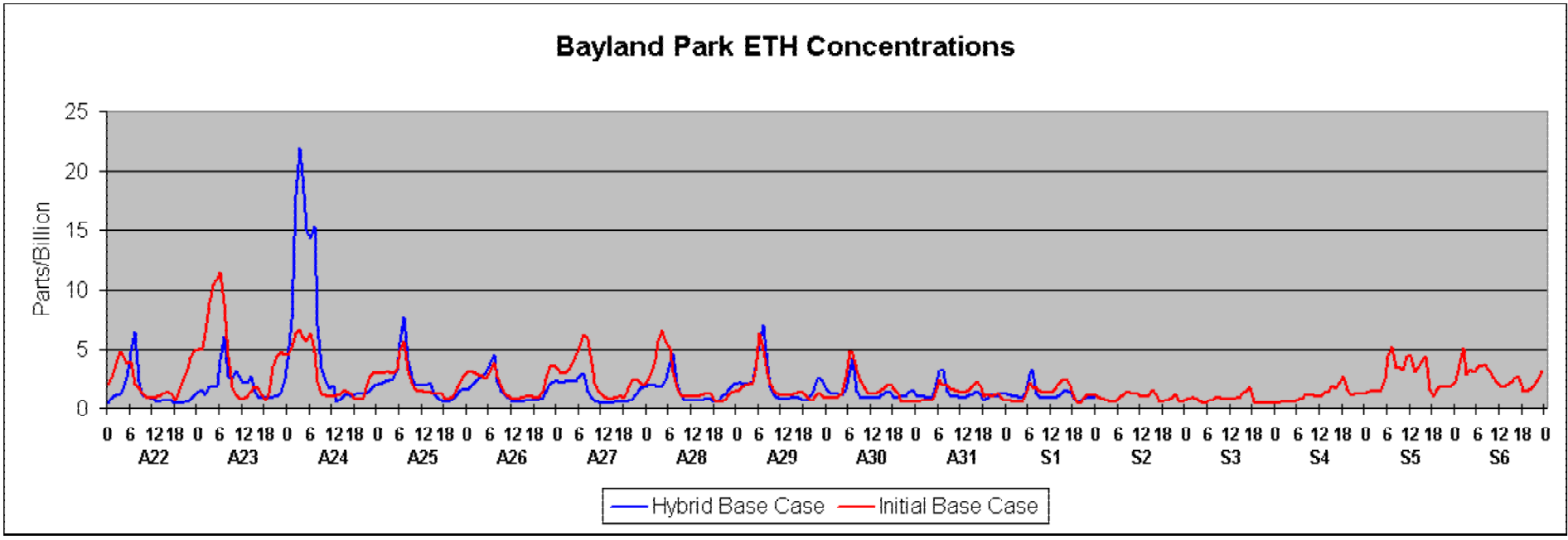


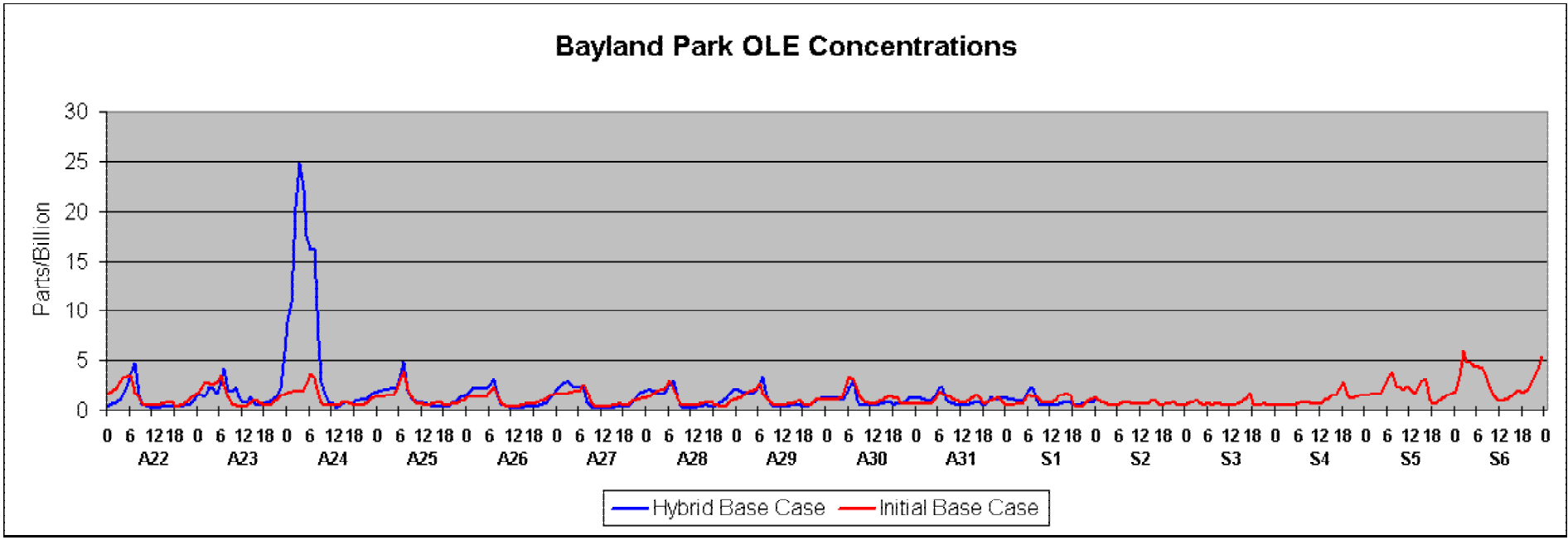
Bayland Park NO2 Concentrations



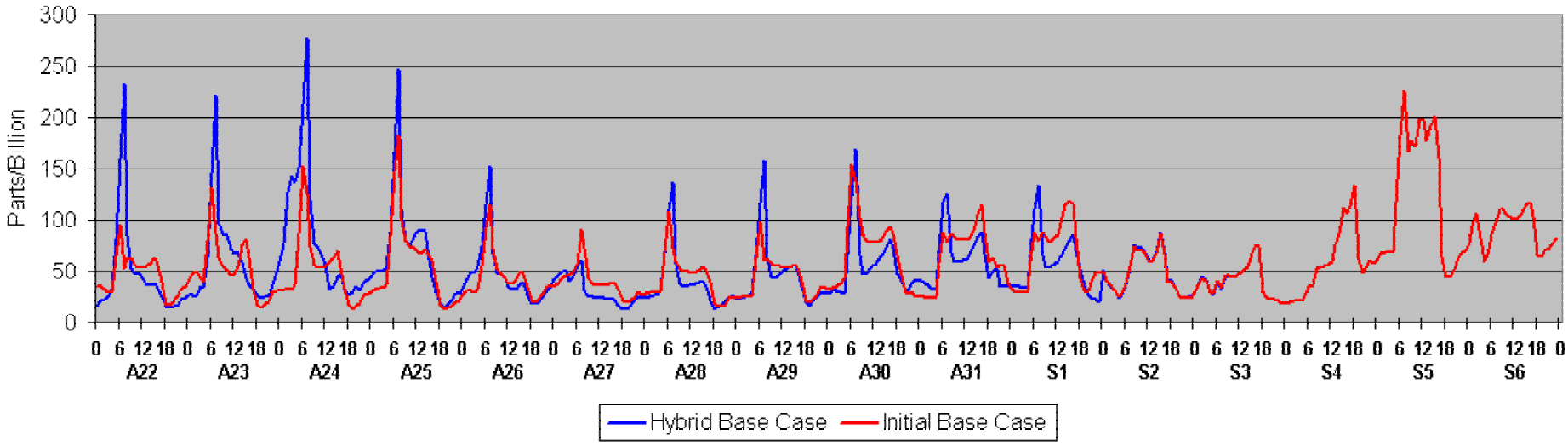
Bayland Park CO Concentrations



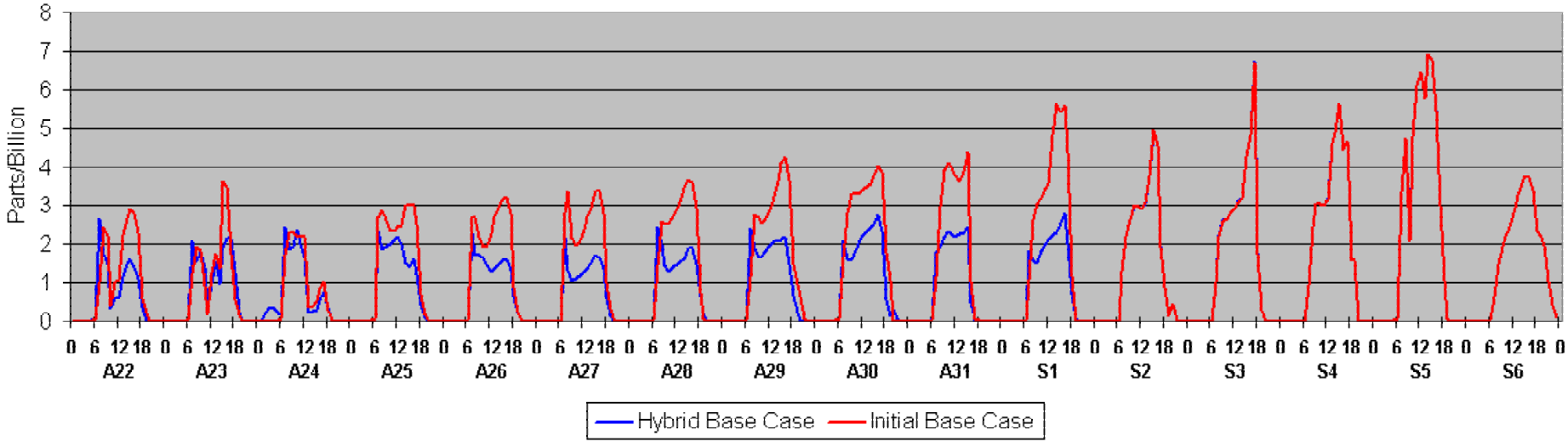

Bayland Park ETH Concentrations
Parts/Billion
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Bayland Park OLE Concentrations
Parts/Billion
30
25
20
15
10
5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

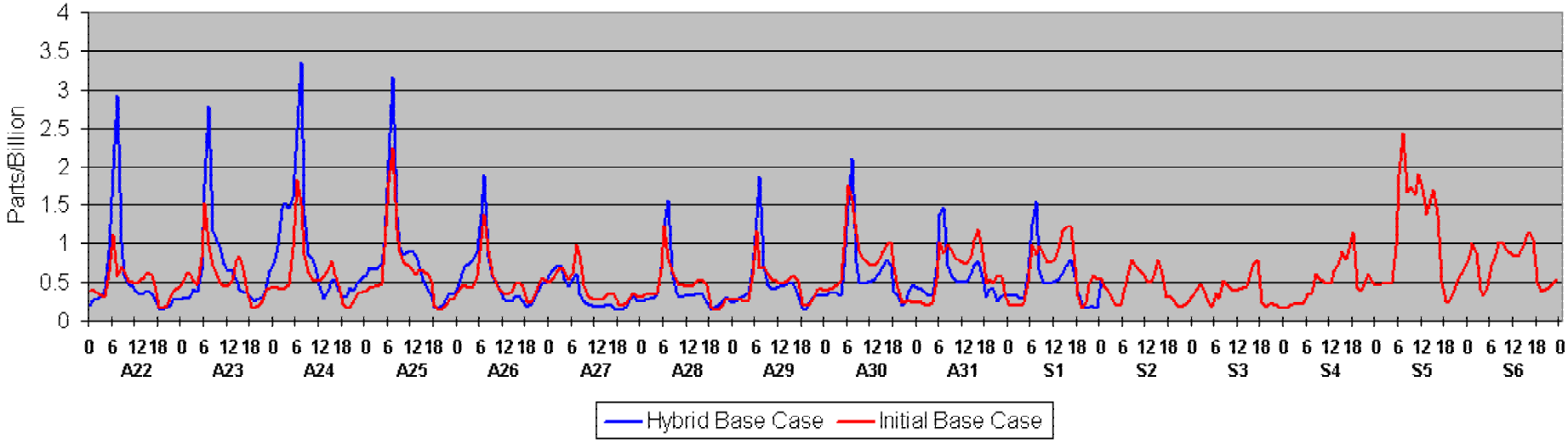
Bayland Park PAR Concentrations



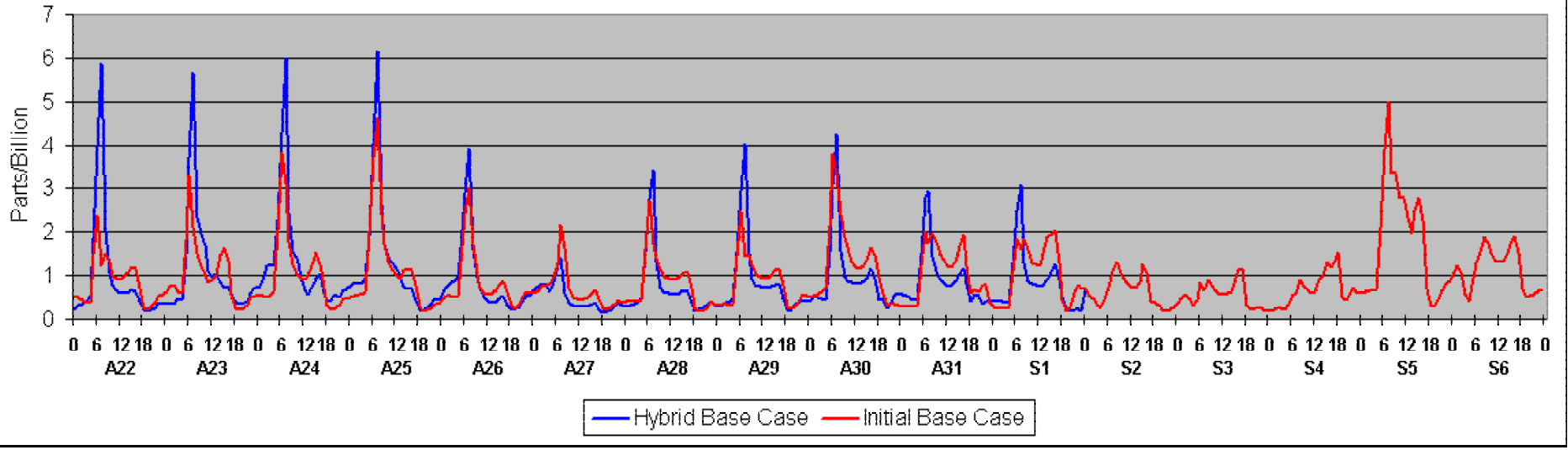
Bayland Park ISOP Concentrations



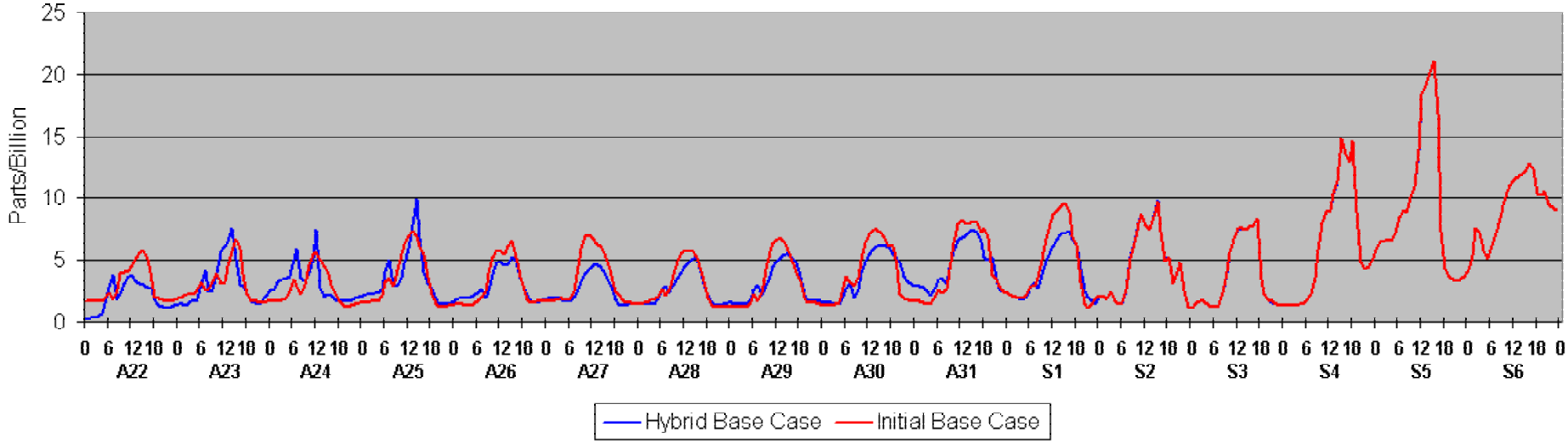
Bayland Park TOL Concentrations



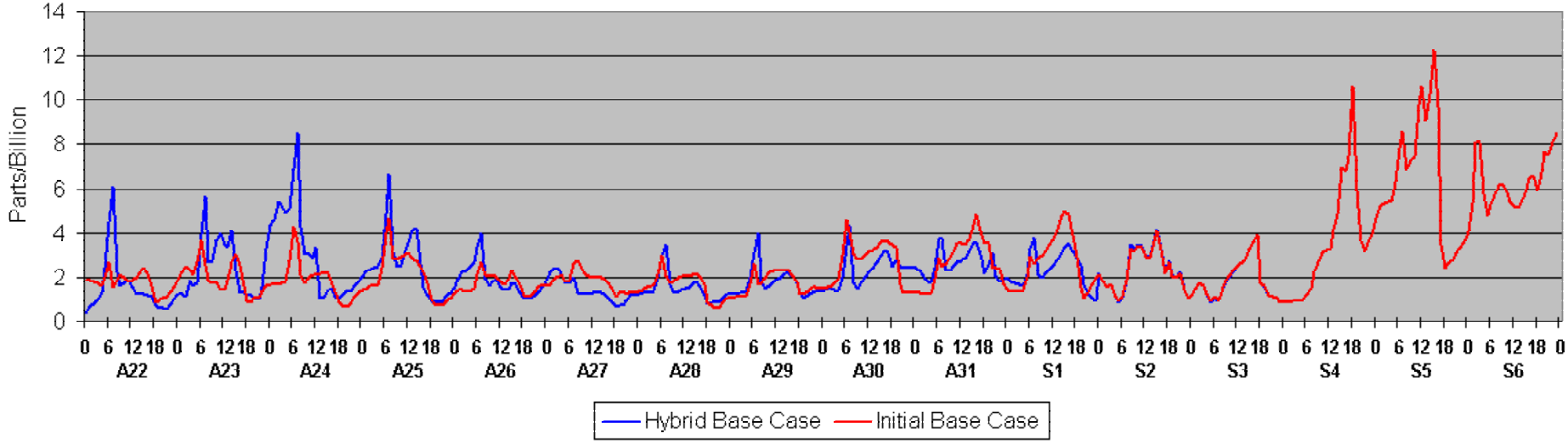
Bayland Park XYL Concentrations

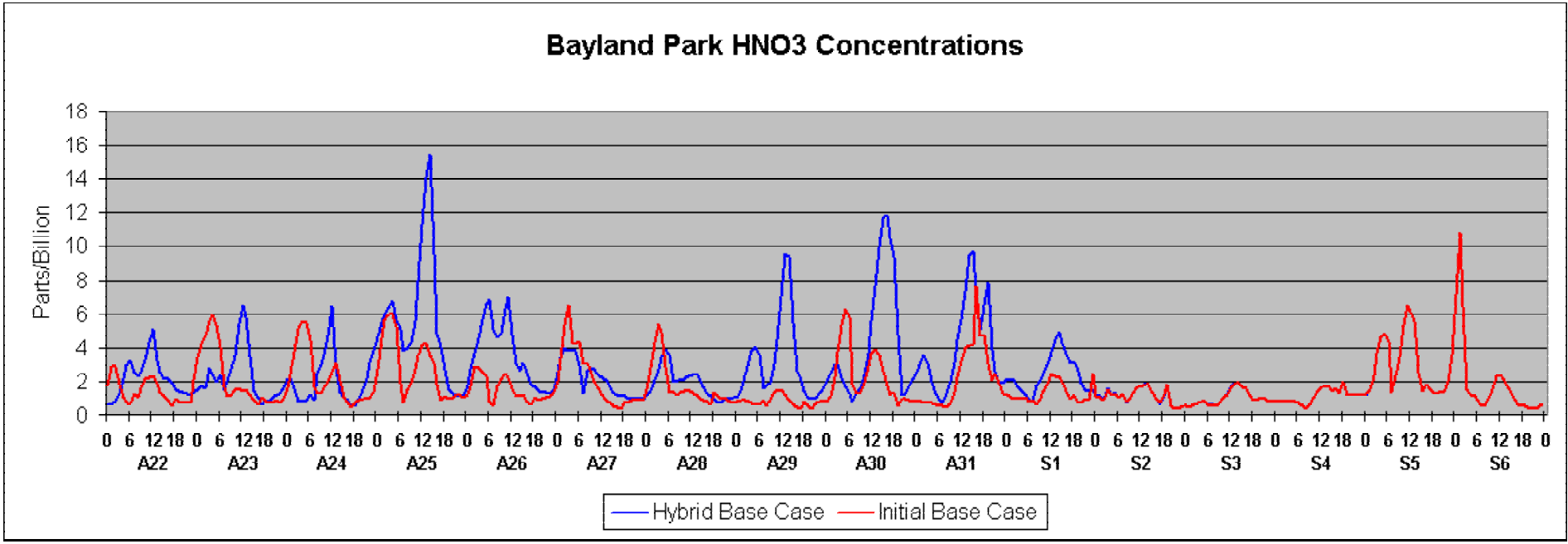


Bayland Park HCHO Concentrations



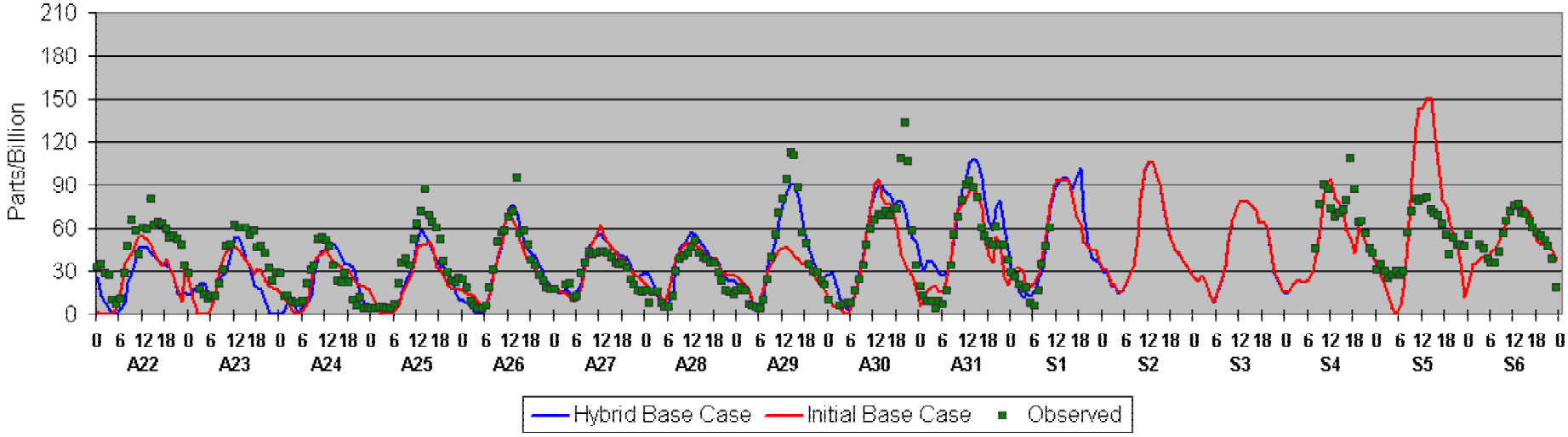
Bayland Park ALD2 Concentrations



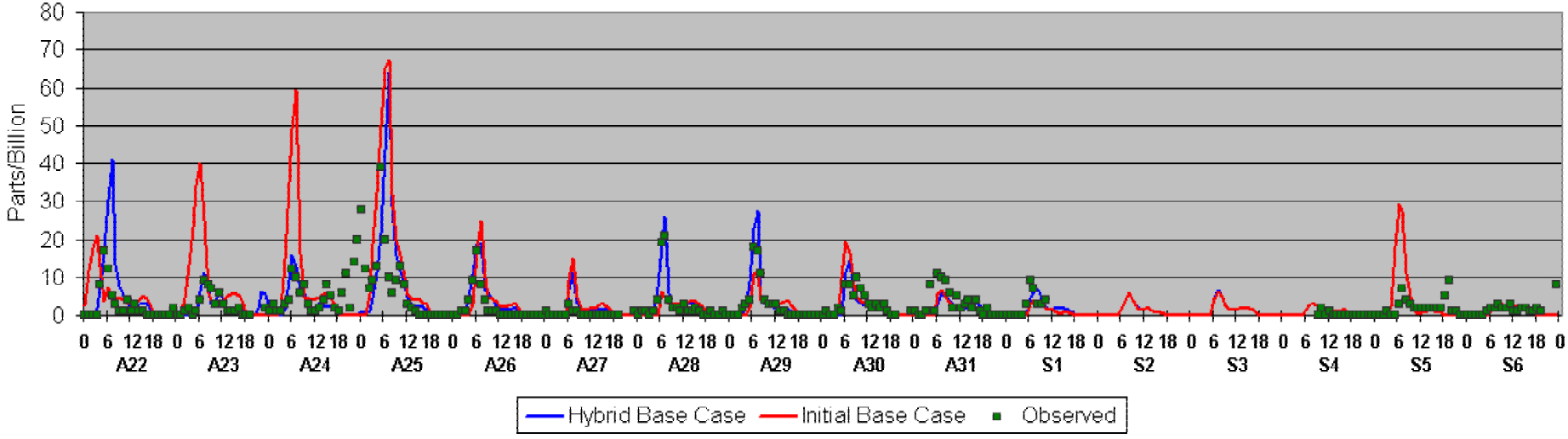

Bayland Park HNO3 Concentrations
Parts/Billion
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Beaumont Time Series

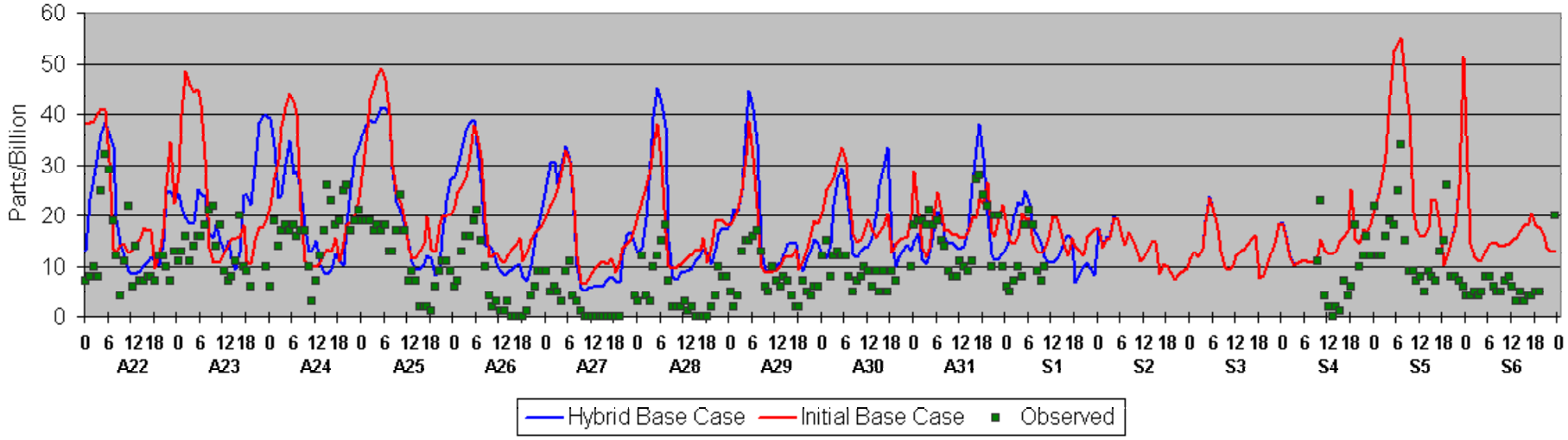
Beaumont Ozone Concentrations



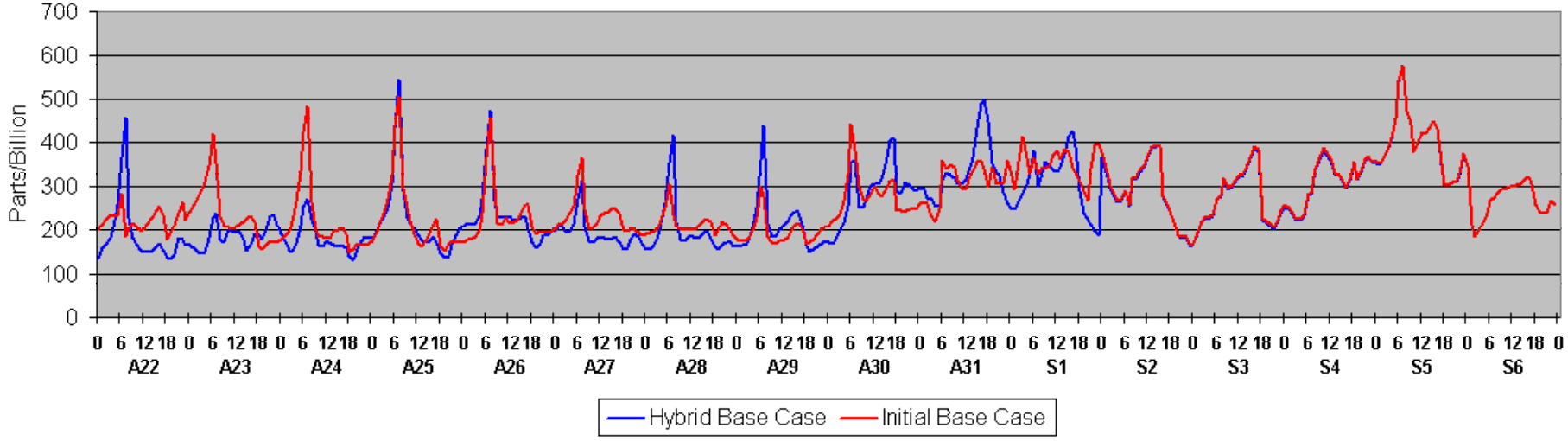
Beaumont NO Concentrations



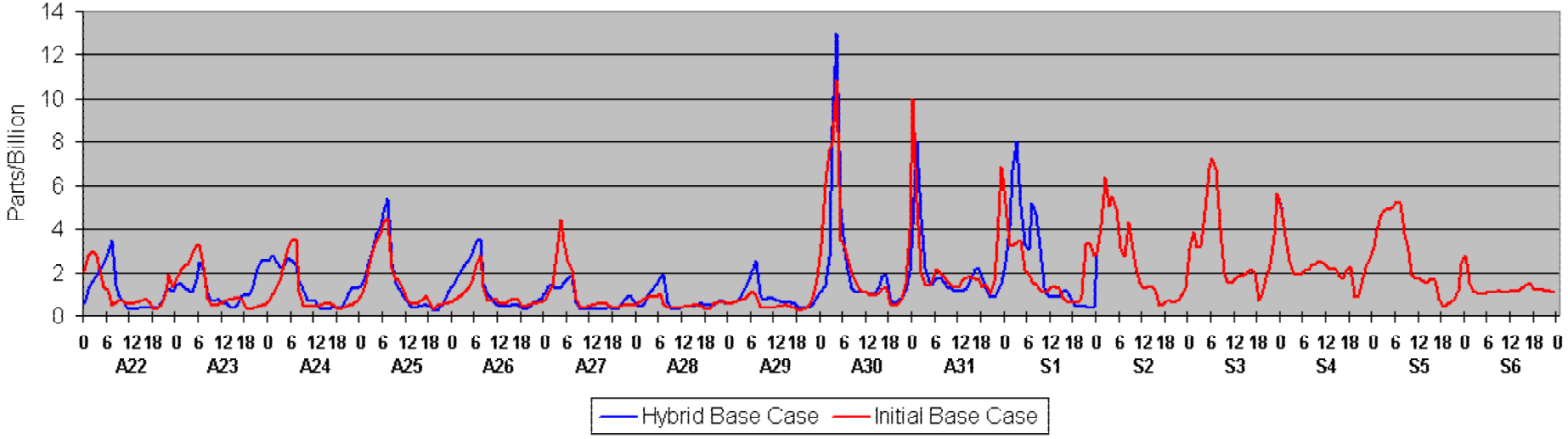
Beaumont NO2 Concentrations



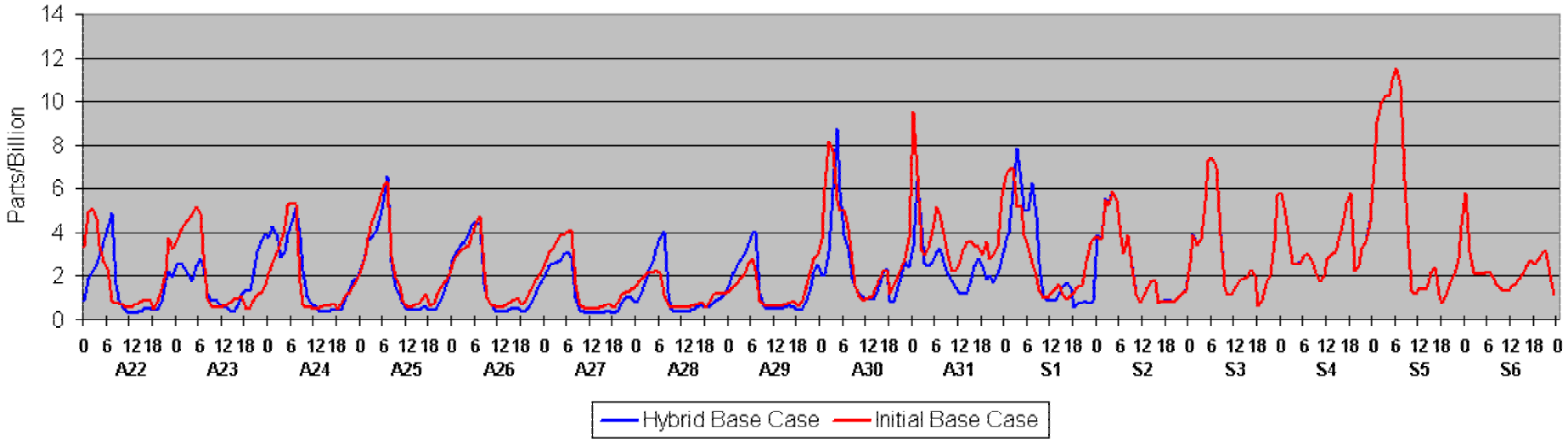
Beaumont CO Concentrations



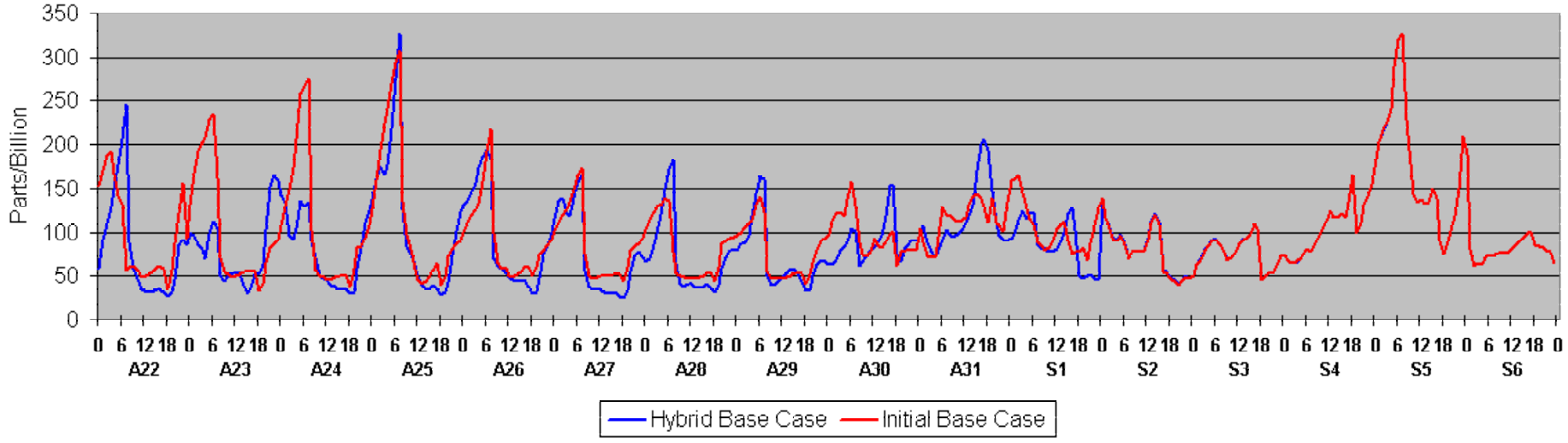
Beaumont ETH Concentrations



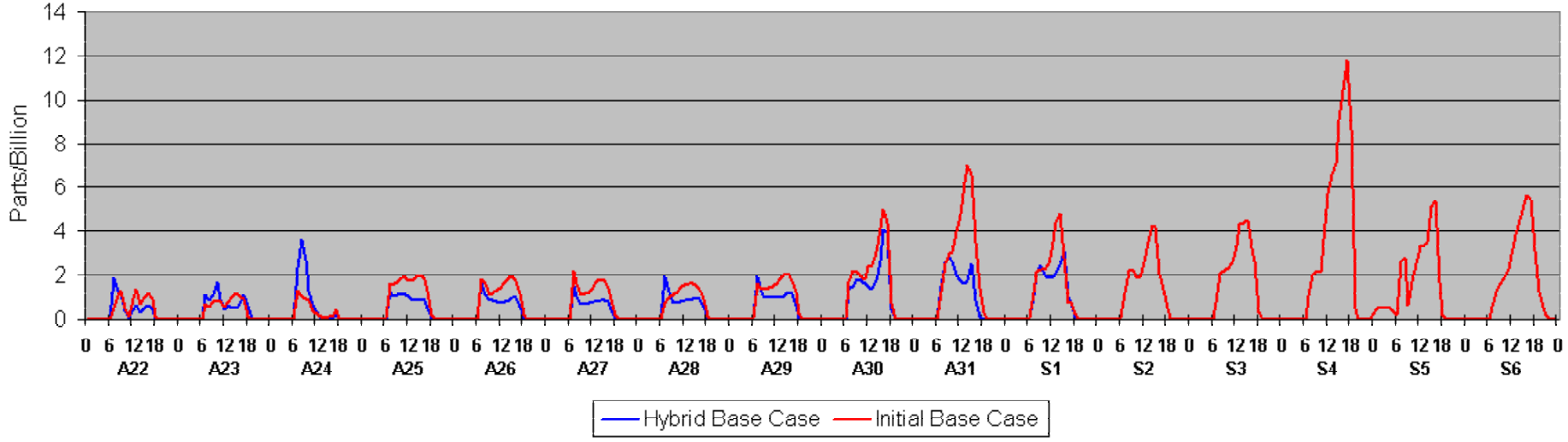
Beaumont OLE Concentrations



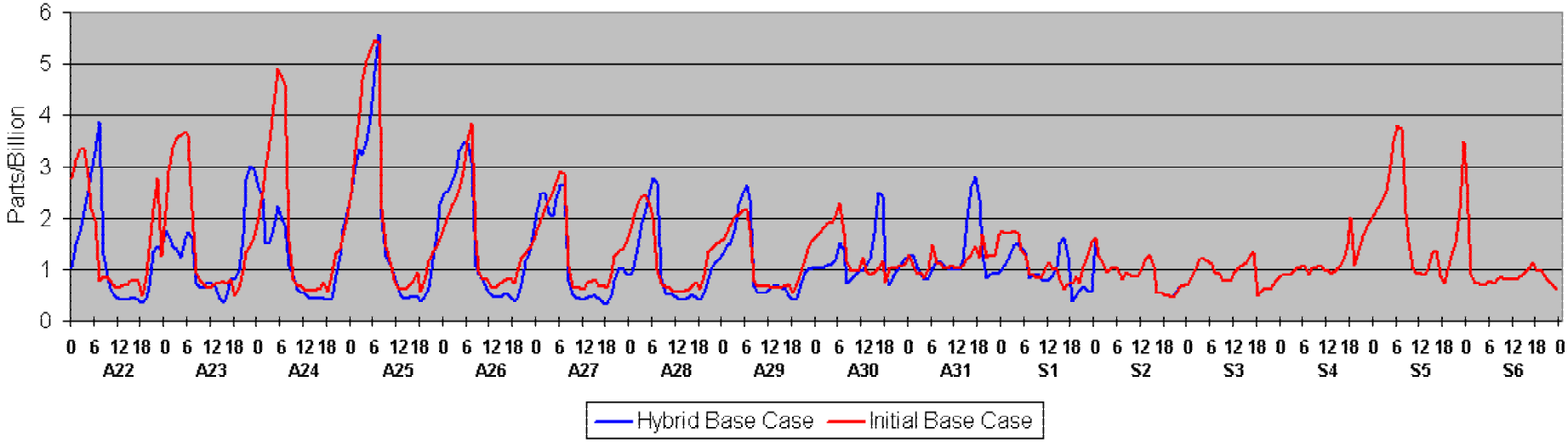
Beaumont PAR Concentrations



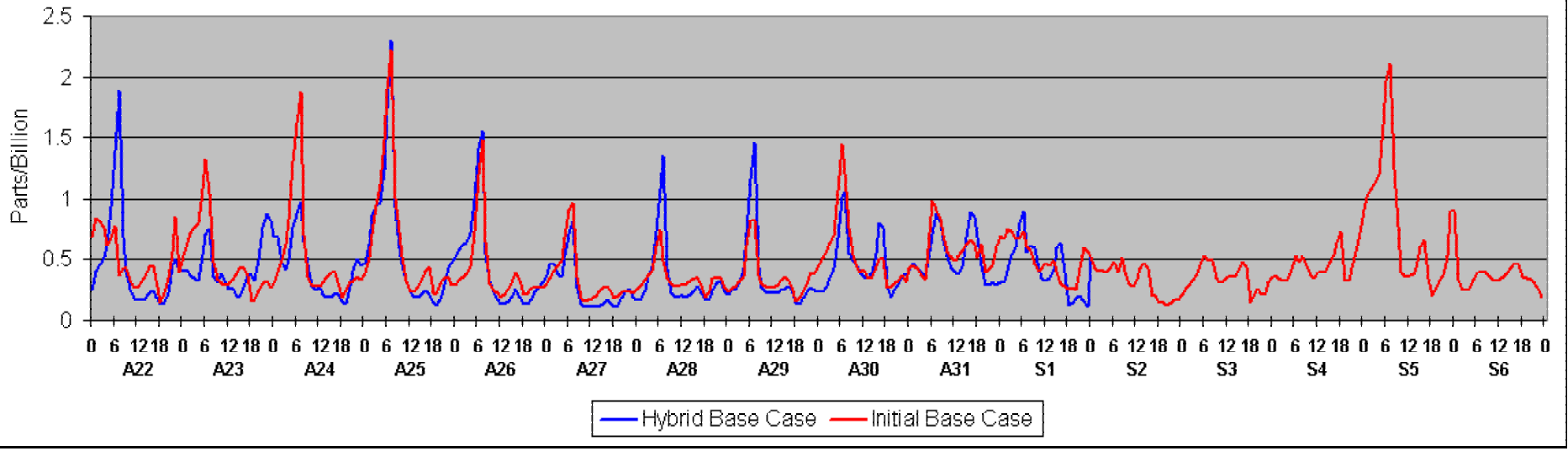
Beaumont ISOP Concentrations



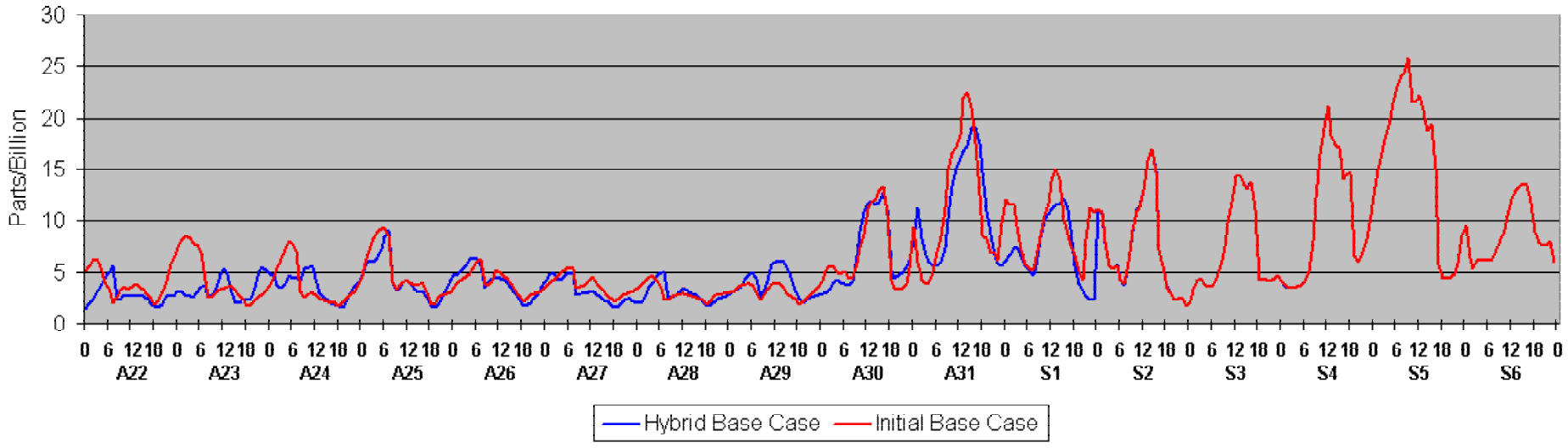
Beaumont TOL Concentrations



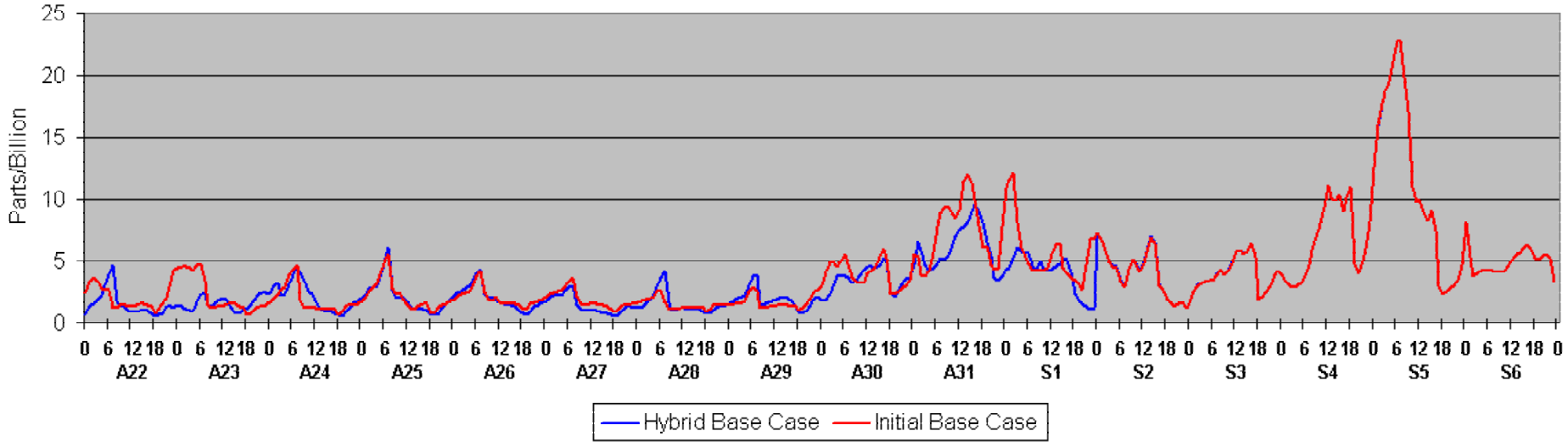
Beaumont XYL Concentrations

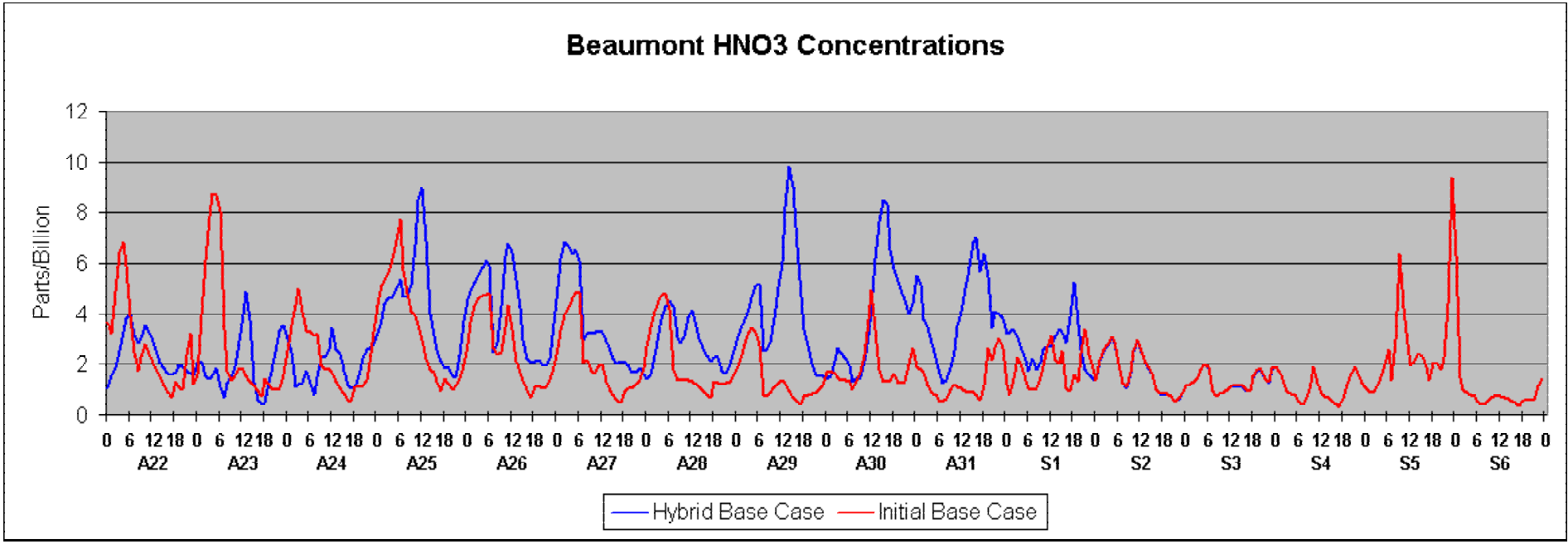


Beaumont HCHO Concentrations



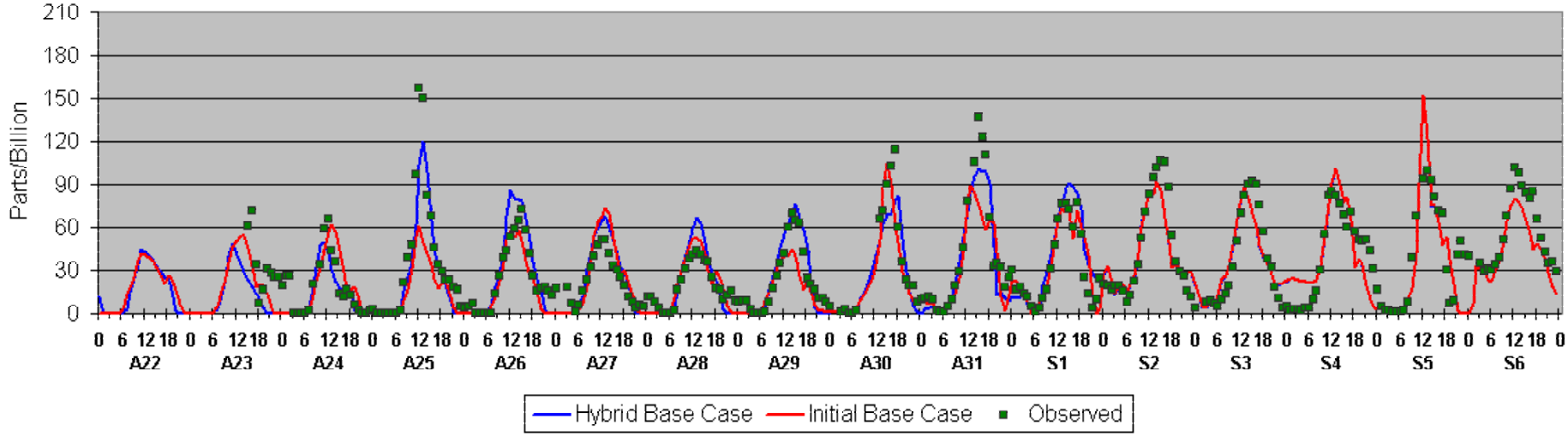
Beaumont ALD2 Concentrations



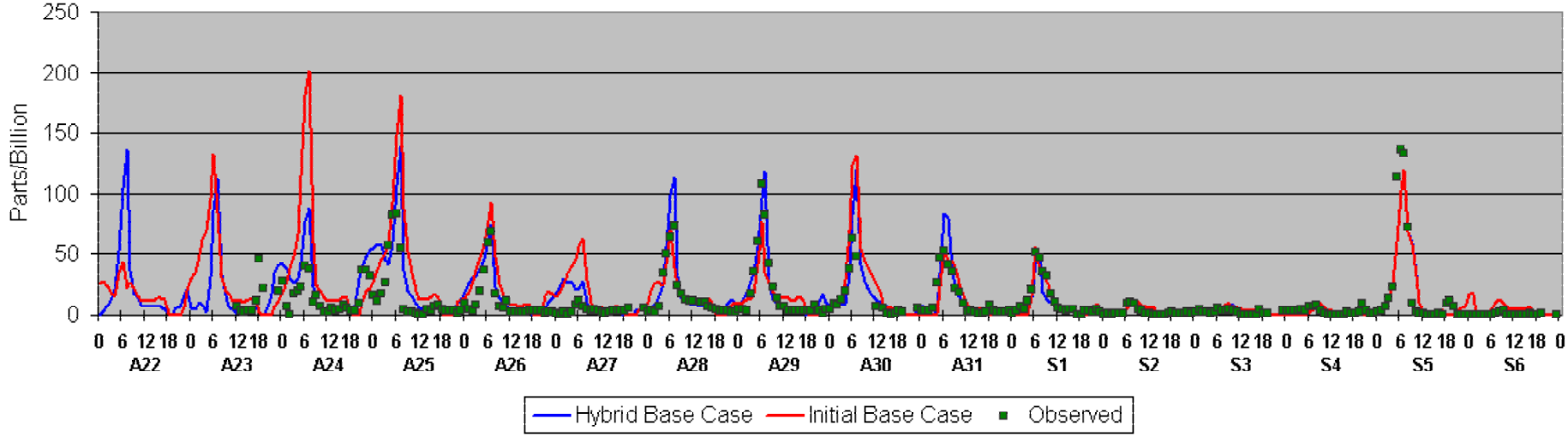

Beaumont HNO3 Concentrations
Parts/Billion
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Clinton Drive Time Series

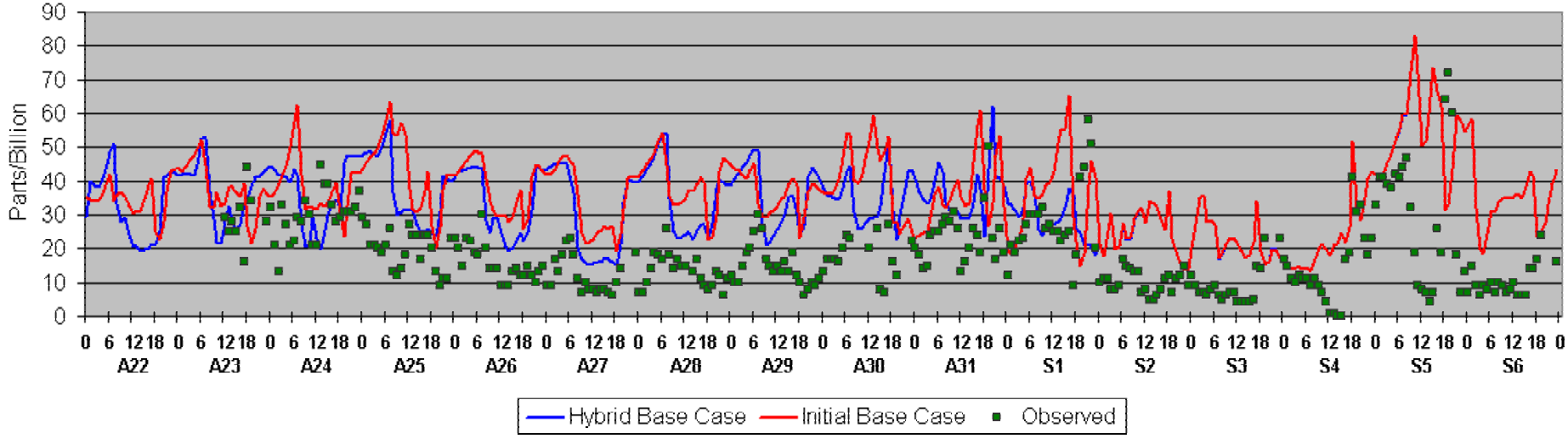
Clinton Drive Ozone Concentrations



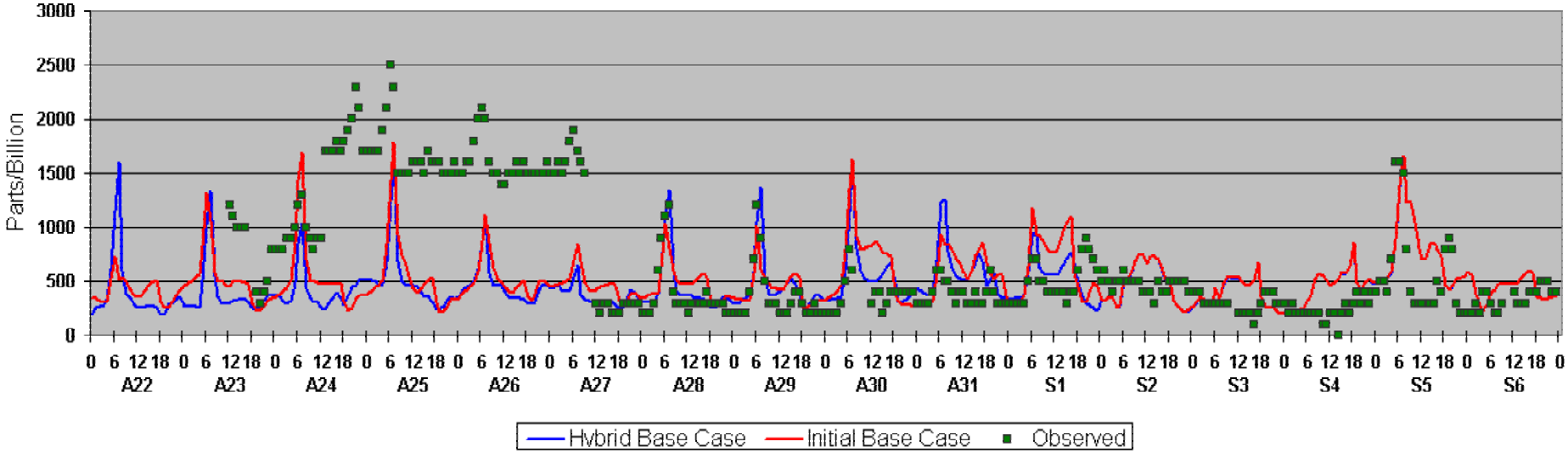
Clinton Drive NO Concentrations



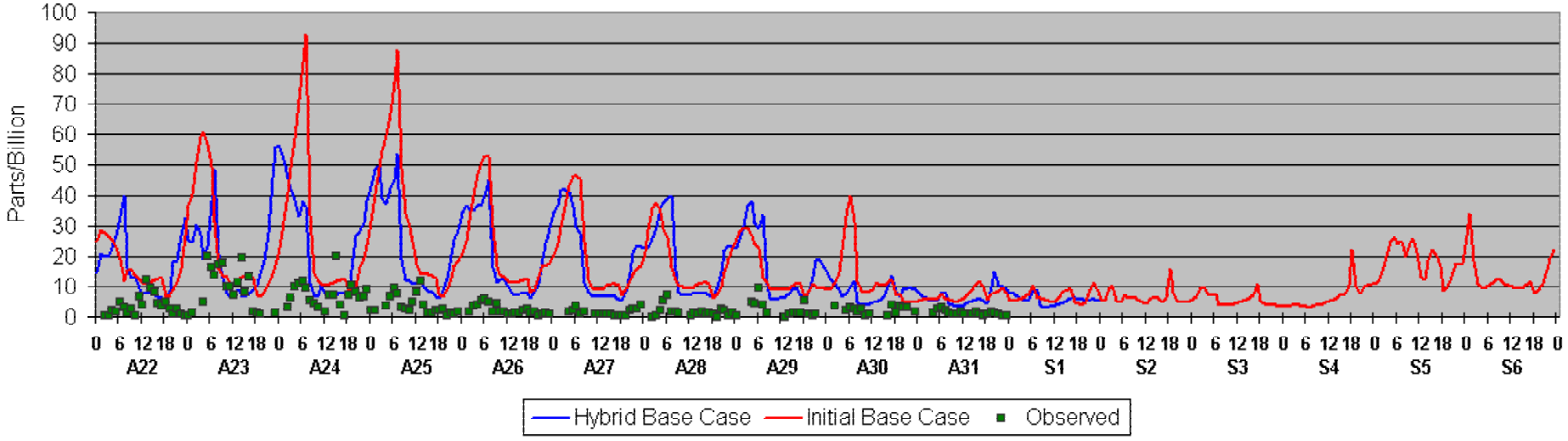
Clinton Drive NO2 Concentrations



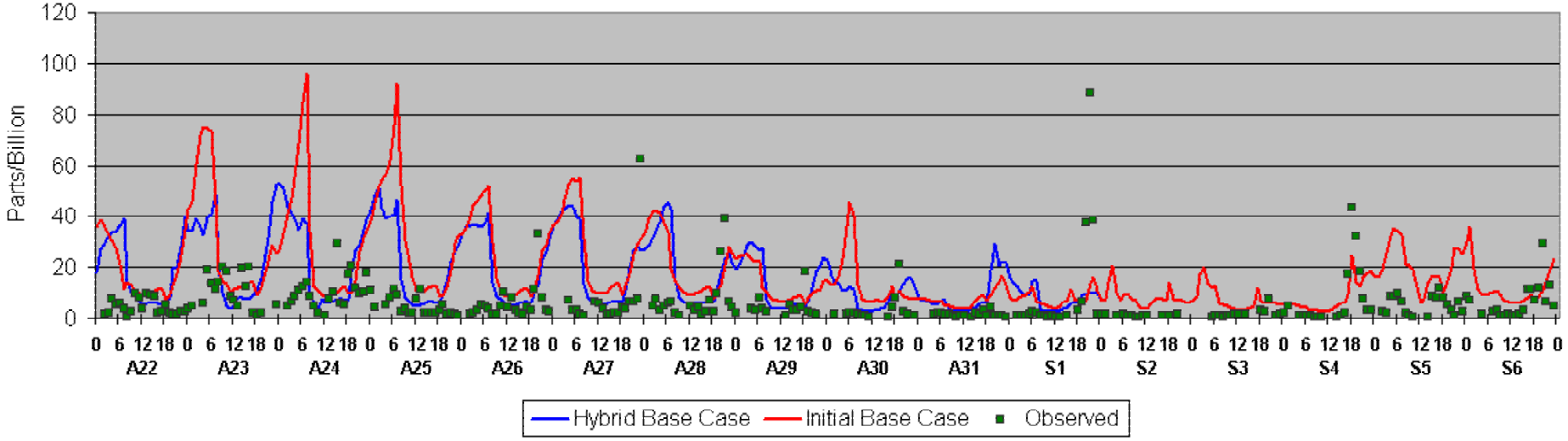
Clinton Drive CO Concentrations



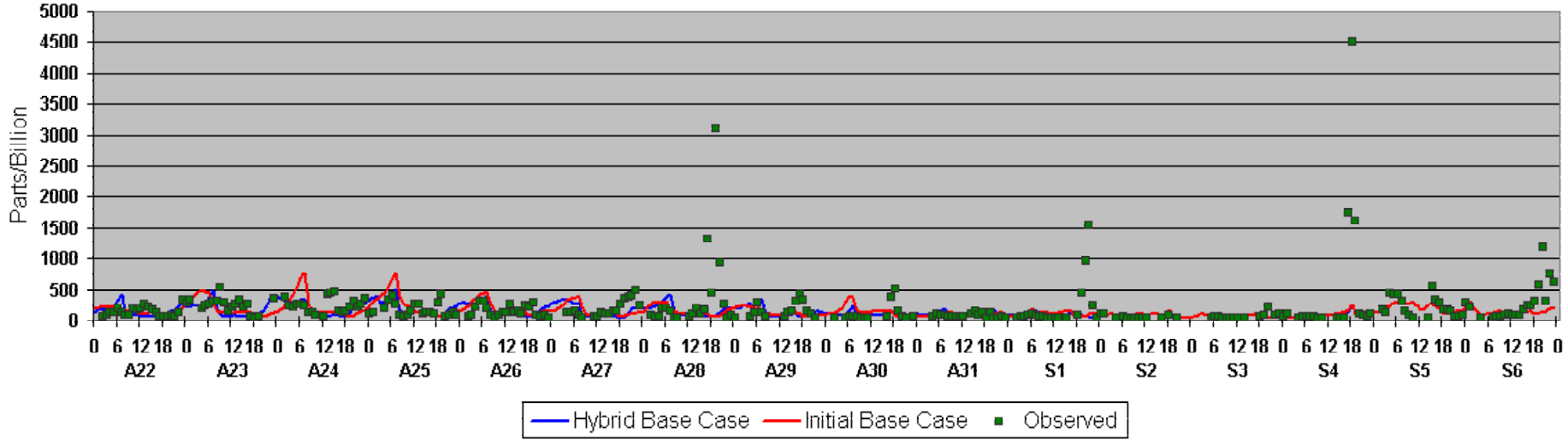
Clinton Drive ETH Concentrations



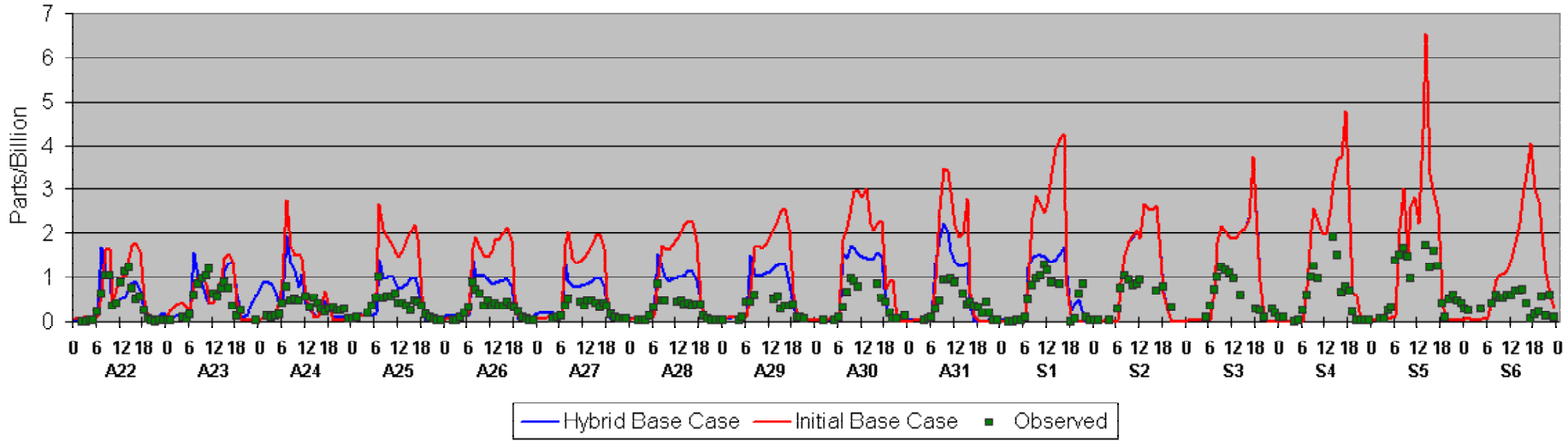
Clinton Drive OLE Concentrations



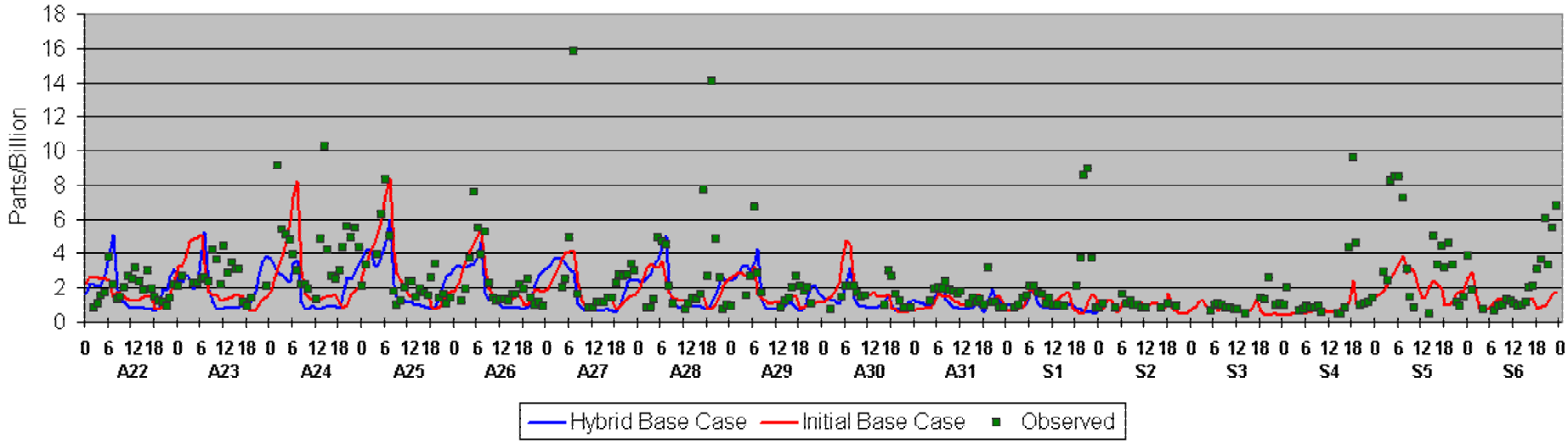
Clinton Drive PAR Concentrations



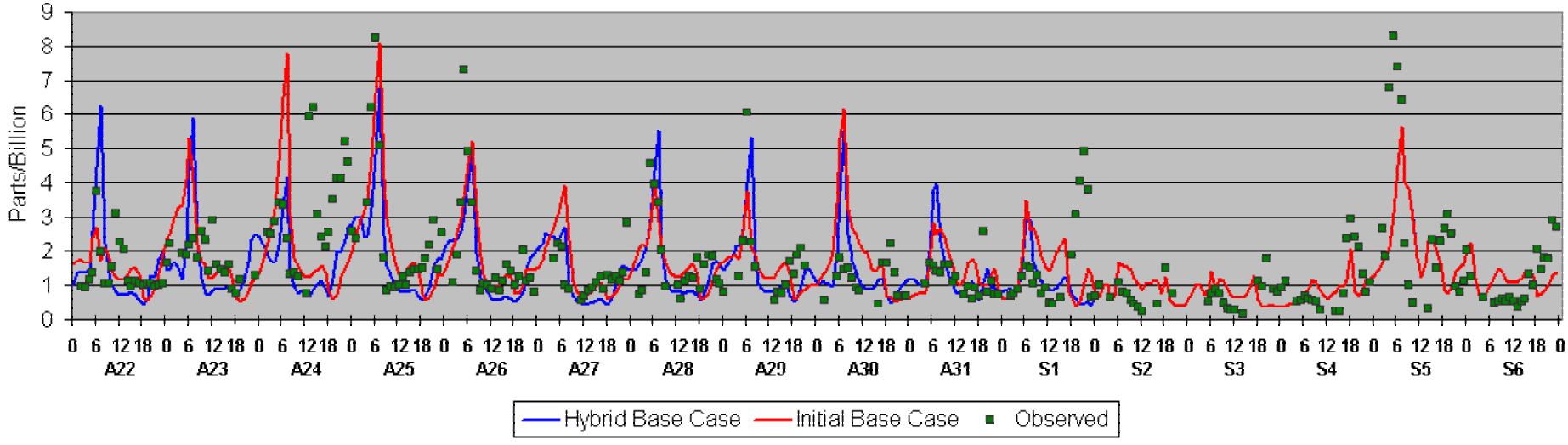
Clinton Drive ISOP Concentrations

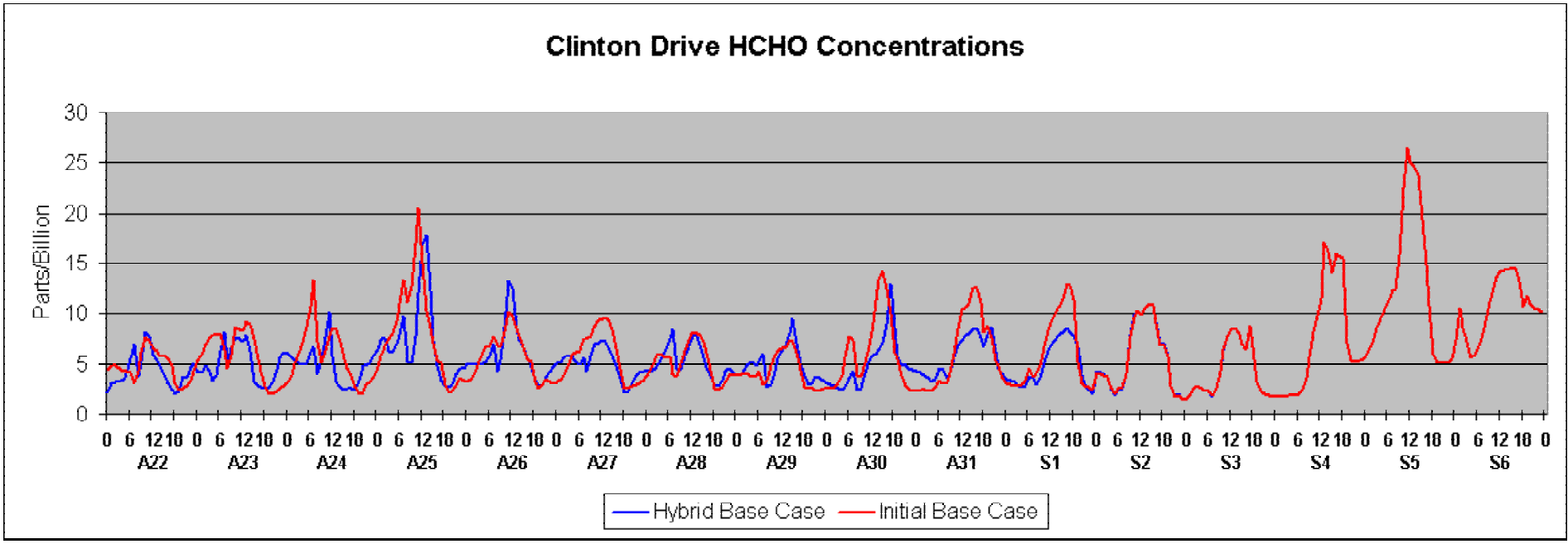


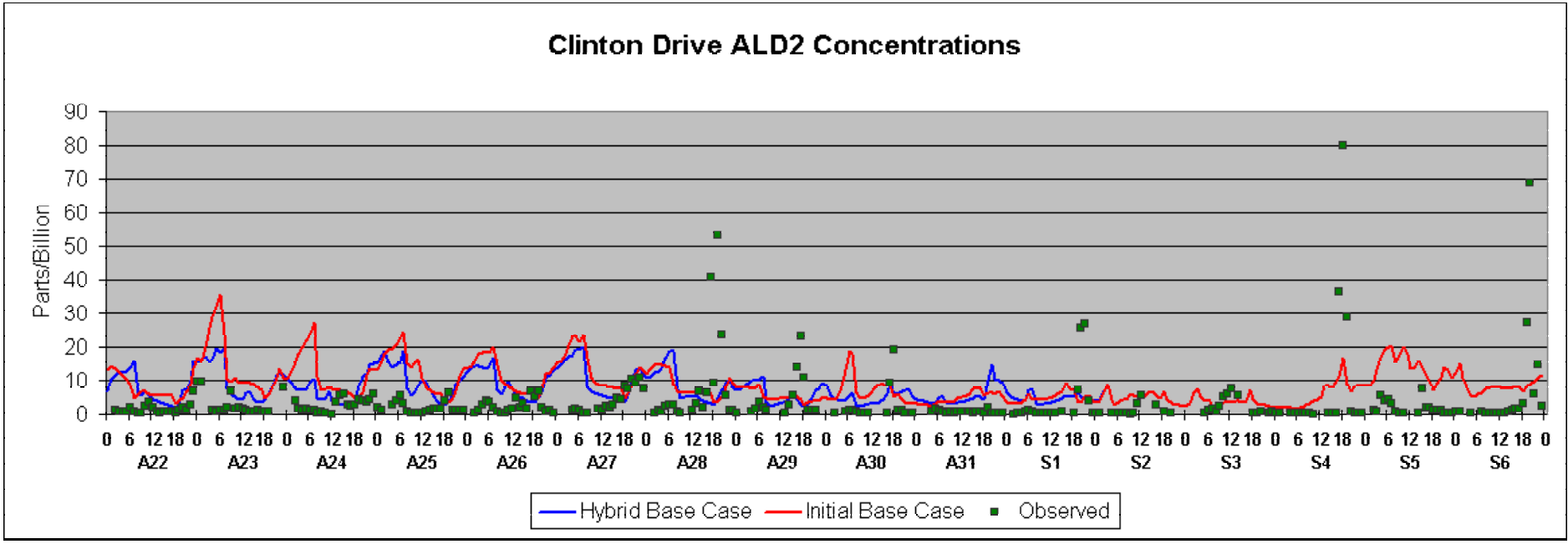
Clinton Drive TOL Concentrations

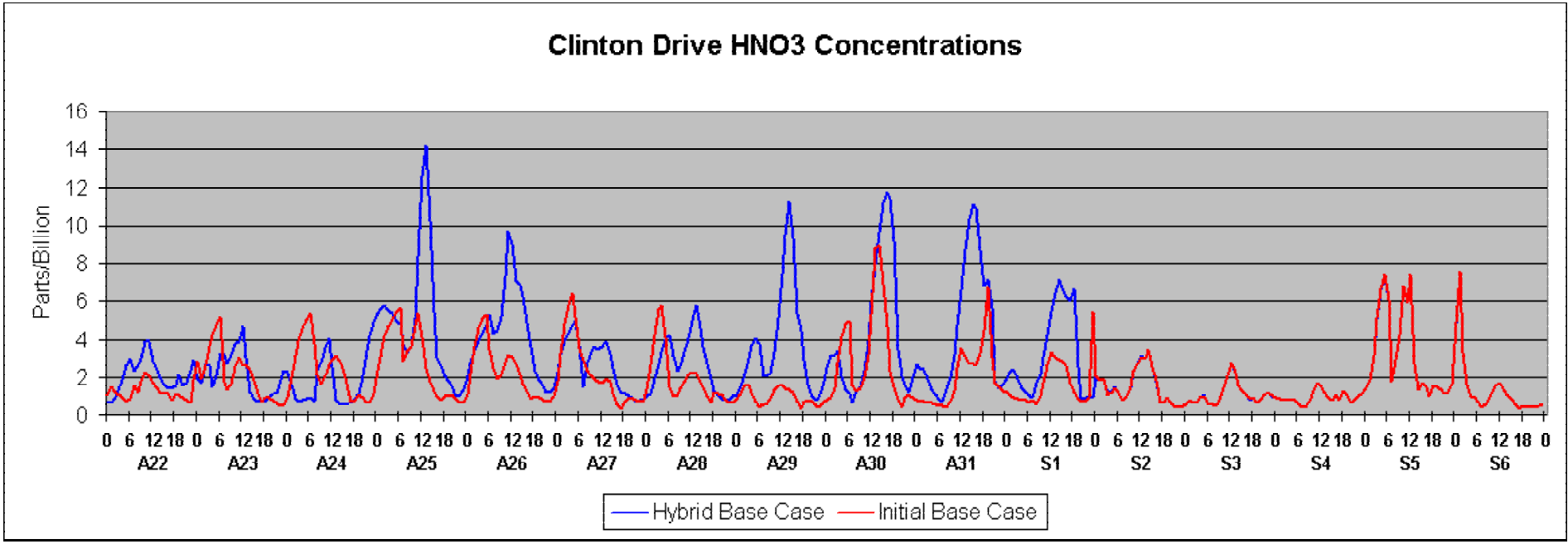


Clinton Drive XYL Concentrations



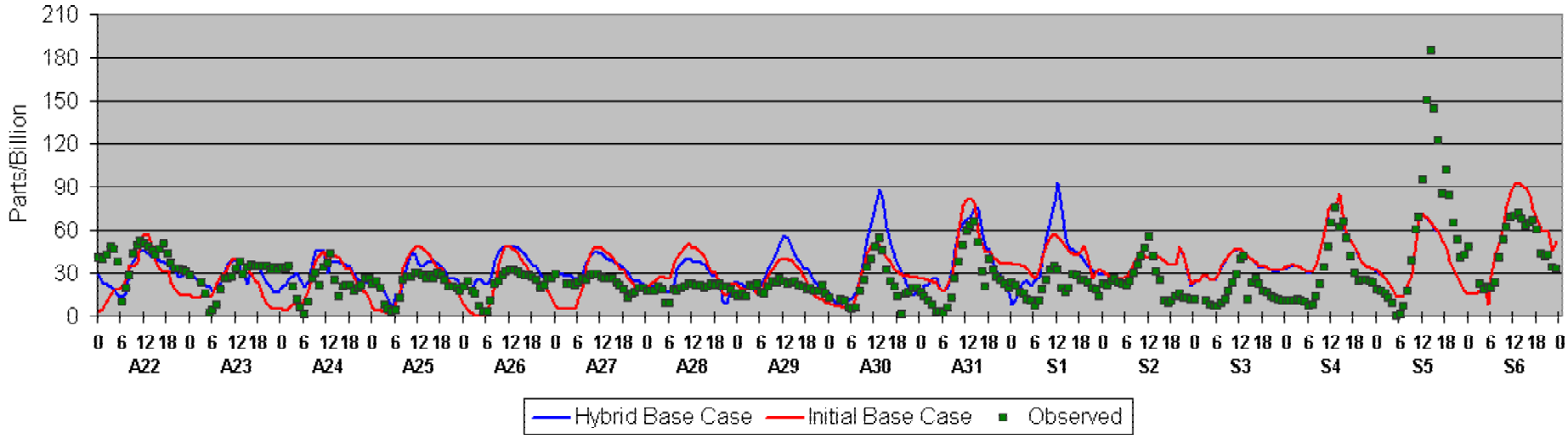

Clinton Drive HCHO Concentrations
Parts/Billion
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Clinton Drive ALD2 Concentrations
Parts/Billion
90
80
70
60
50
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

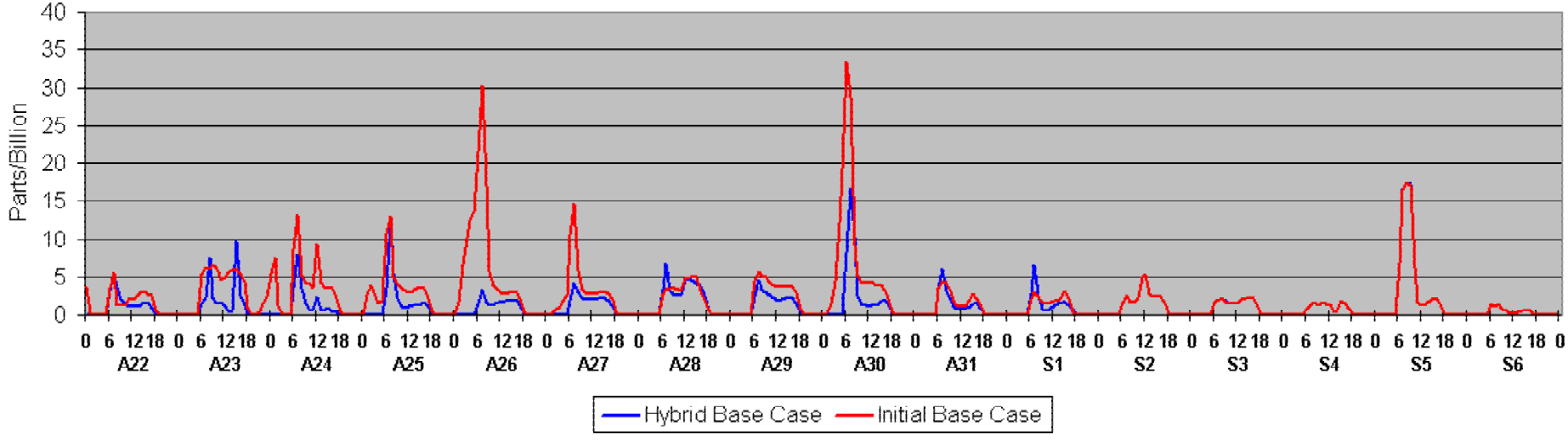

Clinton Drive HNO3 Concentrations
Parts/Billion
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Clute Time Series

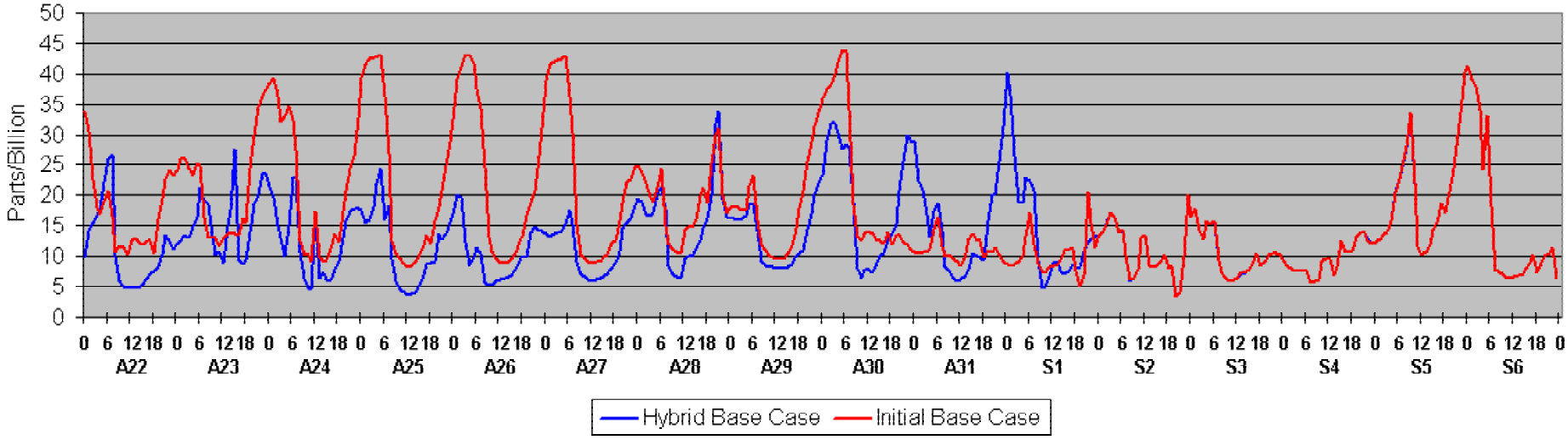
Clute Ozone Concentrations



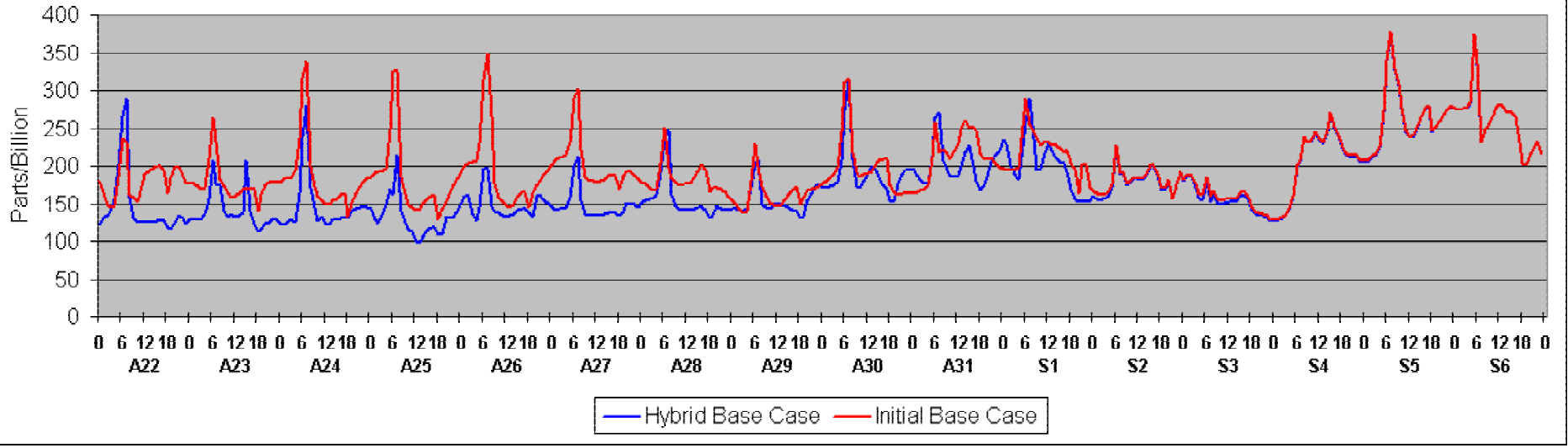
Clute NO Concentrations



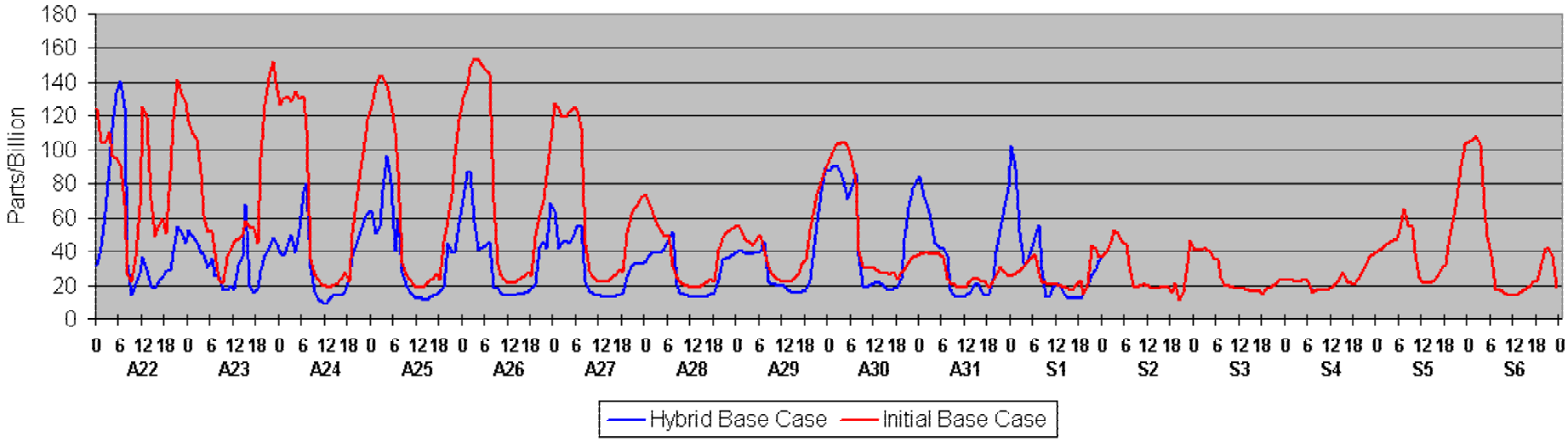
Clute NO2 Concentrations



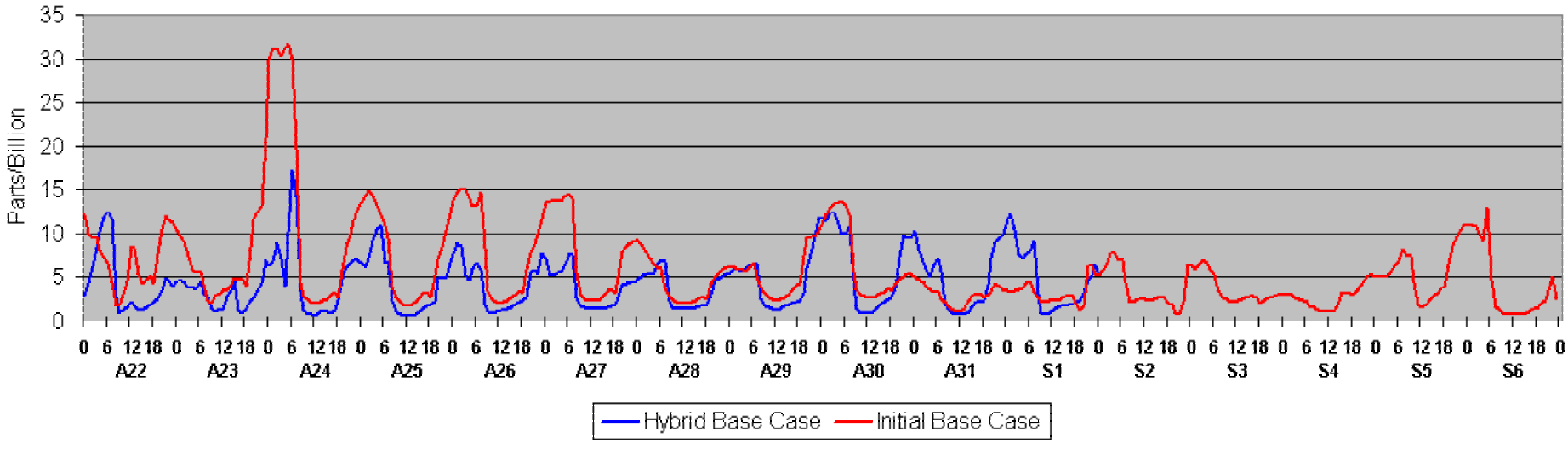
Clute CO Concentrations



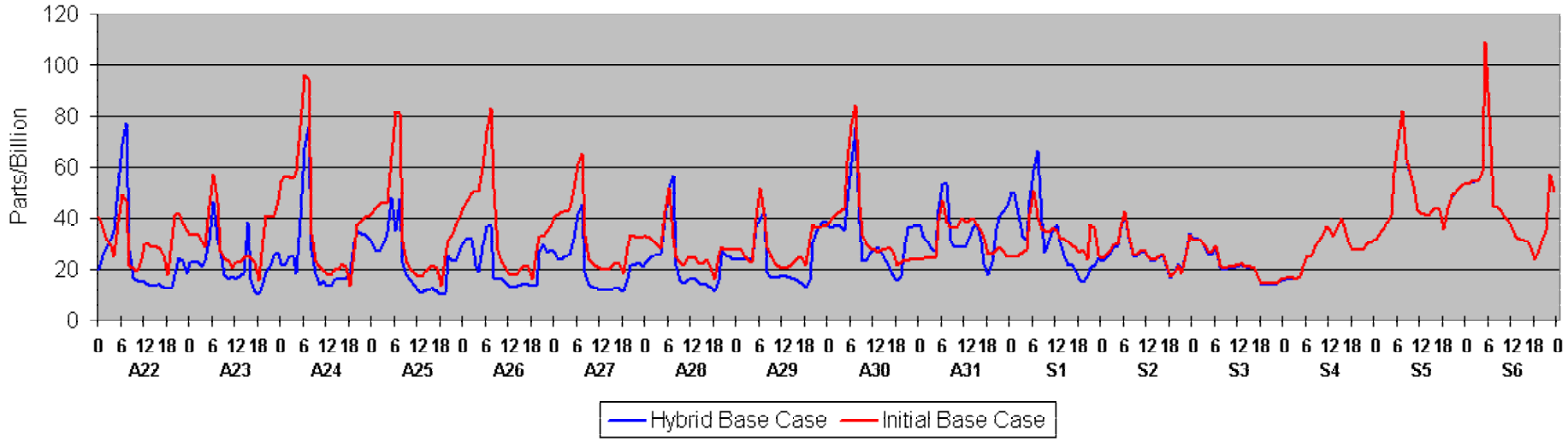
Clute ETH Concentrations



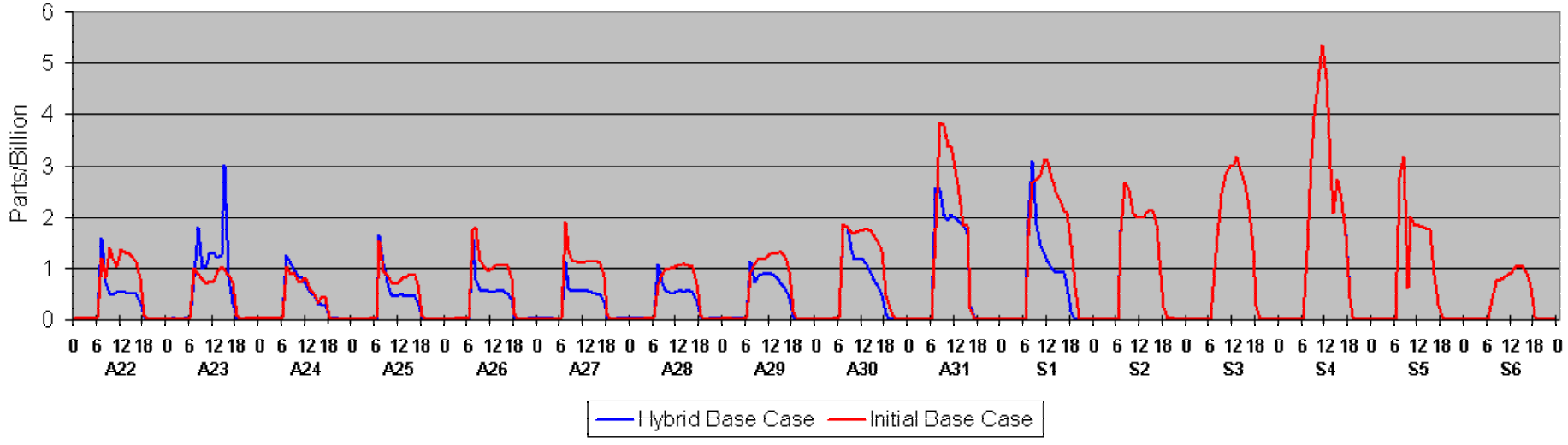
Clute OLE Concentrations



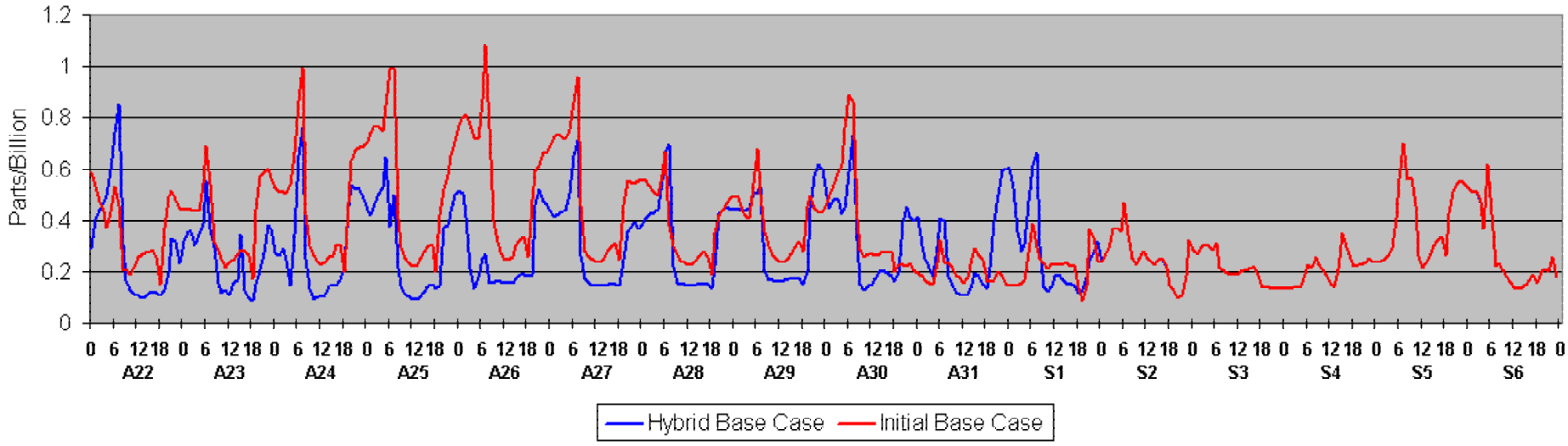
Clute PAR Concentrations



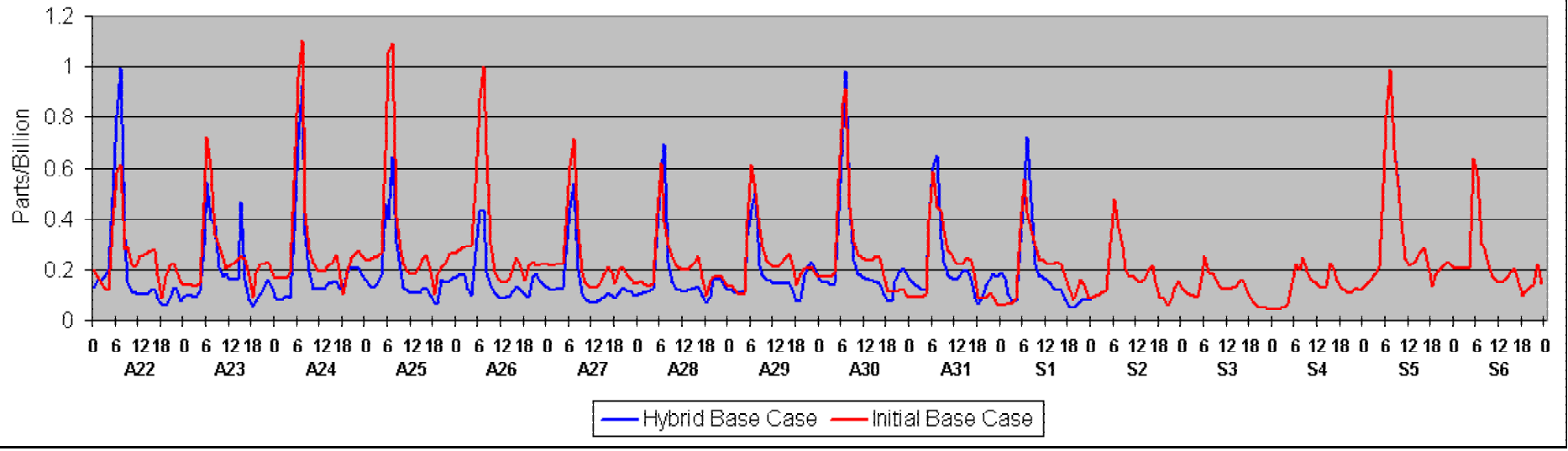
Clute ISOP Concentrations



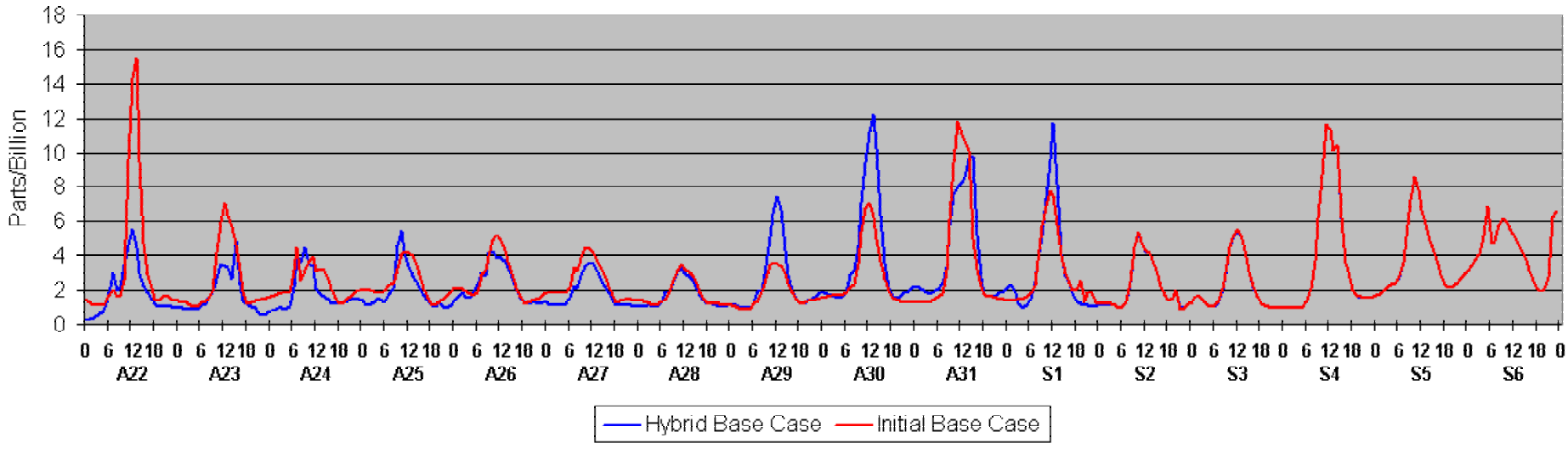
Clute TOL Concentrations



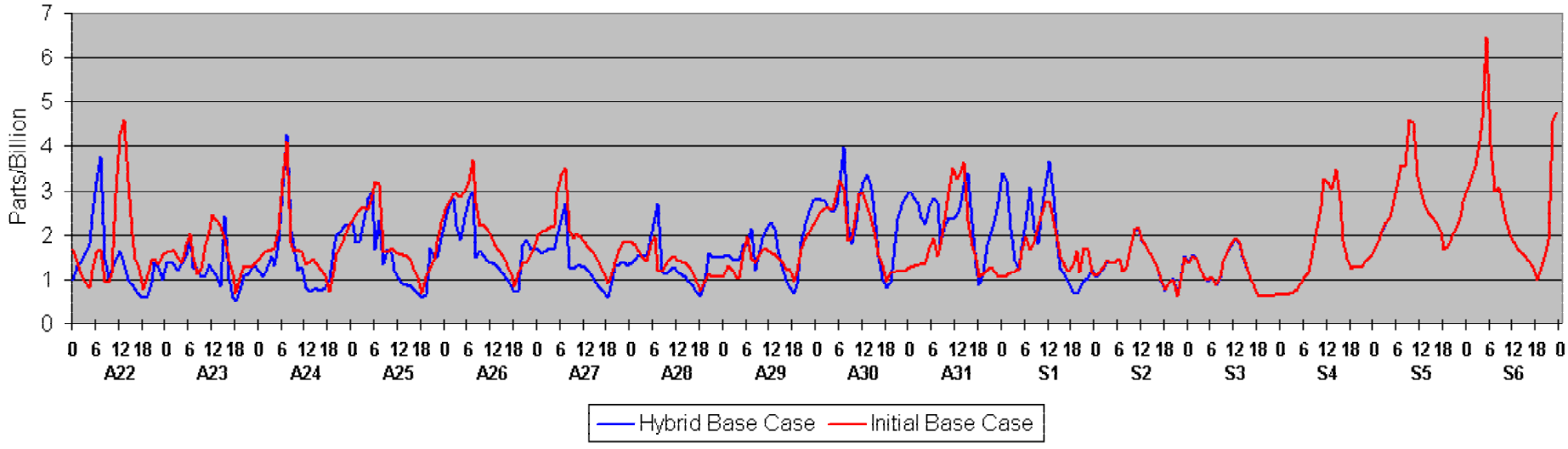
Clute XYL Concentrations

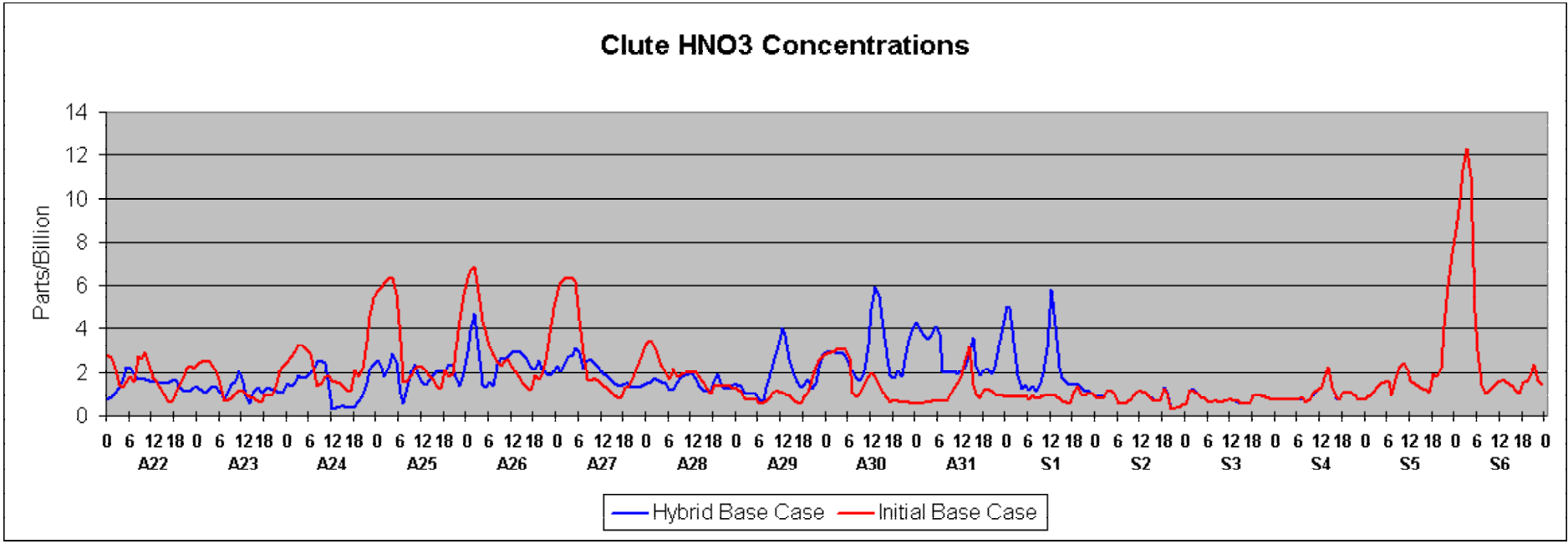


Clute HCHO Concentrations



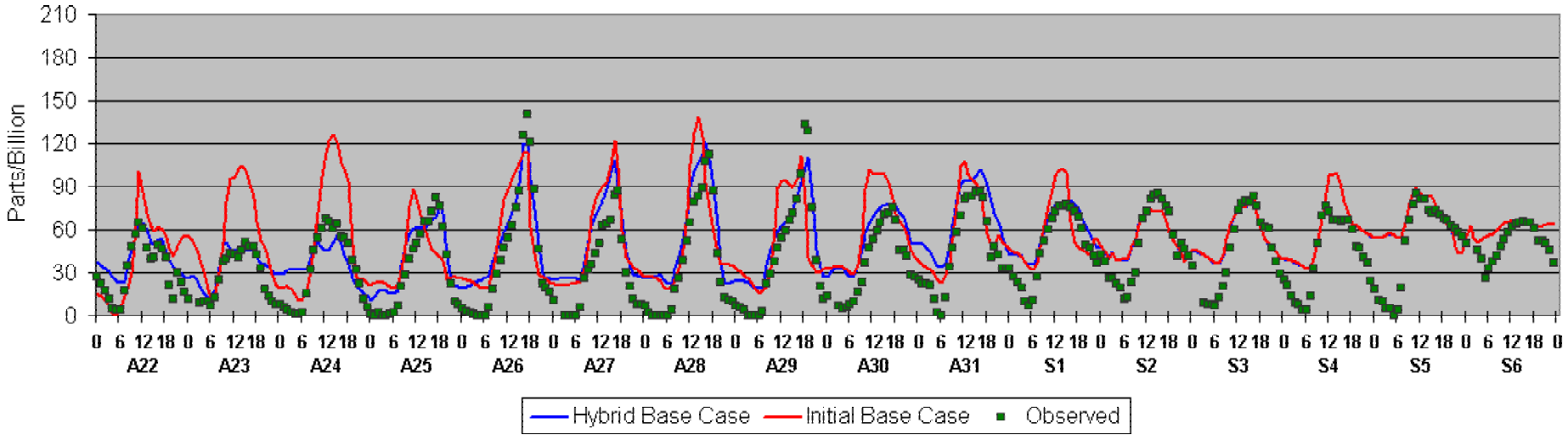
Clute ALD2 Concentrations



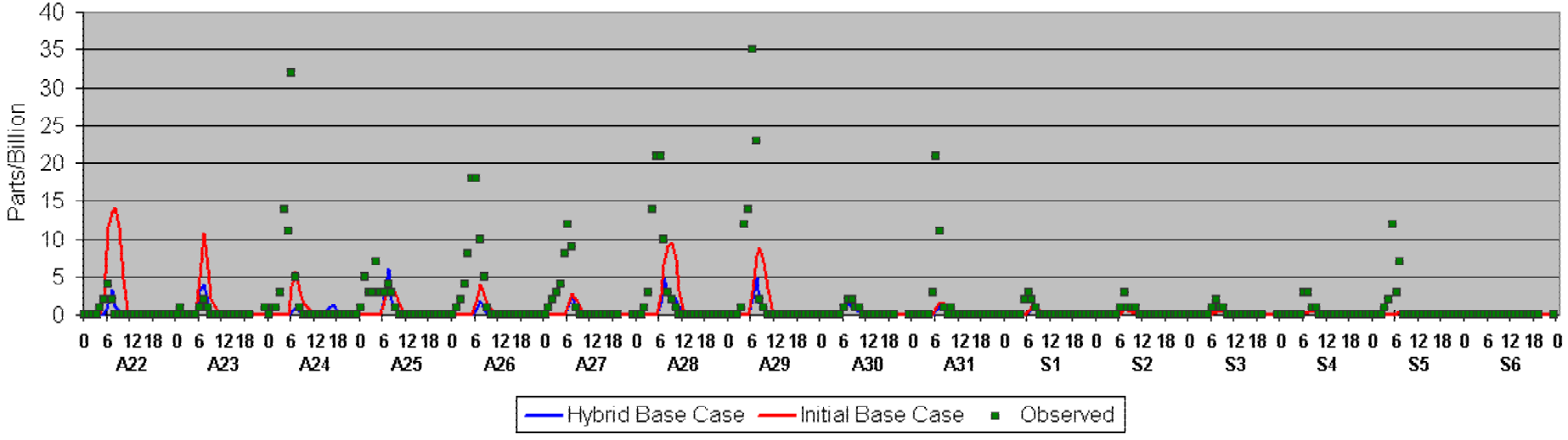

Clute HNO3 Concentrations
Parts/Billion
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

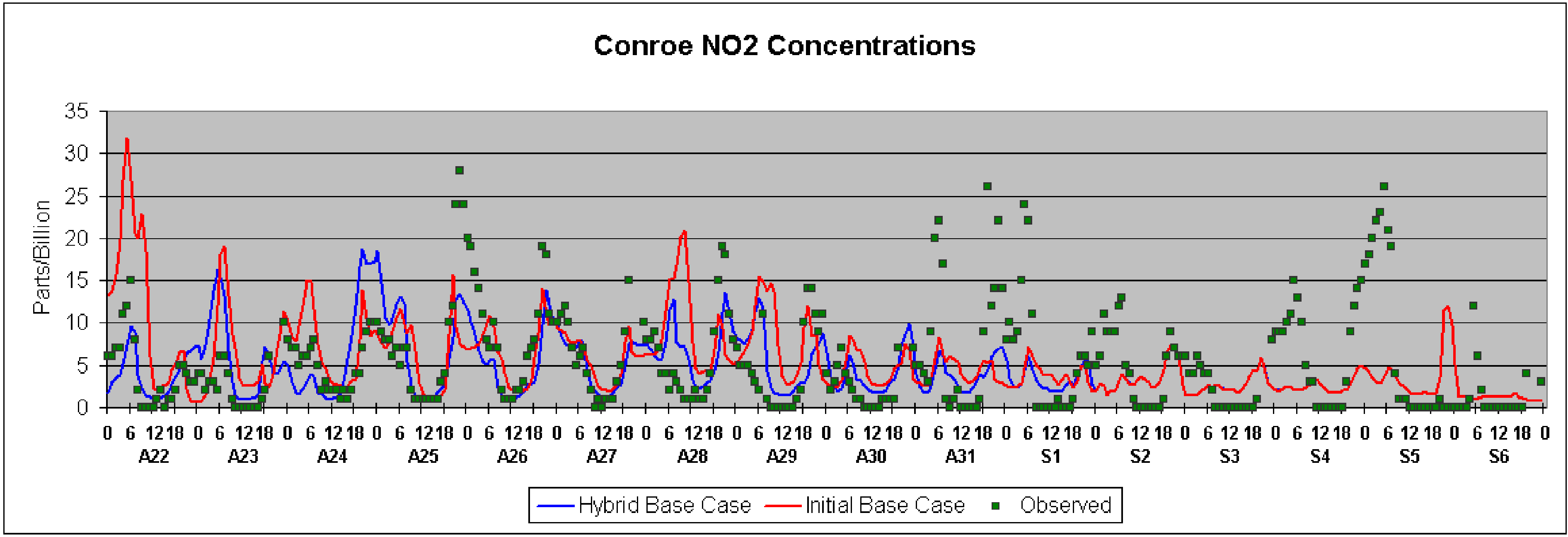
Conroe Time Series

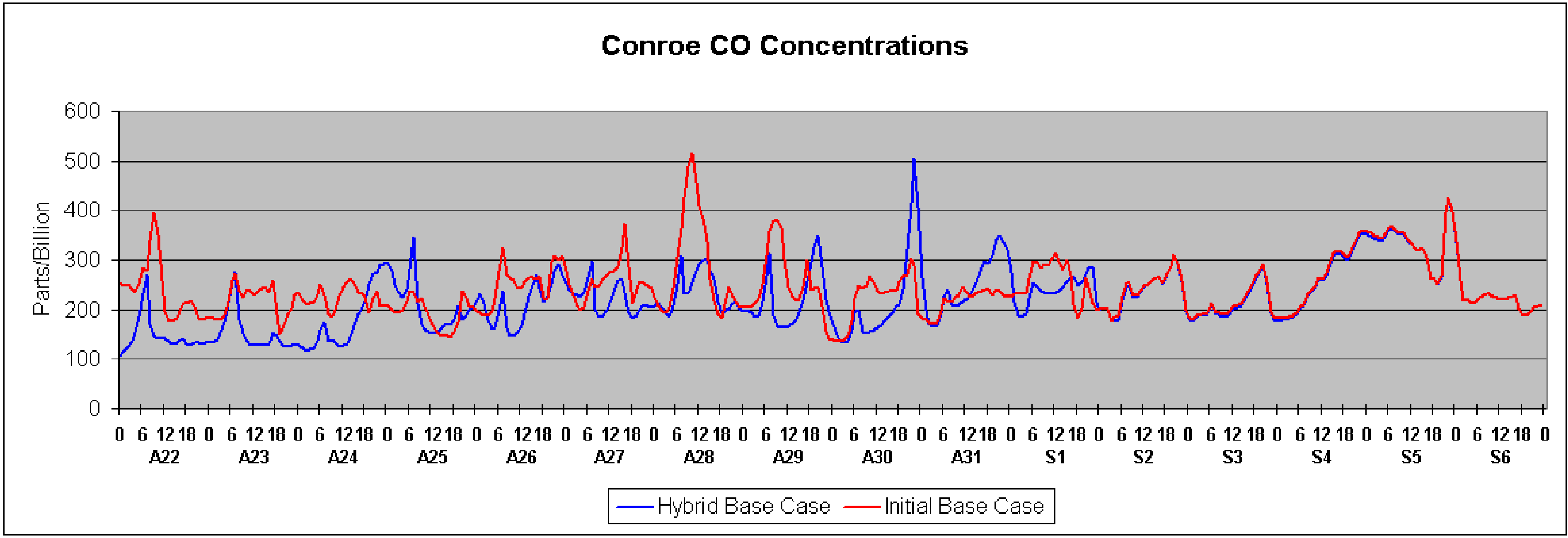
Conroe Ozone Concentrations



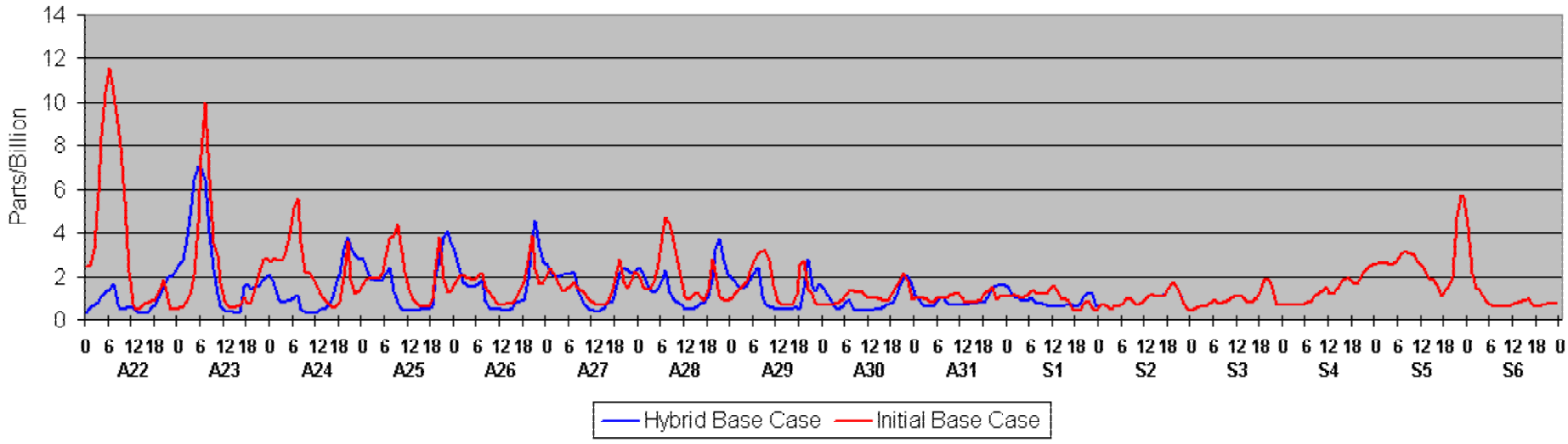
Conroe NO Concentrations



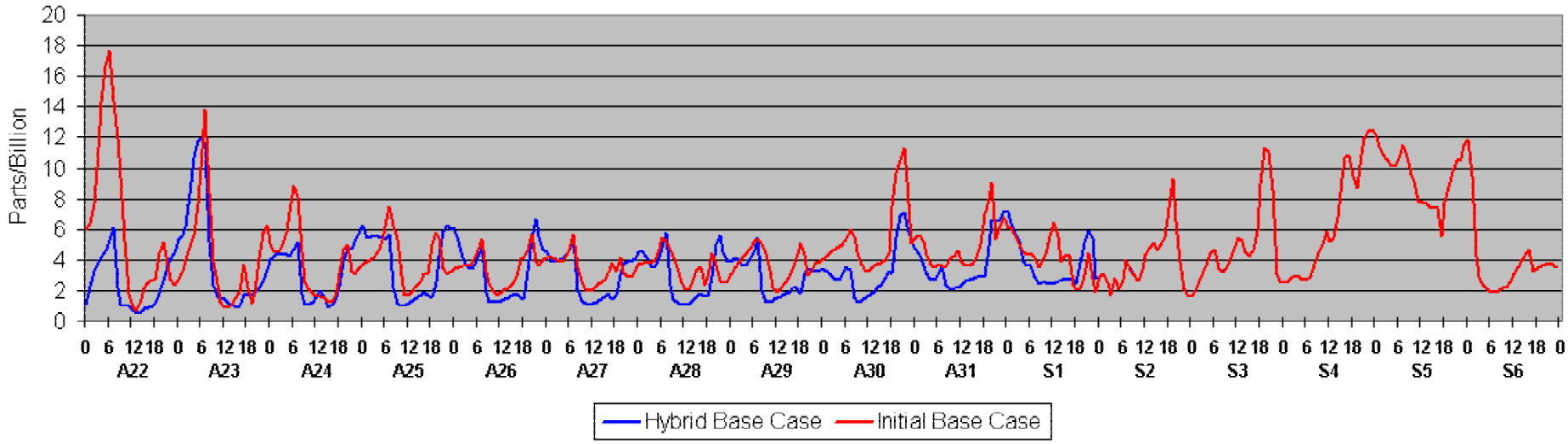

Conroe NO2 Concentrations
Parts/Billion
0
5
10
15
20
25
30
35
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


Conroe CO Concentrations
Parts/Billion
0
100
200
300
400
500
600
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

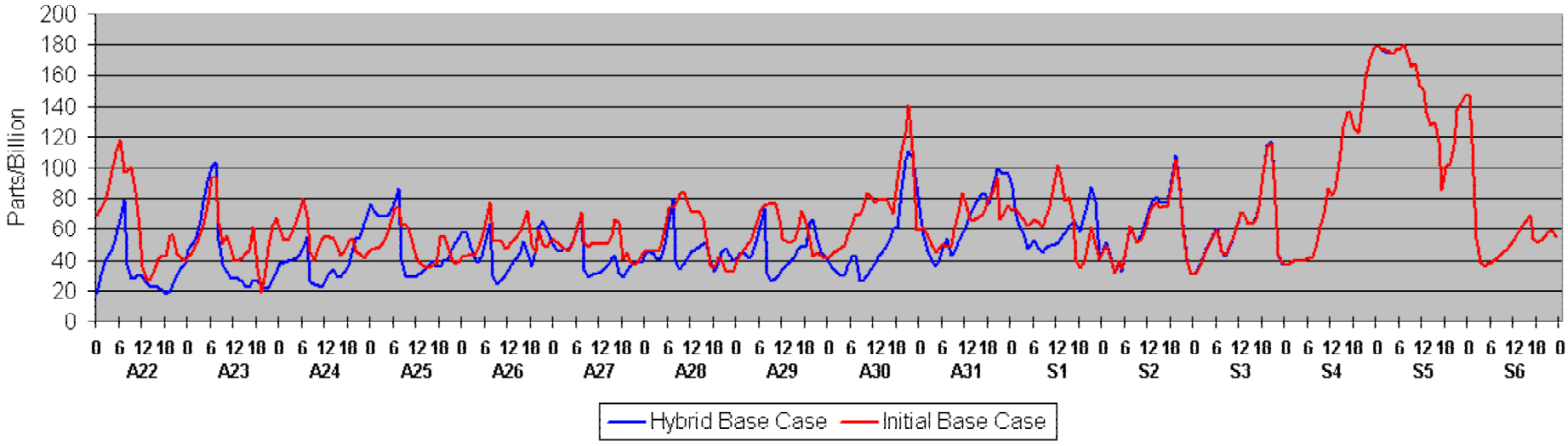
Conroe ETH Concentrations



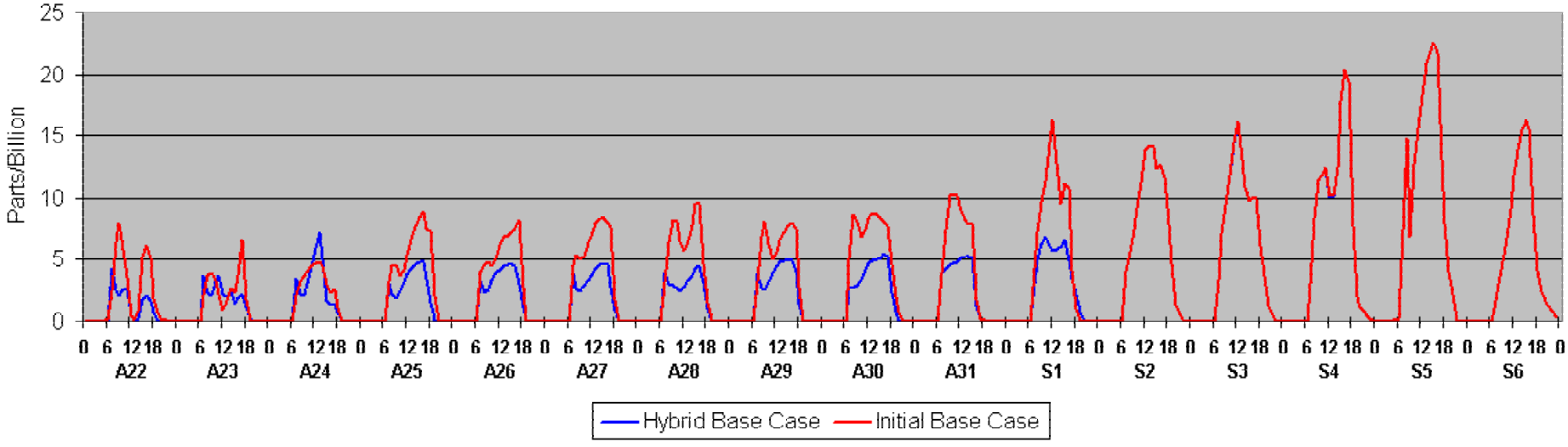
Conroe OLE Concentrations



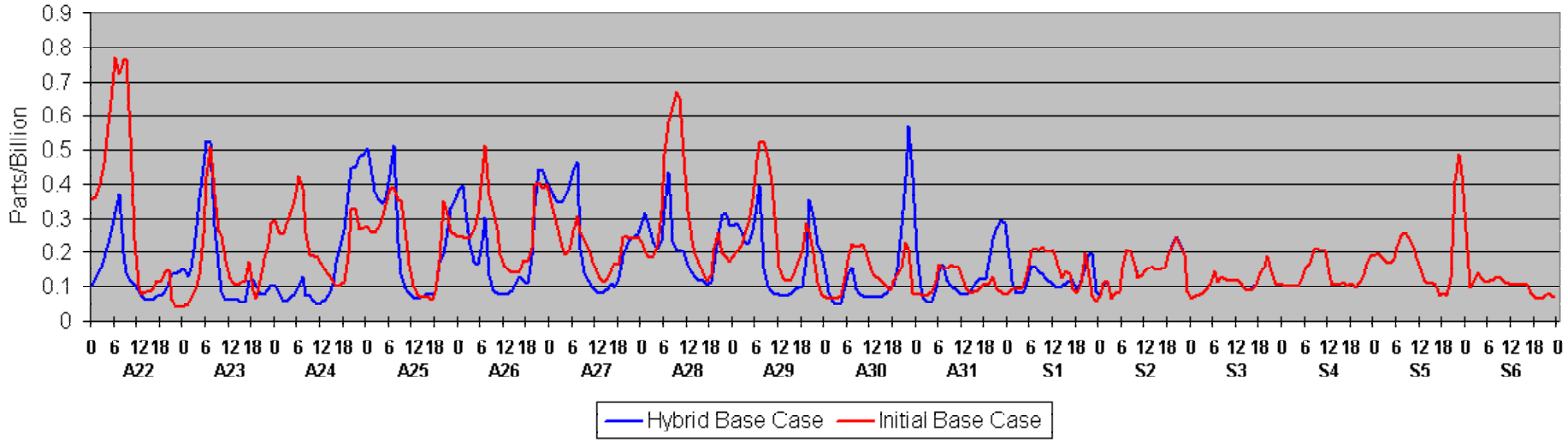
Conroe PAR Concentrations



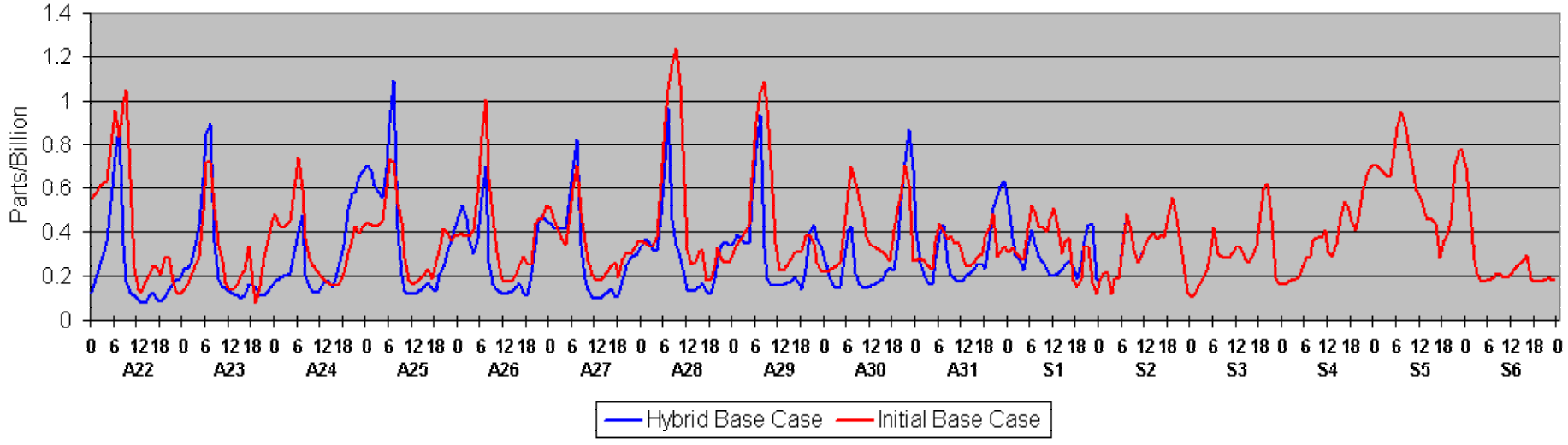
Conroe ISOP Concentrations



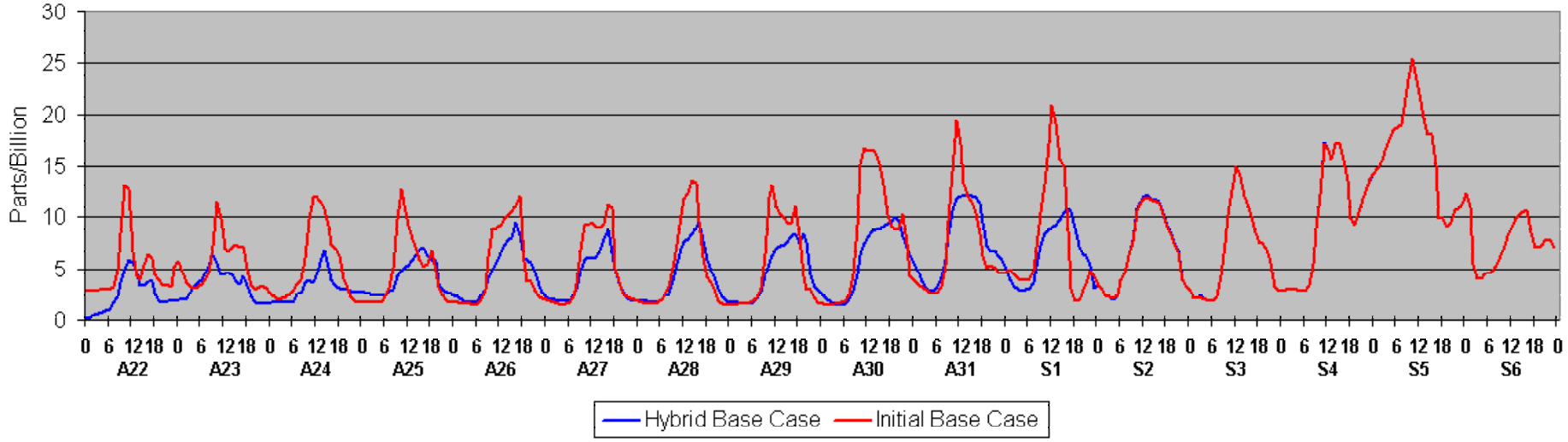
Conroe TOL Concentrations



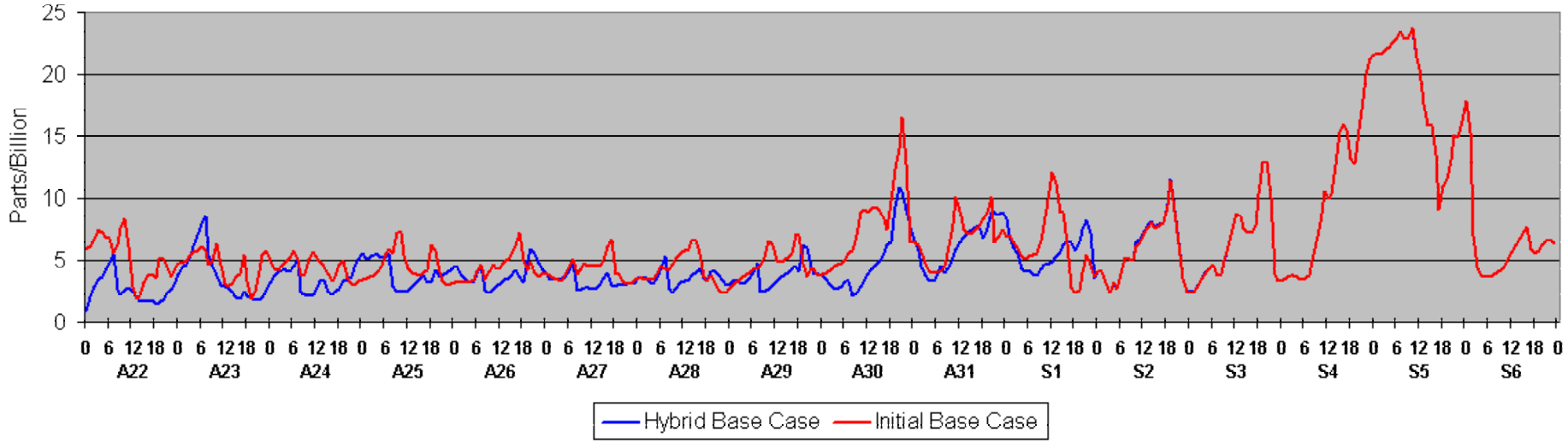
Conroe XYL Concentrations

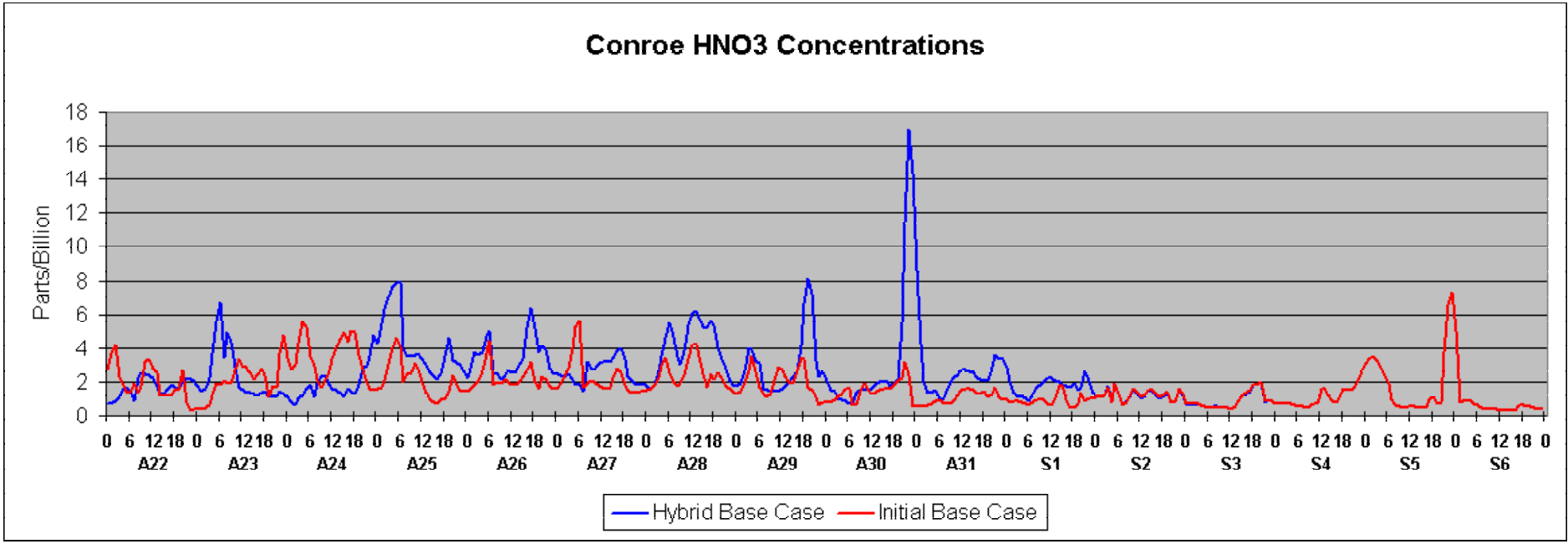


Conroe HCHO Concentrations



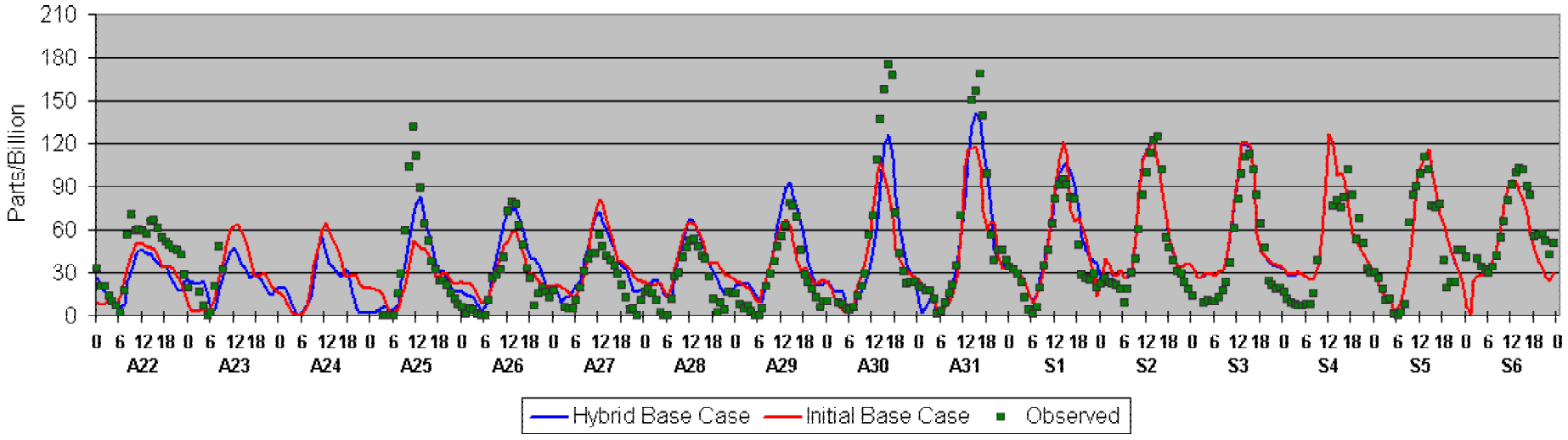
Conroe ALD2 Concentrations



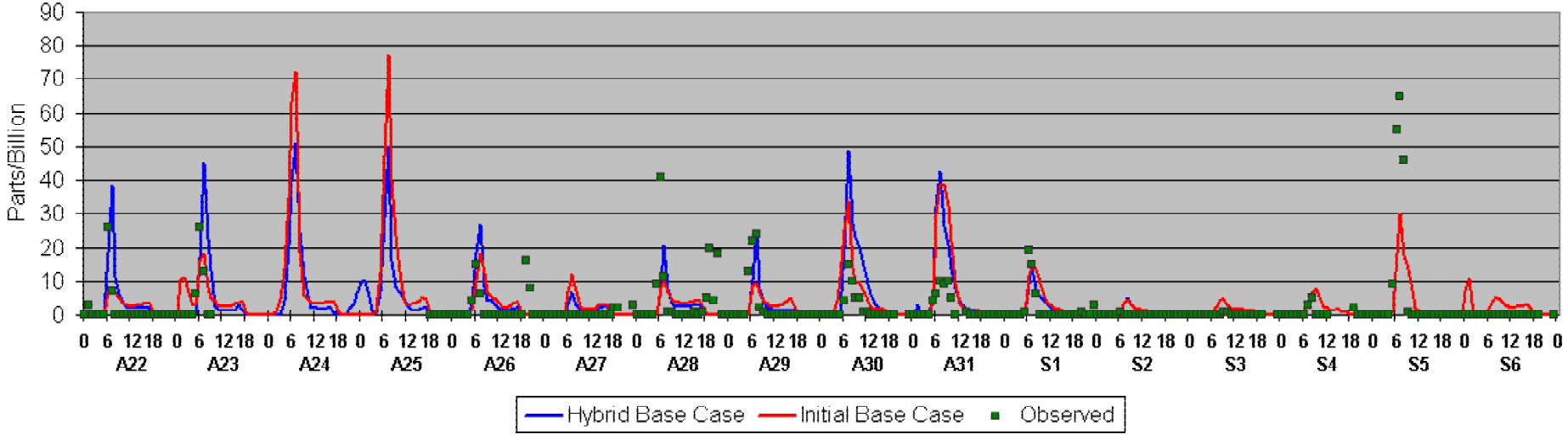

Conroe HNO3 Concentrations
Parts/Billion
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Deer Park Time Series

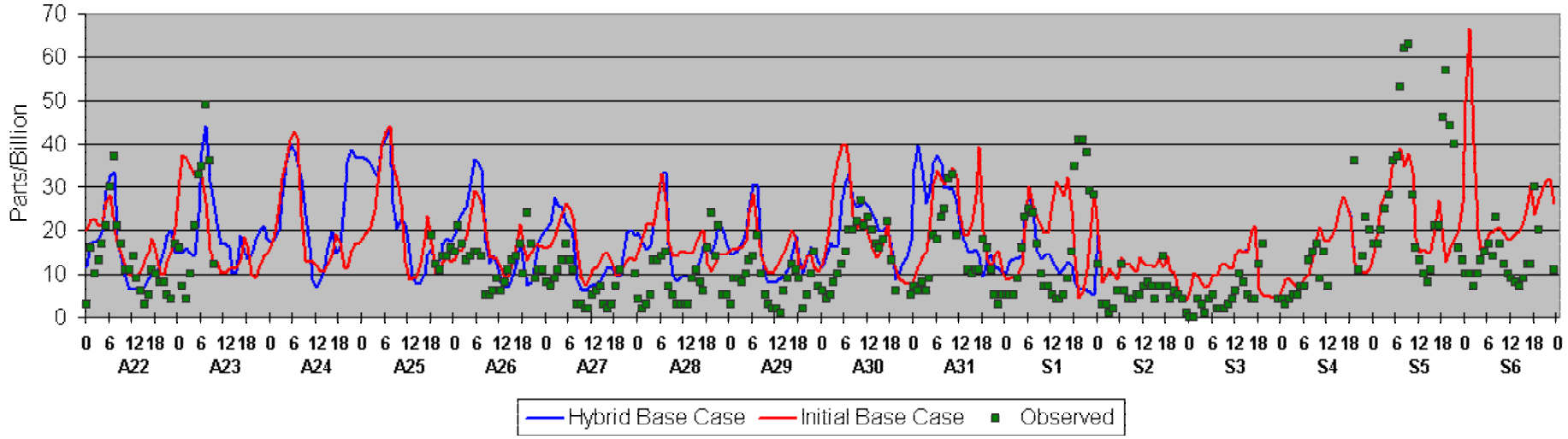
Deer Park Ozone Concentrations



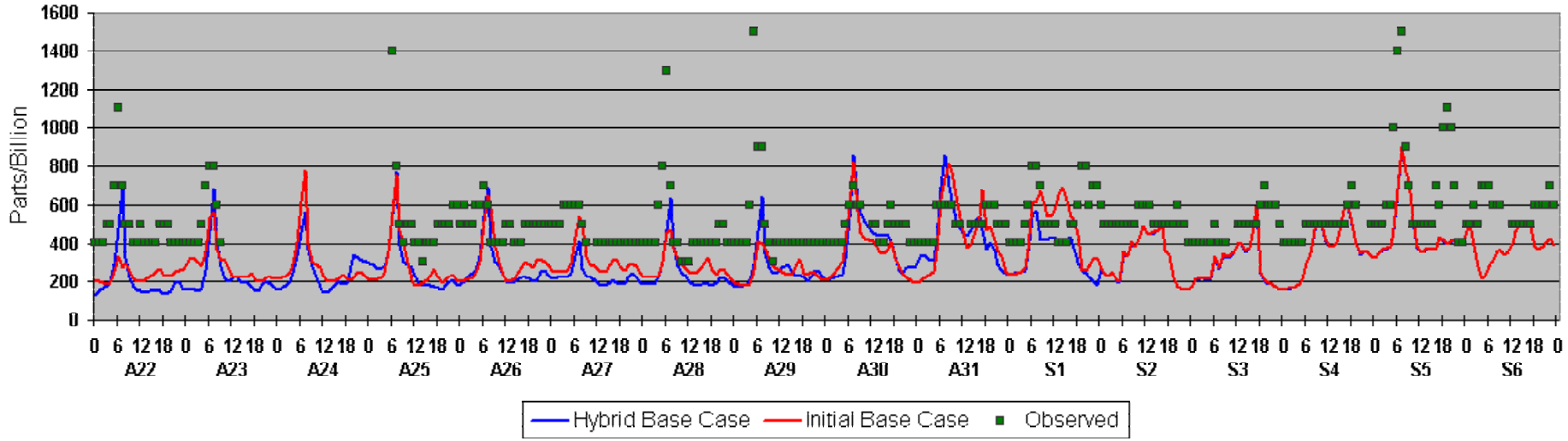
Deer Park NO Concentrations

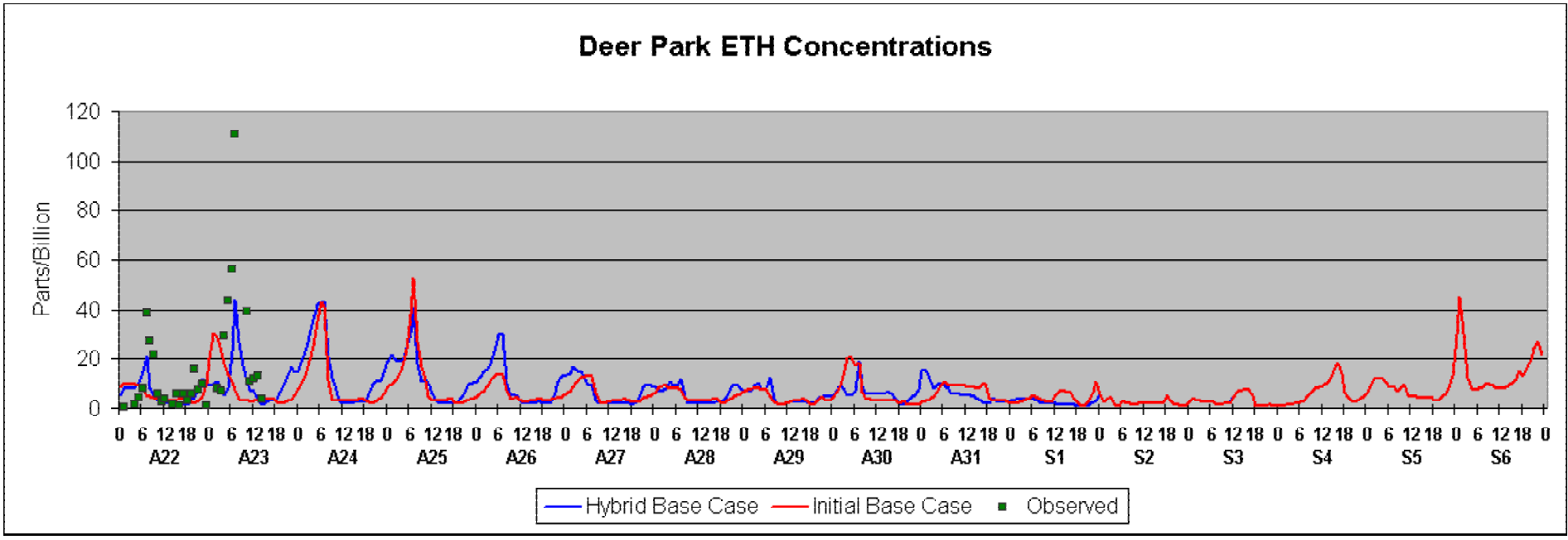


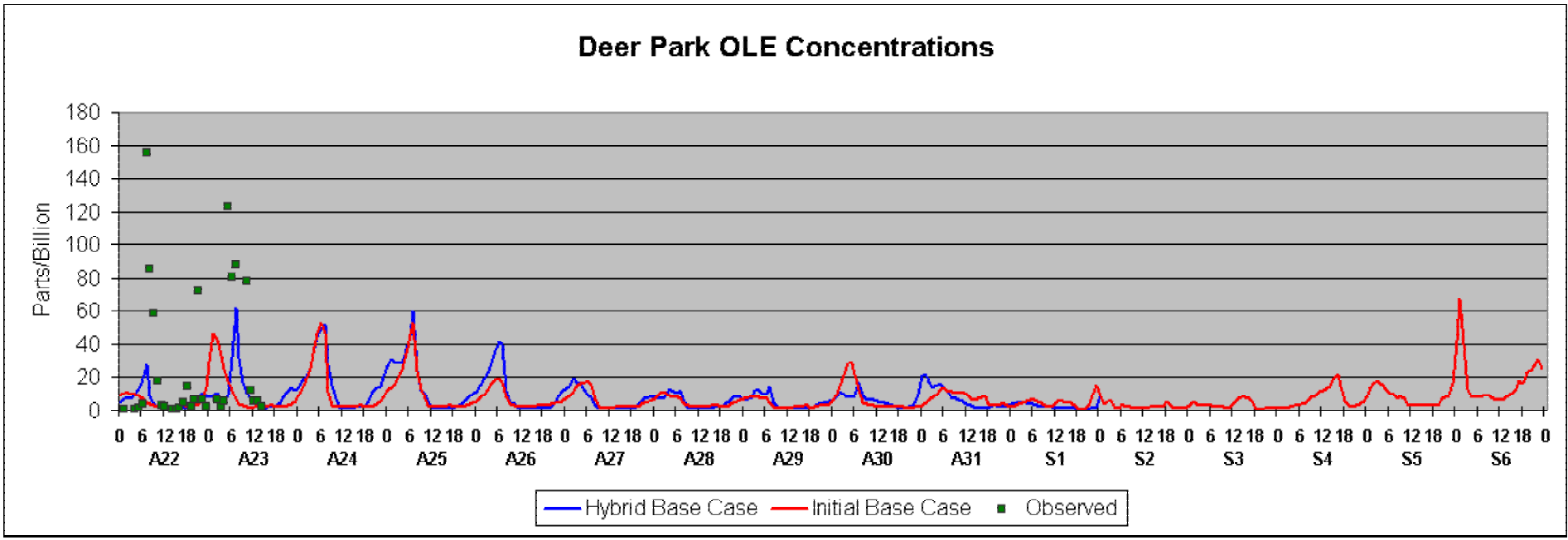
Deer Park NO2 Concentrations



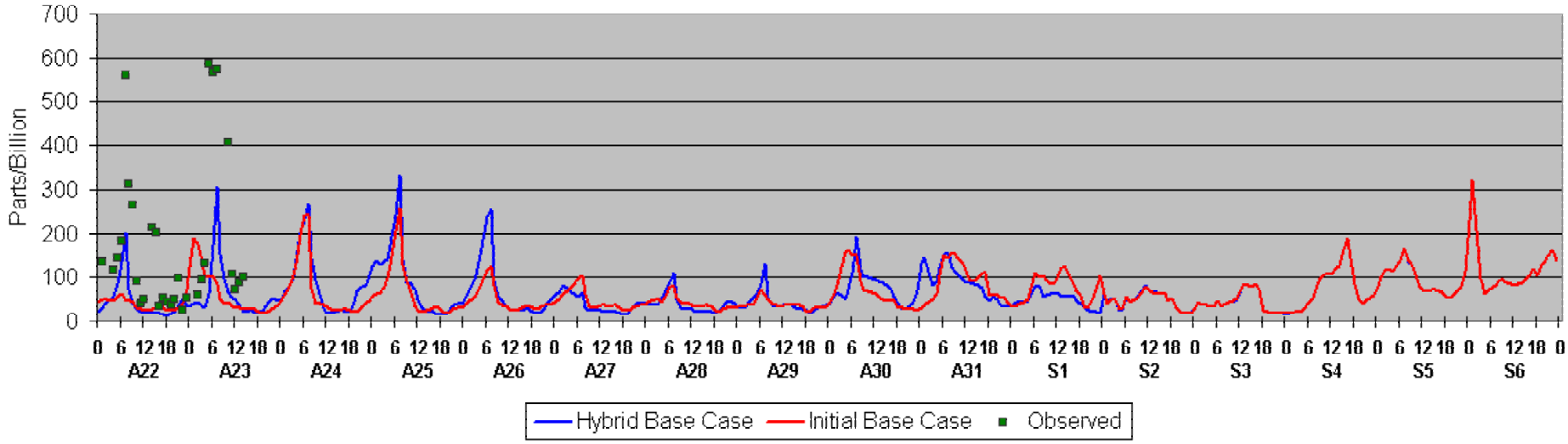
Deer Park CO Concentrations



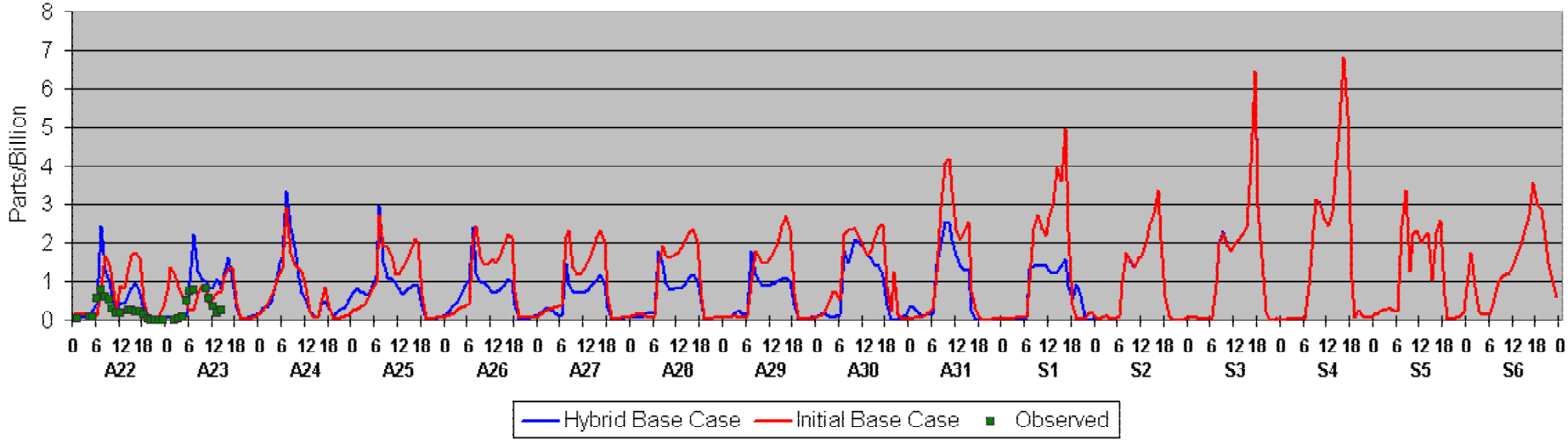

Deer Park ETH Concentrations
Parts/Billion
120
100
80
60
40
20
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


Deer Park OLE Concentrations
Parts/Billion
180
160
140
120
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 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

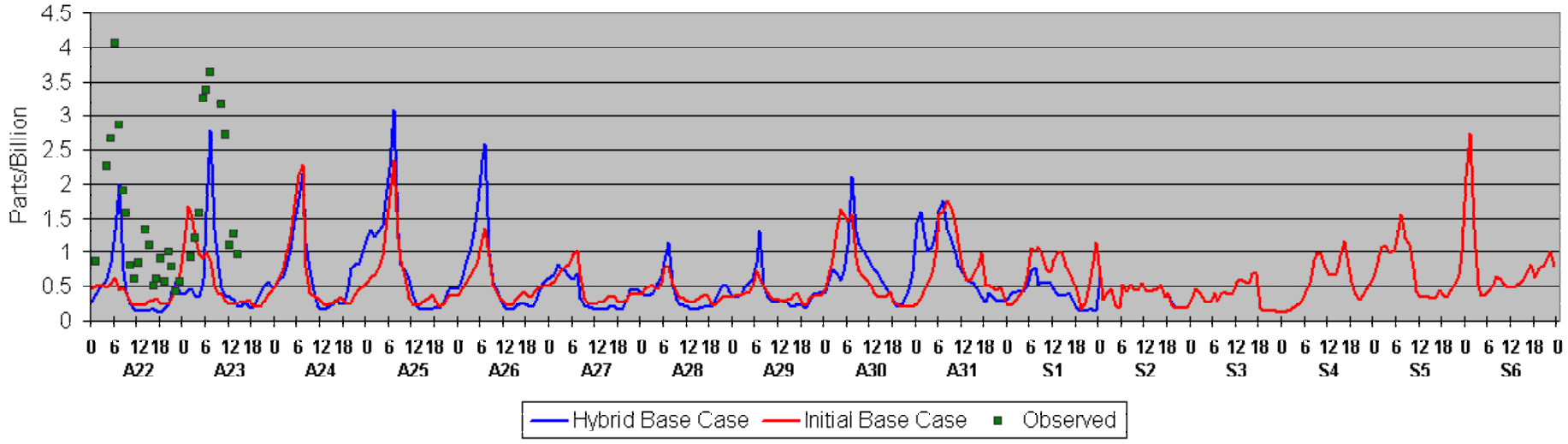
Deer Park PAR Concentrations



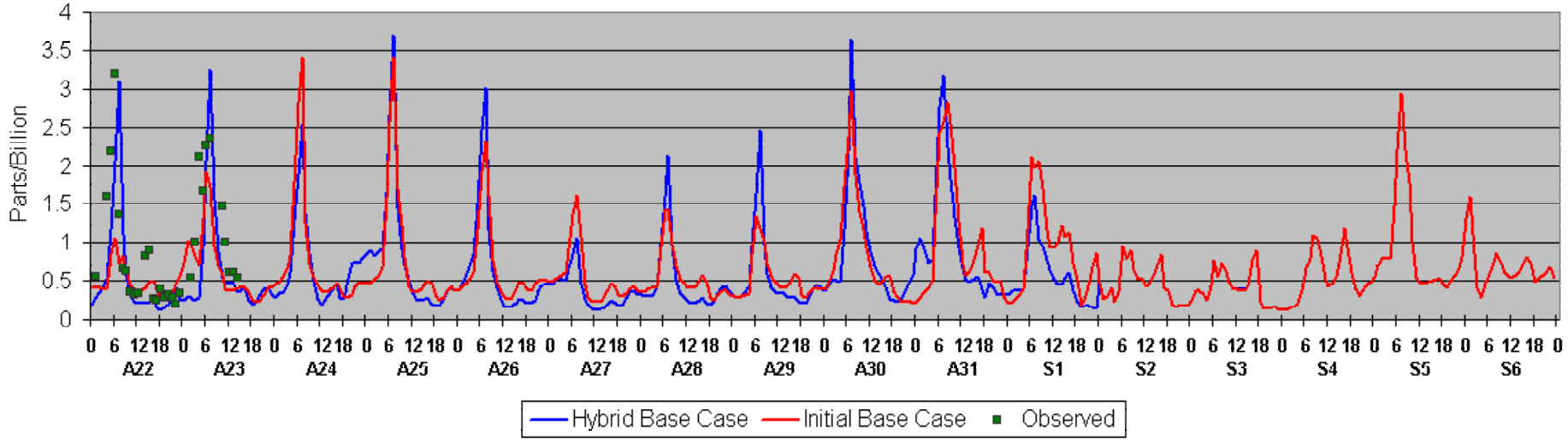
Deer Park ISOP Concentrations

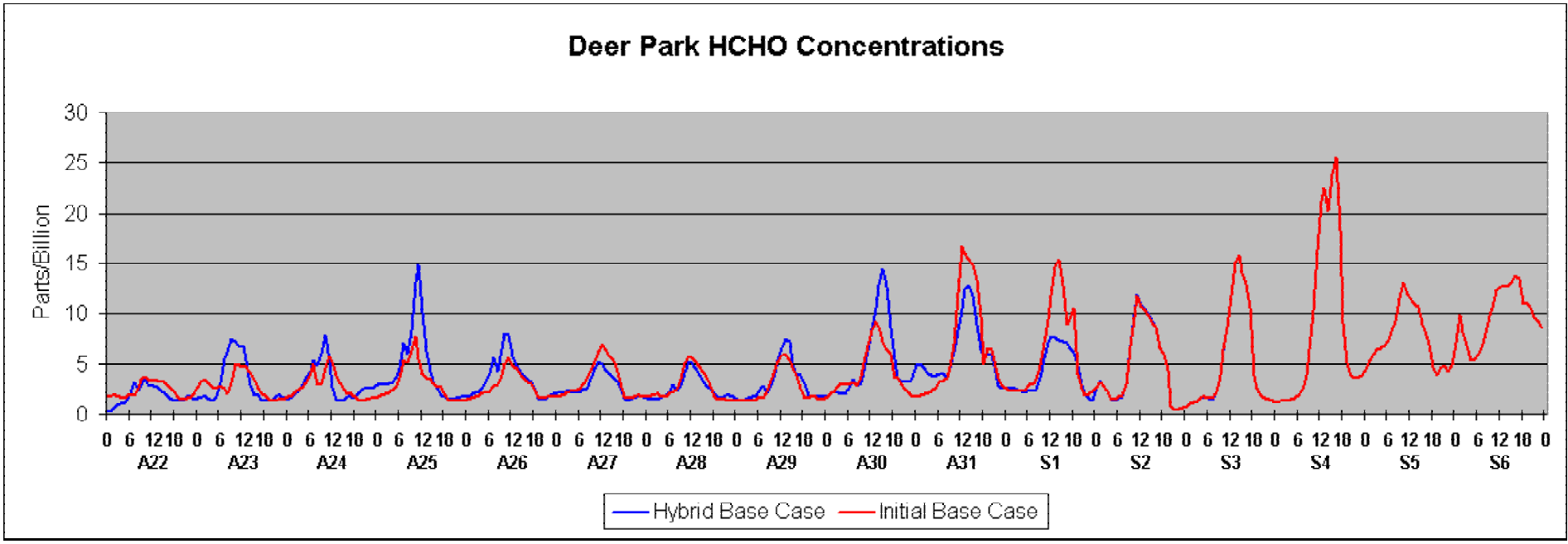


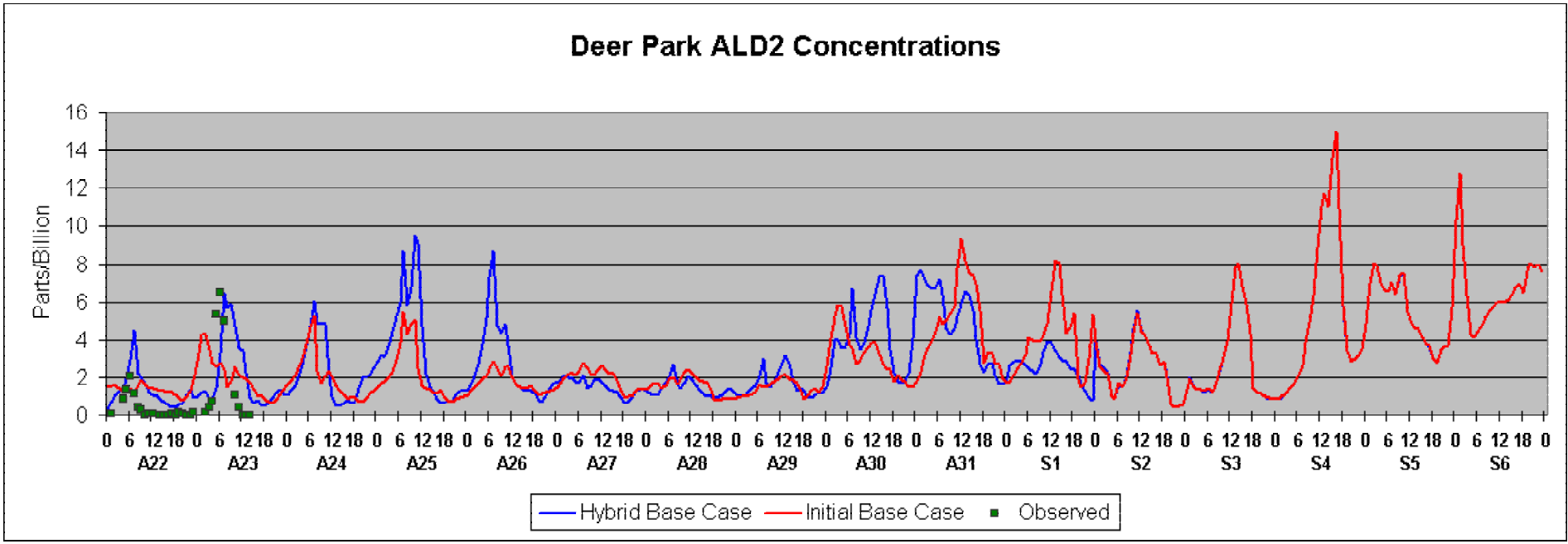
Deer Park TOL Concentrations

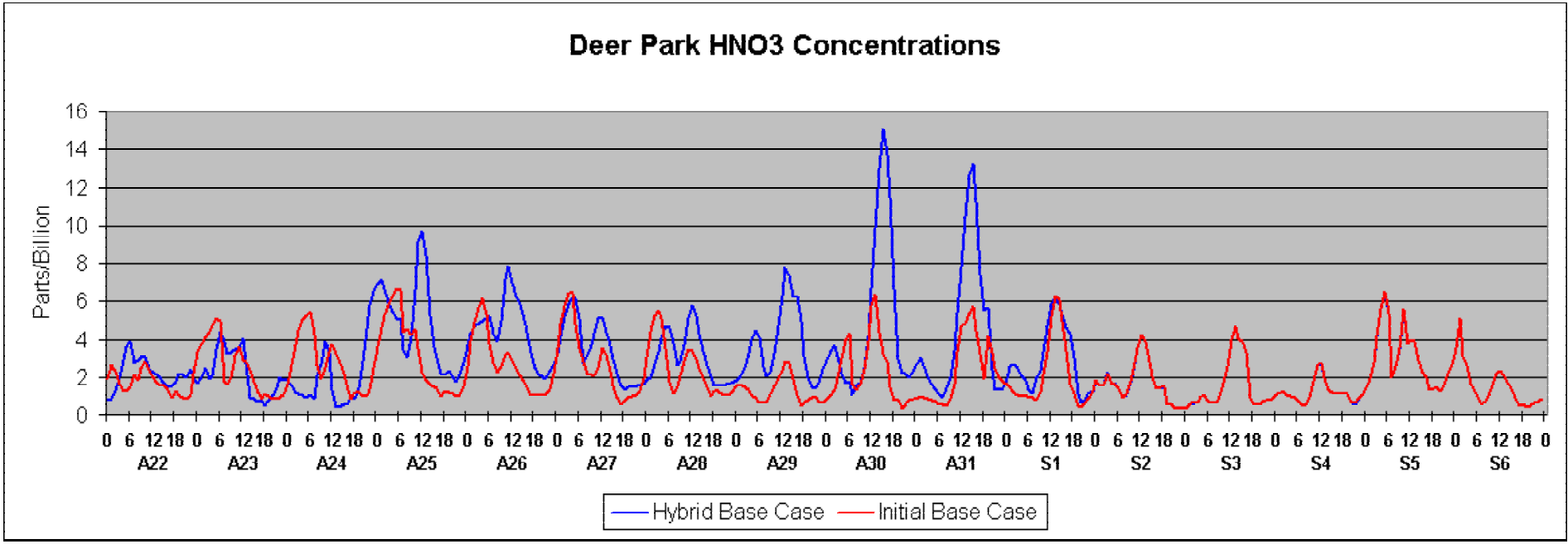


Deer Park XYL Concentrations



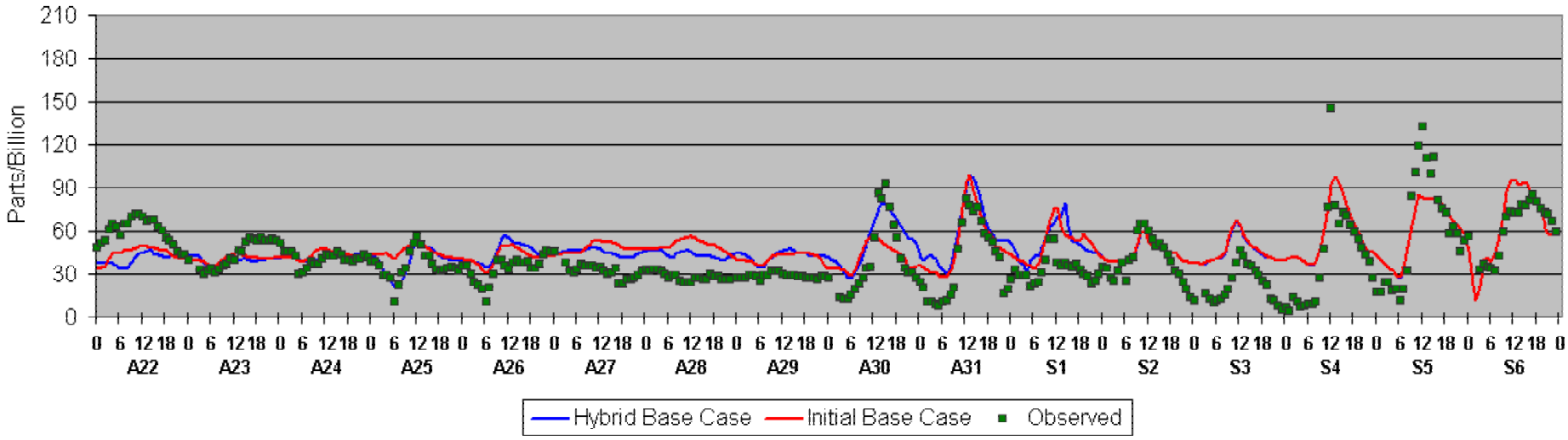

Deer Park HCHO Concentrations
Parts/Billion
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Deer Park ALD2 Concentrations
Parts/Billion
16
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

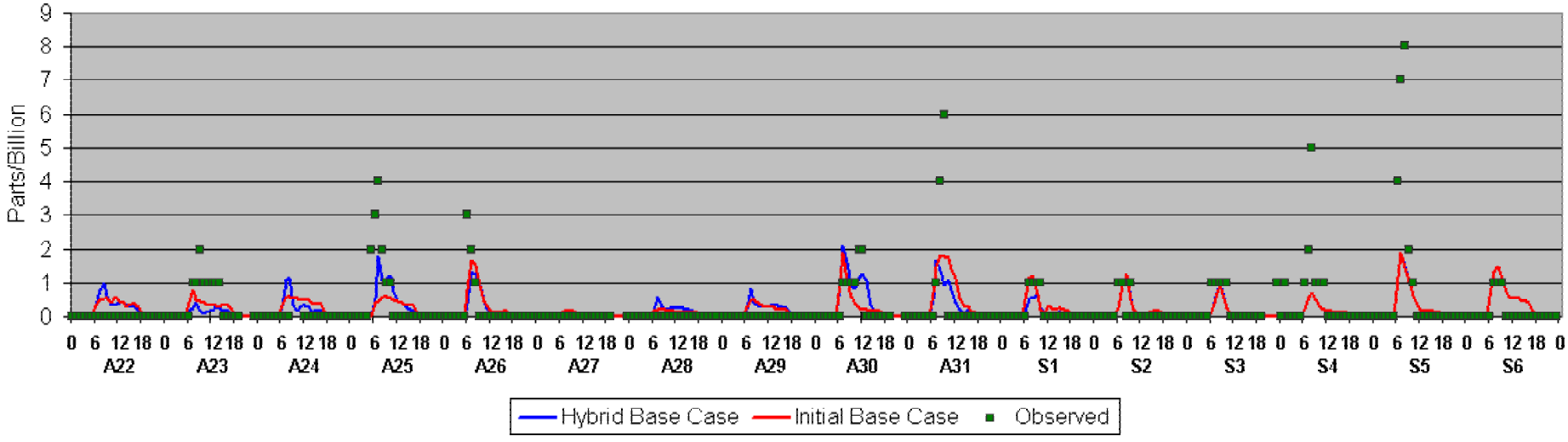

Deer Park HNO3 Concentrations
Parts/Billion
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

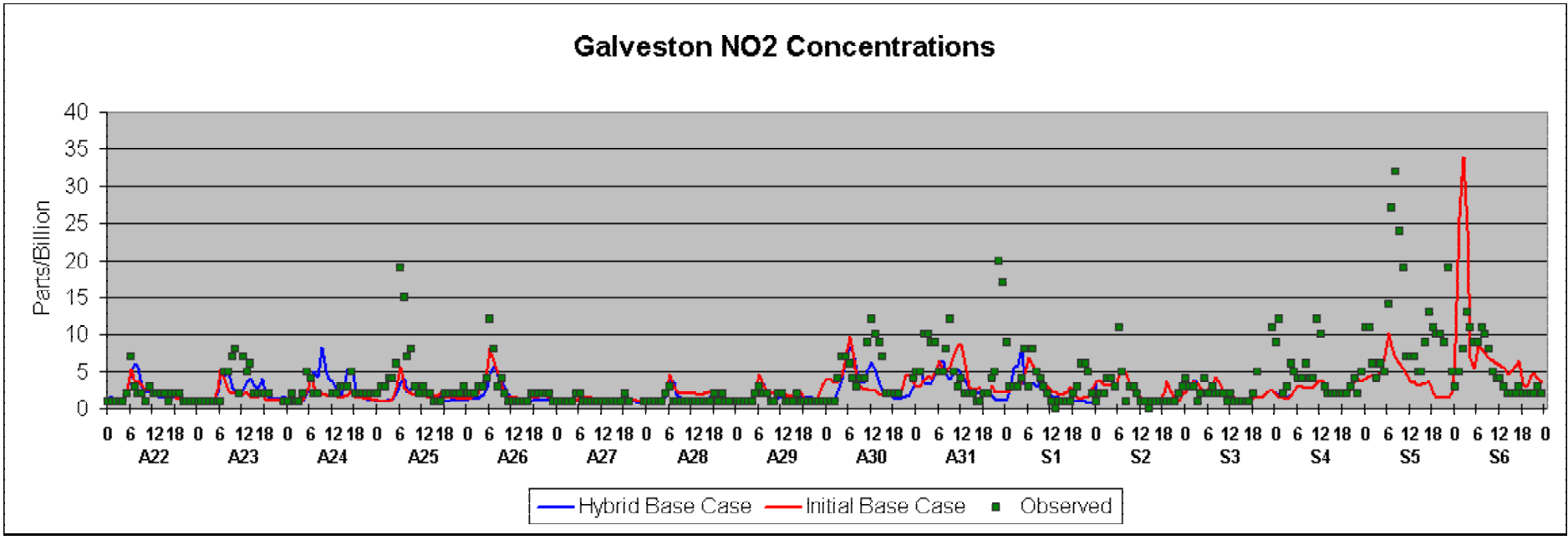
Galveston Time Series

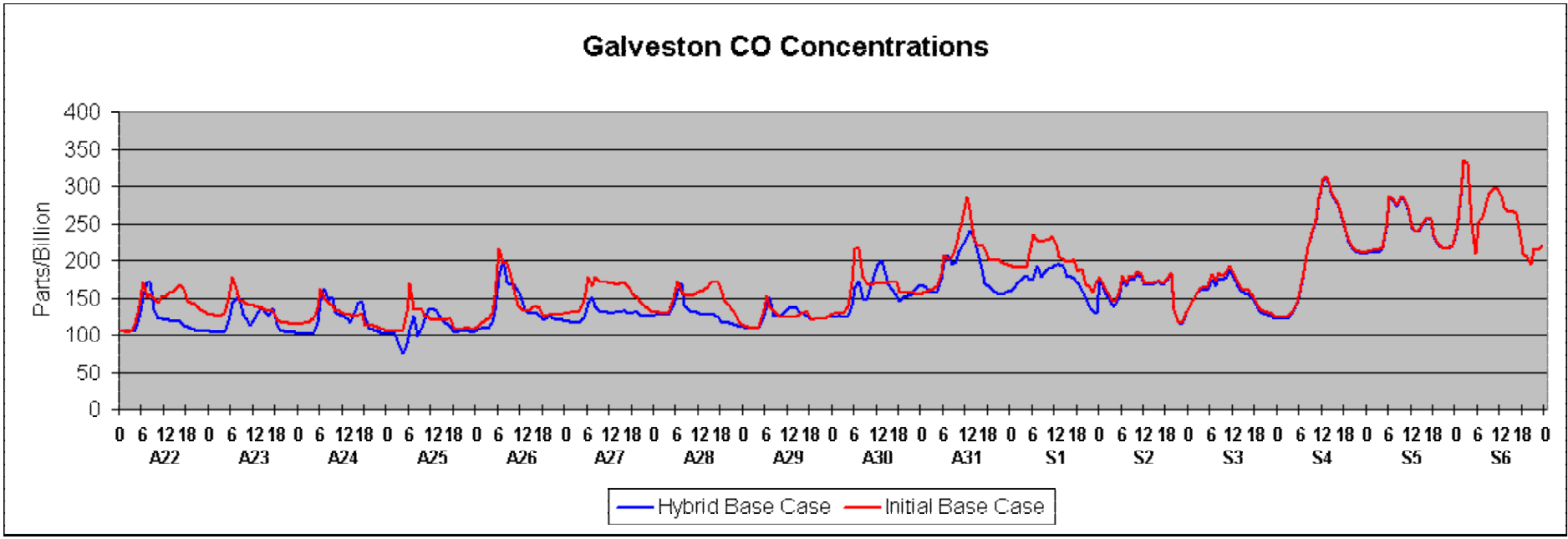
Galveston Ozone Concentrations

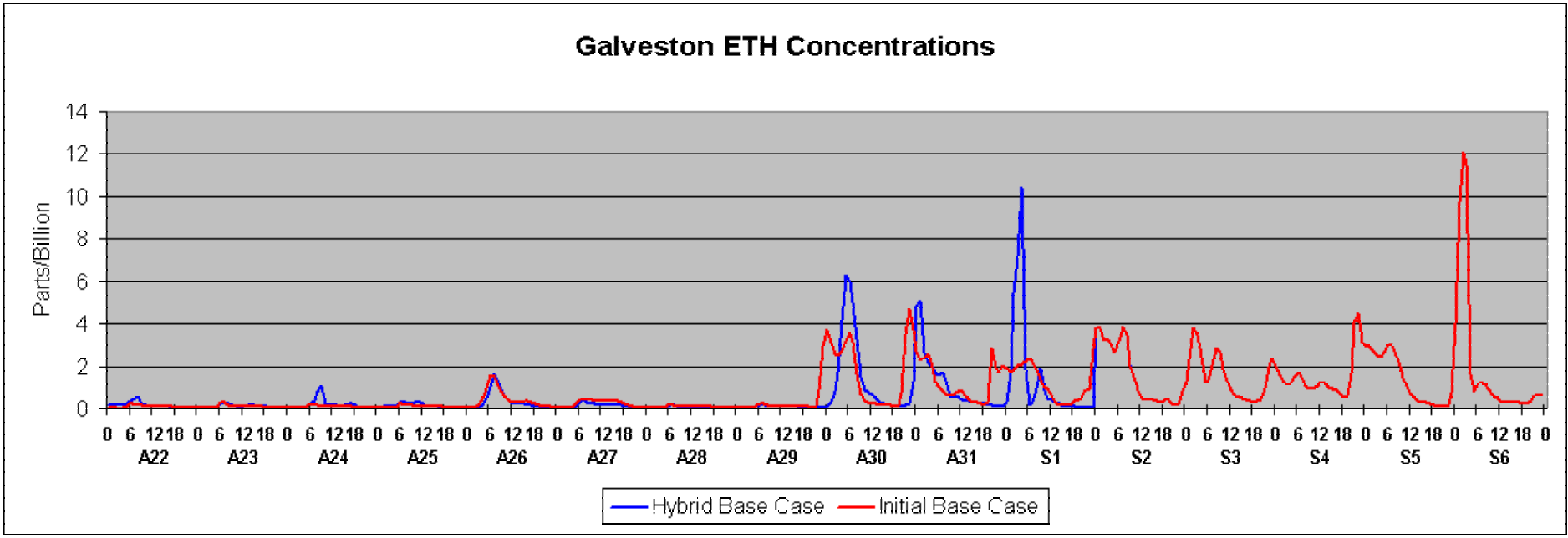


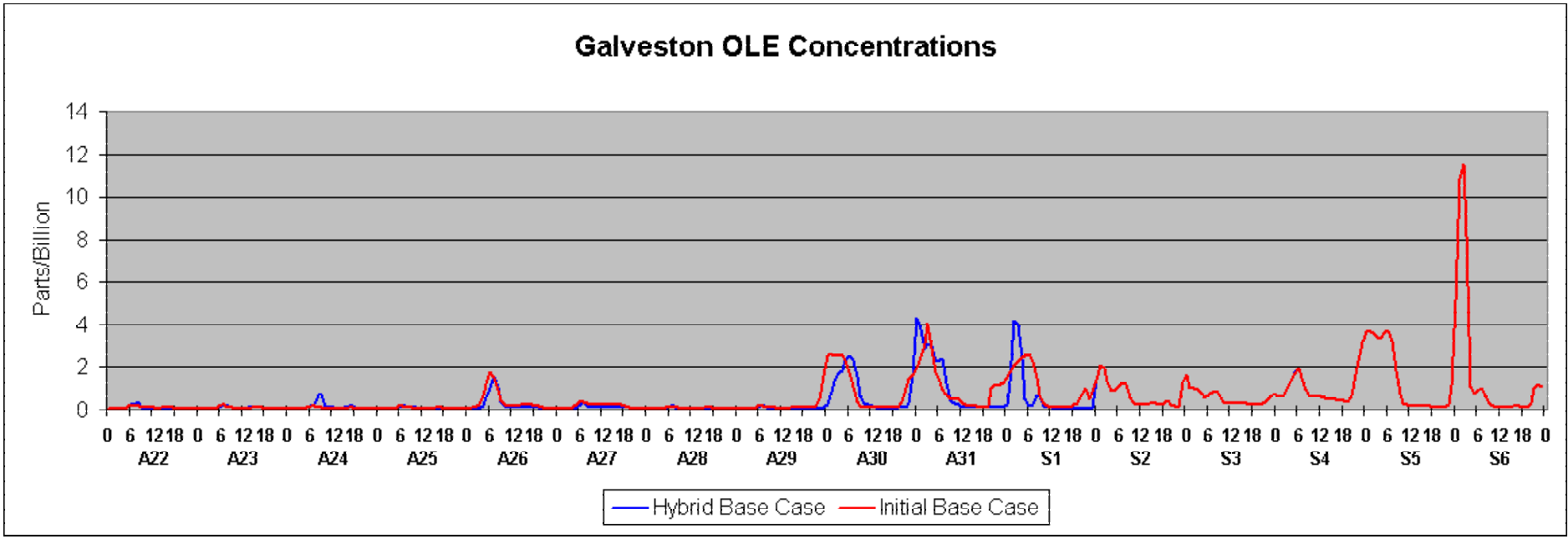
Galveston NO Concentrations



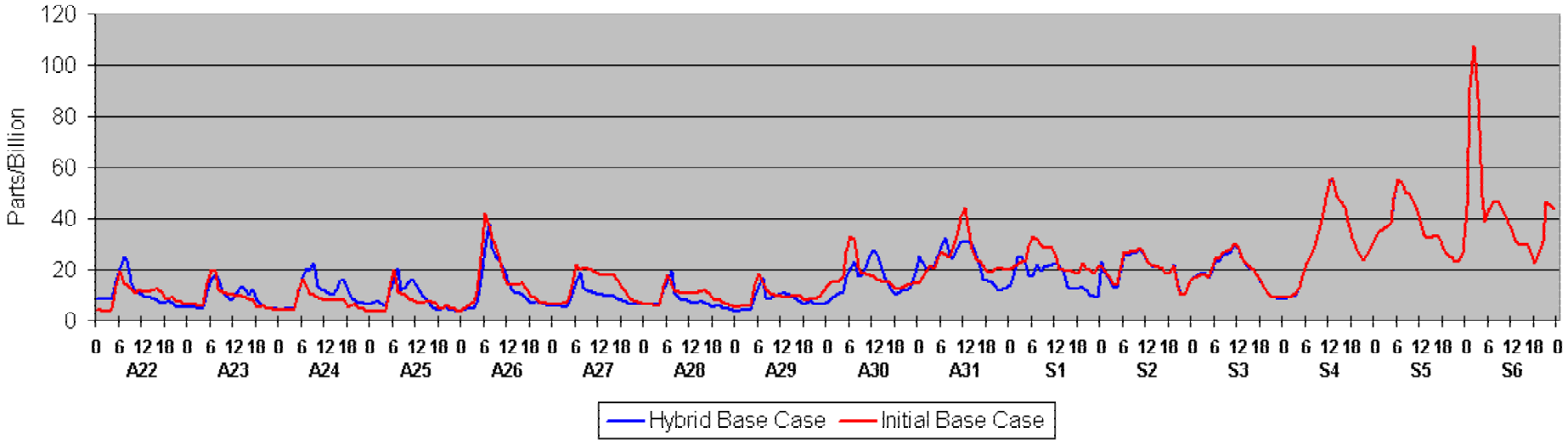

Galveston NO2 Concentrations
Parts/Billion
40
35
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


Galveston CO Concentrations
Parts/Billion
400
350
300
250
200
150
100
50
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

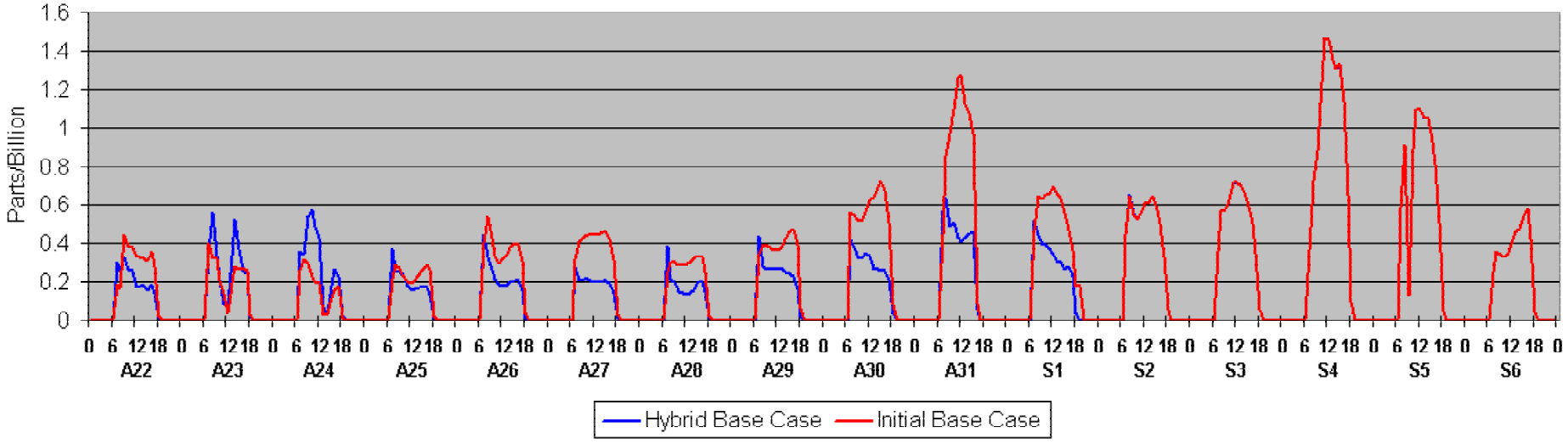

Galveston ETH Concentrations
Parts/Billion
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

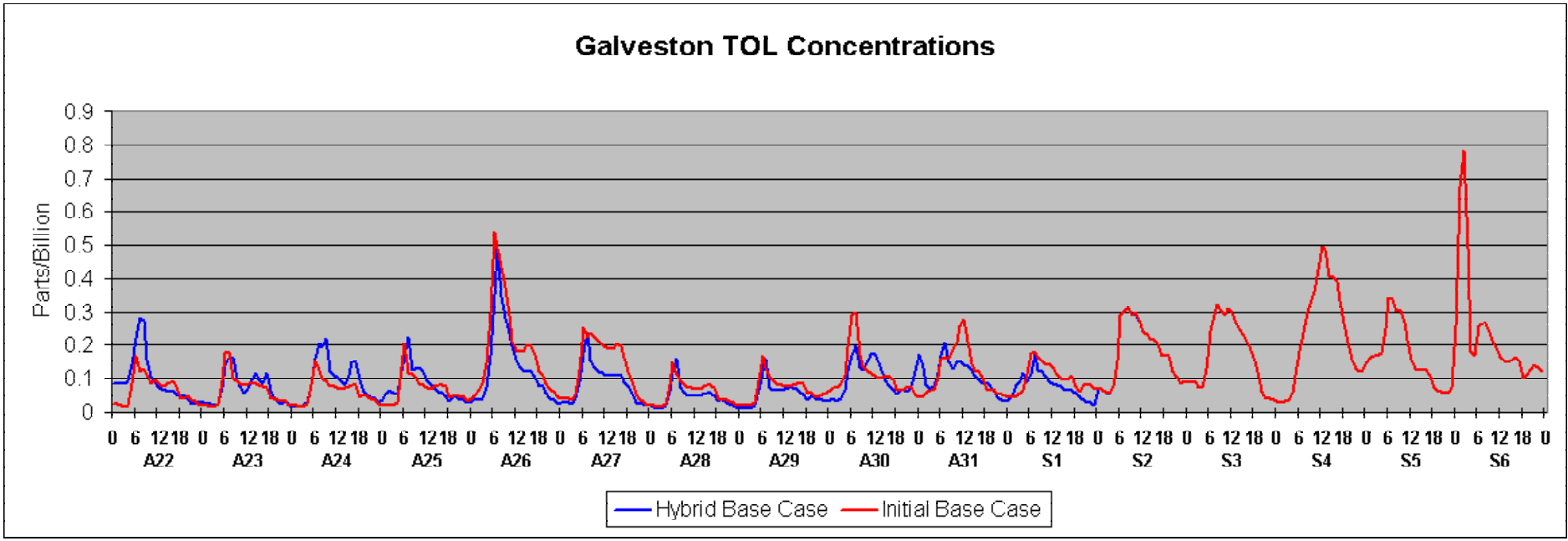

Galveston OLE Concentrations
Parts/Billion
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

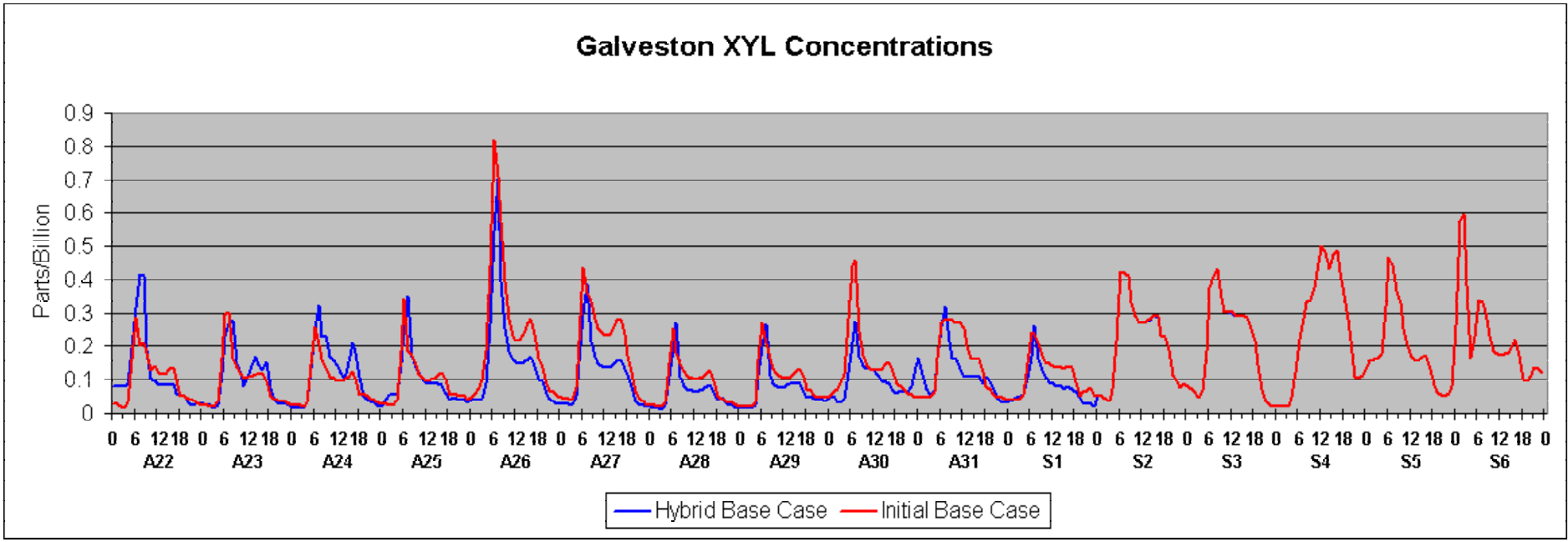
Galveston PAR Concentrations



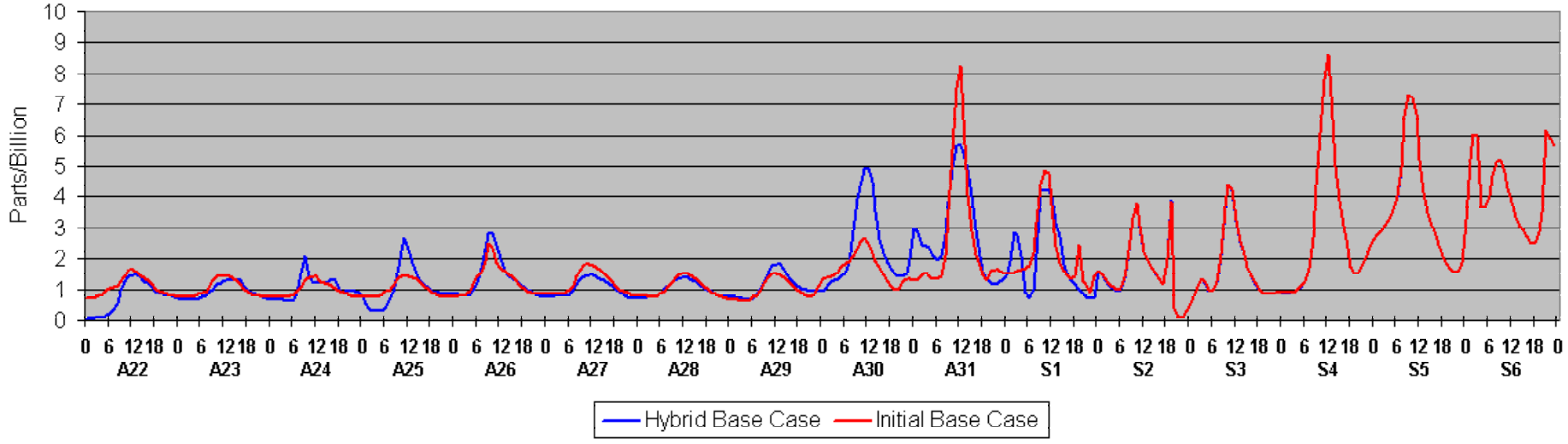
Galveston ISOP Concentrations



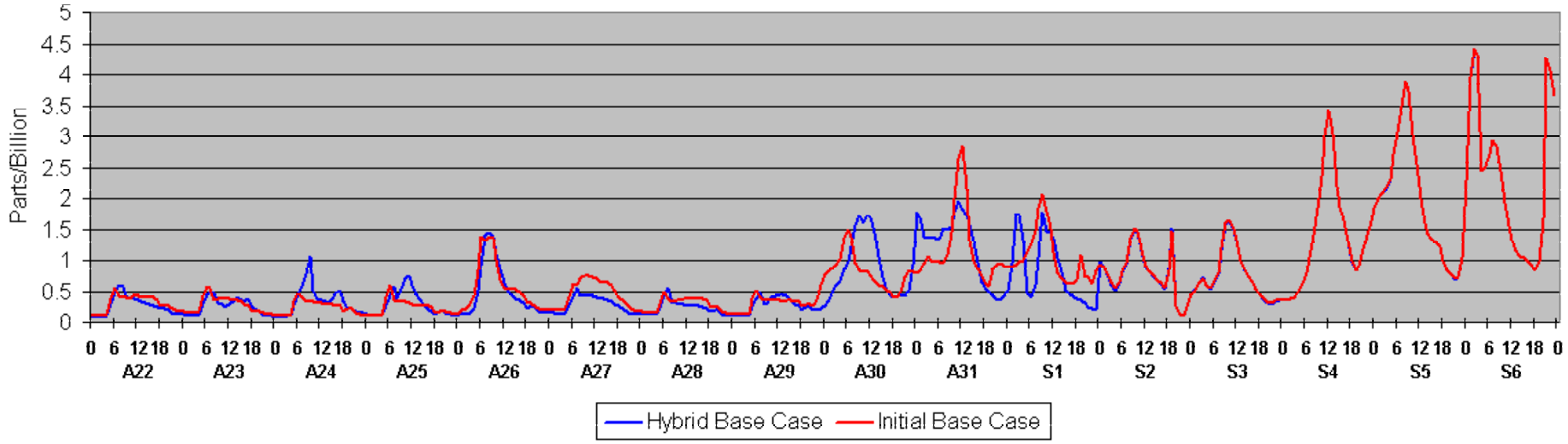

Galveston TOL Concentrations
Parts/Billion
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

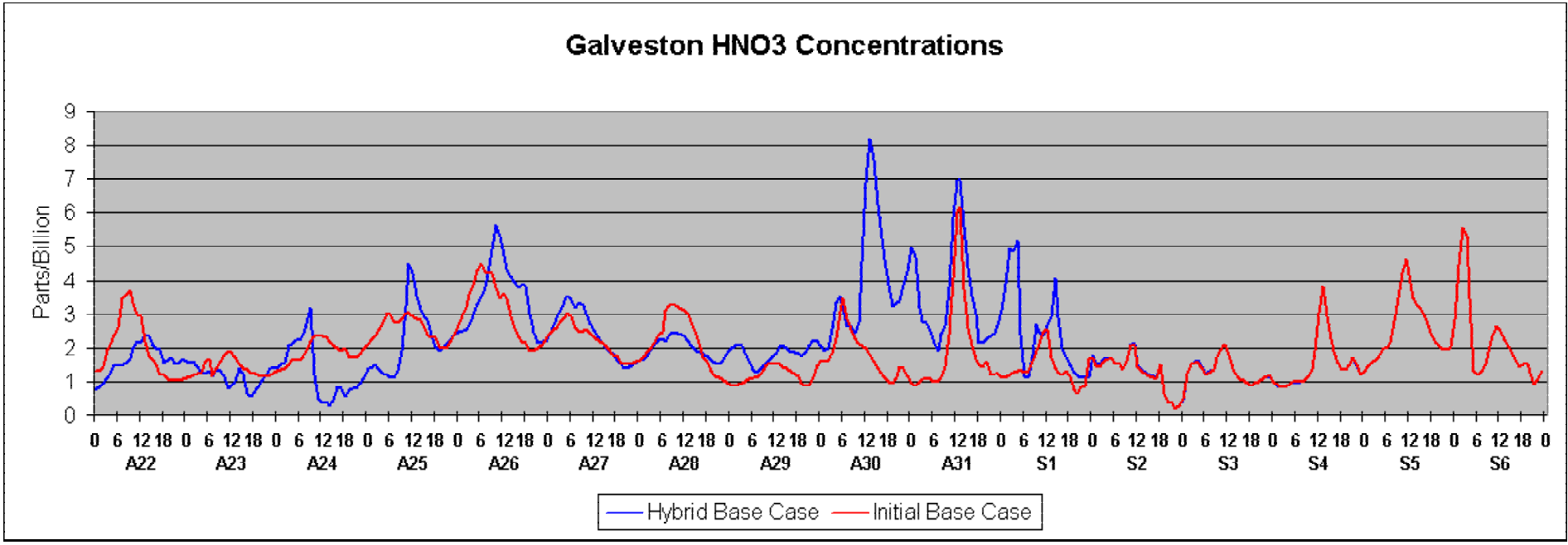

Galveston XYL Concentrations
Parts/Billion
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Galveston HCHO Concentrations

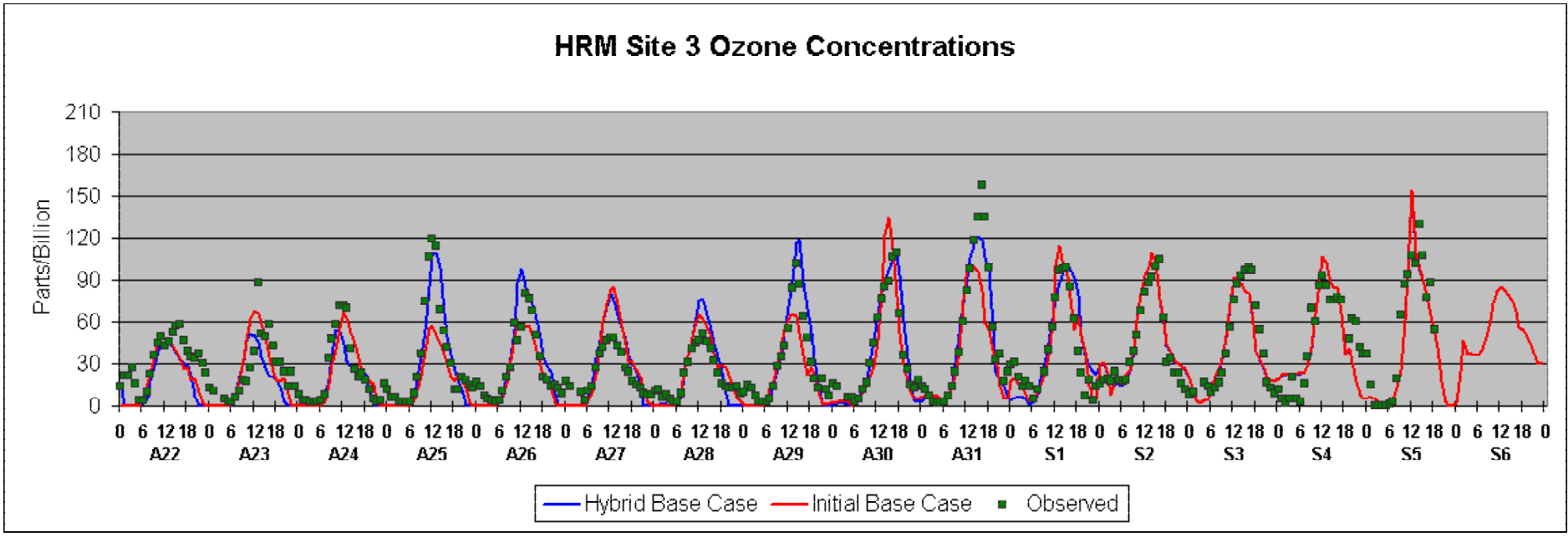


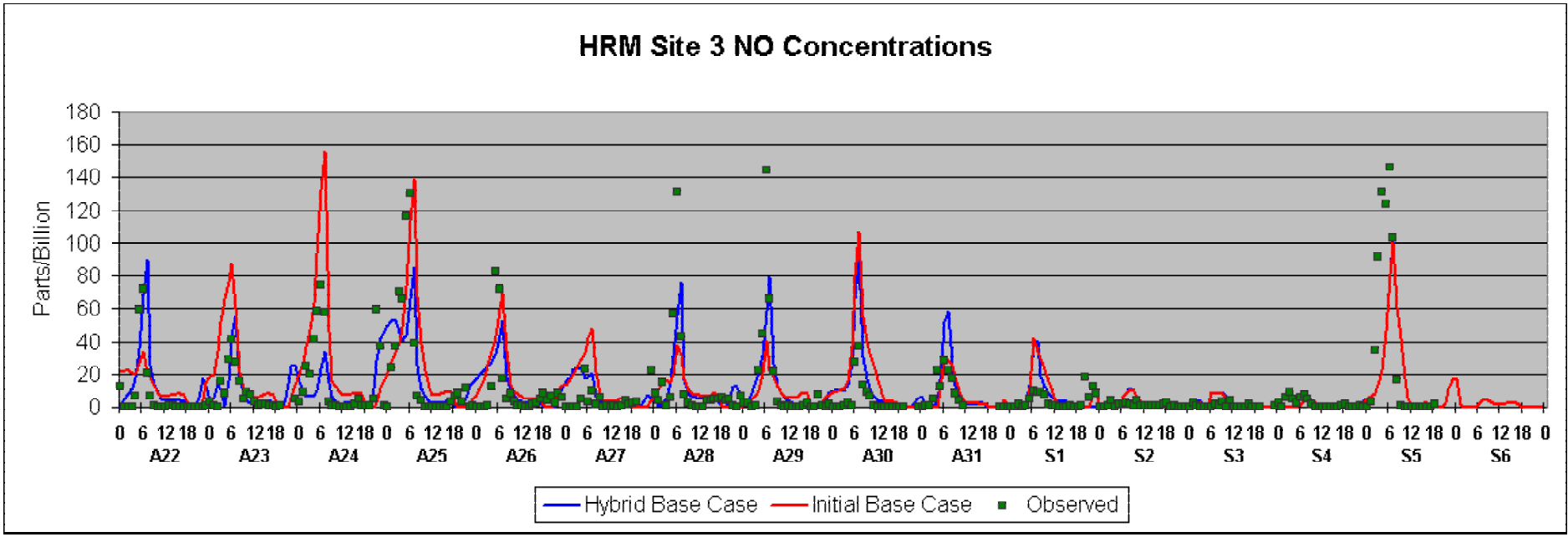
Galveston ALD2 Concentrations



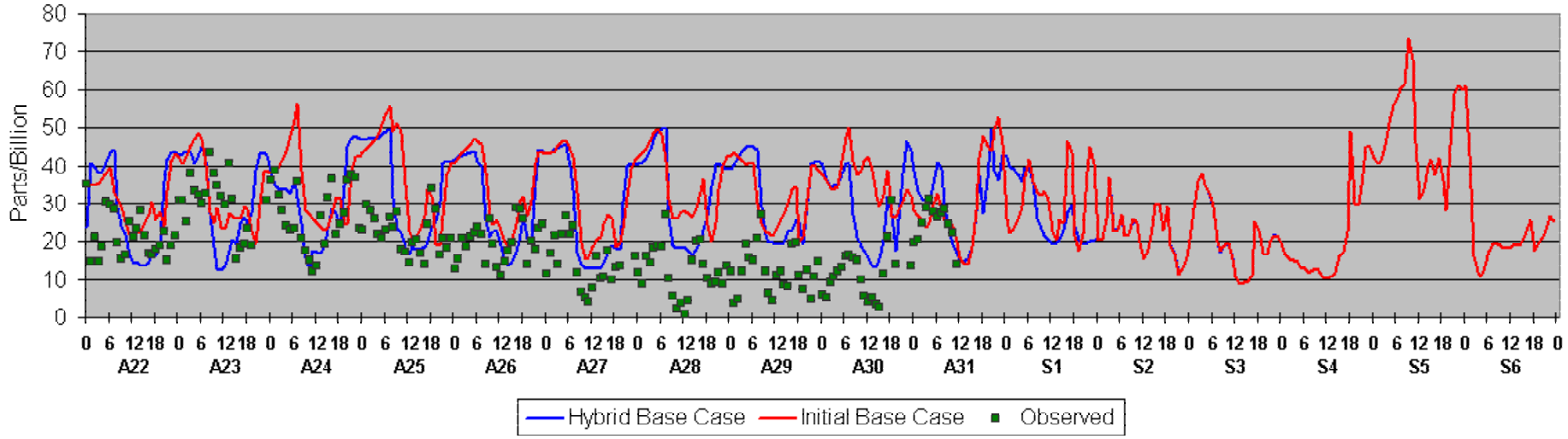

Galveston HNO3 Concentrations
Parts/Billion
0
1
2
3
4
5
6
7
8
9
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22
A23
A24
A25
A26
A27
A28
A29
A30
A31
S1
S2
S3
S4
S5
S6
Hybrid Base Case
Initial Base Case

HRM Site 3 Time Series

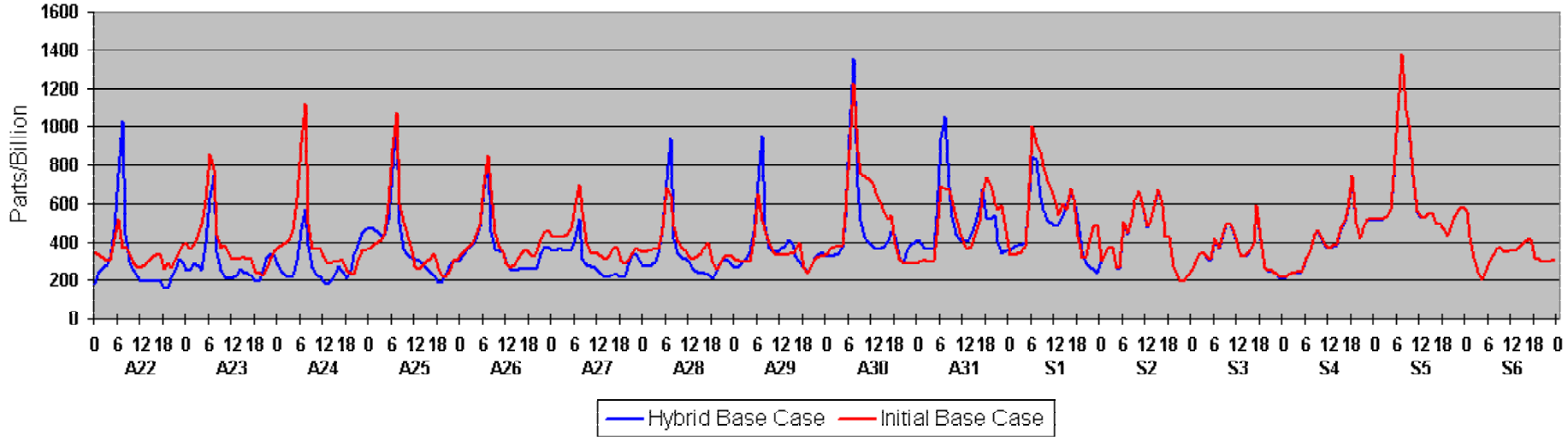

HRM Site 3 Ozone Concentrations
Parts/Billion
210
180
150
120
90
60
30
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

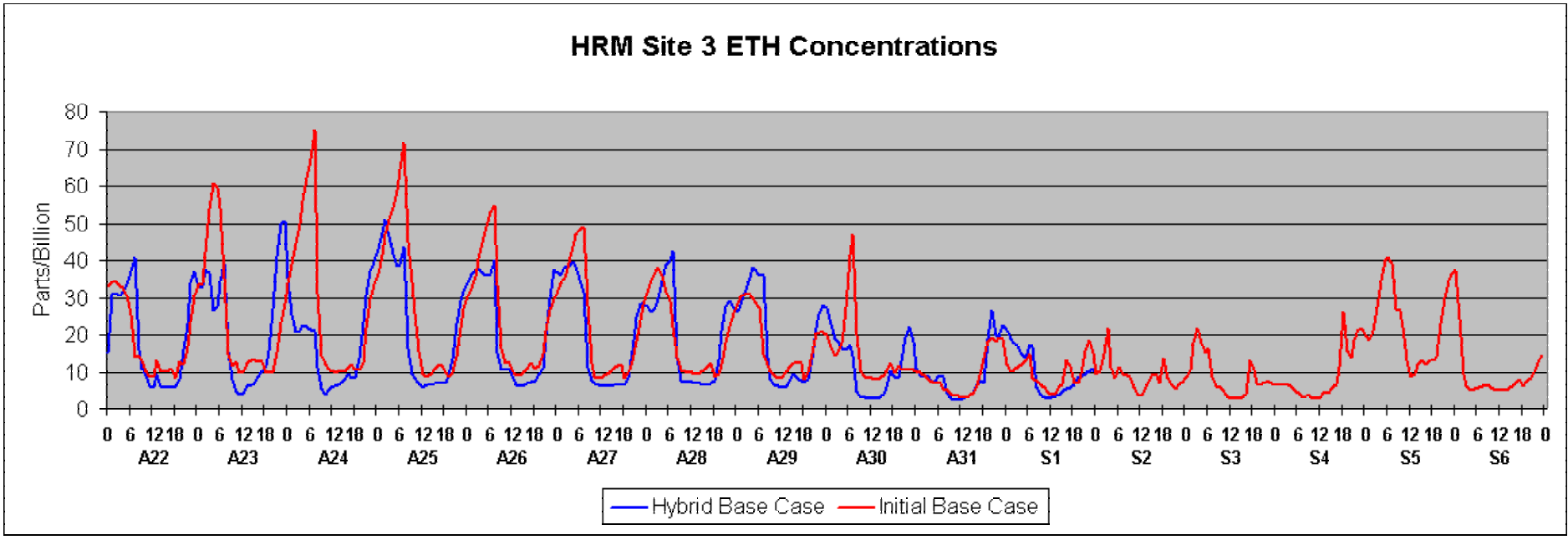

HRM Site 3 NO Concentrations
Parts/Billion
180
160
140
120
100
80
60
40
20
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

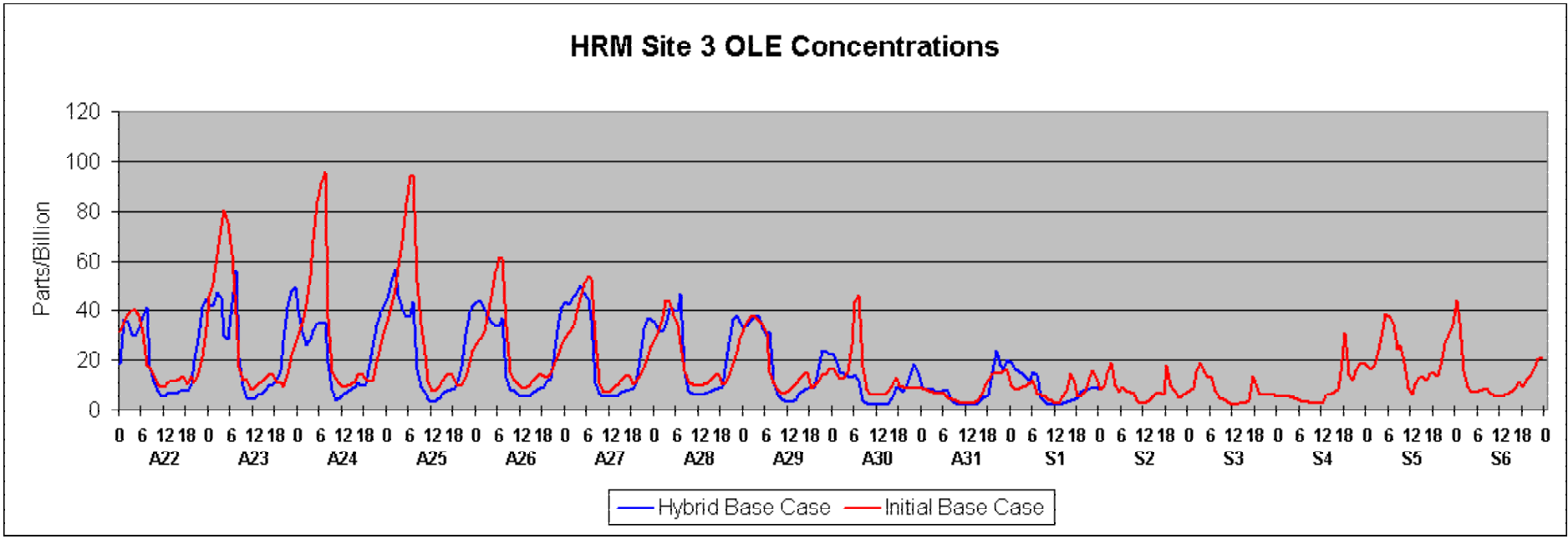
HRM Site 3 NO2 Concentrations

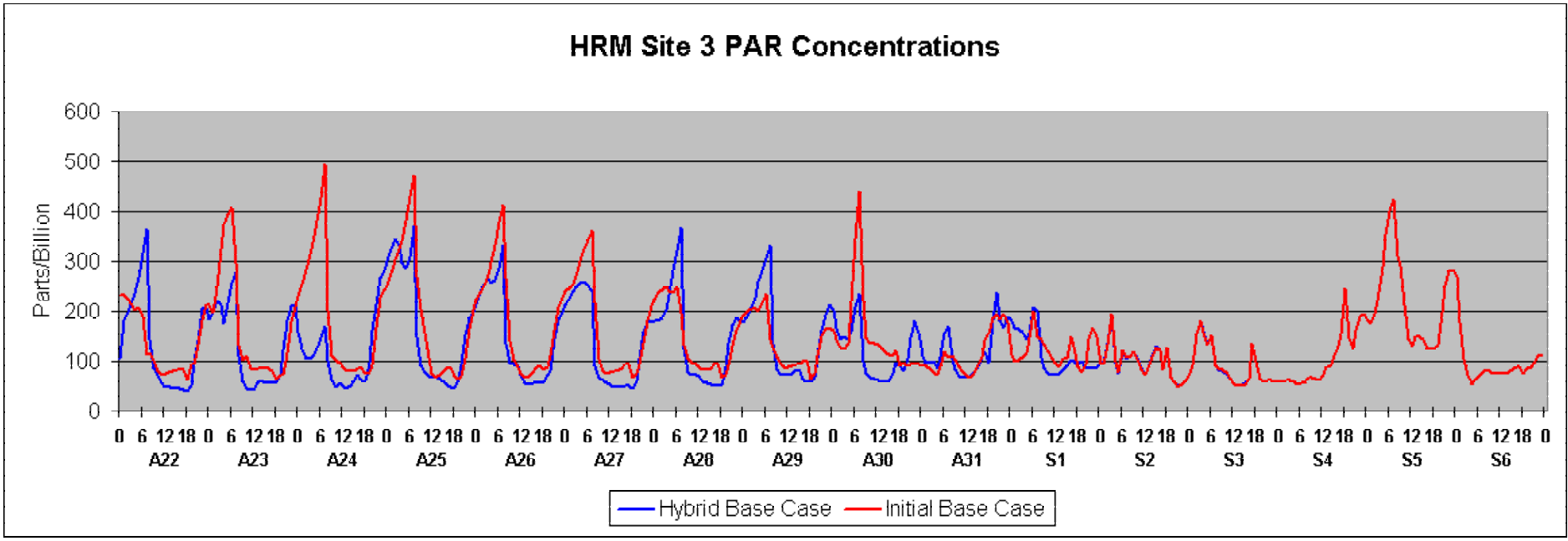


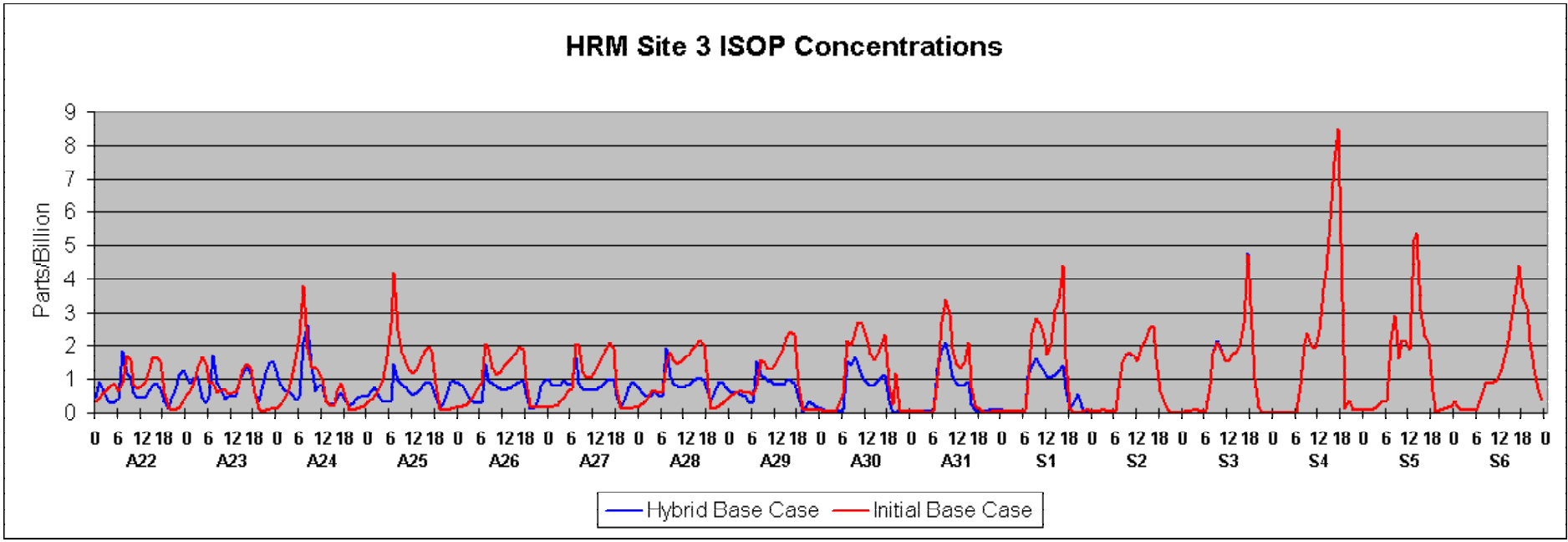
HRM Site 3 CO Concentrations

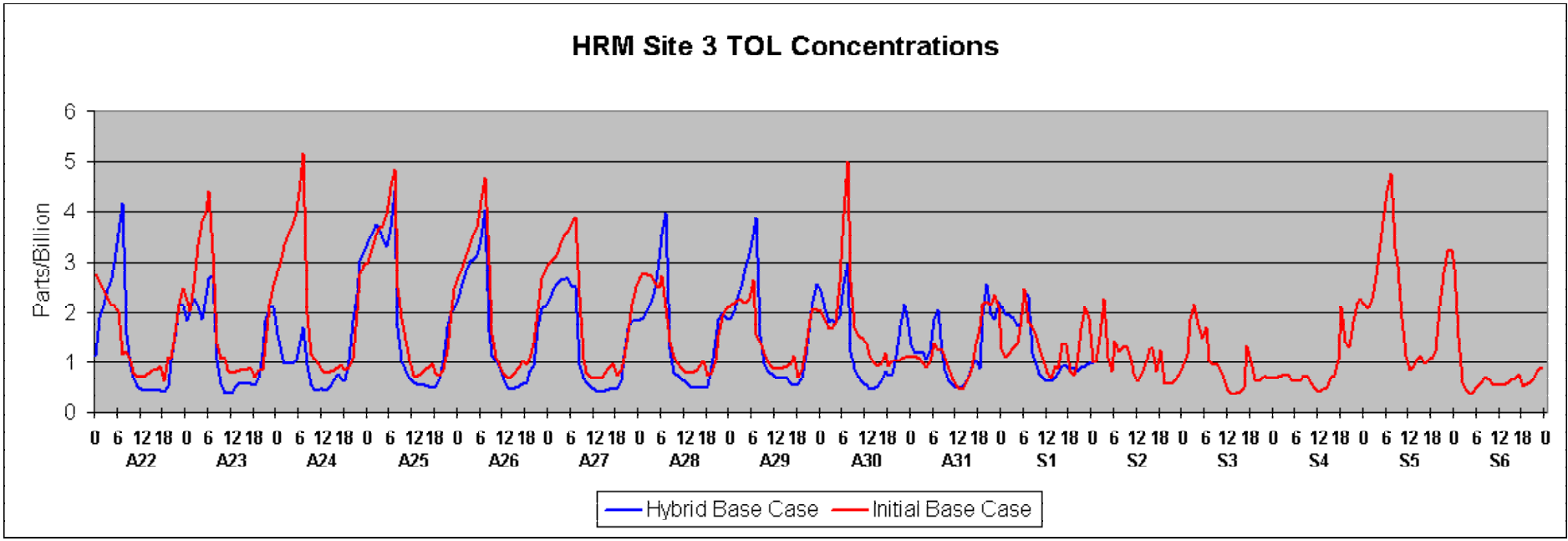


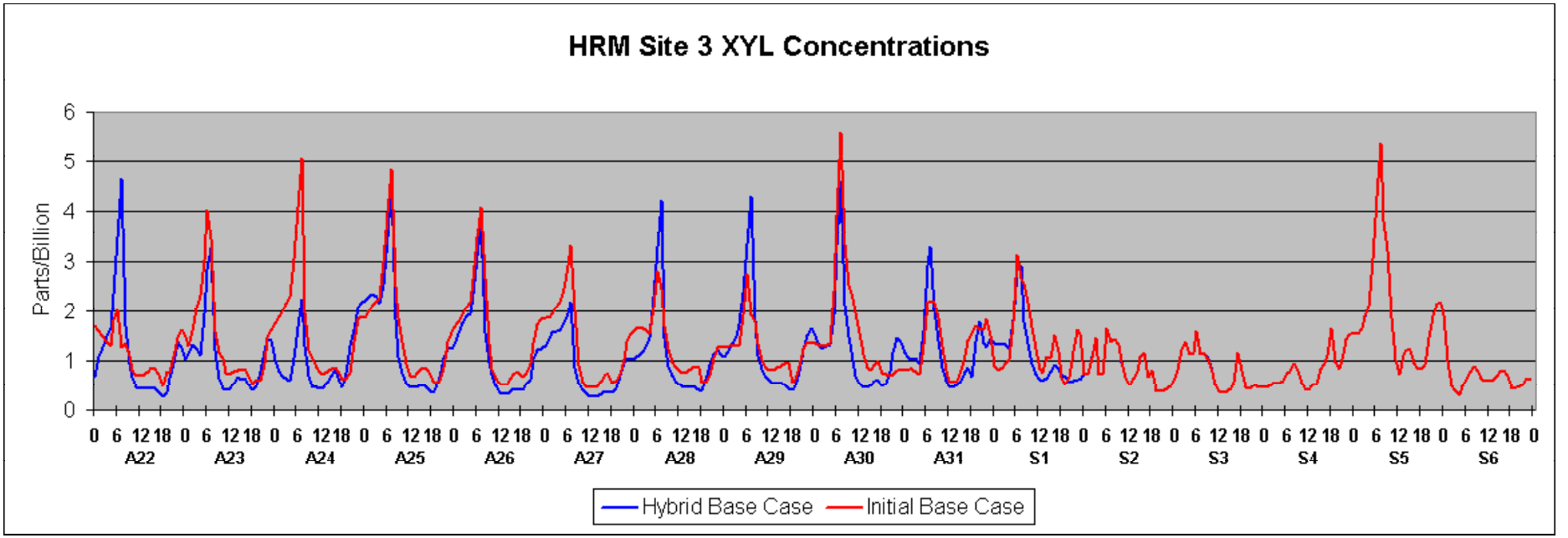

HRM Site 3 ETH Concentrations
Parts/Billion
0
10
20
30
40
50
60
70
80
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

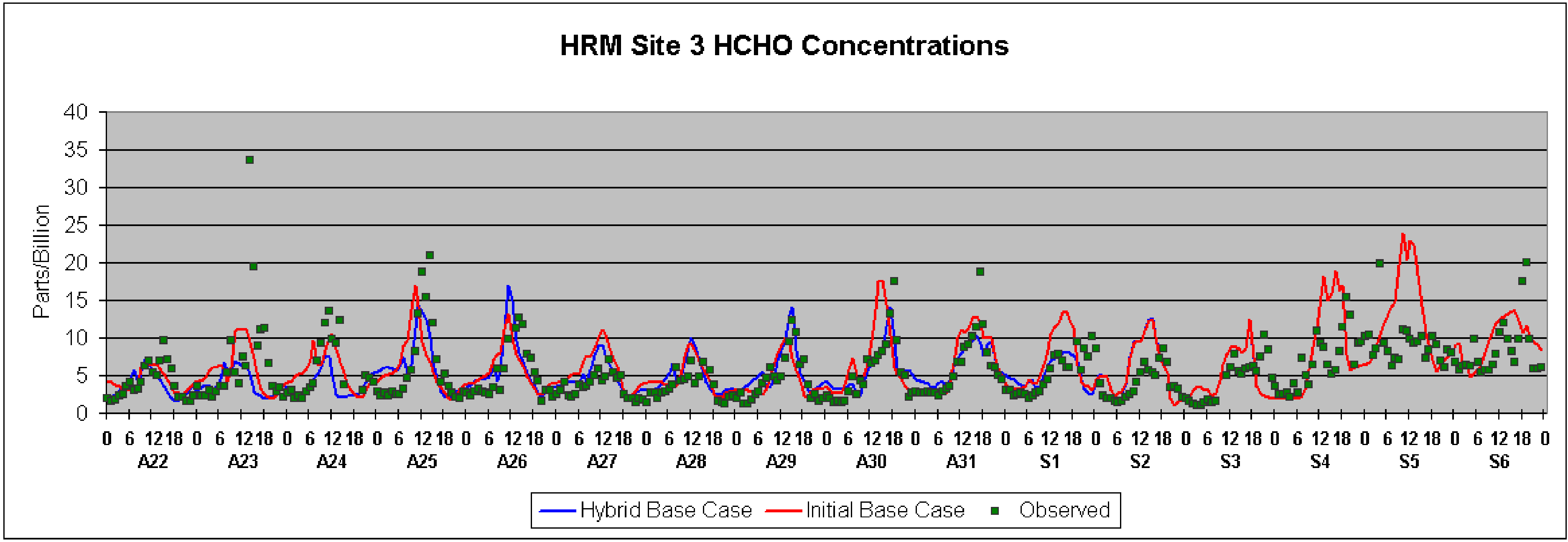

HRM Site 3 OLE Concentrations
Parts/Billion
0
20
40
60
80
100
120
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

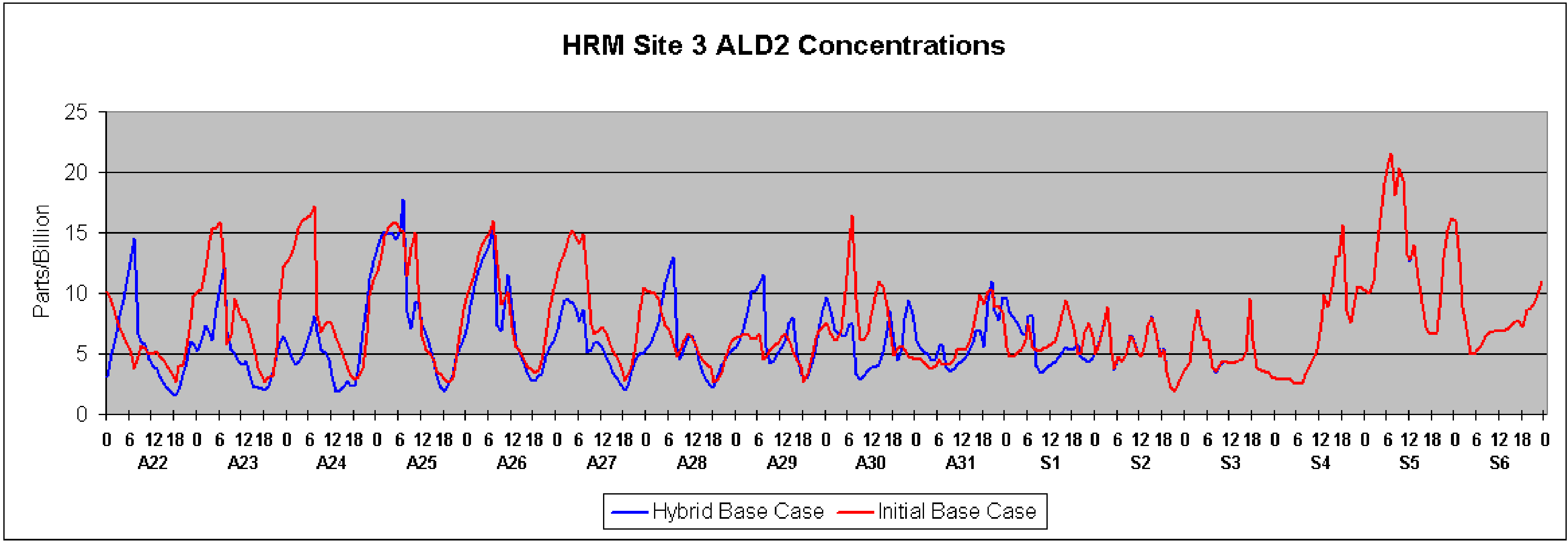

HRM Site 3 PAR Concentrations
Parts/Billion
600
500
400
300
200
100
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

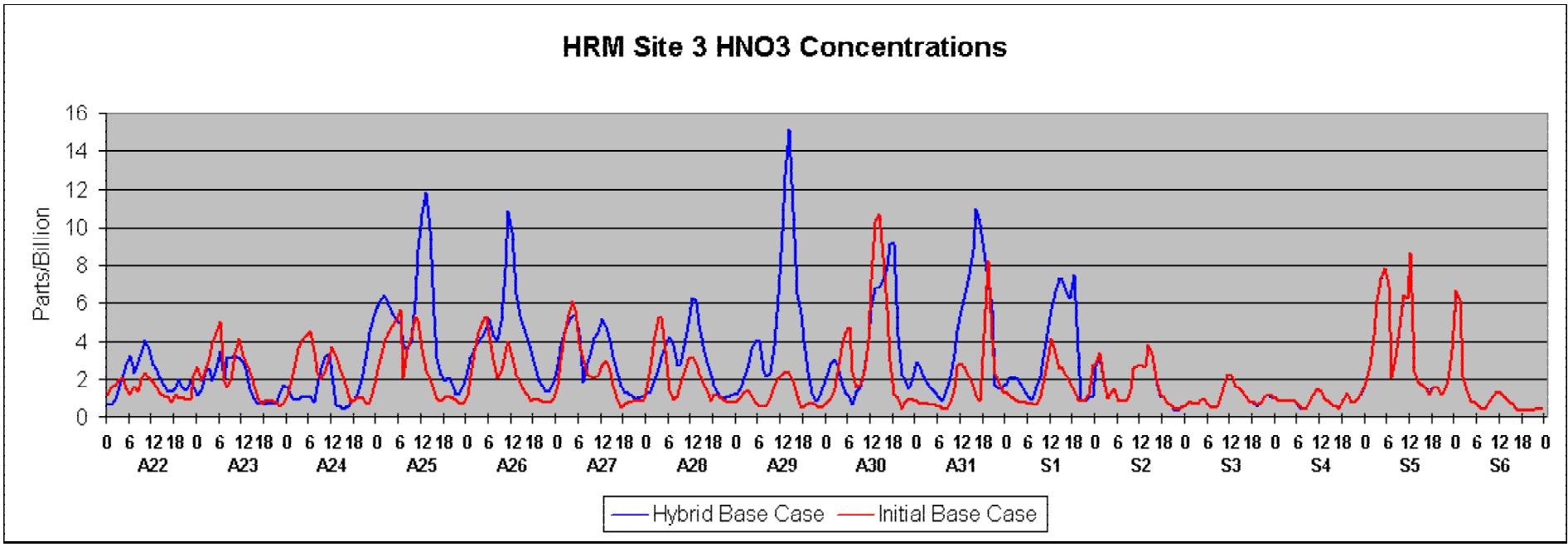

HRM Site 3 ISOP Concentrations
Parts/Billion
9
8
7
6
5
4
3
2
1
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

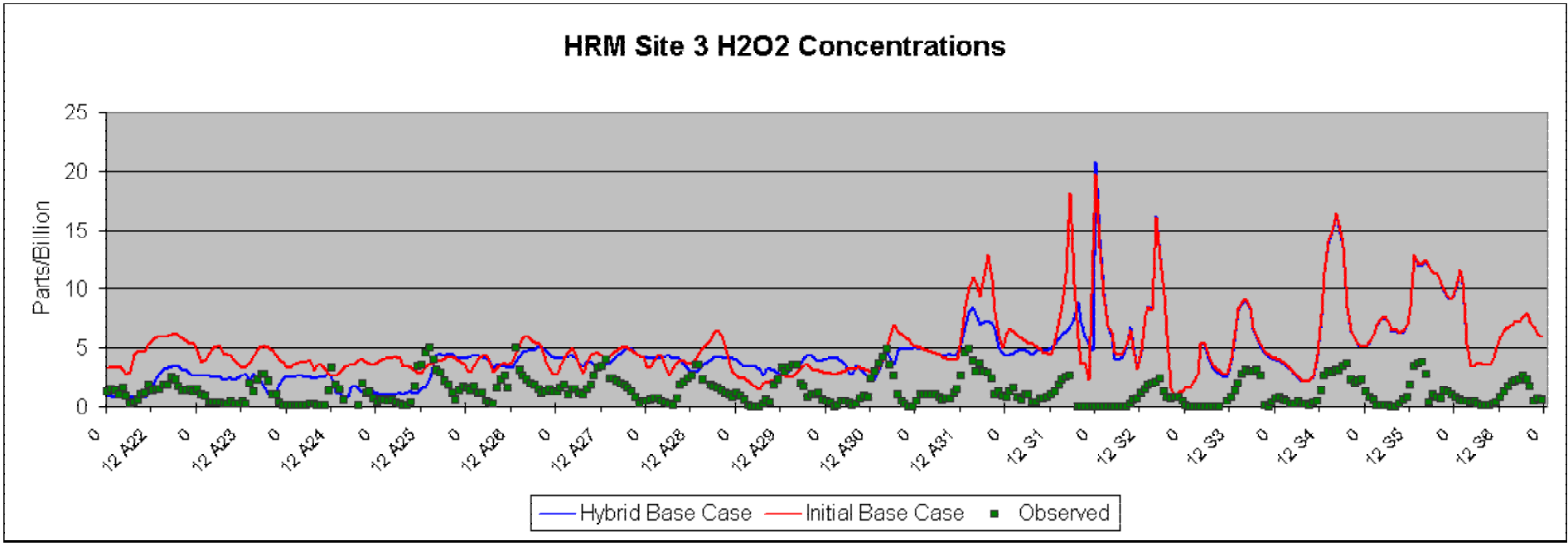

HRM Site 3 TOL Concentrations
Parts/Billion
0
1
2
3
4
5
6
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


HRM Site 3 XYL Concentrations
Parts/Billion
0
1
2
3
4
5
6
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


HRM Site 3 HCHO Concentrations
Parts/Billion
0 5 10 15 20 25 30 35 40
0 6 12 18
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

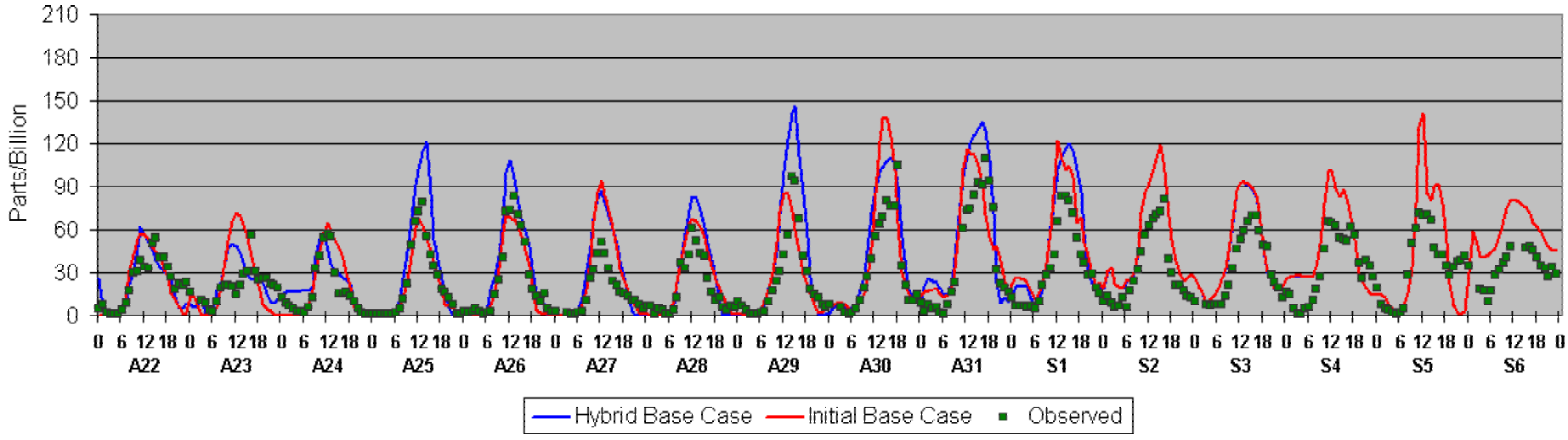

HRM Site 3 ALD2 Concentrations
Parts/Billion
0 5 10 15 20 25
0 6 12 18
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


HRM Site 3 HNO3 Concentrations
Parts/Billion
16
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

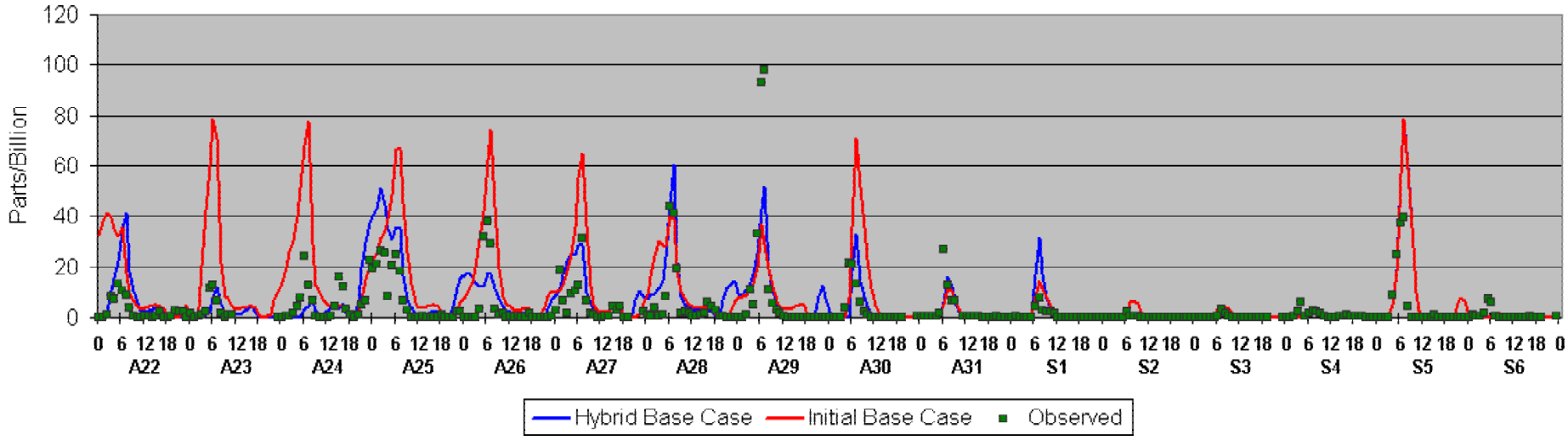

HRM Site 3 H2O2 Concentrations
Parts/Billion
25
20
15
10
5
0
0 12 A22 0 12 A23 0 12 A24 0 12 A25 0 12 A26 0 12 A27 0 12 A28 0 12 A29 0 12 A30 0 12 A31 0 12 S1 0 12 S2 0 12 S3 0 12 S4 0 12 S5 0 12 S6 0
Hybrid Base Case
Initial Base Case
Observed

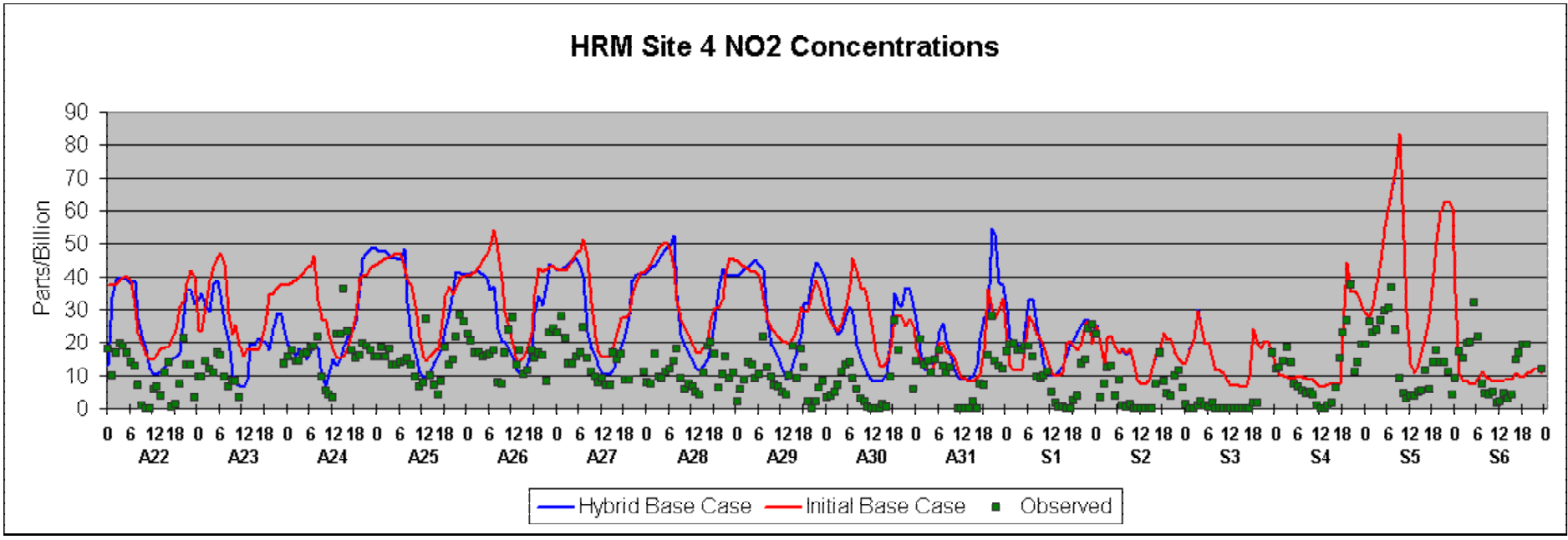
HRM Site 4 Time Series

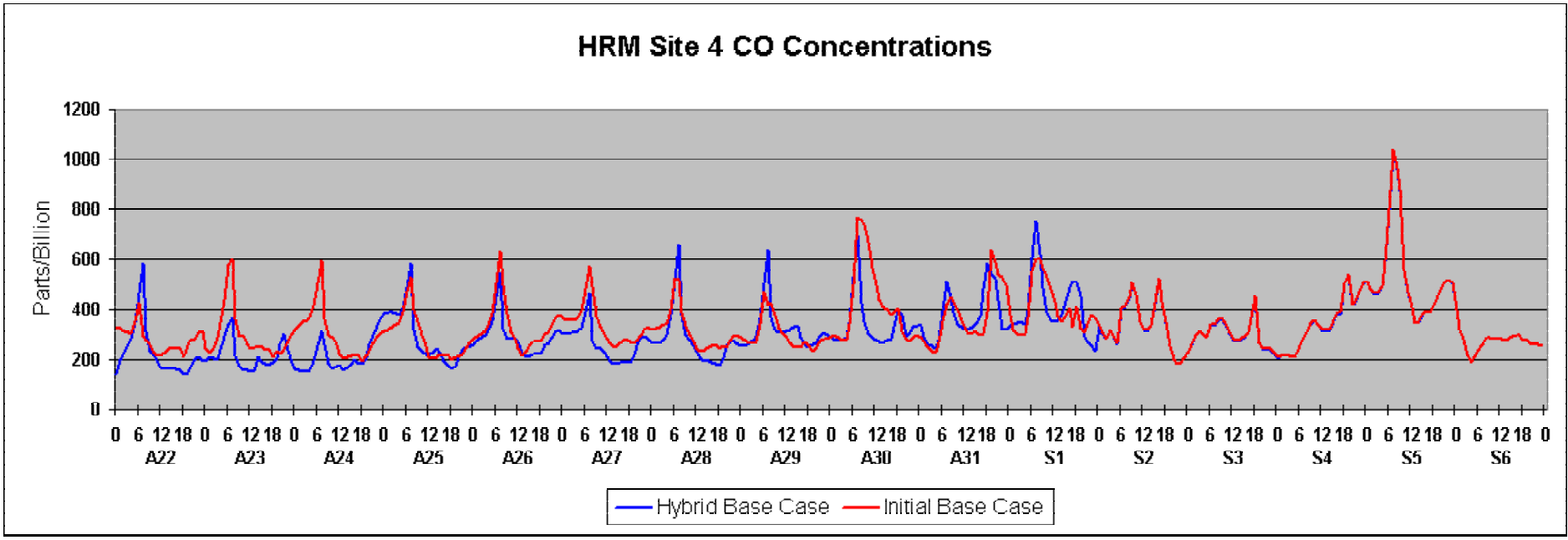
HRM Site 4 Ozone Concentrations

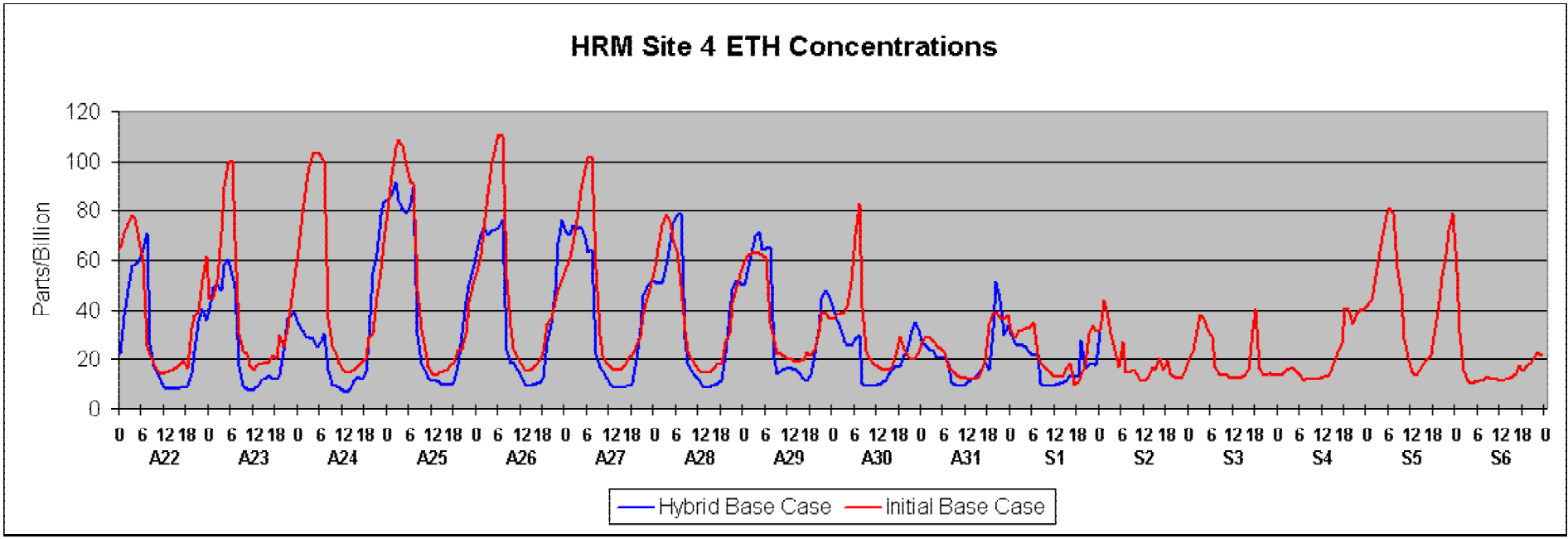


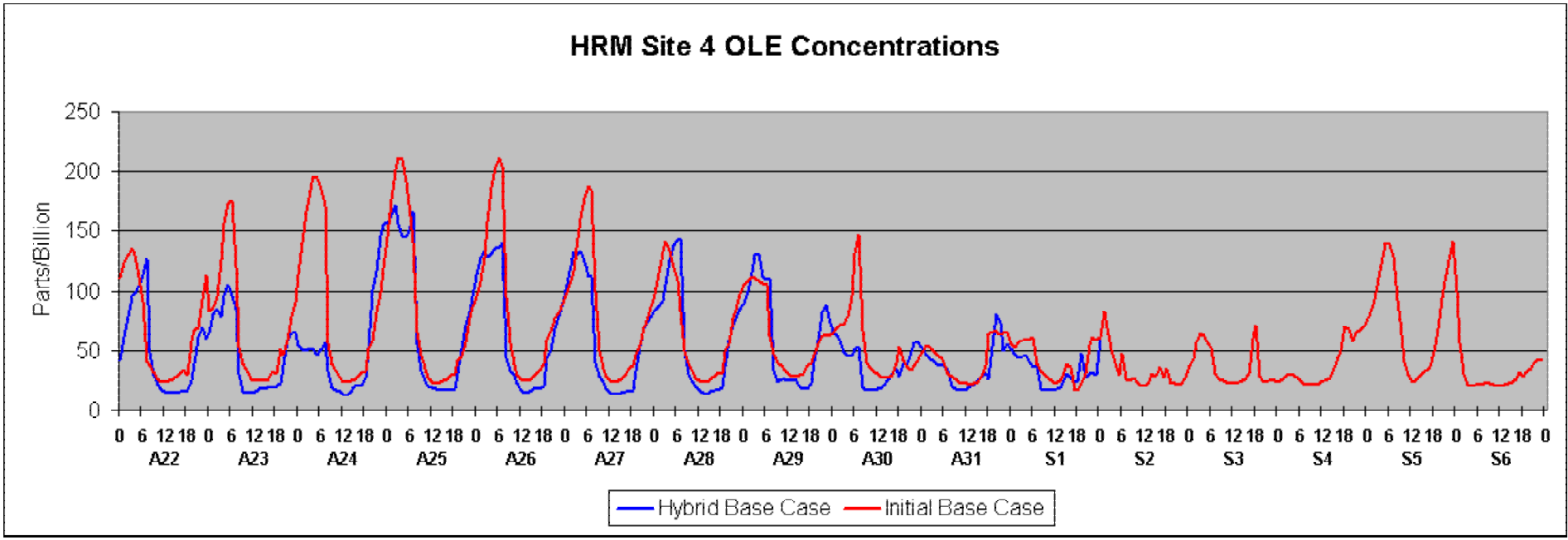
HRM Site 4 NO Concentrations

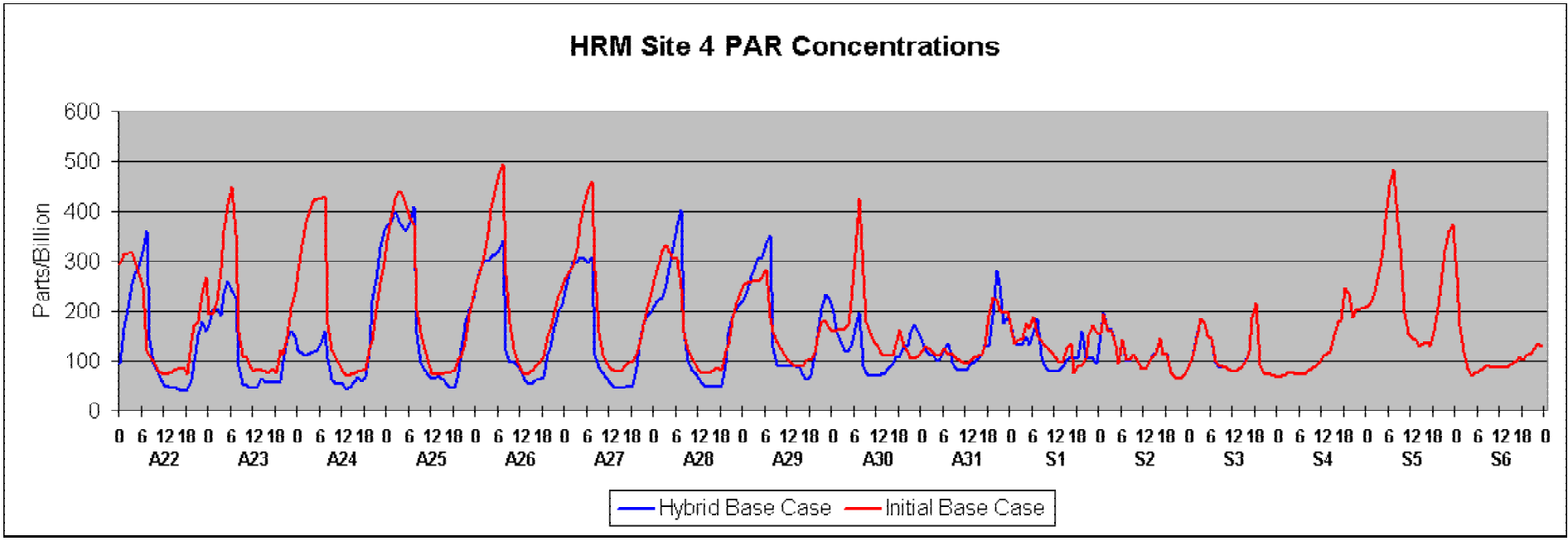


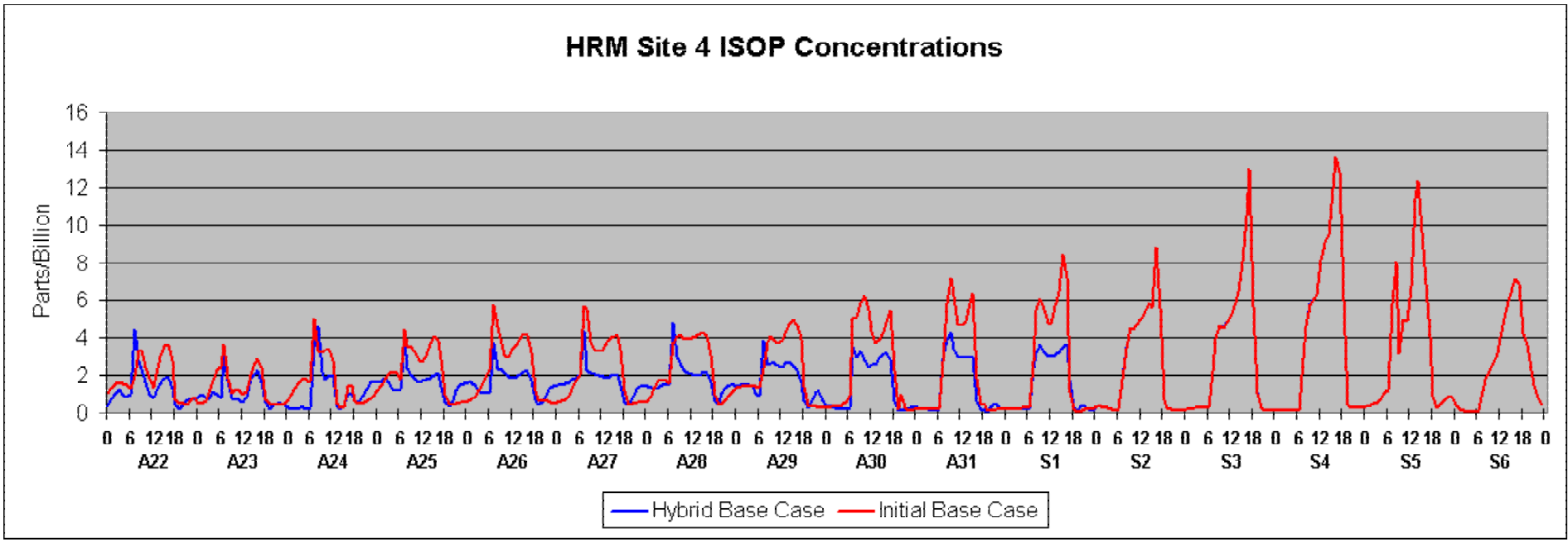

HRM Site 4 NO2 Concentrations
Parts/Billion
90
80
70
60
50
40
30
20
10
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


HRM Site 4 CO Concentrations
Parts/Billion
1200
1000
800
600
400
200
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

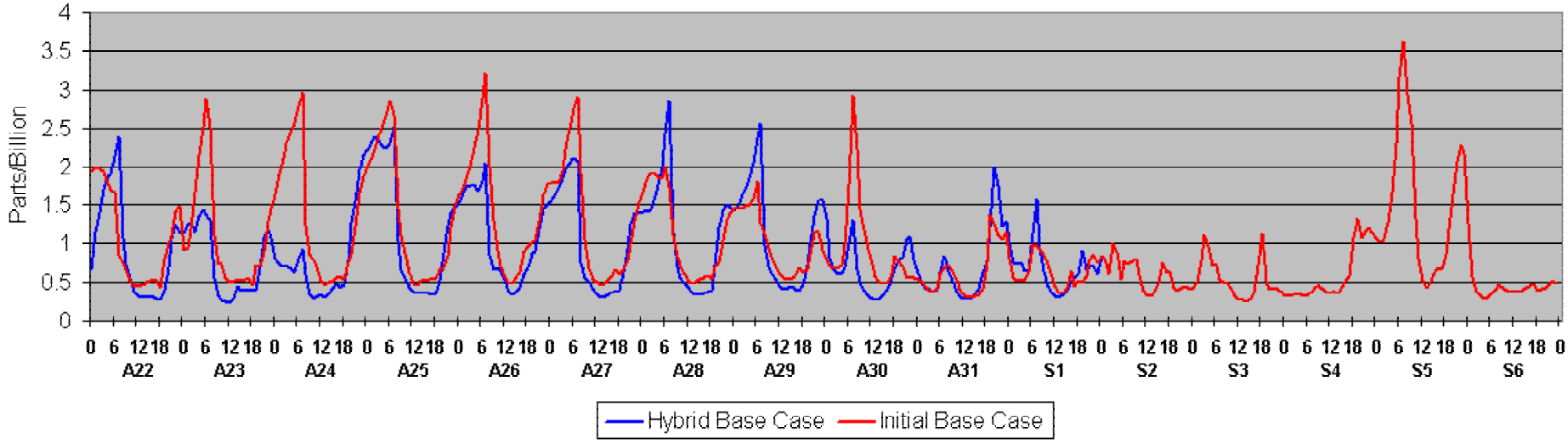

HRM Site 4 ETH Concentrations
Parts/Billion
120
100
80
60
40
20
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


HRM Site 4 OLE Concentrations
Parts/Billion
250
200
150
100
50
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

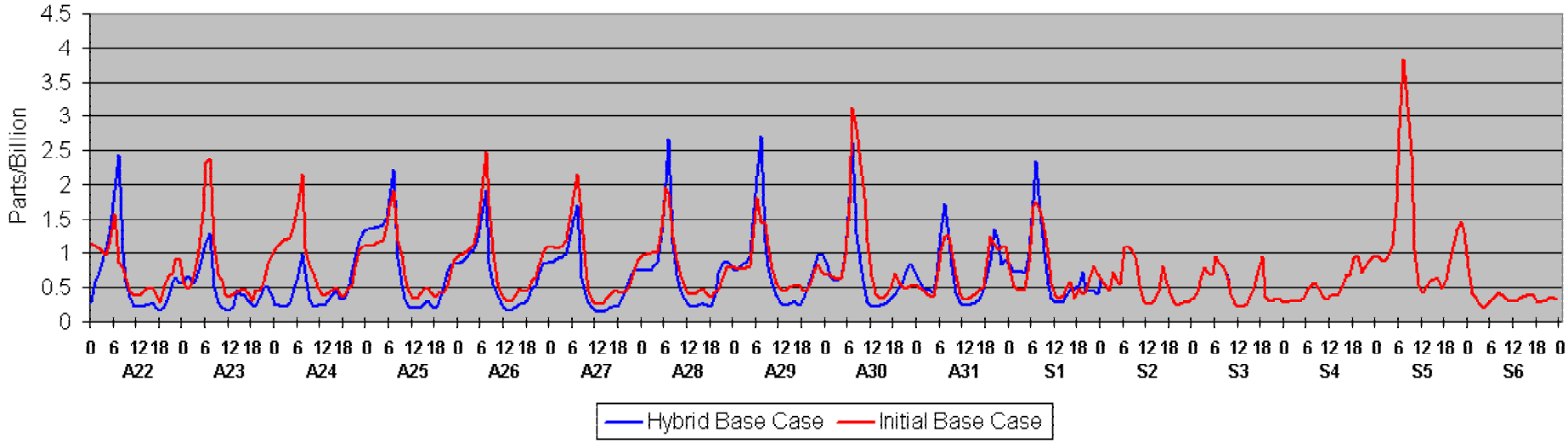

HRM Site 4 PAR Concentrations
Parts/Billion
600
500
400
300
200
100
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


HRM Site 4 ISOP Concentrations
Parts/Billion
16
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

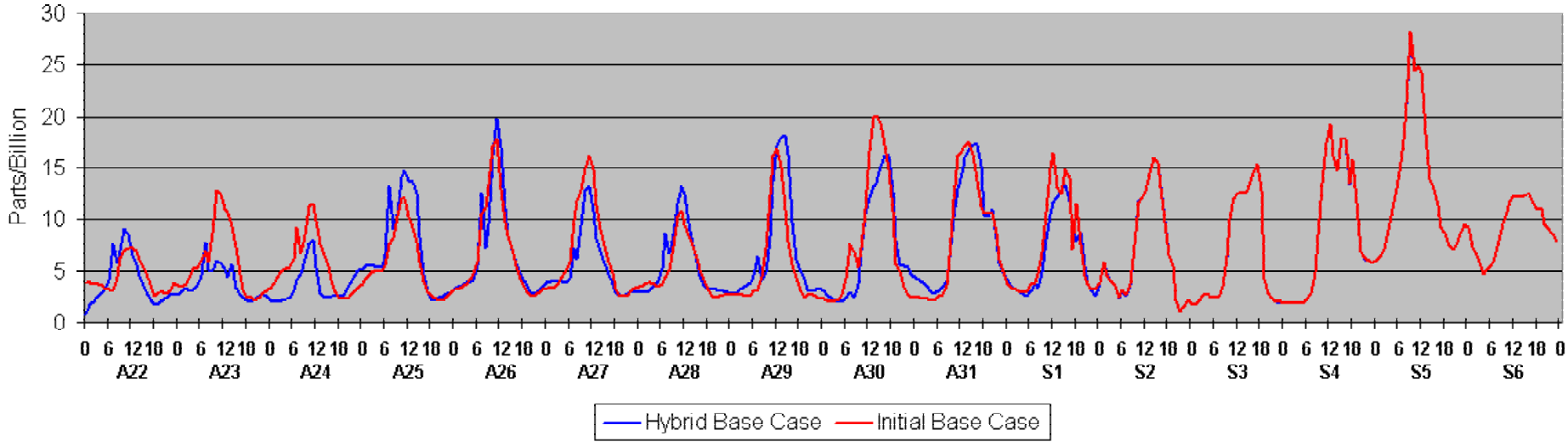
HRM Site 4 TOL Concentrations



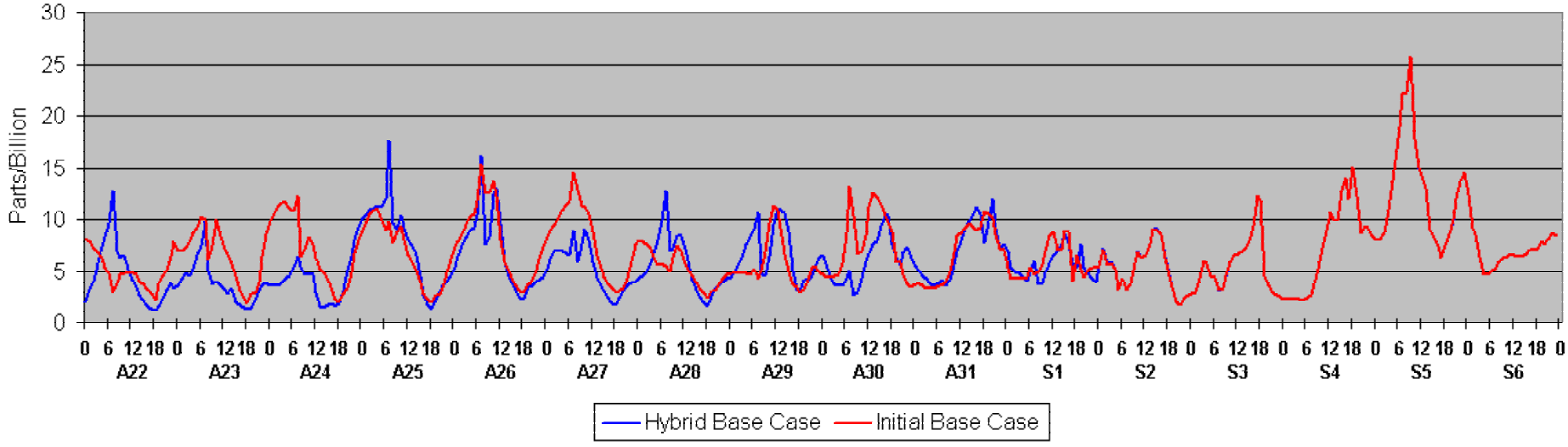
HRM Site 4 XYL Concentrations

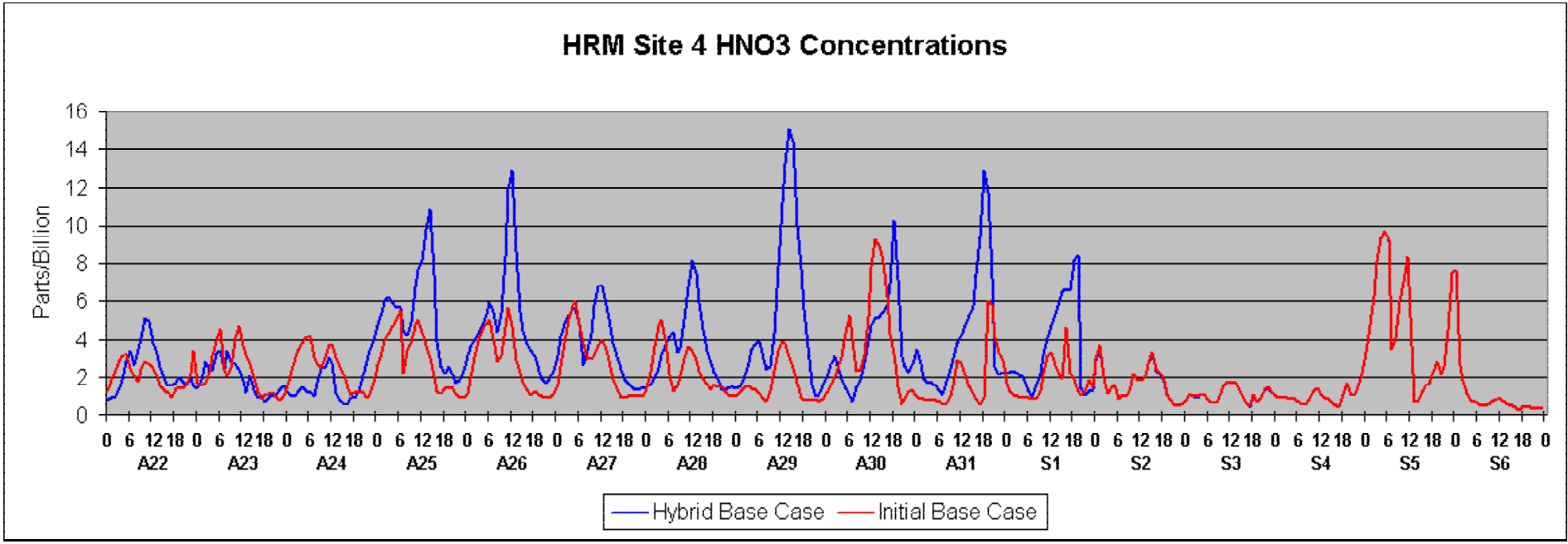


HRM Site 4 HCHO Concentrations

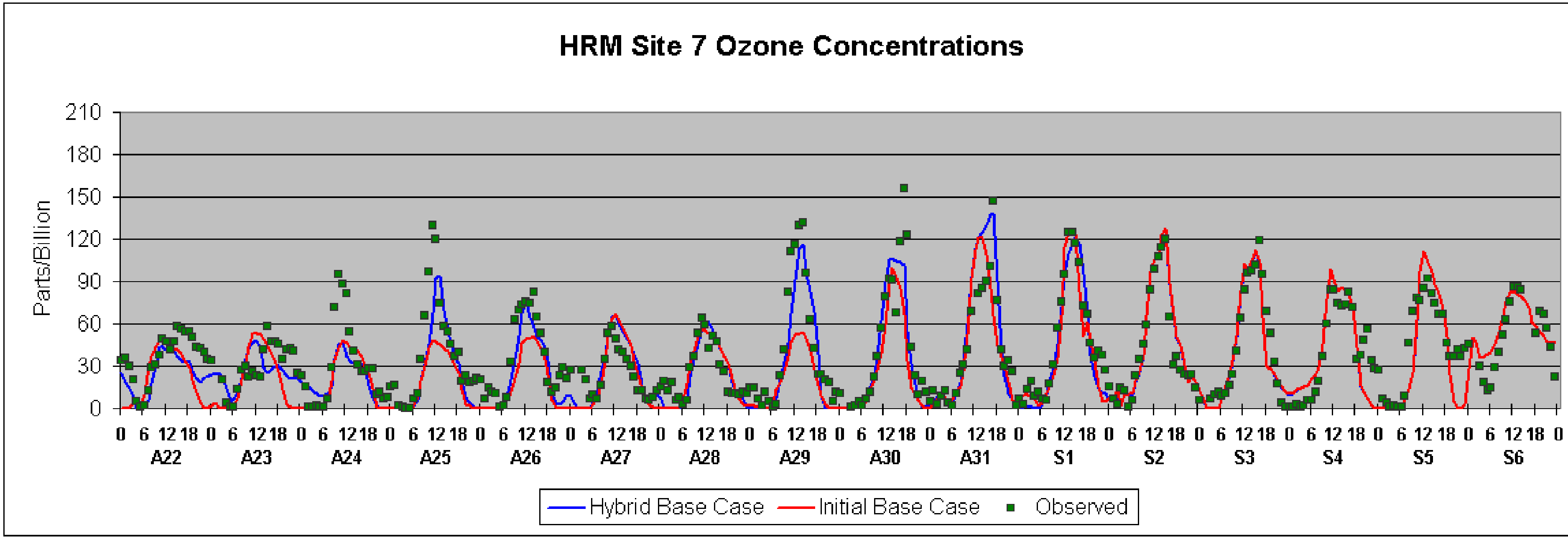


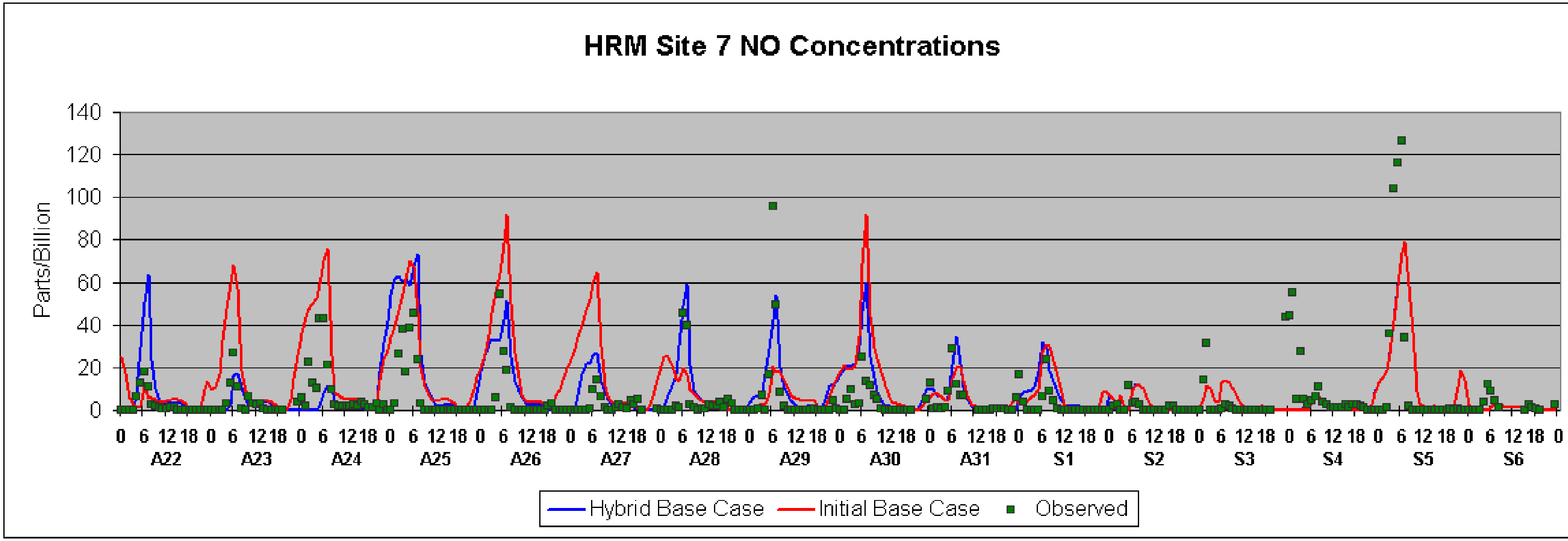
HRM Site 4 ALD2 Concentrations



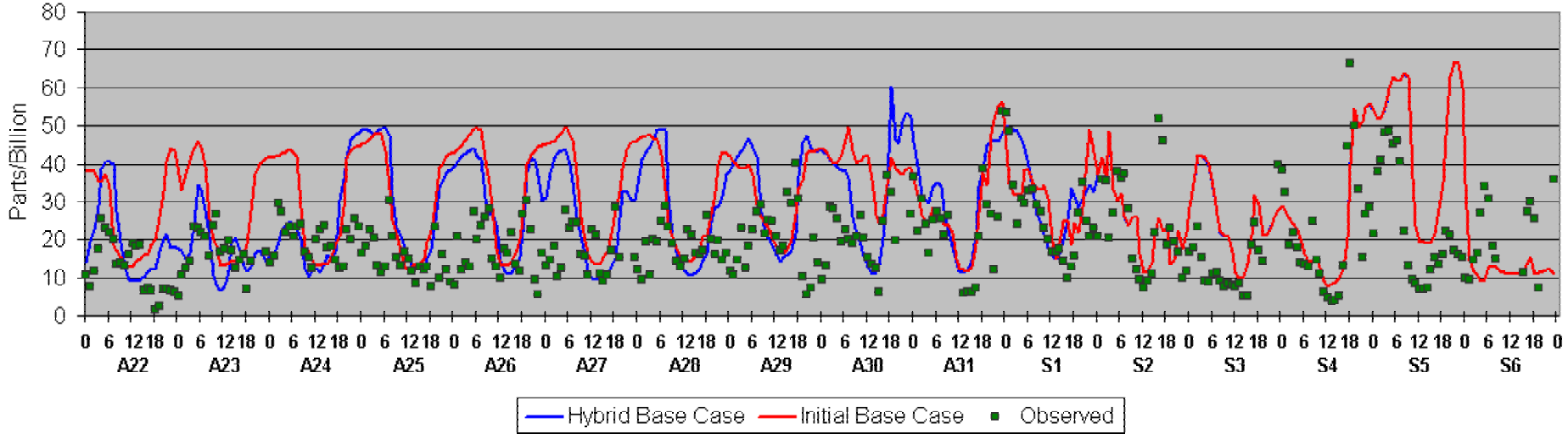

HRM Site 4 HNO3 Concentrations
Parts/Billion
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

HRM Site 7 Time Series

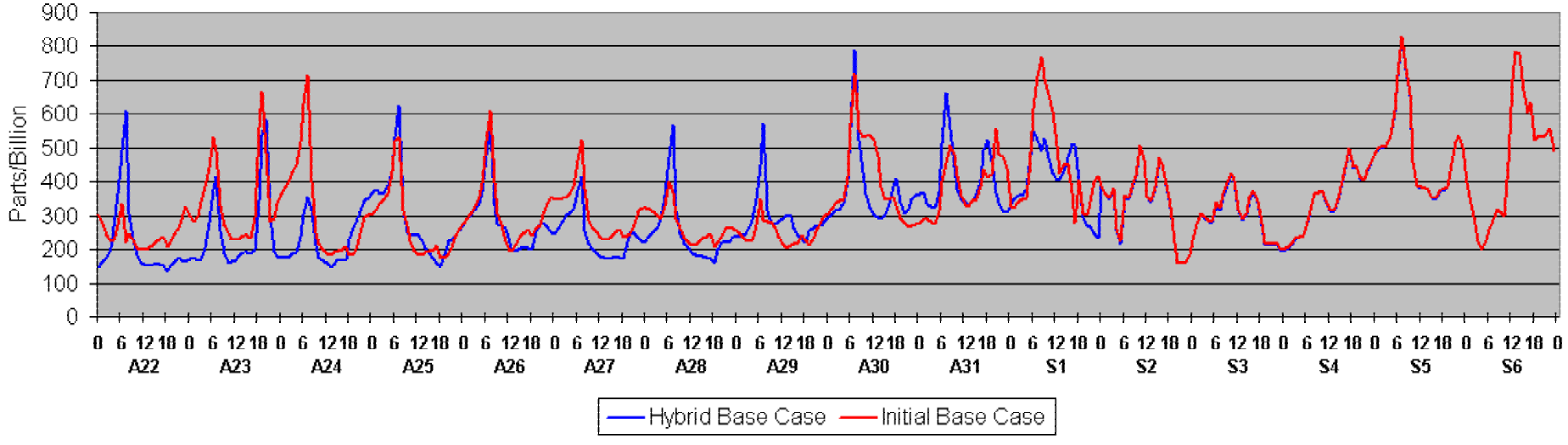

HRM Site 7 Ozone Concentrations
Parts/Billion
210
180
150
120
90
60
30
0
0 6 12 18
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


HRM Site 7 NO Concentrations
Parts/Billion
140
120
100
80
60
40
20
0
0 6 12 18
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

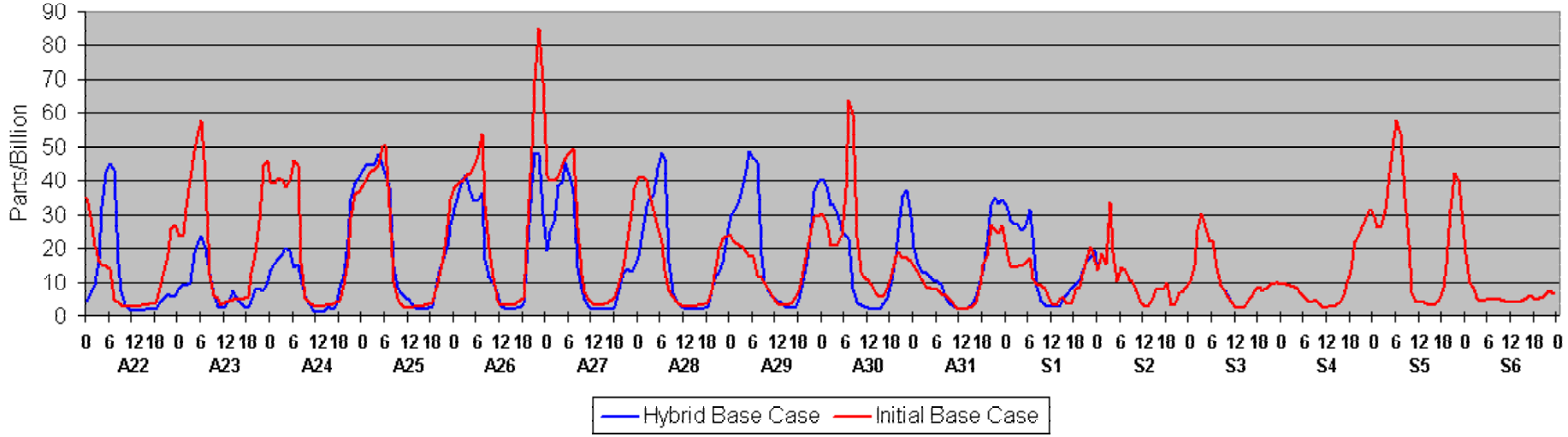
HRM Site 7 NO2 Concentrations



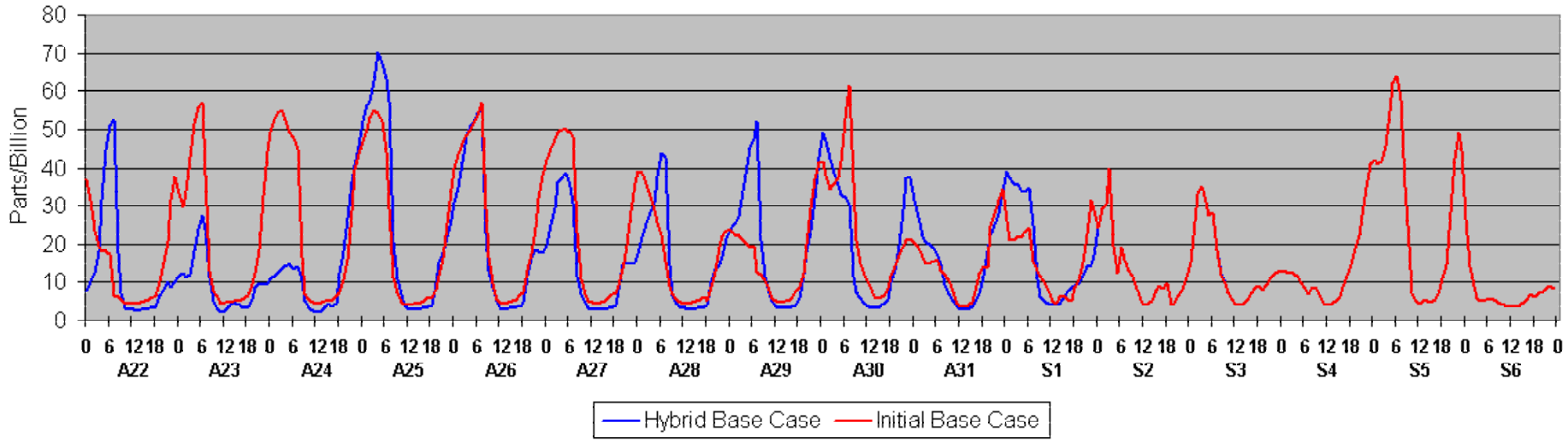
HRM Site 7 CO Concentrations

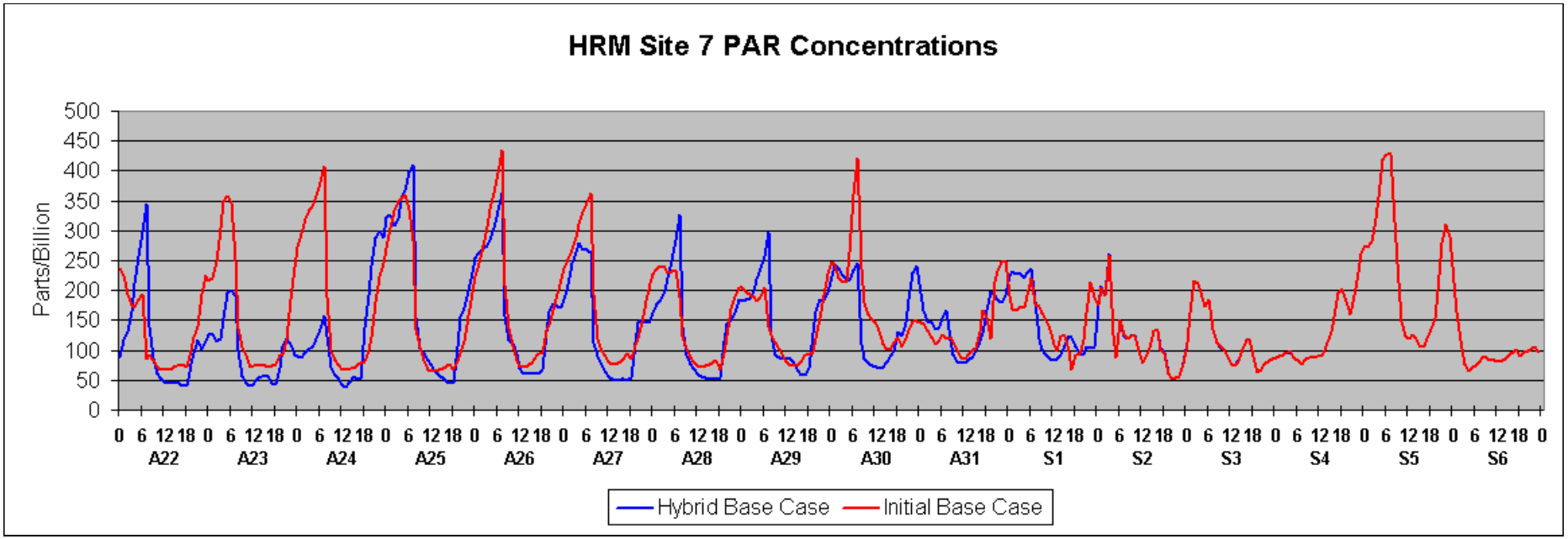


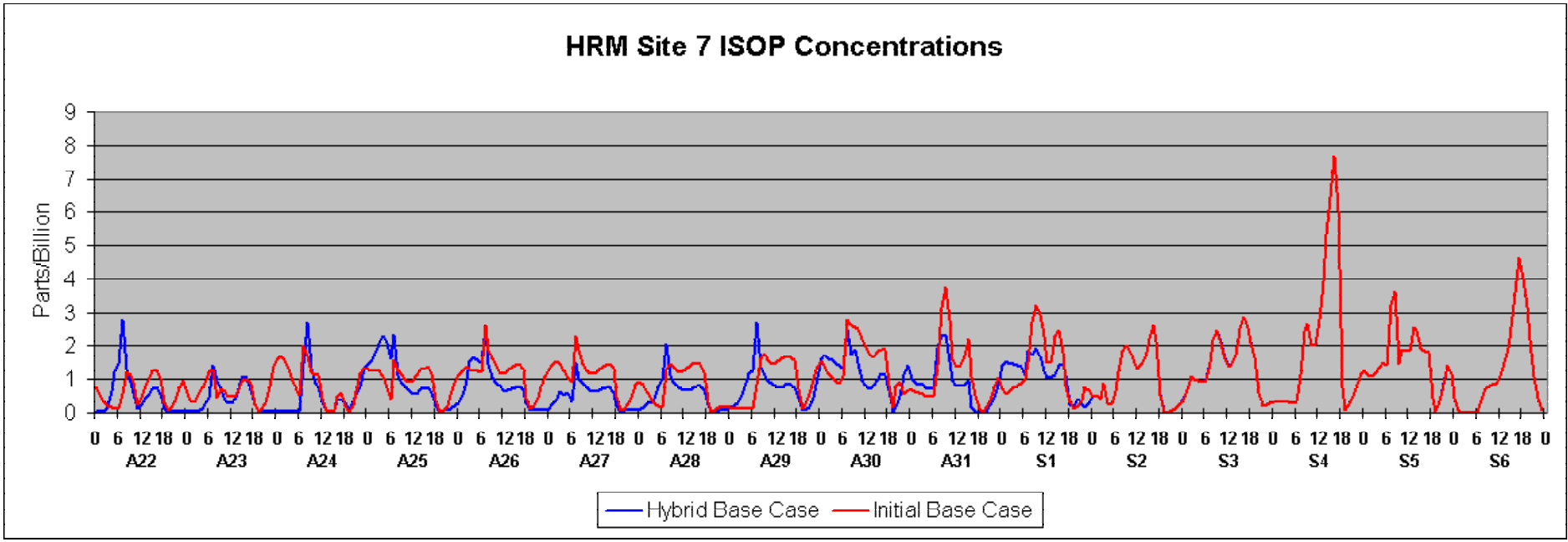
HRM Site 7 ETH Concentrations



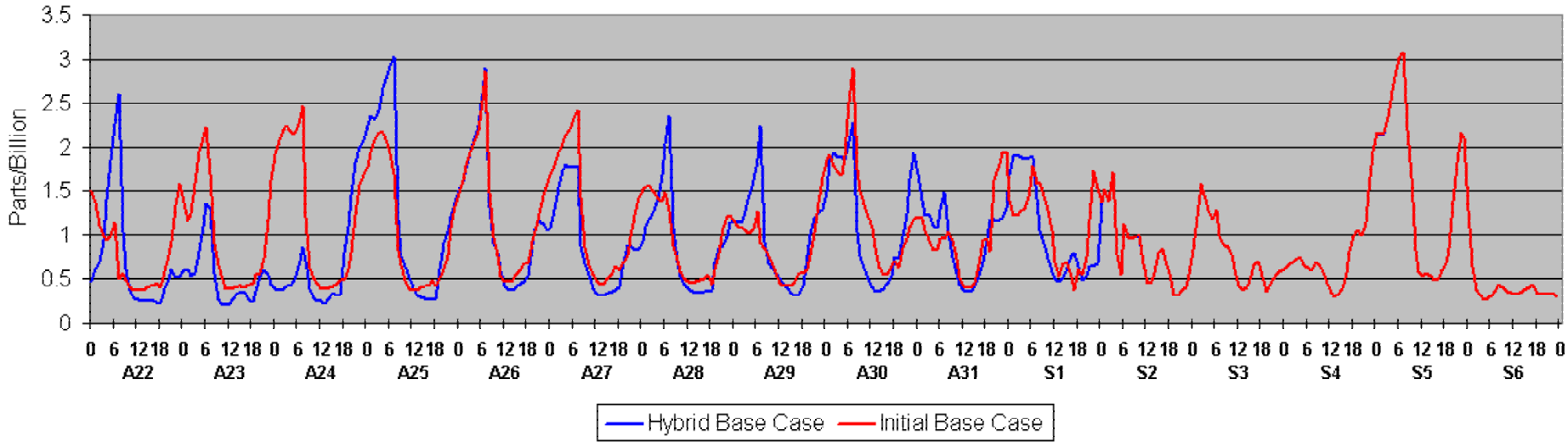
HRM Site 7 OLE Concentrations



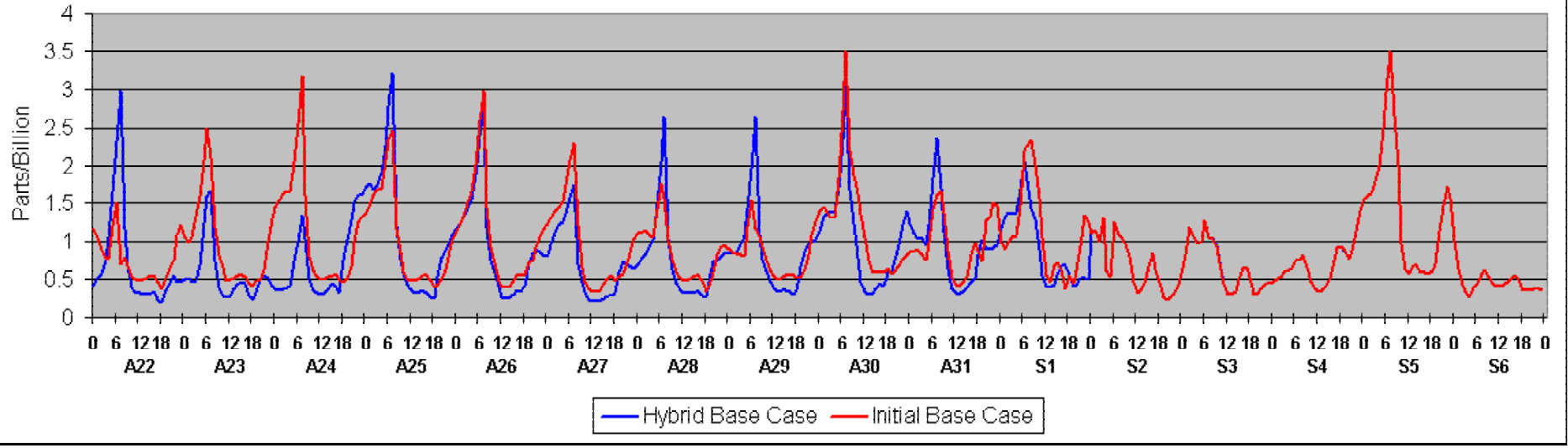

HRM Site 7 PAR Concentrations
Parts/Billion
500
450
400
350
300
250
200
150
100
50
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

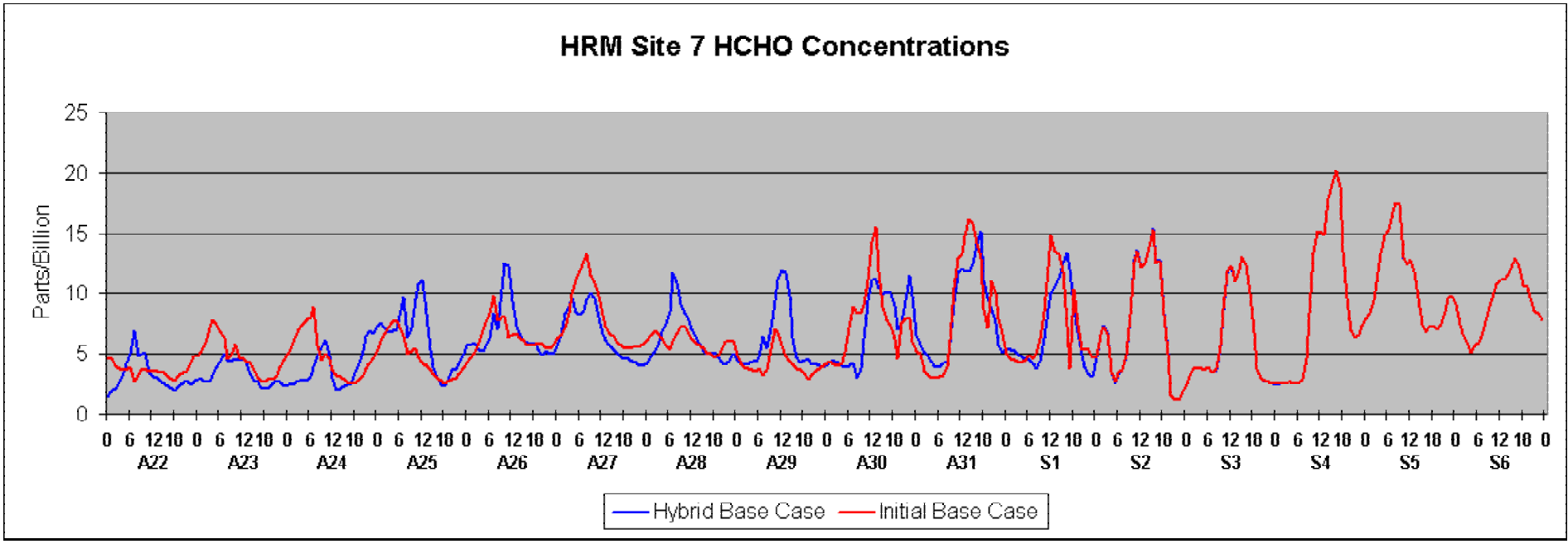

HRM Site 7 ISOP Concentrations
Parts/Billion
9
8
7
6
5
4
3
2
1
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

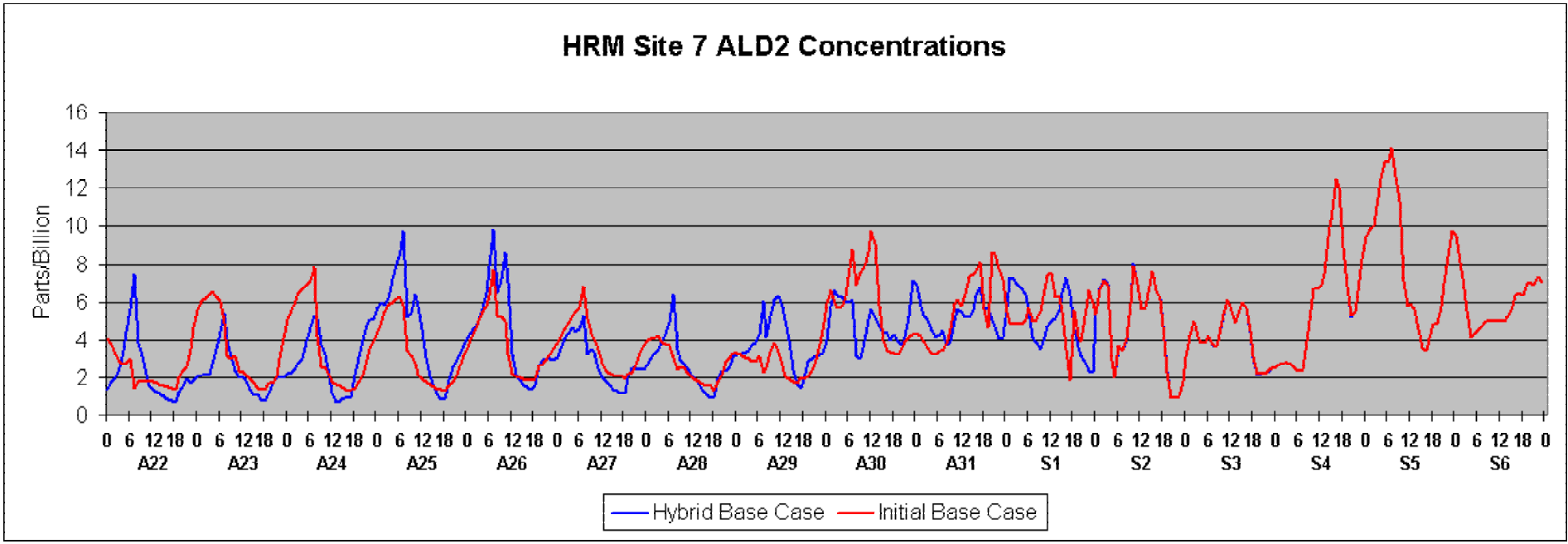
HRM Site 7 TOL Concentrations

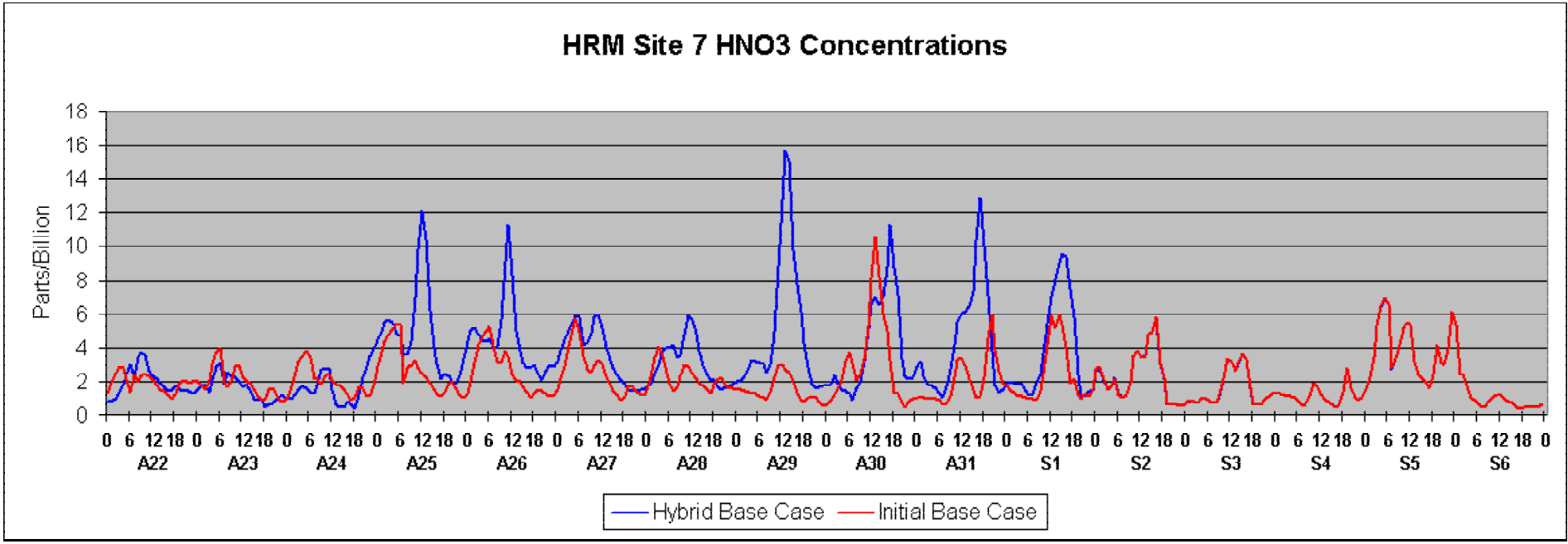


HRM Site 7 XYL Concentrations



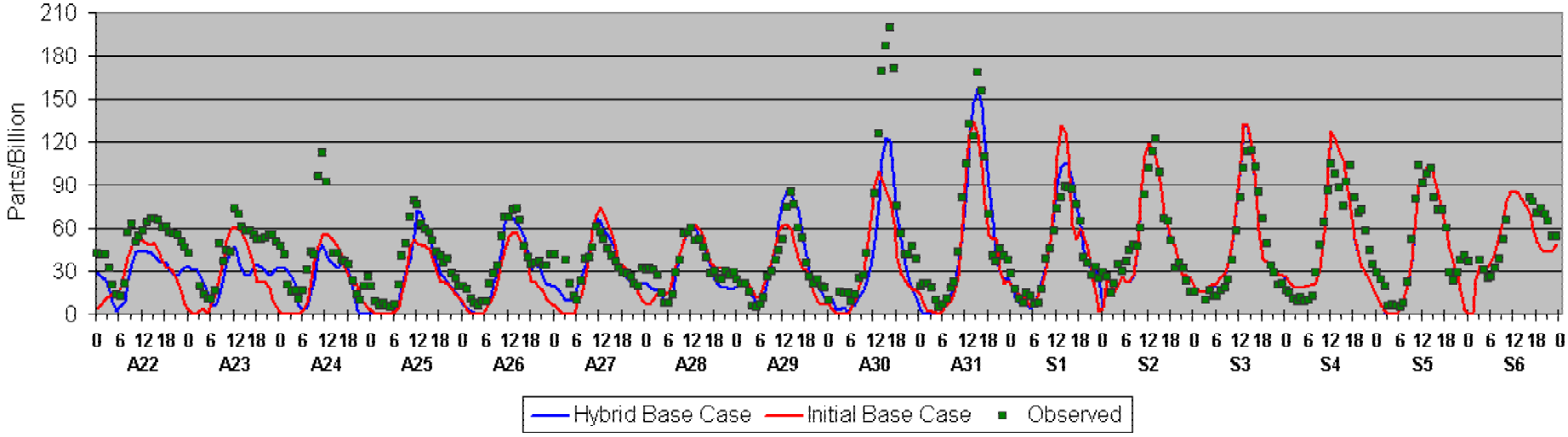

HRM Site 7 HCHO Concentrations
Parts/Billion
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


HRM Site 7 ALD2 Concentrations
Parts/Billion
16
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

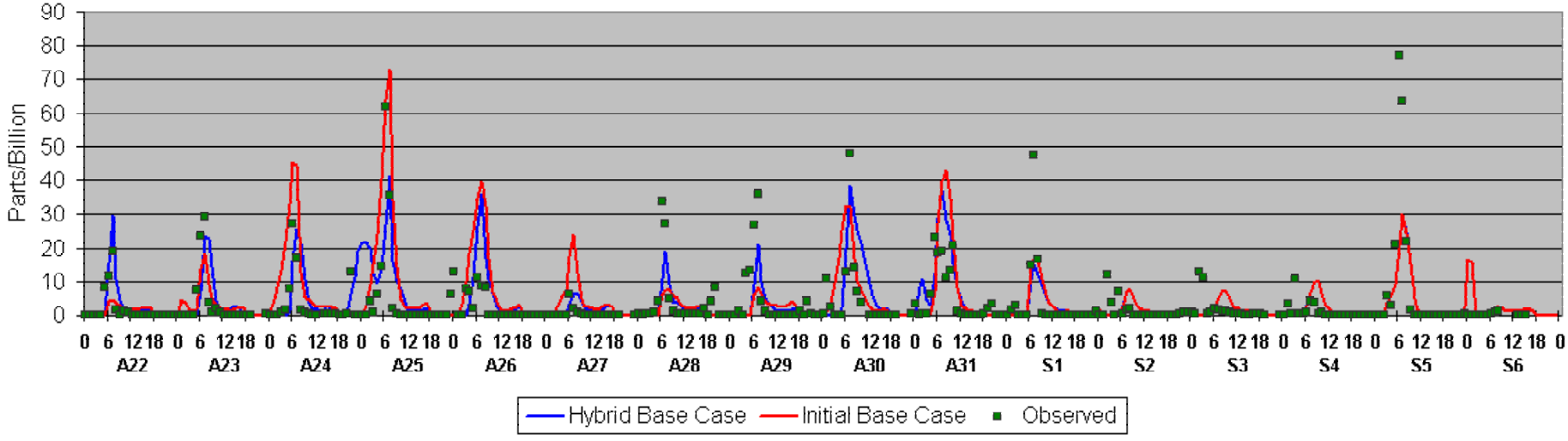

HRM Site 7 HNO3 Concentrations
Parts/Billion
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

HRM Site 8 Time Series

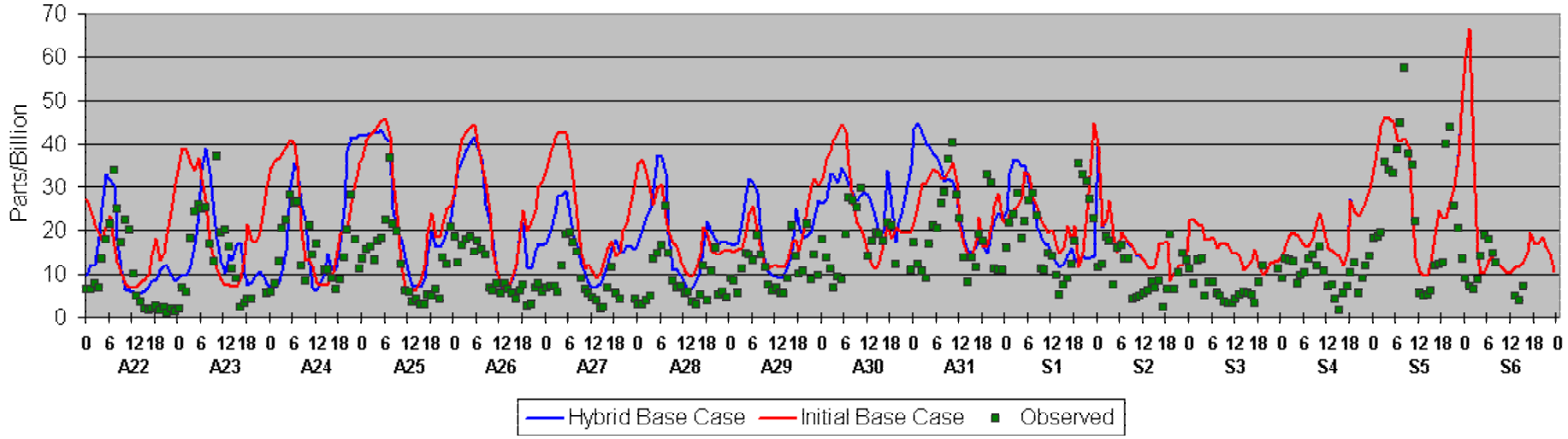
HRM Site 8 Ozone Concentrations



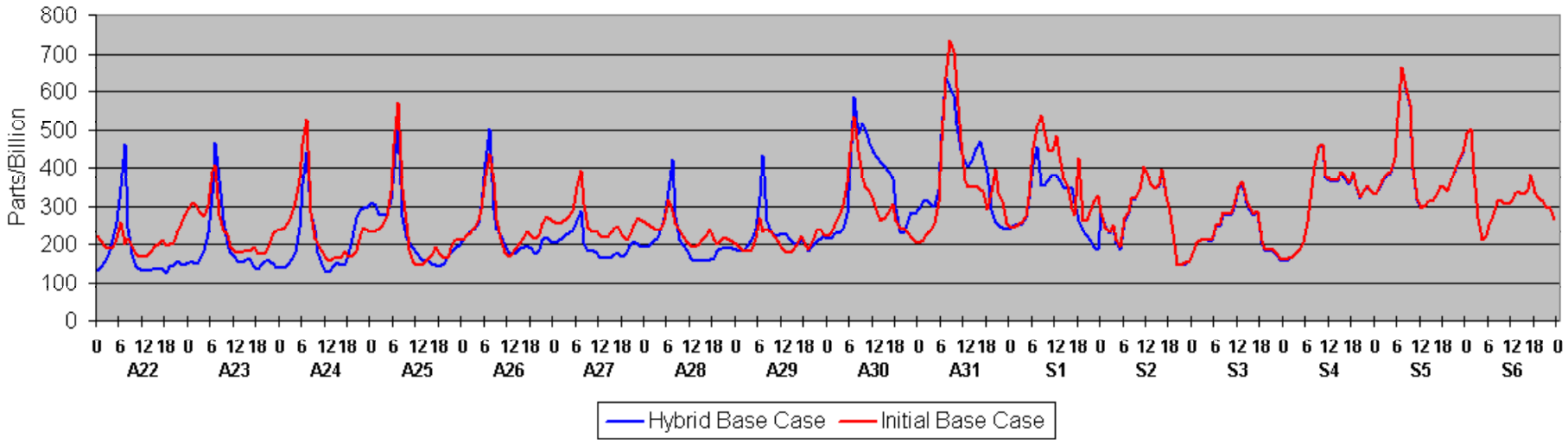
HRM Site 8 NO Concentrations



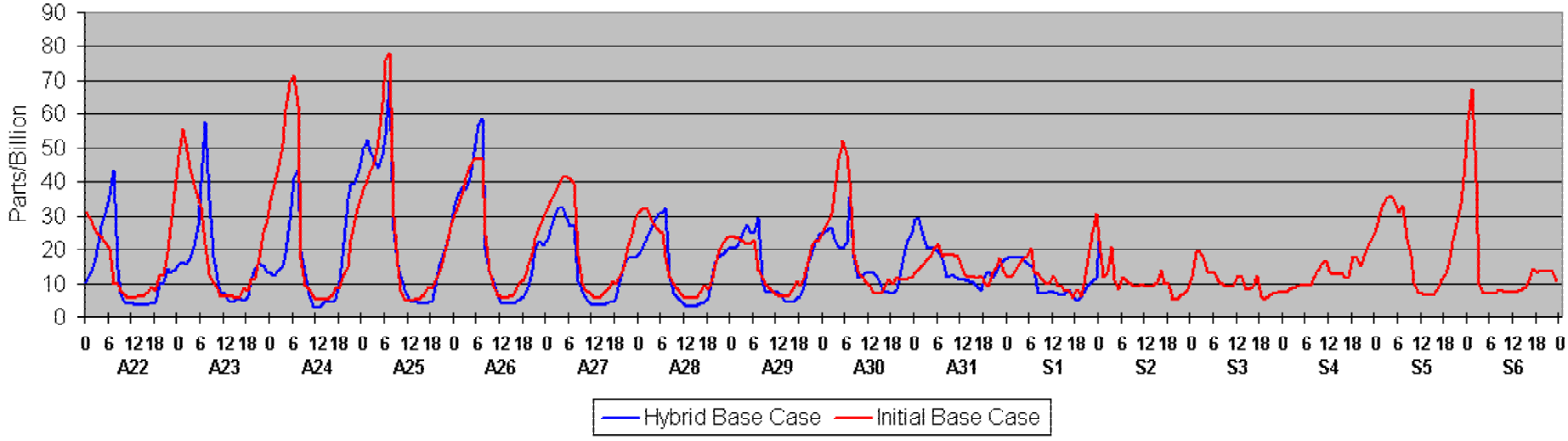
HRM Site 8 NO2 Concentrations



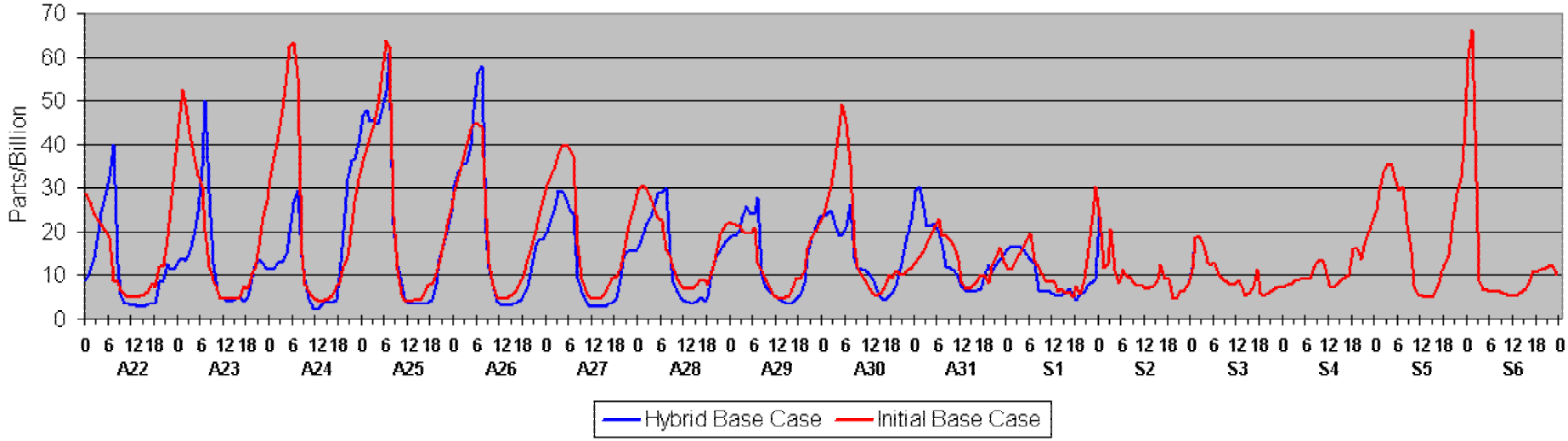
HRM Site 8 CO Concentrations

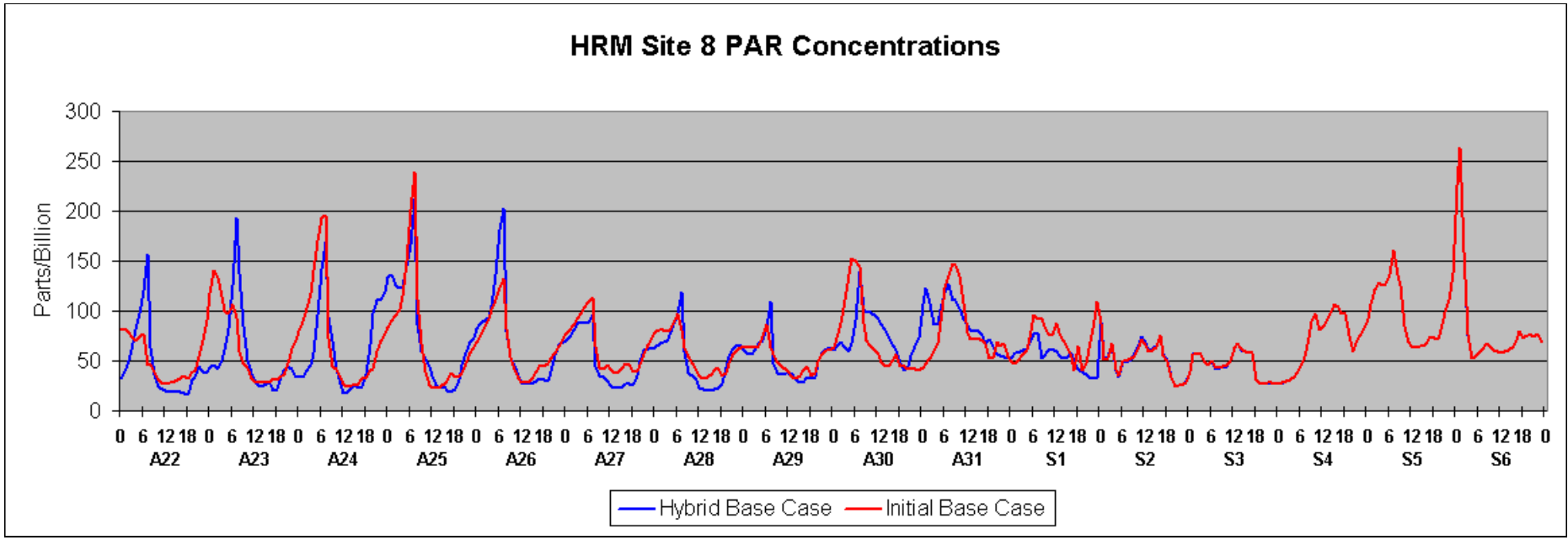


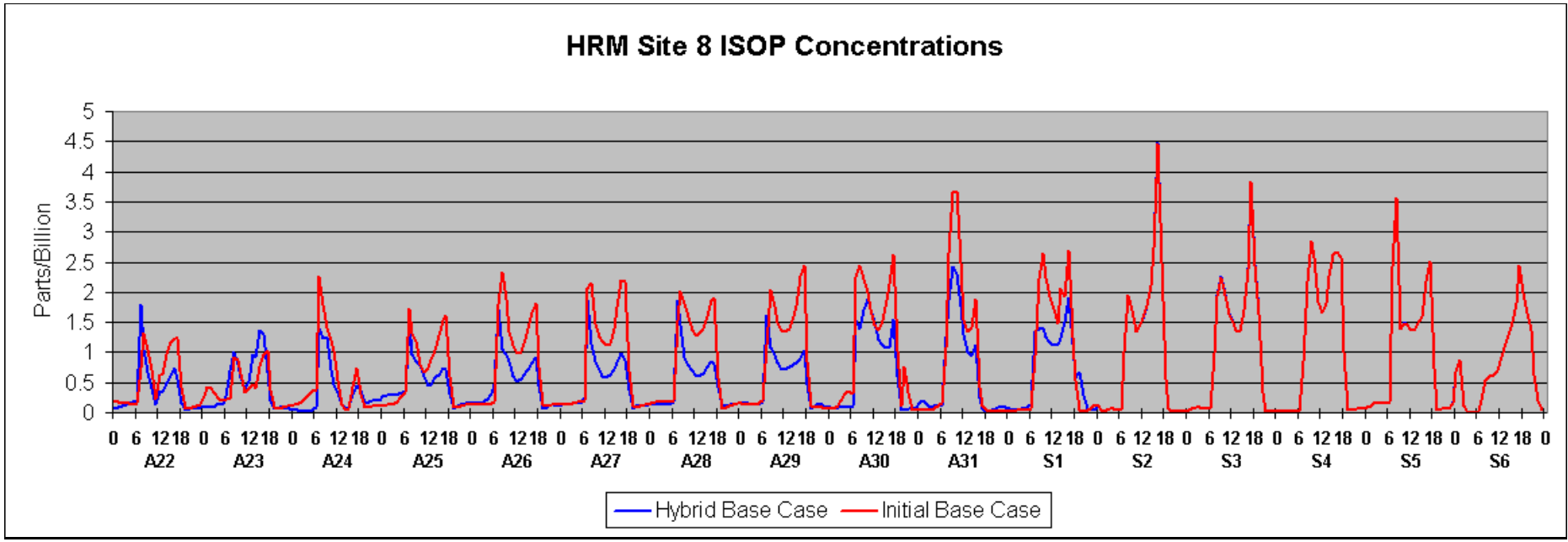
HRM Site 8 ETH Concentrations



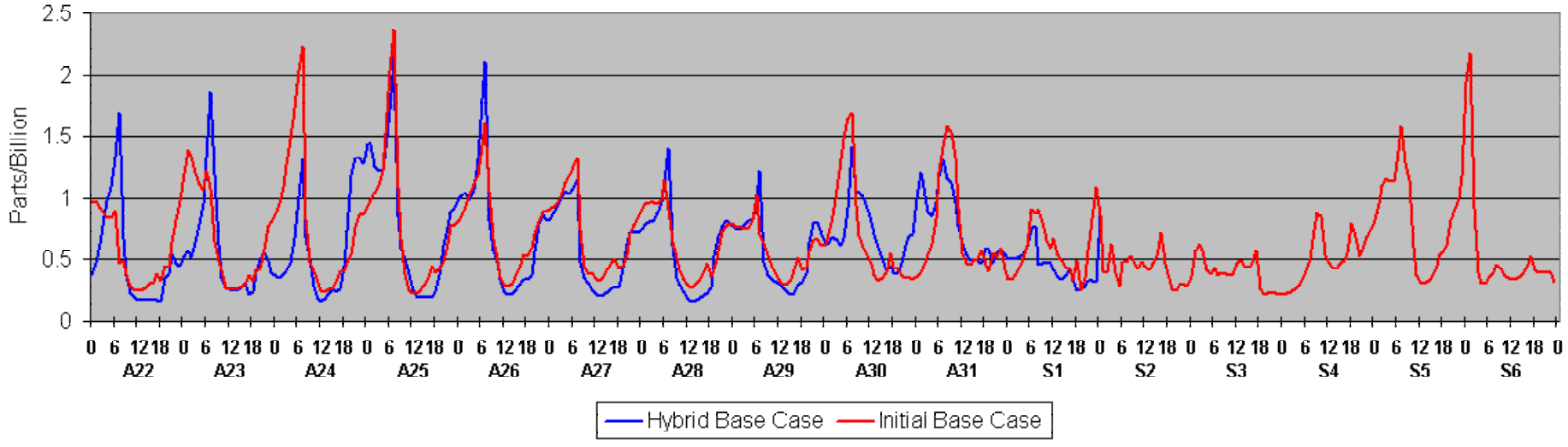
HRM Site 8 OLE Concentrations



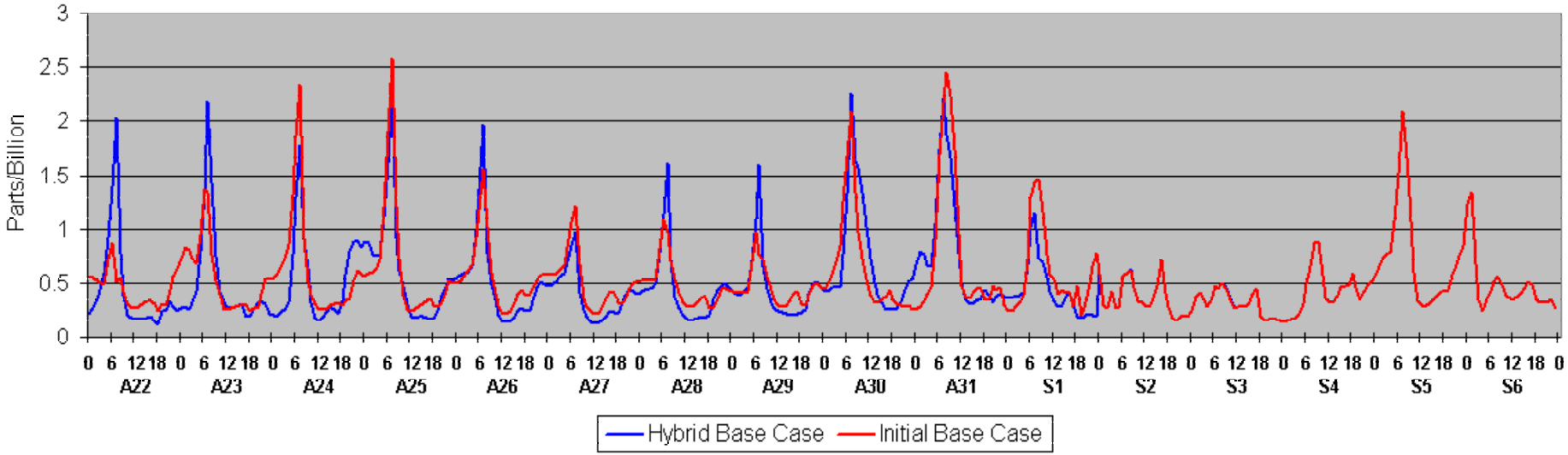

HRM Site 8 PAR Concentrations
Parts/Billion
300
250
200
150
100
50
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


HRM Site 8 ISOP Concentrations
Parts/Billion
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

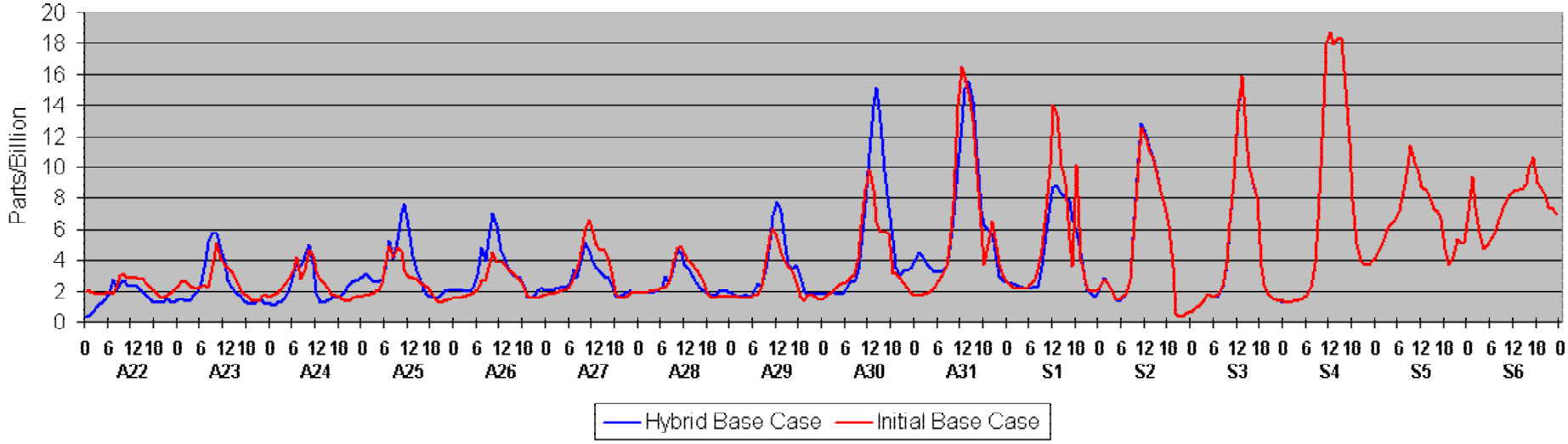
HRM Site 8 TOL Concentrations



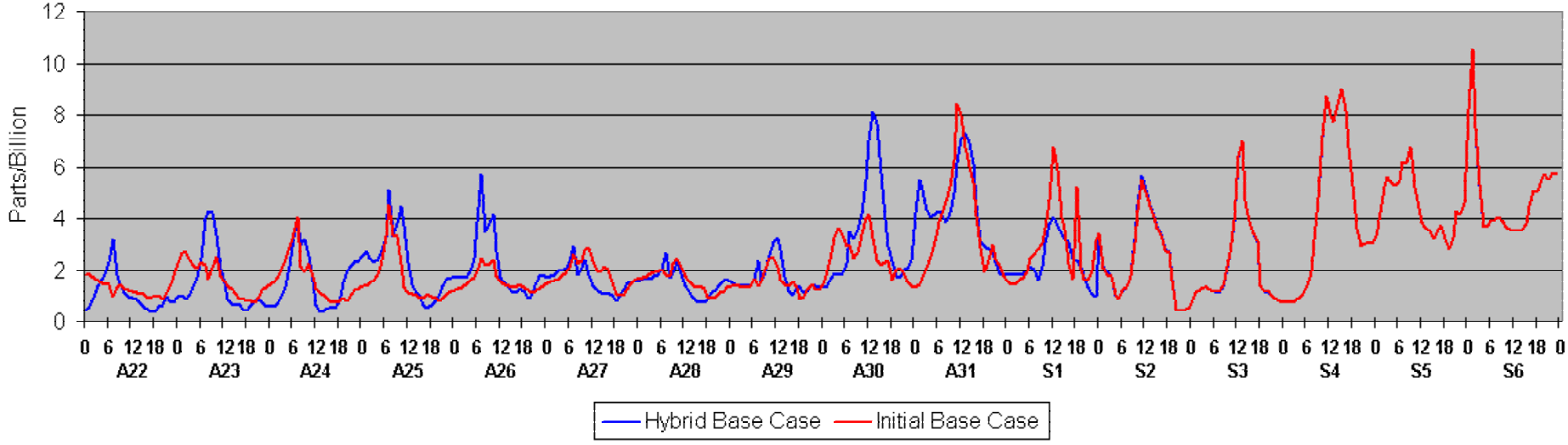
HRM Site 8 XYL Concentrations

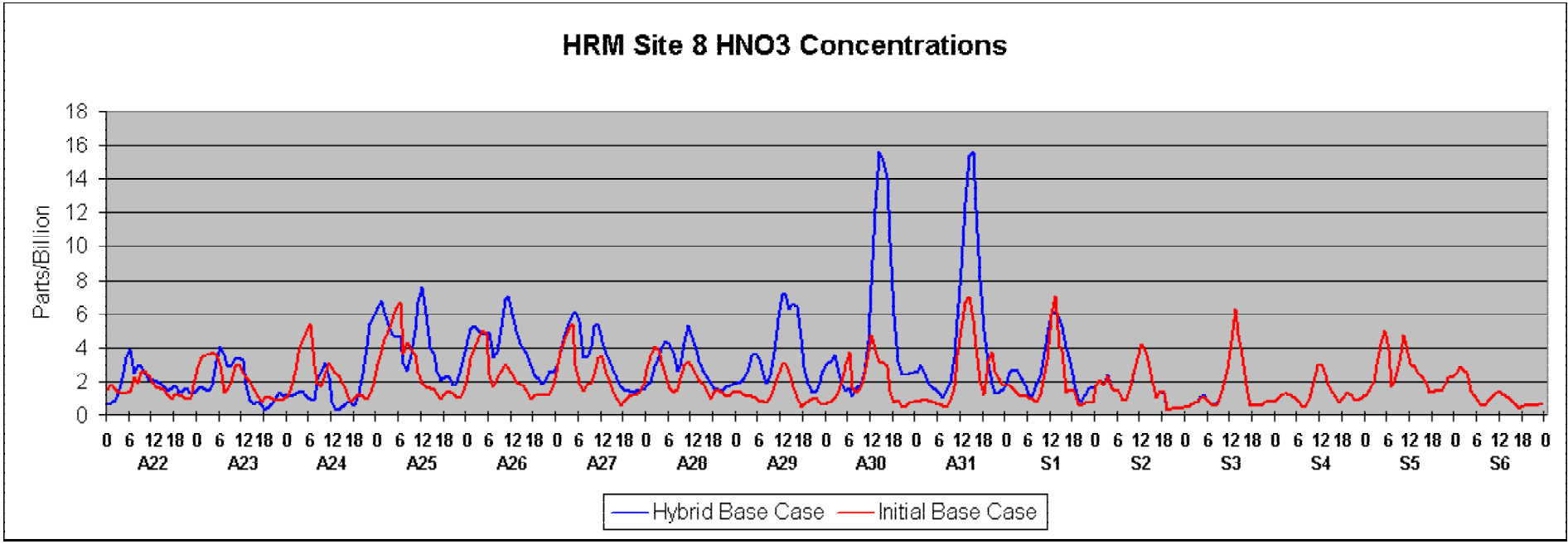


HRM Site 8 HCHO Concentrations

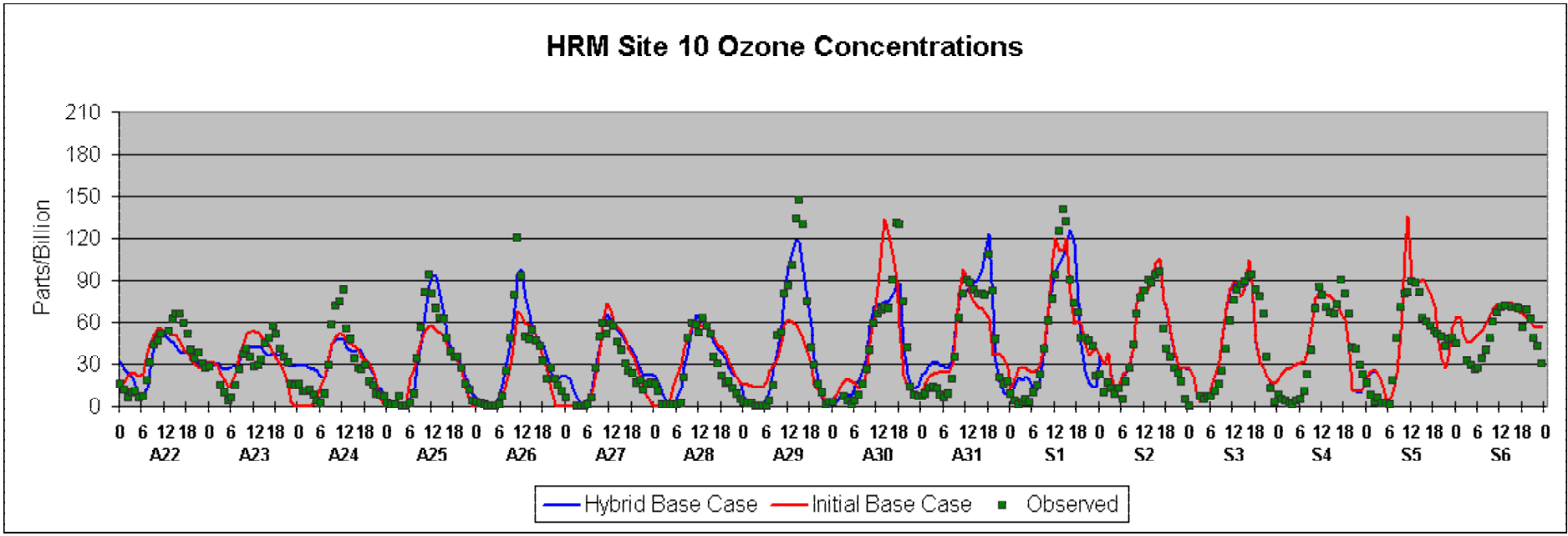


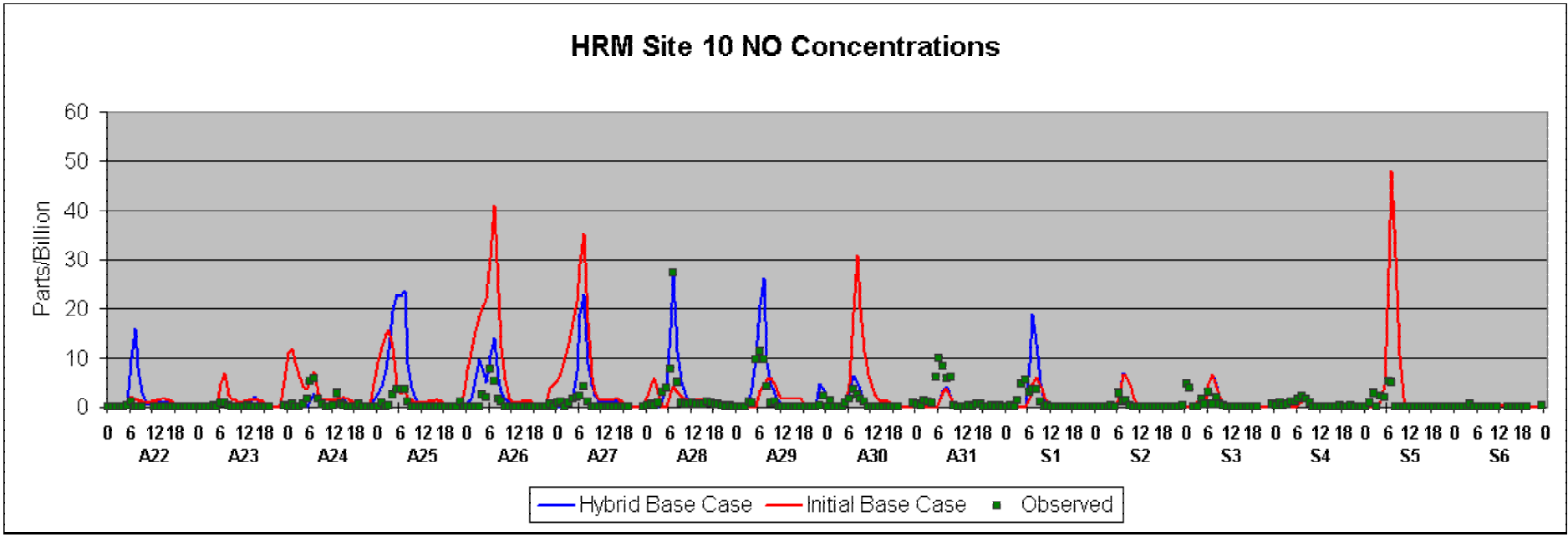
HRM Site 8 ALD2 Concentrations

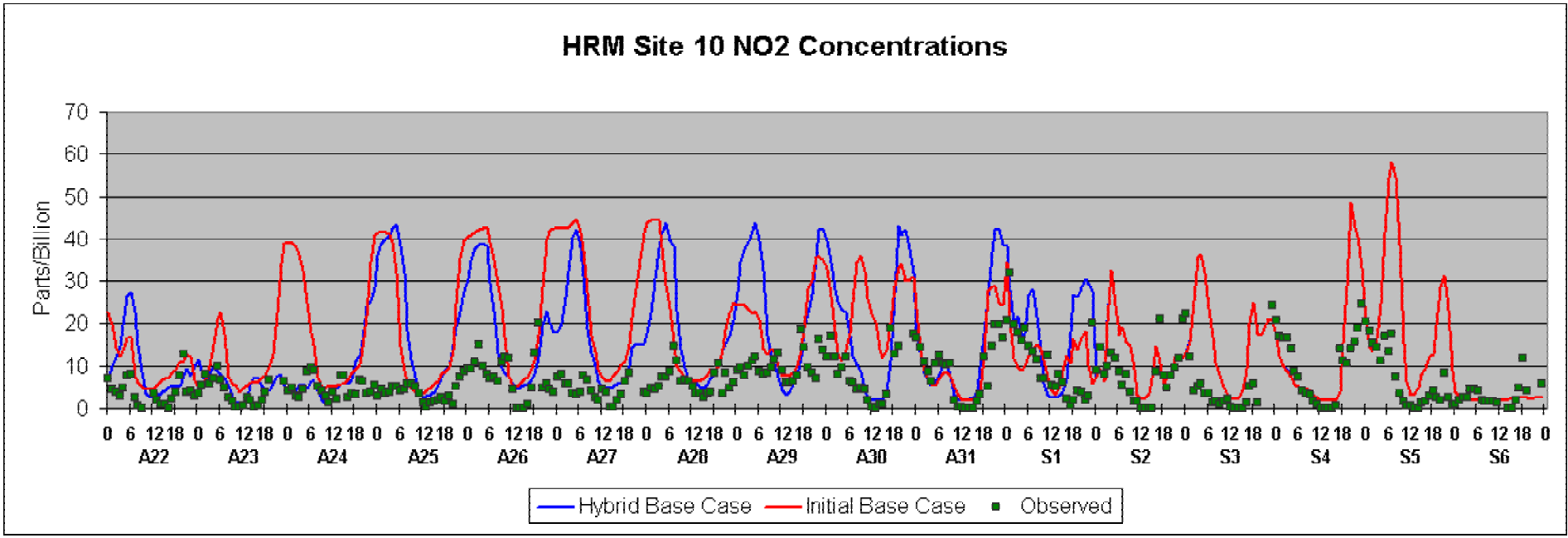


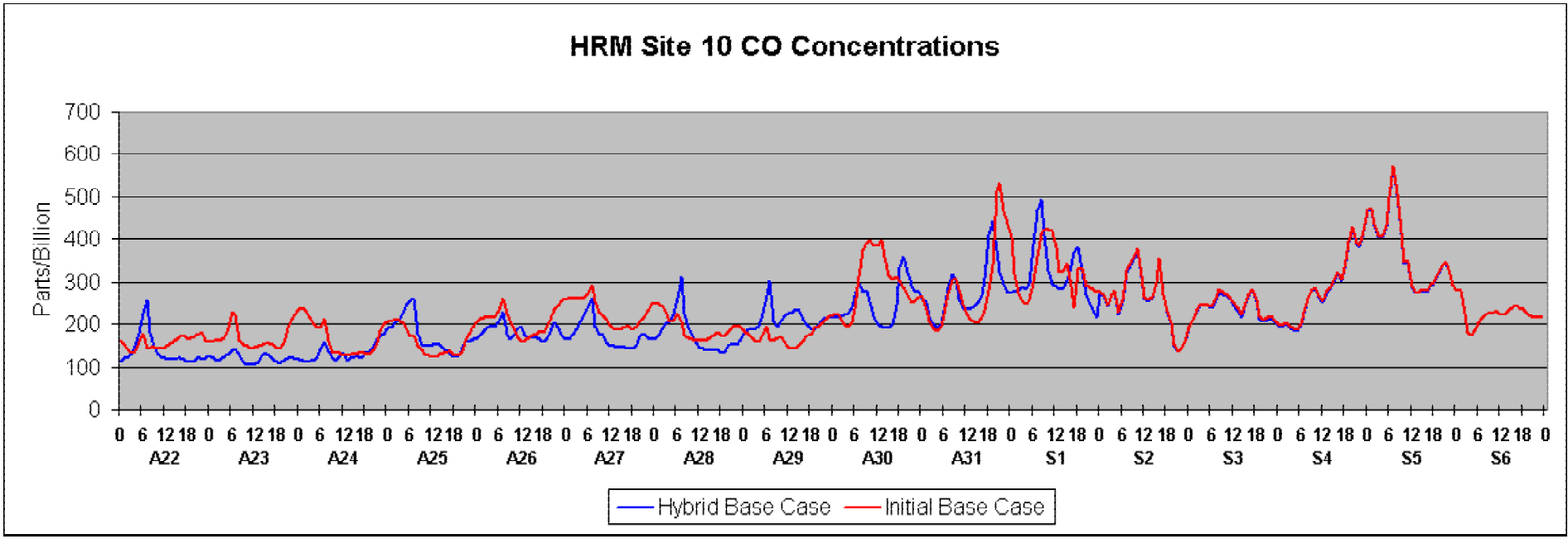

HRM Site 8 HNO3 Concentrations
Parts/Billion
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

HRM Site 10 Time Series

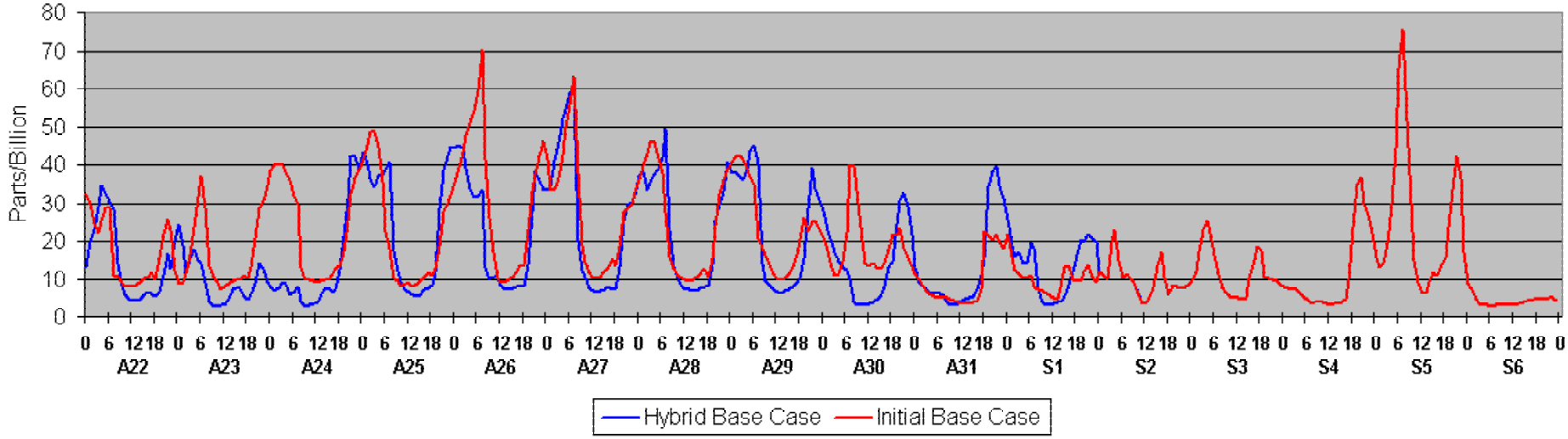

HRM Site 10 Ozone Concentrations
Parts/Billion
210
180
150
120
90
60
30
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


HRM Site 10 NO Concentrations
Parts/Billion
60
50
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

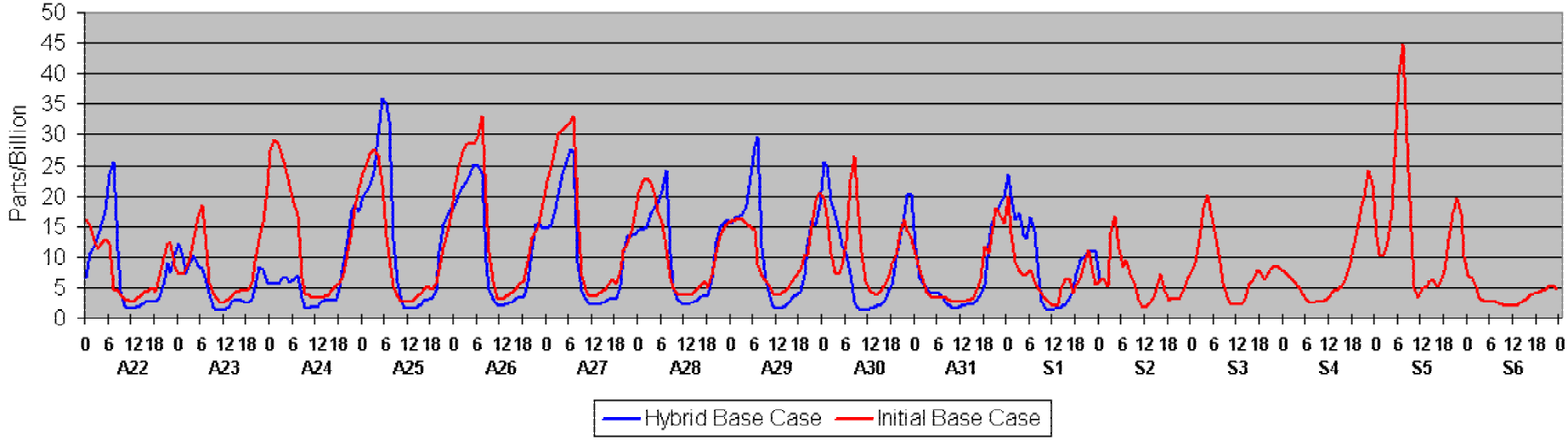

HRM Site 10 NO2 Concentrations
Parts/Billion
70
60
50
40
30
20
10
0
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


HRM Site 10 CO Concentrations
Parts/Billion
700
600
500
400
300
200
100
0
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

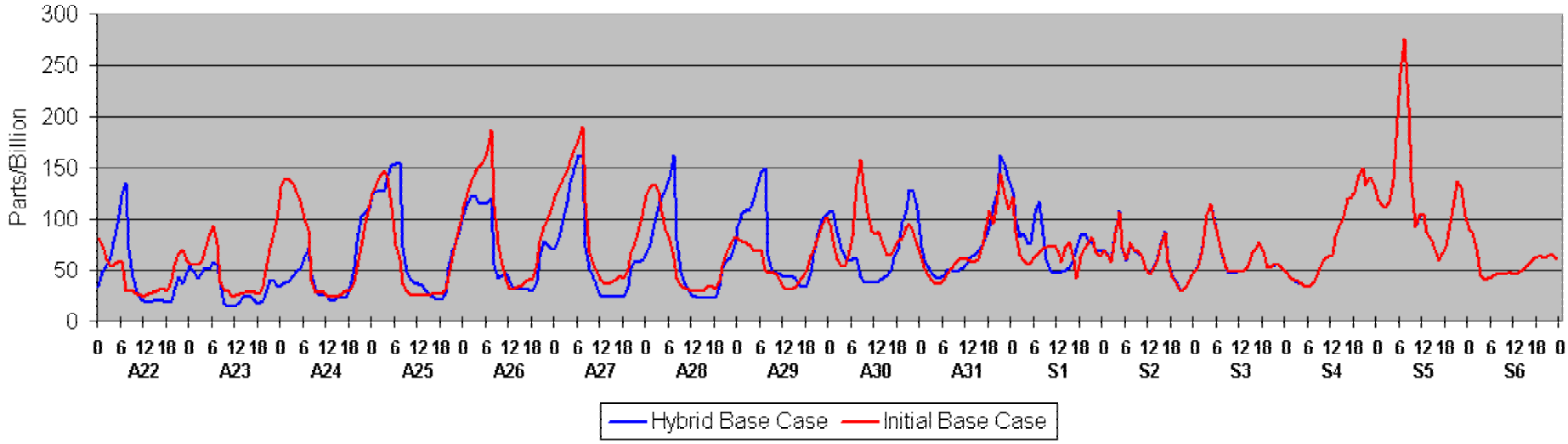
HRM Site 10 ETH Concentrations



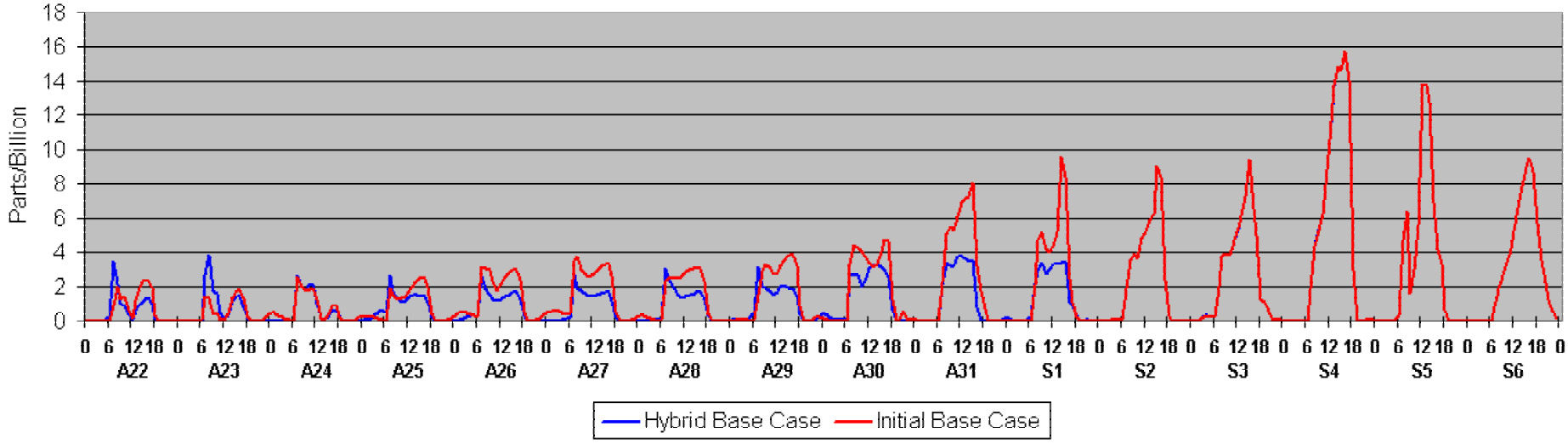
HRM Site 10 OLE Concentrations

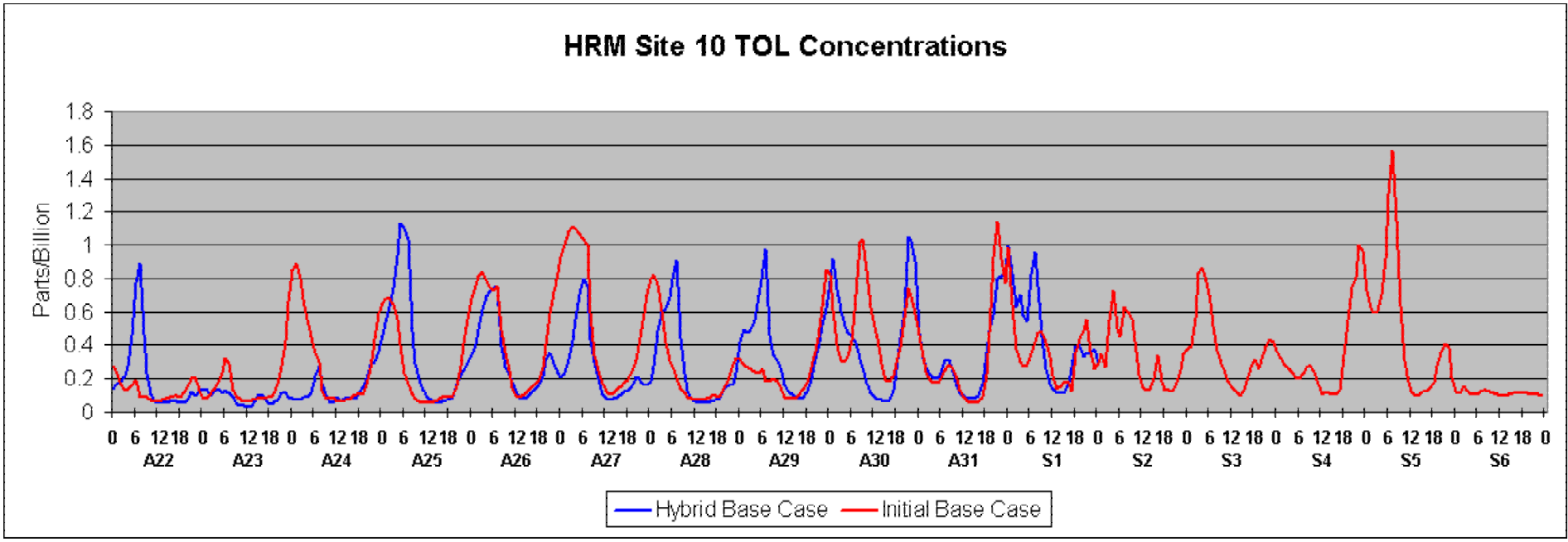


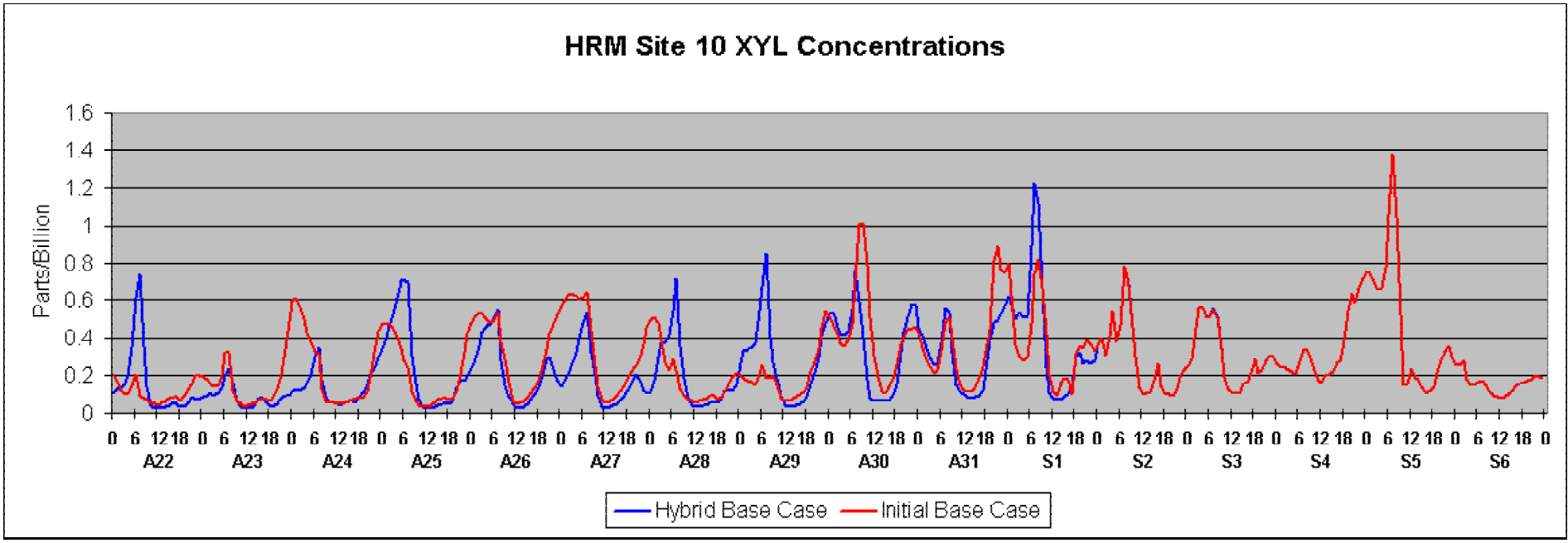
HRM Site 10 PAR Concentrations

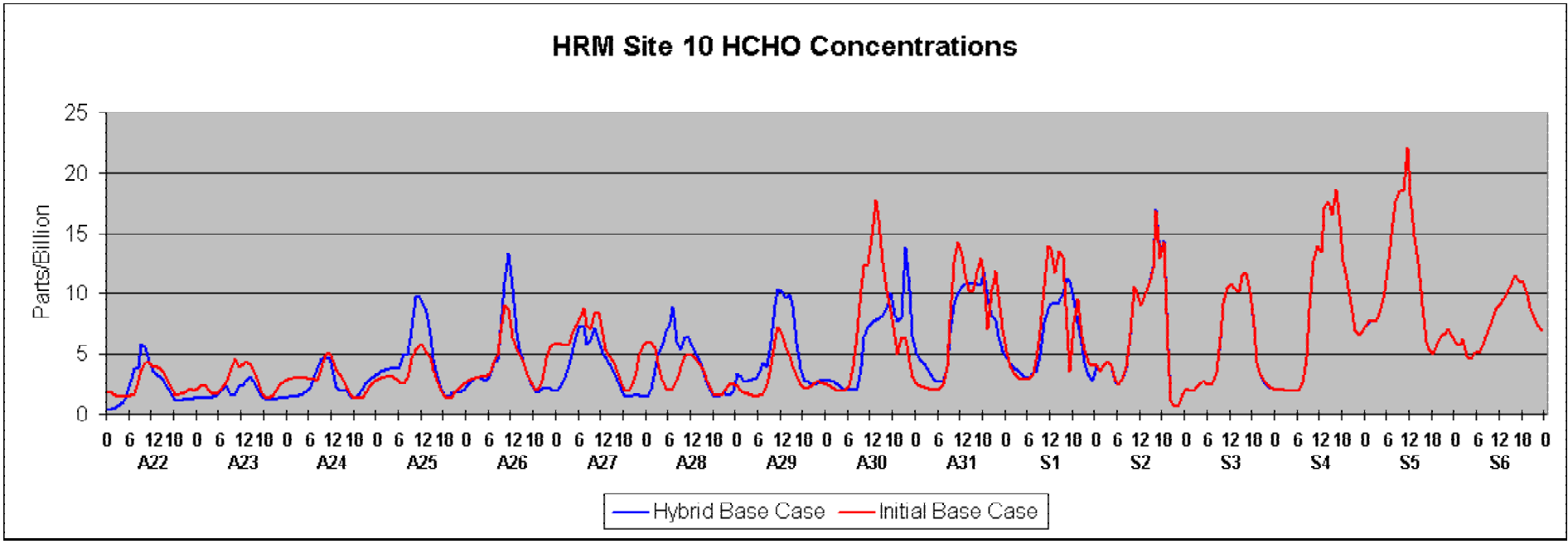


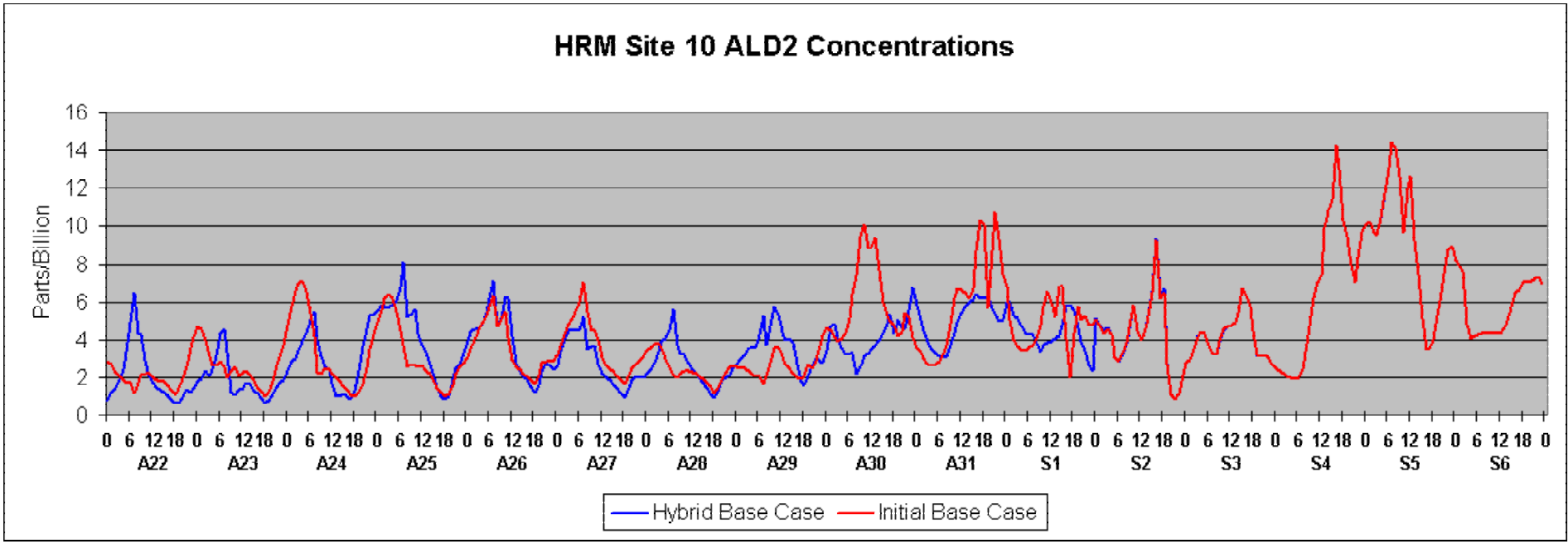
HRM Site 10 ISOP Concentrations

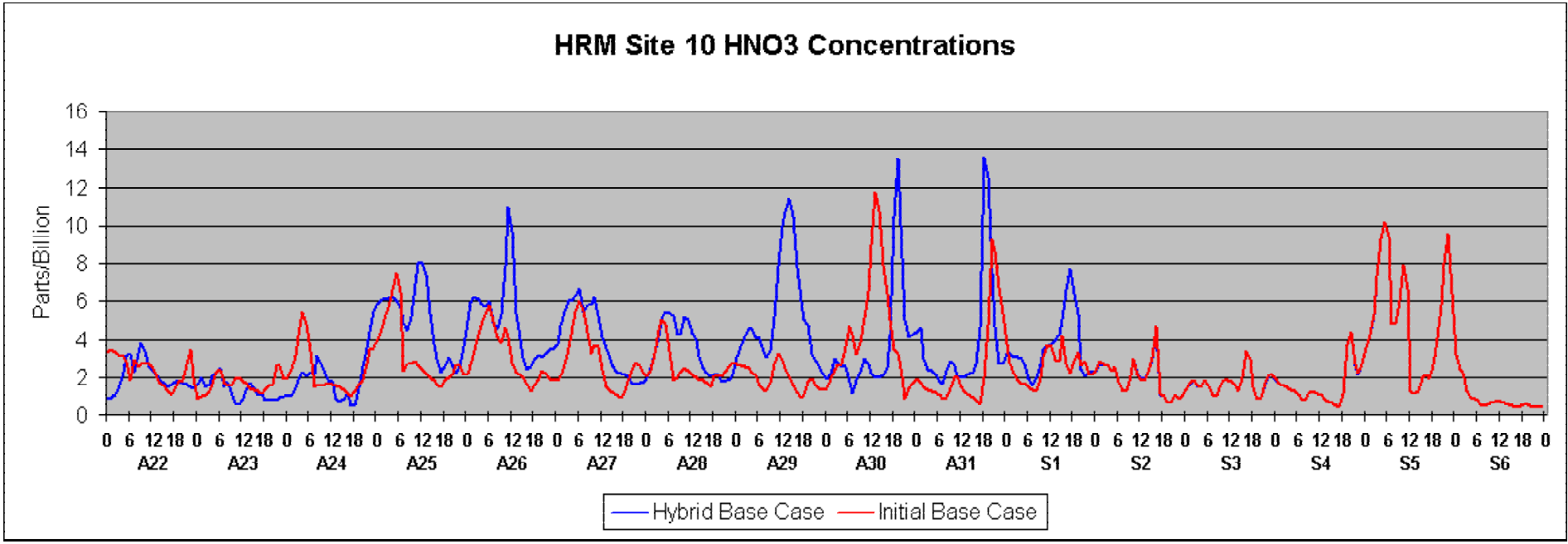



HRM Site 10 TOL Concentrations
Parts/Billion
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


HRM Site 10 XYL Concentrations
Parts/Billion
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

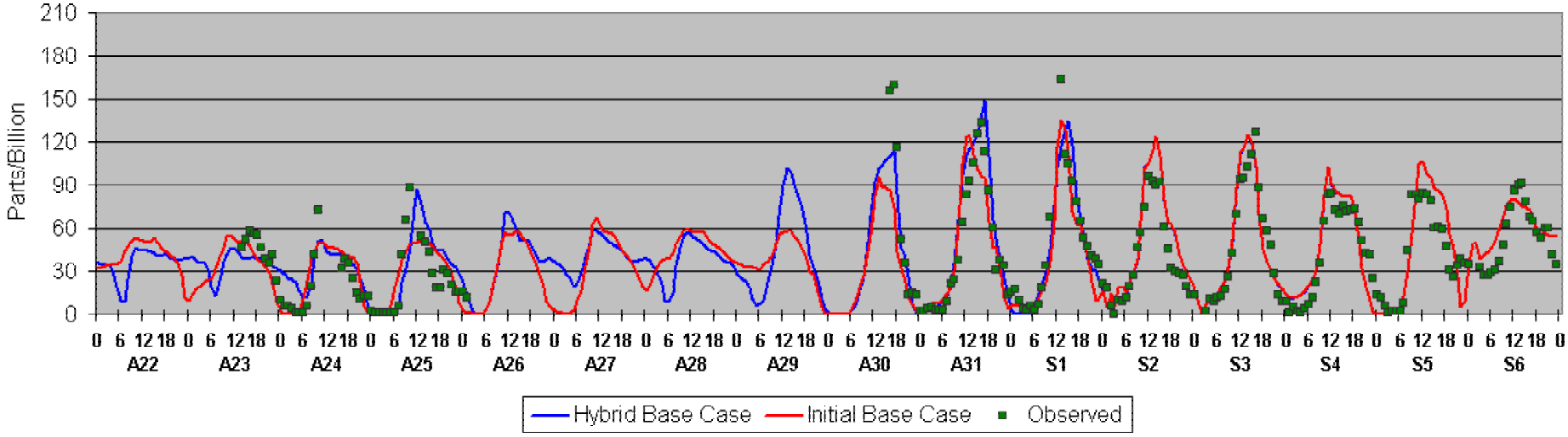

HRM Site 10 HCHO Concentrations
Parts/Billion
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


HRM Site 10 ALD2 Concentrations
Parts/Billion
16
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

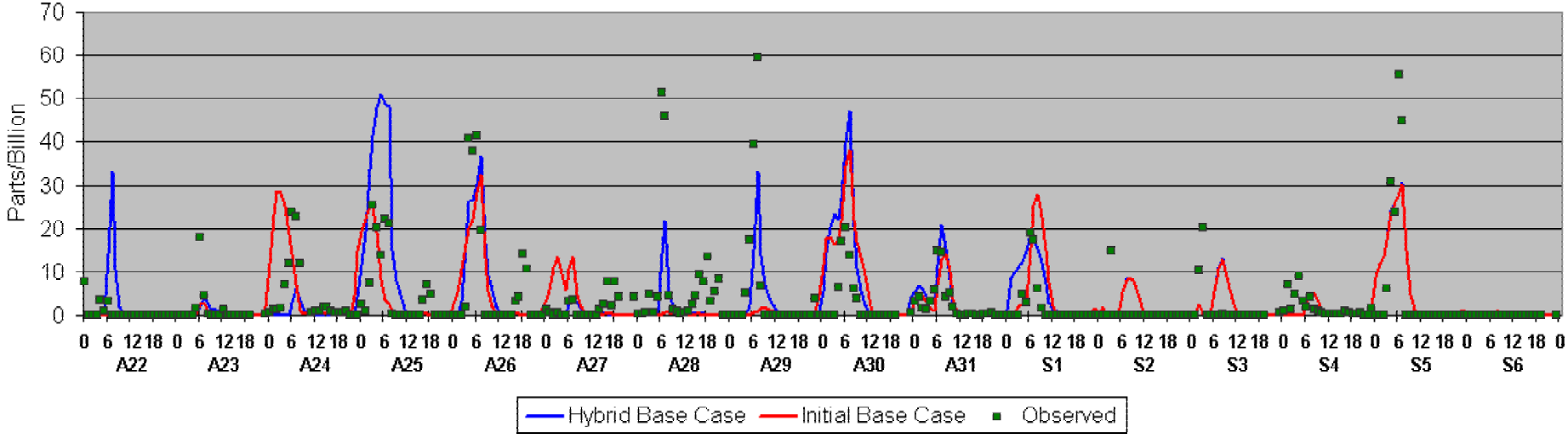

HRM Site 10 HNO3 Concentrations
Parts/Billion
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

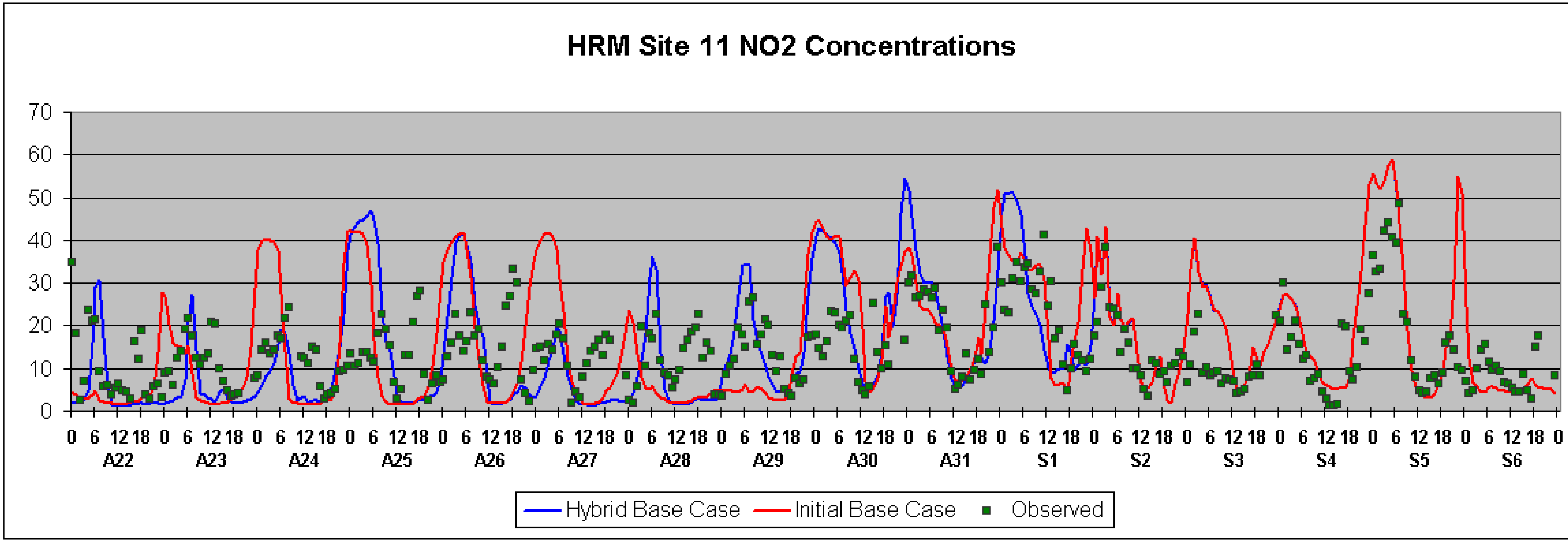
HRM Site 11 Time Series

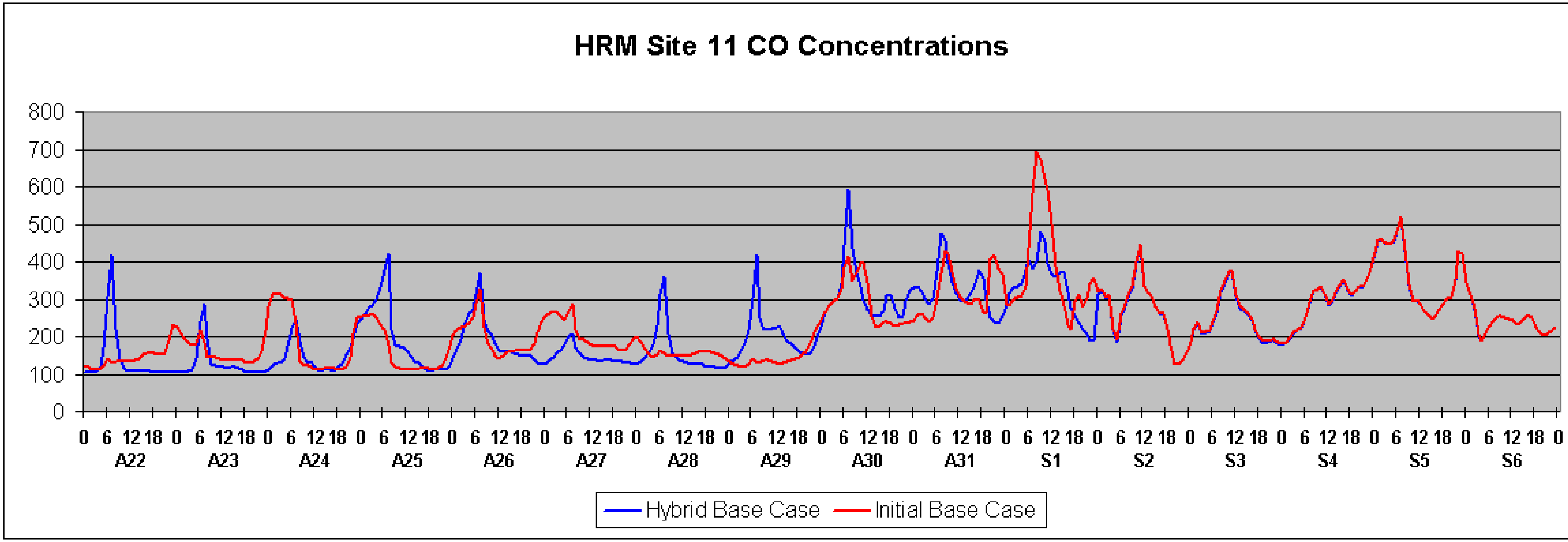
HRM Site 11 Ozone Concentrations



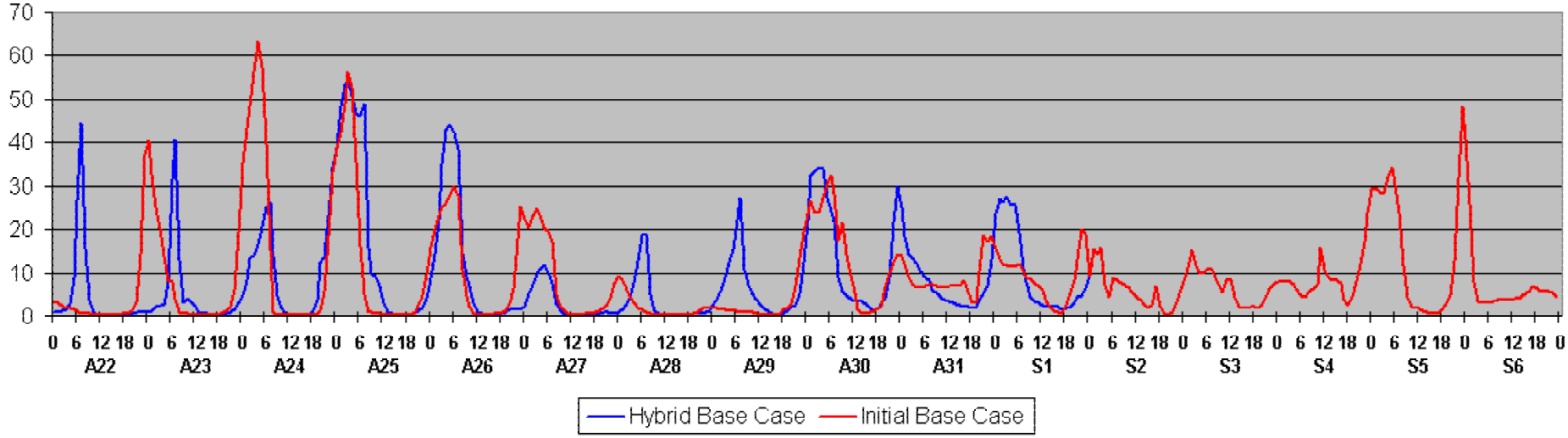
HRM Site 11 NO Concentrations



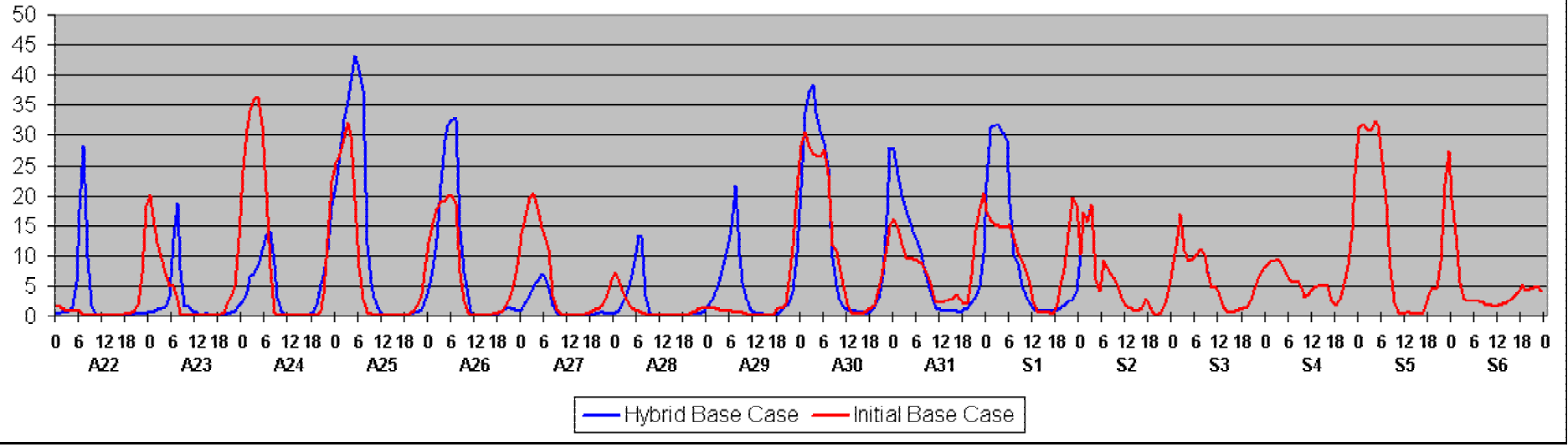

HRM Site 11 NO2 Concentrations
70
60
50
40
30
20
10
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


HRM Site 11 CO Concentrations
800
700
600
500
400
300
200
100
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

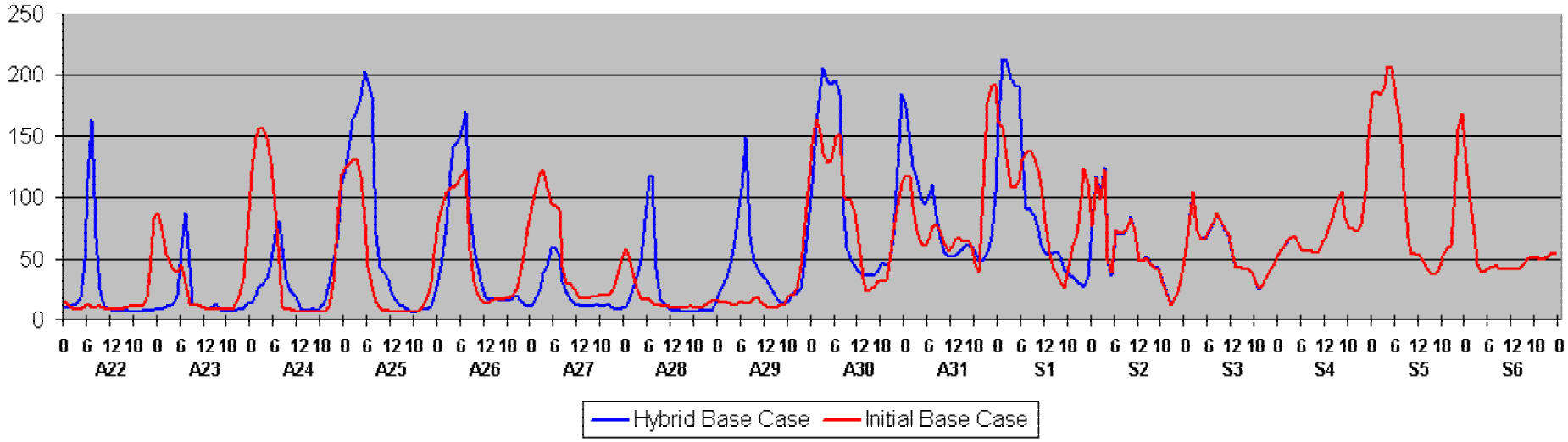
HRM Site 11 ETH Concentrations



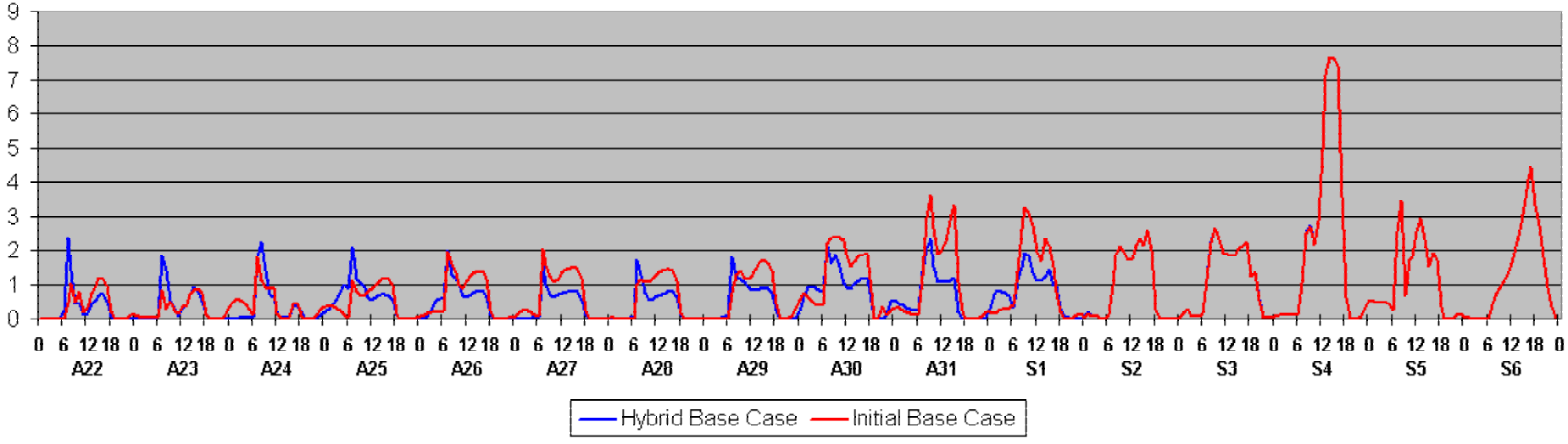
HRM Site 11 OLE Concentrations

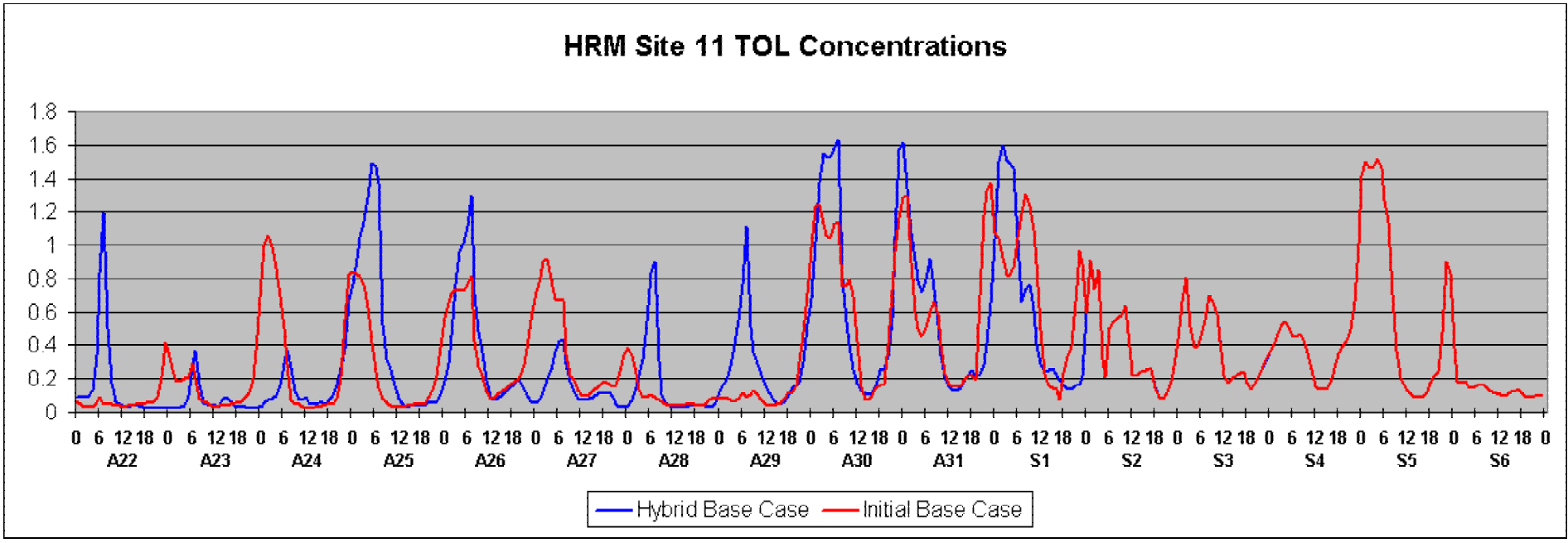


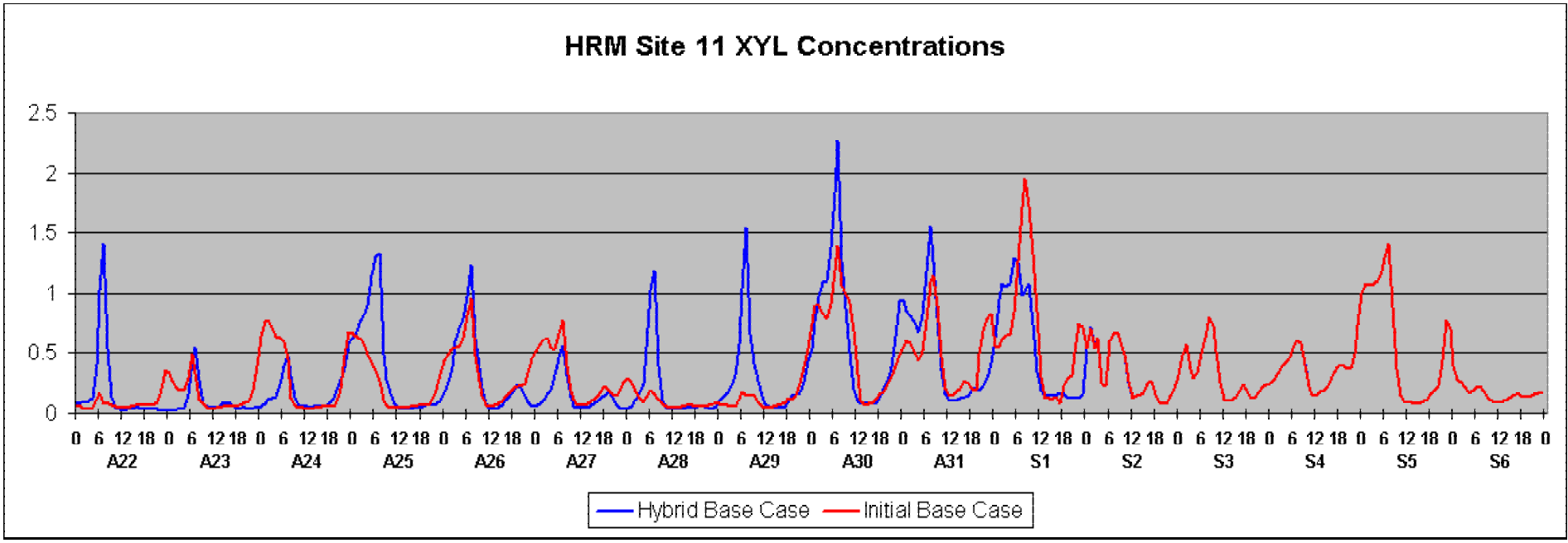
HRM Site 11 PAR Concentrations



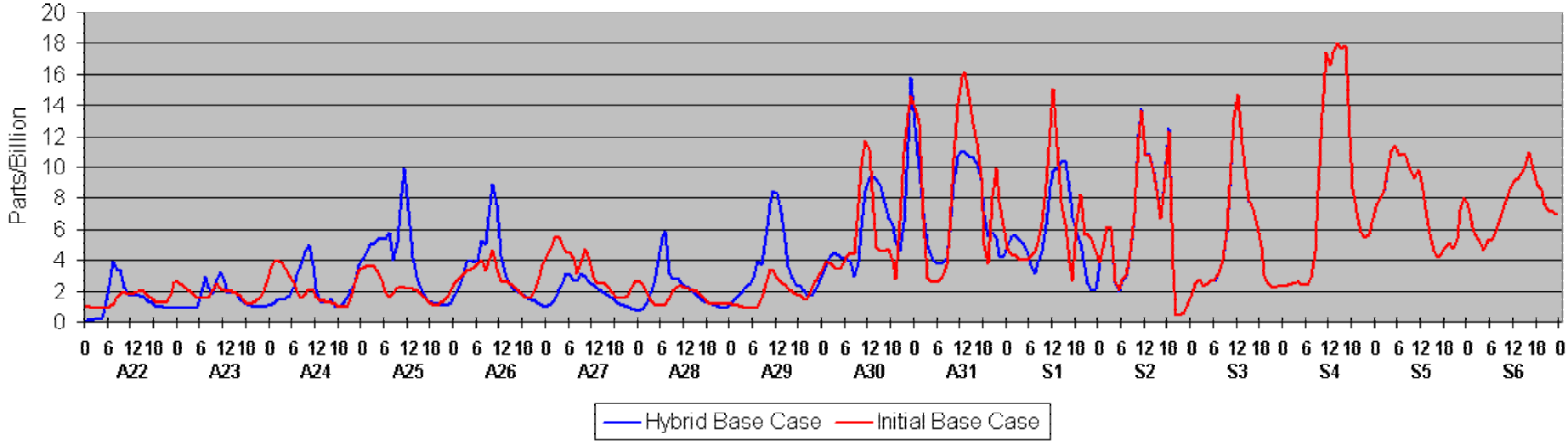
HRM Site 11 ISOP Concentrations



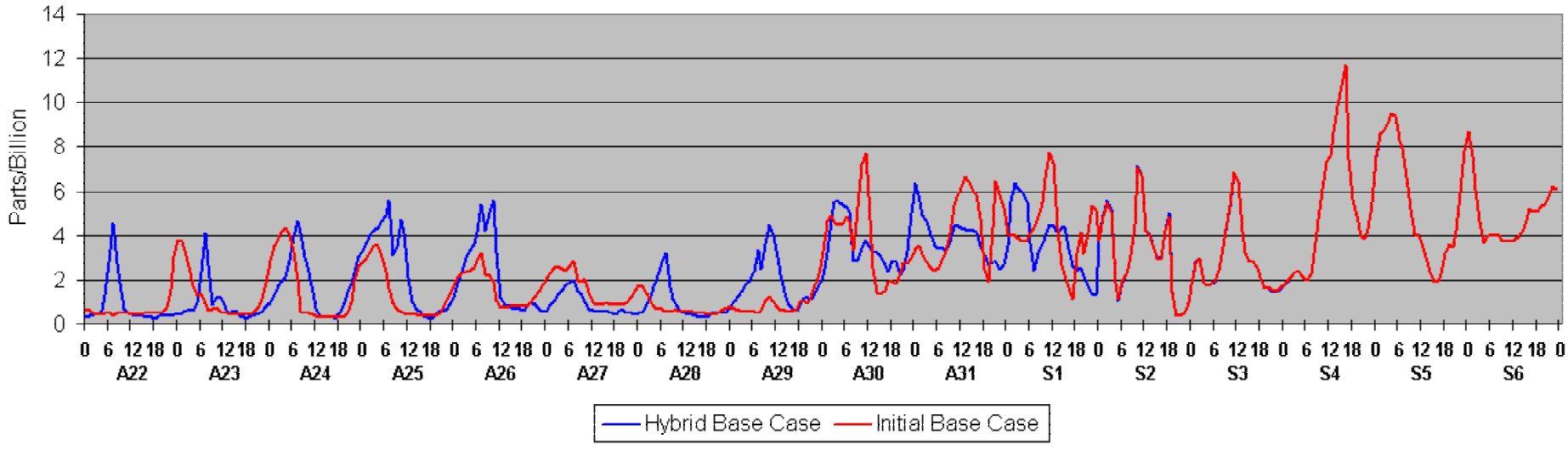

HRM Site 11 TOL Concentrations
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

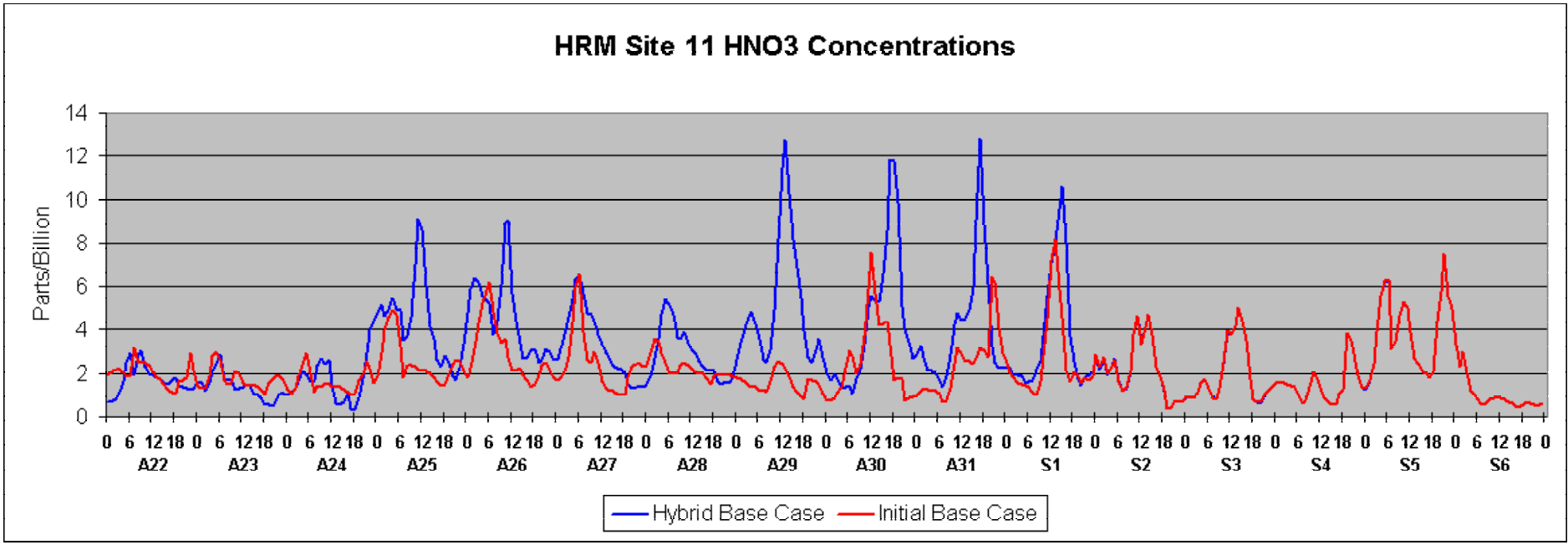

HRM Site 11 XYL Concentrations
2.5
2
1.5
1
0.5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

HRM Site 11 HCHO Concentrations



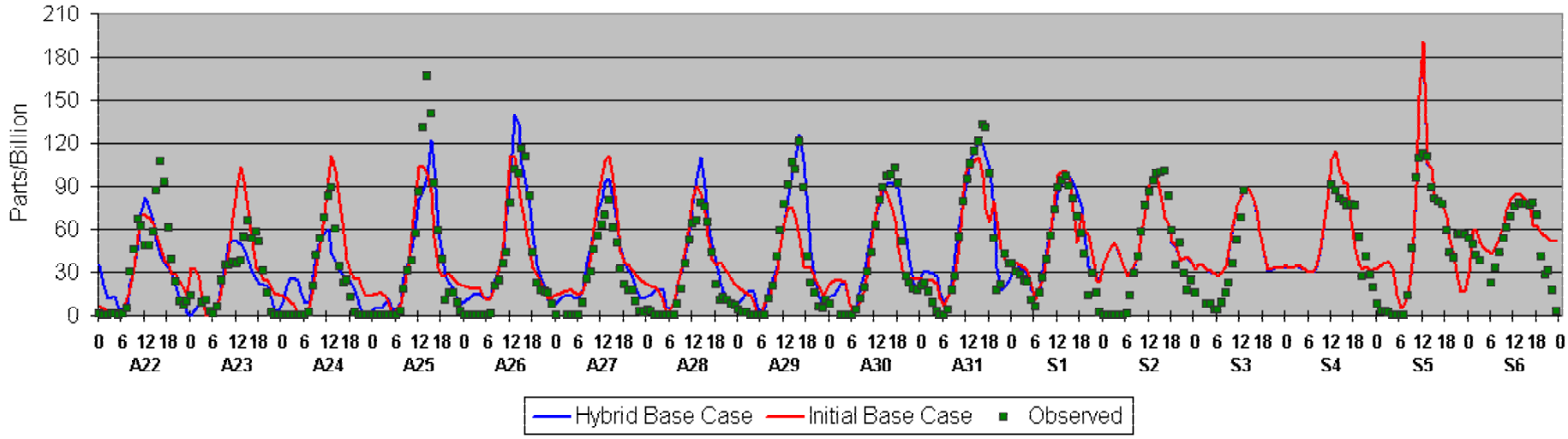
HRM Site 11 ALD2 Concentrations



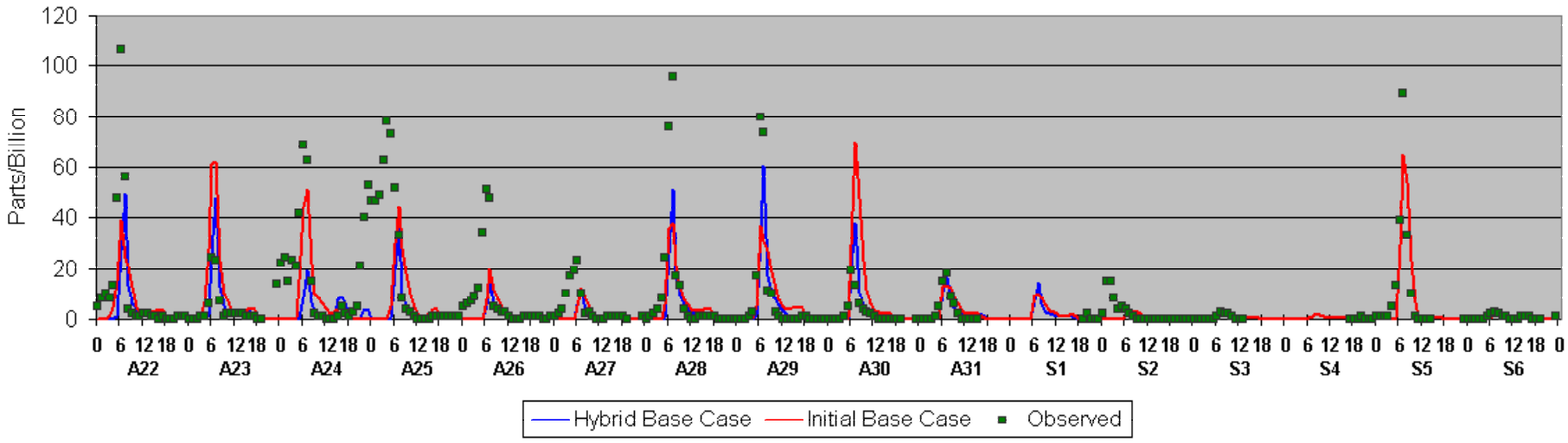

HRM Site 11 HNO3 Concentrations
Parts/Billion
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Aldine Time Series

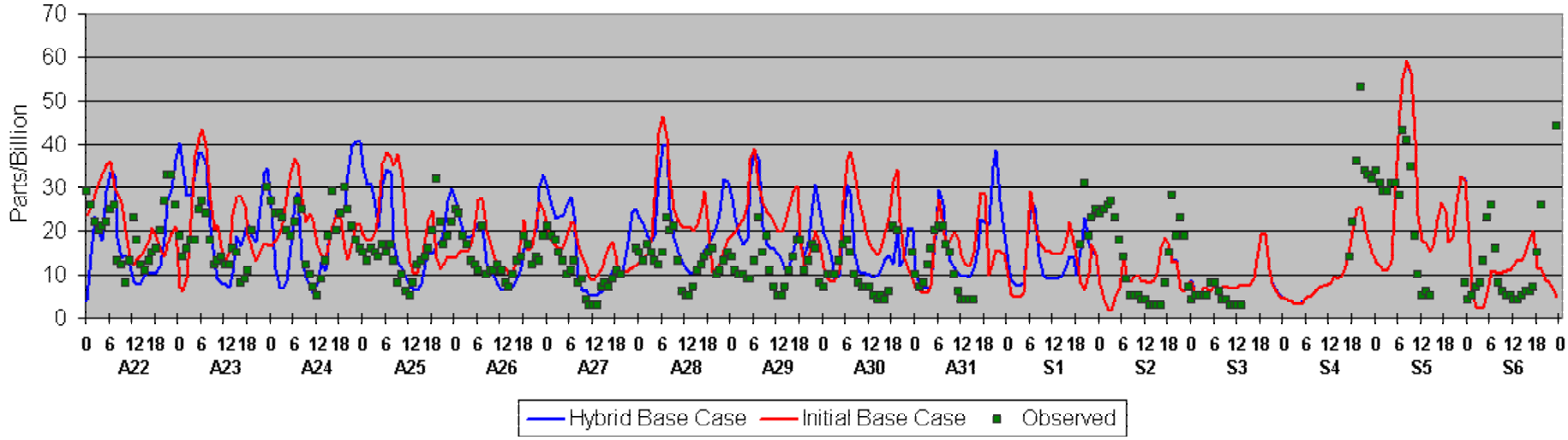
Aldine Ozone Concentrations



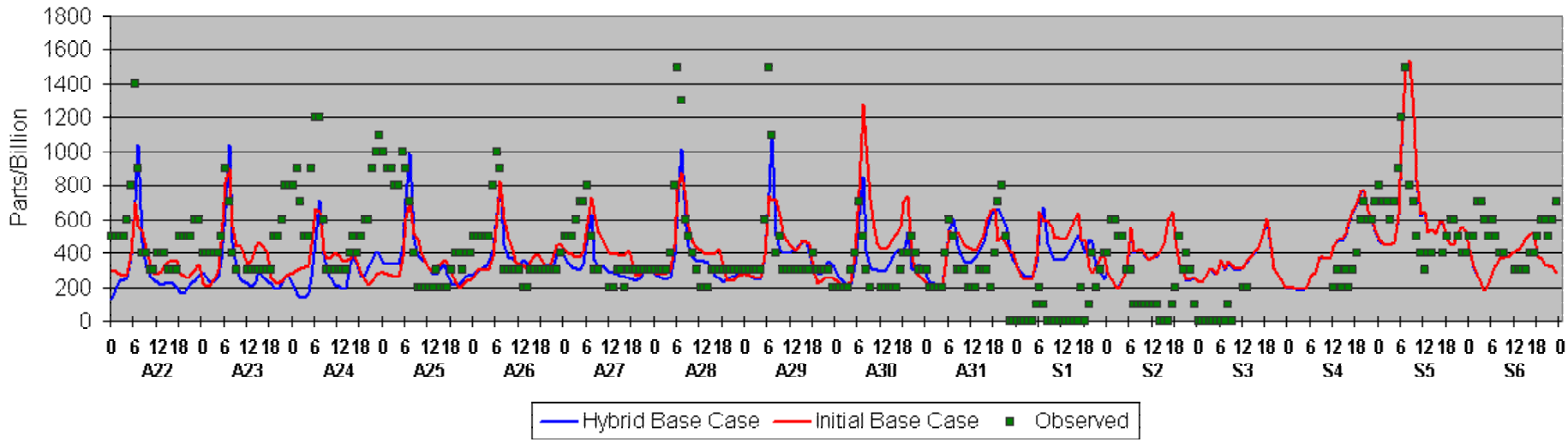
Aldine NO Concentrations



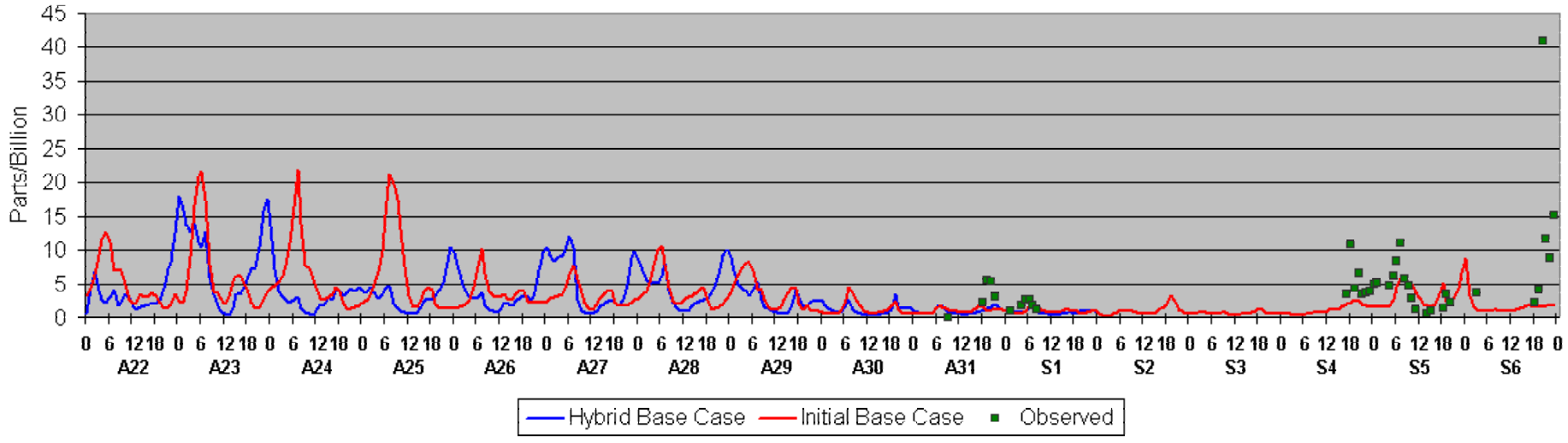
Aldine NO2 Concentrations



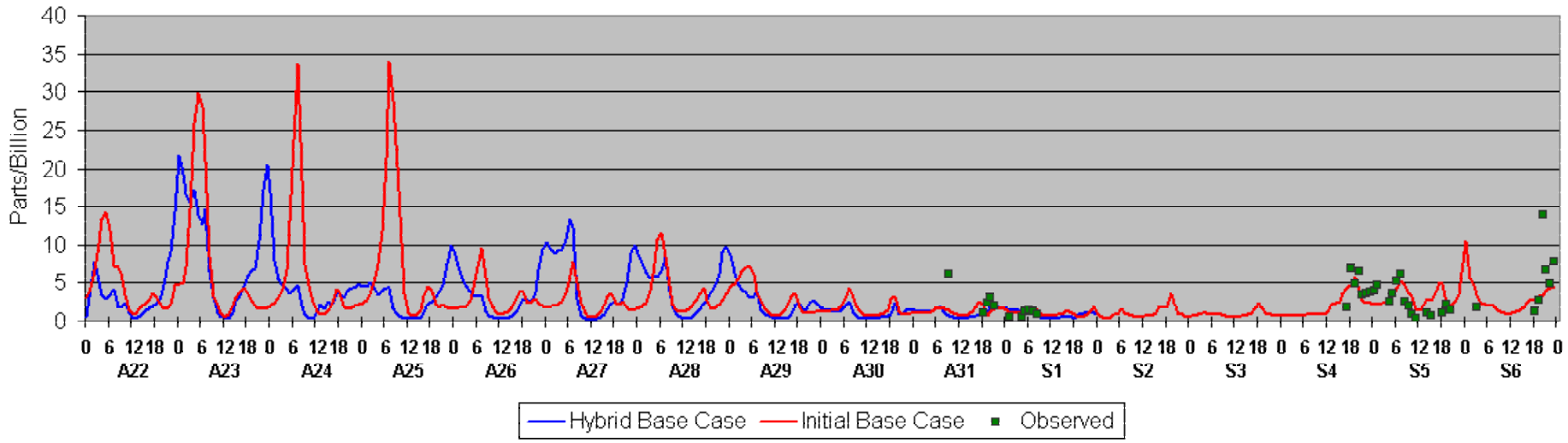
Aldine CO Concentrations



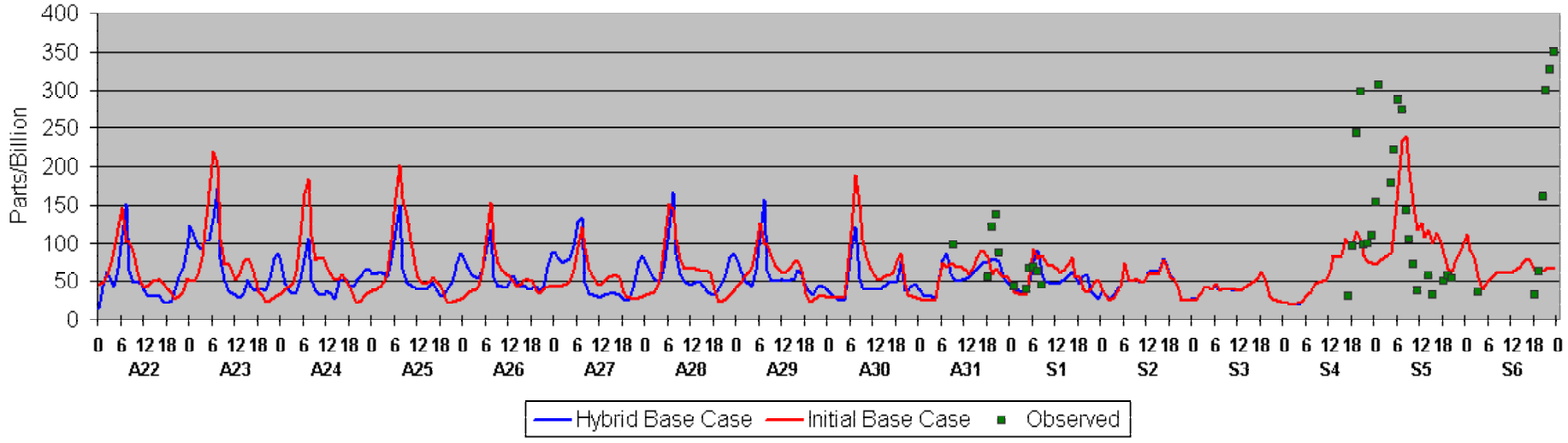
Aldine ETH Concentrations



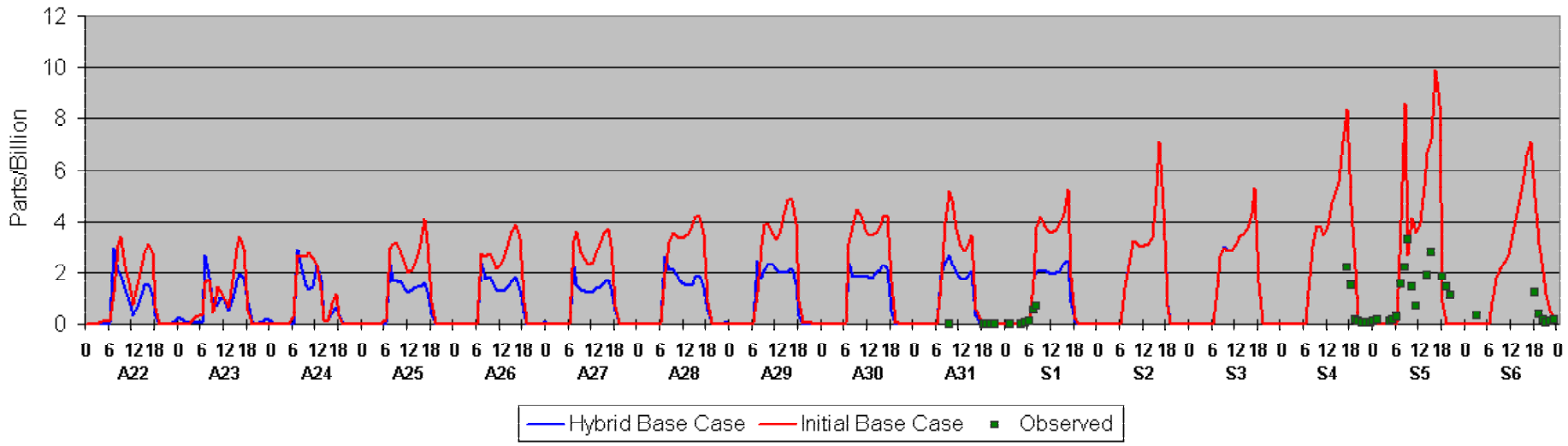
Aldine OLE Concentrations



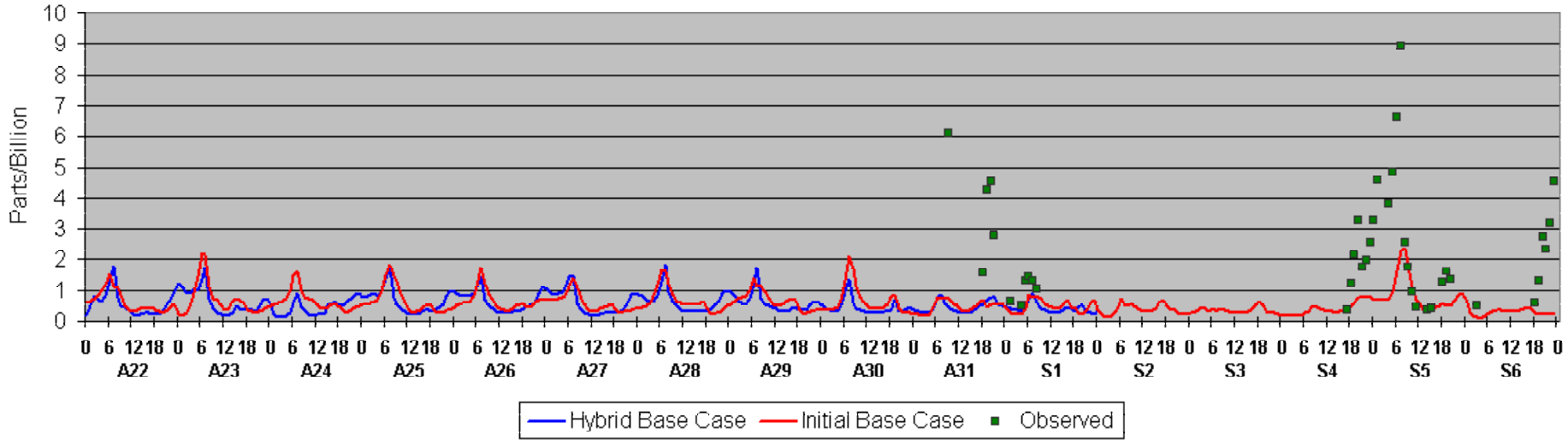
Aldine PAR Concentrations



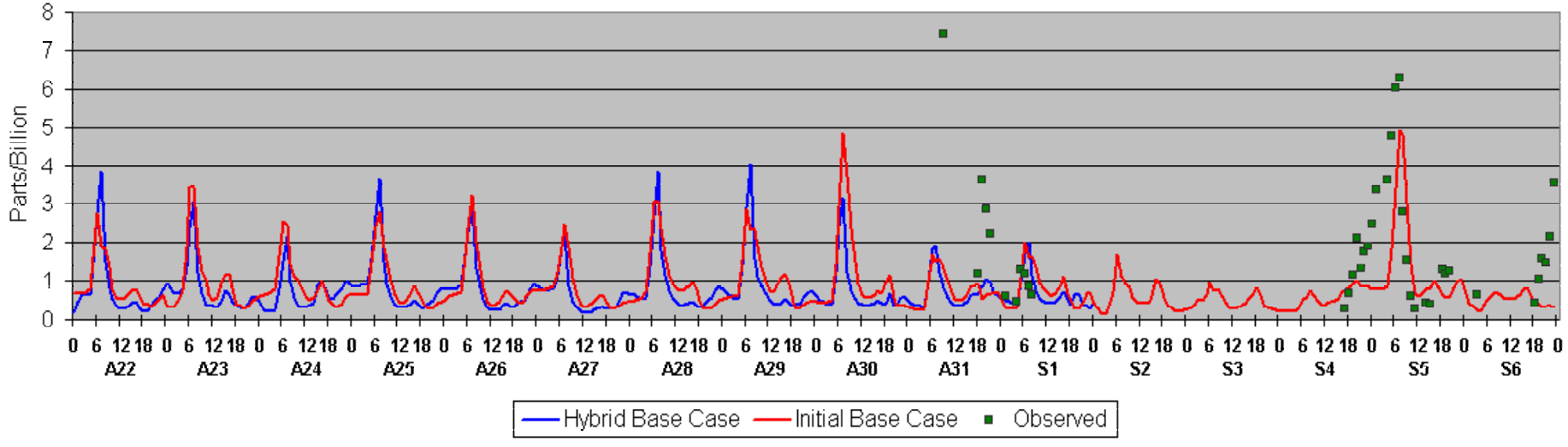
Aldine ISOP Concentrations



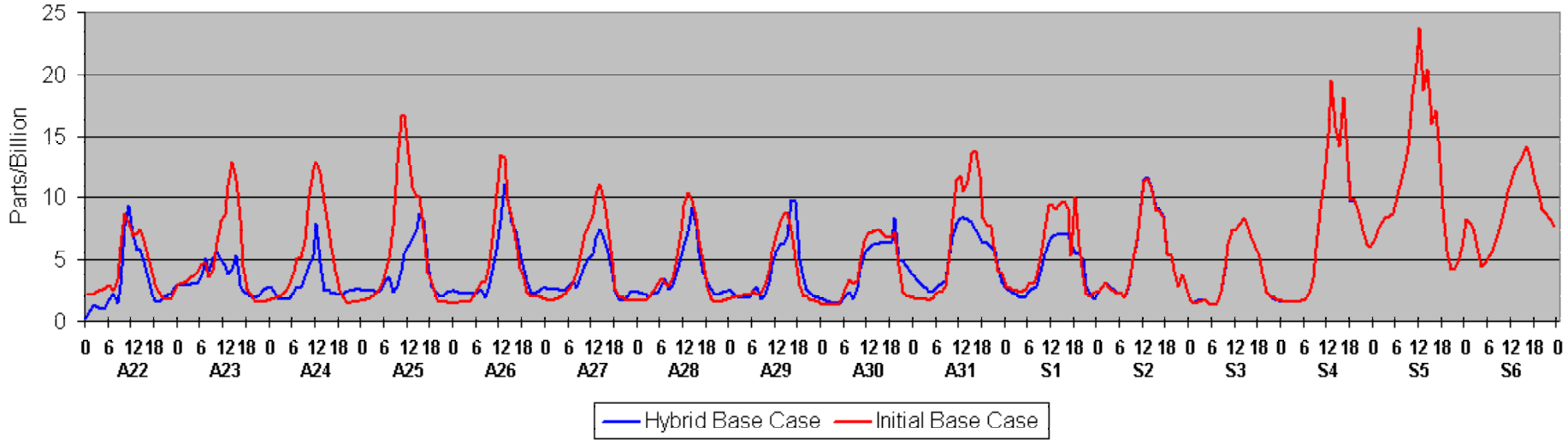
Aldine TOL Concentrations



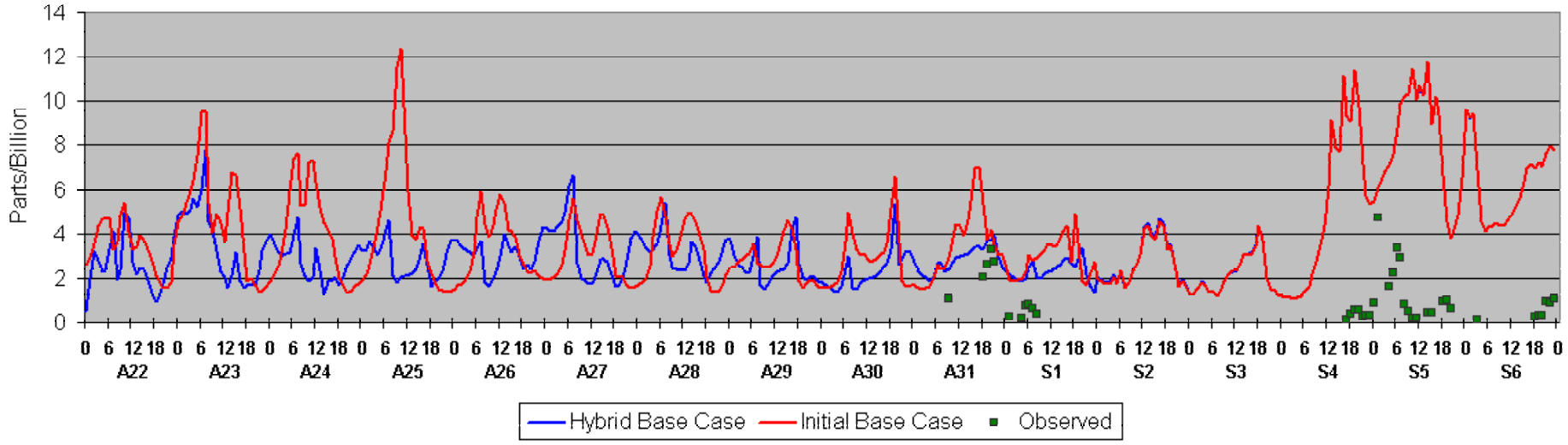
Aldine XYL Concentrations

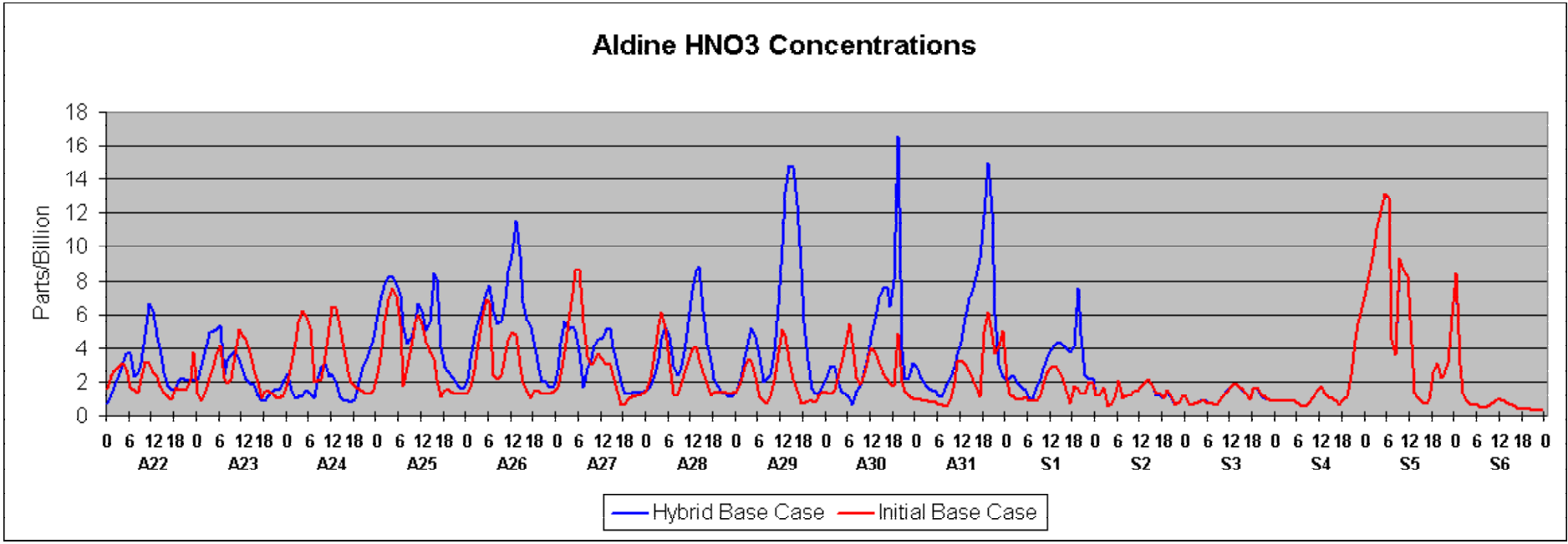


Aldine HCHO Concentrations

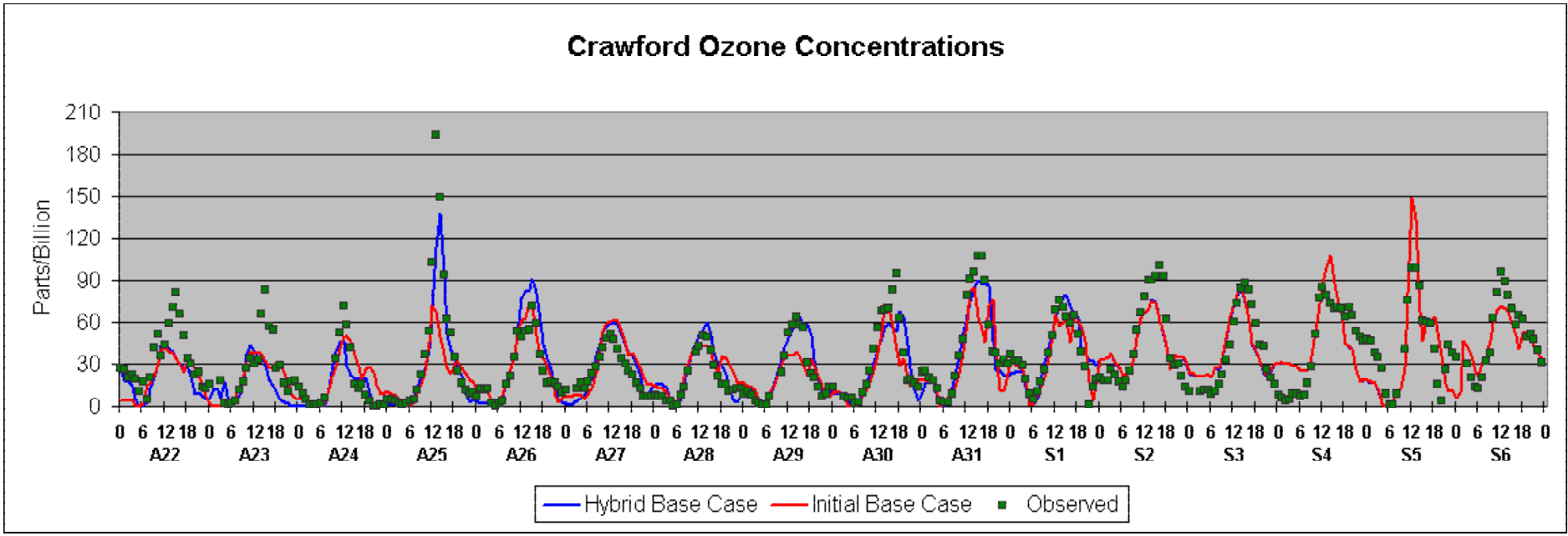


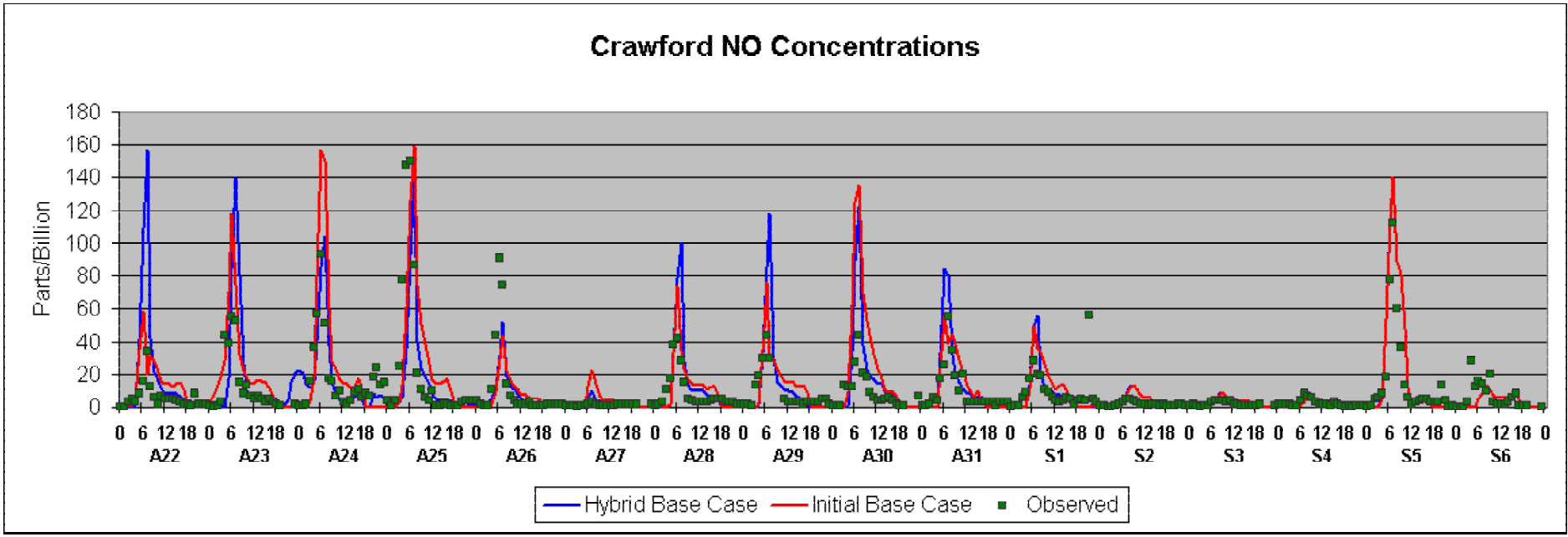
Aldine ALD2 Concentrations

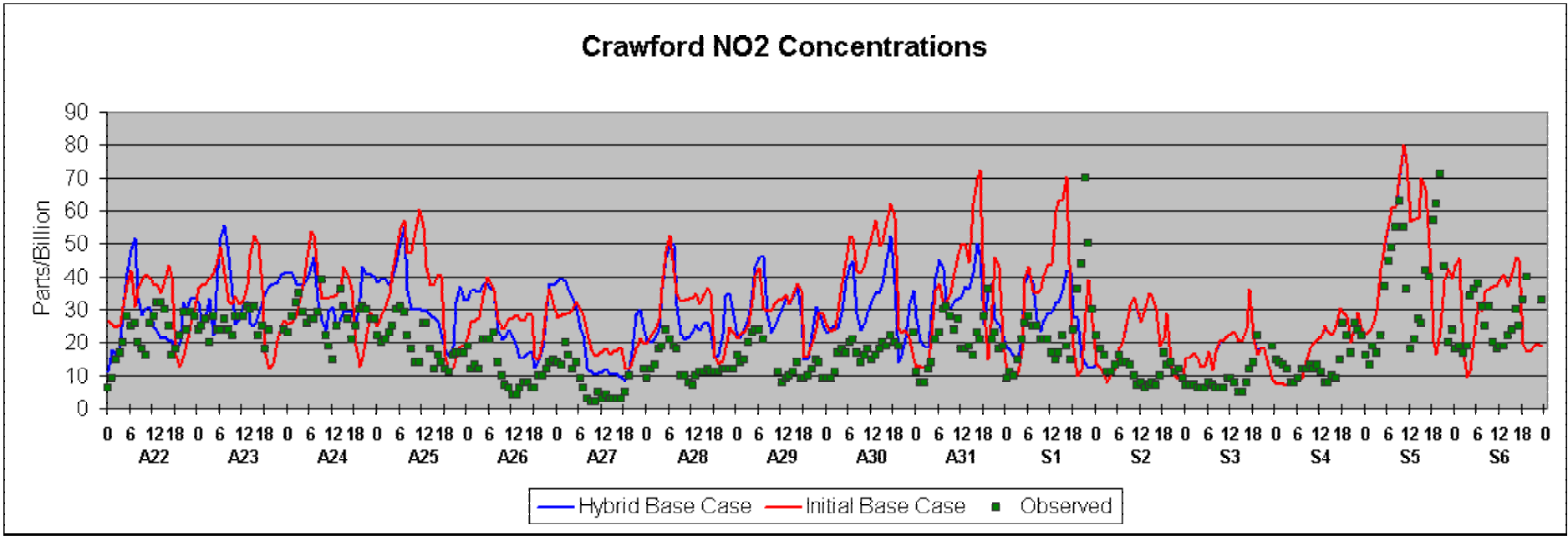


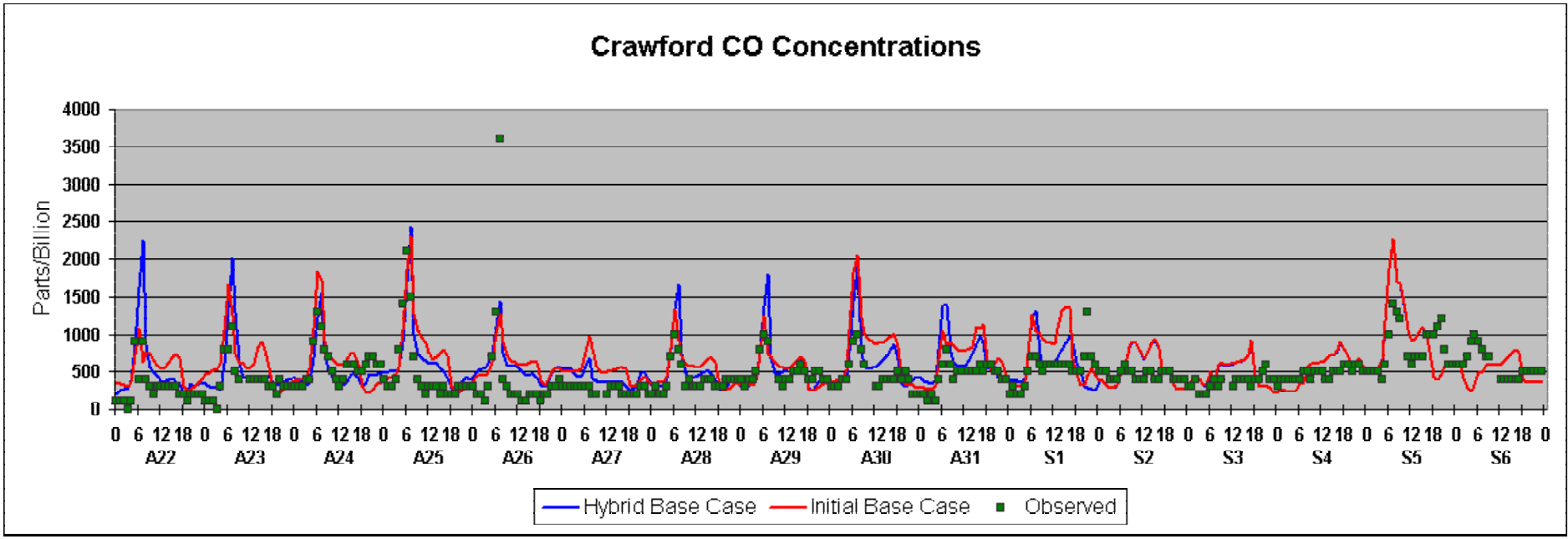

Aldine HNO3 Concentrations
Parts/Billion
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

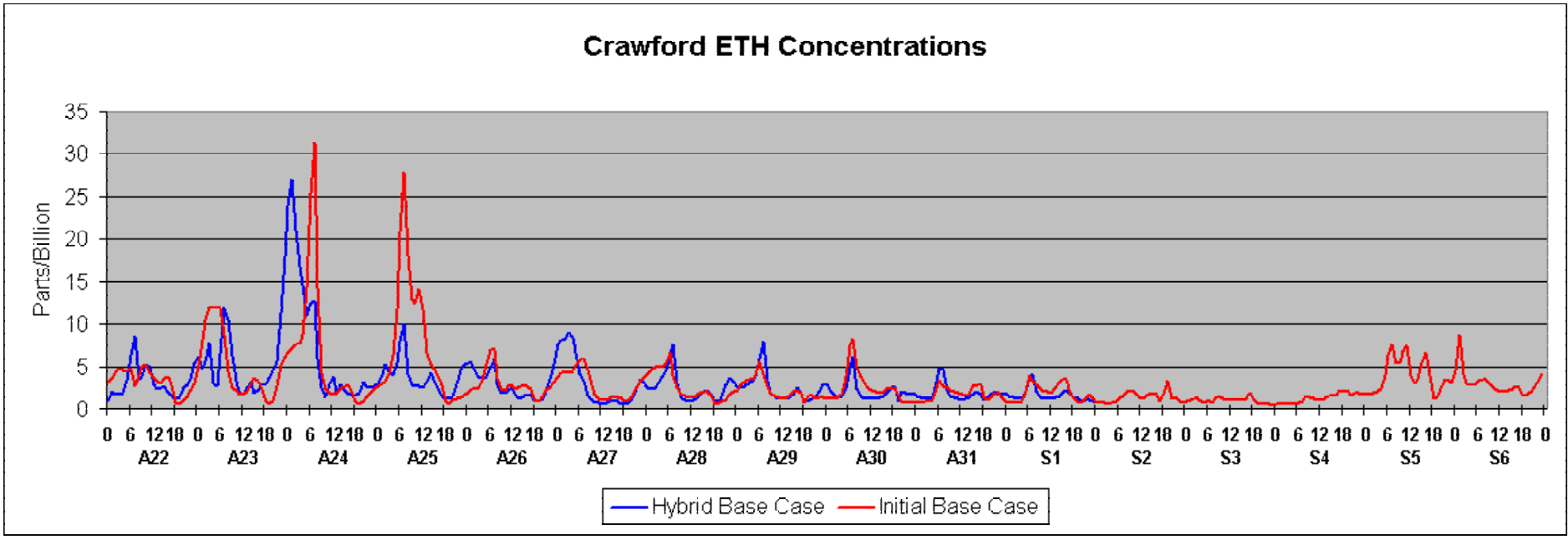
Crawford Time Series

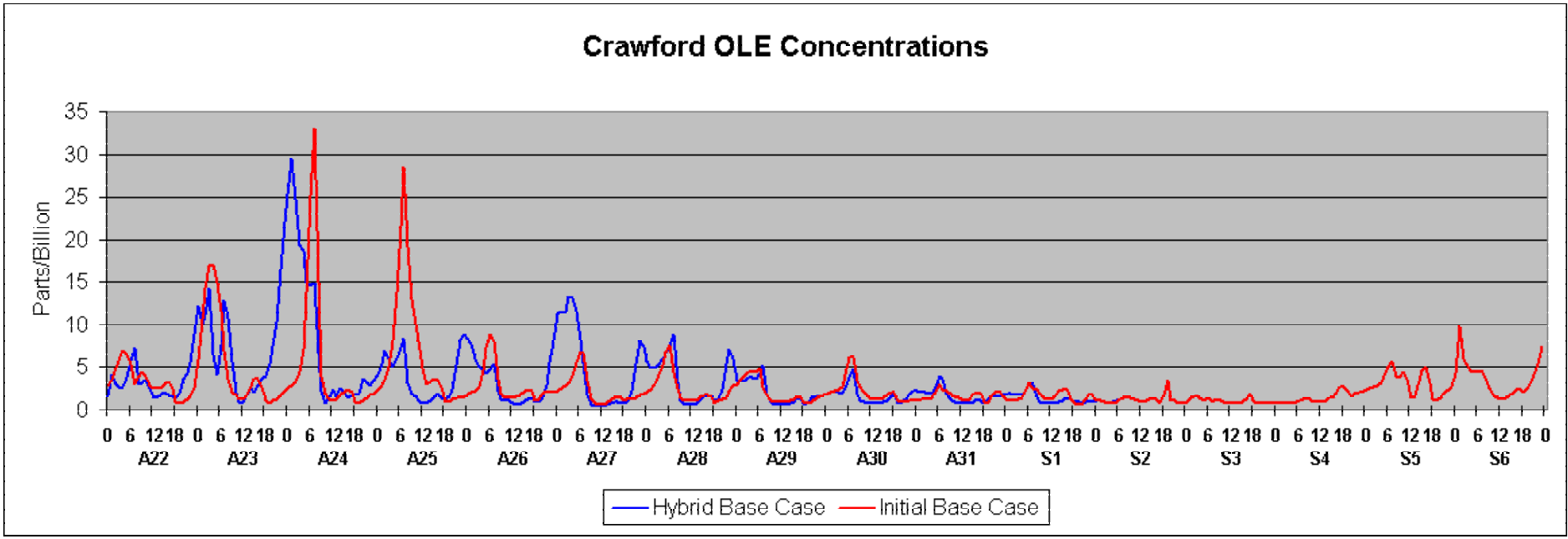

Crawford Ozone Concentrations
Parts/Billion
210
180
150
120
90
60
30
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


Crawford NO Concentrations
Parts/Billion
180
160
140
120
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 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

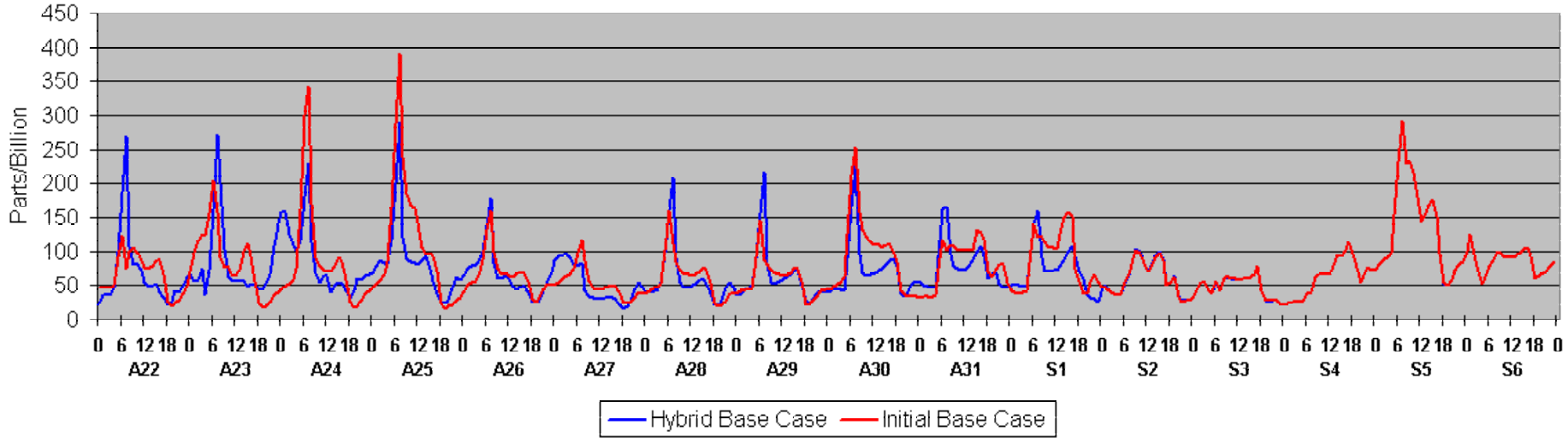

Crawford NO2 Concentrations
Parts/Billion
90
80
70
60
50
40
30
20
10
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


Crawford CO Concentrations
Parts/Billion
4000
3500
3000
2500
2000
1500
1000
500
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

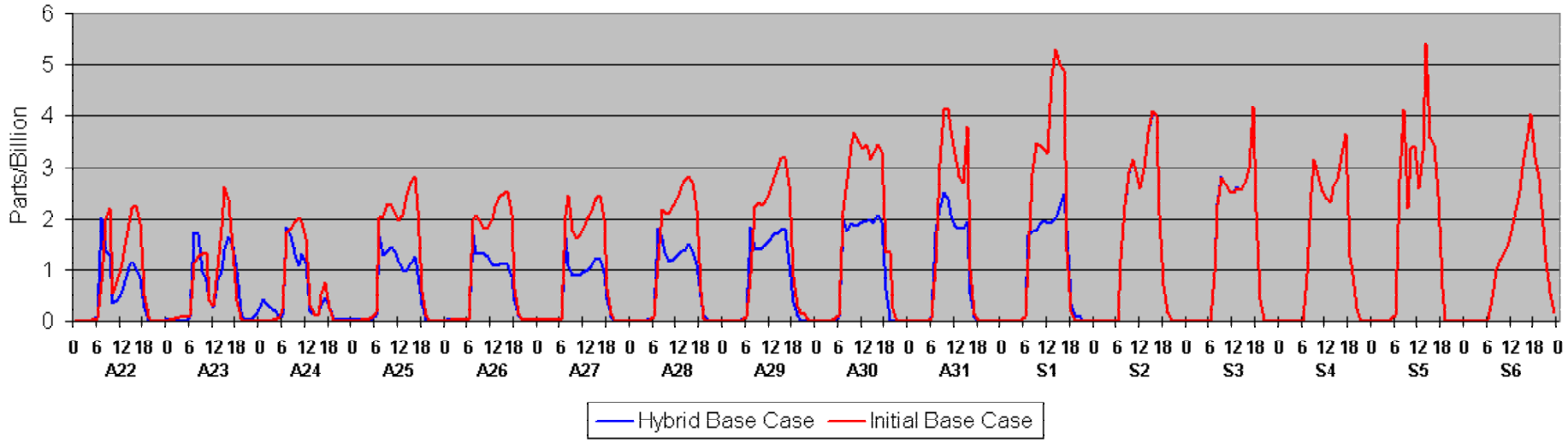

Crawford ETH Concentrations
Parts/Billion
35
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

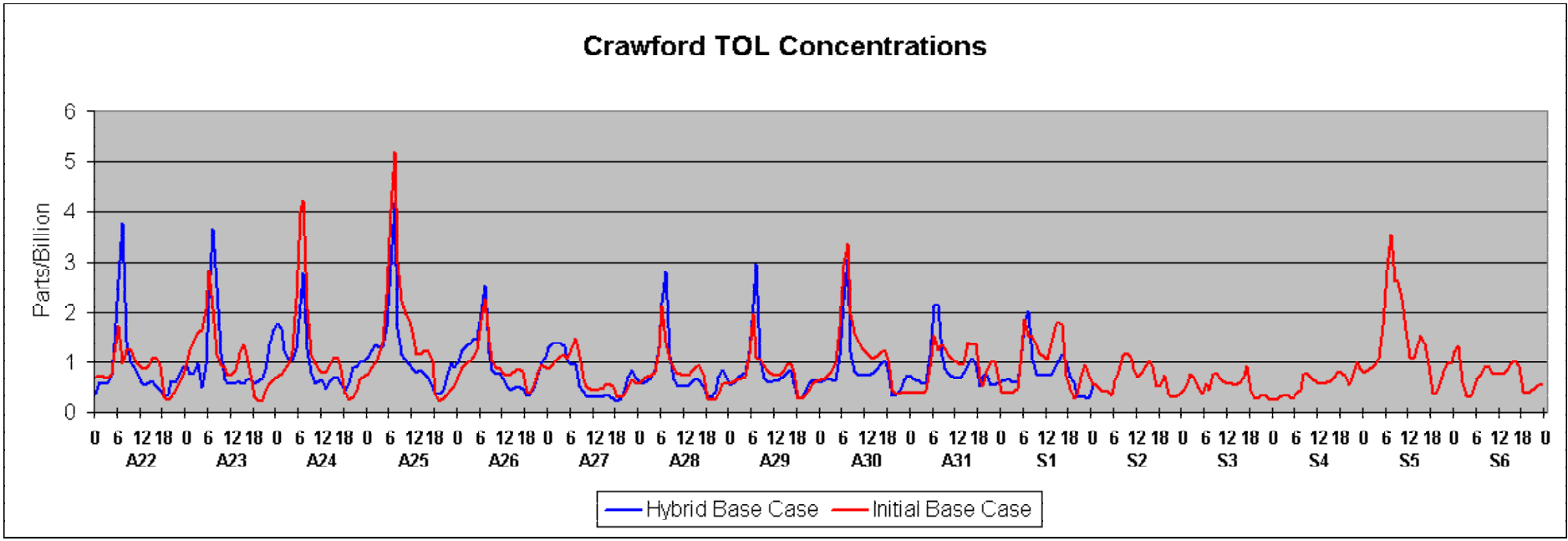

Crawford OLE Concentrations
Parts/Billion
35
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

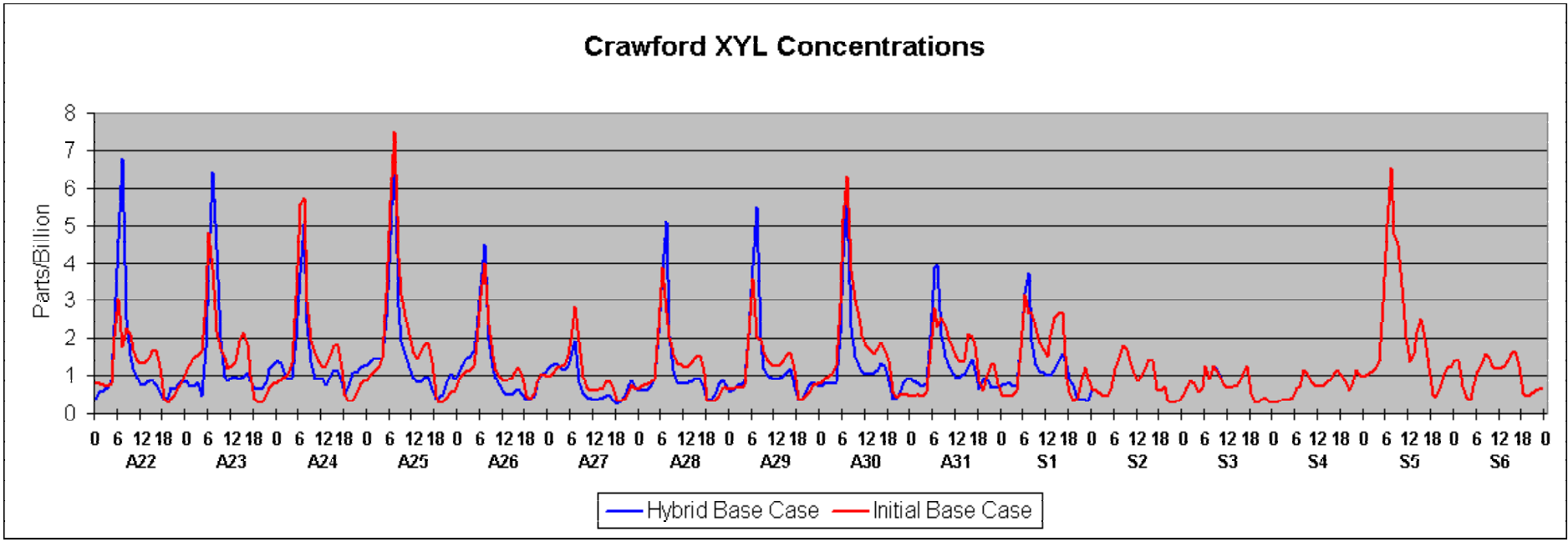
Crawford PAR Concentrations

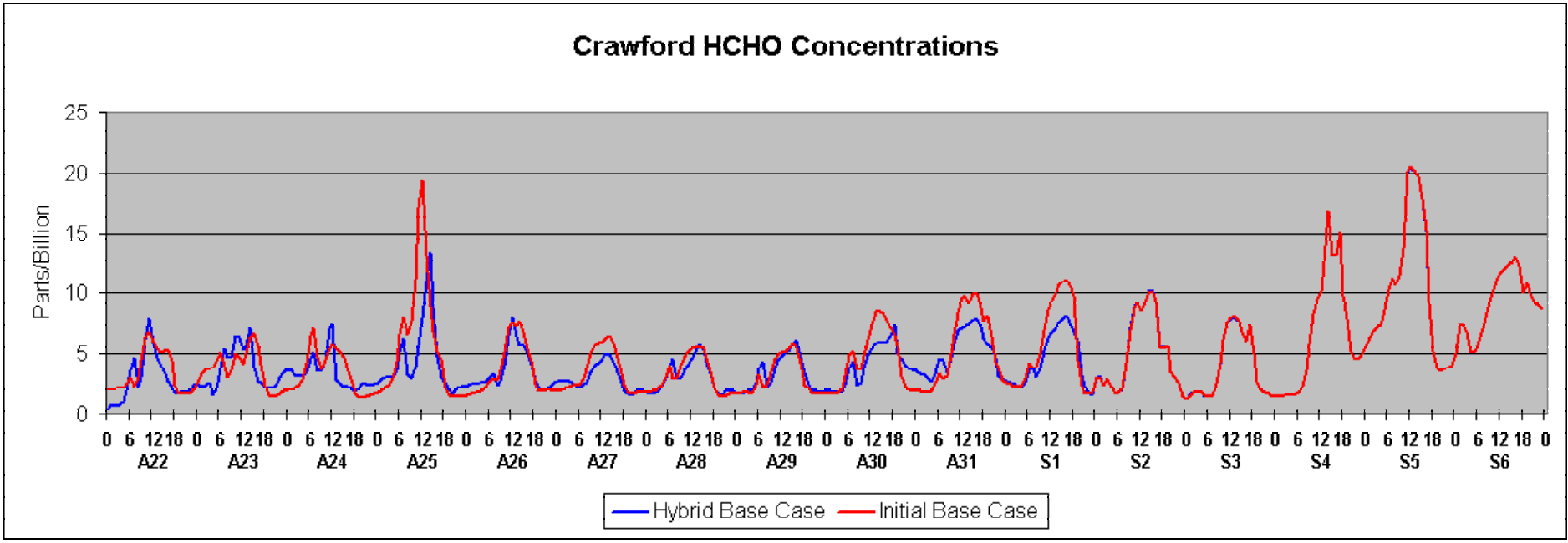


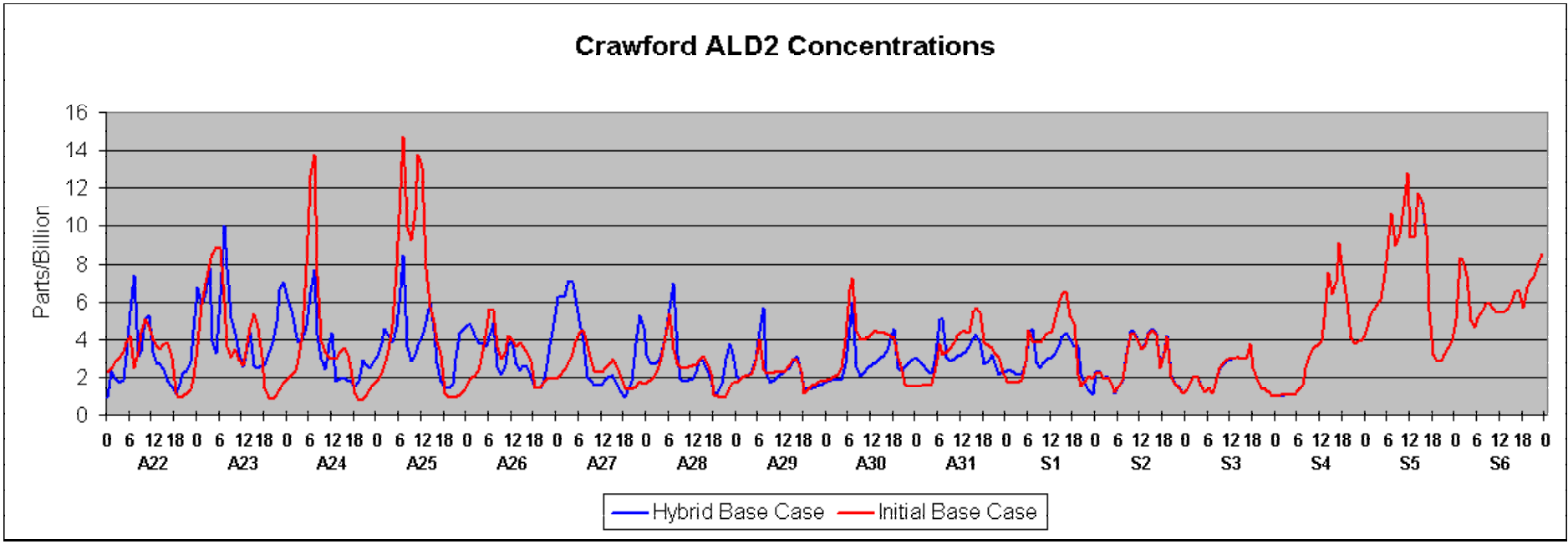
Crawford ISOP Concentrations

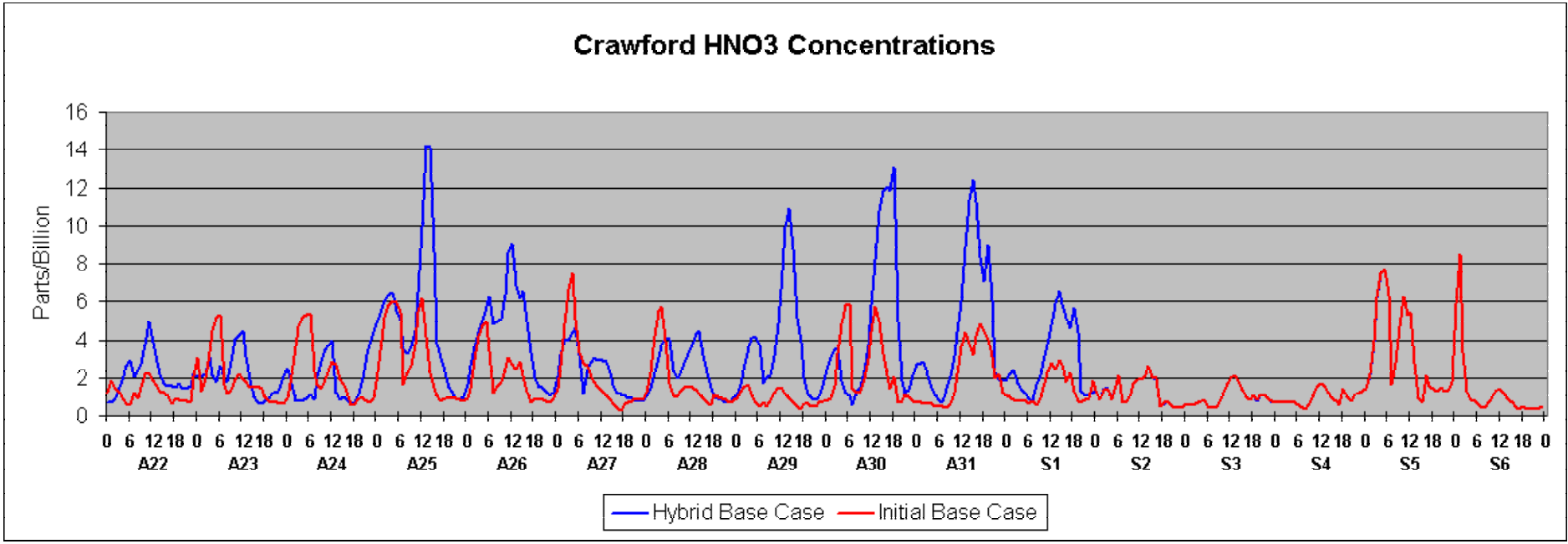



Crawford TOL Concentrations
Parts/Billion
0
1
2
3
4
5
6
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Crawford XYL Concentrations
Parts/Billion
0
1
2
3
4
5
6
7
8
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

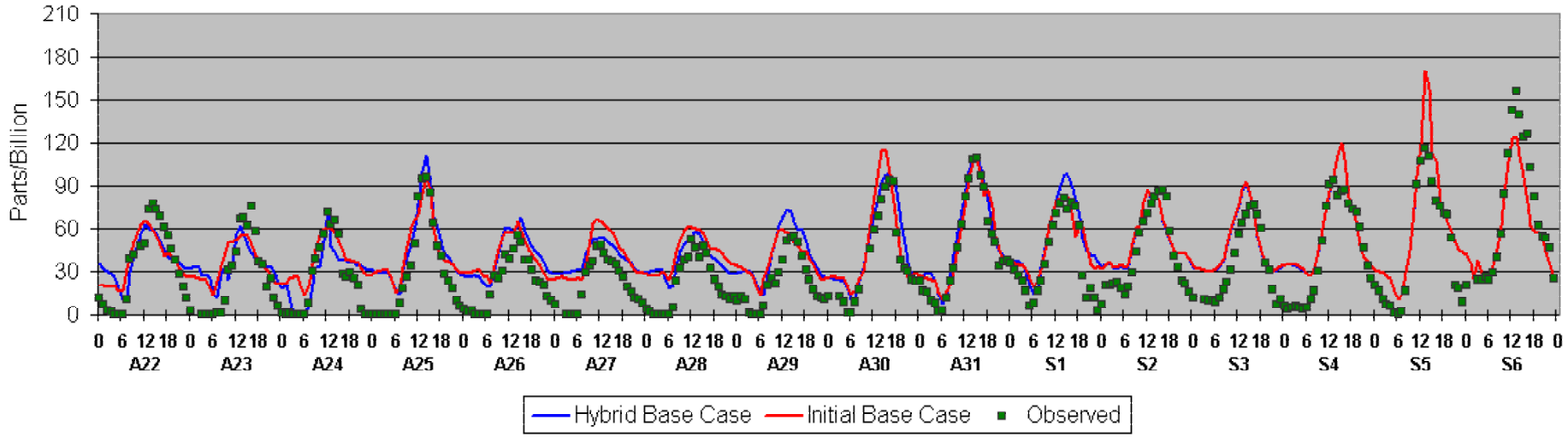

Crawford HCHO Concentrations
Parts/Billion
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Crawford ALD2 Concentrations
Parts/Billion
16
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

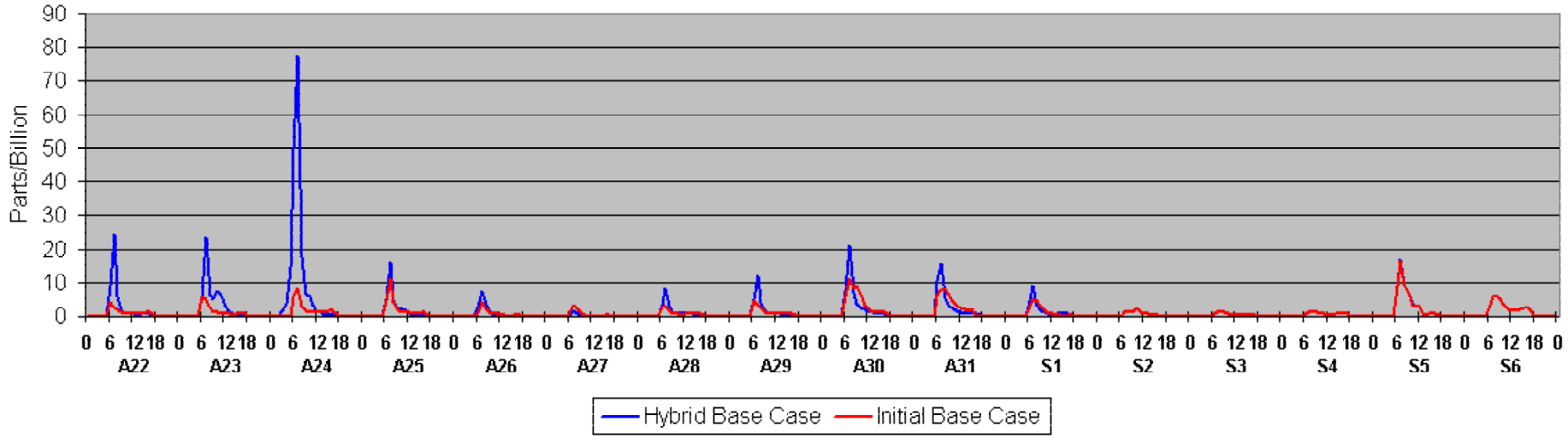

Crawford HNO3 Concentrations
Parts/Billion
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

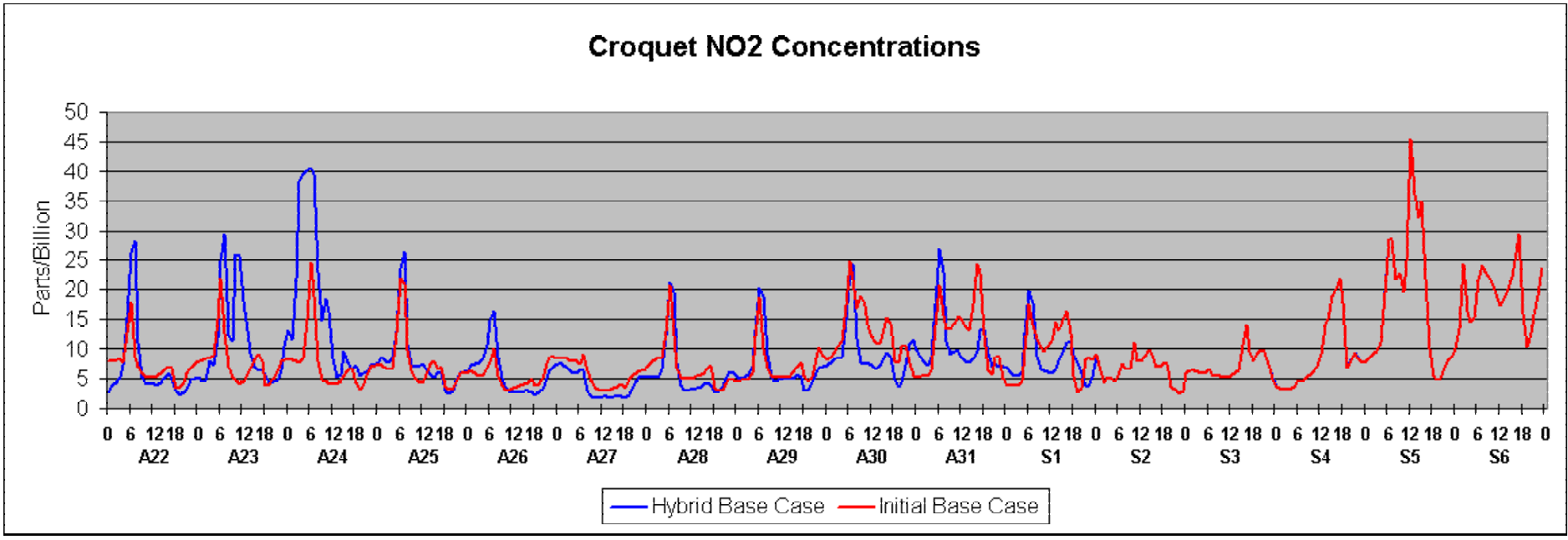
Croquet Time Series

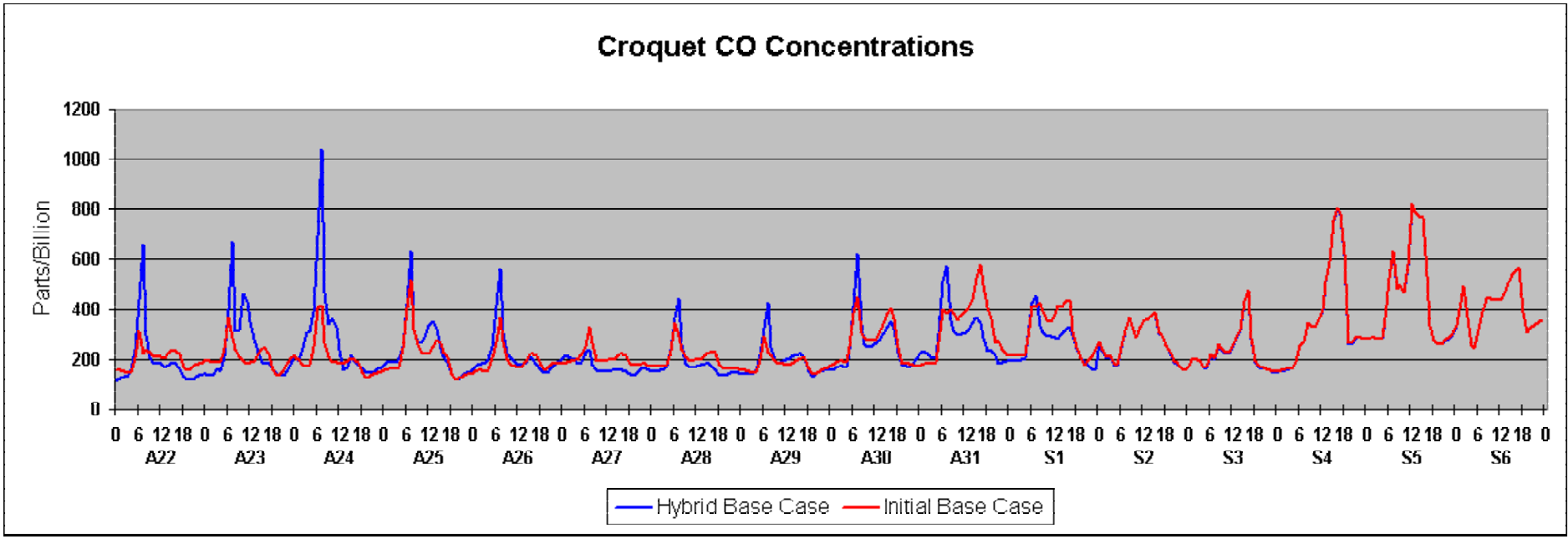
Croquet Ozone Concentrations

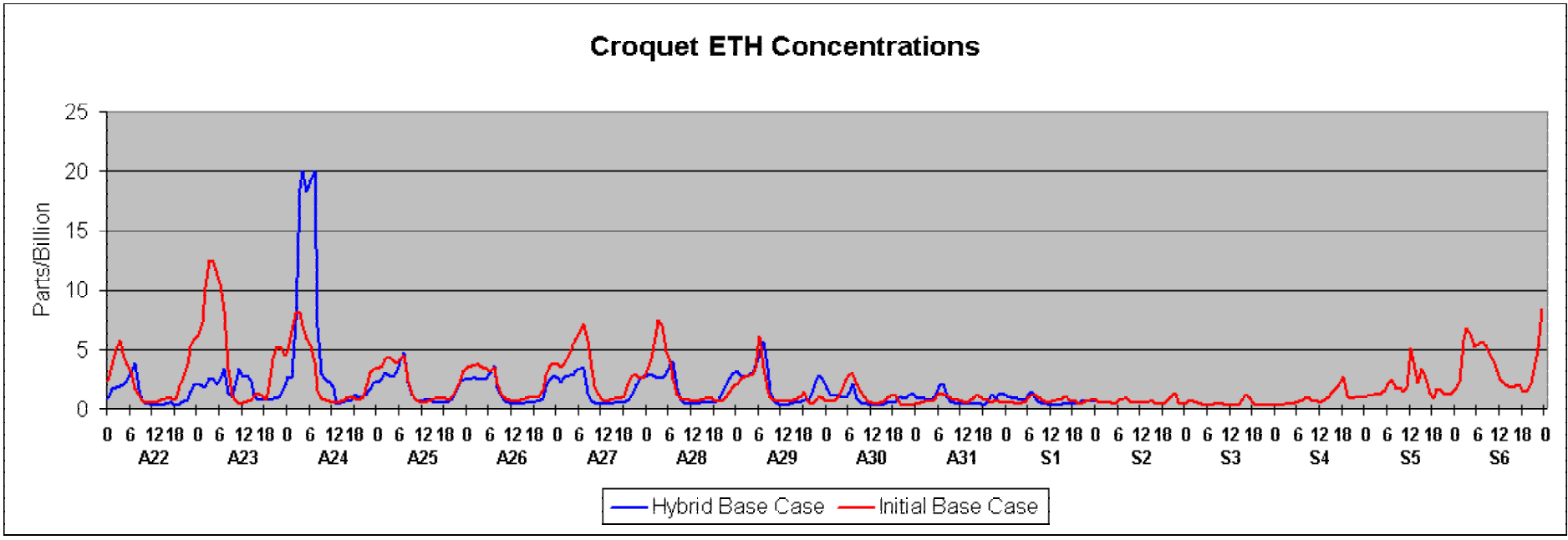


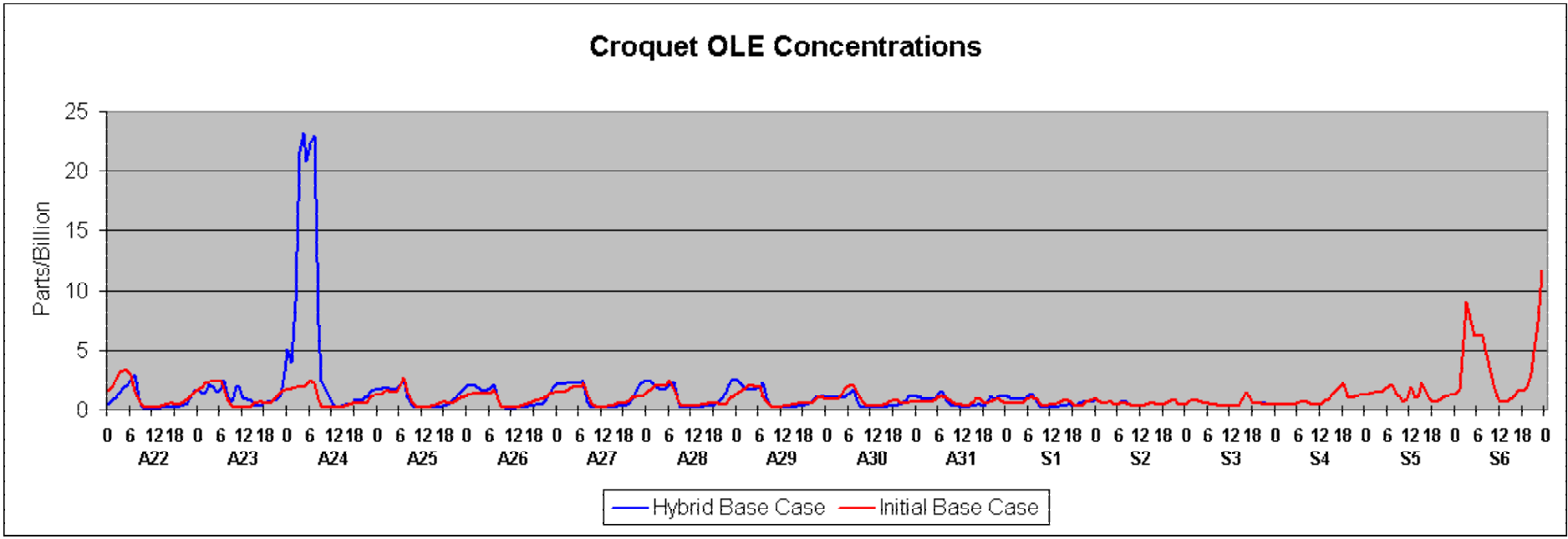
Croquet NO Concentrations



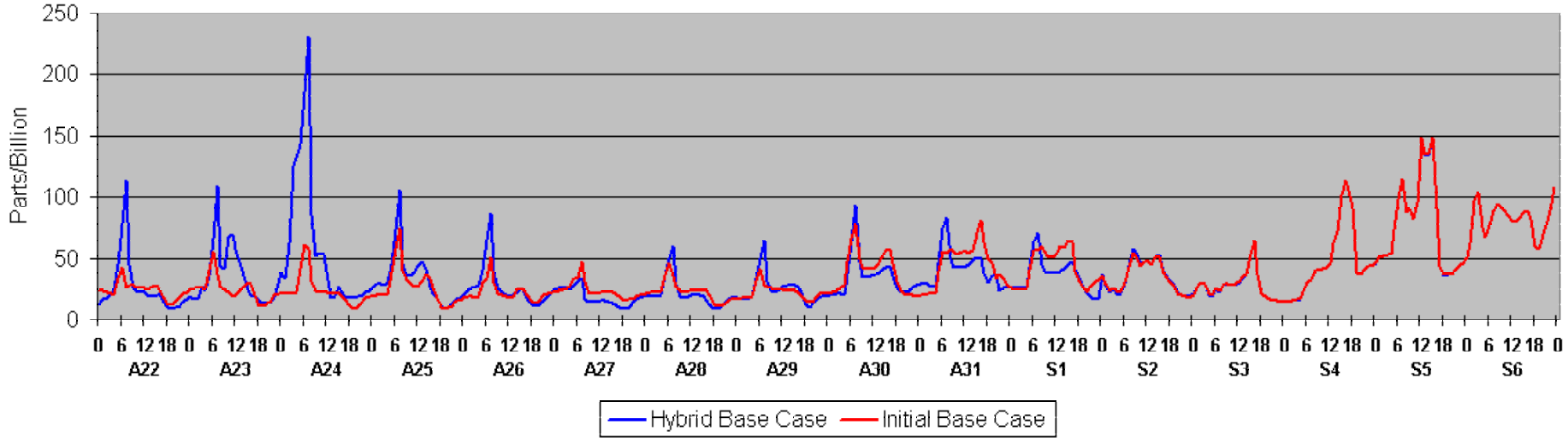

Croquet NO2 Concentrations
Parts/Billion
50
45
40
35
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Croquet CO Concentrations
Parts/Billion
1200
1000
800
600
400
200
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

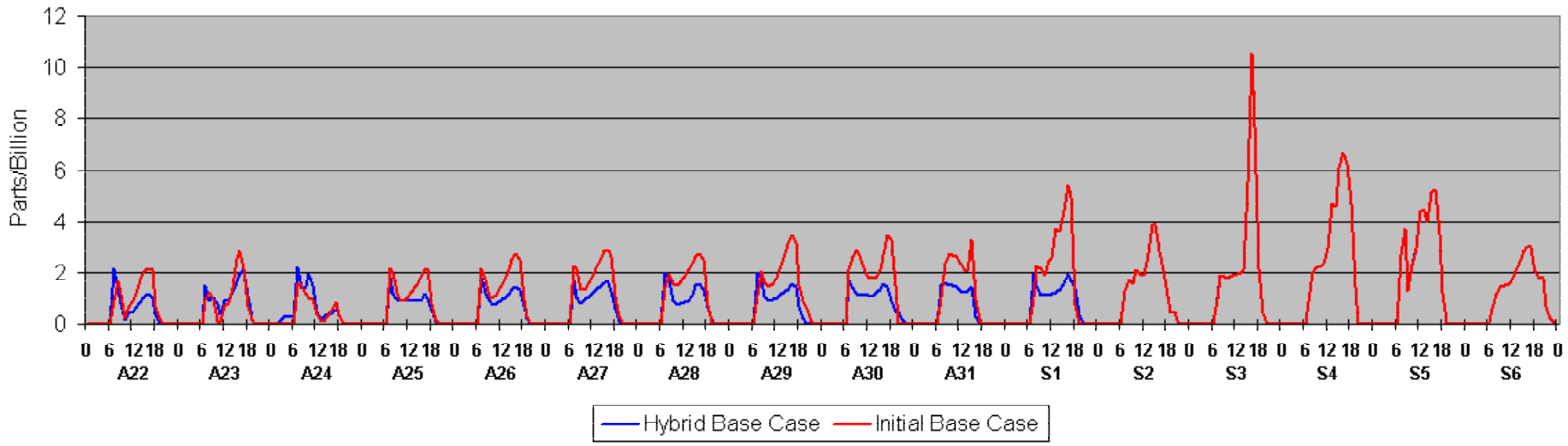

Croquet ETH Concentrations
Parts/Billion
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Croquet OLE Concentrations
Parts/Billion
25
20
15
10
5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

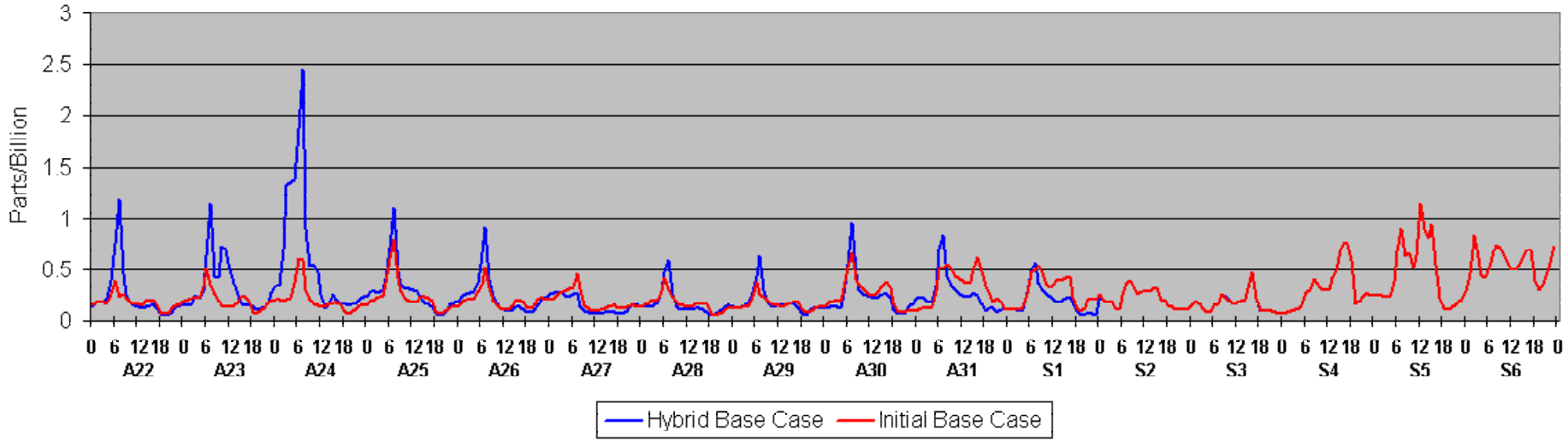
Croquet PAR Concentrations



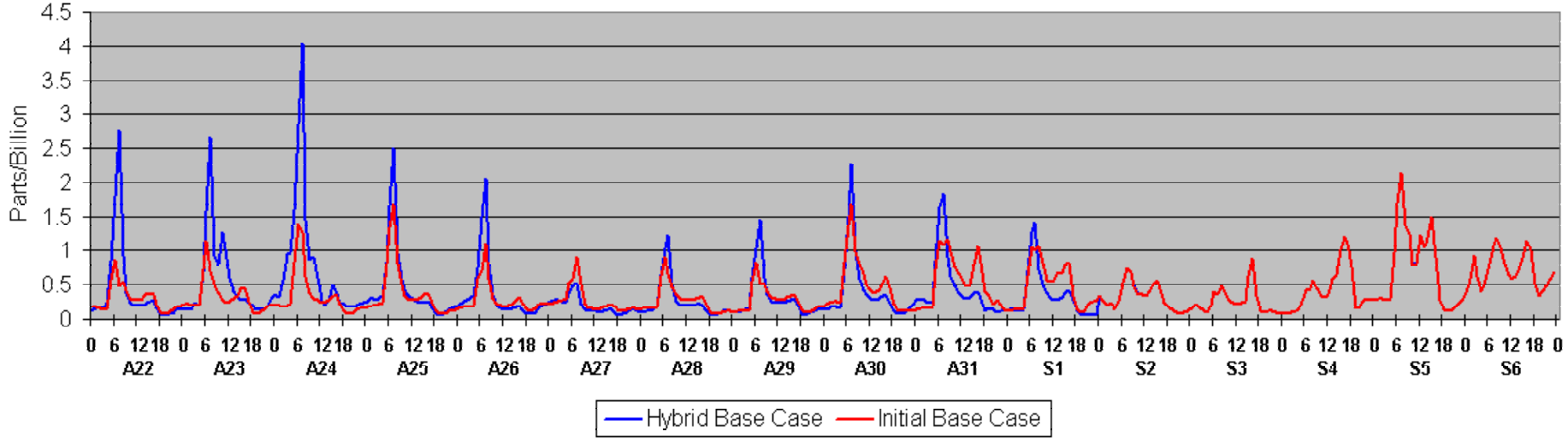
Croquet ISOP Concentrations

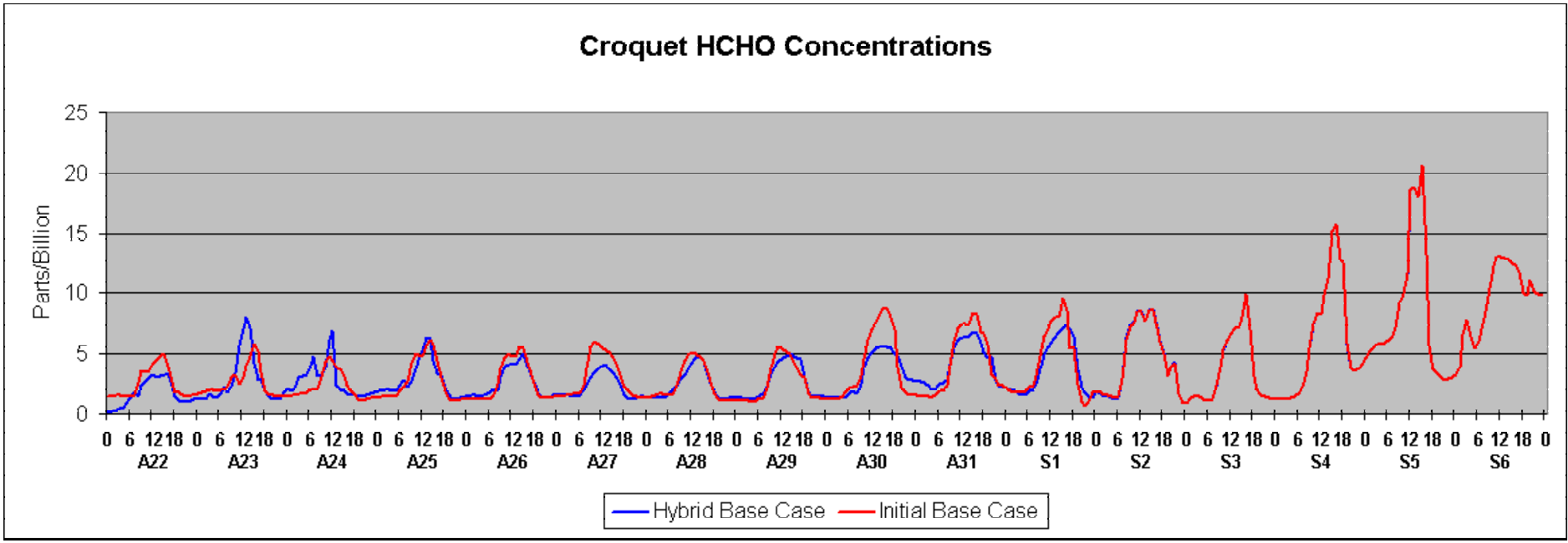


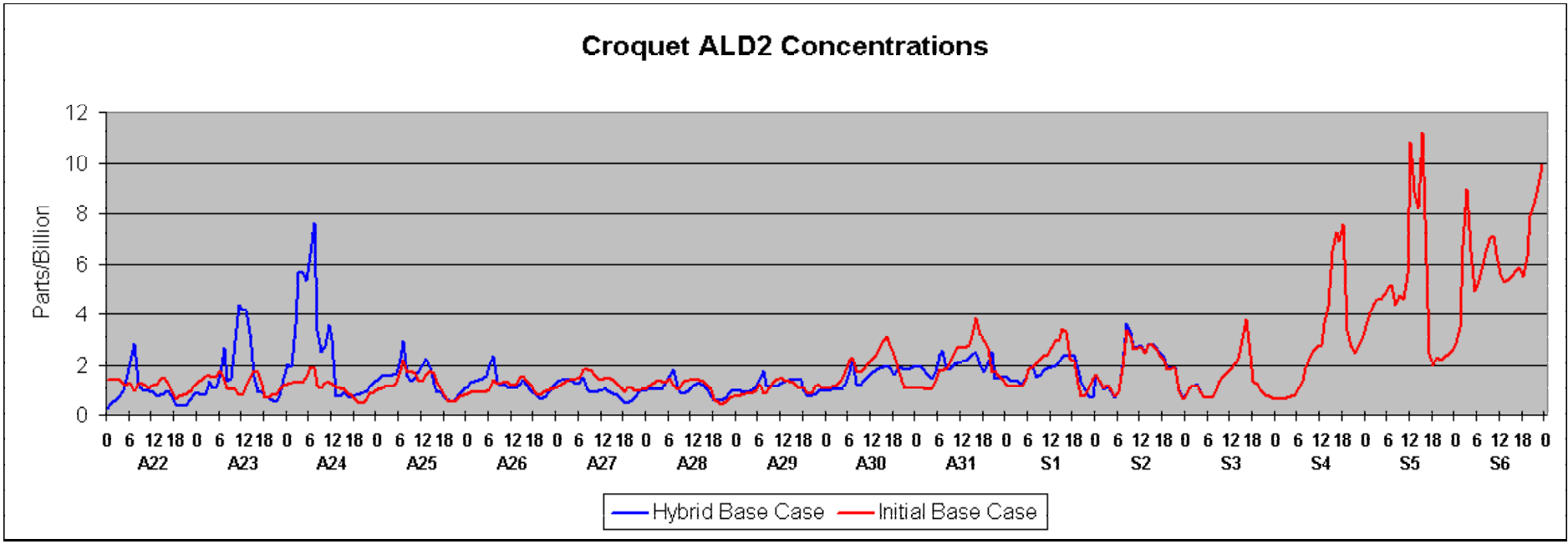
Croquet TOL Concentrations

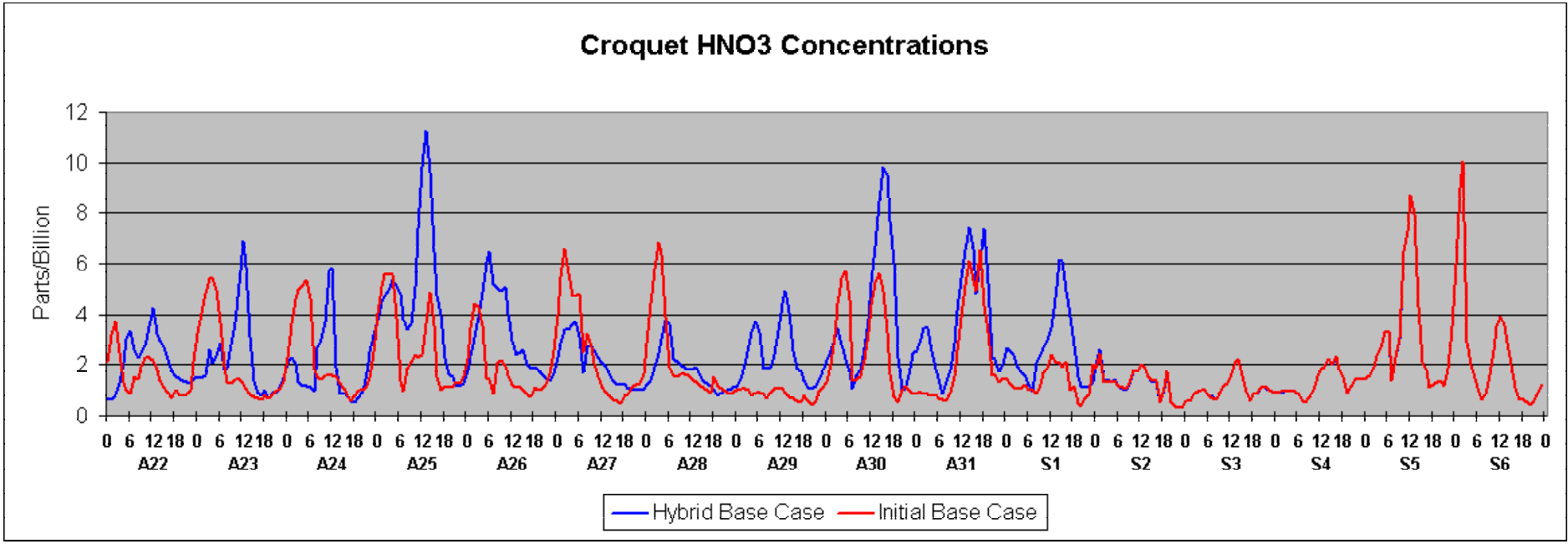


Croquet XYL Concentrations

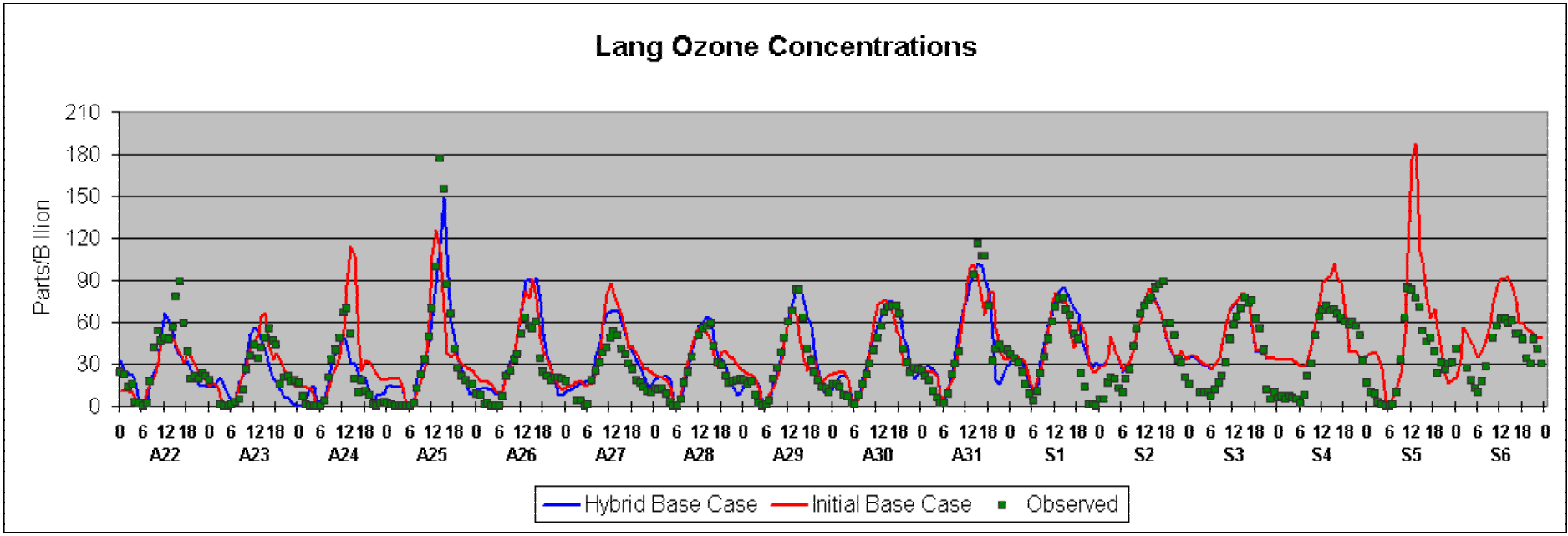


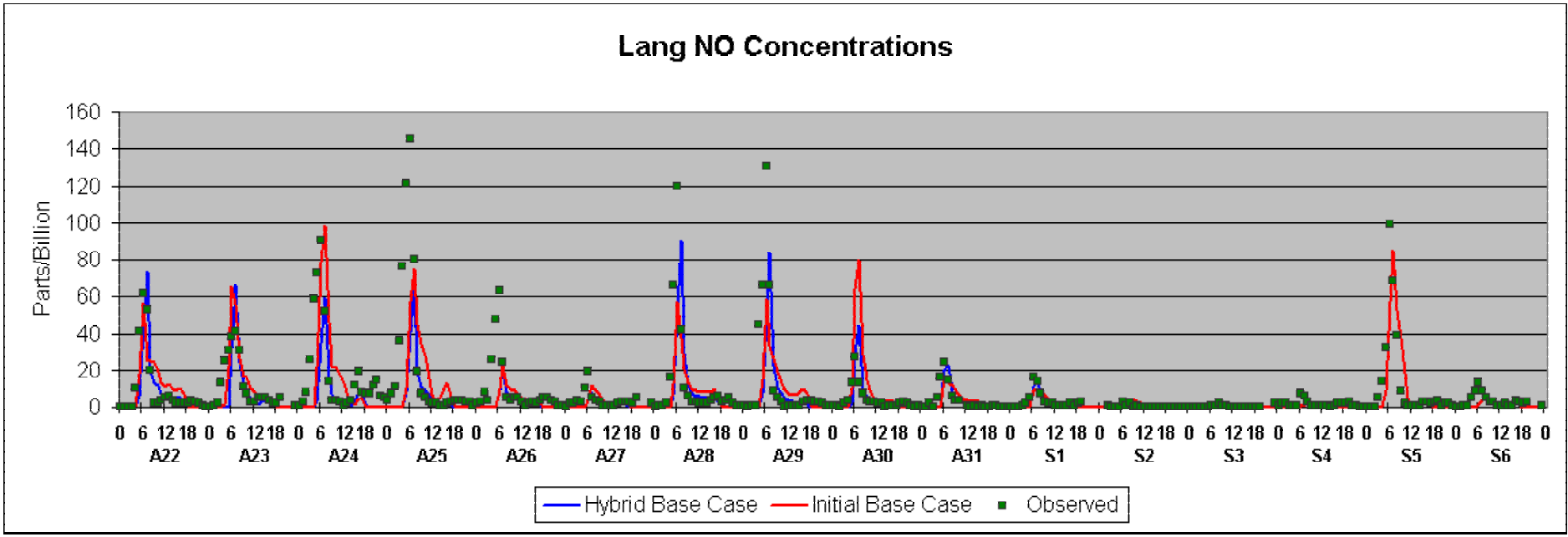

Croquet HCHO Concentrations
Parts/Billion
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Croquet ALD2 Concentrations
Parts/Billion
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

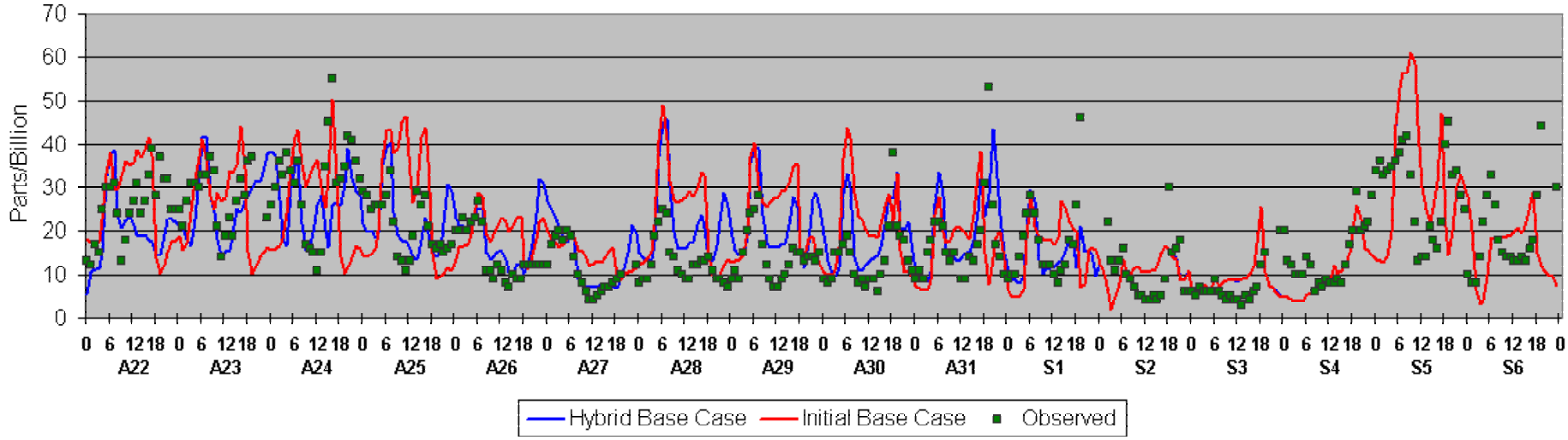

Croquet HNO3 Concentrations
Parts/Billion
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Lang Time Series

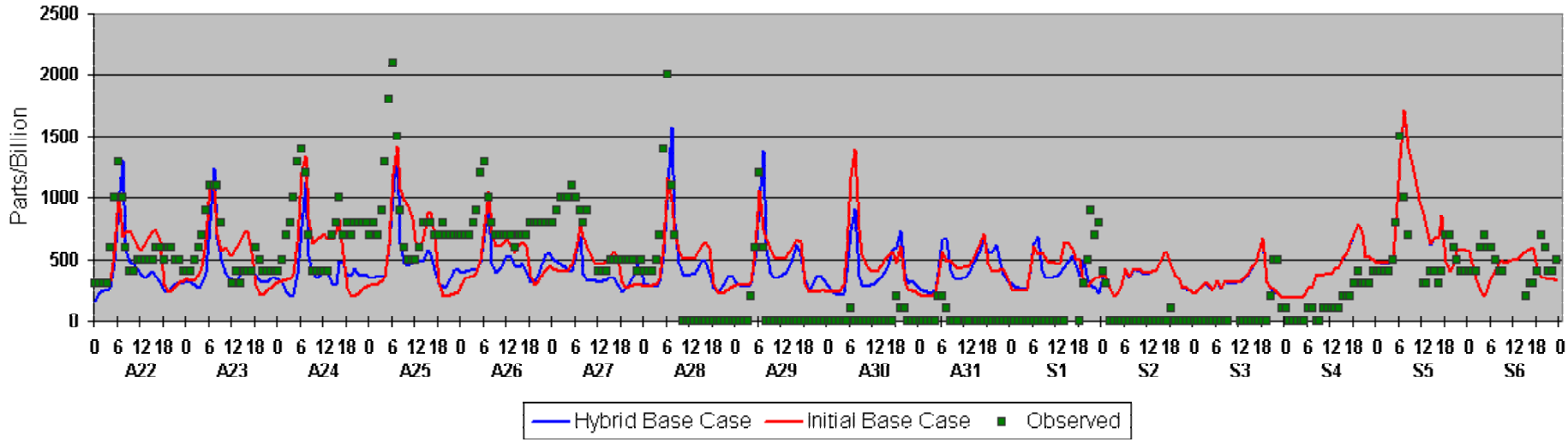

Lang Ozone Concentrations
Parts/Billion
210
180
150
120
90
60
30
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

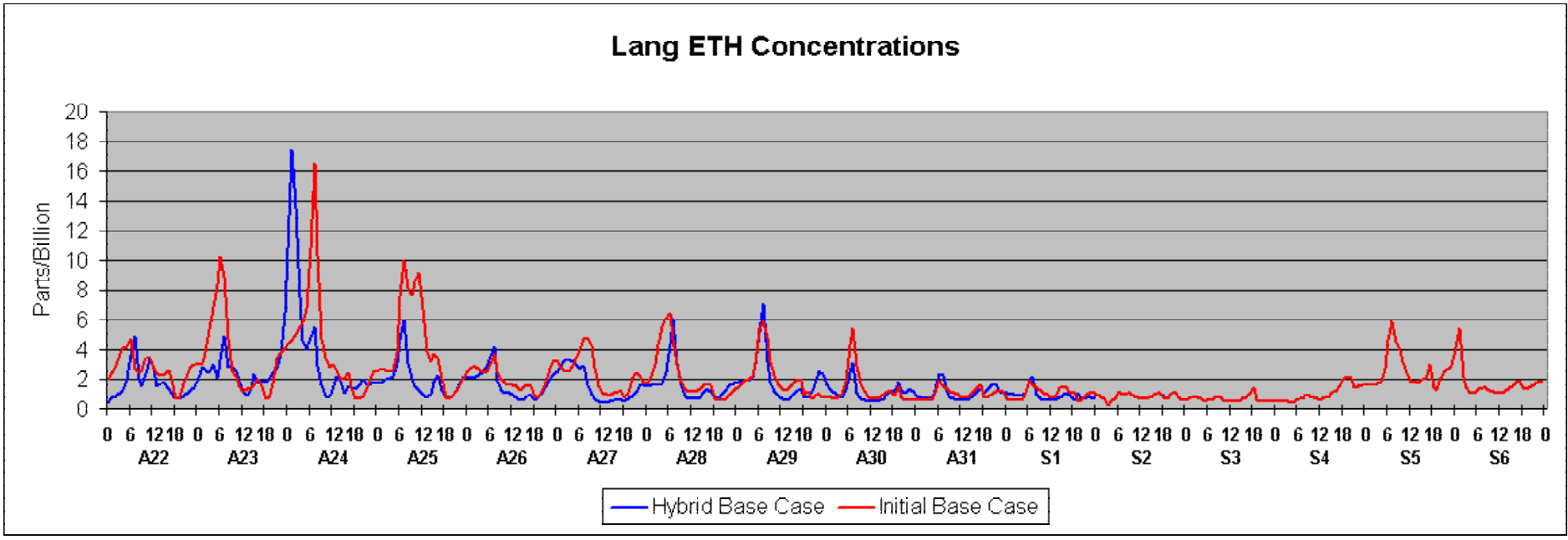

Lang NO Concentrations
Parts/Billion
160
140
120
100
80
60
40
20
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

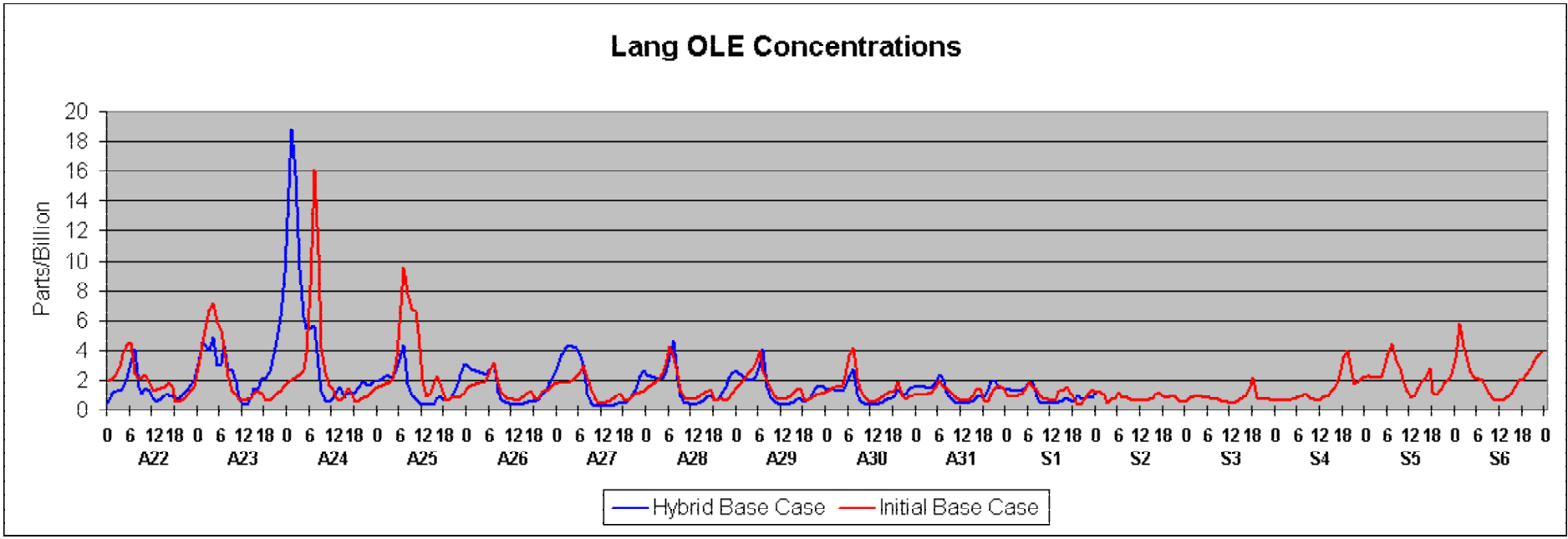
Lang NO2 Concentrations

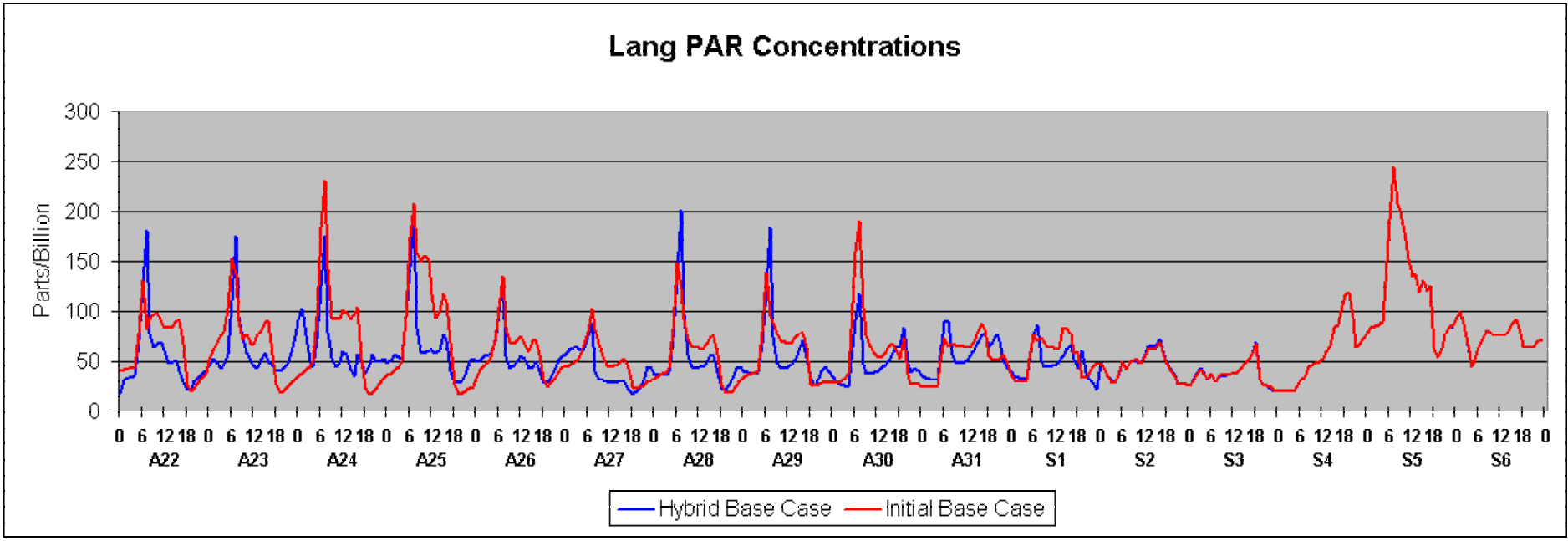


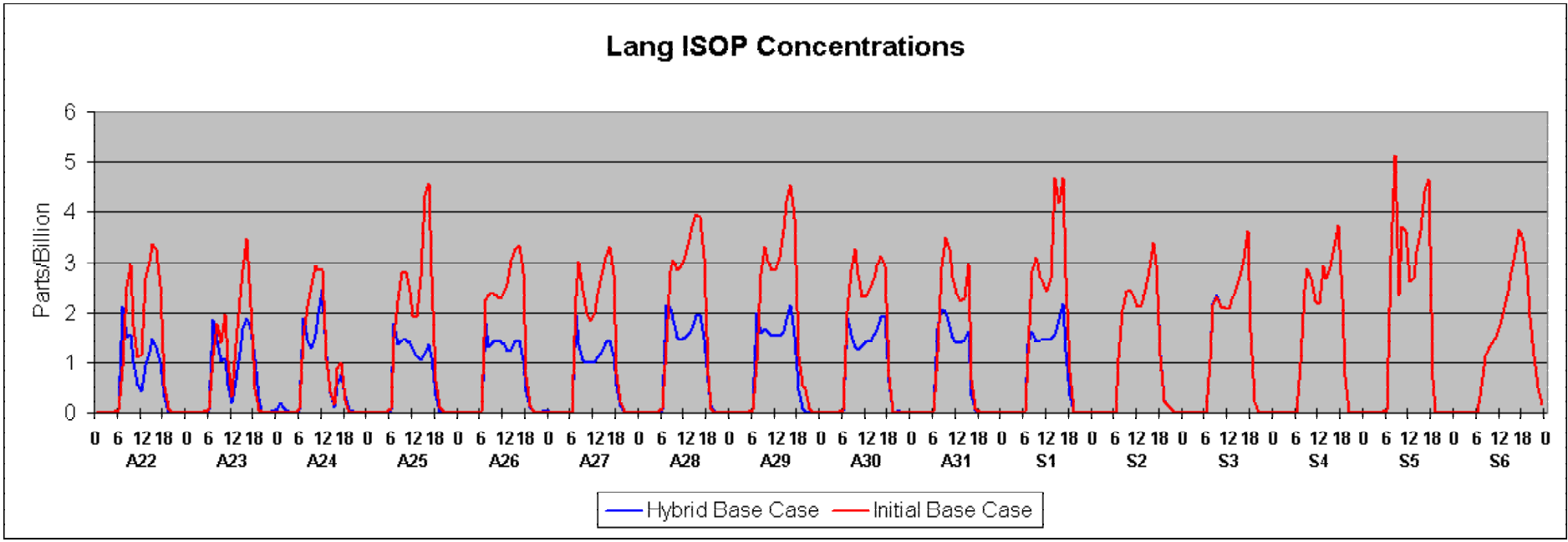
Lang CO Concentrations



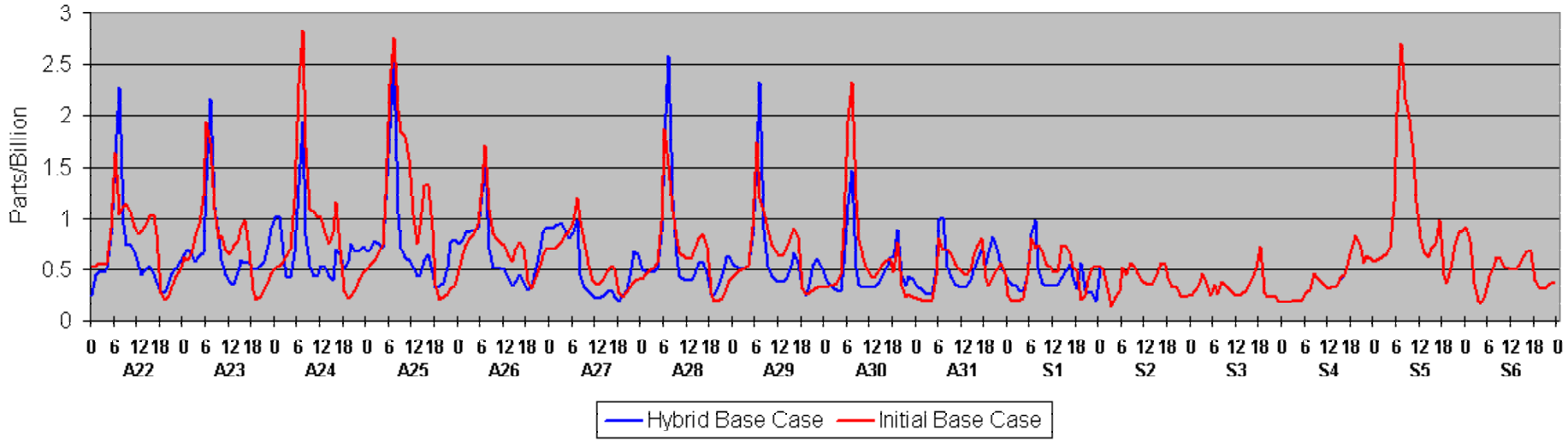

Lang ETH Concentrations
Parts/Billion
20
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Lang OLE Concentrations
Parts/Billion
20
18
16
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

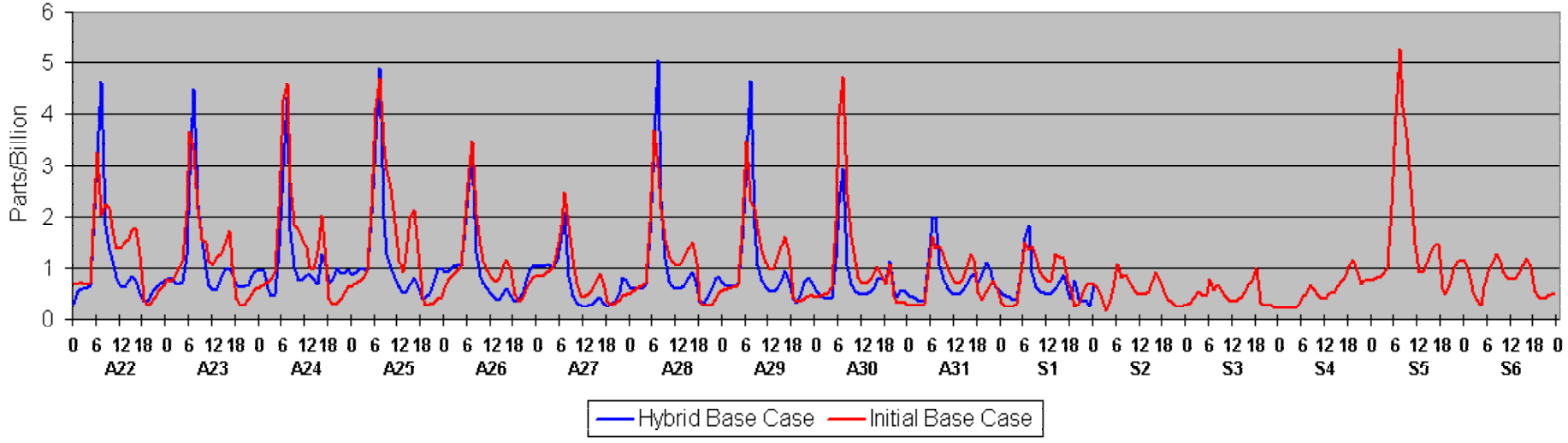

Lang PAR Concentrations
Parts/Billion
300
250
200
150
100
50
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

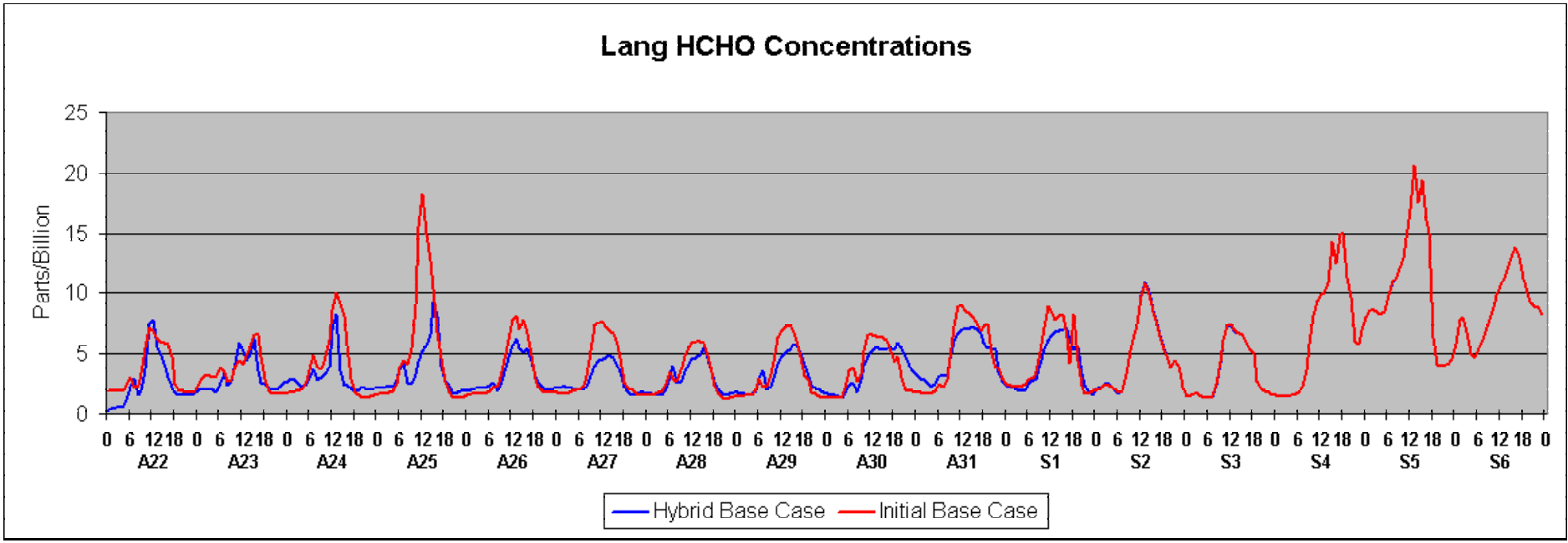

Lang ISOP Concentrations
Parts/Billion
6
5
4
3
2
1
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

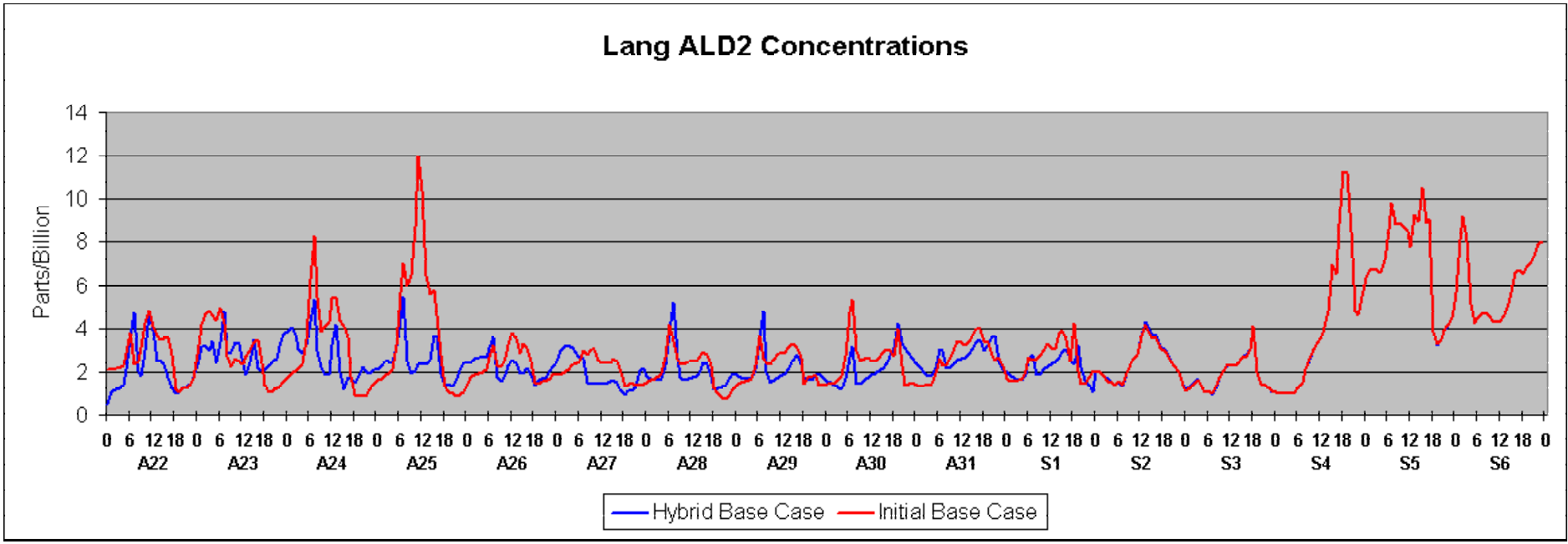
Lang TOL Concentrations

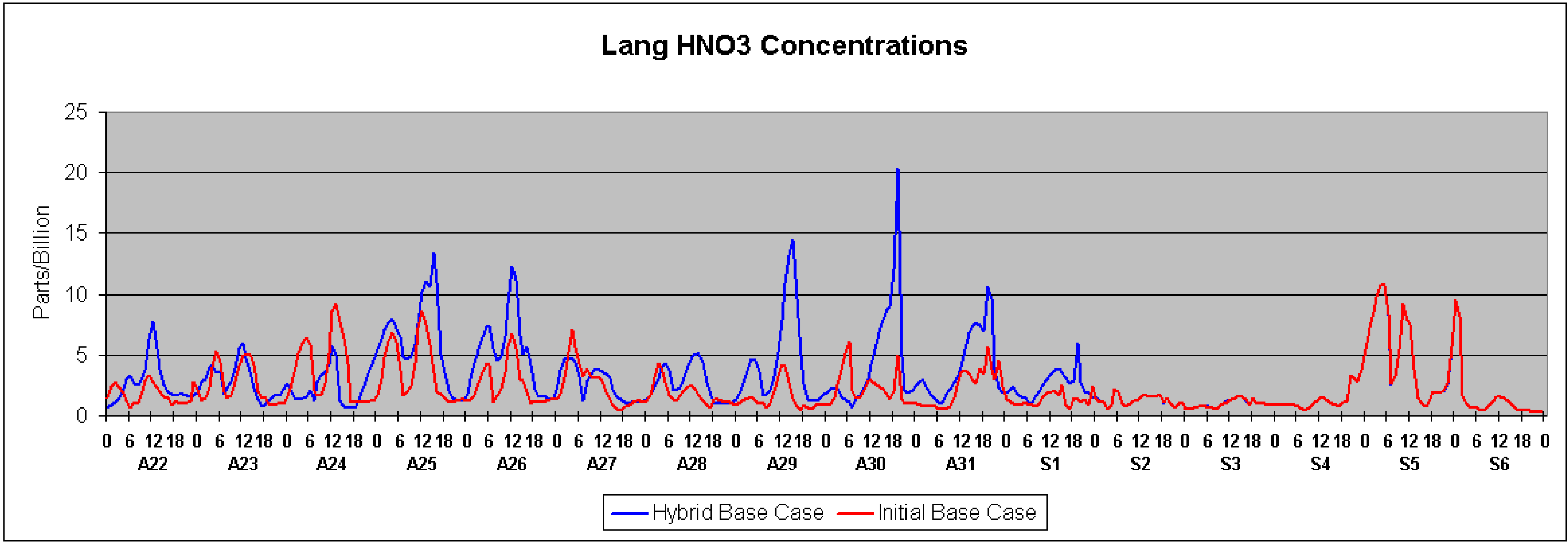


Lang XYL Concentrations



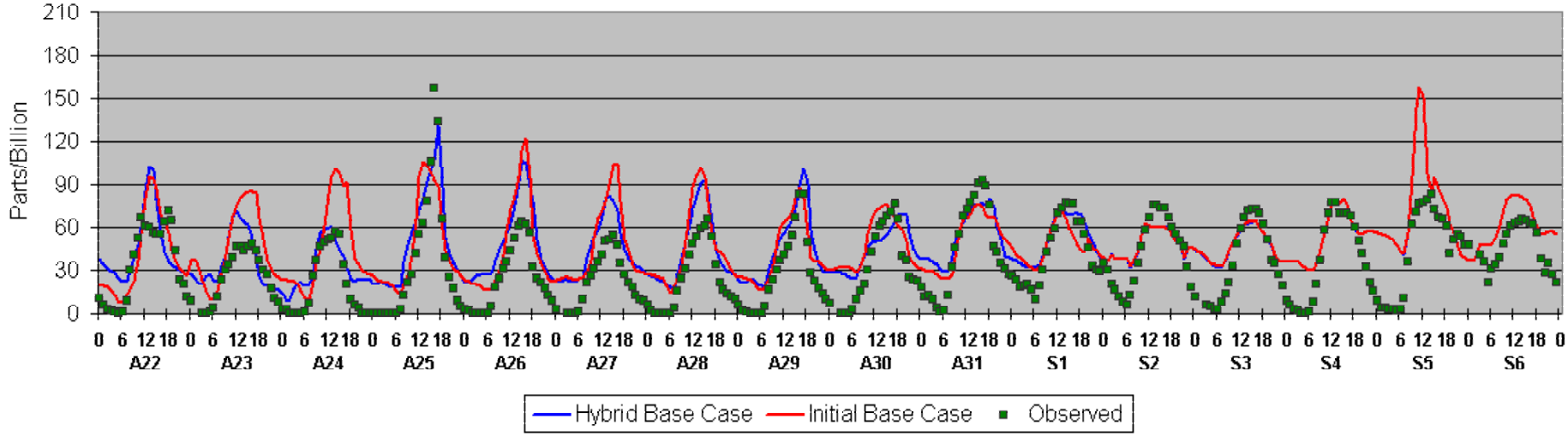

Lang HCHO Concentrations
Parts/Billion
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Lang ALD2 Concentrations
Parts/Billion
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

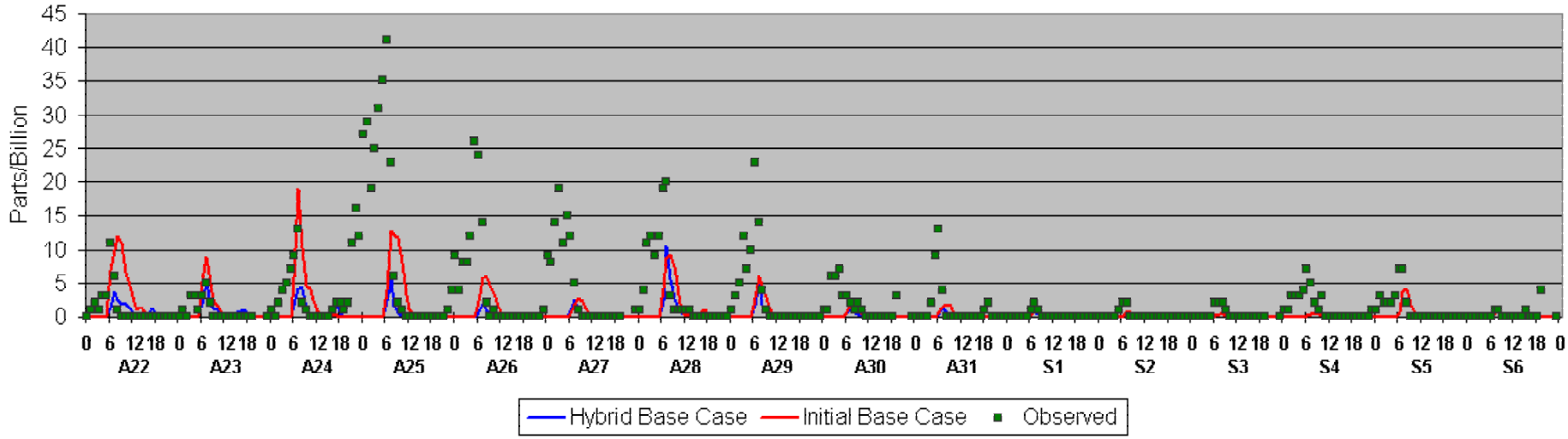

Lang HNO3 Concentrations
Parts/Billion
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

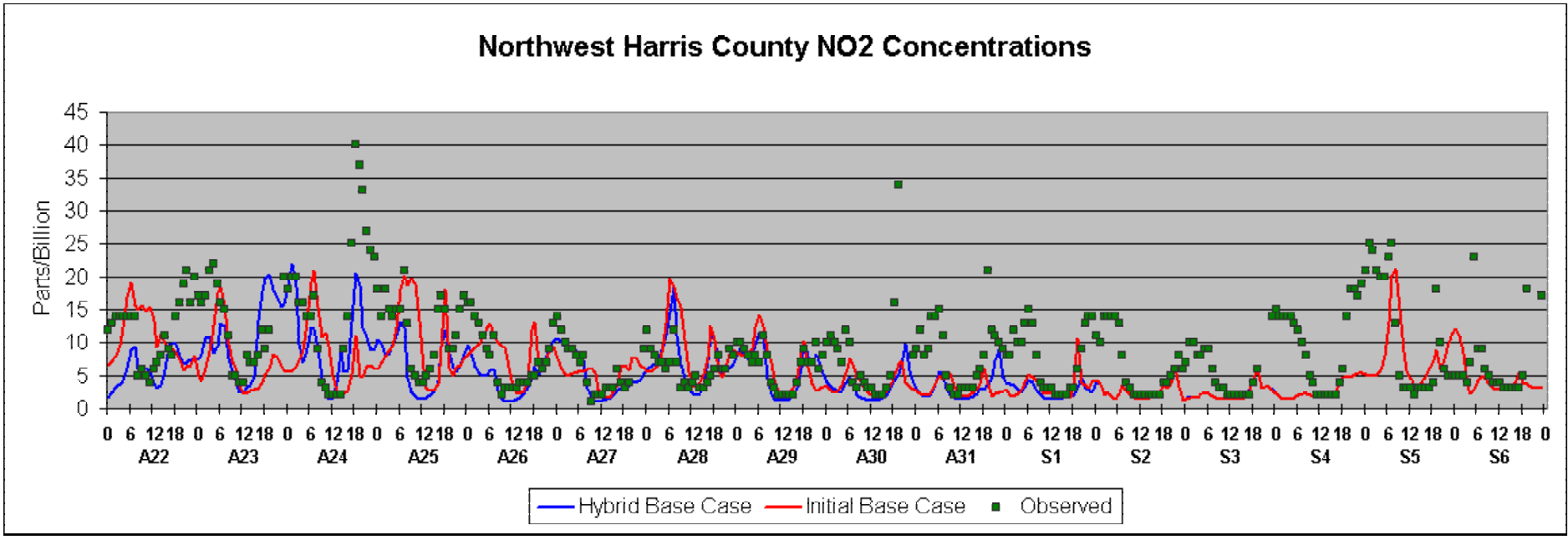
Northwest Harris County Time Series

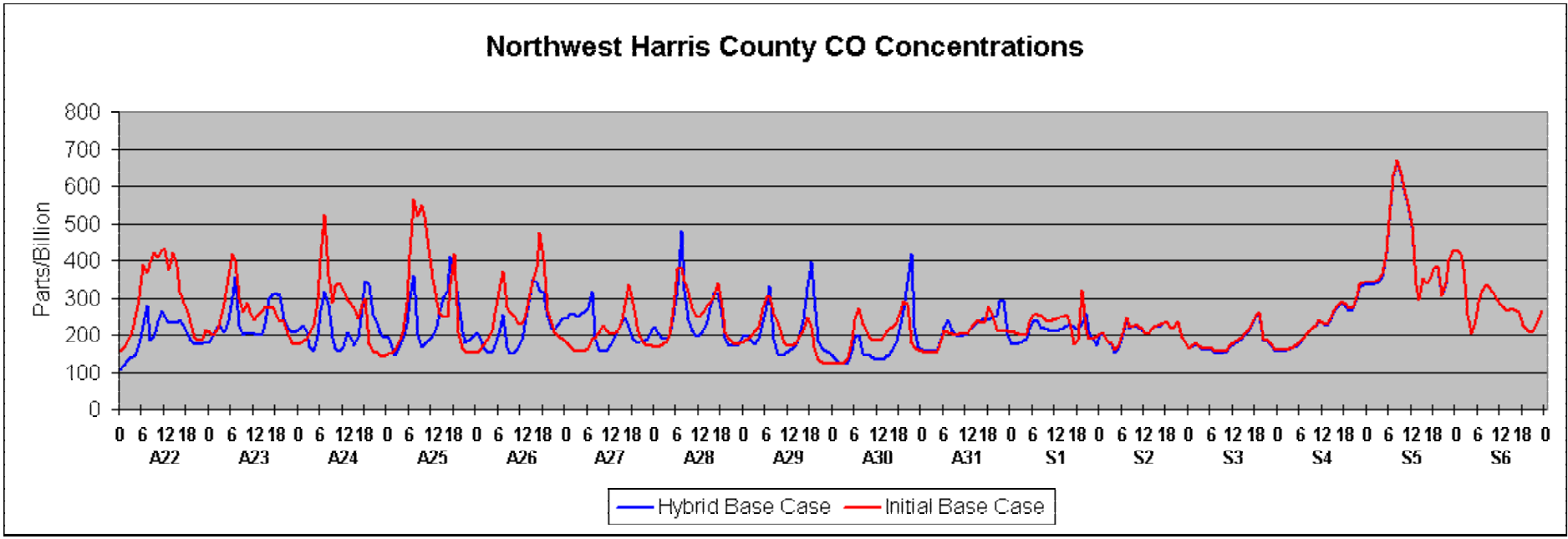
Northwest Harris County Ozone Concentrations

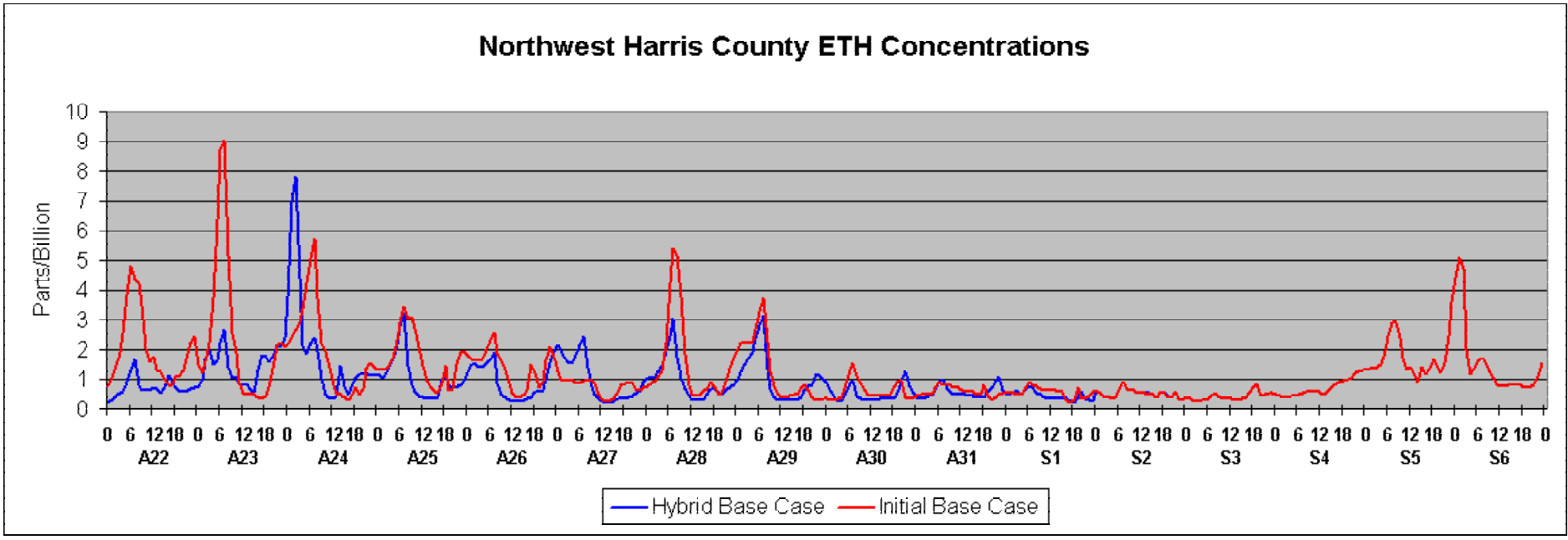


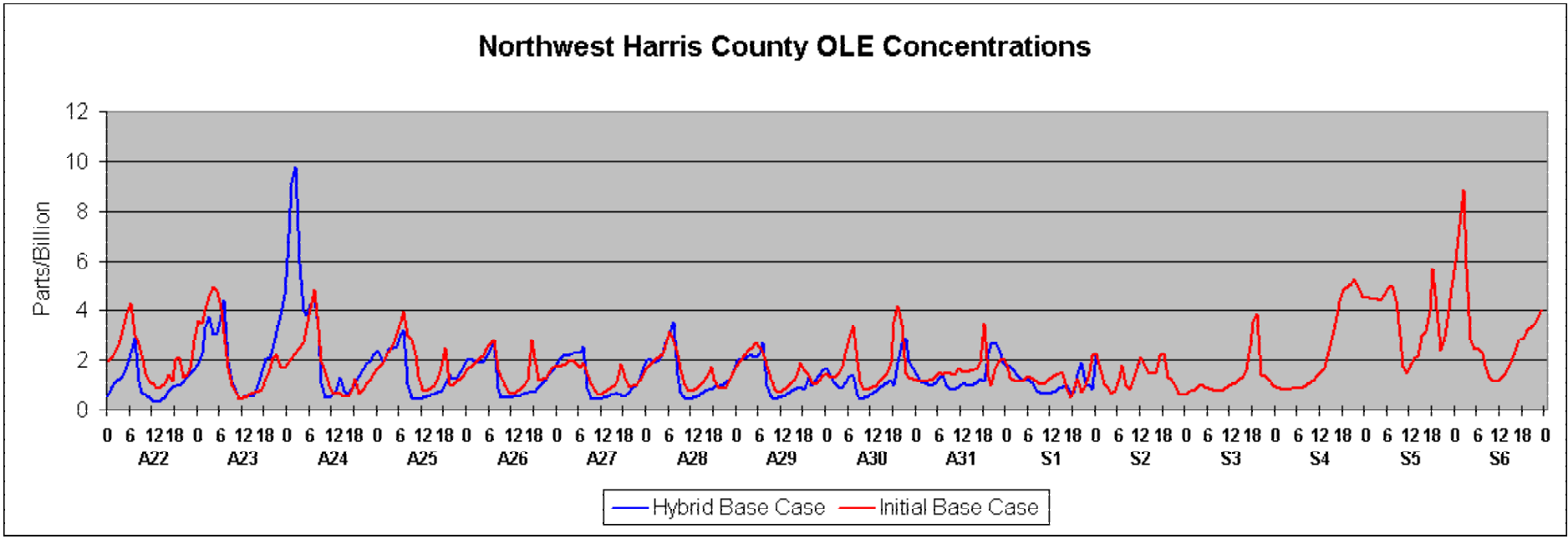
Northwest Harris County NO Concentrations



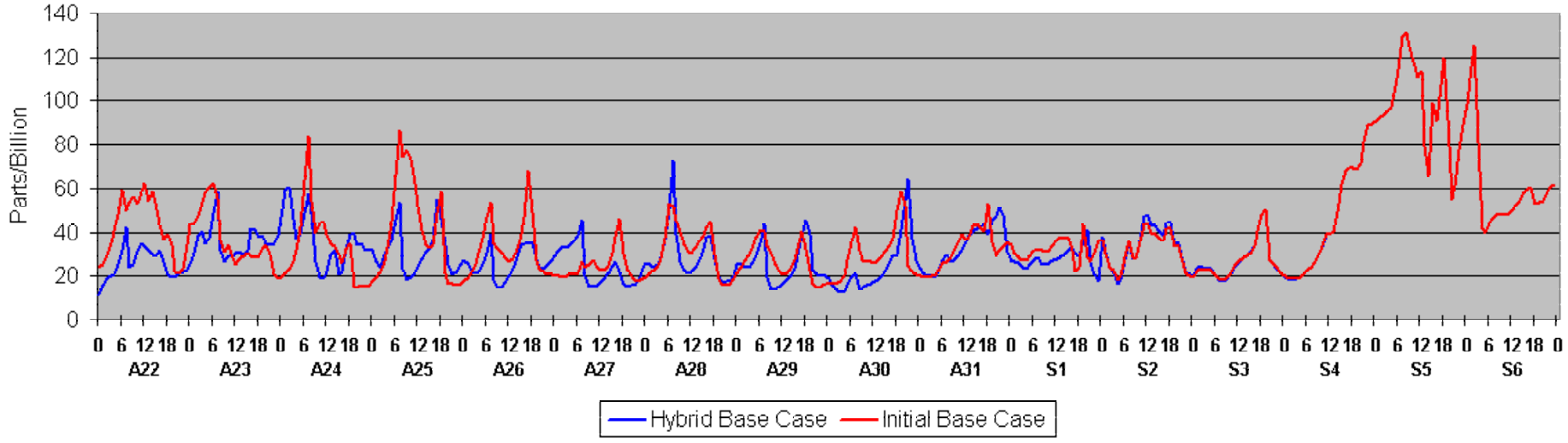

Northwest Harris County NO2 Concentrations
Parts/Billion
45
40
35
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


Northwest Harris County CO Concentrations
Parts/Billion
800
700
600
500
400
300
200
100
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

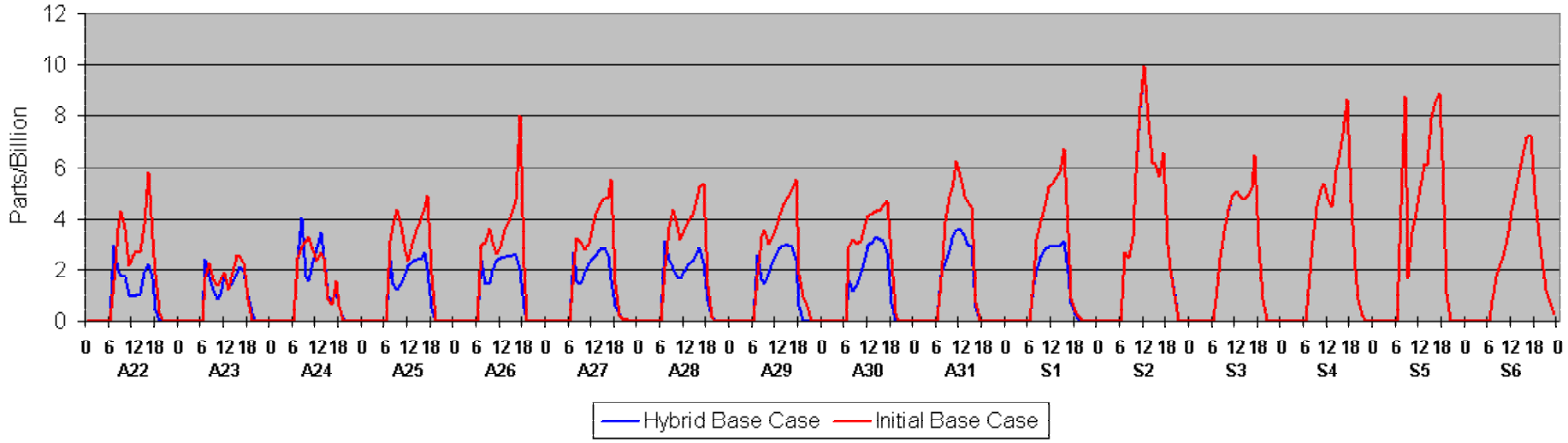

Northwest Harris County ETH Concentrations
Parts/Billion
0 1 2 3 4 5 6 7 8 9 10
0 6 12 18 A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Northwest Harris County OLE Concentrations
Parts/Billion
0 2 4 6 8 10 12
0 6 12 18 A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

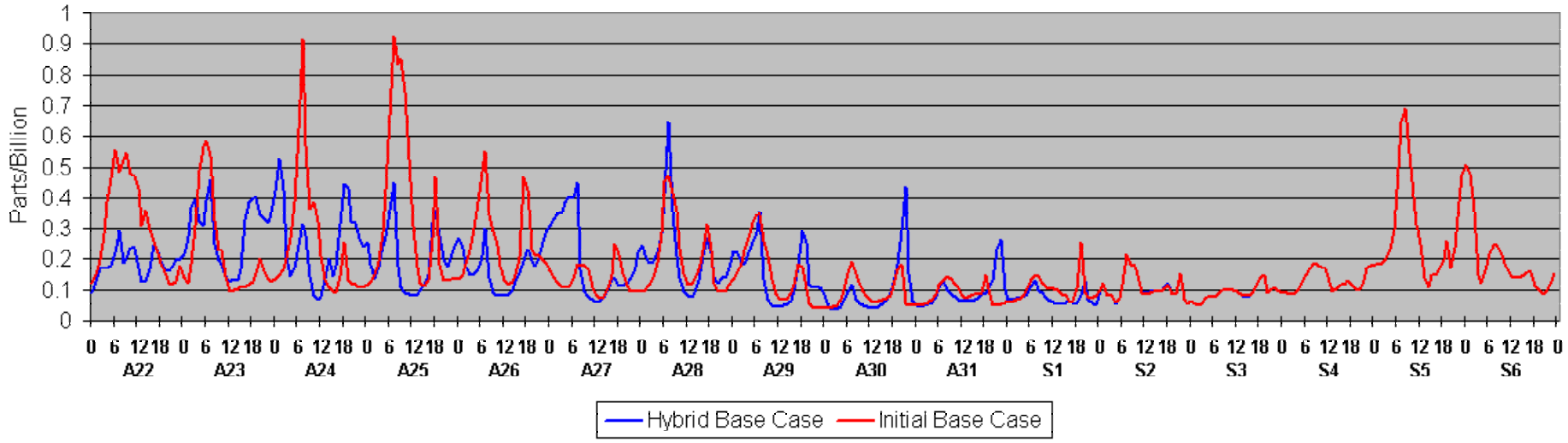
Northwest Harris County PAR Concentrations



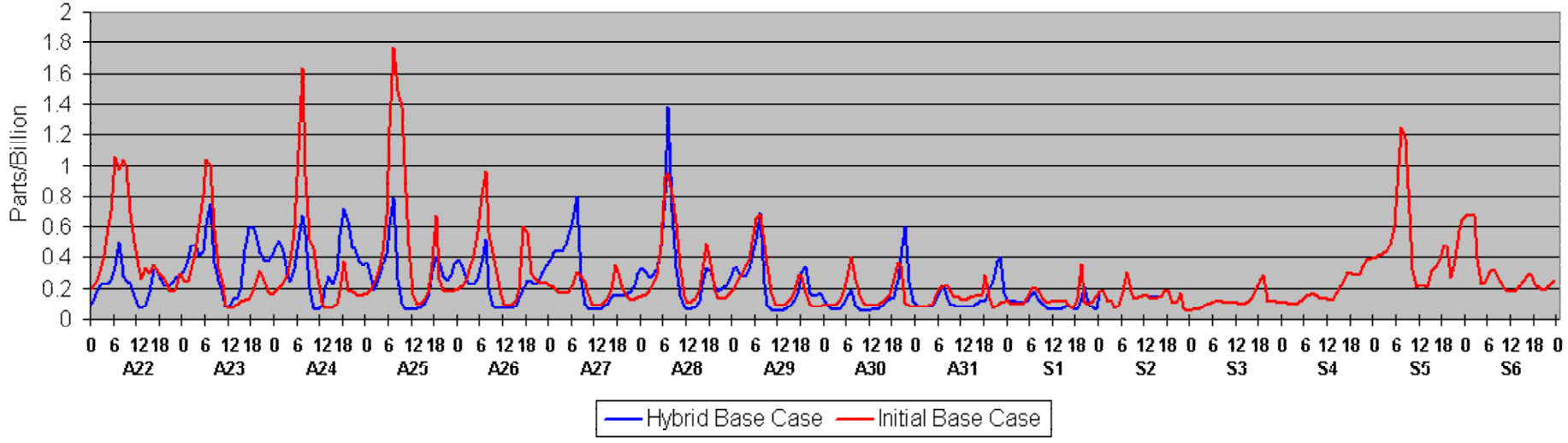
Northwest Harris County ISOP Concentrations

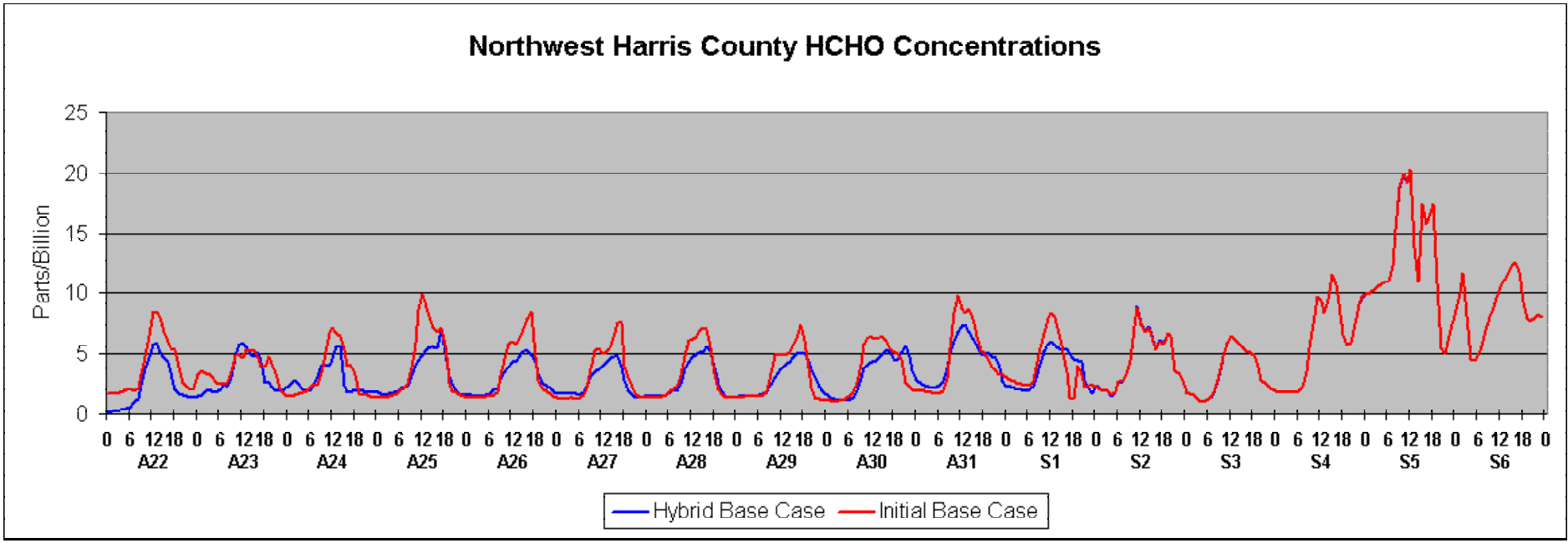


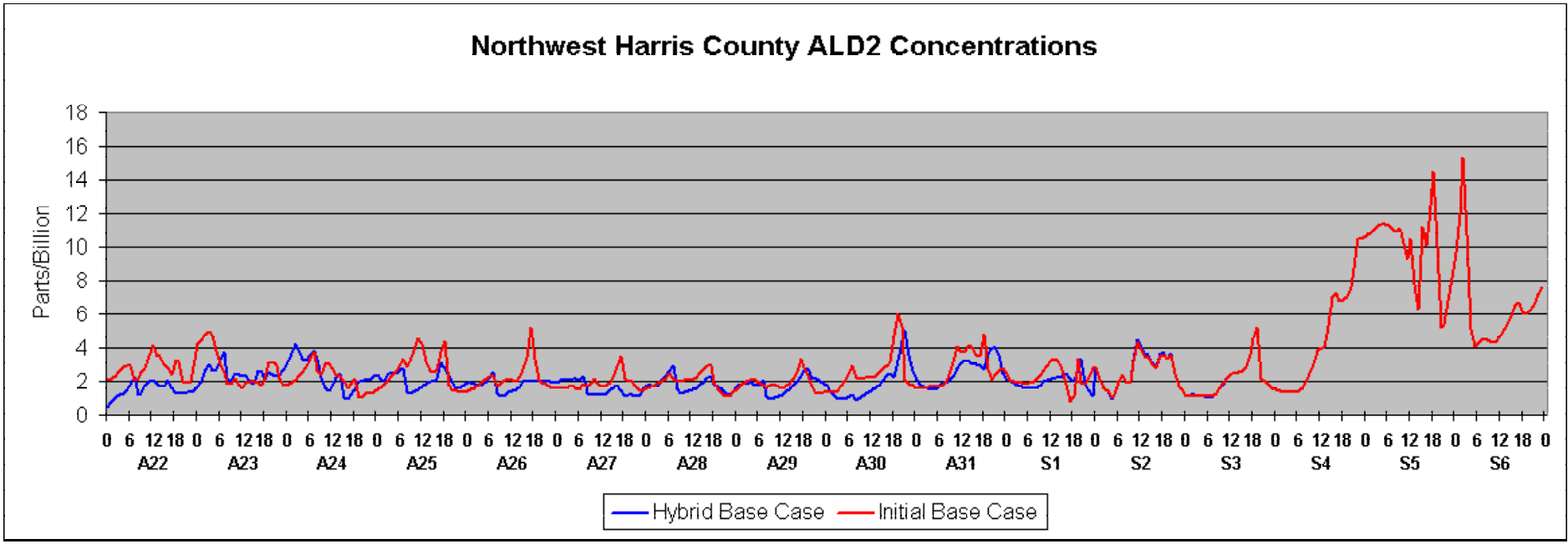
Northwest Harris County TOL Concentrations

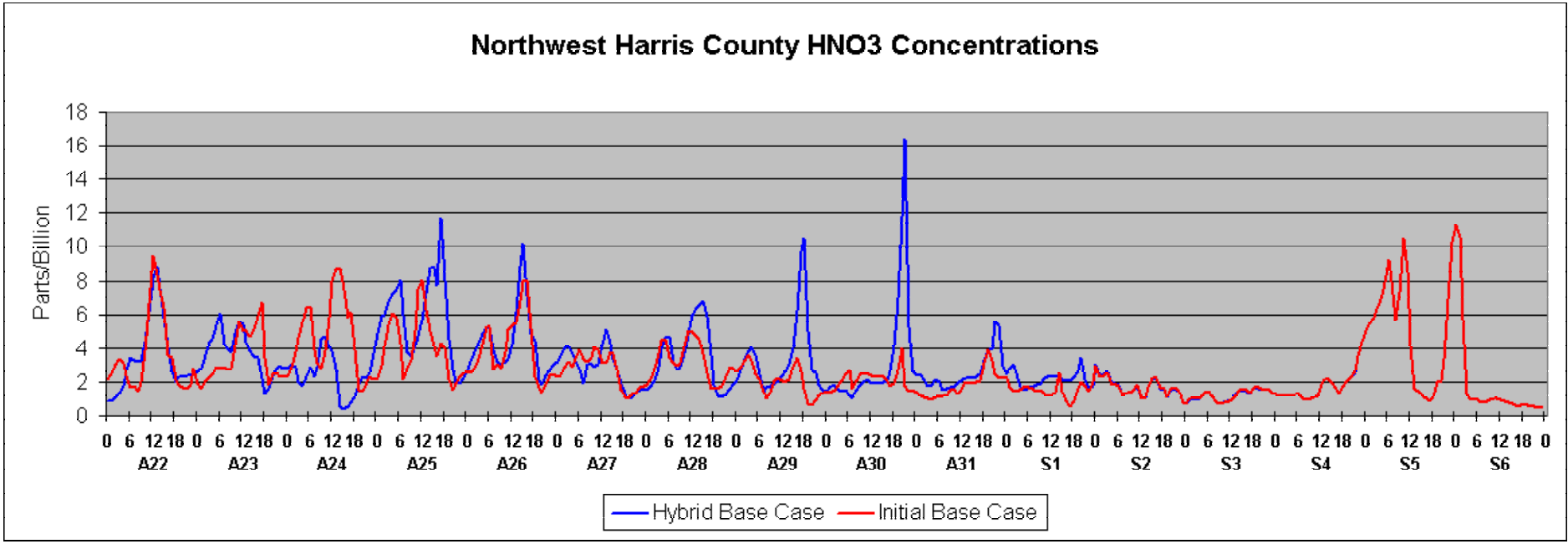


Northwest Harris County XYL Concentrations



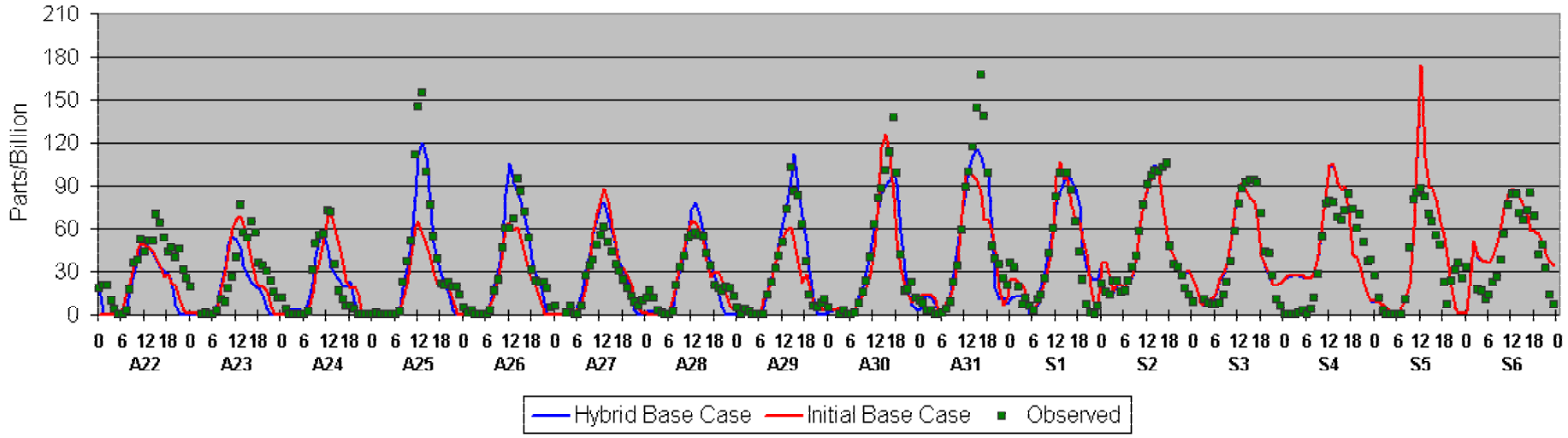

Northwest Harris County HCHO Concentrations
Parts/Billion
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Northwest Harris County ALD2 Concentrations
Parts/Billion
18
16
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

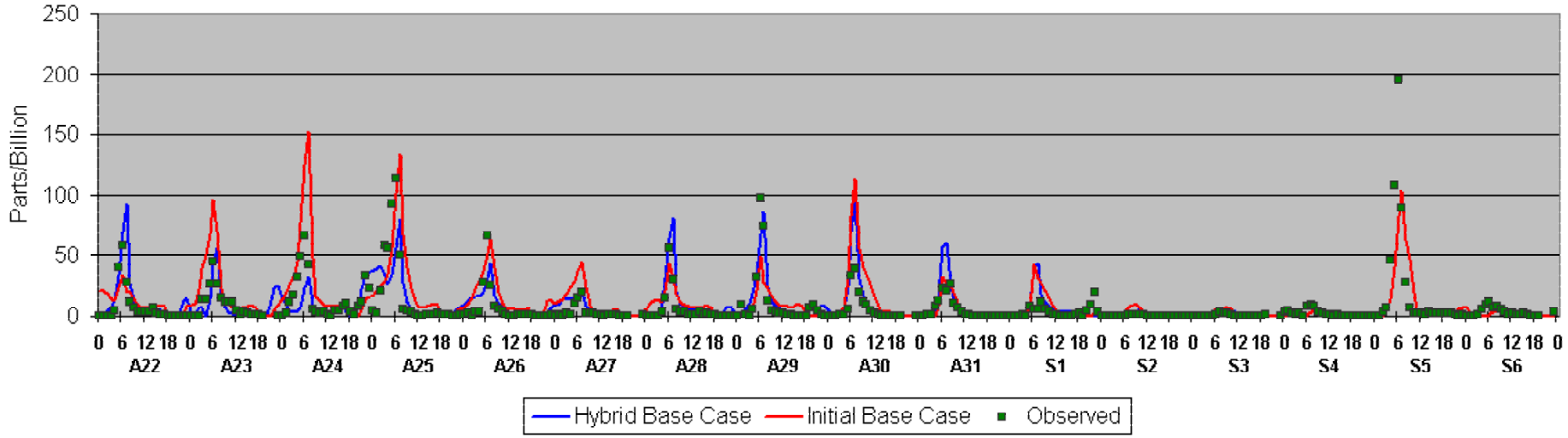

Northwest Harris County HNO3 Concentrations
Parts/Billion
0
2
4
6
8
10
12
14
16
18
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Houston East Time Series

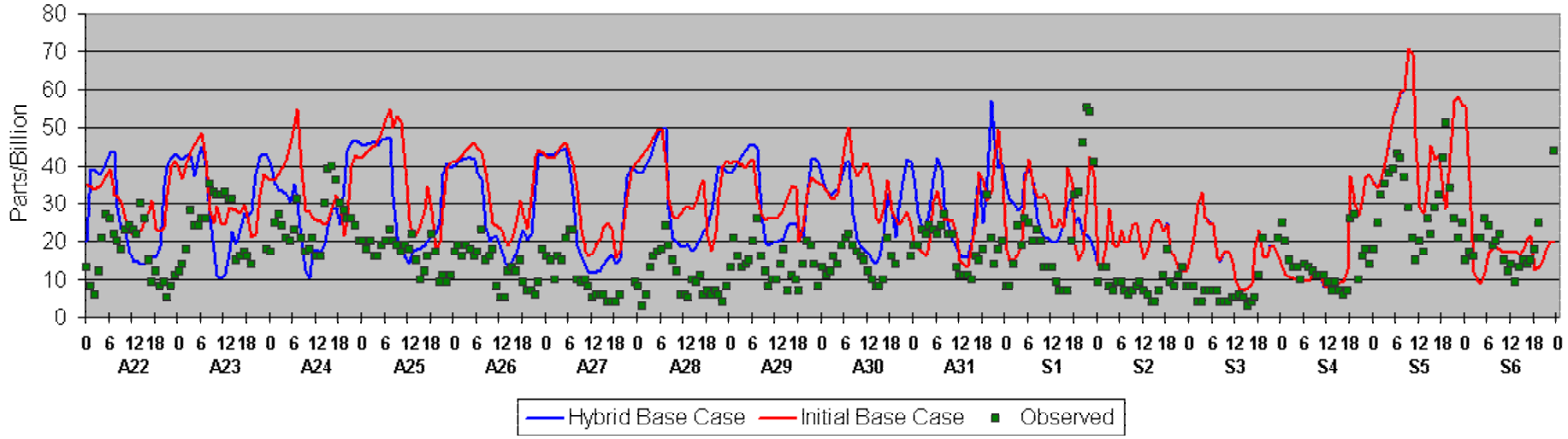
Houston East Ozone Concentrations



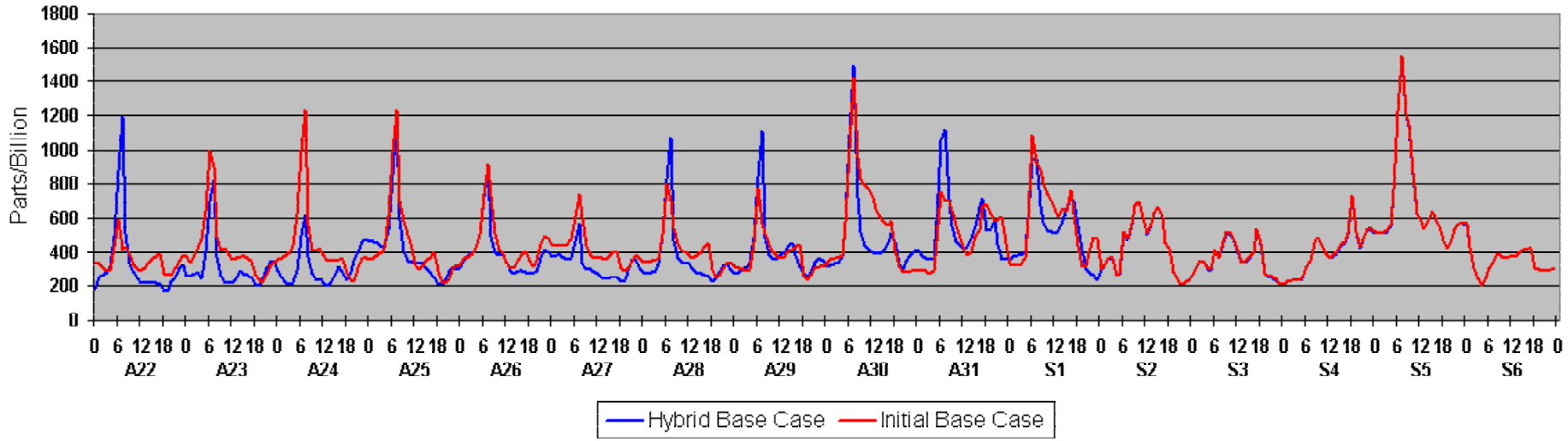
Houston East NO Concentrations



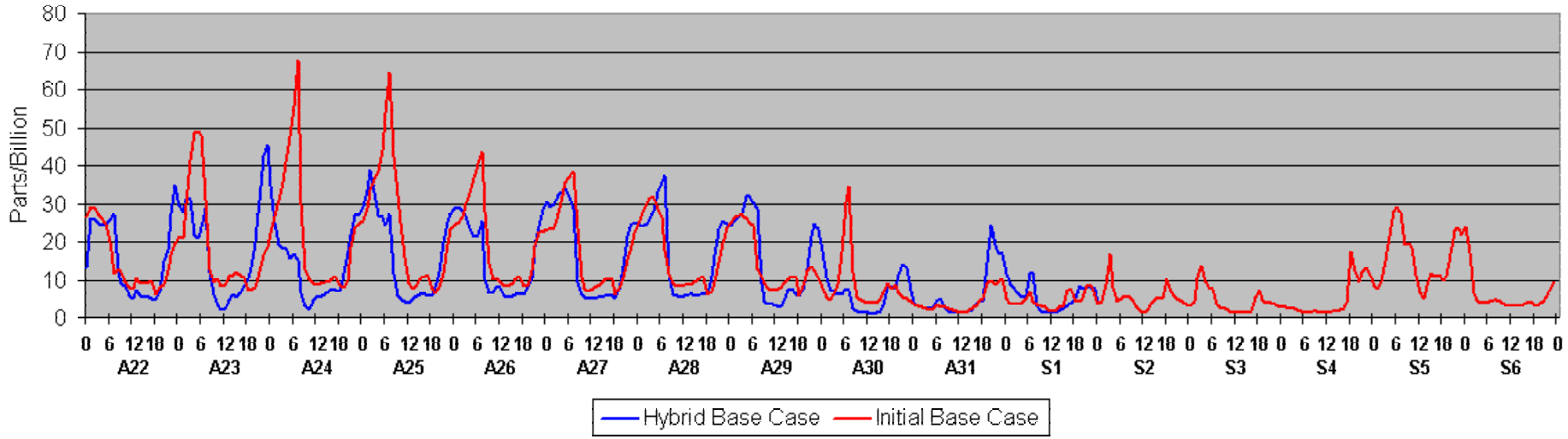
Houston East NO2 Concentrations



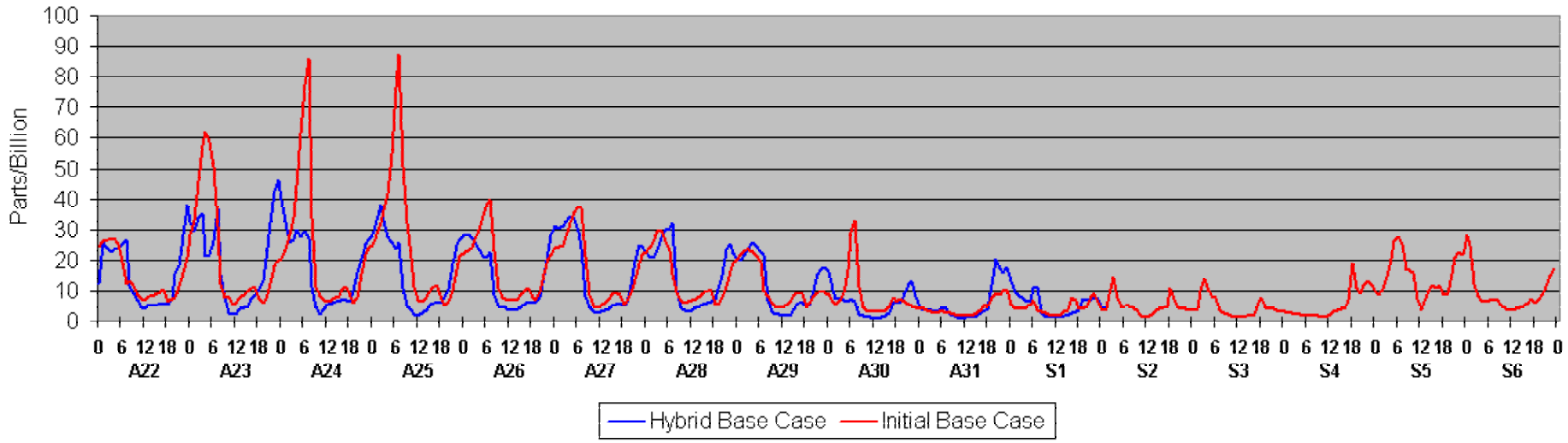
Houston East CO Concentrations



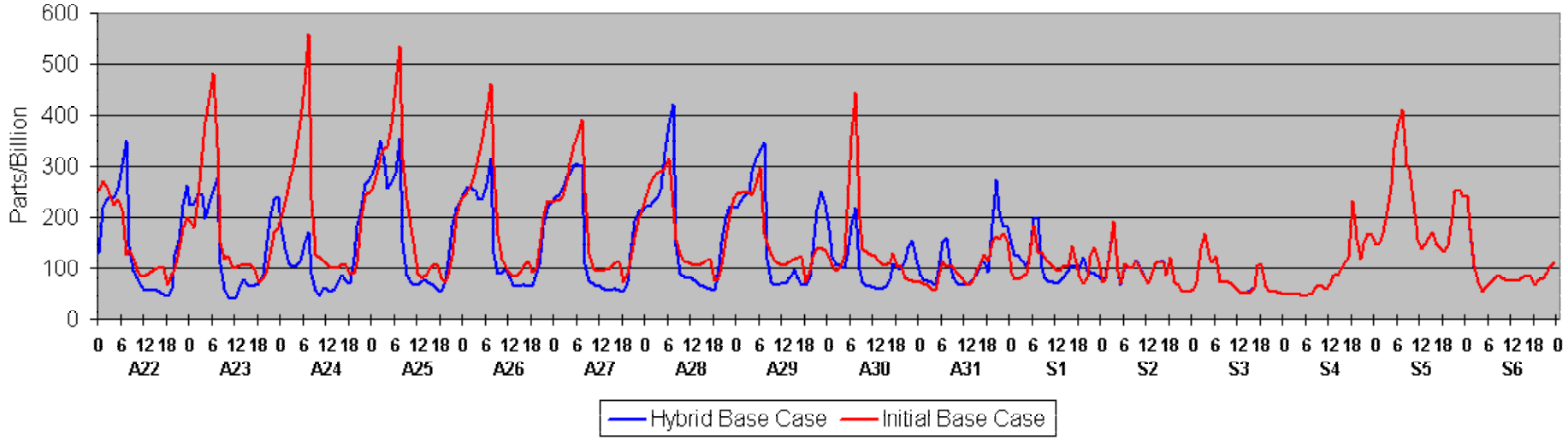
Houston East ETH Concentrations



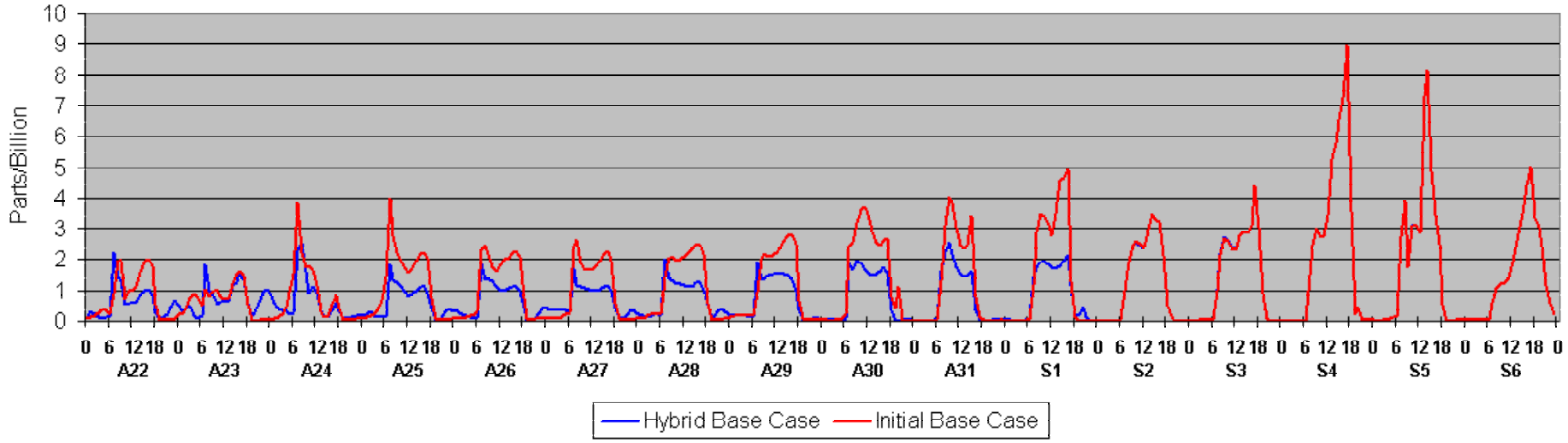
Houston East OLE Concentrations

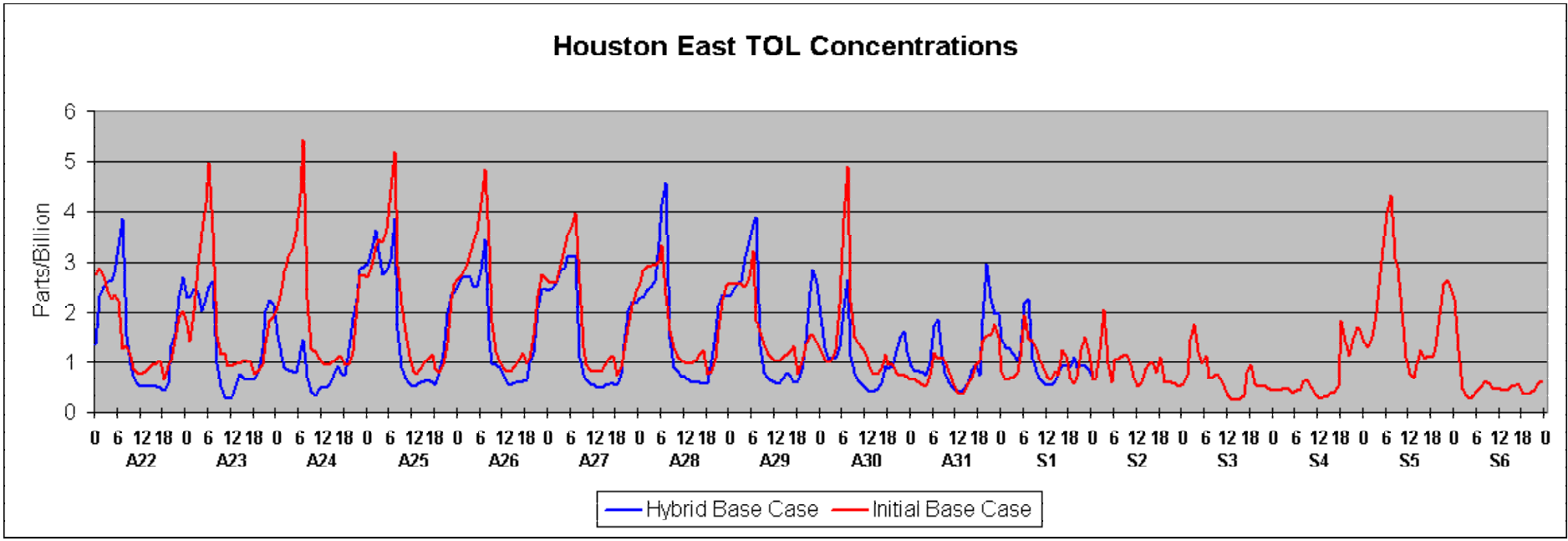


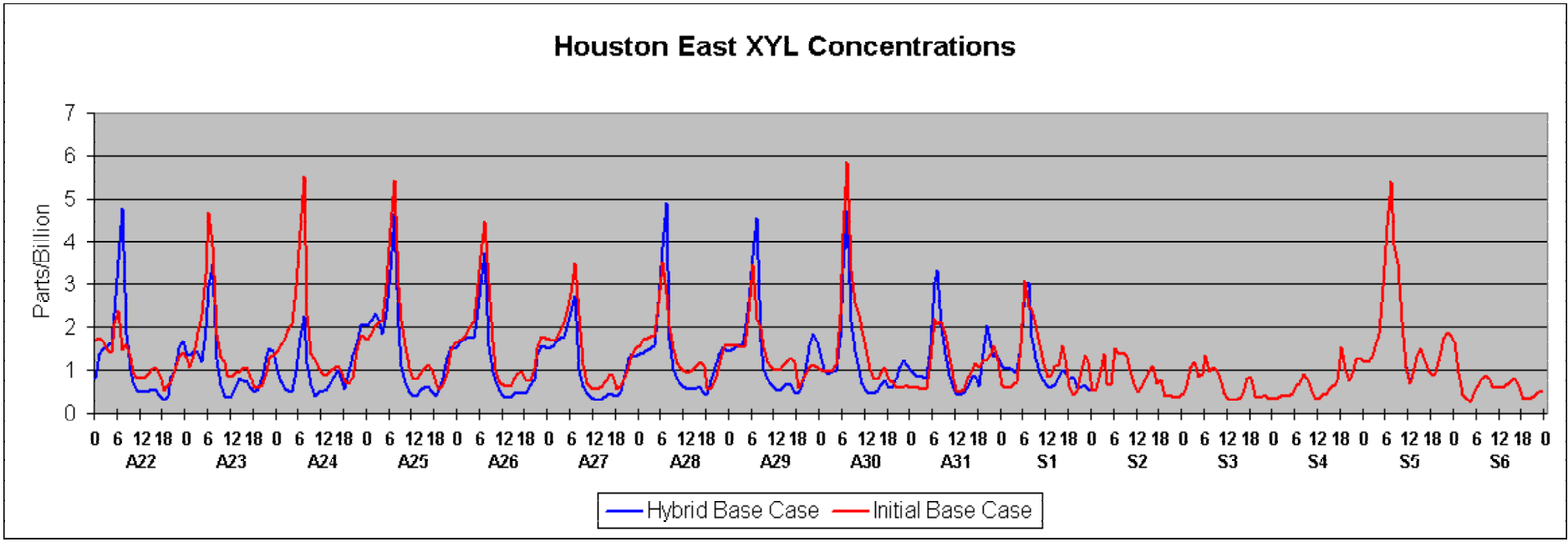
Houston East PAR Concentrations



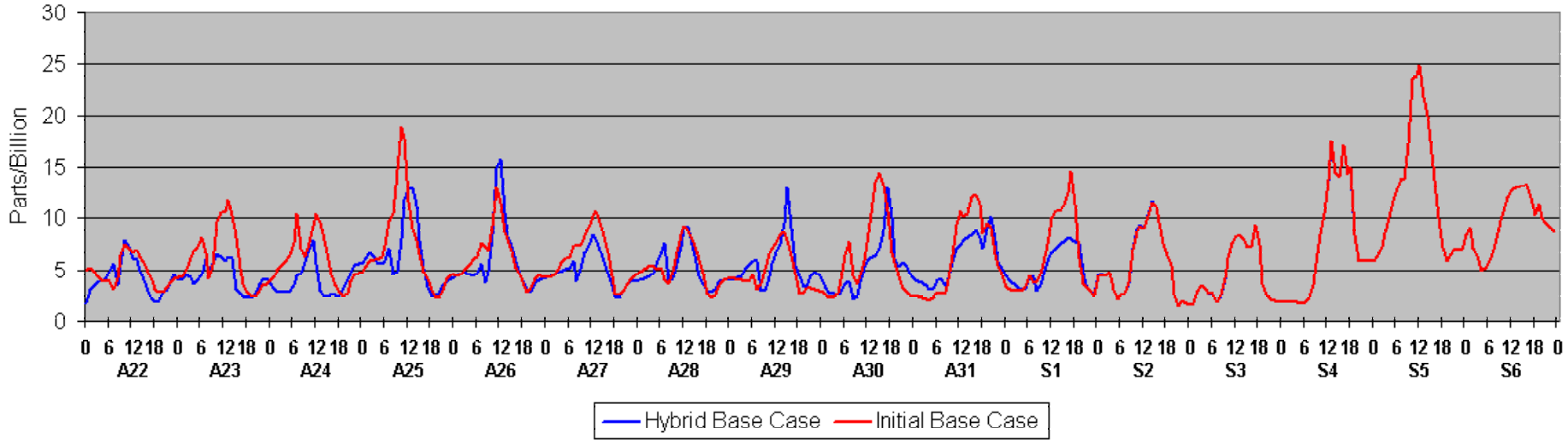
Houston East ISOP Concentrations



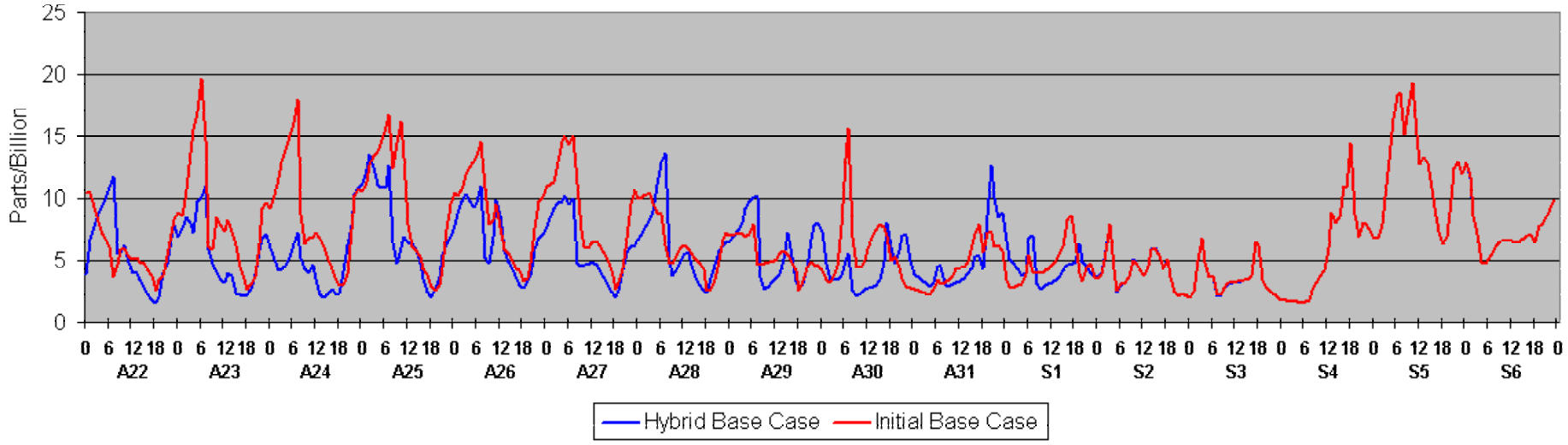

Houston East TOL Concentrations
Parts/Billion
0
1
2
3
4
5
6
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

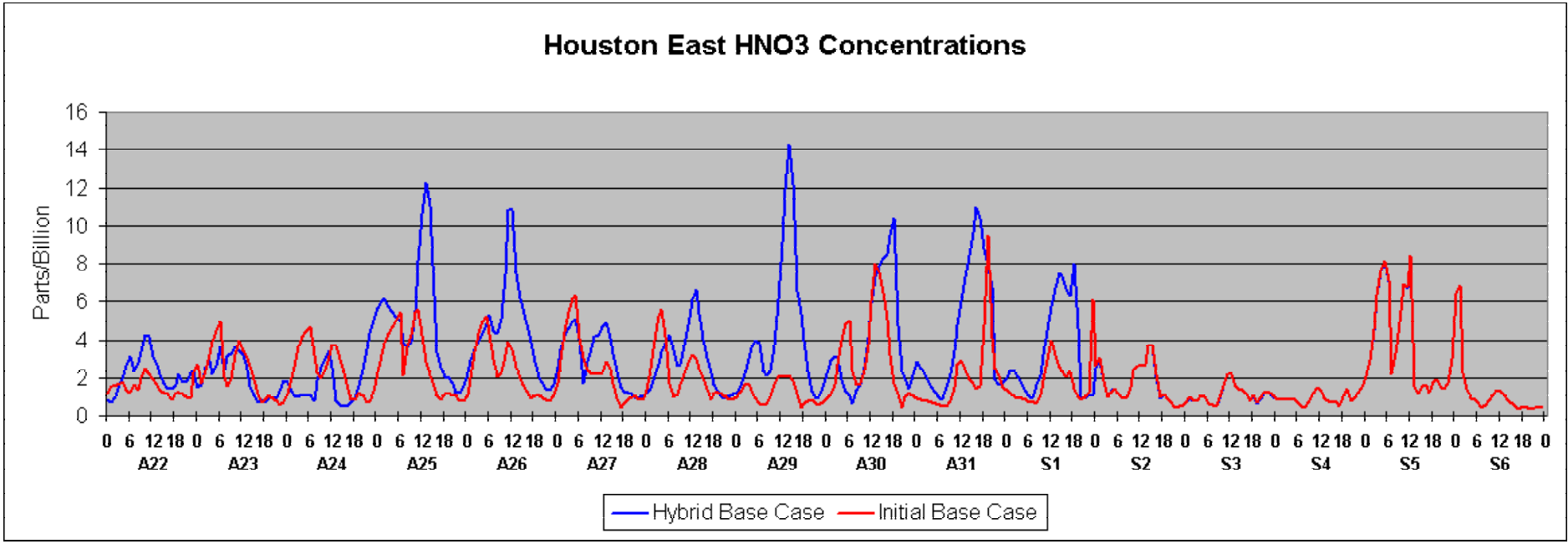

Houston East XYL Concentrations
Parts/Billion
0
1
2
3
4
5
6
7
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Houston East HCHO Concentrations



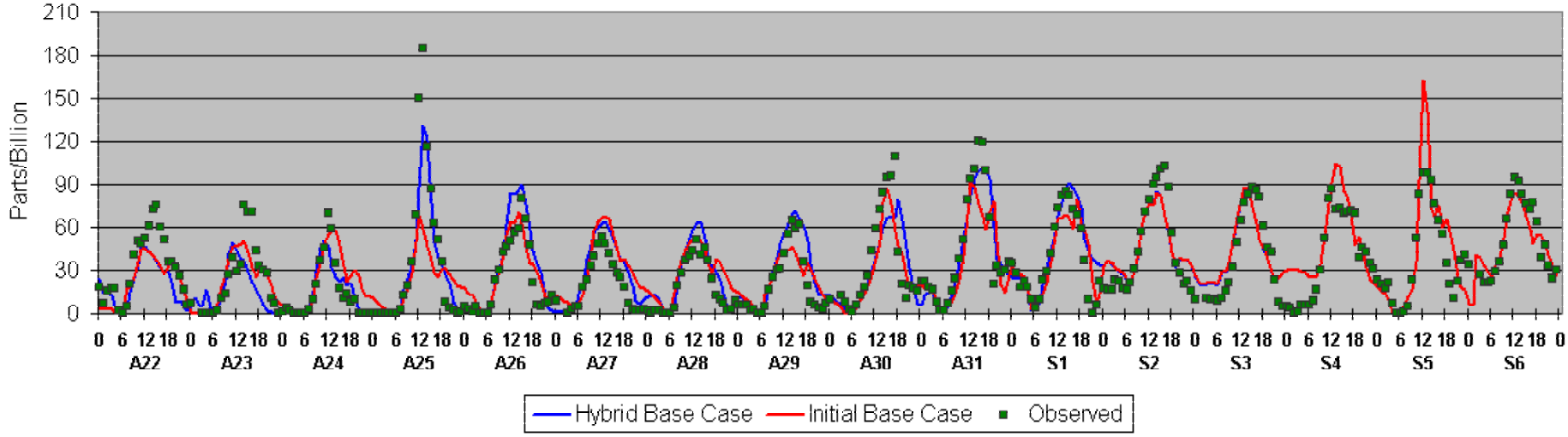
Houston East ALD2 Concentrations



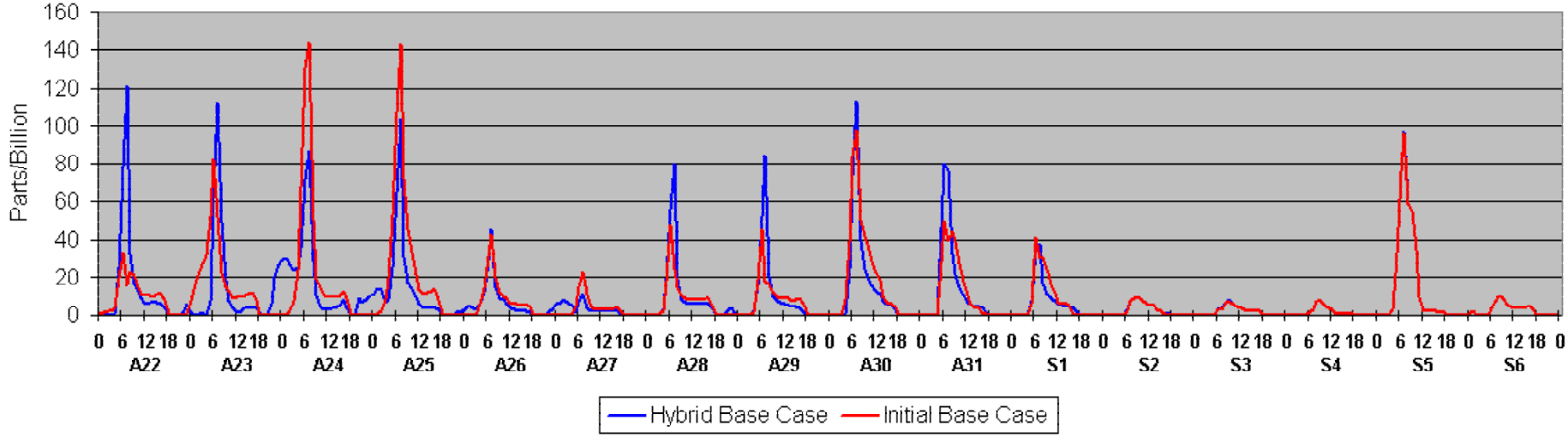

Houston East HNO3 Concentrations
Parts/Billion
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Houston Regional Office
Time Series

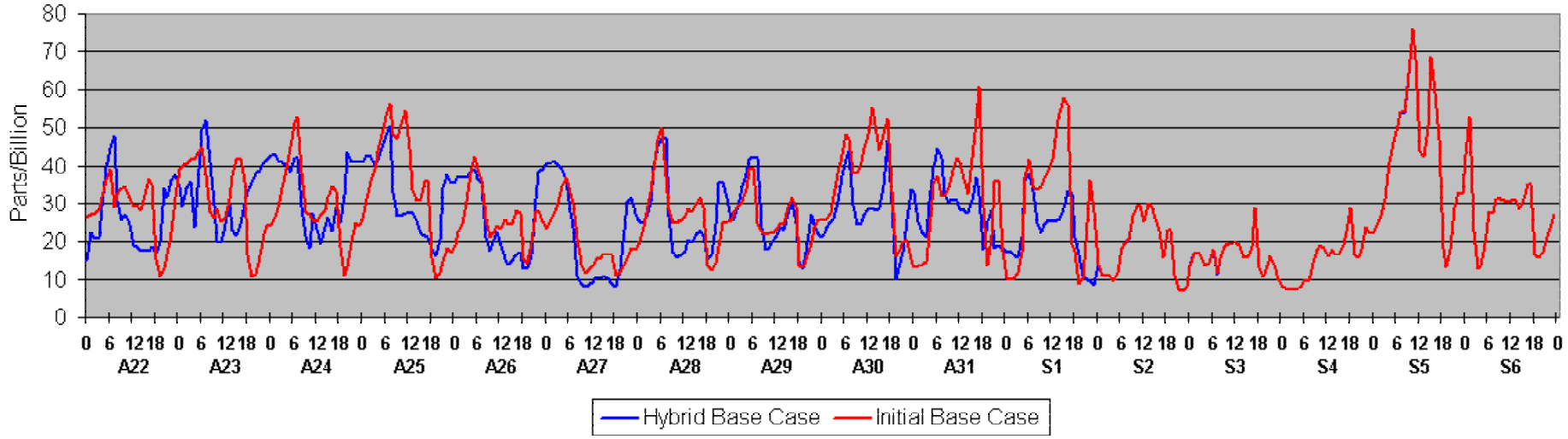
Houston Regional Office Ozone Concentrations



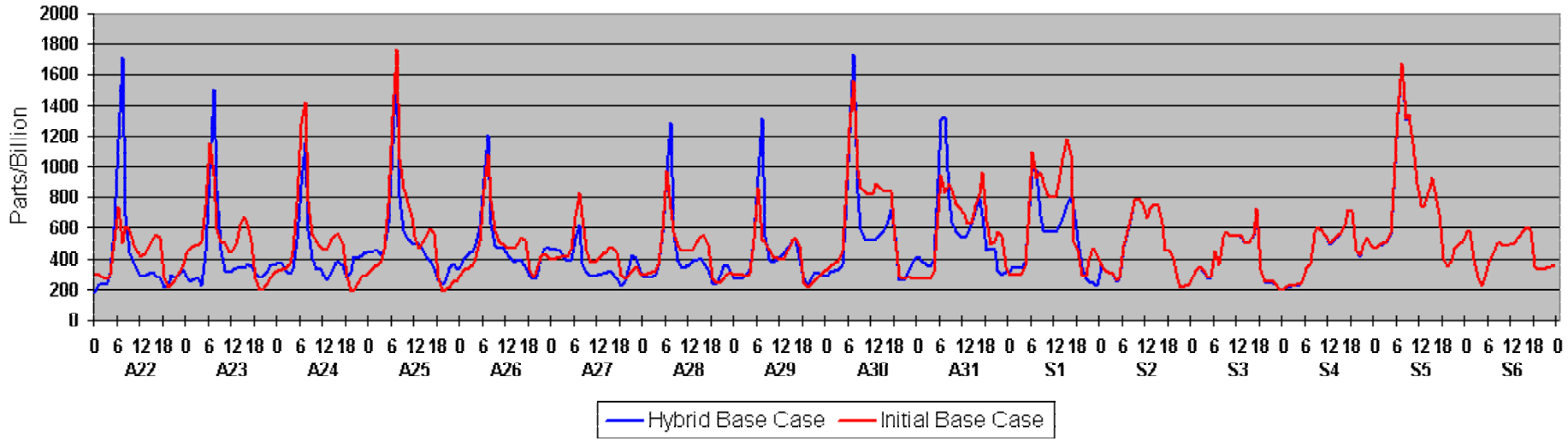
Houston Regional Office NO Concentrations



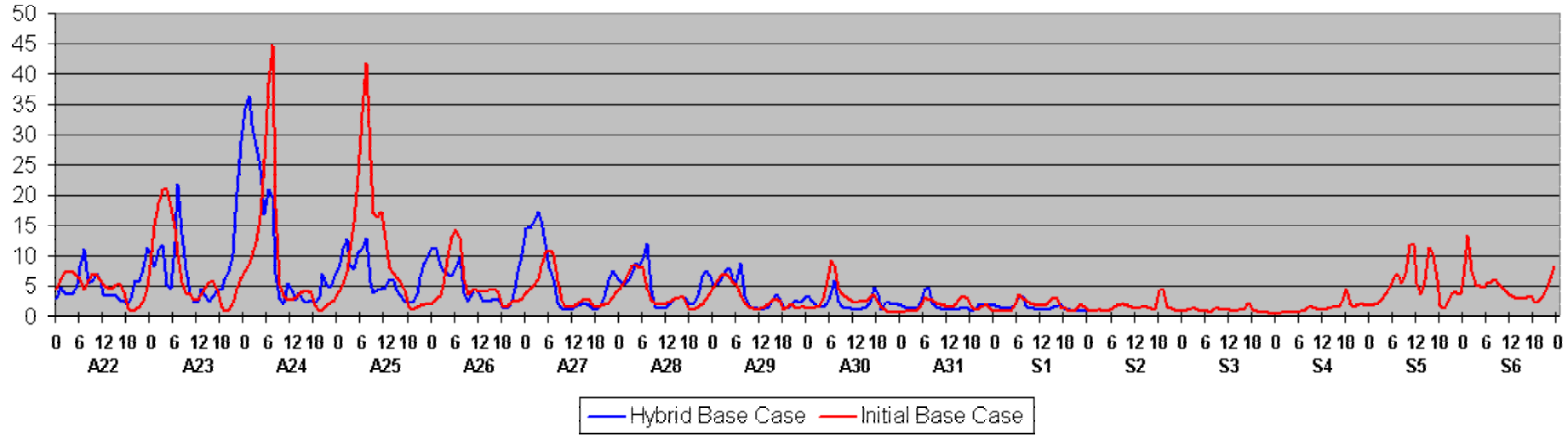
Houston Regional Office NO2 Concentrations



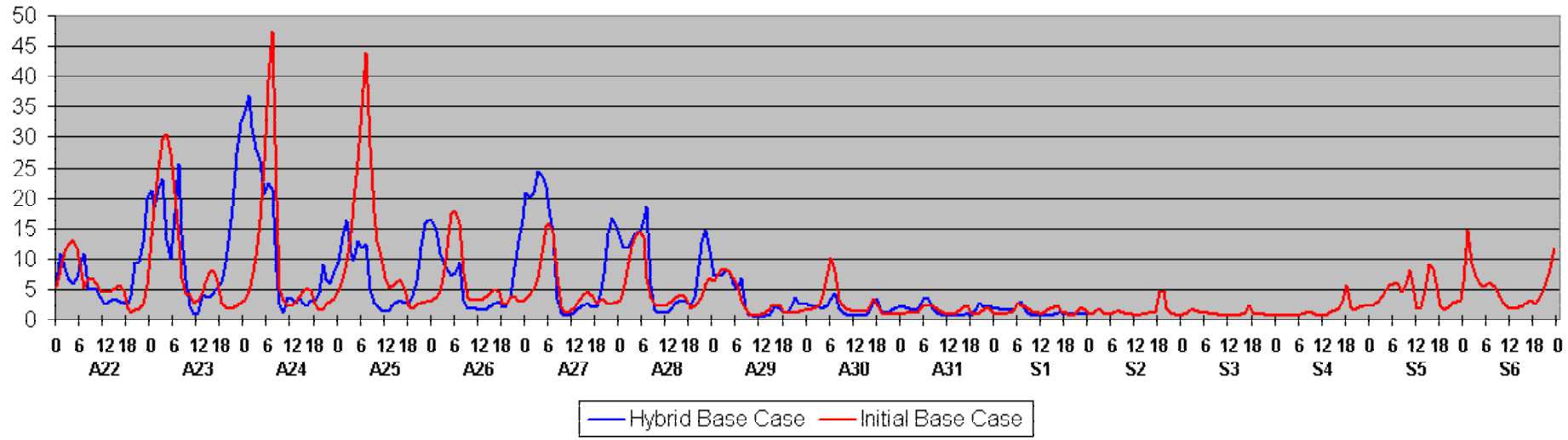
Houston Regional Office CO Concentrations



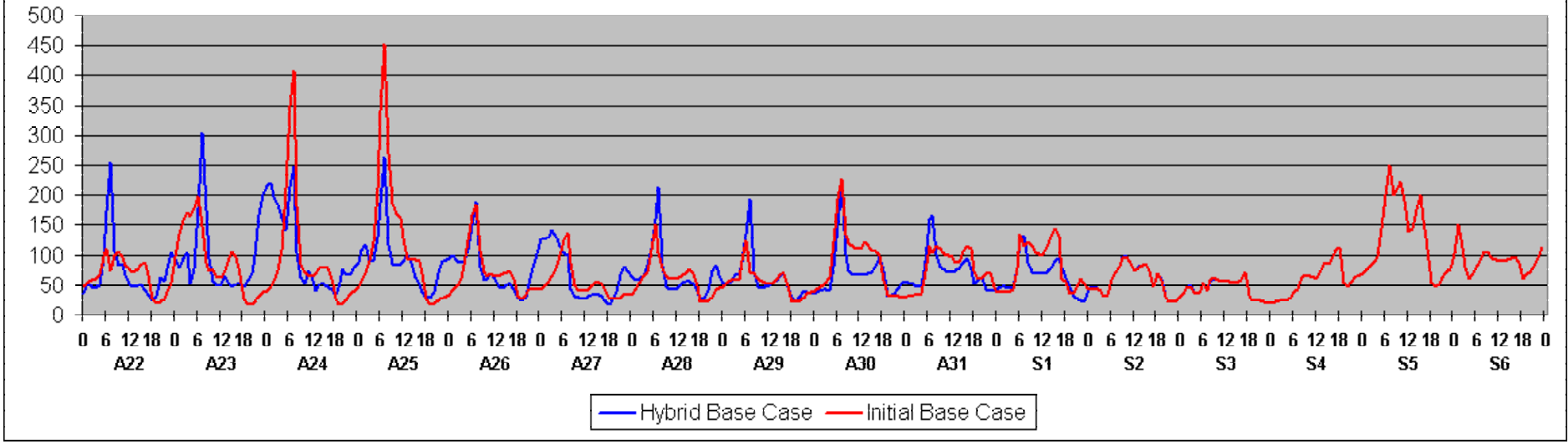
Houston Regional Office ETH Concentrations



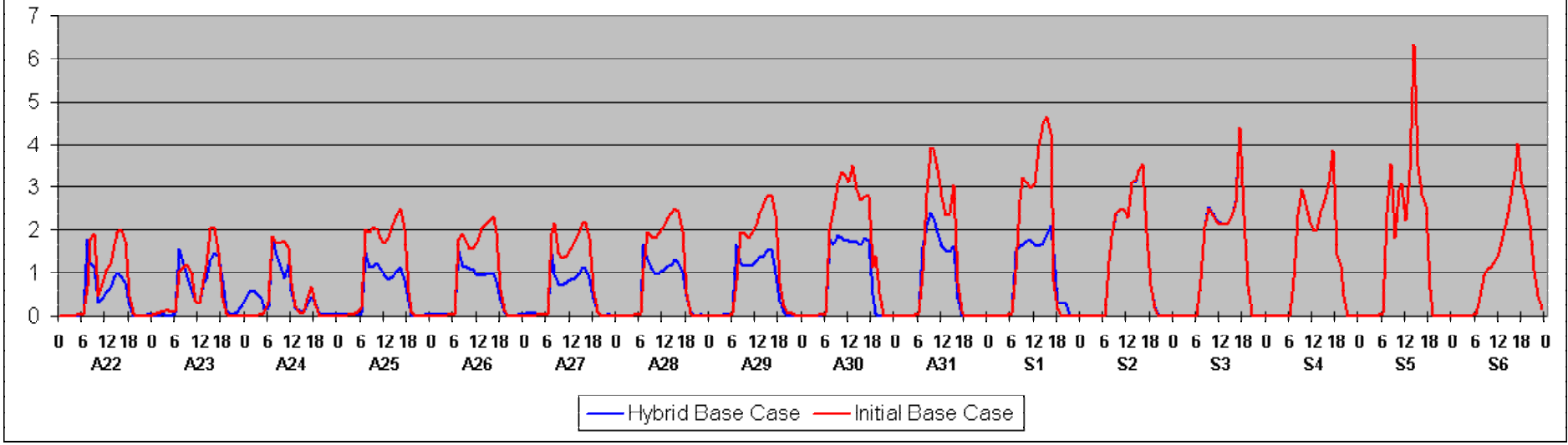
Houston Regional Office OLE Concentrations



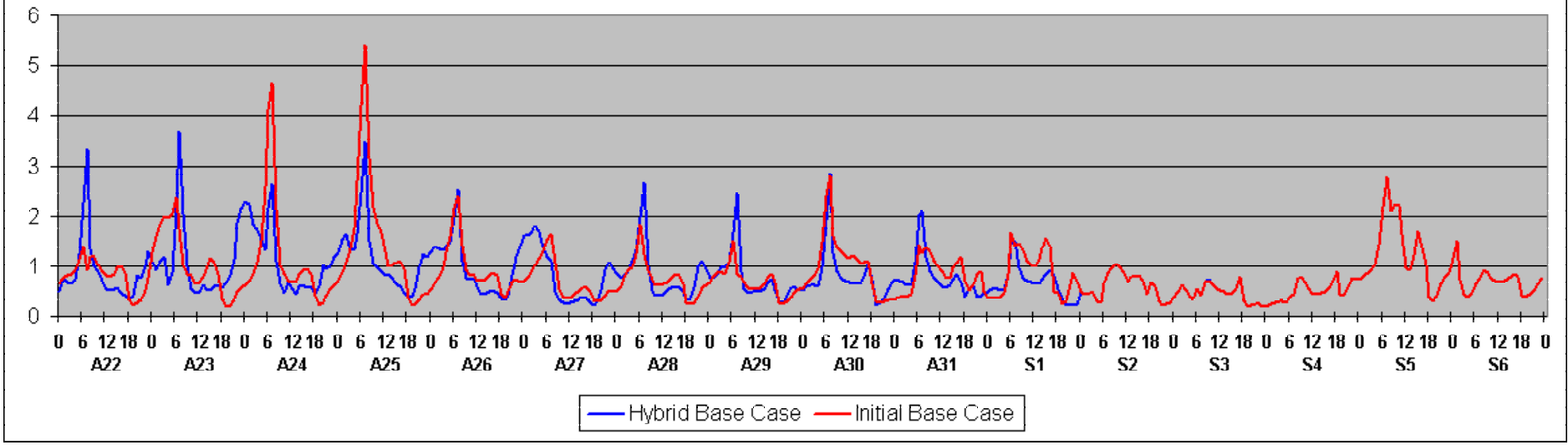
Houston Regional Office PAR Concentrations



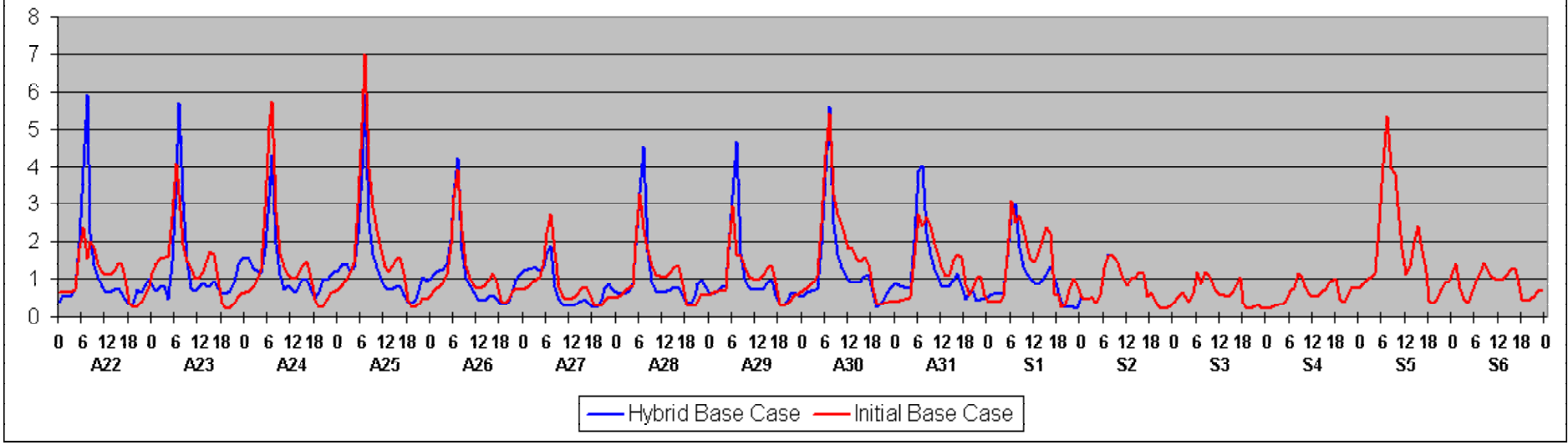
Houston Regional Office ISOP Concentrations

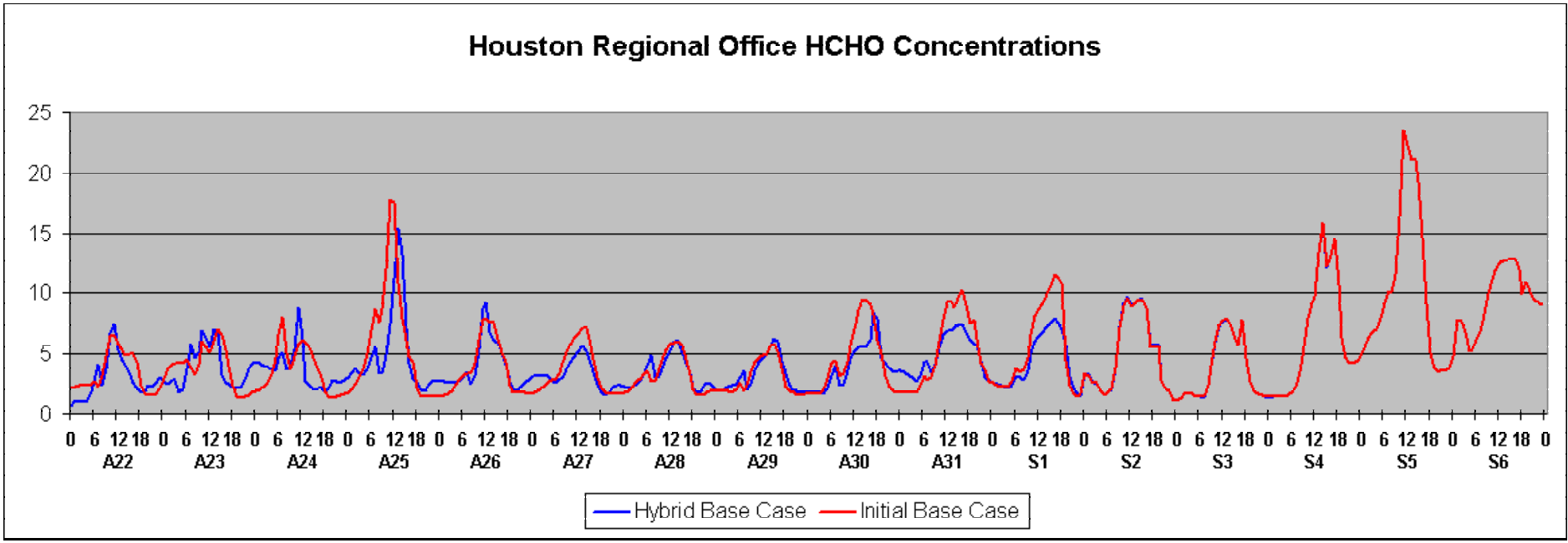


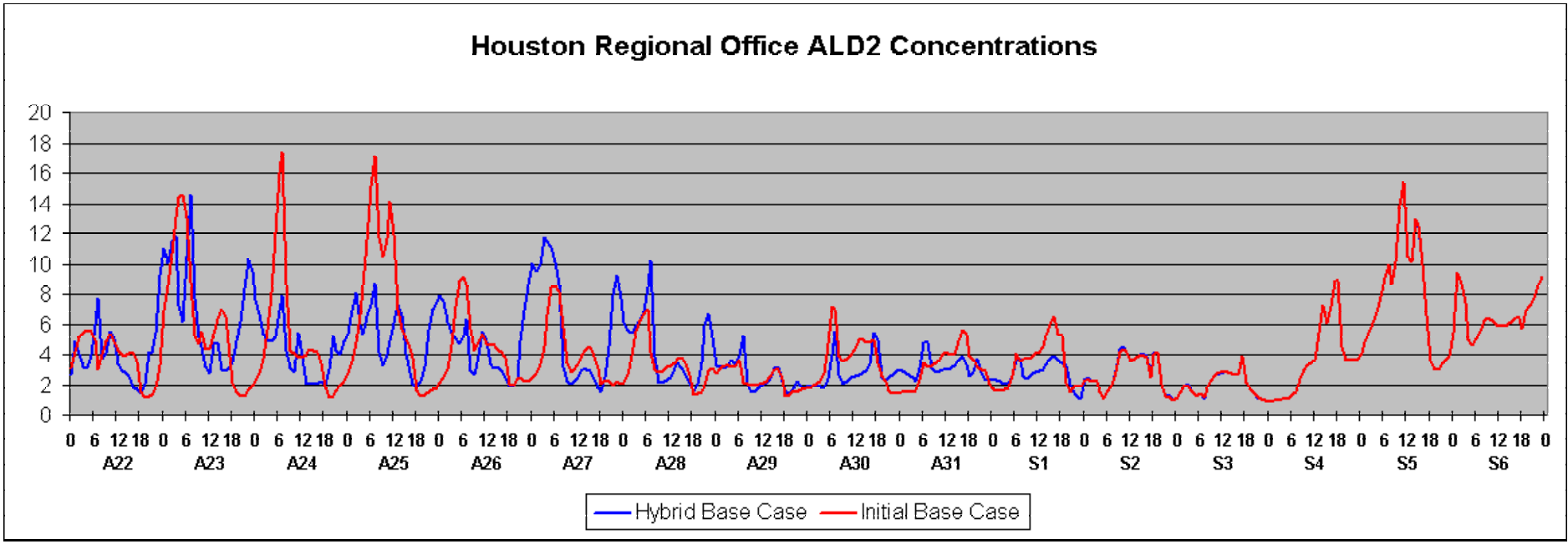
Houston Regional Office TOL Concentrations

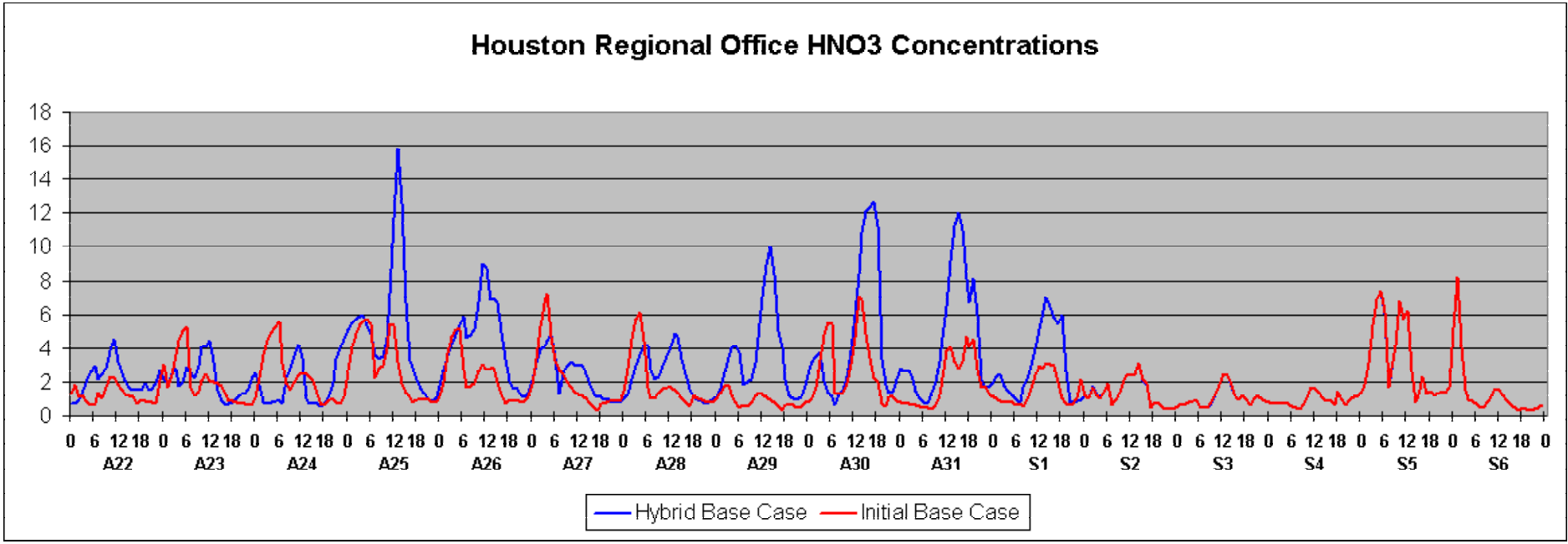


Houston Regional Office XYL Concentrations



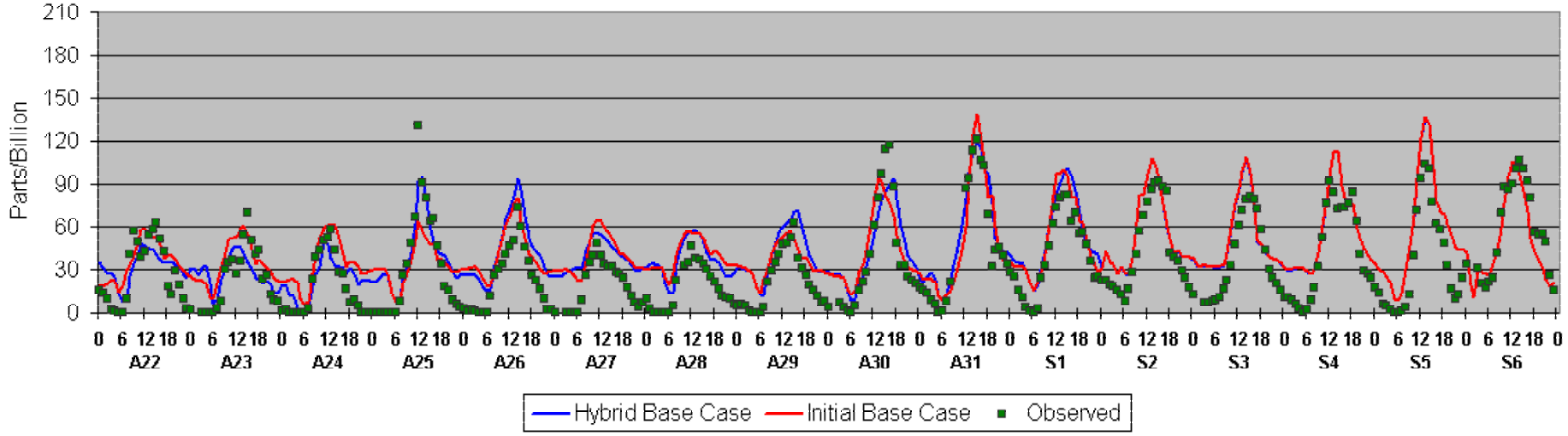

Houston Regional Office HCHO Concentrations
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Houston Regional Office ALD2 Concentrations
20
18
16
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

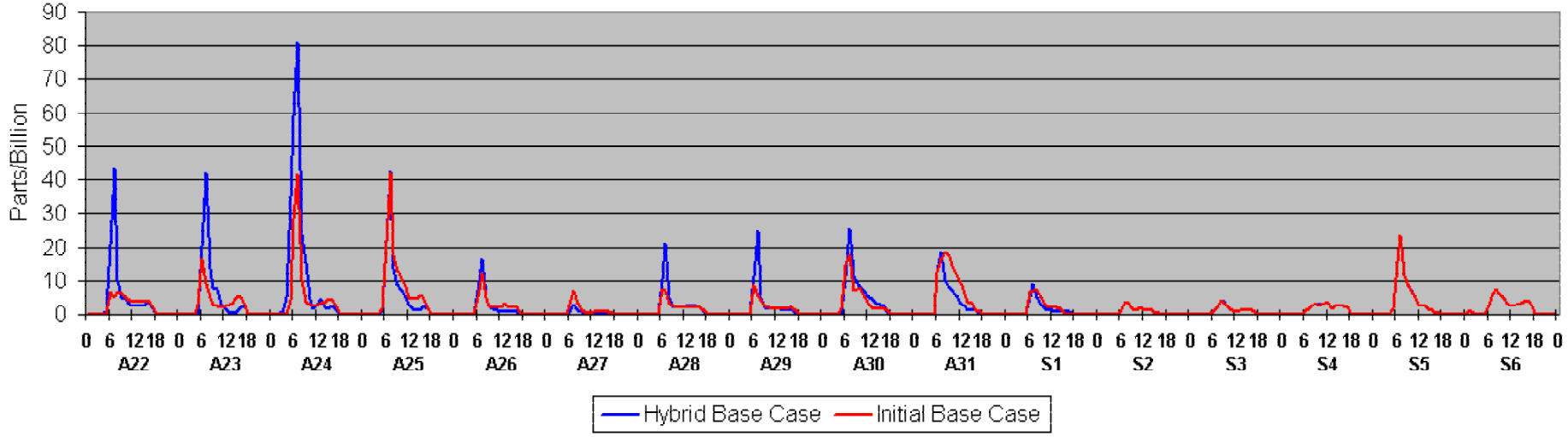

Houston Regional Office HNO3 Concentrations
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

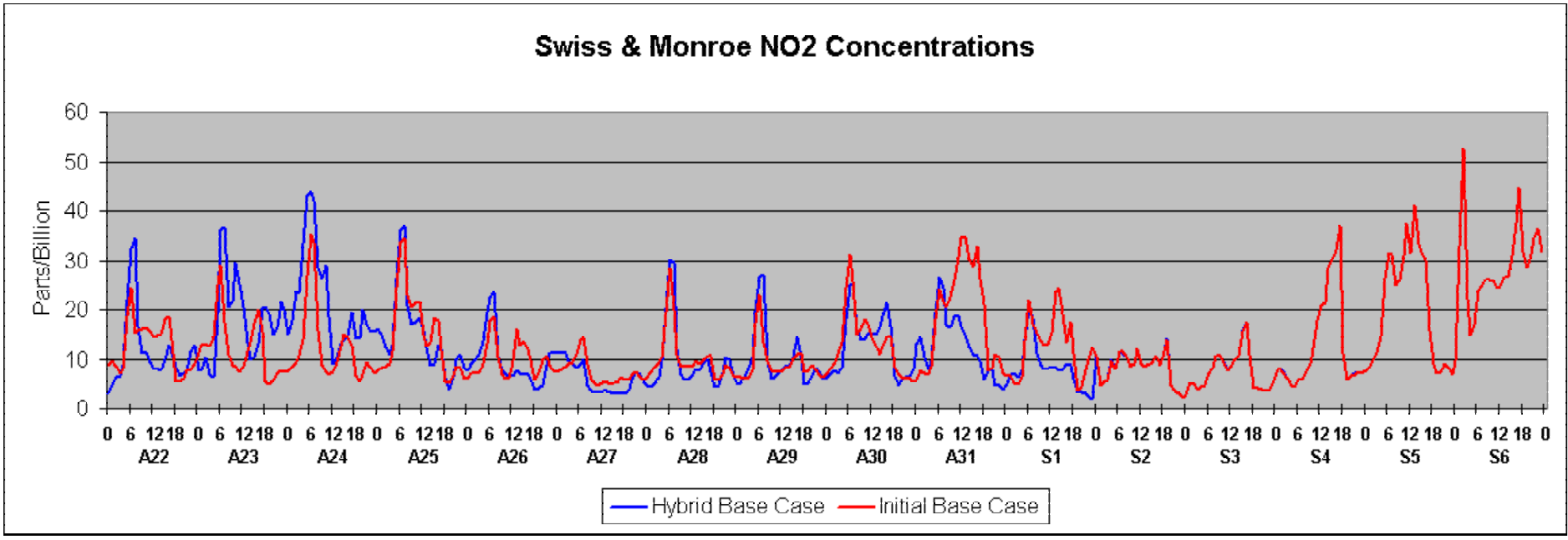
Swiss & Monroe Time Series

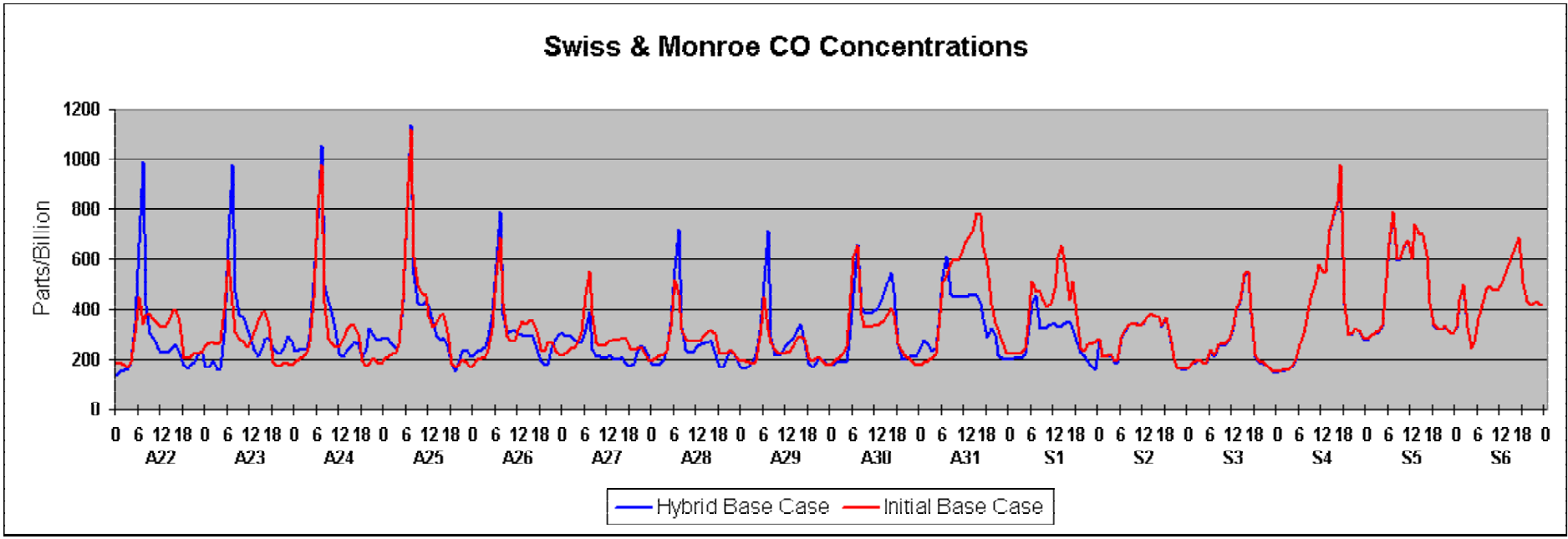
Swiss & Monroe Ozone Concentrations



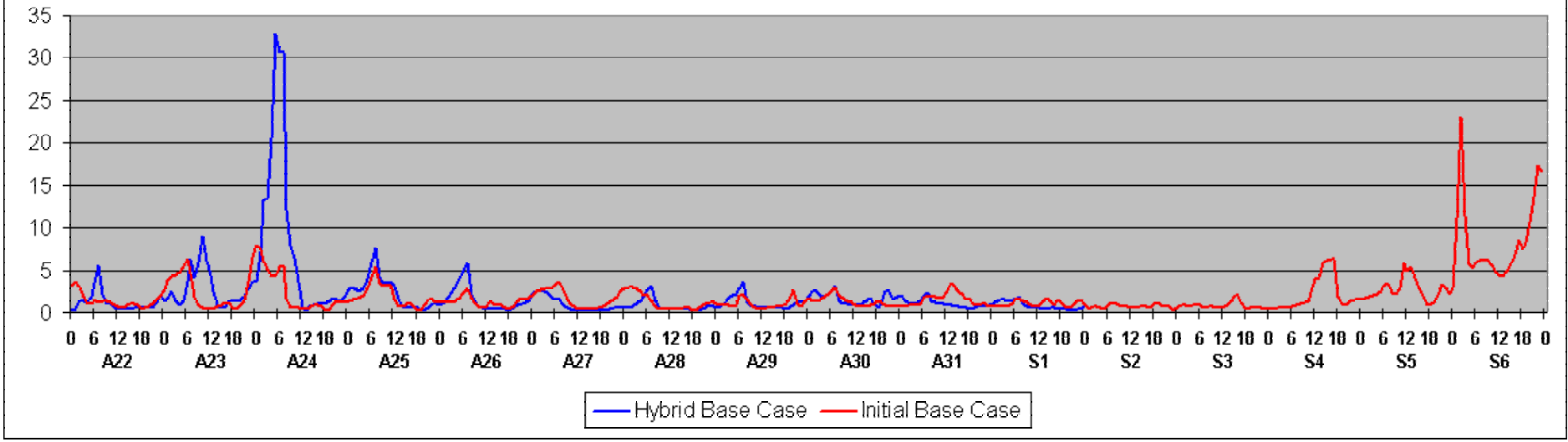
Swiss & Monroe NO Concentrations



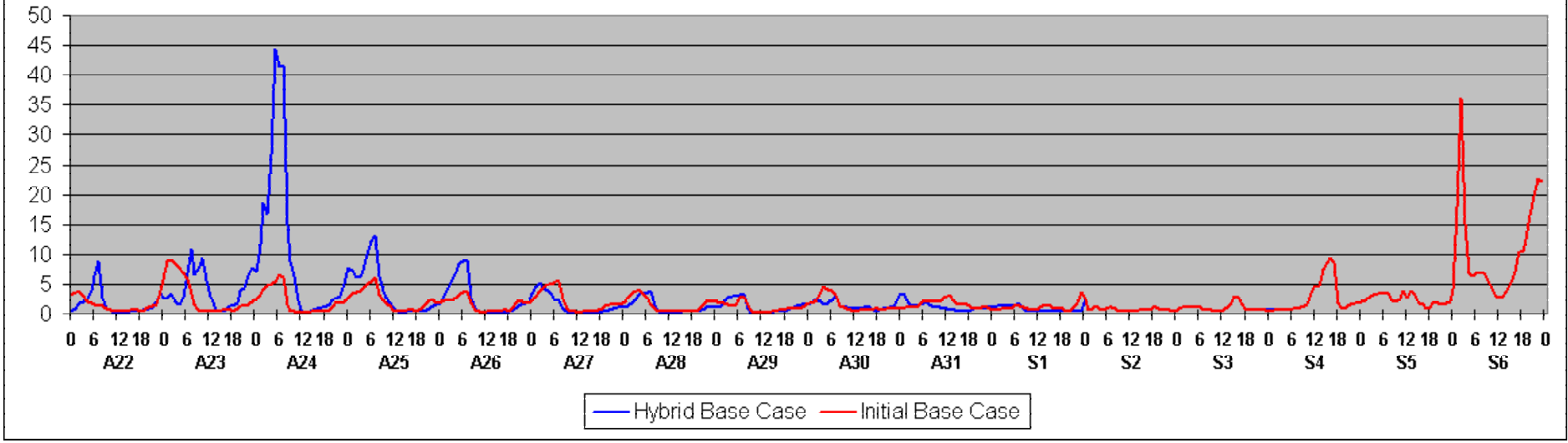

Swiss & Monroe NO2 Concentrations
Parts/Billion
60
50
40
30
20
10
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

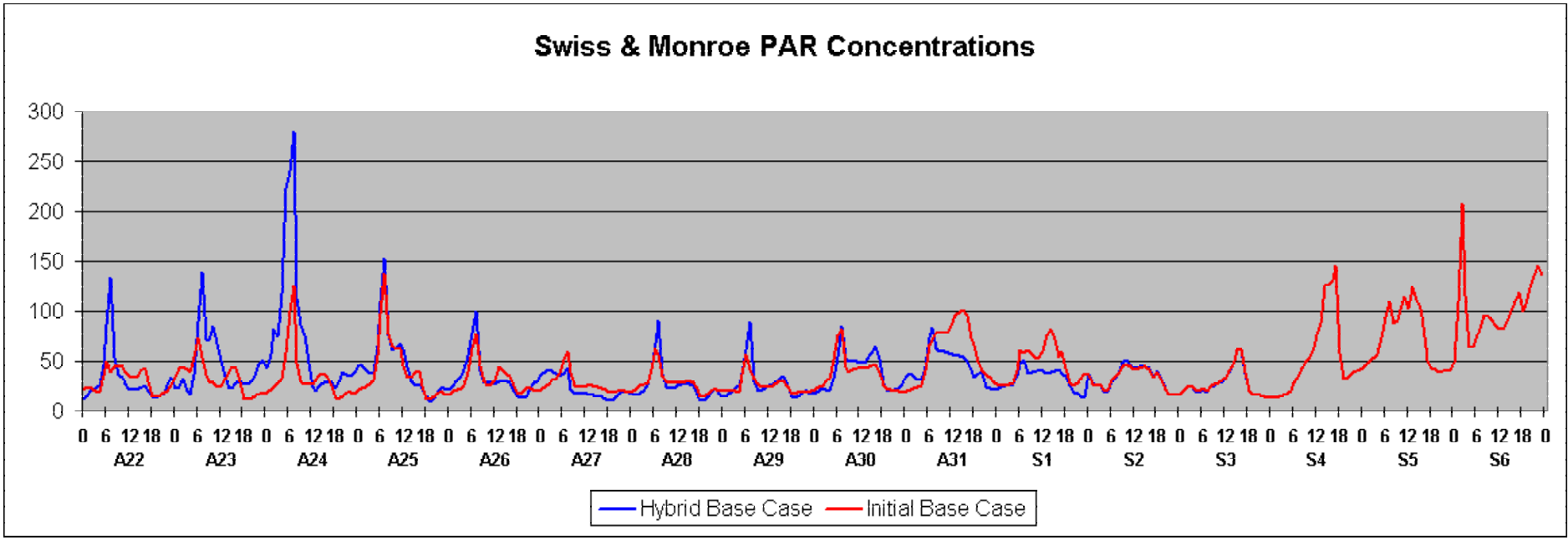

Swiss & Monroe CO Concentrations
Parts/Billion
1200
1000
800
600
400
200
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

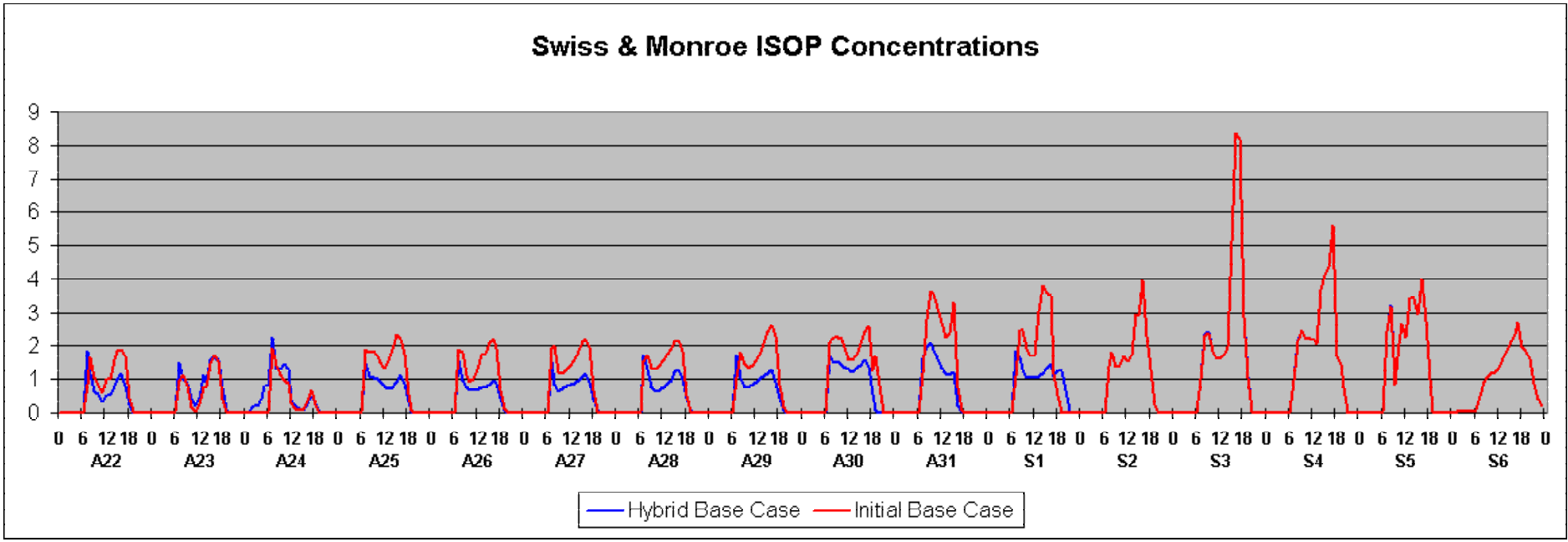
Swiss & Monroe ETH Concentrations



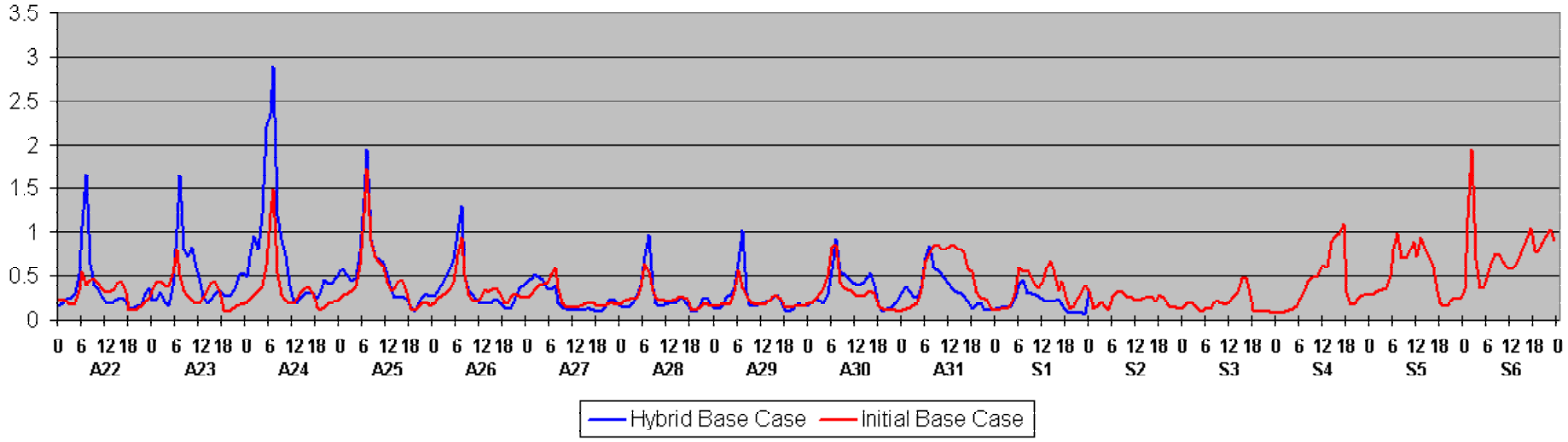
Swiss & Monroe OLE Concentrations



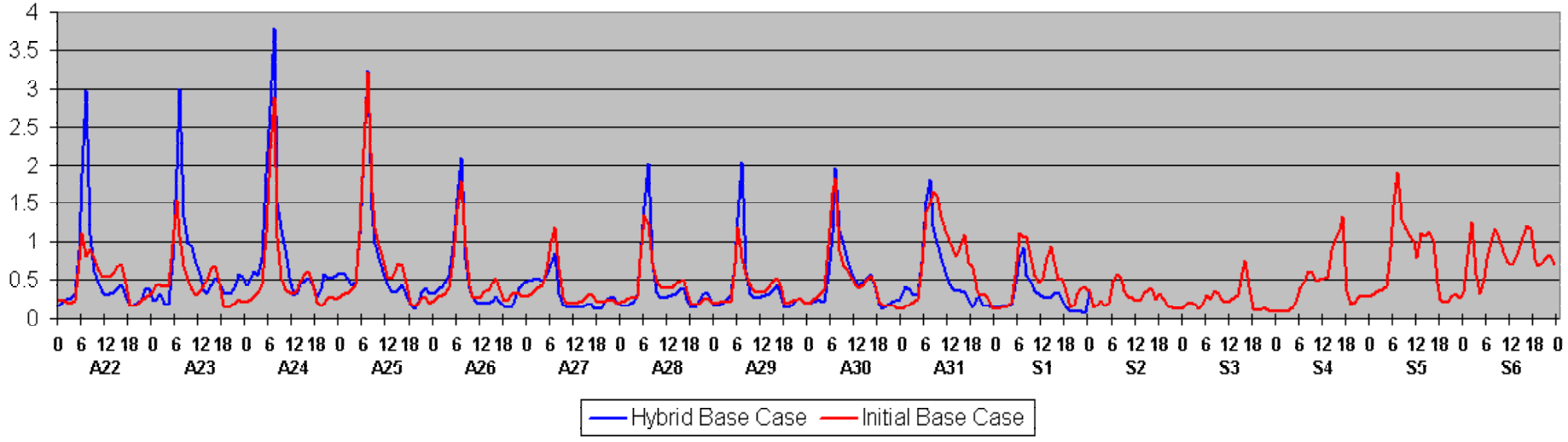

Swiss & Monroe PAR Concentrations
300
250
200
150
100
50
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

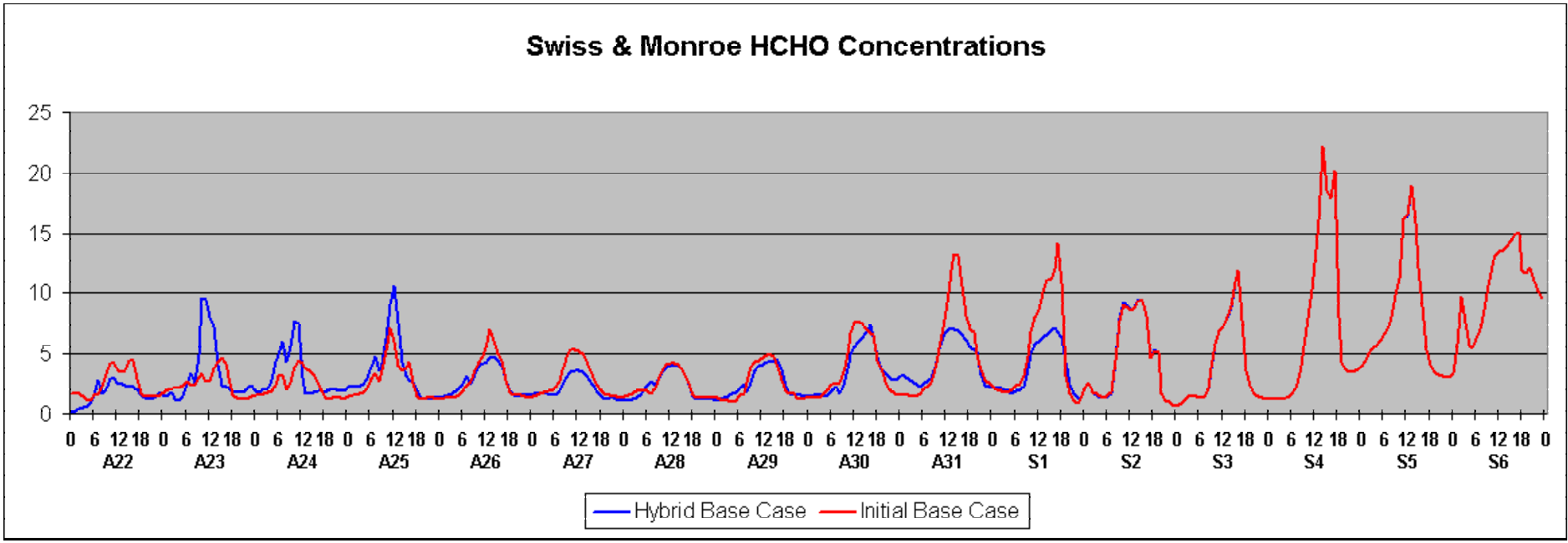

Swiss & Monroe ISOP Concentrations
9
8
7
6
5
4
3
2
1
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

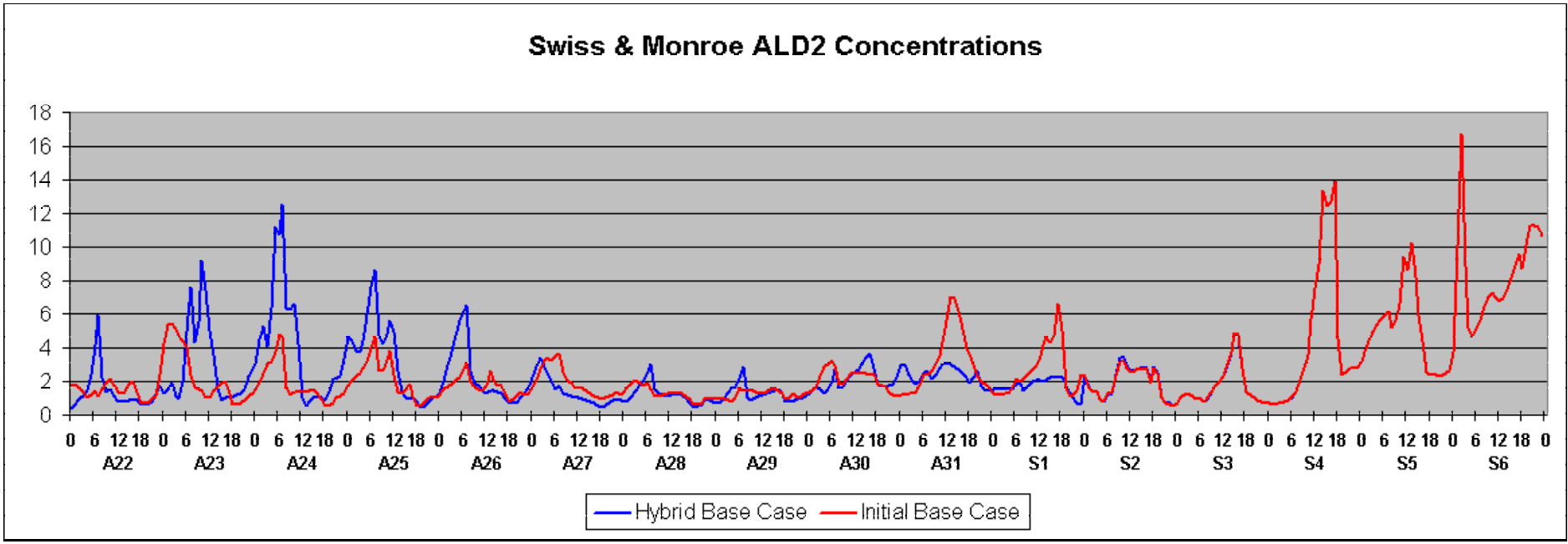
Swiss & Monroe TOL Concentrations

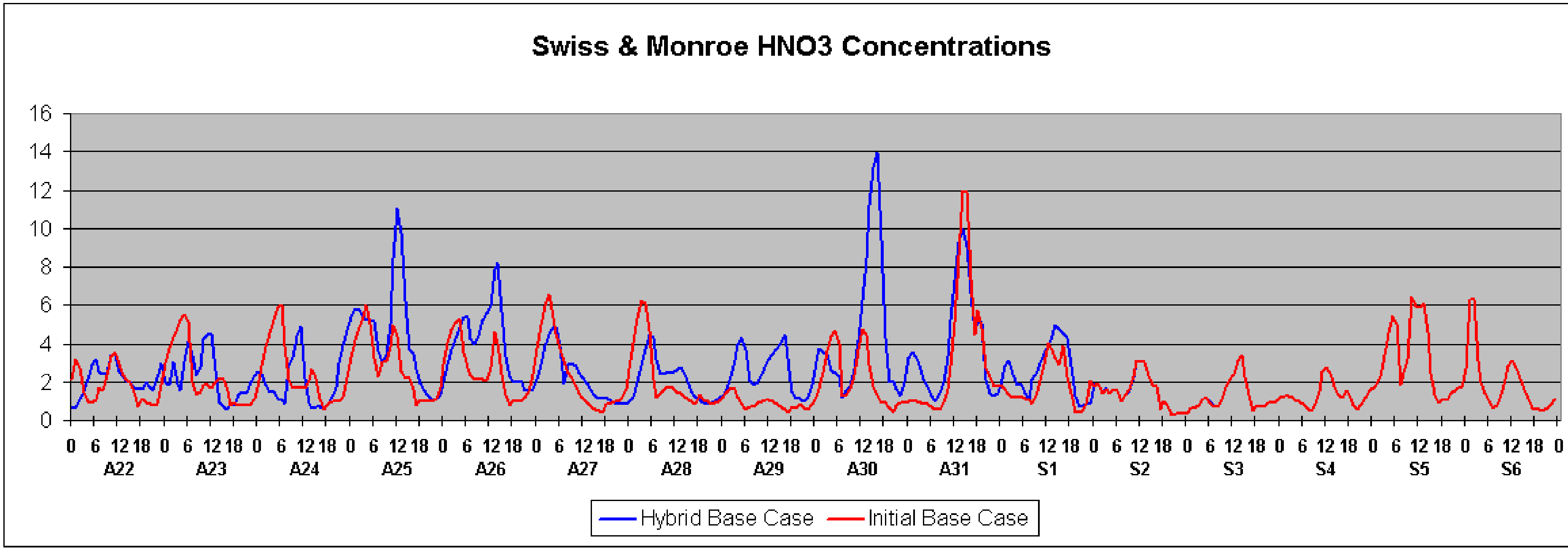


Swiss & Monroe XYL Concentrations

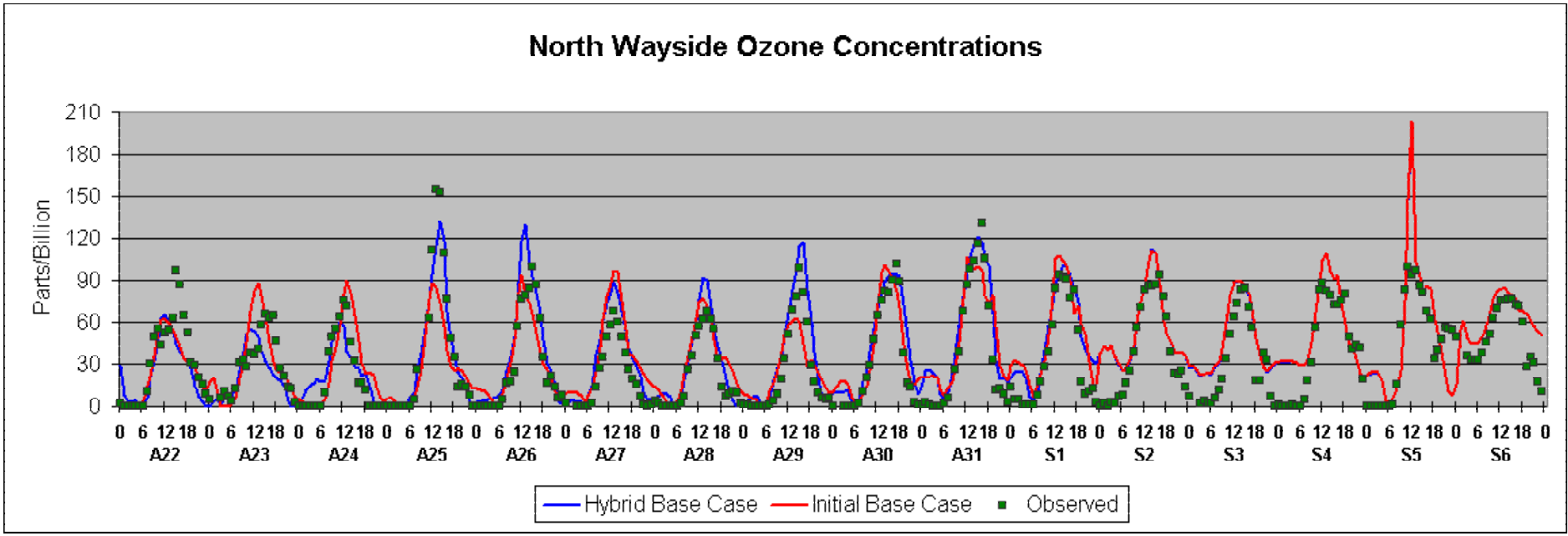


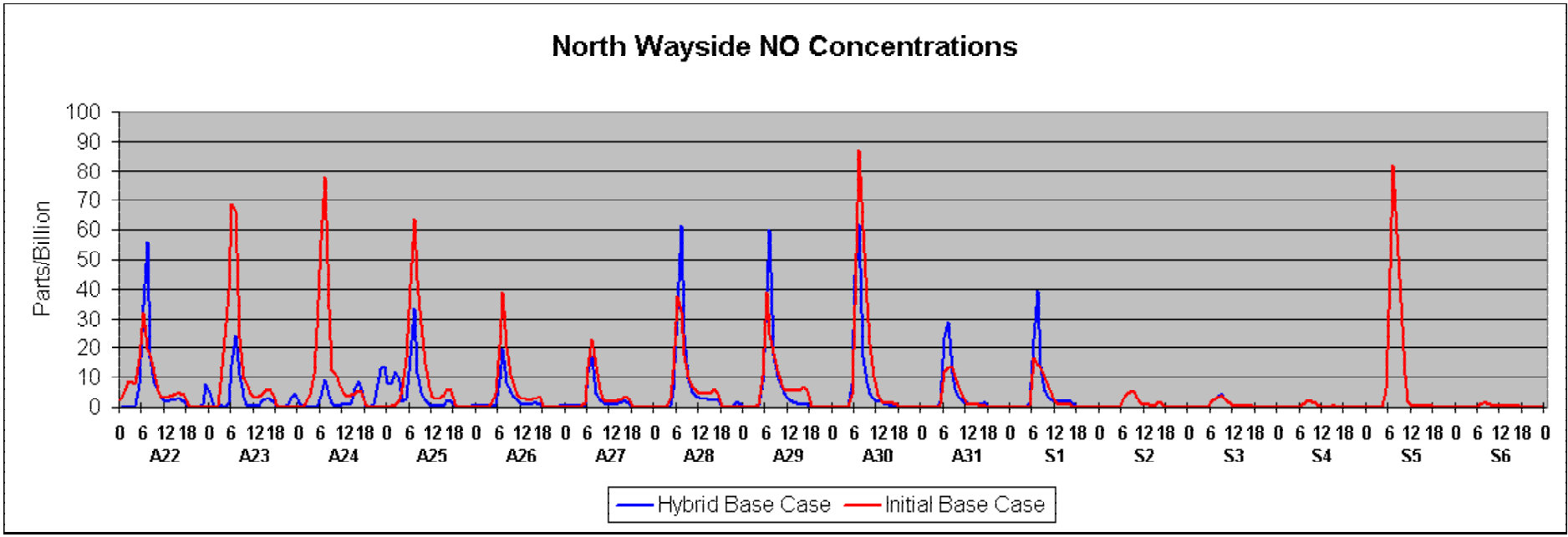

Swiss & Monroe HCHO Concentrations
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

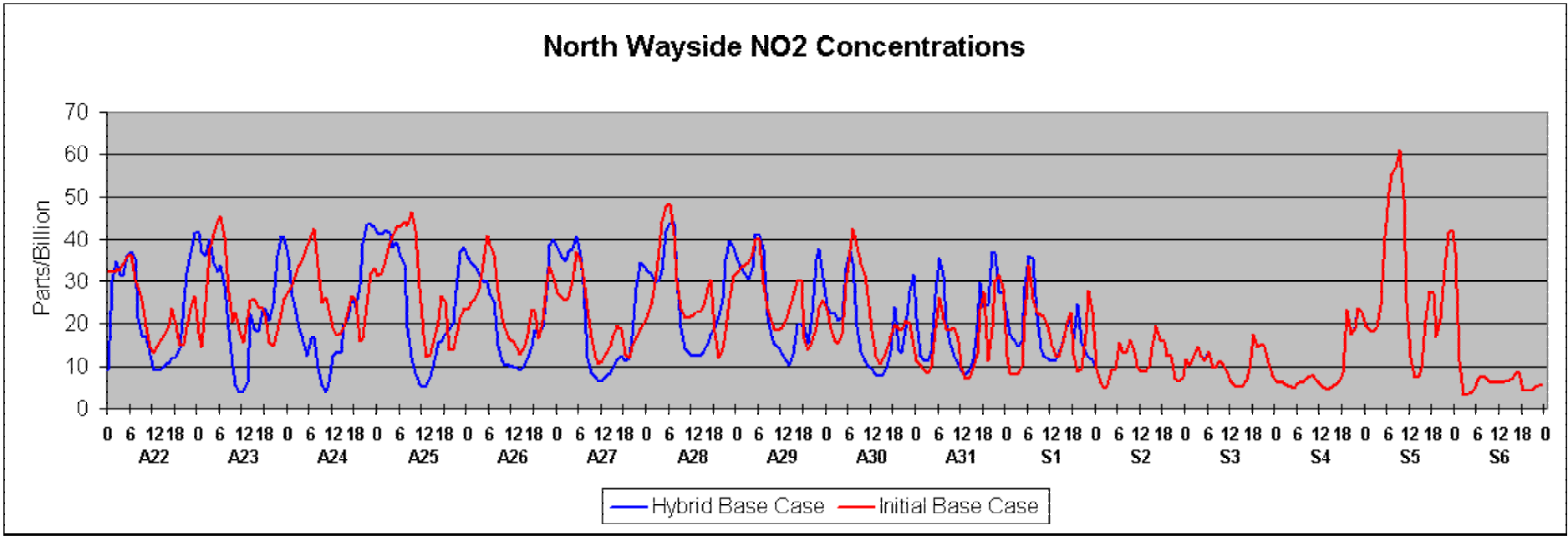

Swiss & Monroe ALD2 Concentrations
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

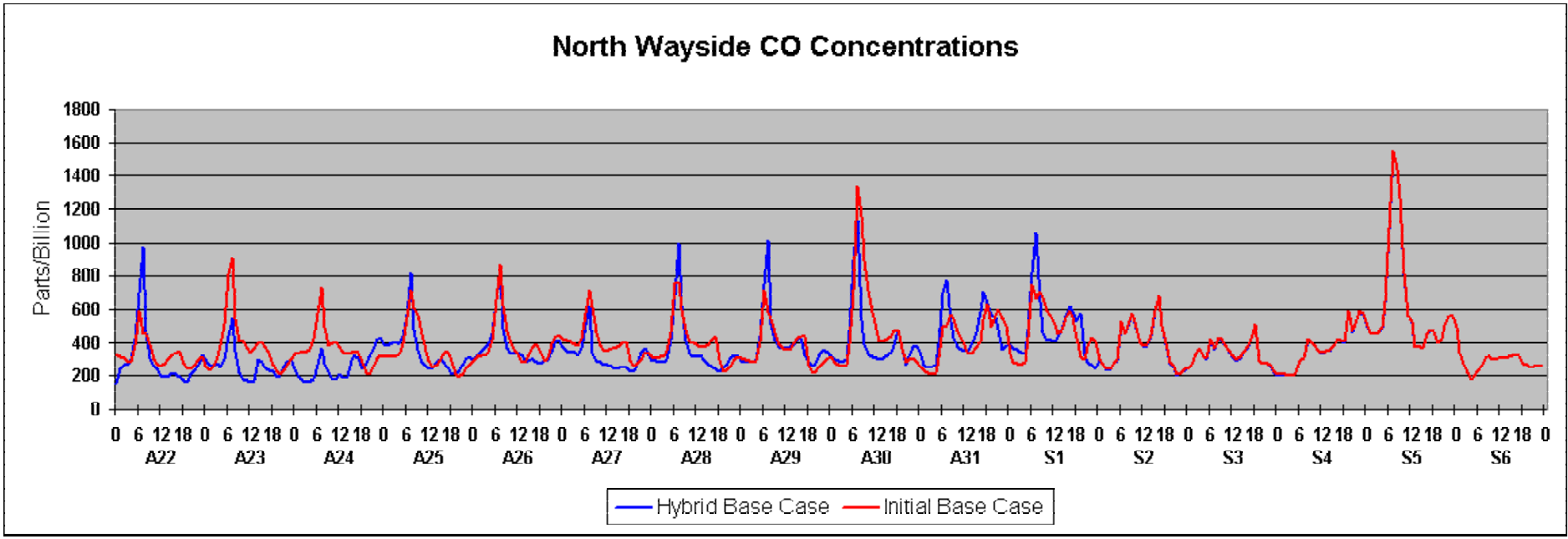

Swiss & Monroe HNO3 Concentrations
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

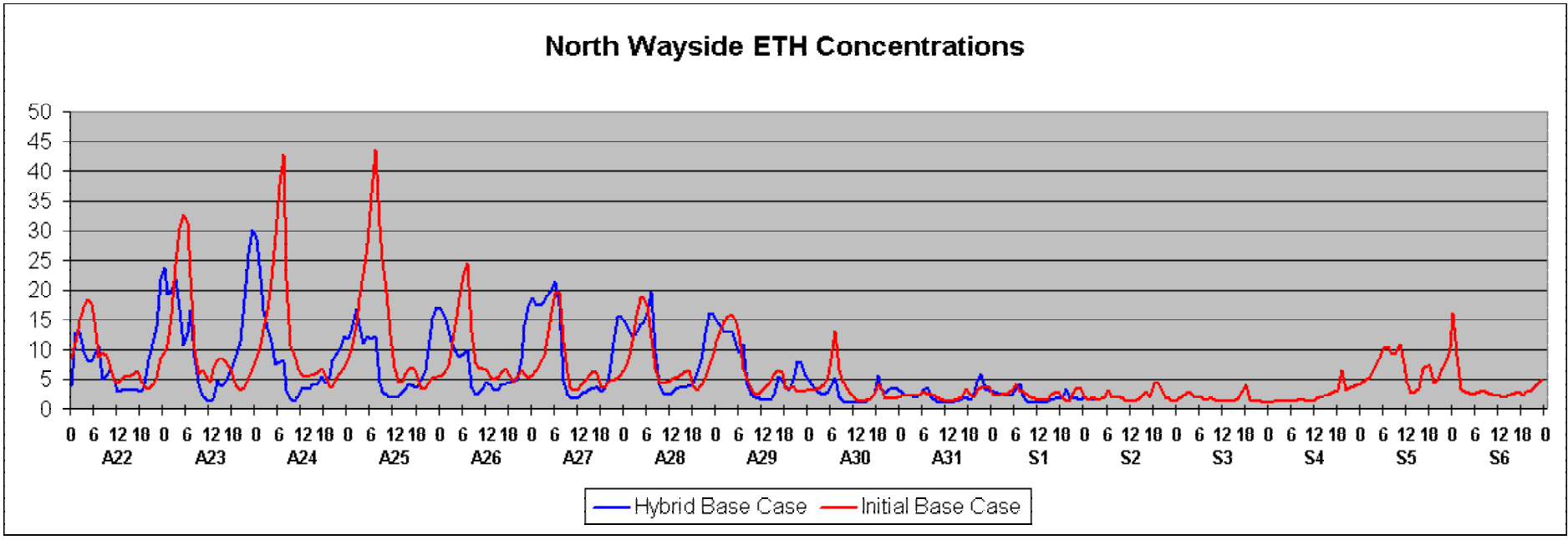
North Wayside Time Series

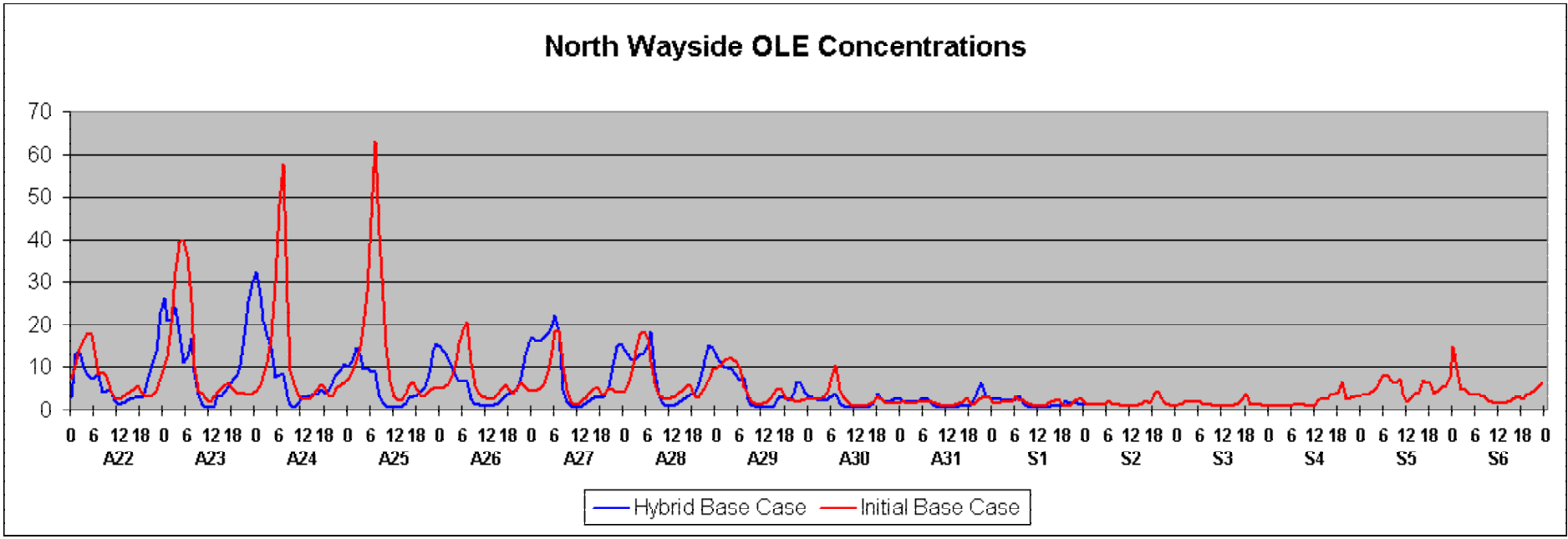

North Wayside Ozone Concentrations
Parts/Billion
210
180
150
120
90
60
30
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

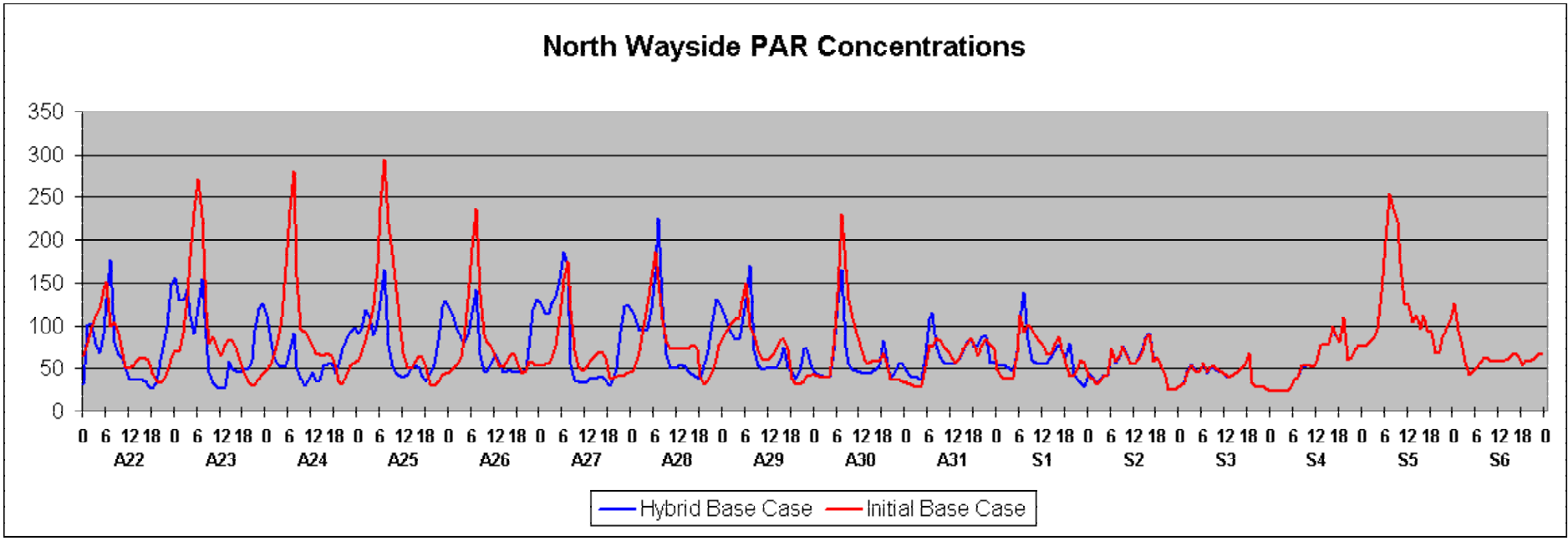

North Wayside NO Concentrations
Parts/Billion
100
90
80
70
60
50
40
30
20
10
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

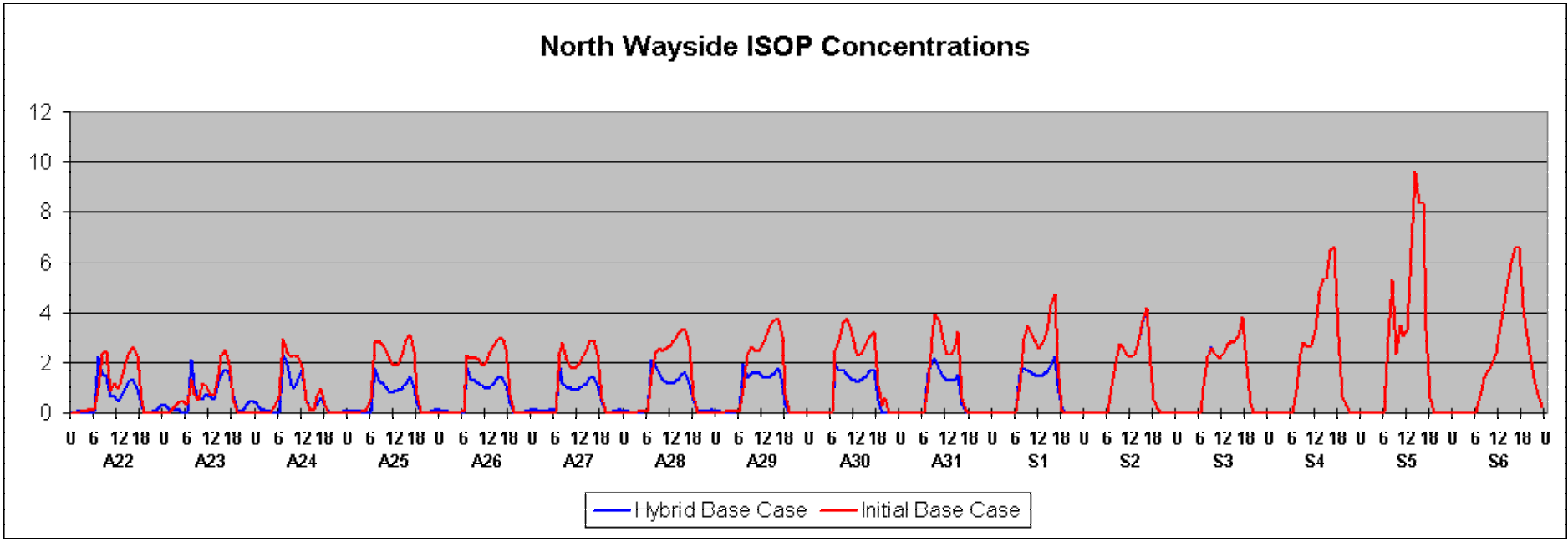

North Wayside NO2 Concentrations
Parts/Billion
70
60
50
40
30
20
10
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

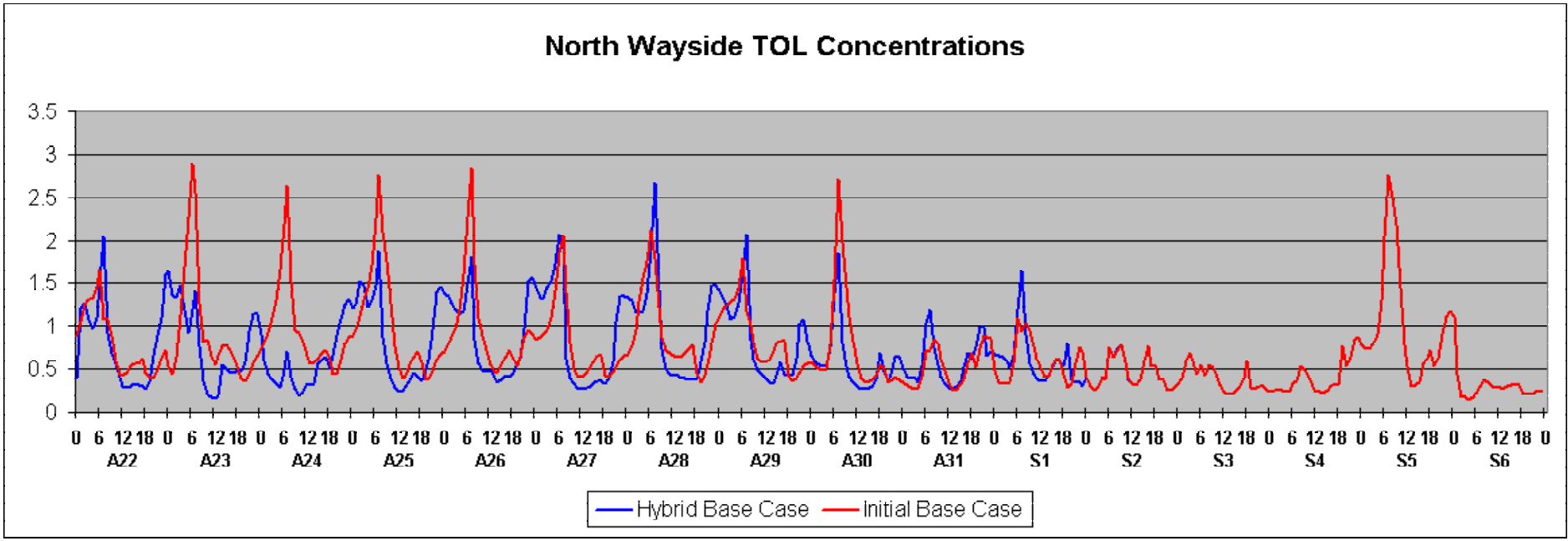

North Wayside CO Concentrations
Parts/Billion
1800
1600
1400
1200
1000
800
600
400
200
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

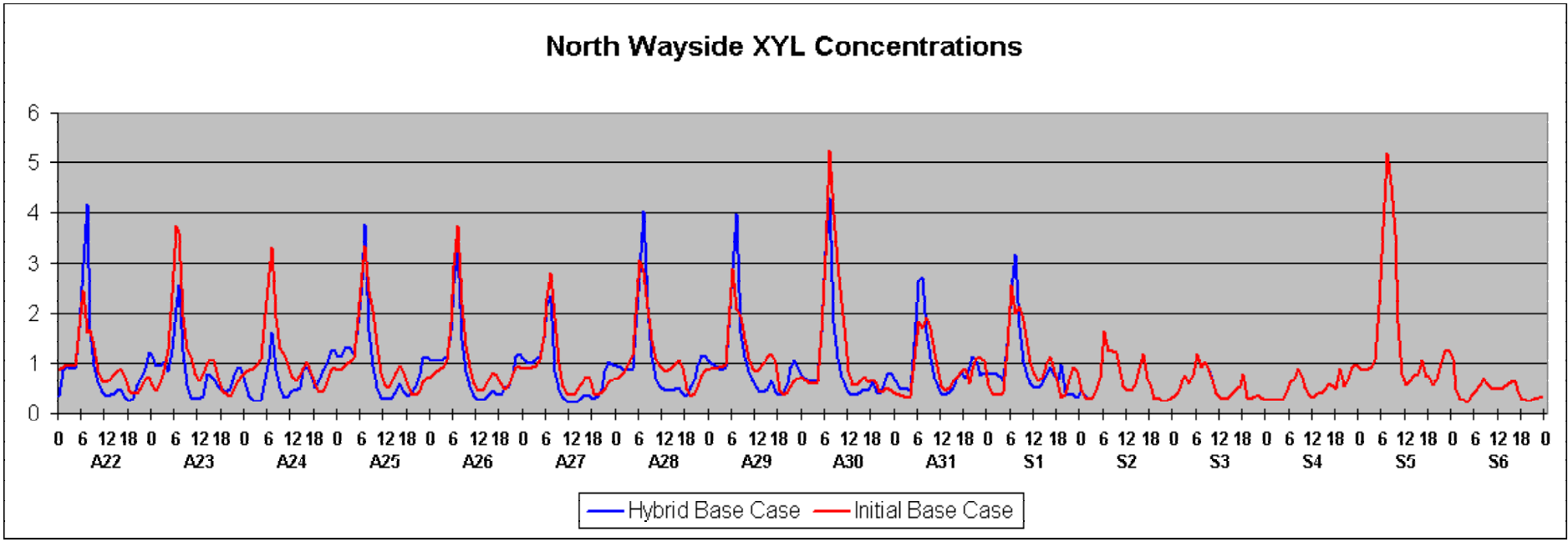

North Wayside ETH Concentrations
50
45
40
35
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

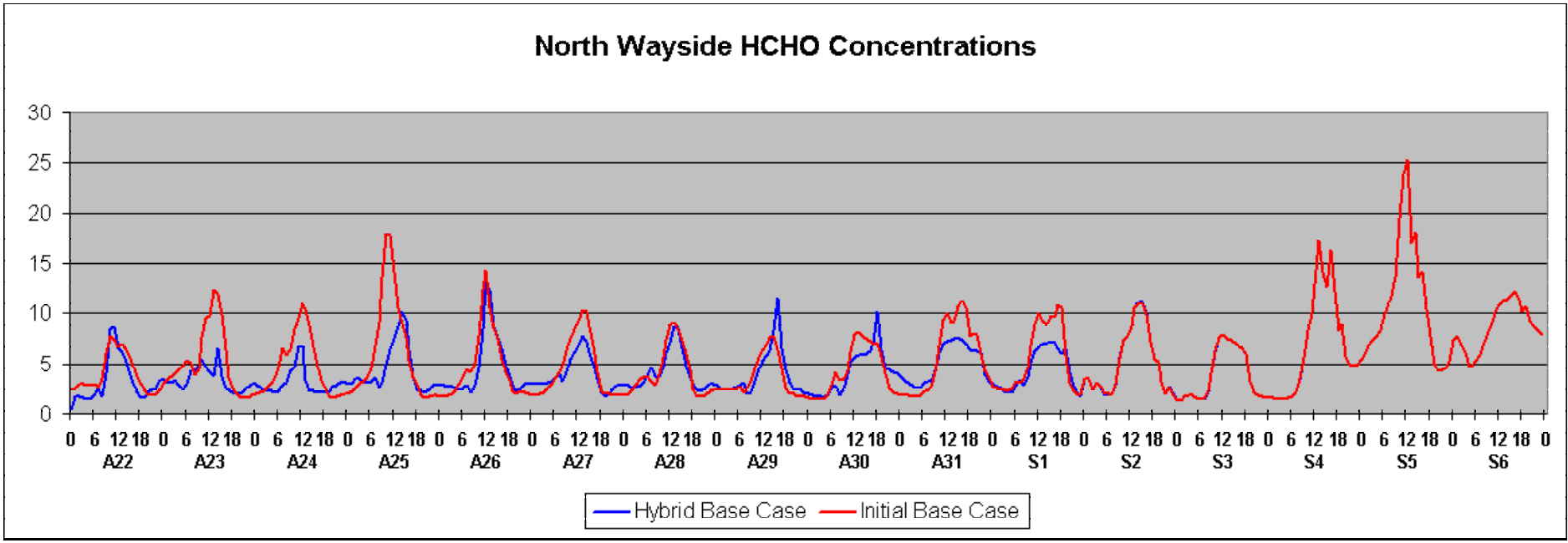

North Wayside OLE Concentrations
70
60
50
40
30
20
10
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

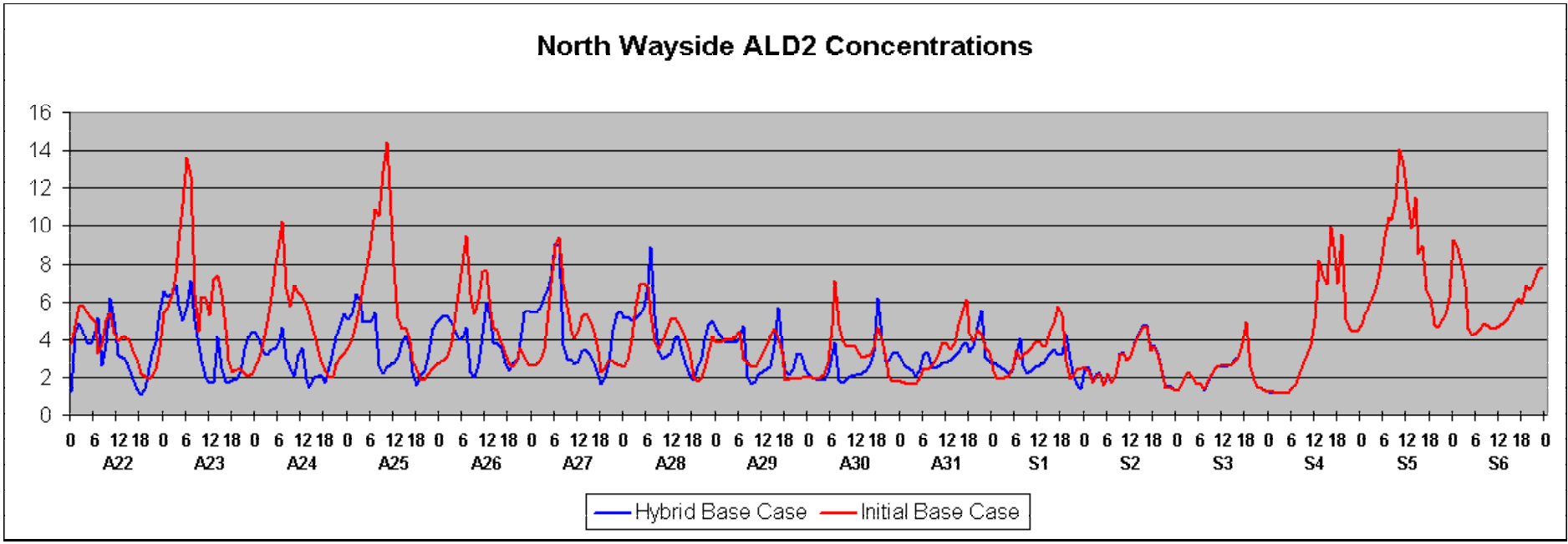

North Wayside PAR Concentrations
350
300
250
200
150
100
50
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

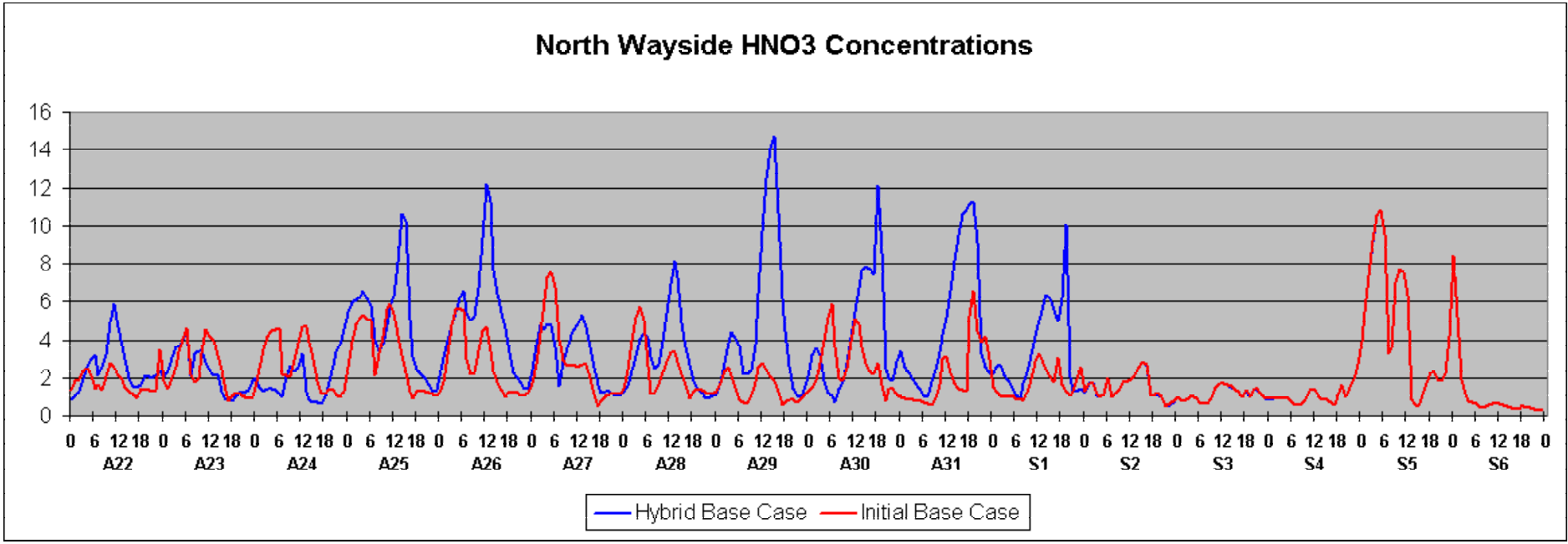

North Wayside ISOP Concentrations
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


North Wayside TOL Concentrations
3.5
3
2.5
2
1.5
1
0.5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


North Wayside XYL Concentrations
6
5
4
3
2
1
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

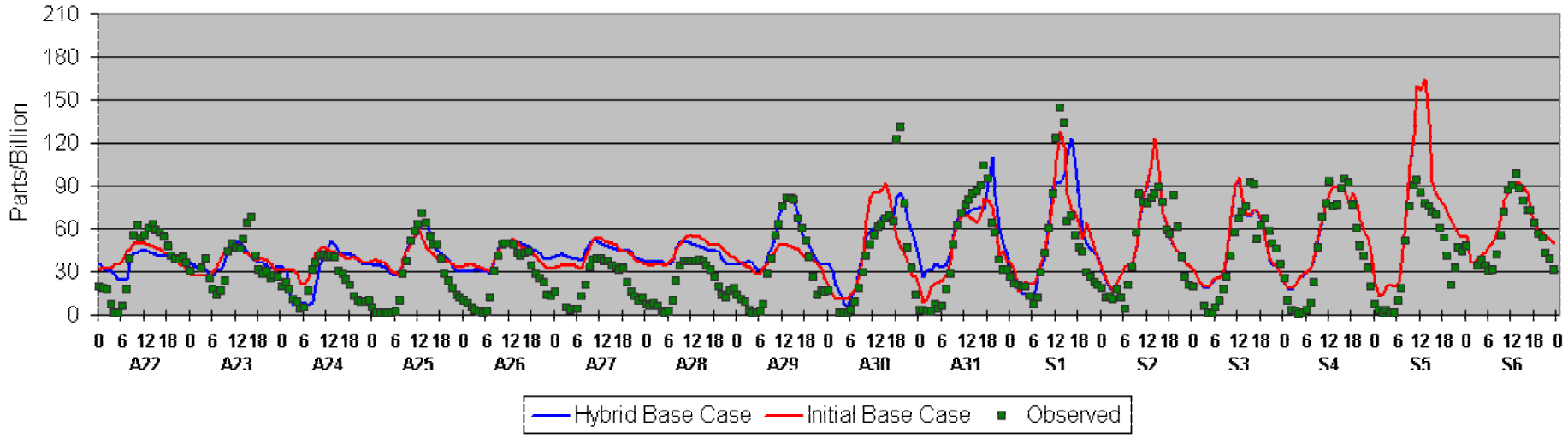

North Wayside HCHO Concentrations
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


North Wayside ALD2 Concentrations
16
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

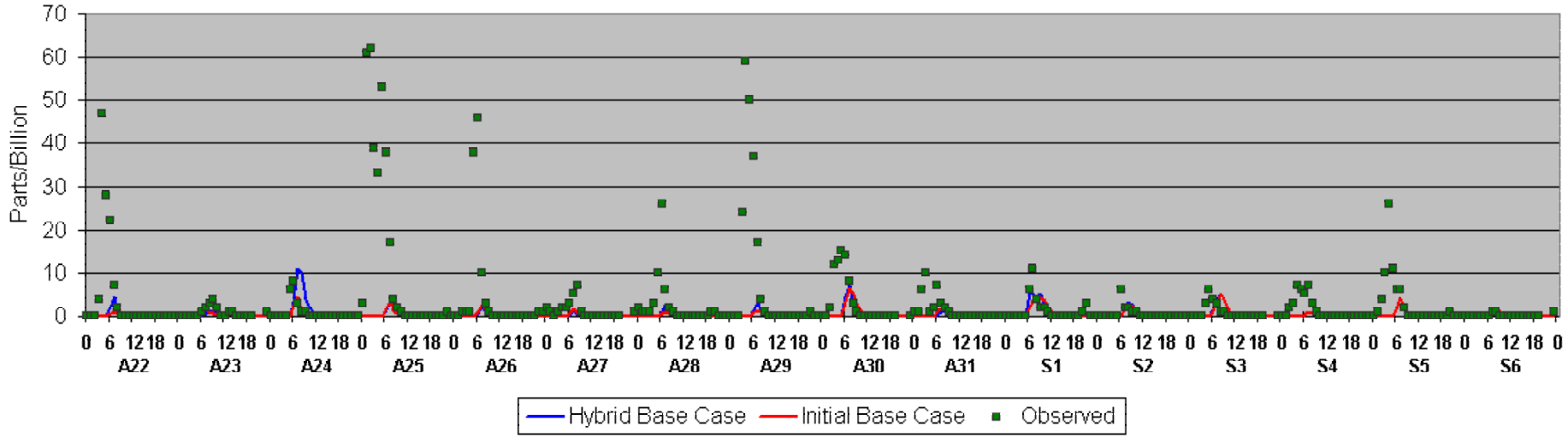

North Wayside HNO3 Concentrations
16
14
12
10
8
6
4
2
0
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Hamshire Time Series

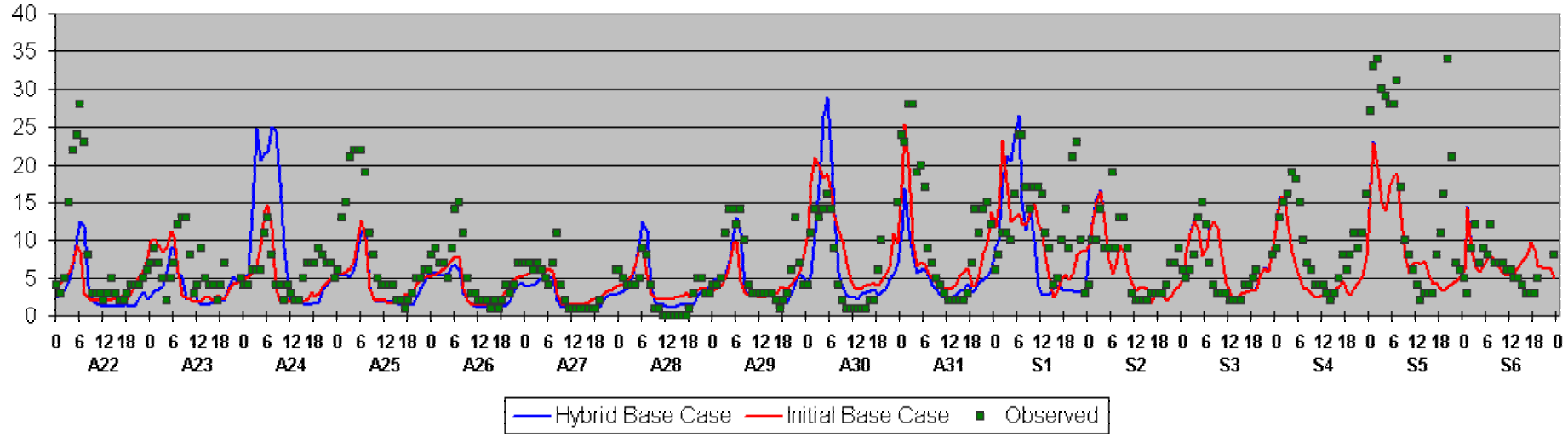
Hamshire Ozone Concentrations



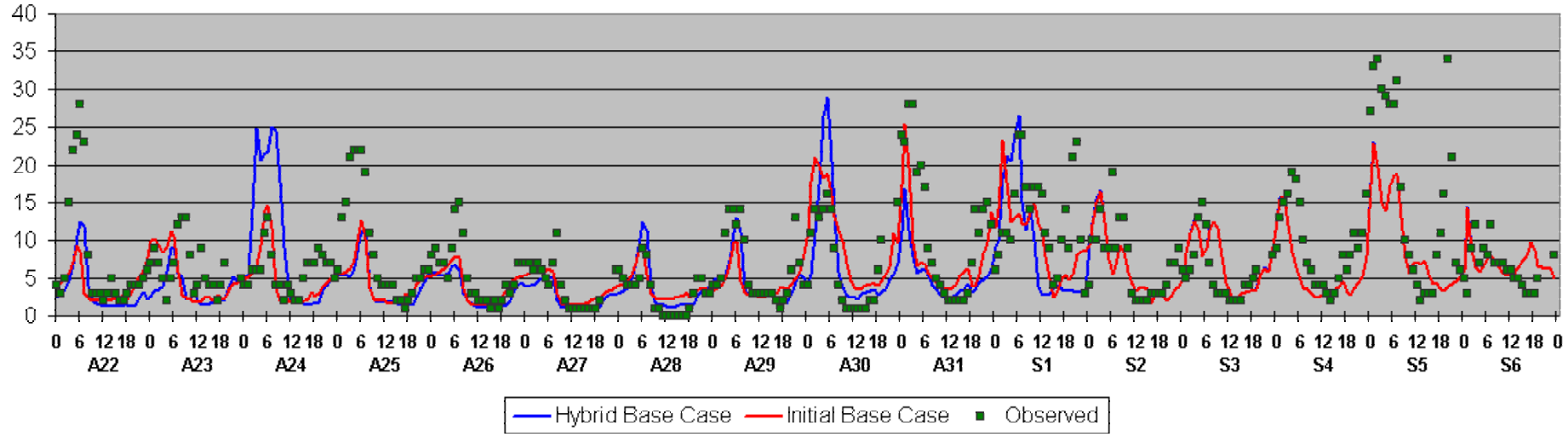
Hamshire NO Concentrations



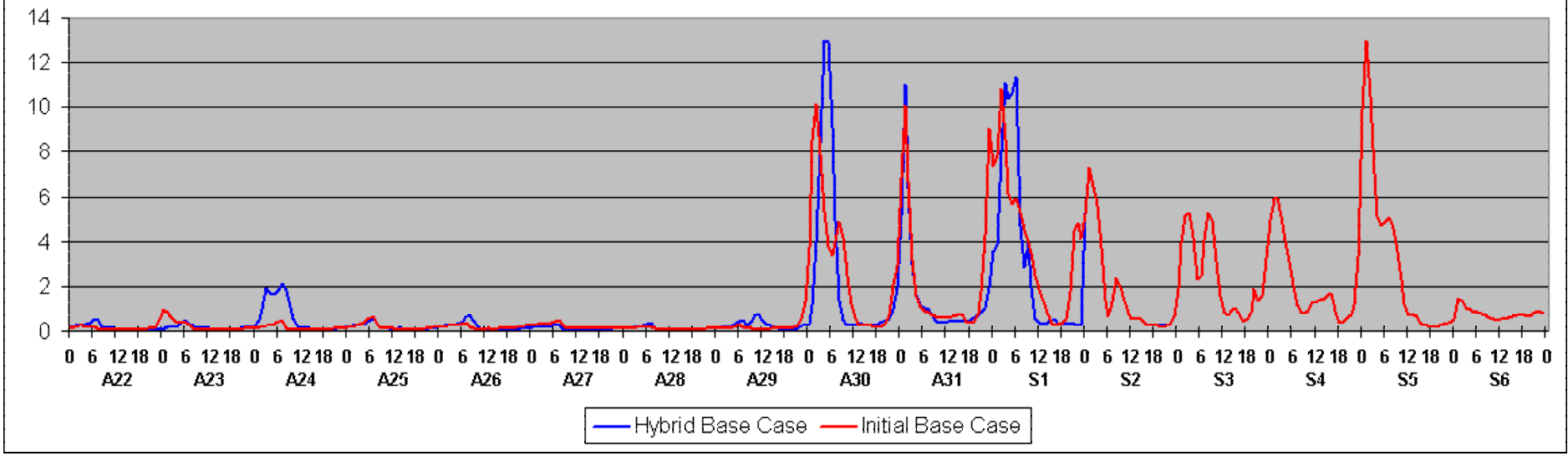
Hamshire NO2 Concentrations



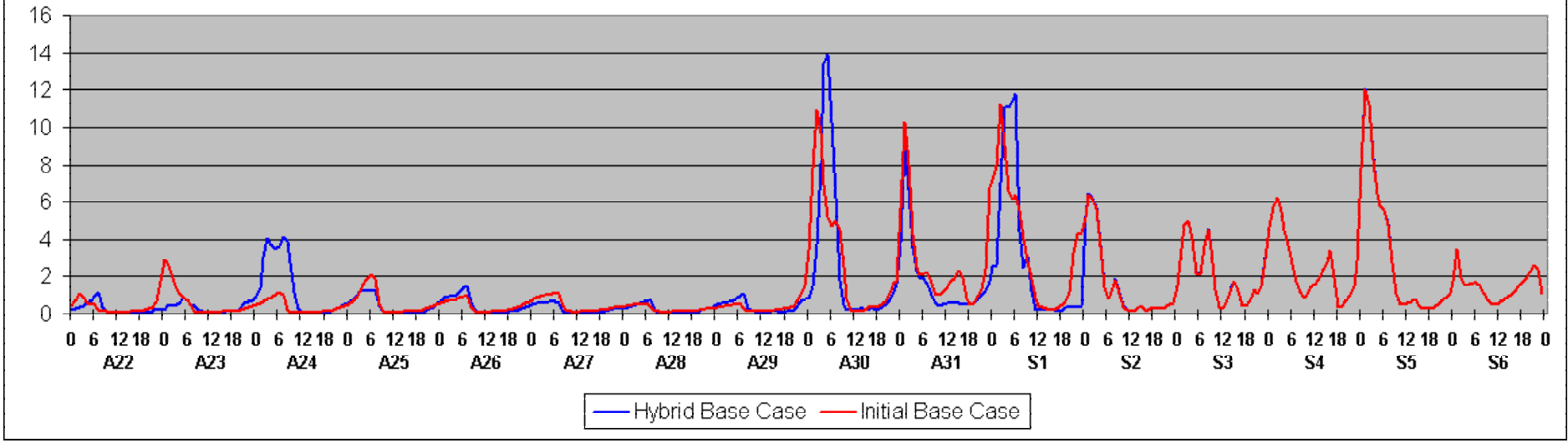
Hamshire NO2 Concentrations

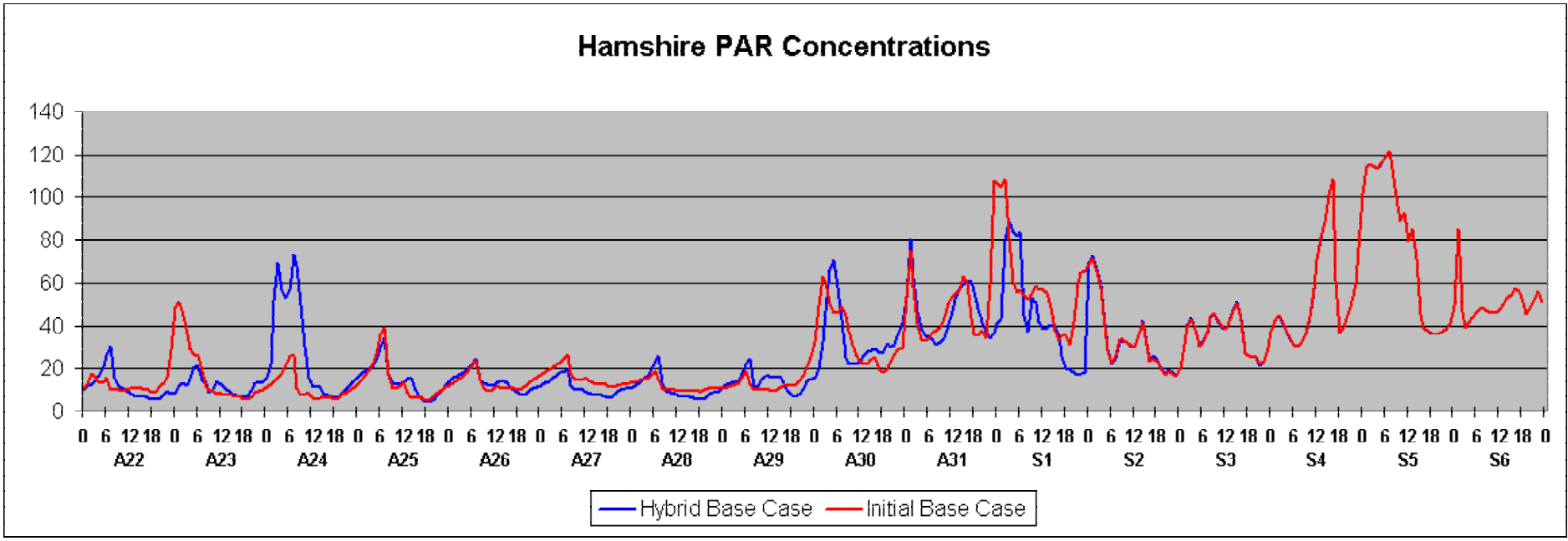


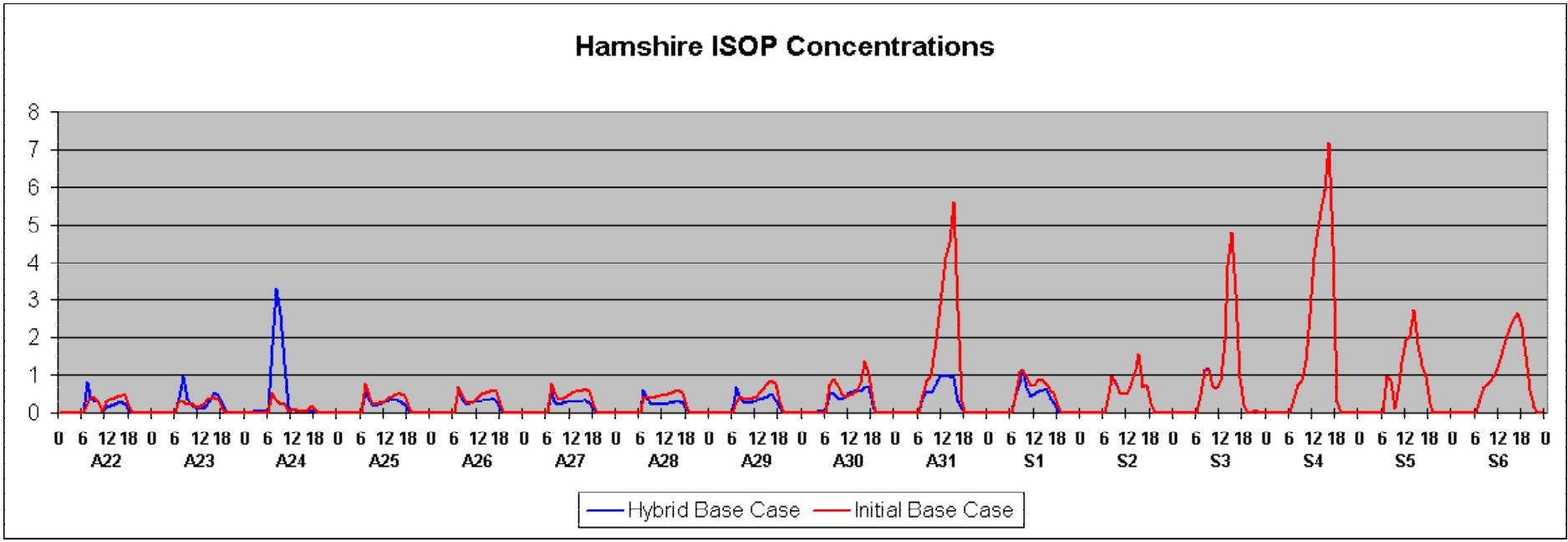
Hamshire ETH Concentrations



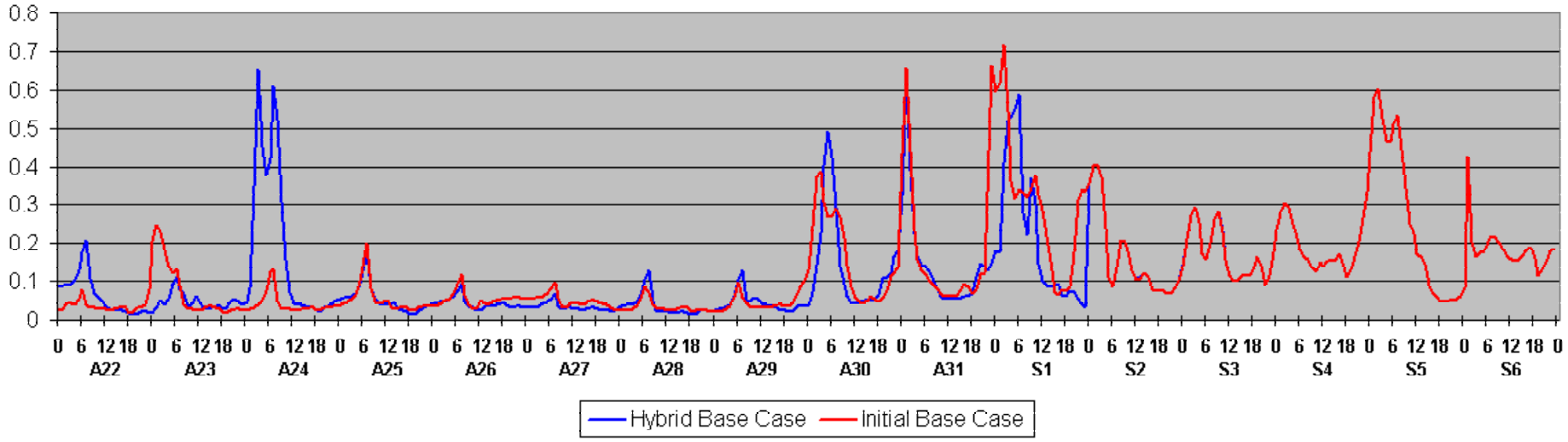
Hamshire OLE Concentrations



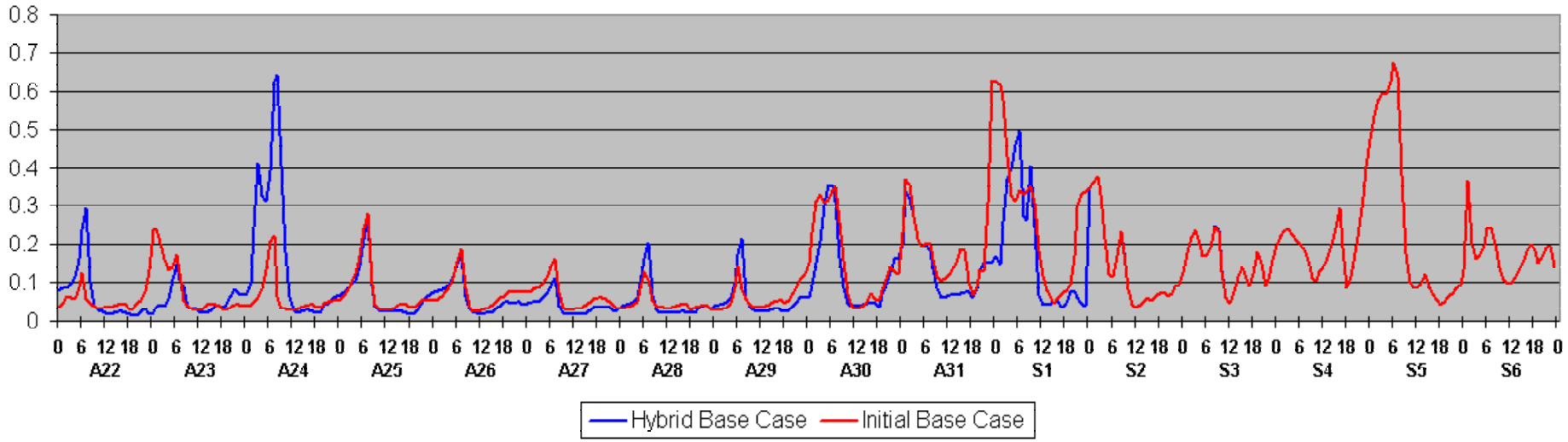

Hamshire PAR Concentrations
140
120
100
80
60
40
20
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

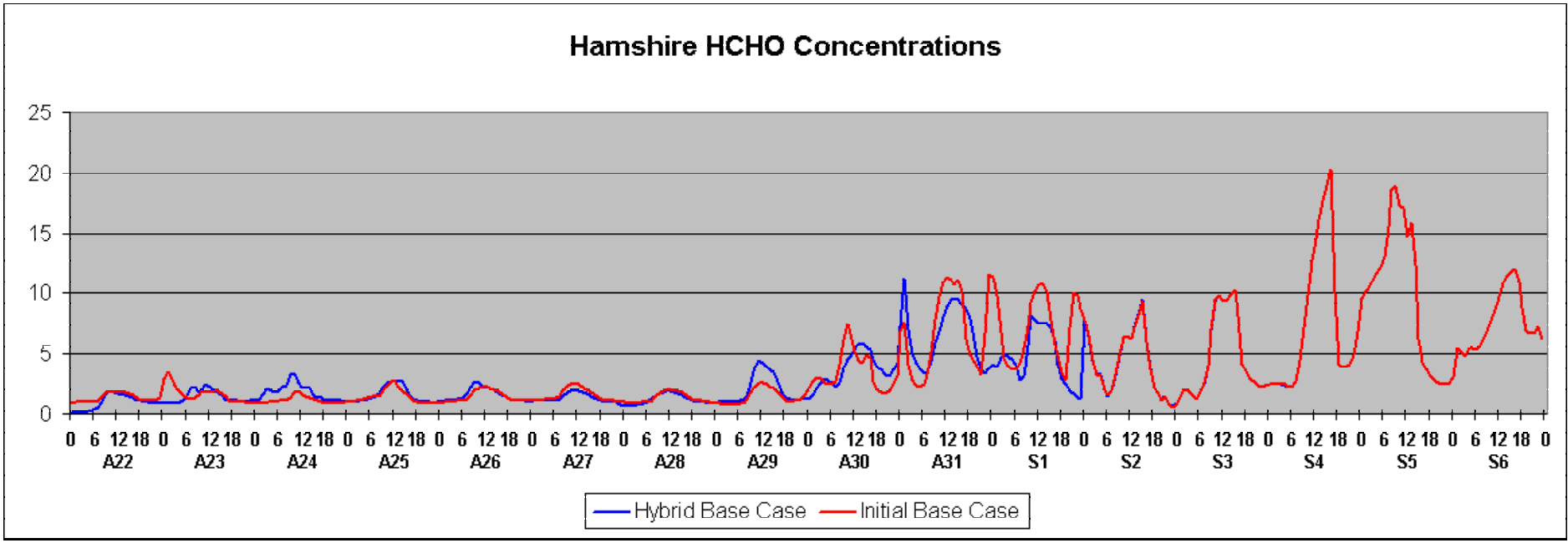

Hamshire ISOP Concentrations
8
7
6
5
4
3
2
1
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

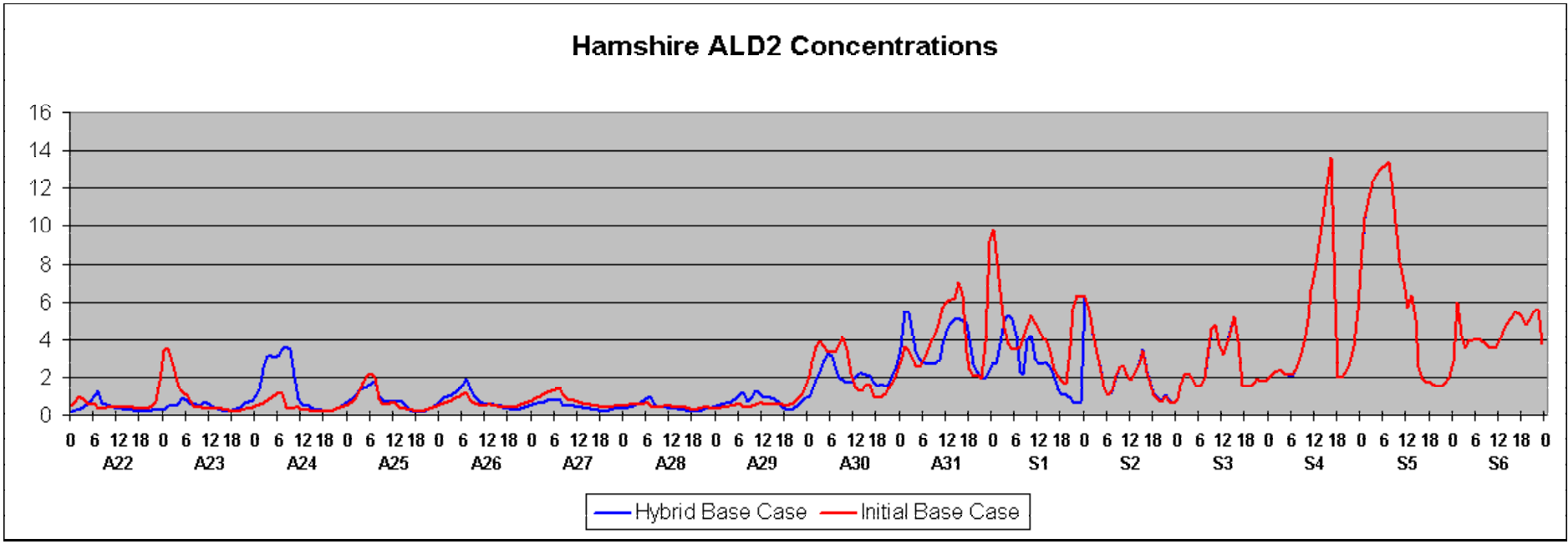
Hamshire TOL Concentrations

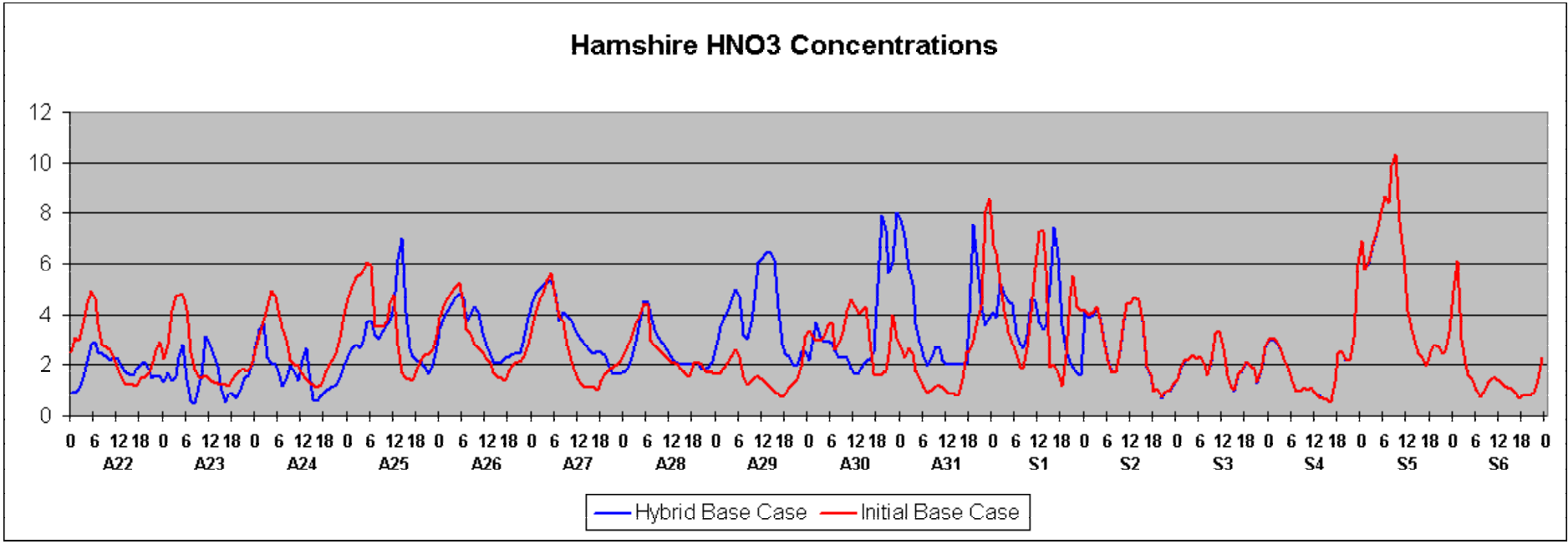


Hamshire XYL Concentrations



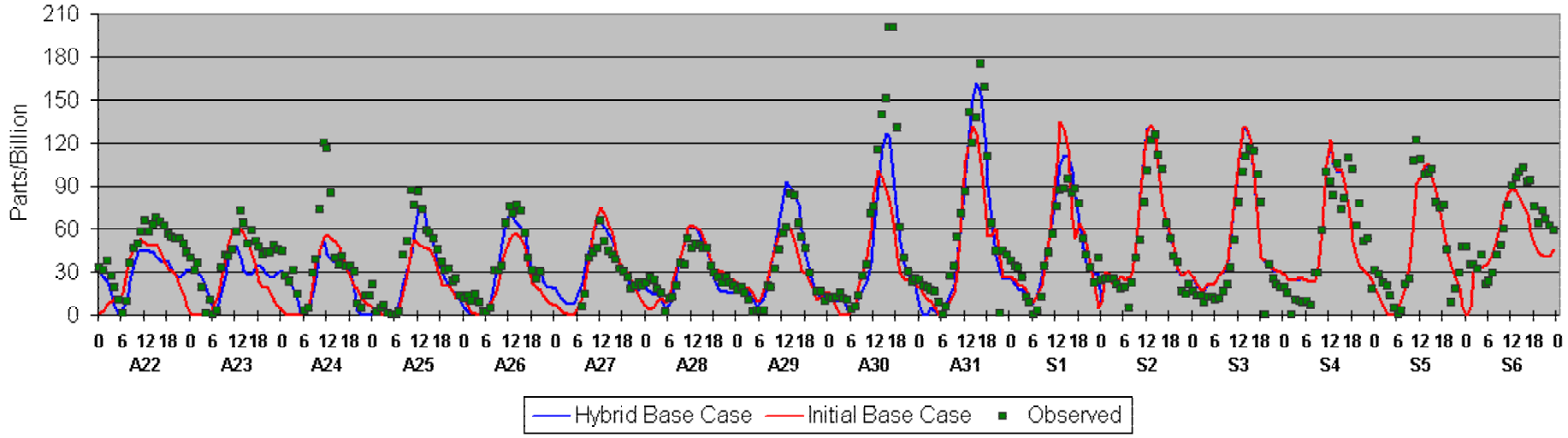

Hamshire HCHO Concentrations
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Hamshire ALD2 Concentrations
16
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

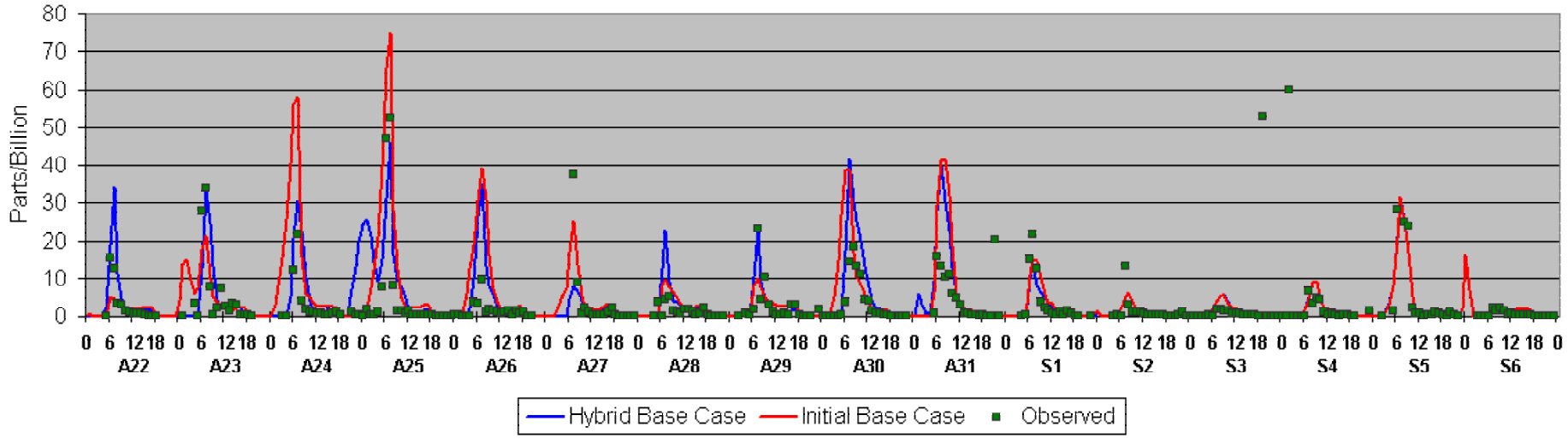

Hamshire HNO3 Concentrations
12
10
8
6
4
2
0
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

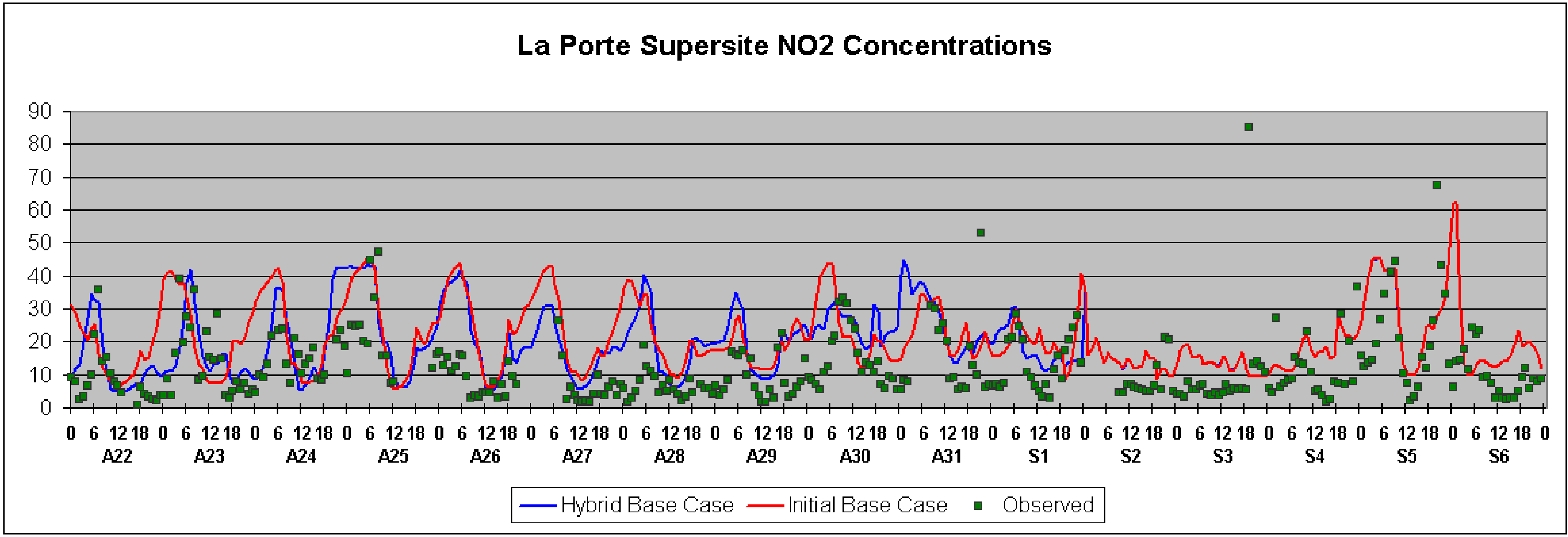
La Porte Supersite Time Series

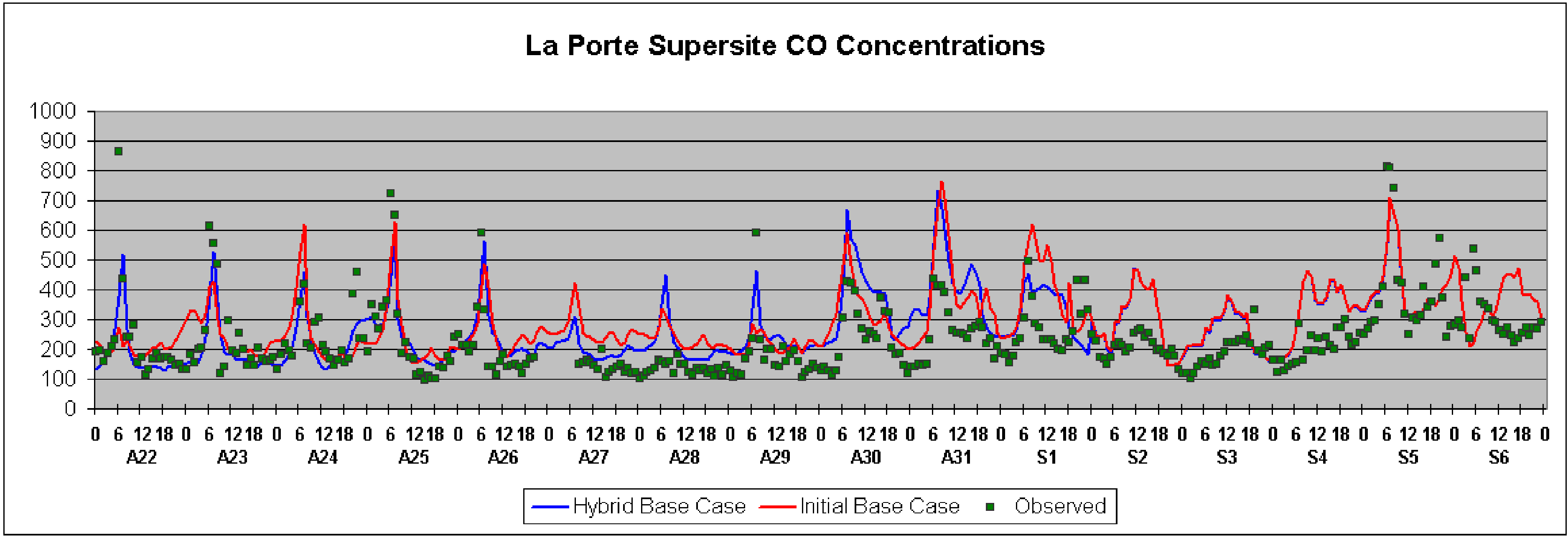
La Porte Supersite Ozone Concentrations



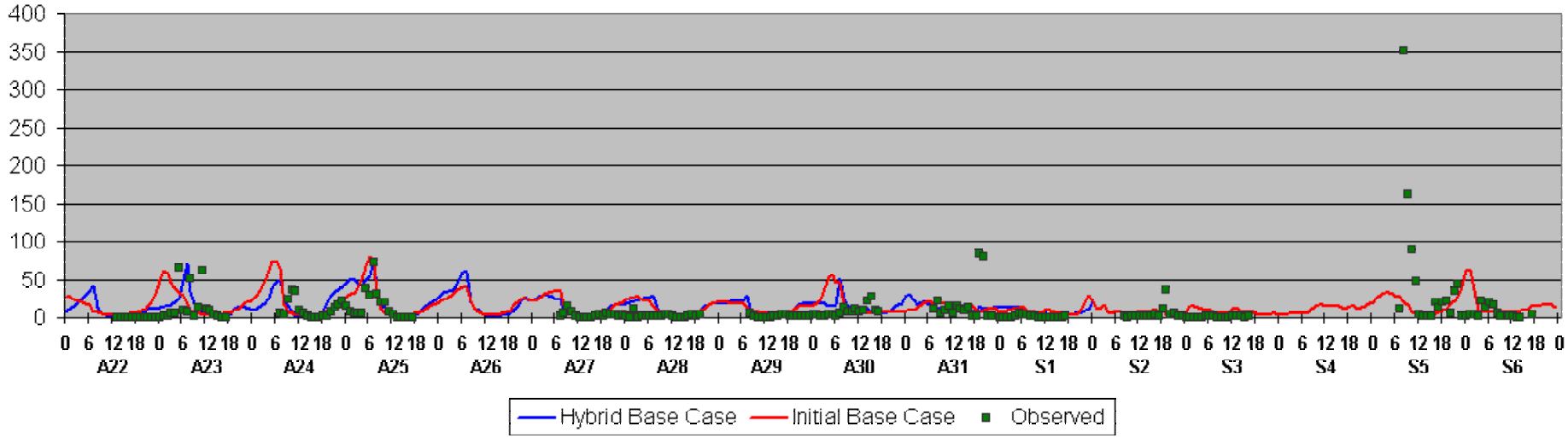
La Porte Supersite NO Concentrations



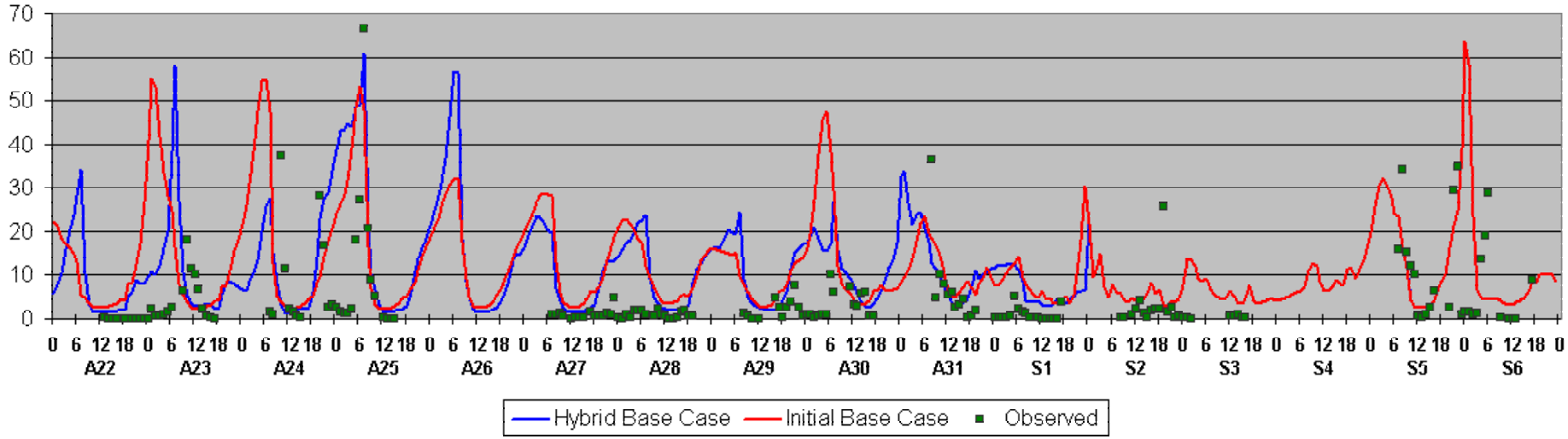

La Porte Supersite NO2 Concentrations
0
10
20
30
40
50
60
70
80
90
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

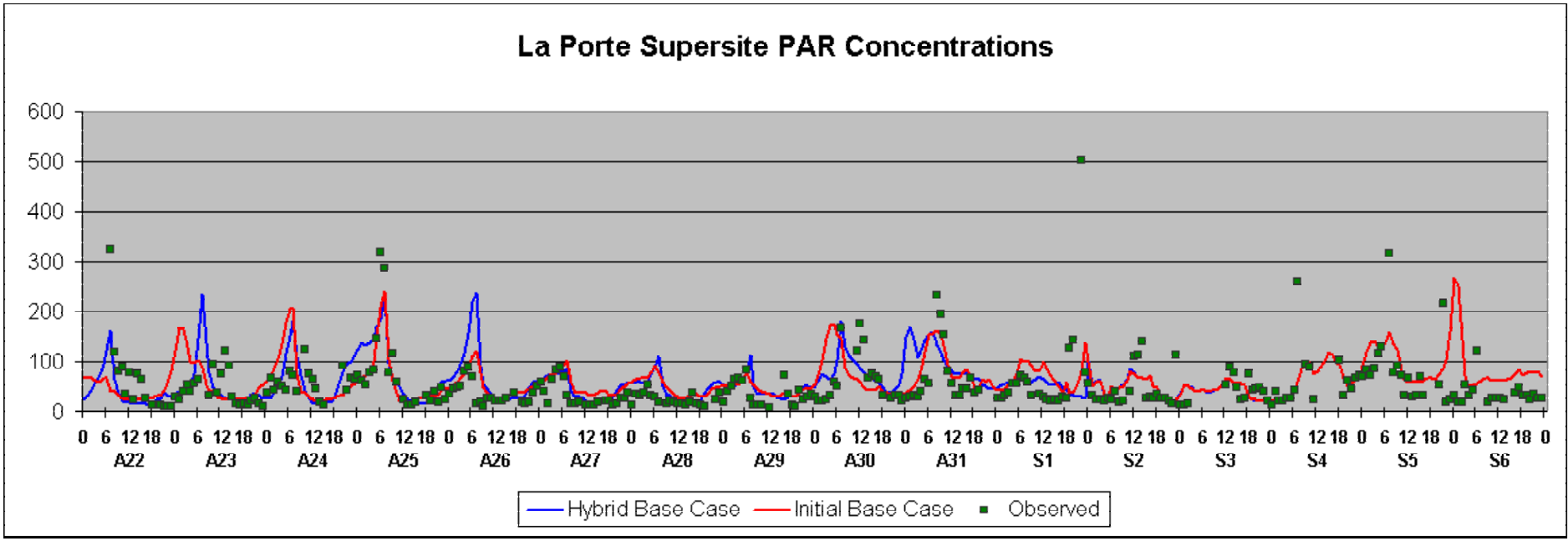

La Porte Supersite CO Concentrations
0
100
200
300
400
500
600
700
800
900
1000
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

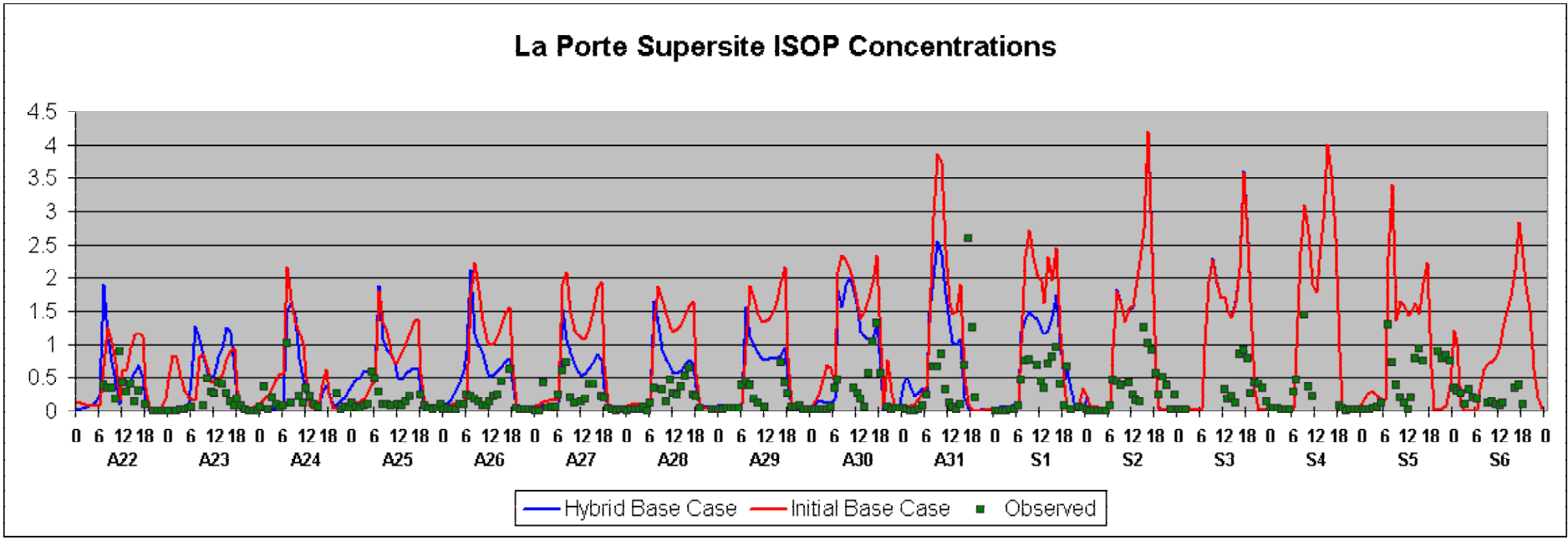
La Porte Supersite ETH Concentrations



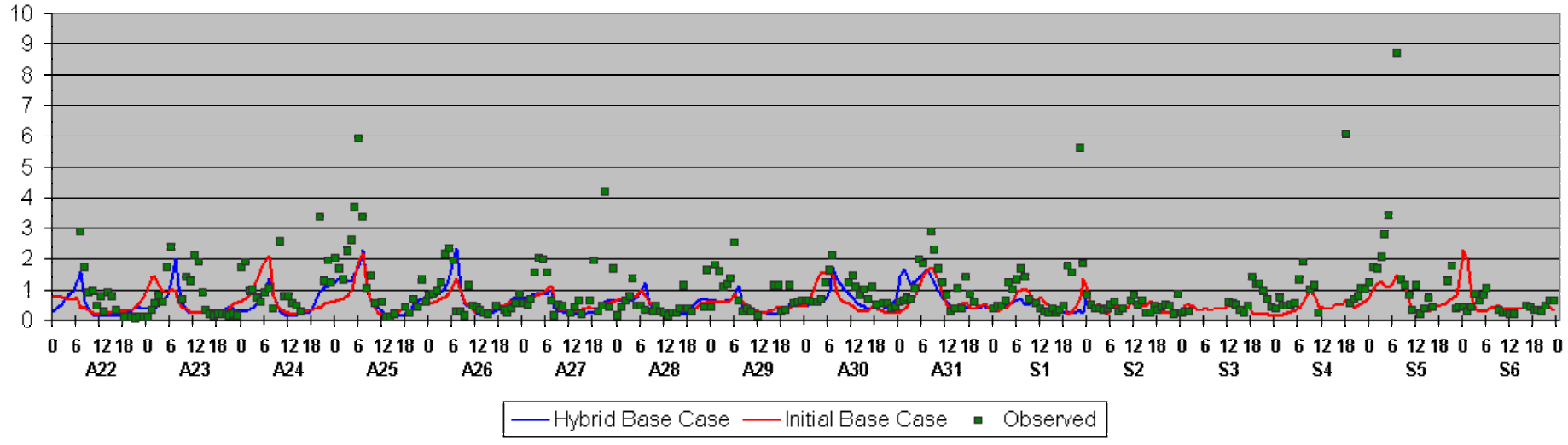
La Porte Supersite OLE Concentrations



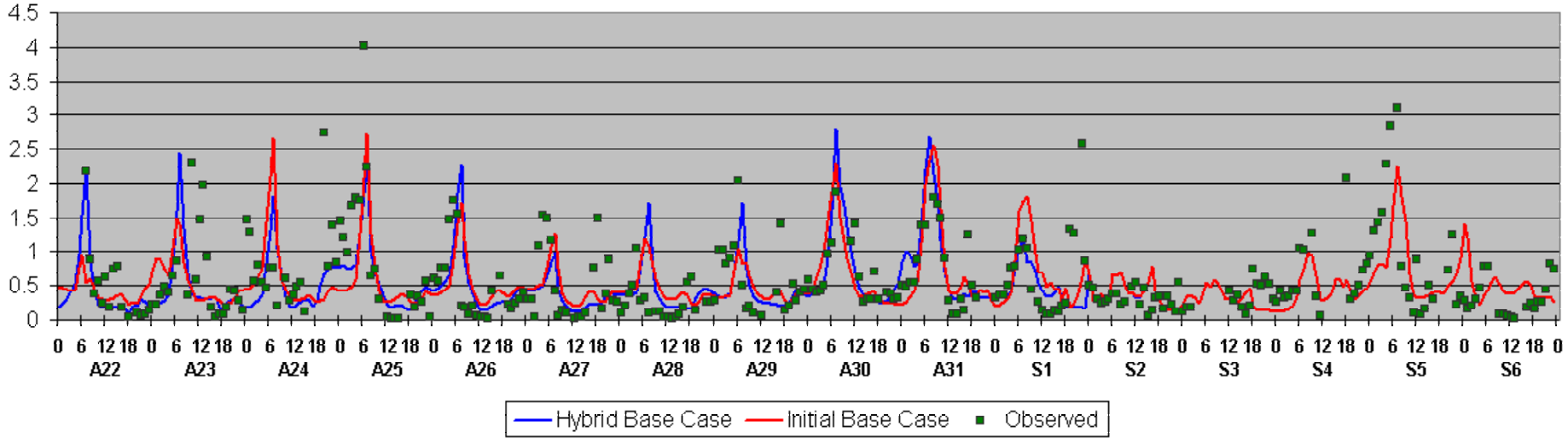

La Porte Supersite PAR Concentrations
600
500
400
300
200
100
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


La Porte Supersite ISOP Concentrations
4.5
4
3.5
3
2.5
2
1.5
1
0.5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

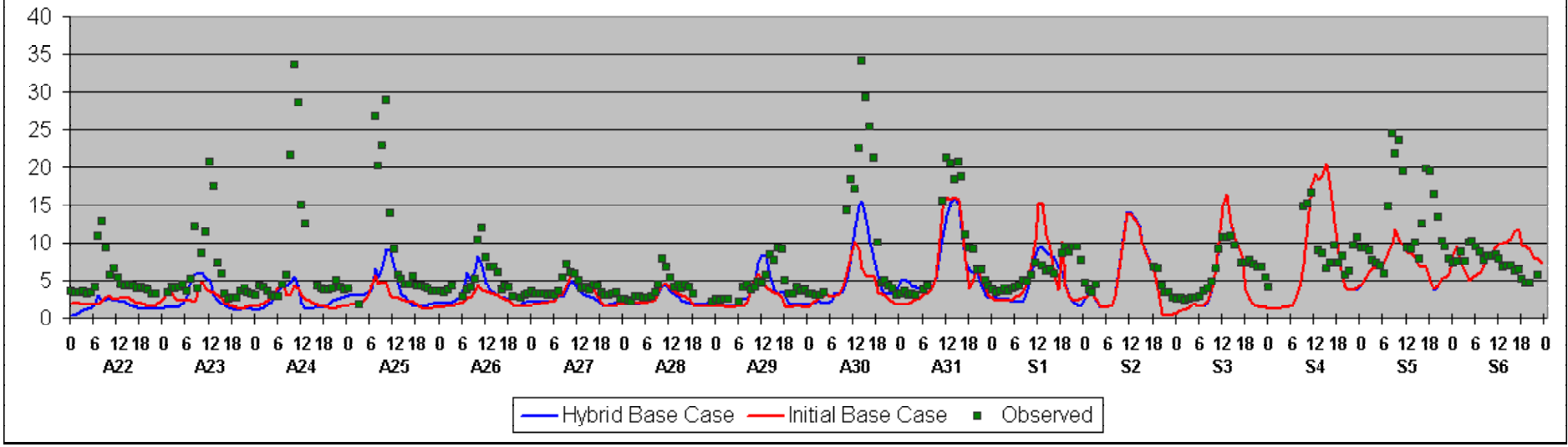
La Porte Supersite TOL Concentrations



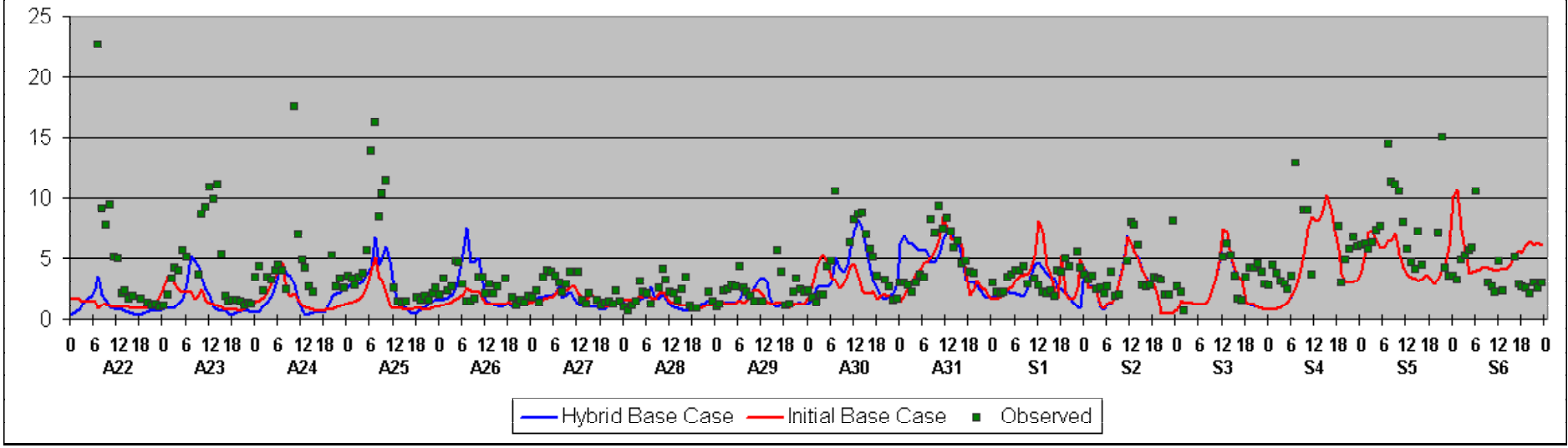
La Porte Supersite XYL Concentrations

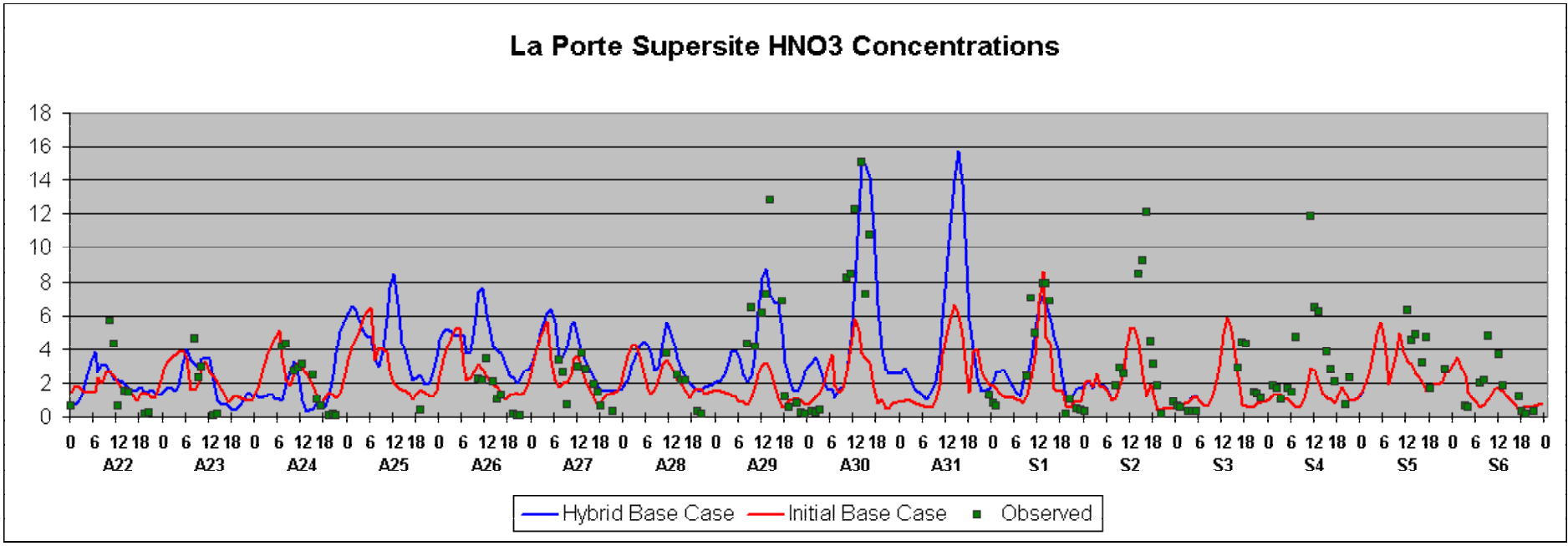


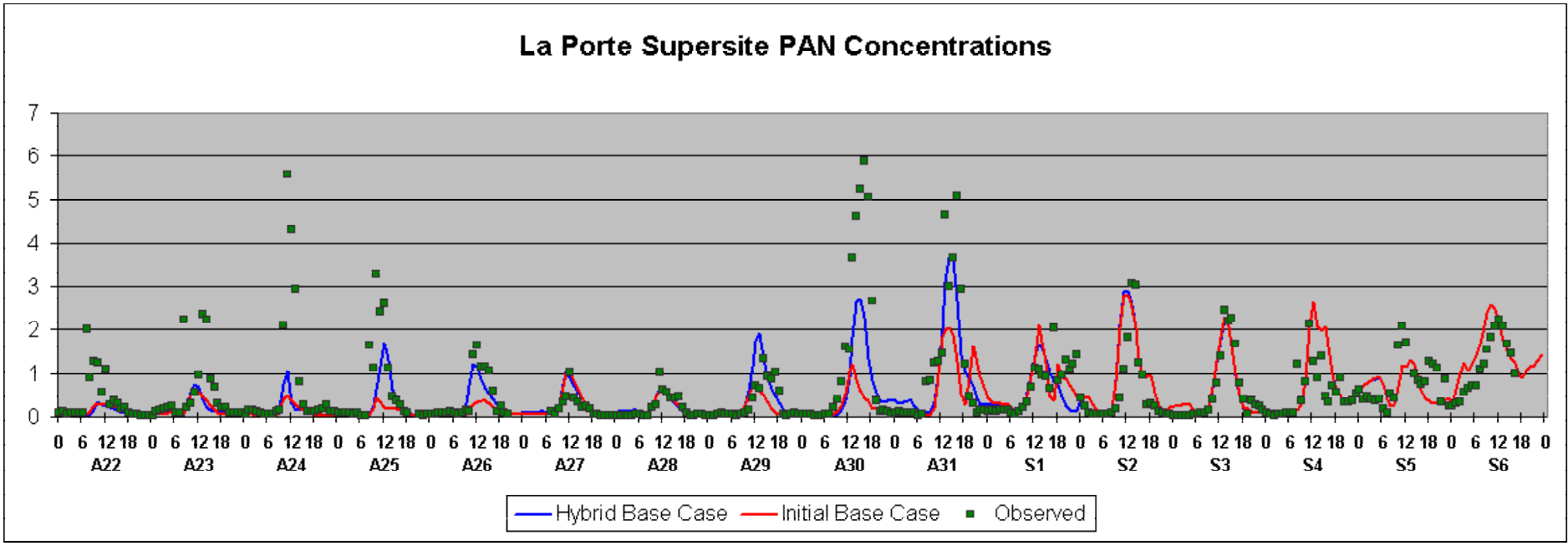
La Porte Supersite HCHO Concentrations

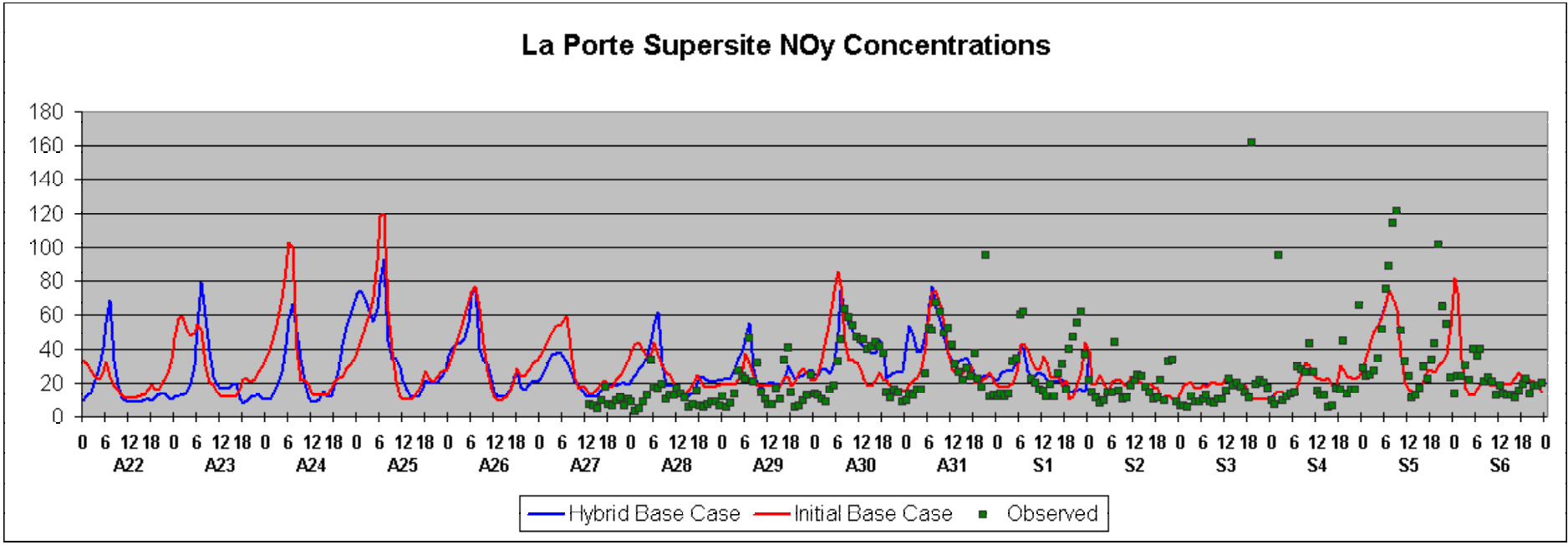


La Porte Supersite ALD2 Concentrations



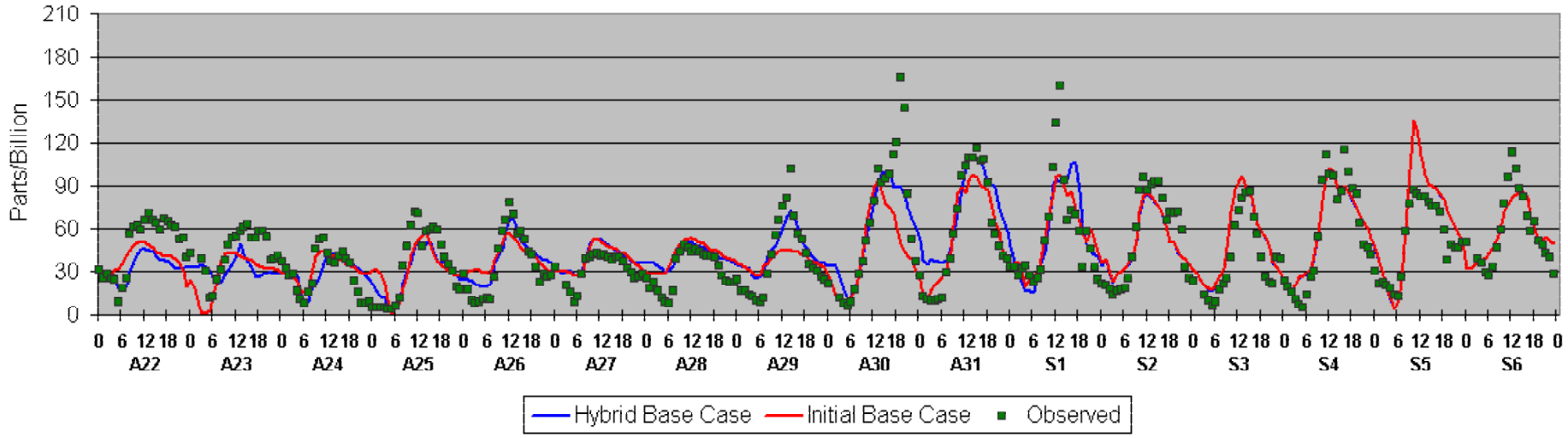

La Porte Supersite HNO3 Concentrations
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


La Porte Supersite PAN Concentrations
7
6
5
4
3
2
1
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

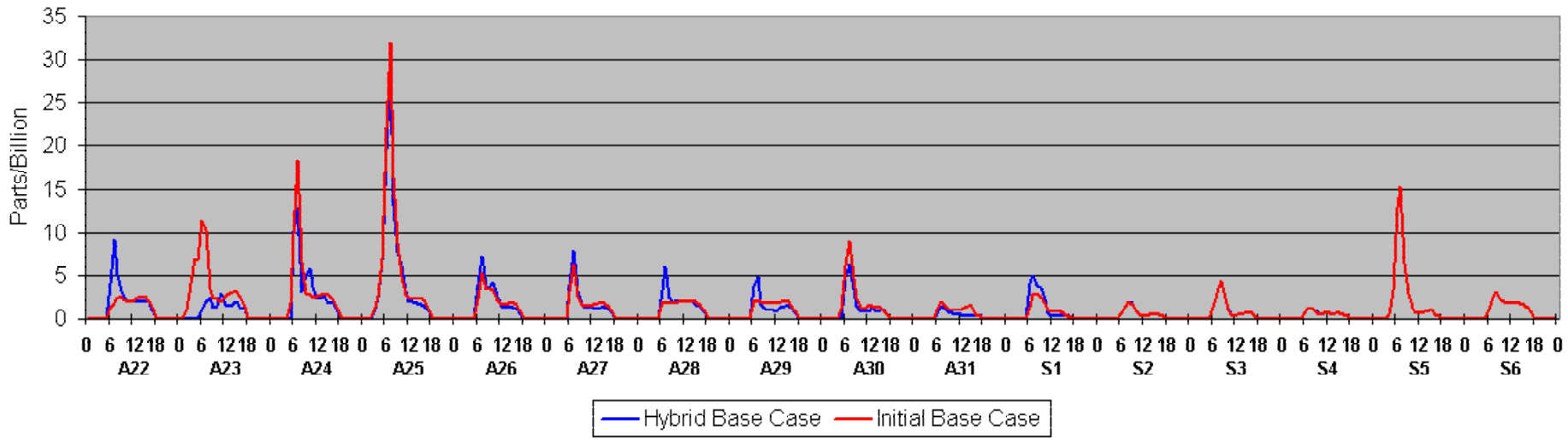

La Porte Supersite NOy Concentrations
180
160
140
120
100
80
60
40
20
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

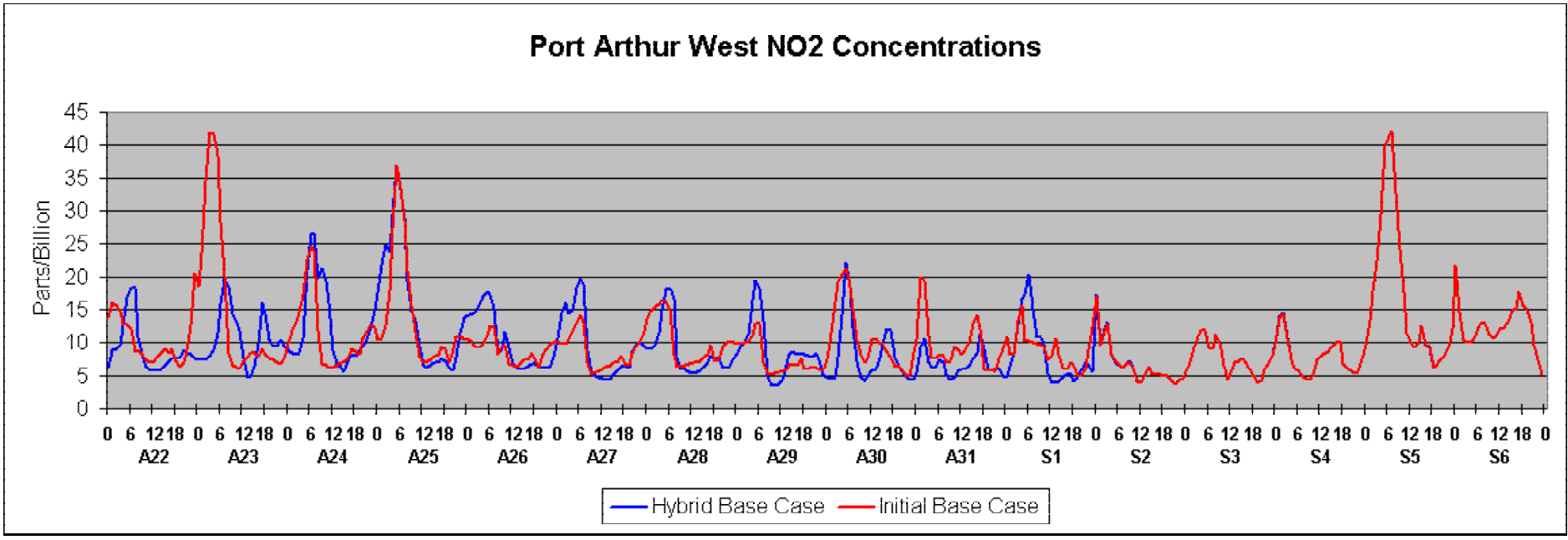
Port Arthur West Time Series

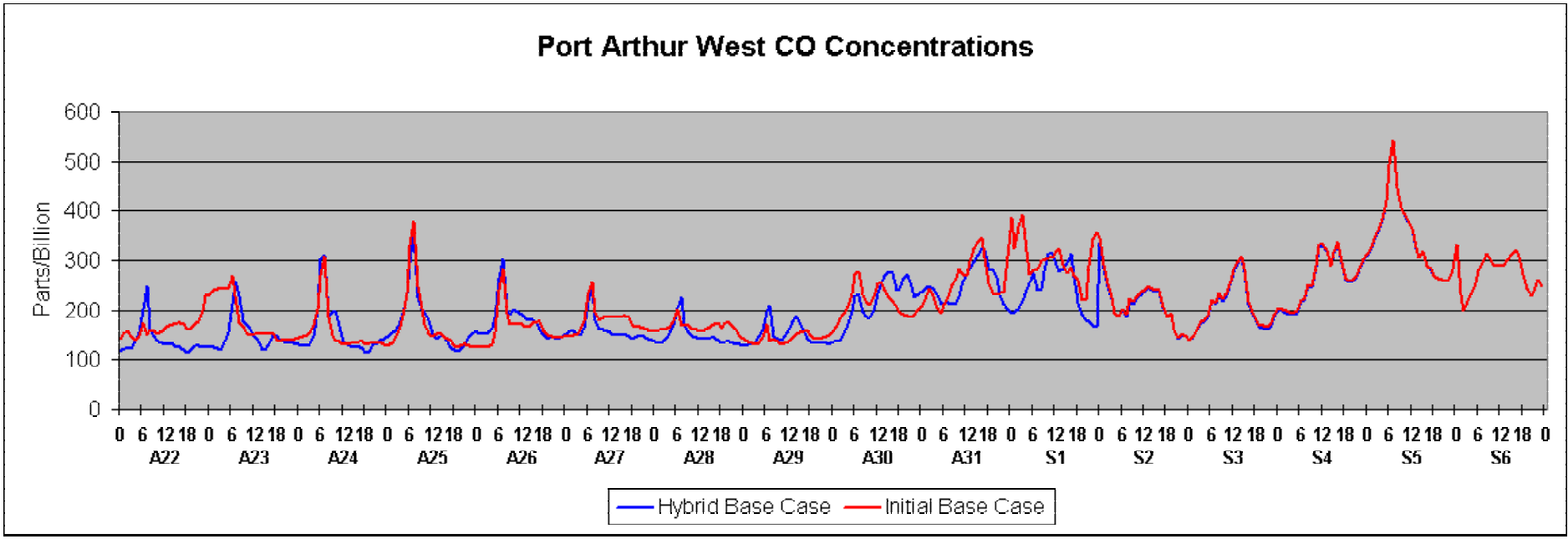
Port Arthur West Ozone Concentrations

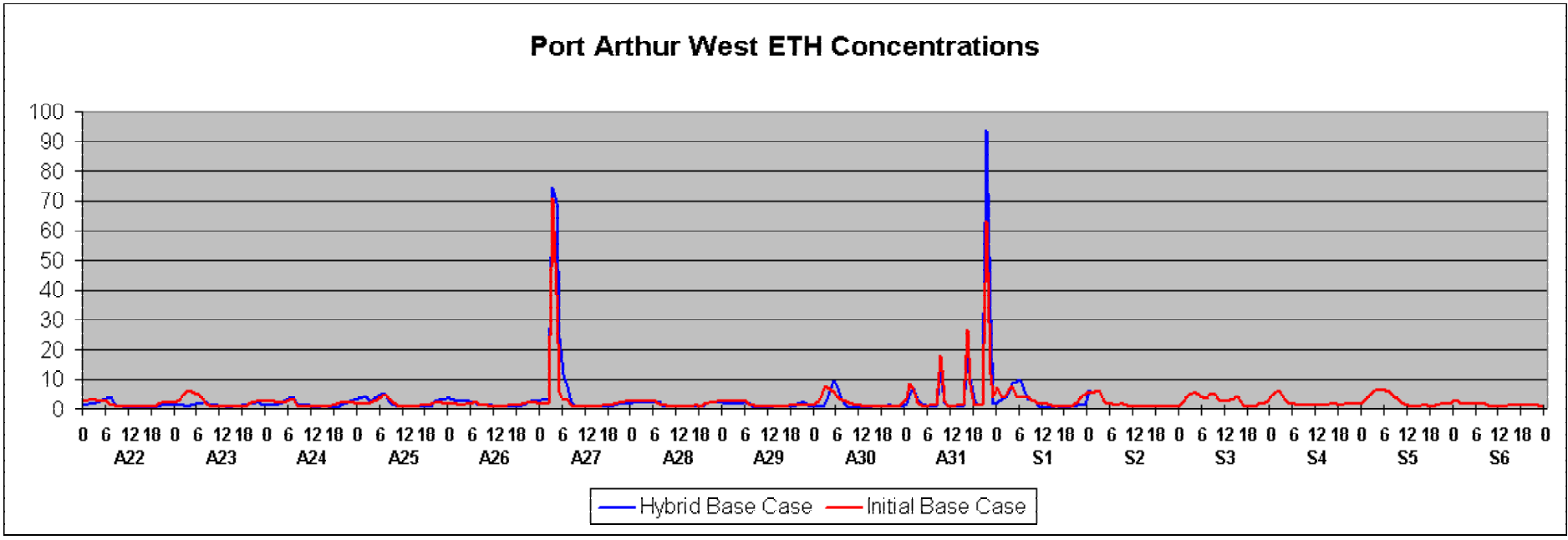


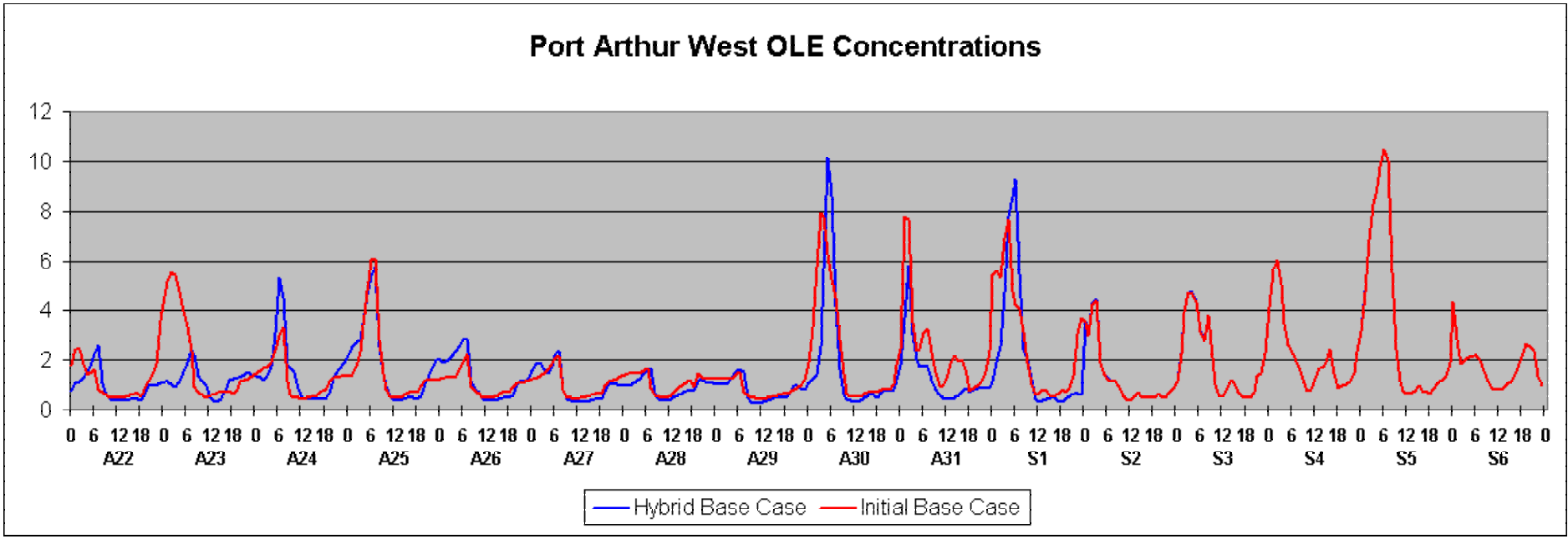
Port Arthur West NO Concentrations

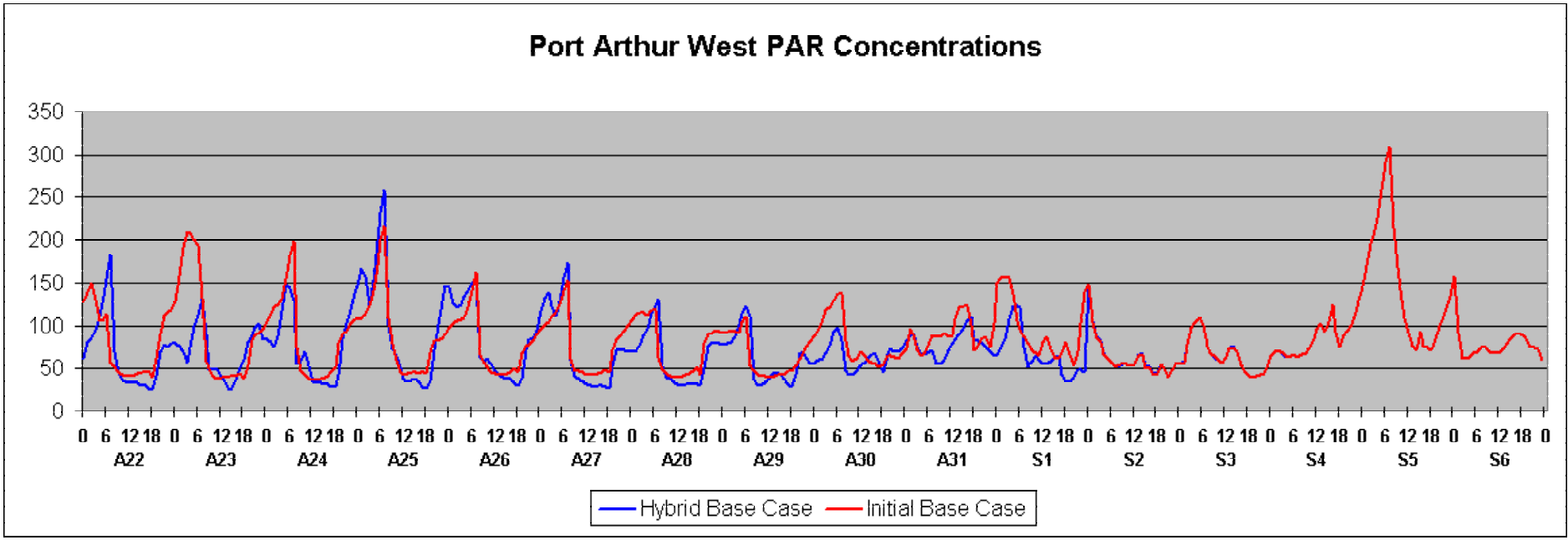


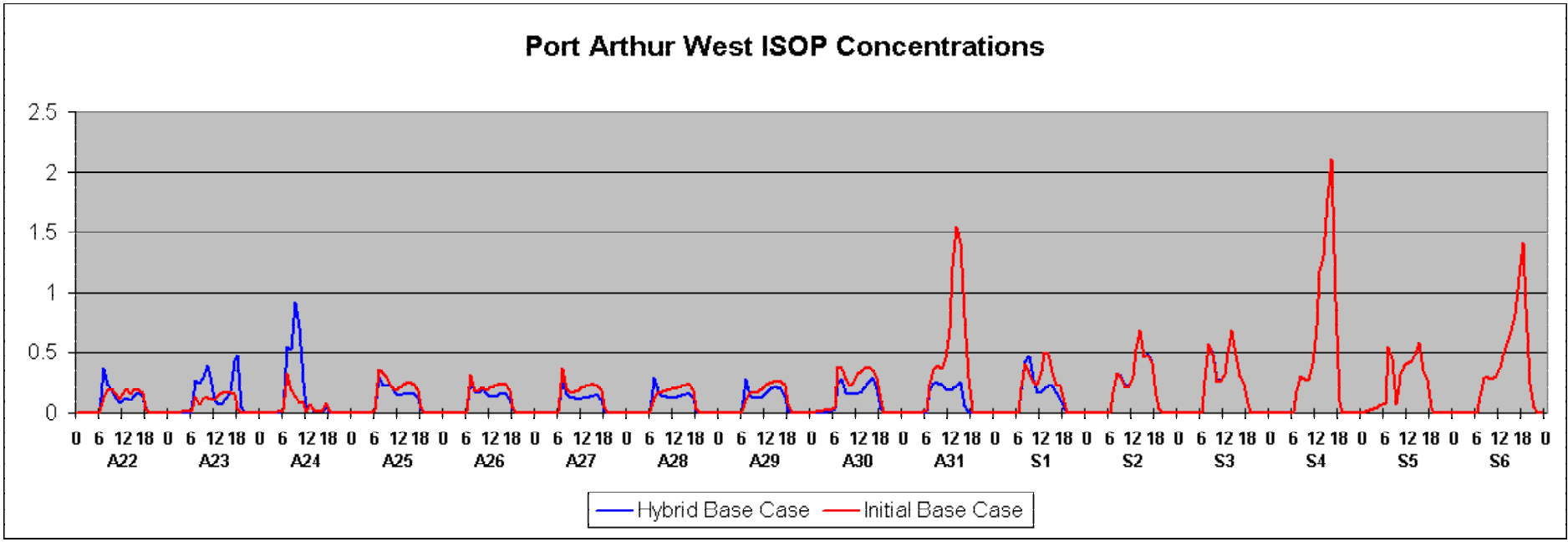

Port Arthur West NO2 Concentrations
Parts/Billion
45
40
35
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

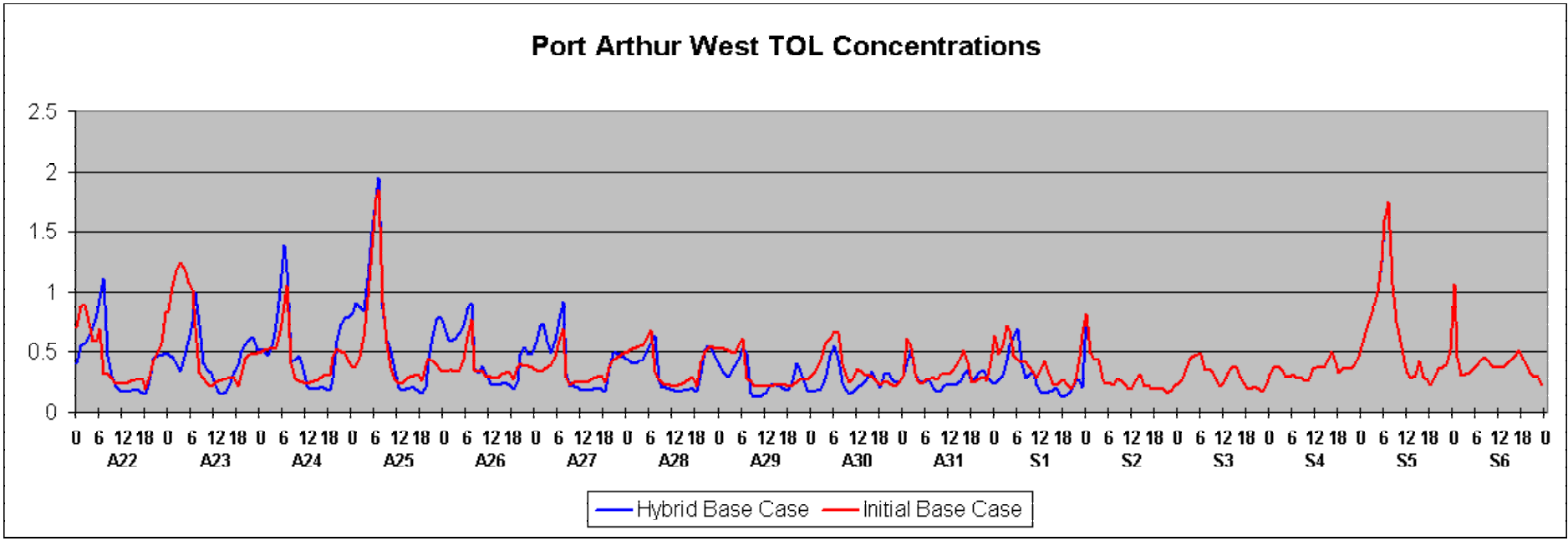

Port Arthur West CO Concentrations
Parts/Billion
600
500
400
300
200
100
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

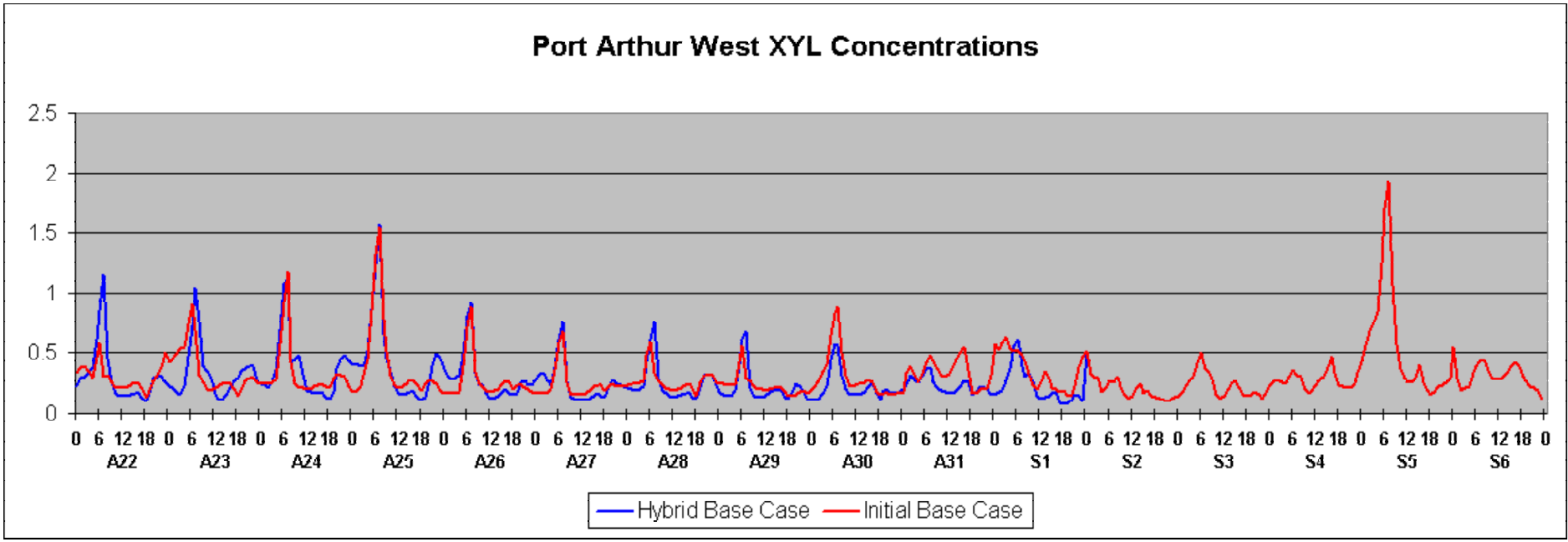

Port Arthur West ETH Concentrations
100
90
80
70
60
50
40
30
20
10
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

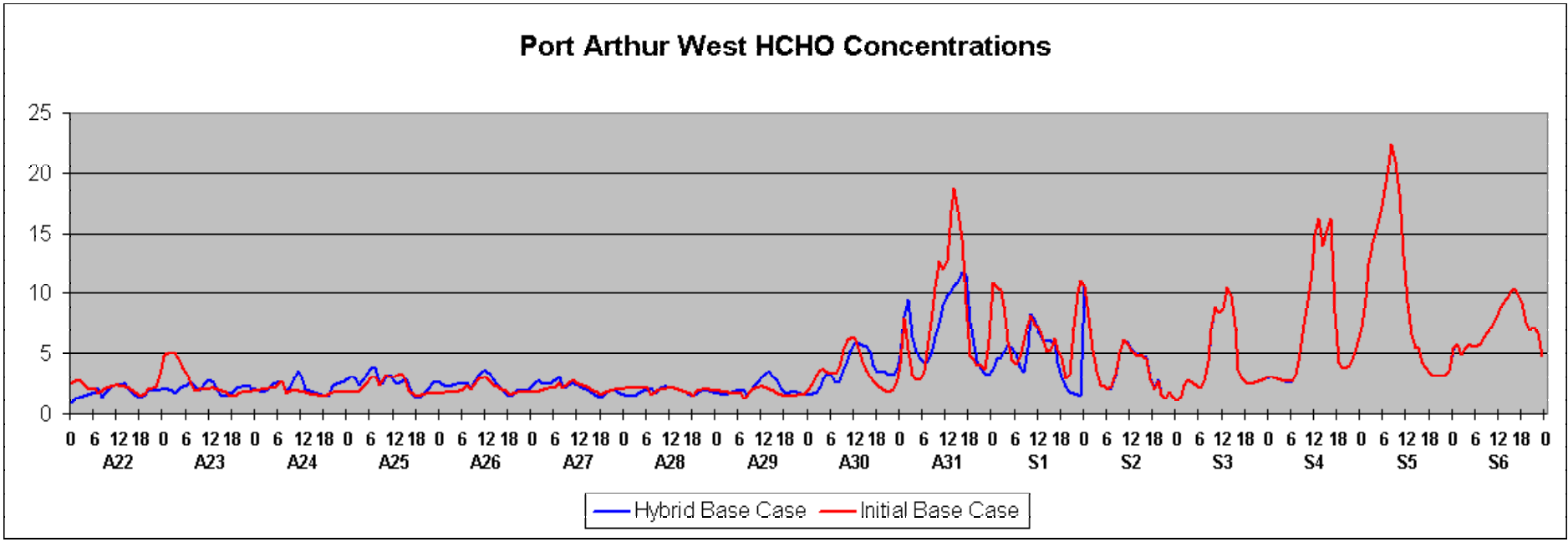

Port Arthur West OLE Concentrations
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

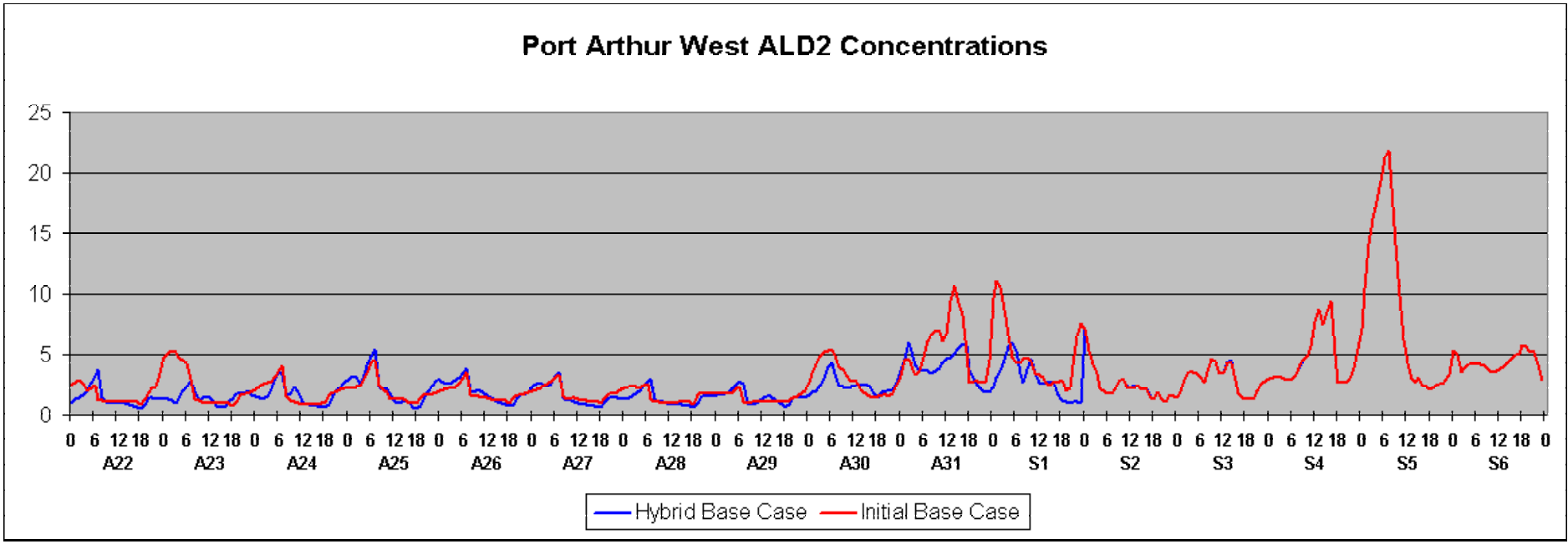

Port Arthur West PAR Concentrations
350
300
250
200
150
100
50
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

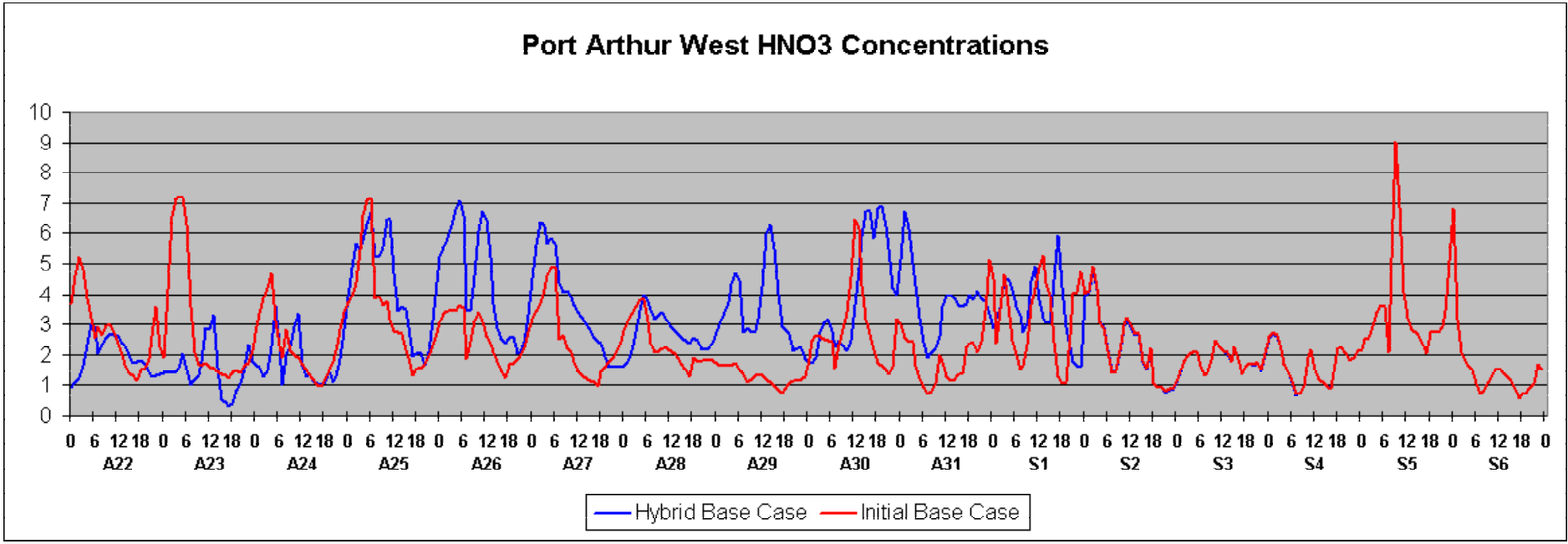

Port Arthur West ISOP Concentrations
2.5
2
1.5
1
0.5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Port Arthur West TOL Concentrations
2.5
2
1.5
1
0.5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Port Arthur West XYL Concentrations
2.5
2
1.5
1
0.5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

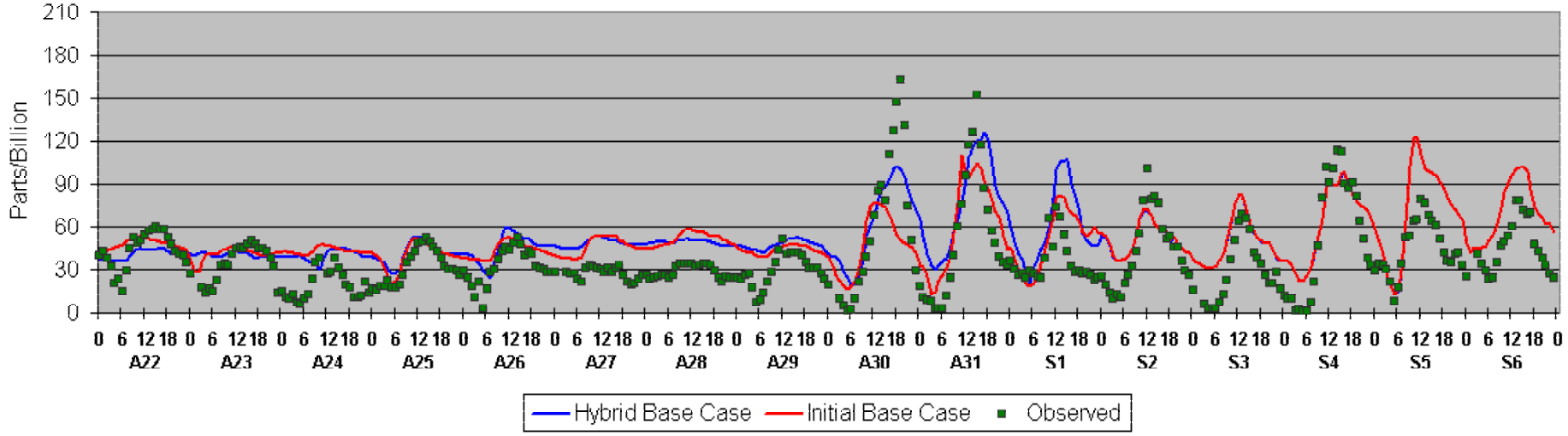

Port Arthur West HCHO Concentrations
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Port Arthur West ALD2 Concentrations
25
20
15
10
5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

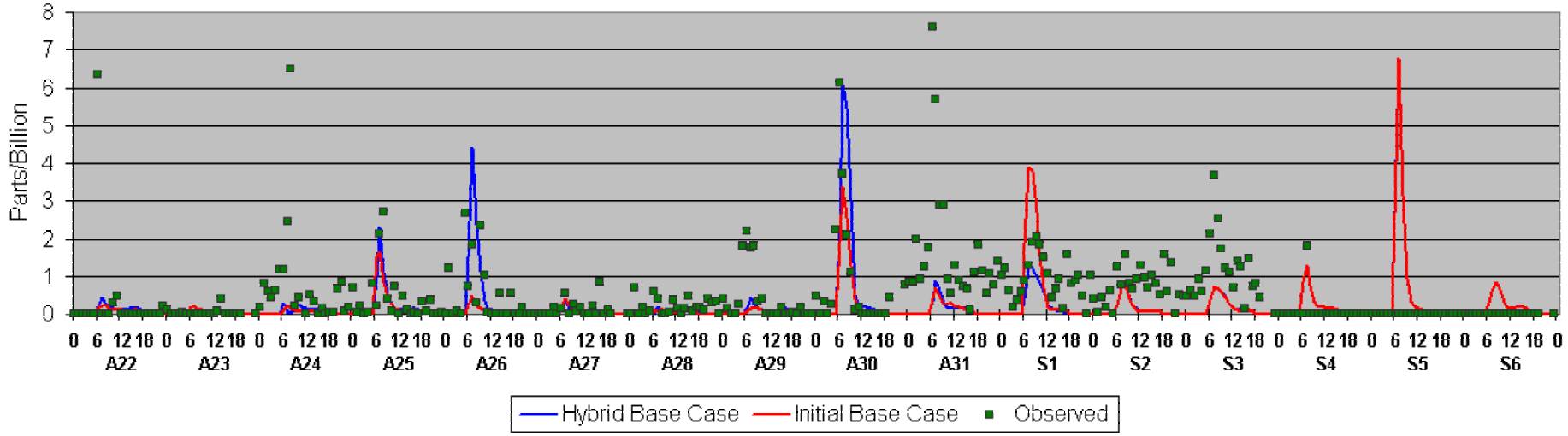

Port Arthur West HNO3 Concentrations
10
9
8
7
6
5
4
3
2
1
0
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Sabine Pass Time Series

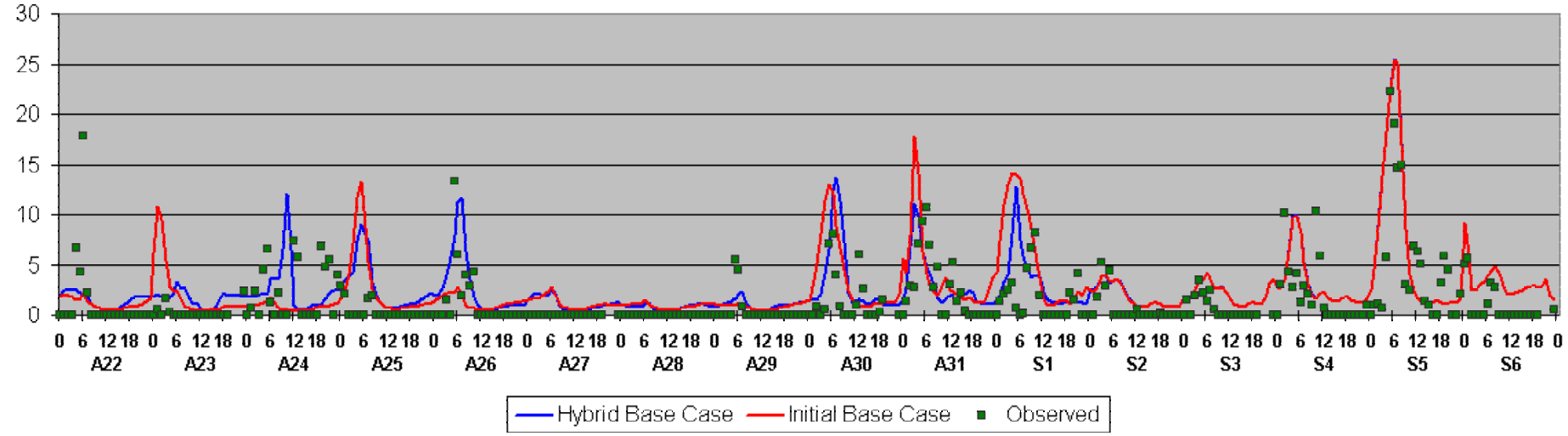
Sabine Pass Ozone Concentrations



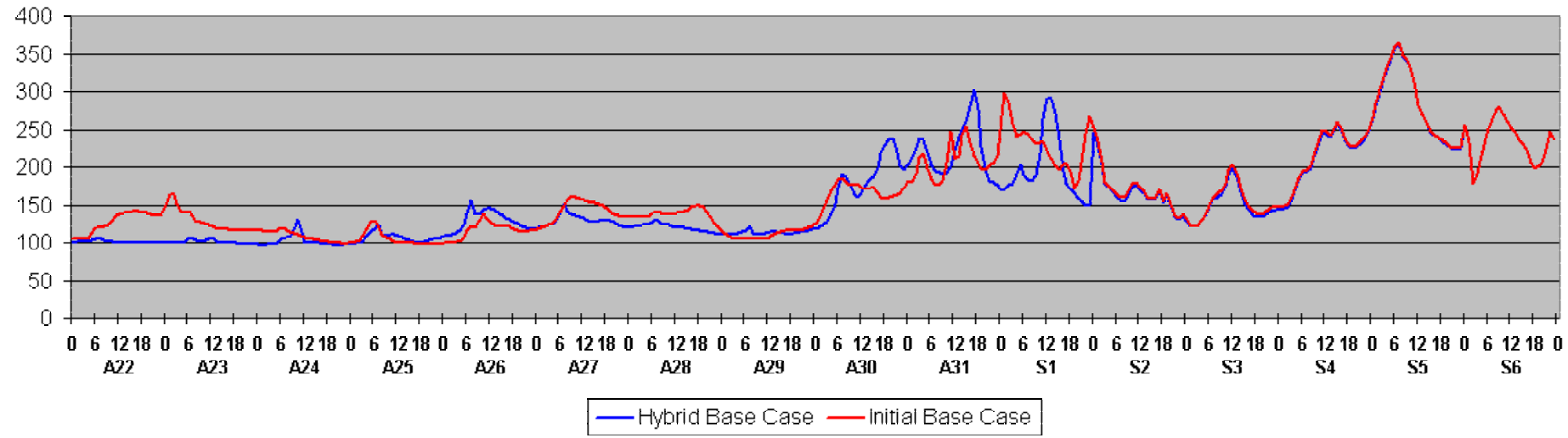
Sabine Pass NO Concentrations

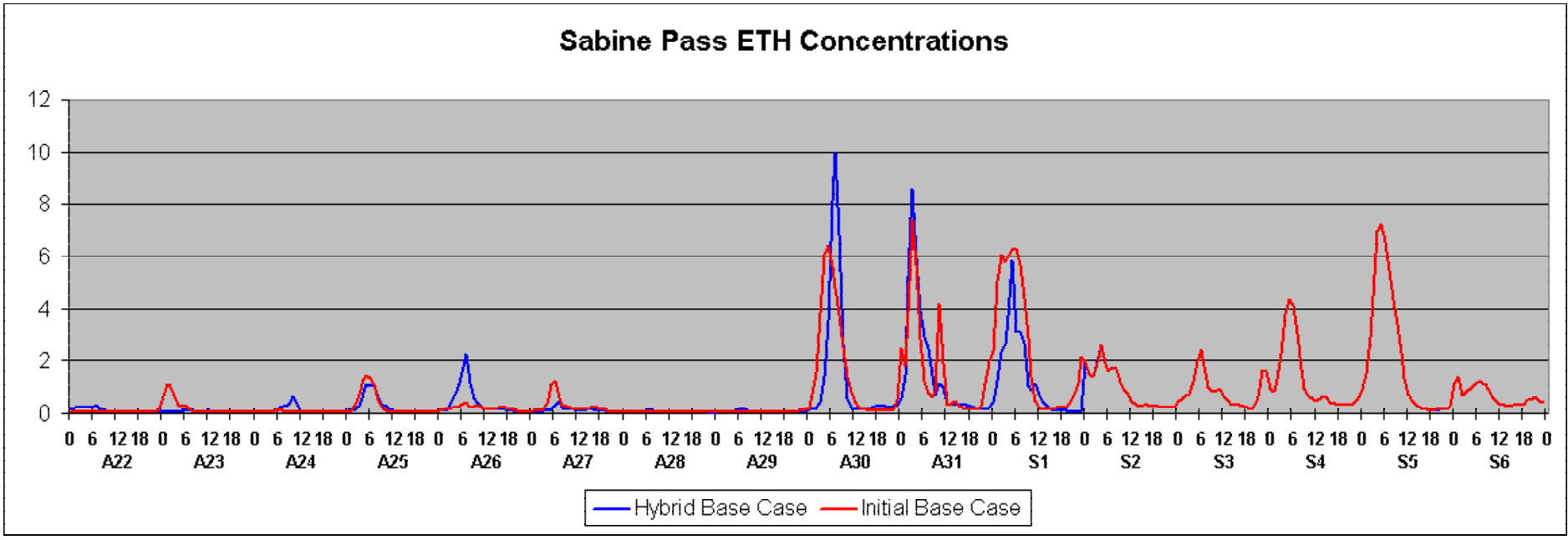


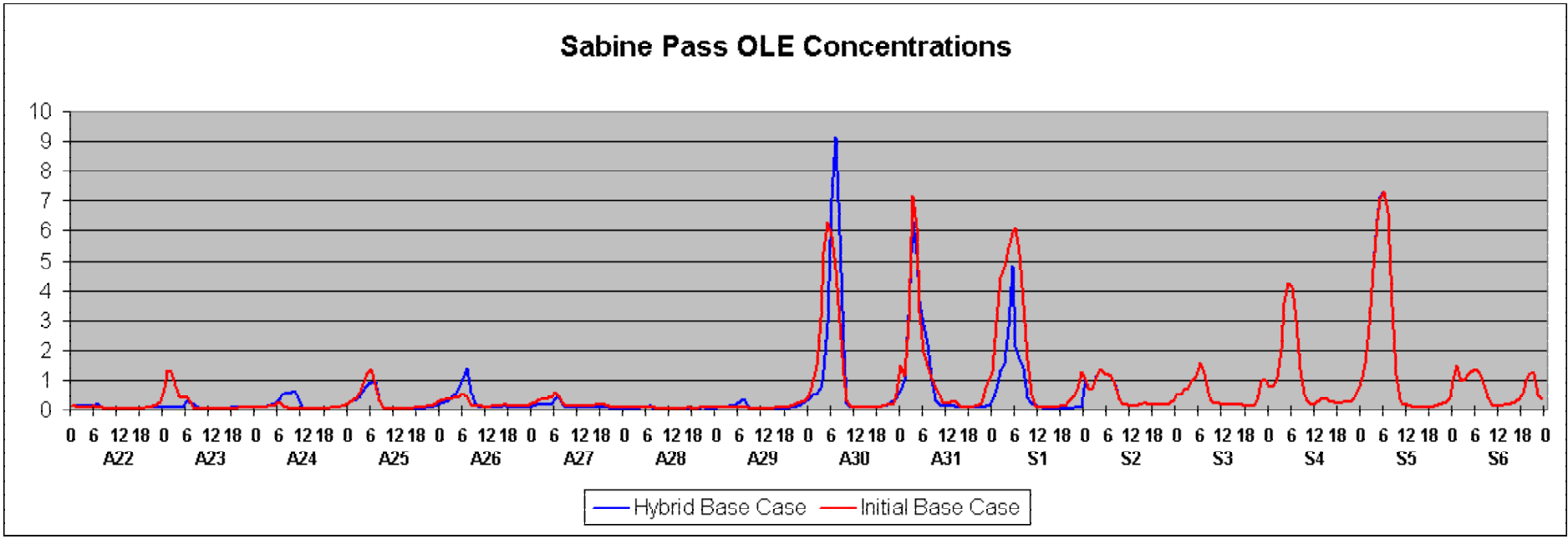
Sabine Pass NO2 Concentrations



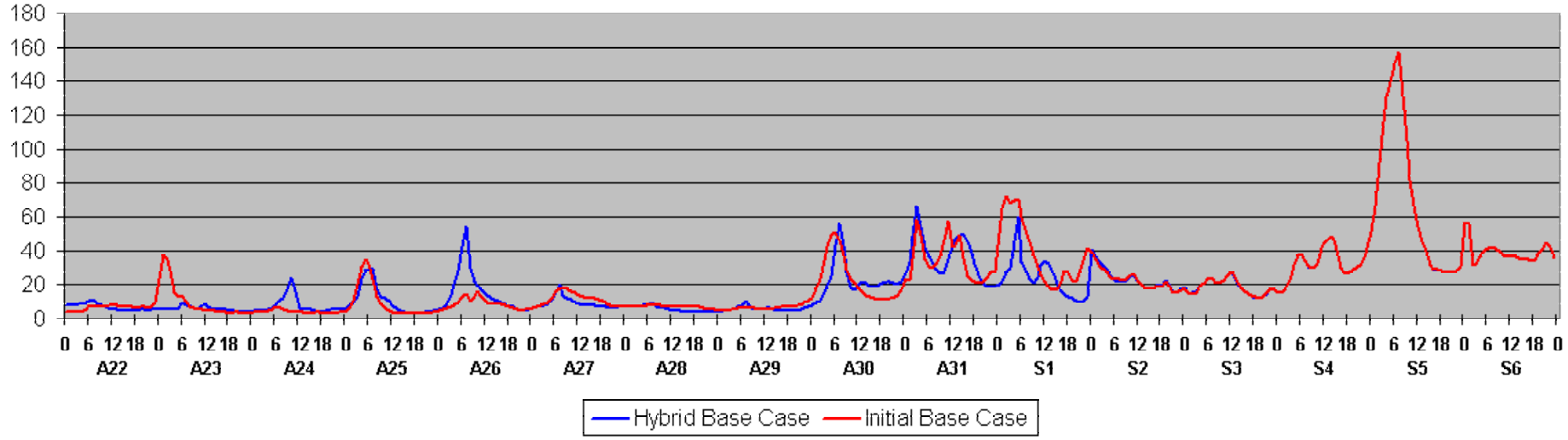
Sabine Pass CO Concentrations



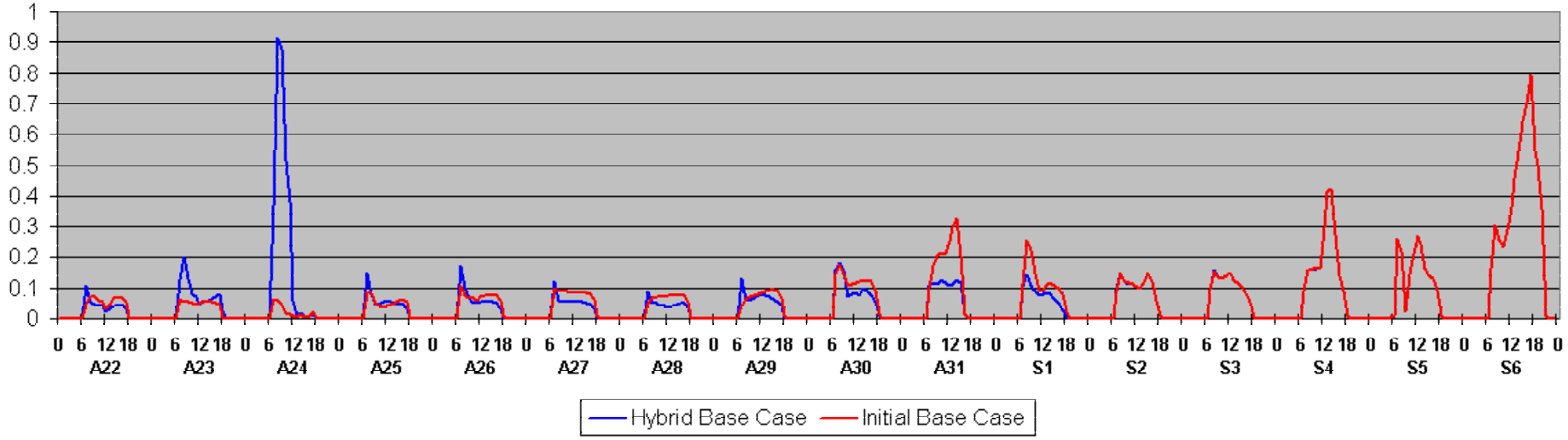

Sabine Pass ETH Concentrations
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Sabine Pass OLE Concentrations
10
9
8
7
6
5
4
3
2
1
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

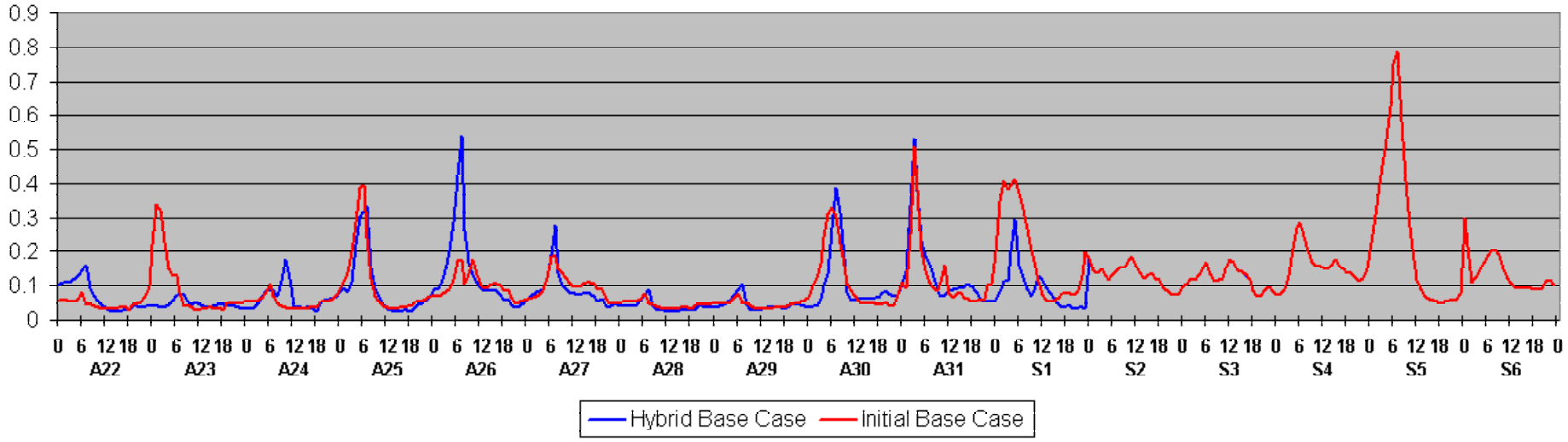
Sabine Pass PAR Concentrations



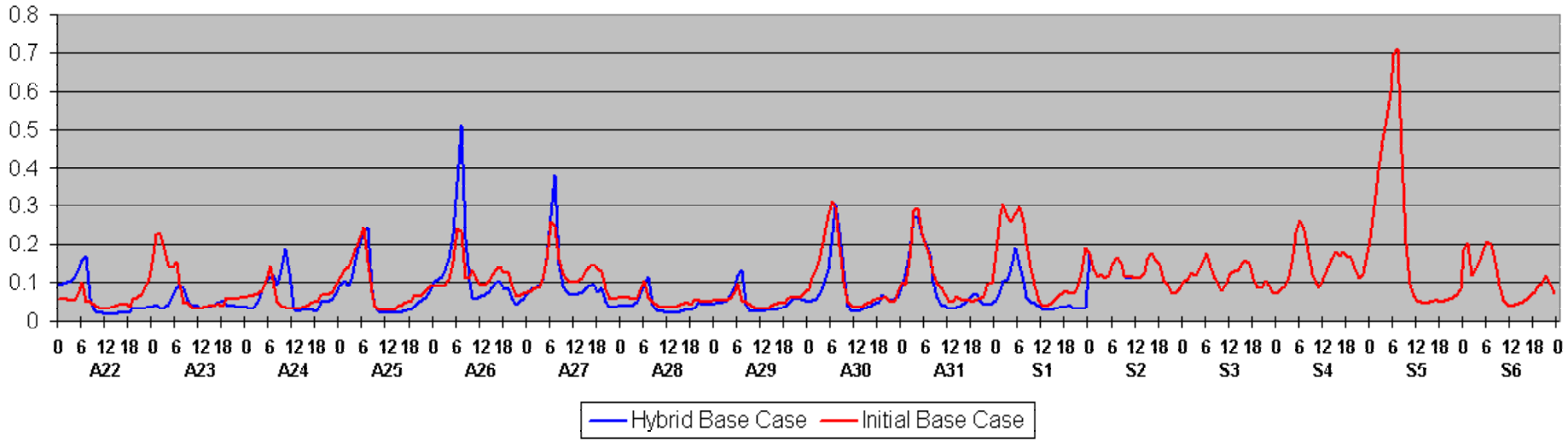
Sabine Pass ISOP Concentrations

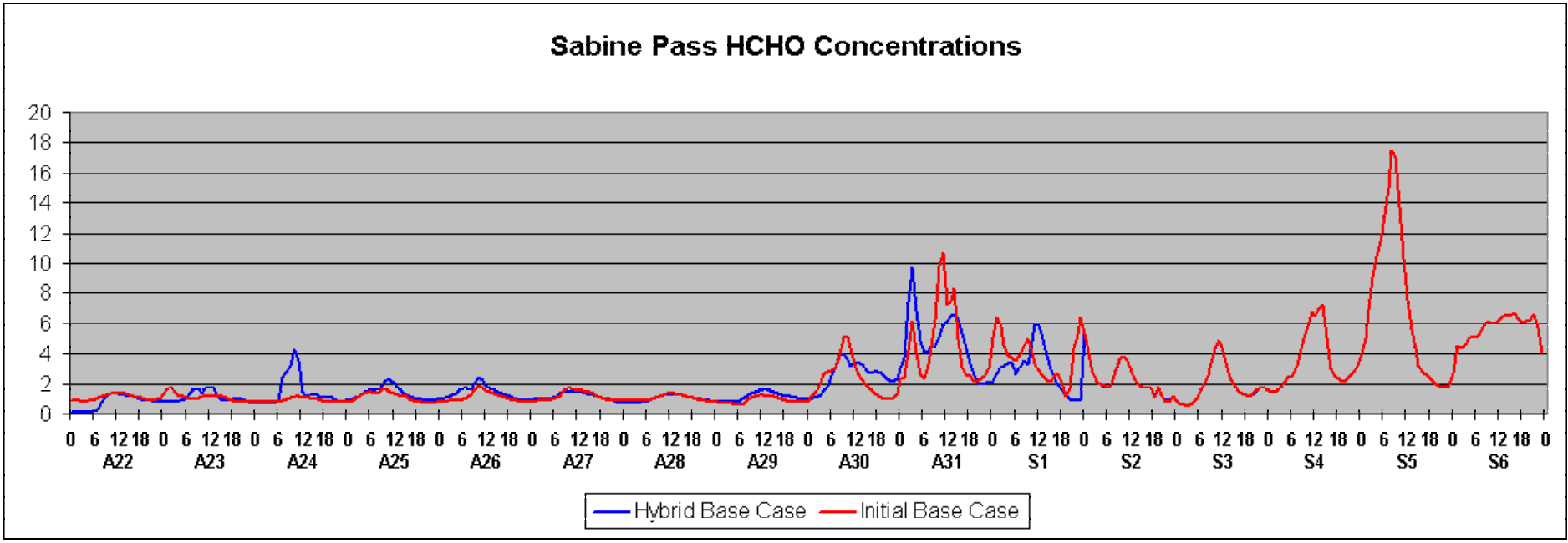


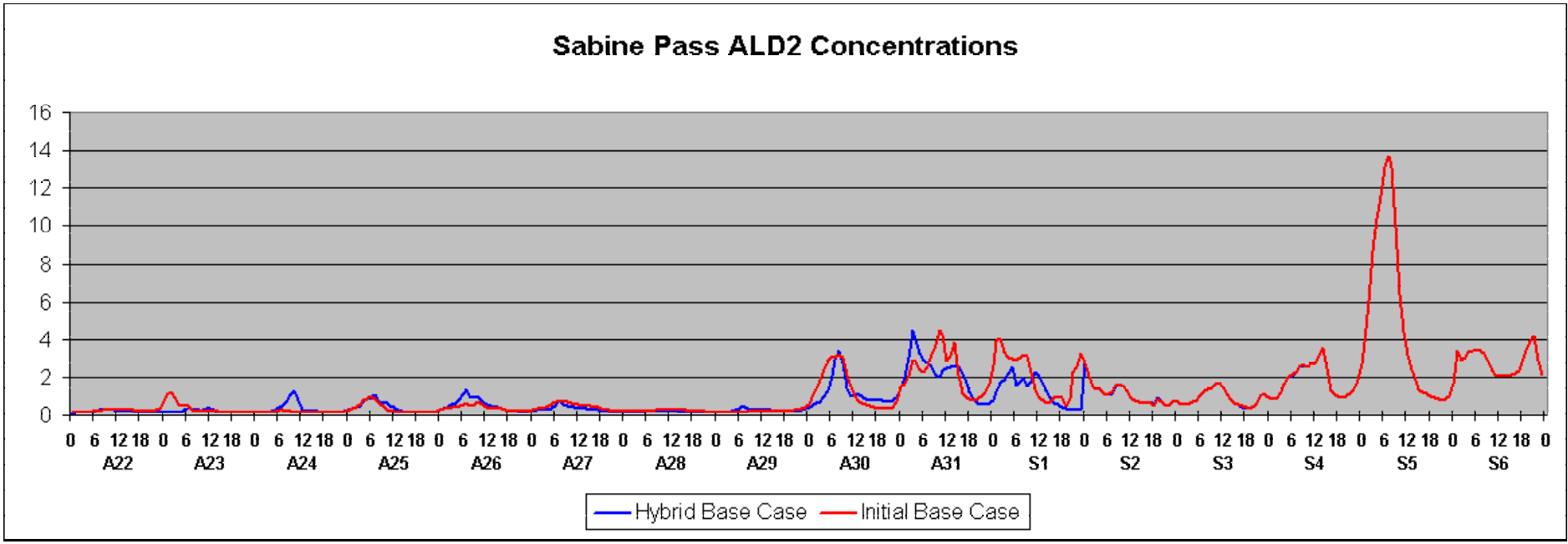
Sabine Pass TOL Concentrations

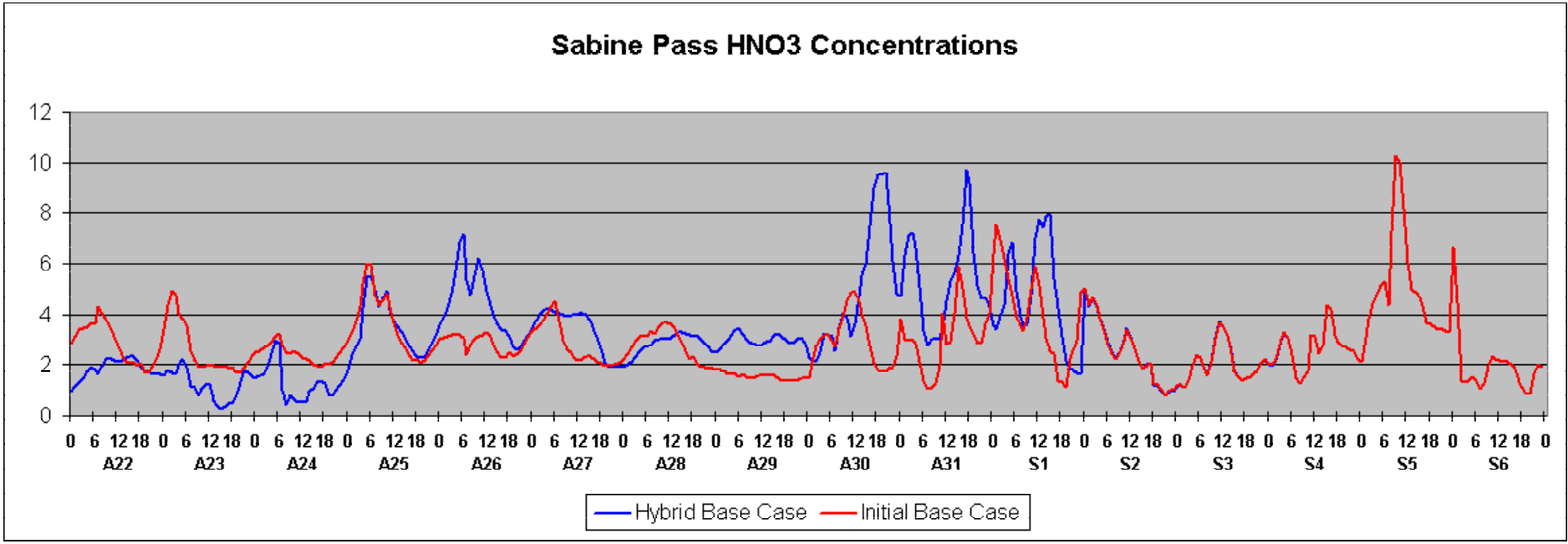


Sabine Pass XYL Concentrations

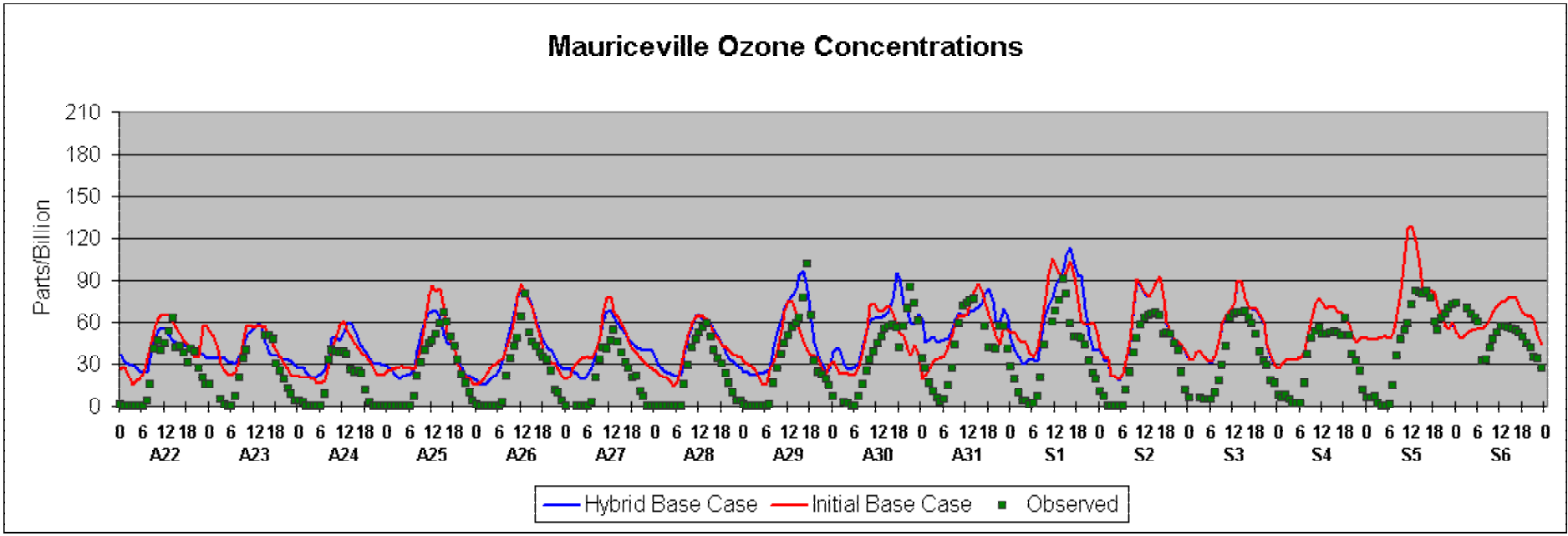


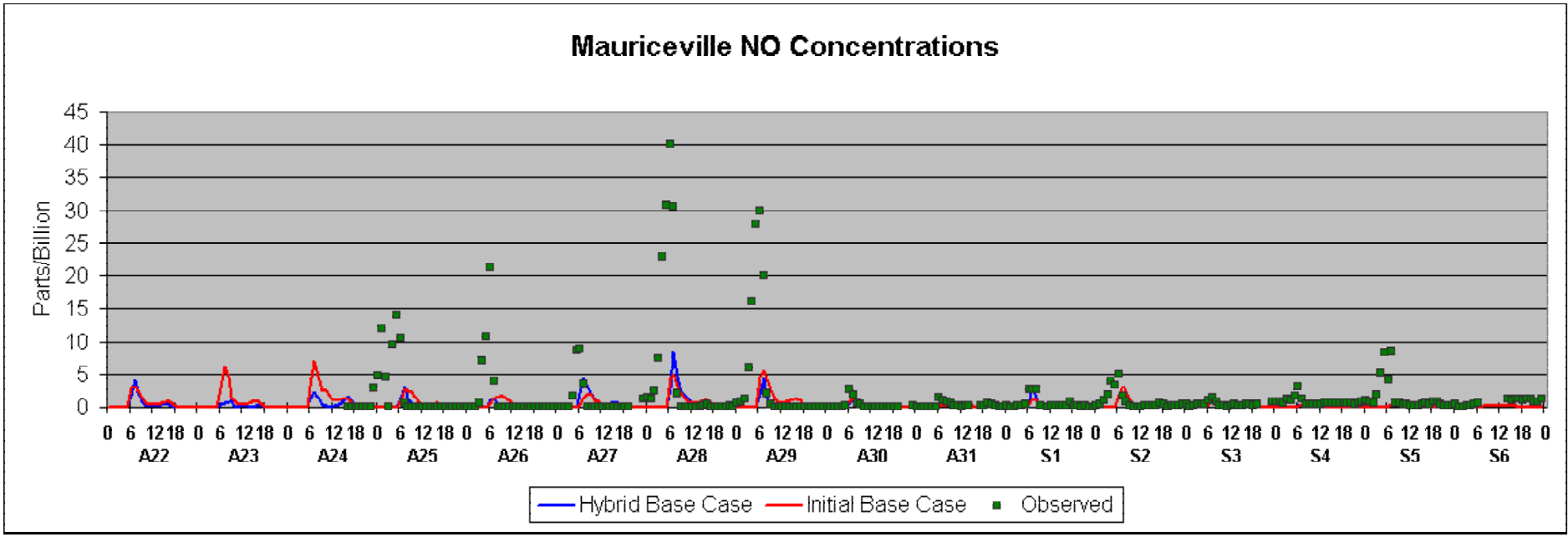

Sabine Pass HCHO Concentrations
20
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

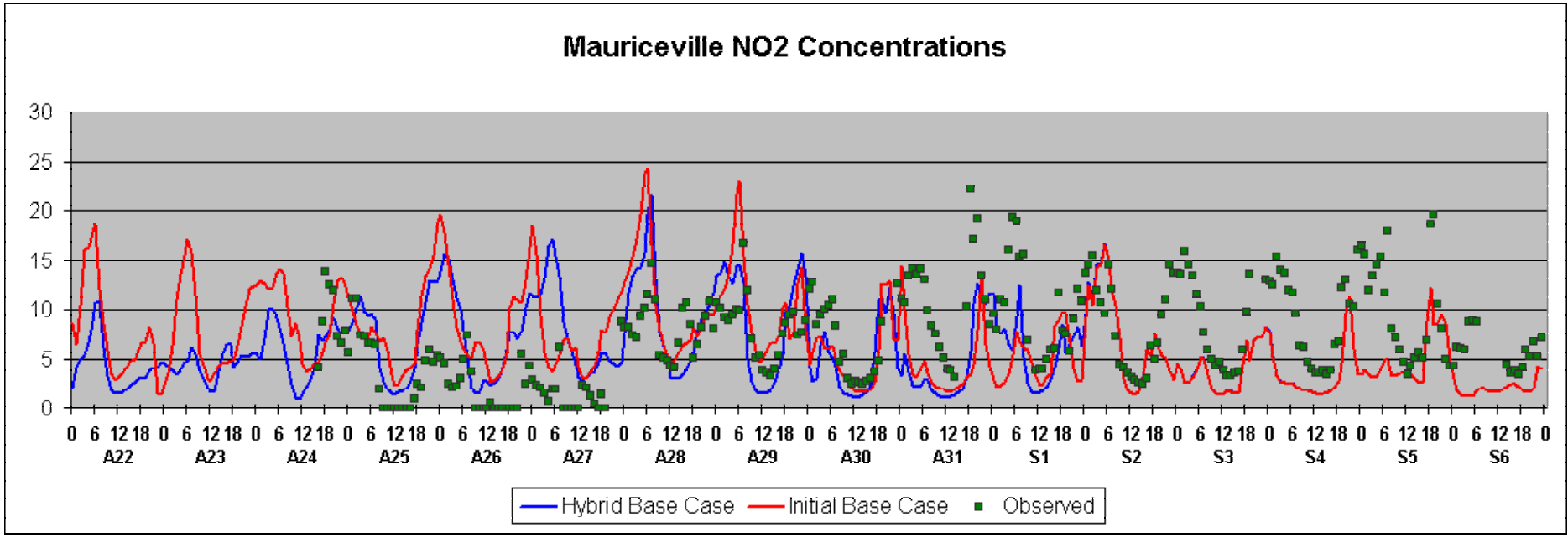

Sabine Pass ALD2 Concentrations
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

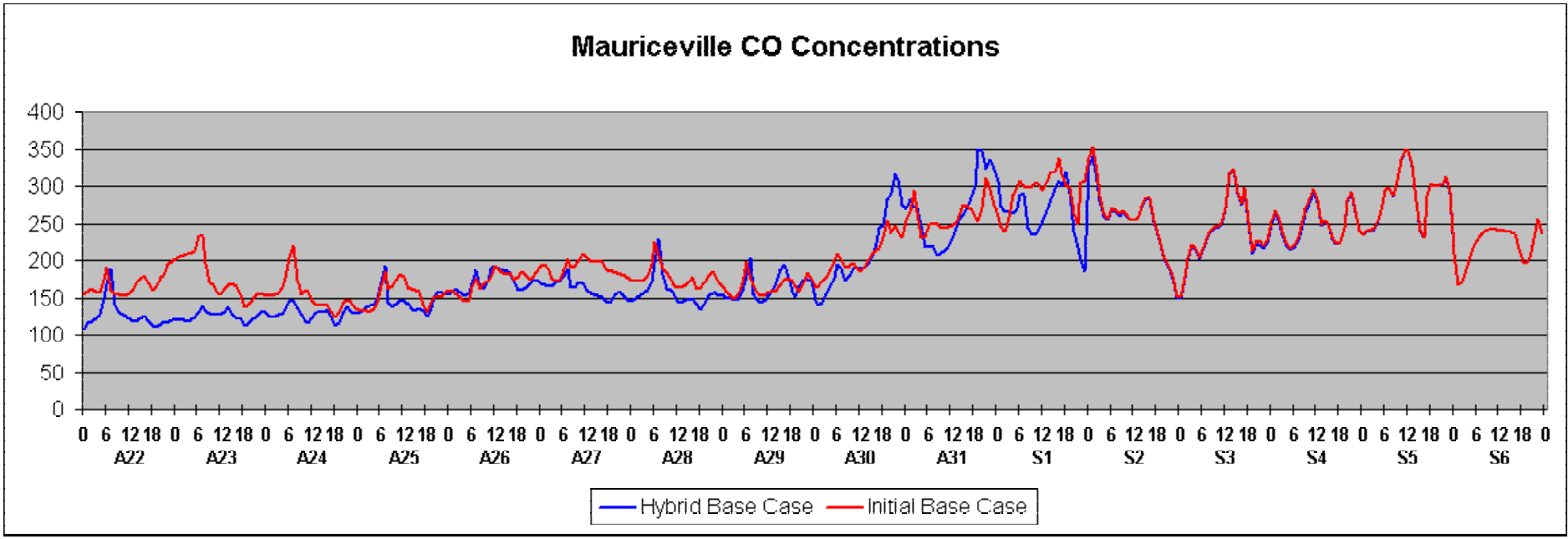

Sabine Pass HNO3 Concentrations
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Mauriceville Time Series

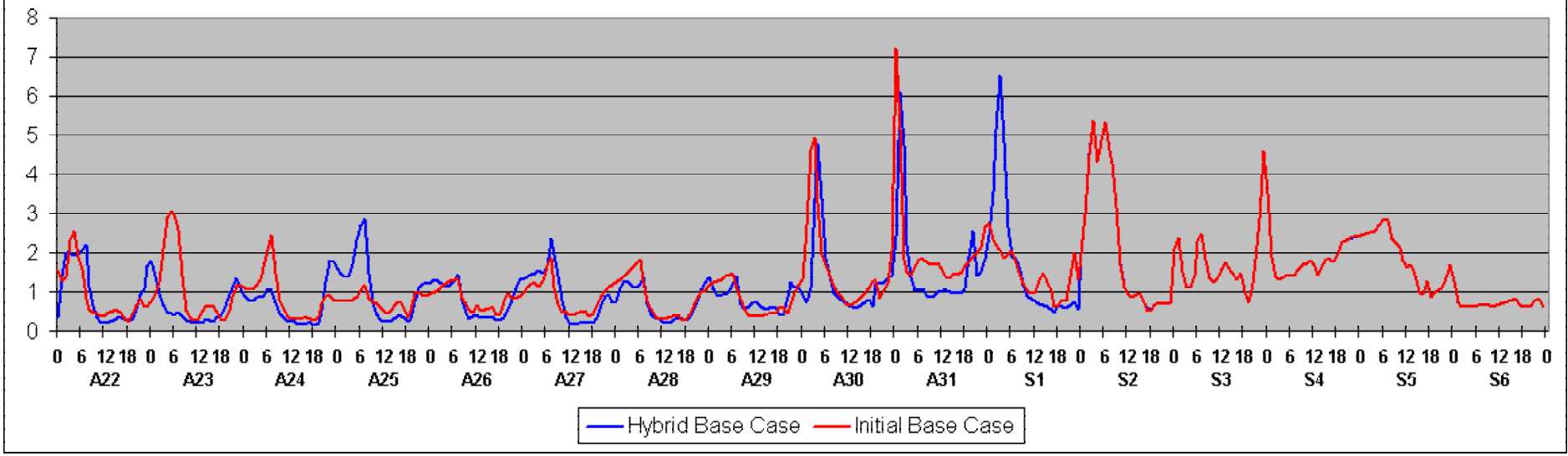

Mauriceville Ozone Concentrations
Parts/Billion
210
180
150
120
90
60
30
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


Mauriceville NO Concentrations
Parts/Billion
45
40
35
30
25
20
15
10
5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

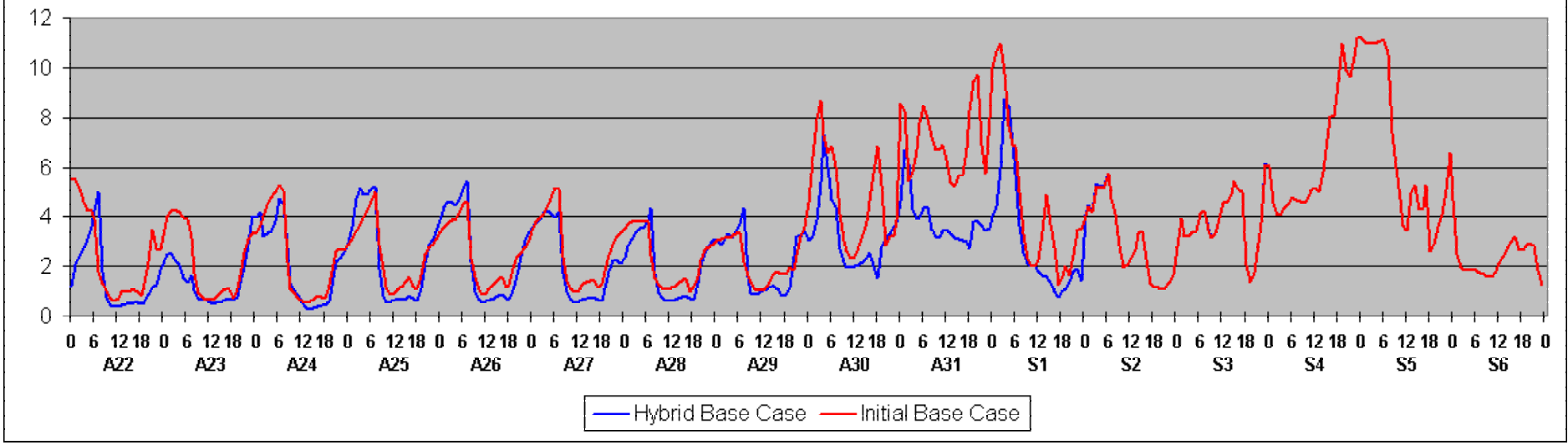

Mauriceville NO2 Concentrations
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


Mauriceville CO Concentrations
400
350
300
250
200
150
100
50
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

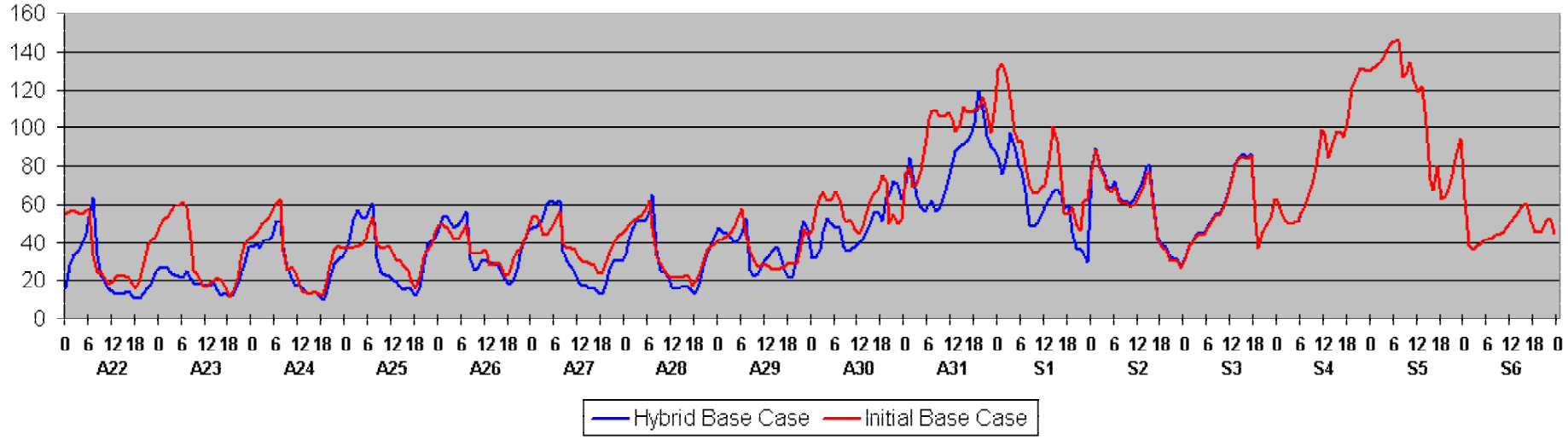
Mauriceville ETH Concentrations



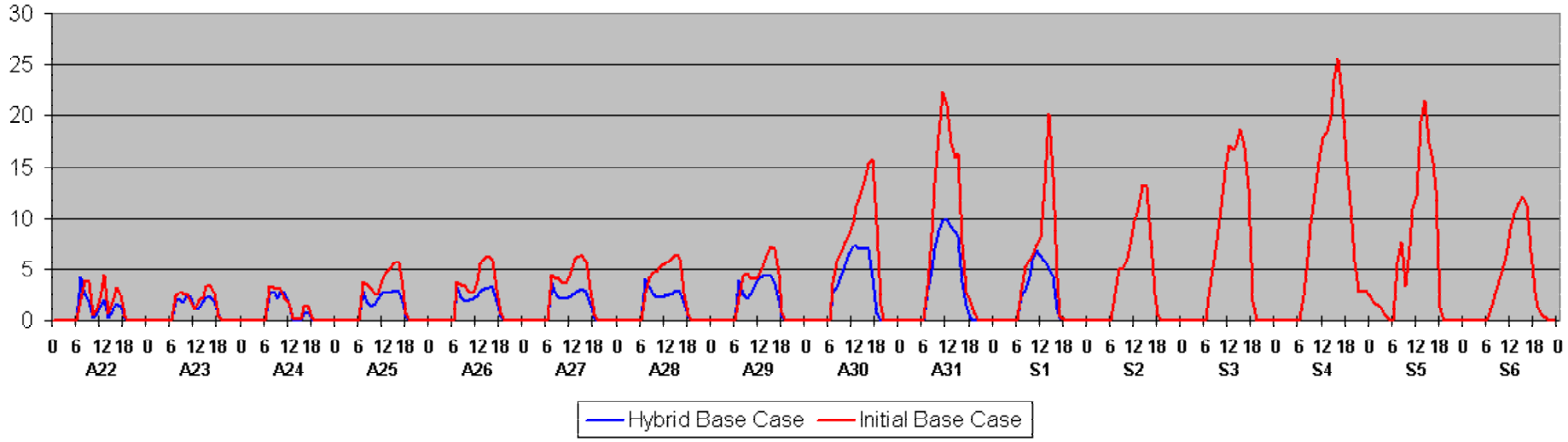
Mauriceville OLE Concentrations



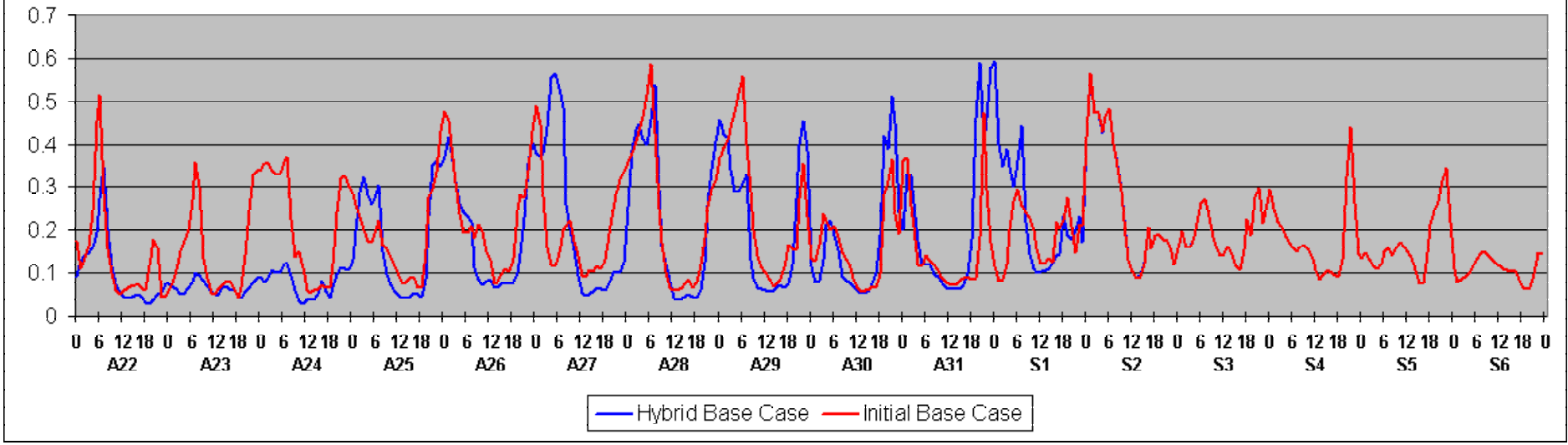
Mauriceville PAR Concentrations



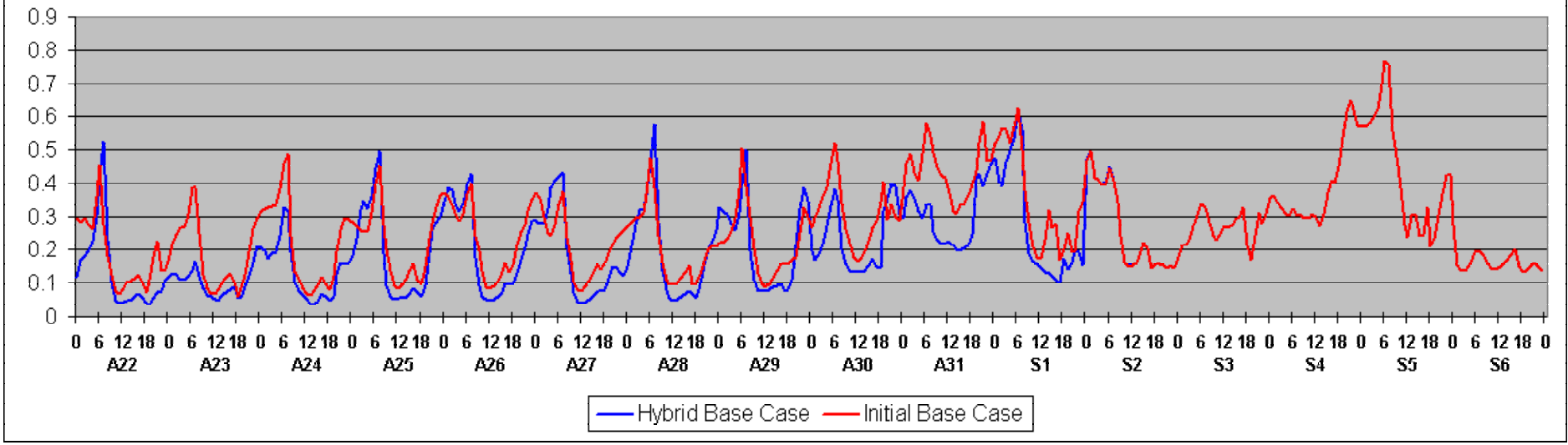
Mauriceville ISOP Concentrations

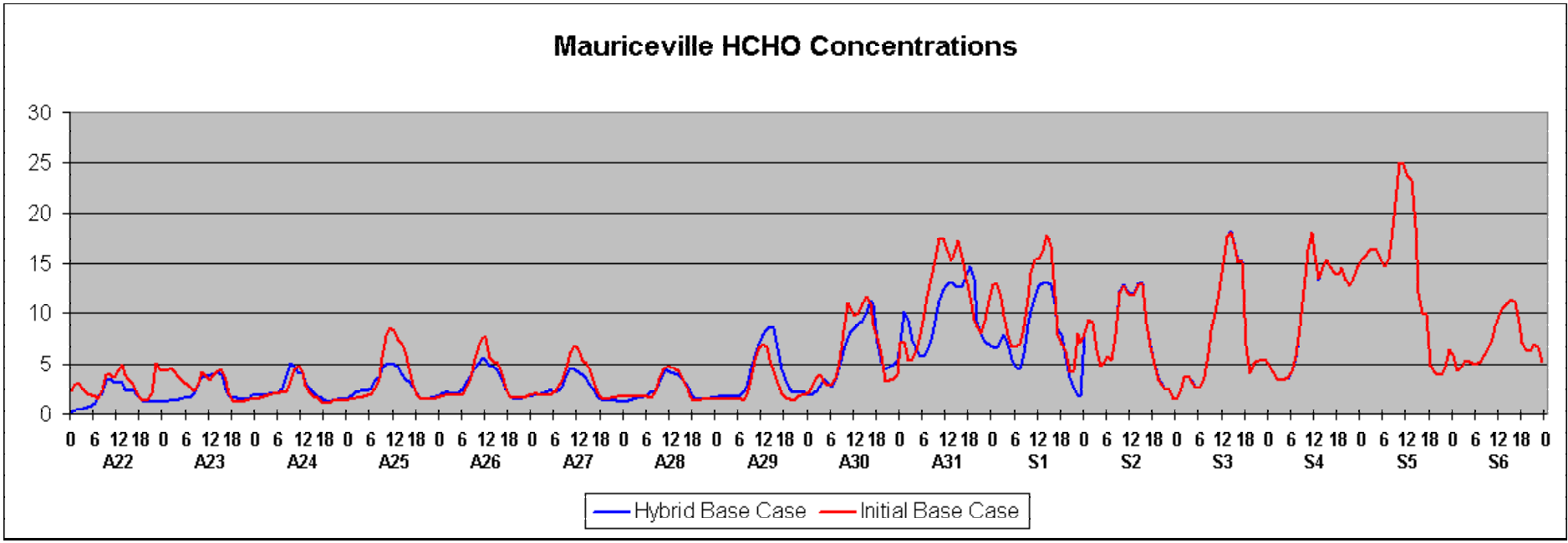


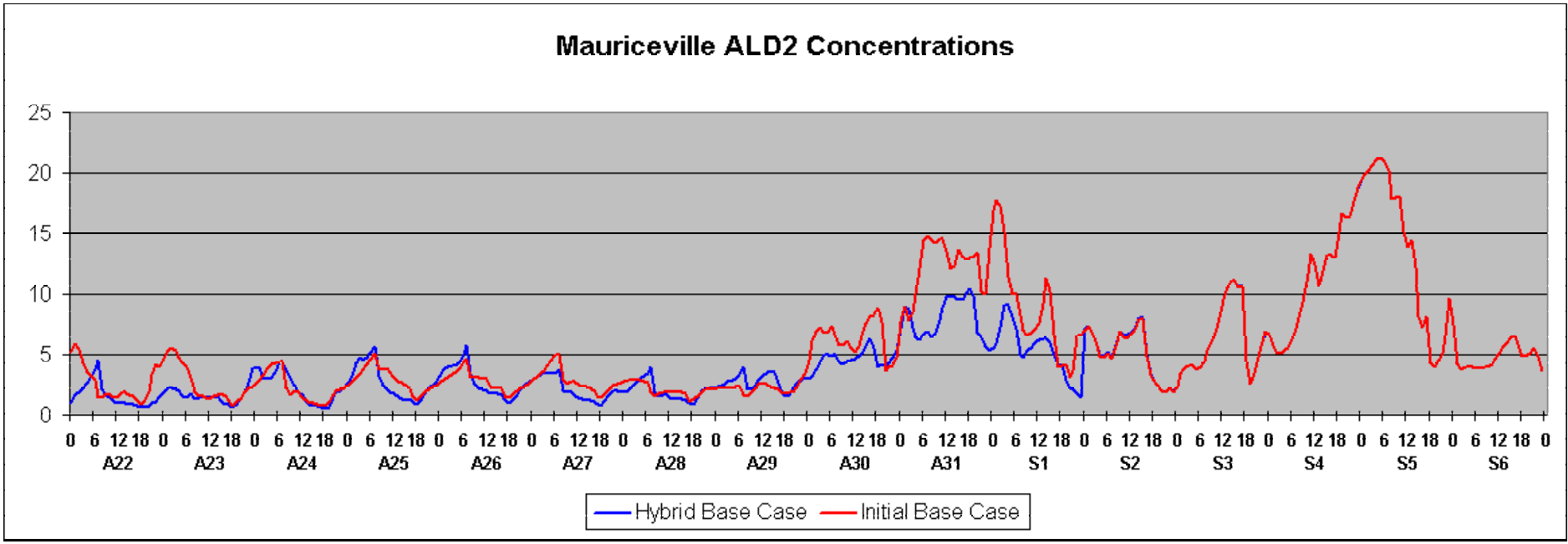
Mauriceville TOL Concentrations

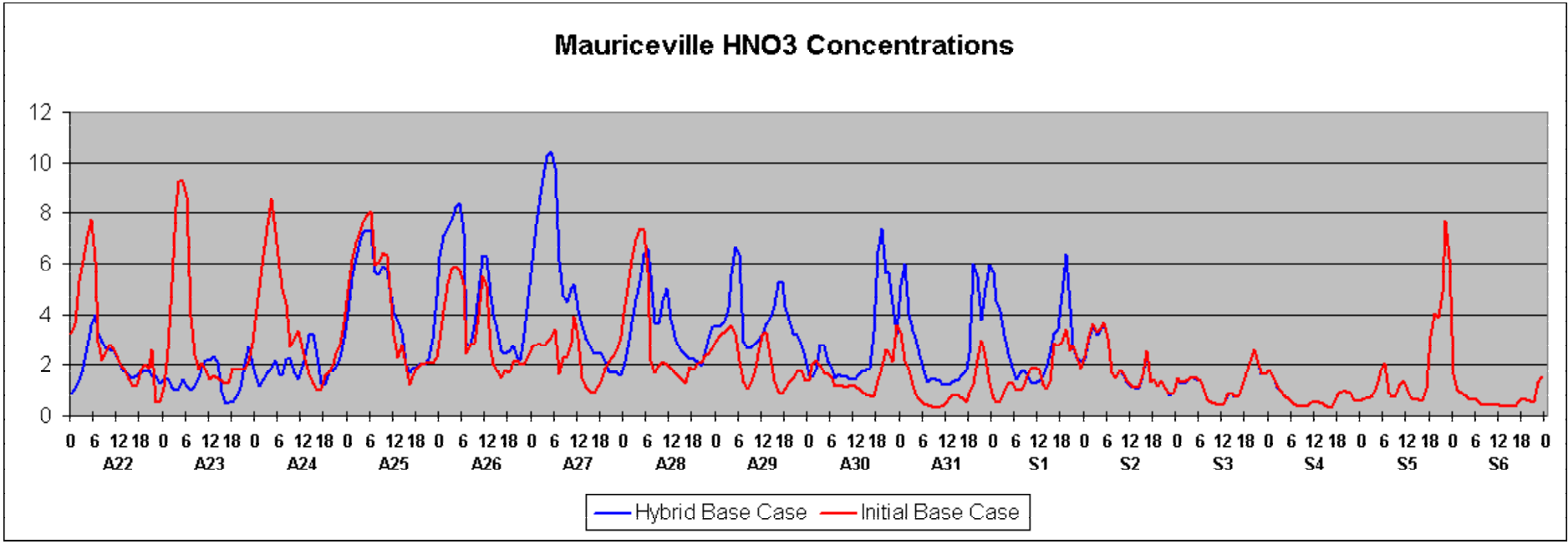


Mauriceville XYL Concentrations



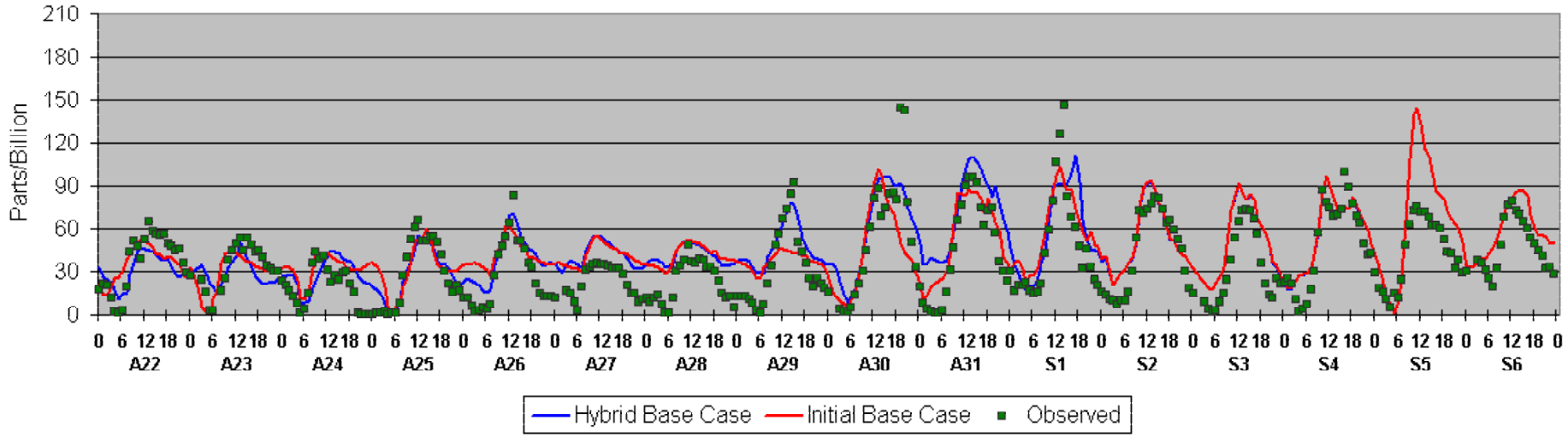

Mauriceville HCHO Concentrations
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Mauriceville ALD2 Concentrations
25
20
15
10
5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

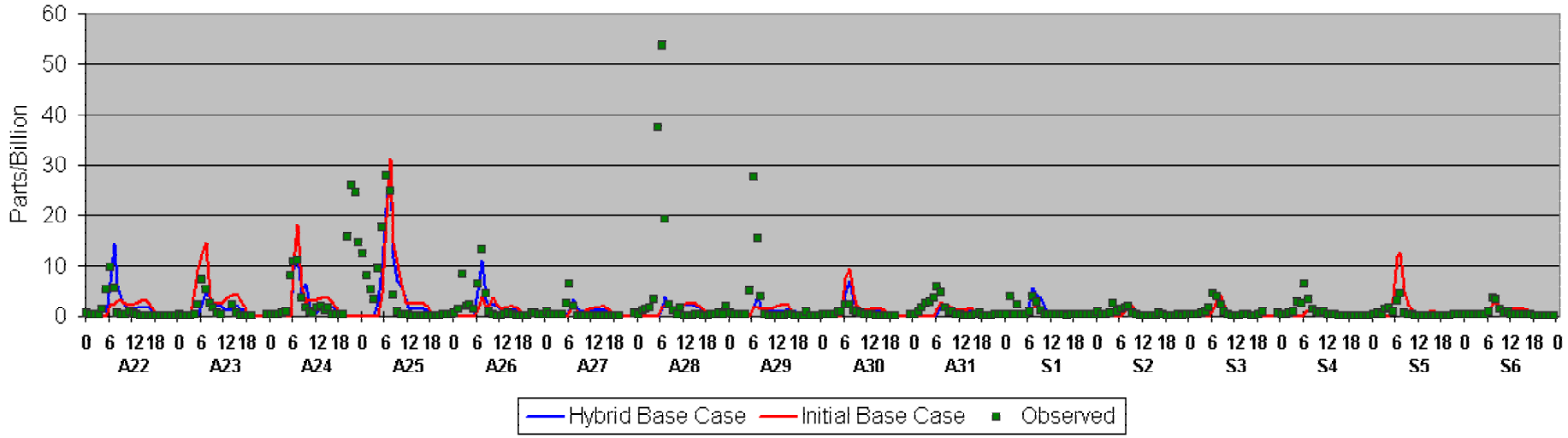

Mauriceville HNO3 Concentrations
12
10
8
6
4
2
0
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

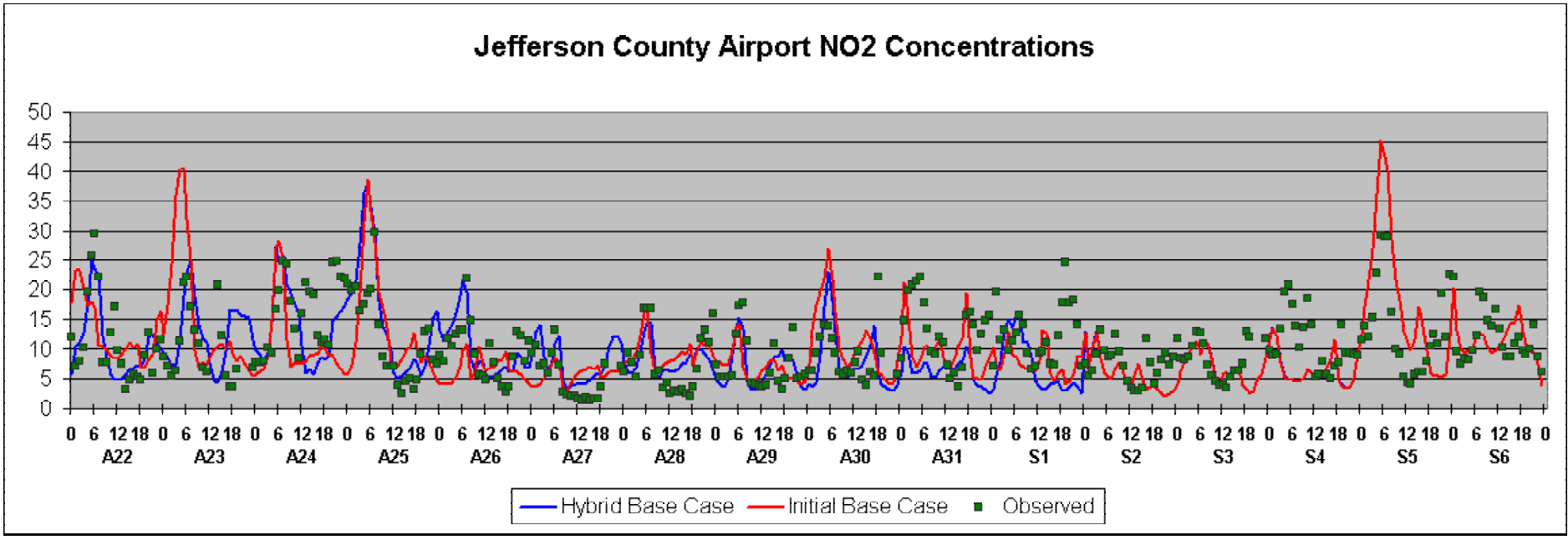
Jefferson County Airport Time Series

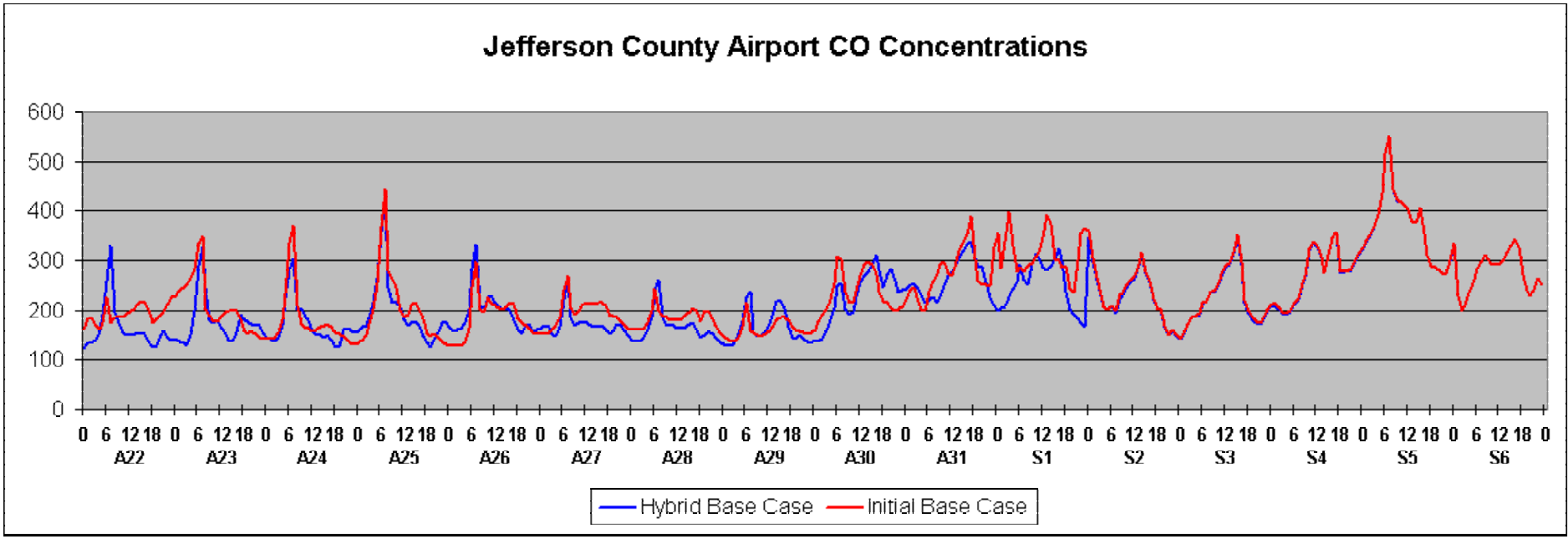
Jefferson County Airport Ozone Concentrations

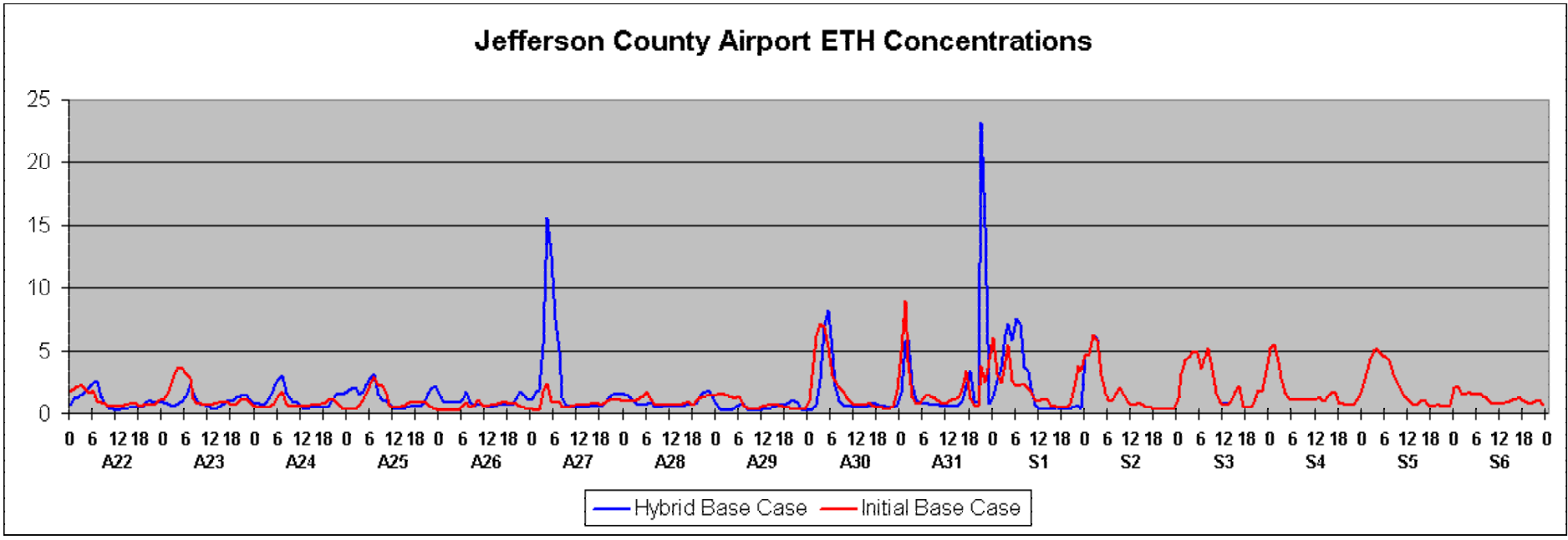


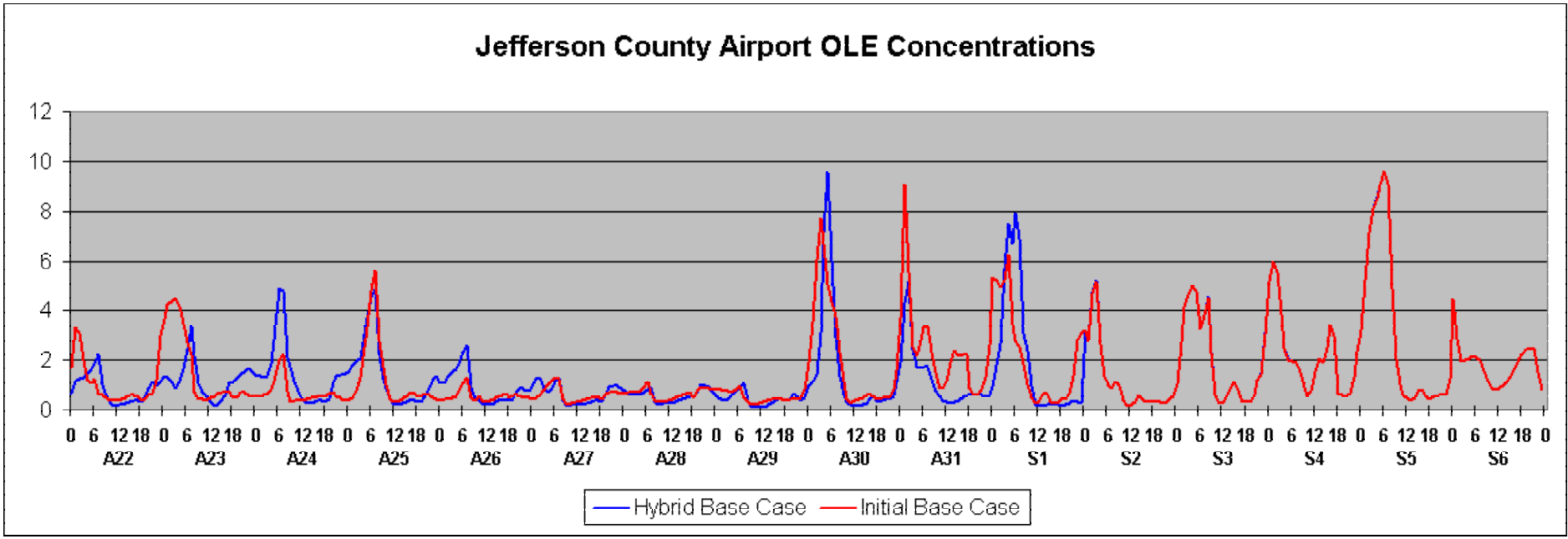
Jefferson County Airport NO Concentrations



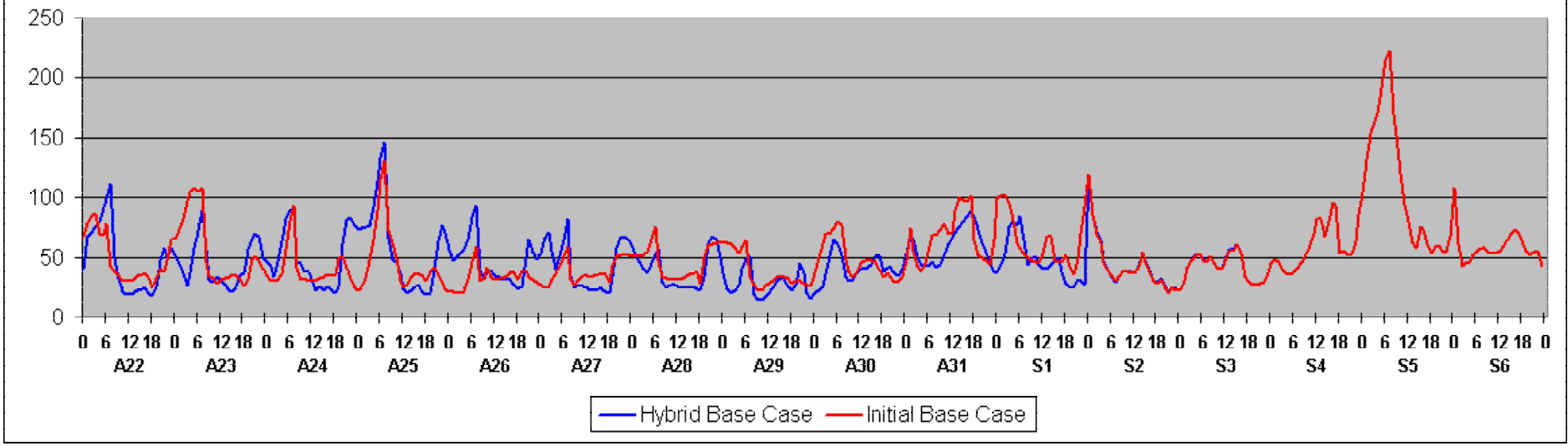

Jefferson County Airport NO2 Concentrations
50
45
40
35
30
25
20
15
10
5
0
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


Jefferson County Airport CO Concentrations
600
500
400
300
200
100
0
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

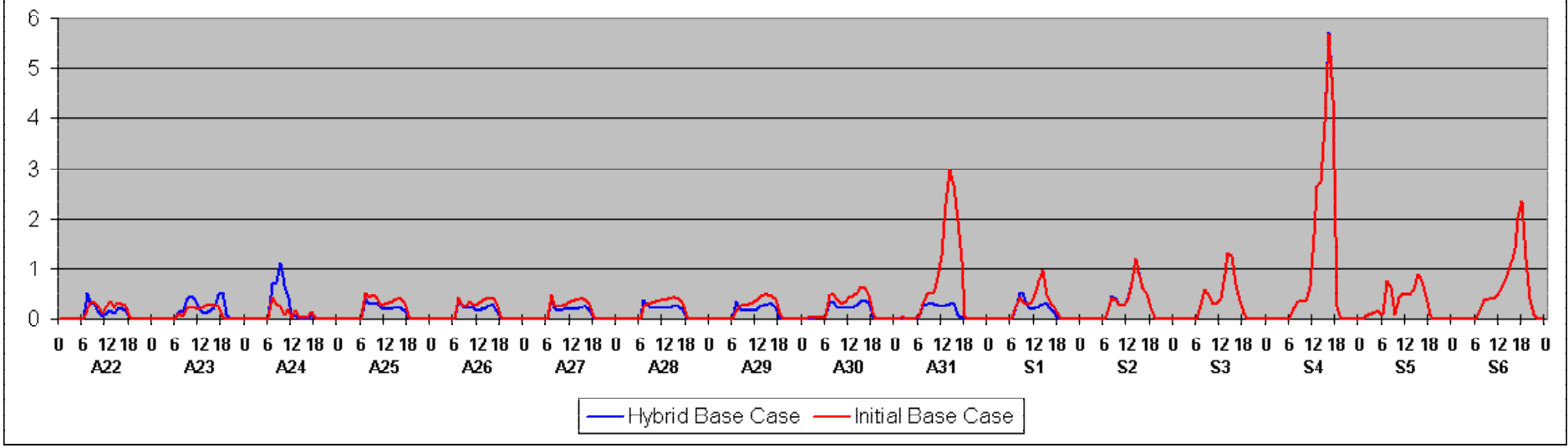

Jefferson County Airport ETH Concentrations
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Jefferson County Airport OLE Concentrations
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

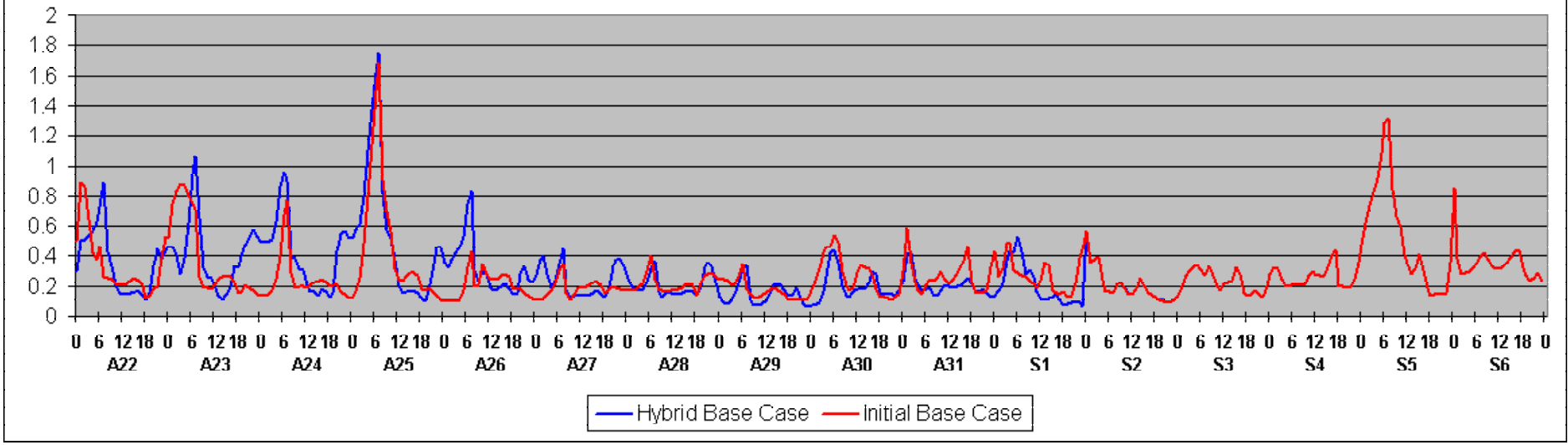
Jefferson County Airport PAR Concentrations



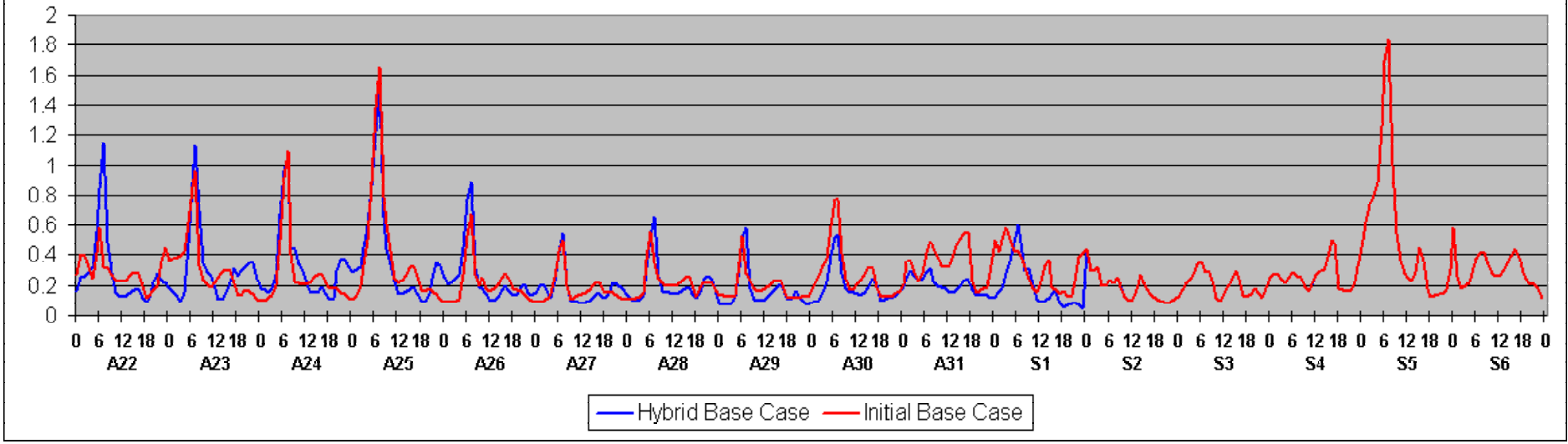
Jefferson County Airport ISOP Concentrations

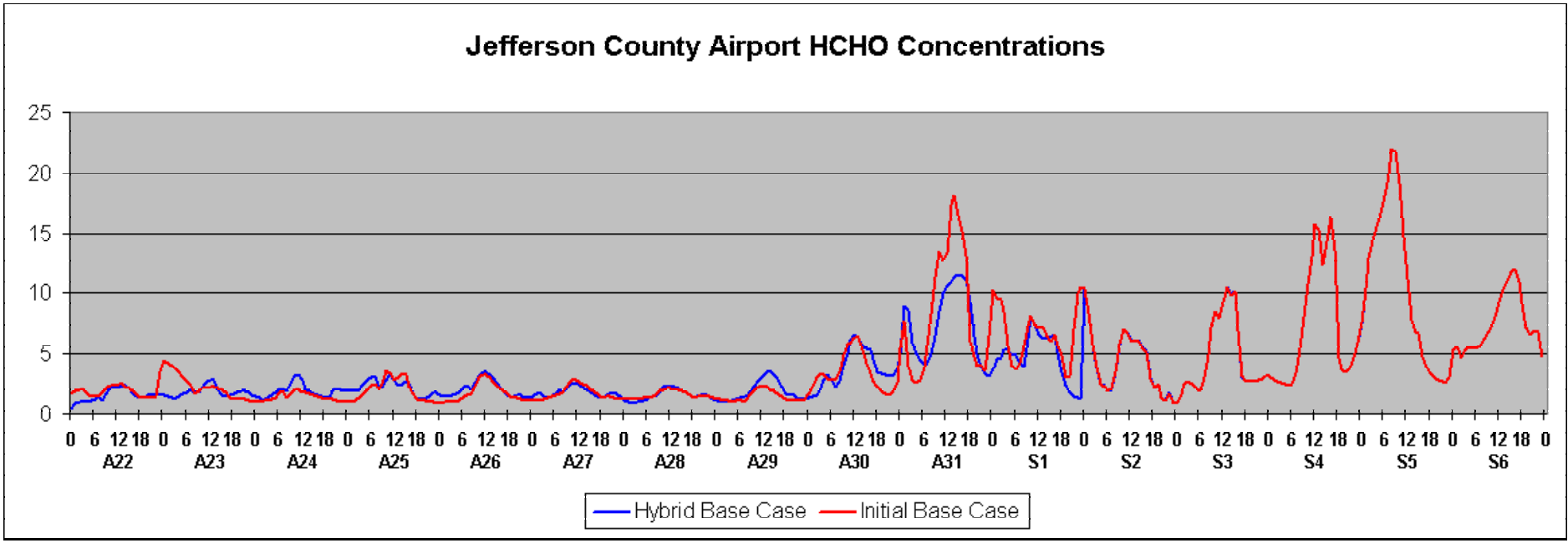


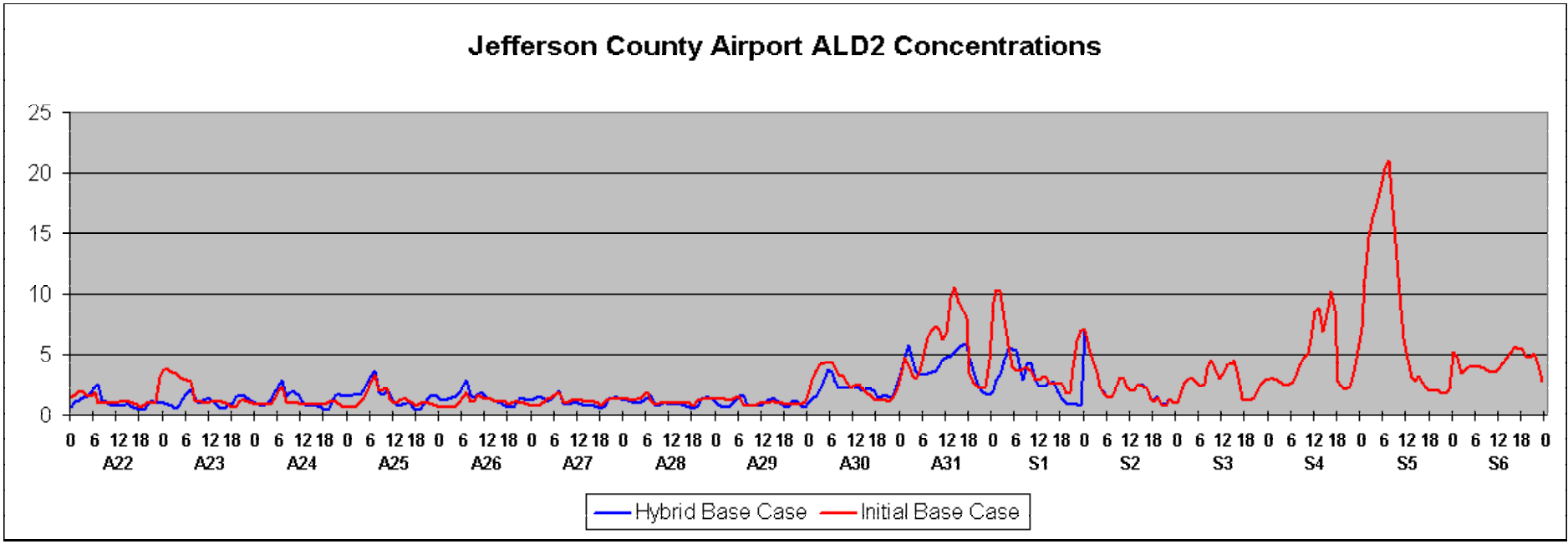
Jefferson County Airport TOL Concentrations

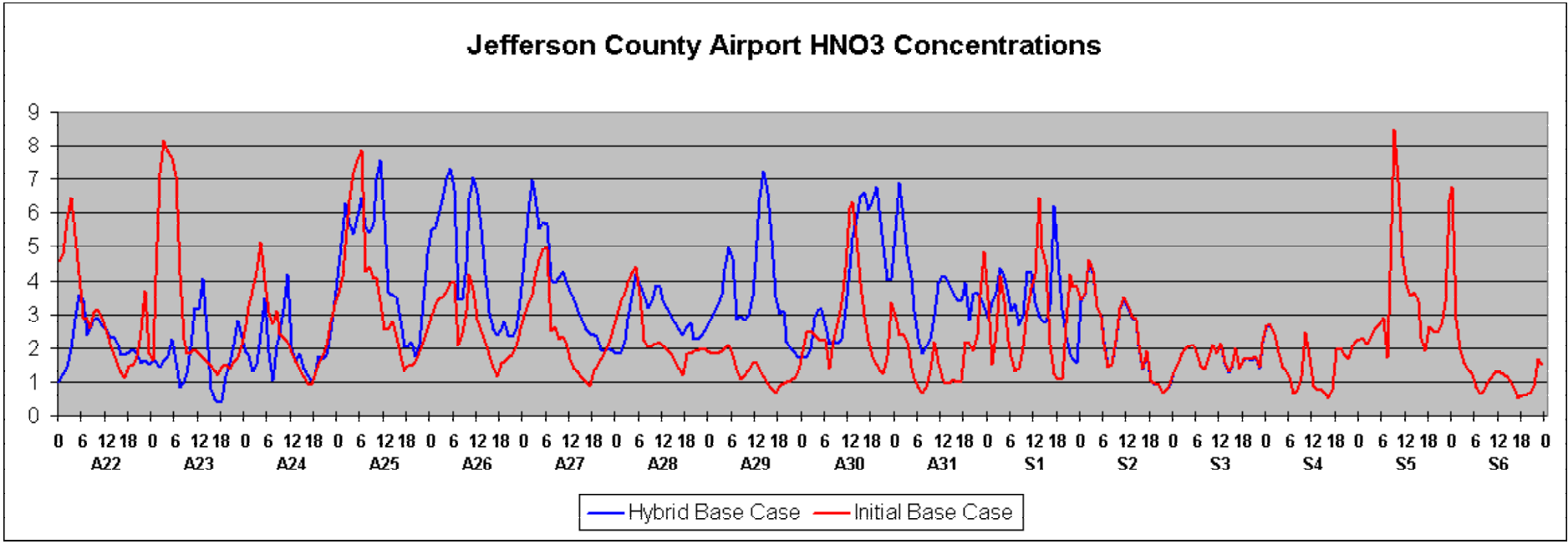


Jefferson County Airport XYL Concentrations



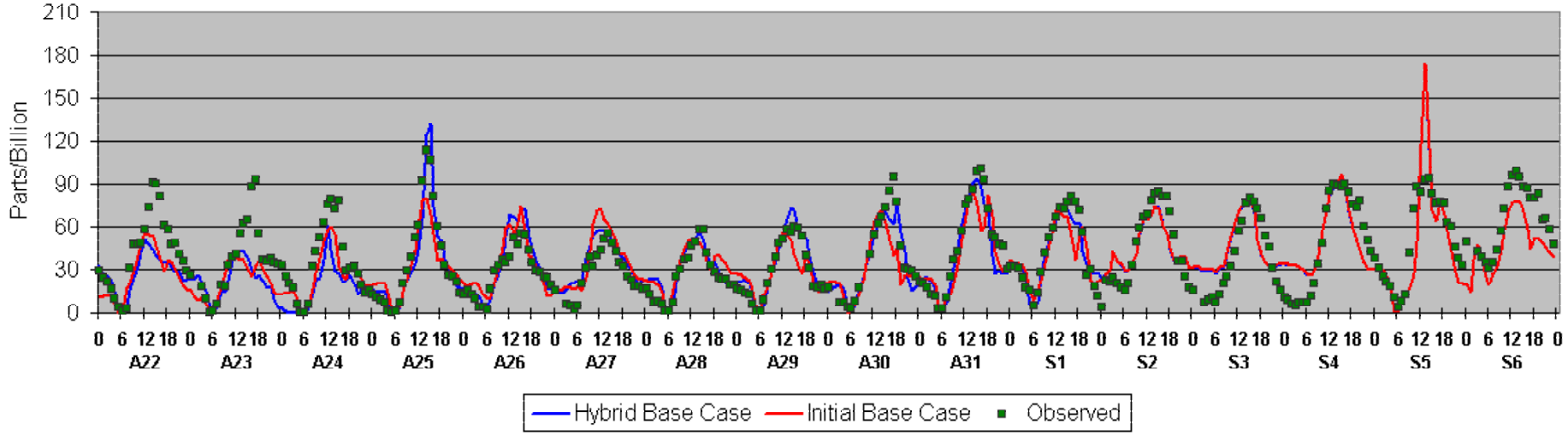

Jefferson County Airport HCHO Concentrations
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Jefferson County Airport ALD2 Concentrations
25
20
15
10
5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

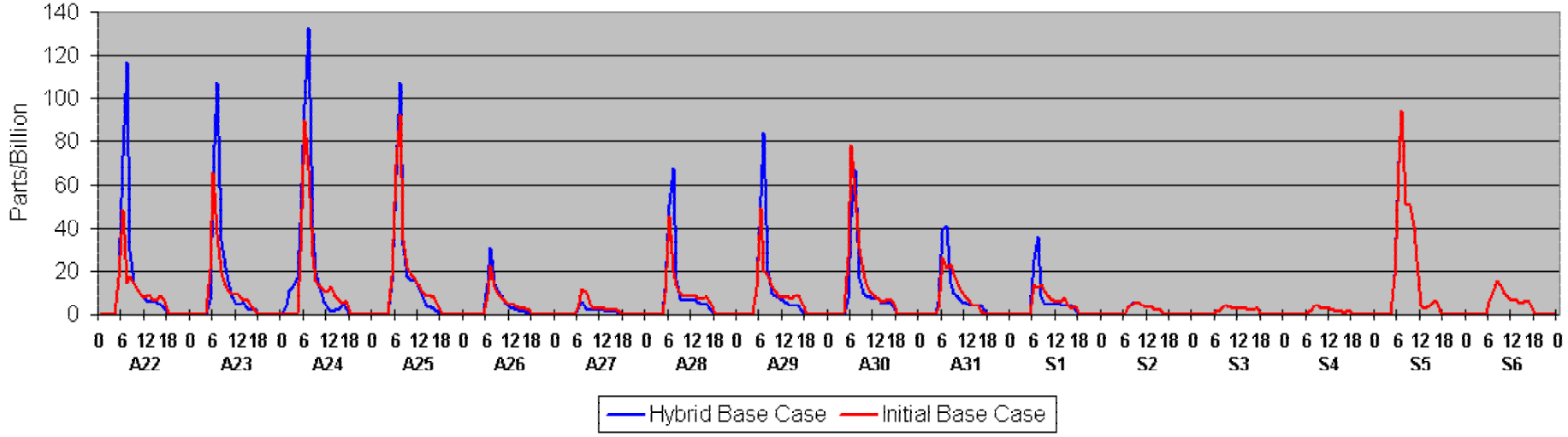

Jefferson County Airport HNO3 Concentrations
9
8
7
6
5
4
3
2
1
0
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

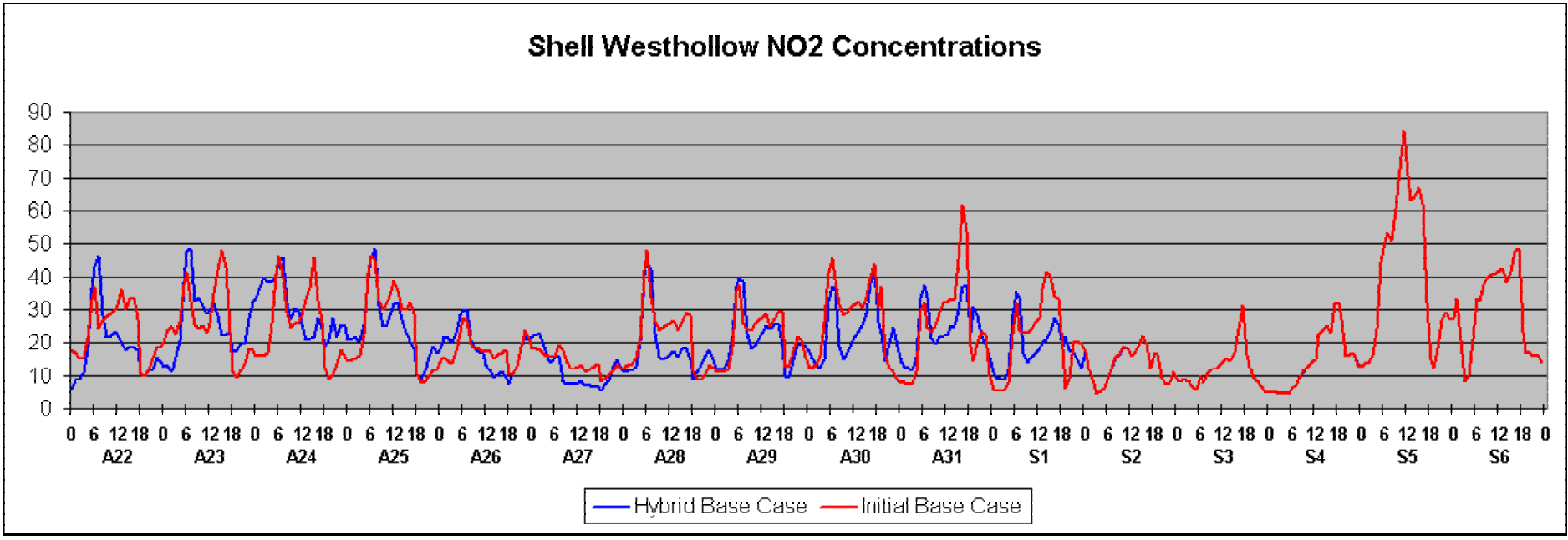
Shell Westhollow Time Series

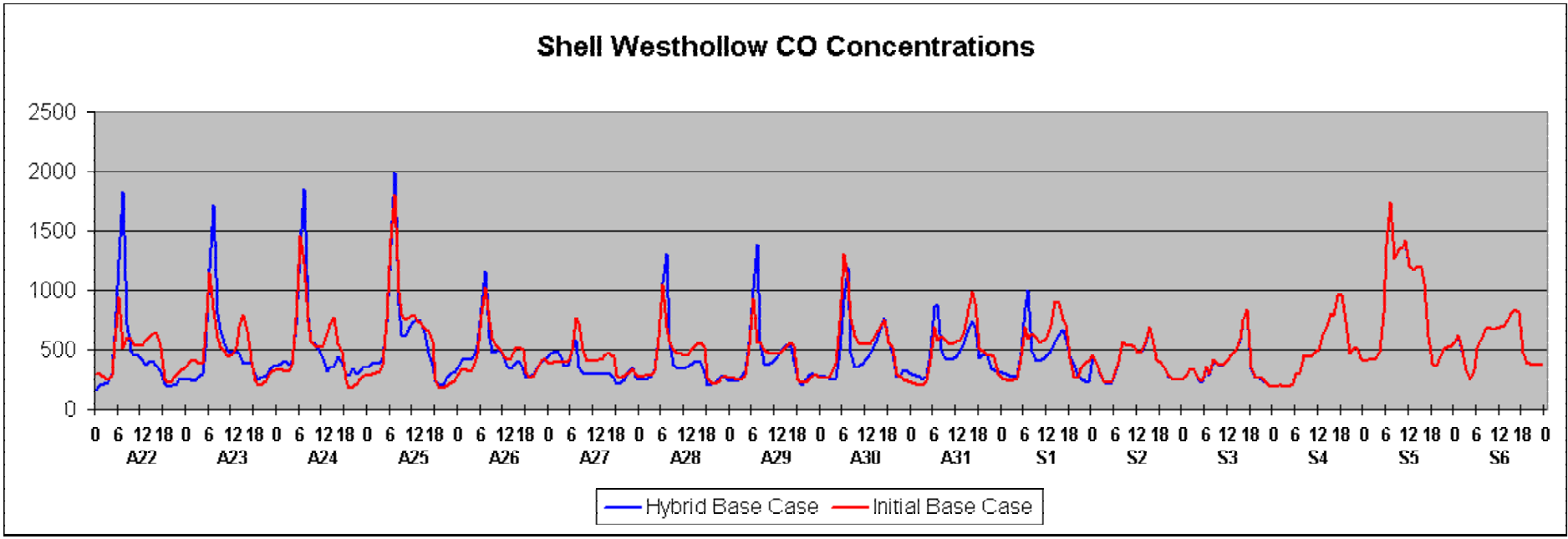
Shell Westhollow Ozone Concentrations

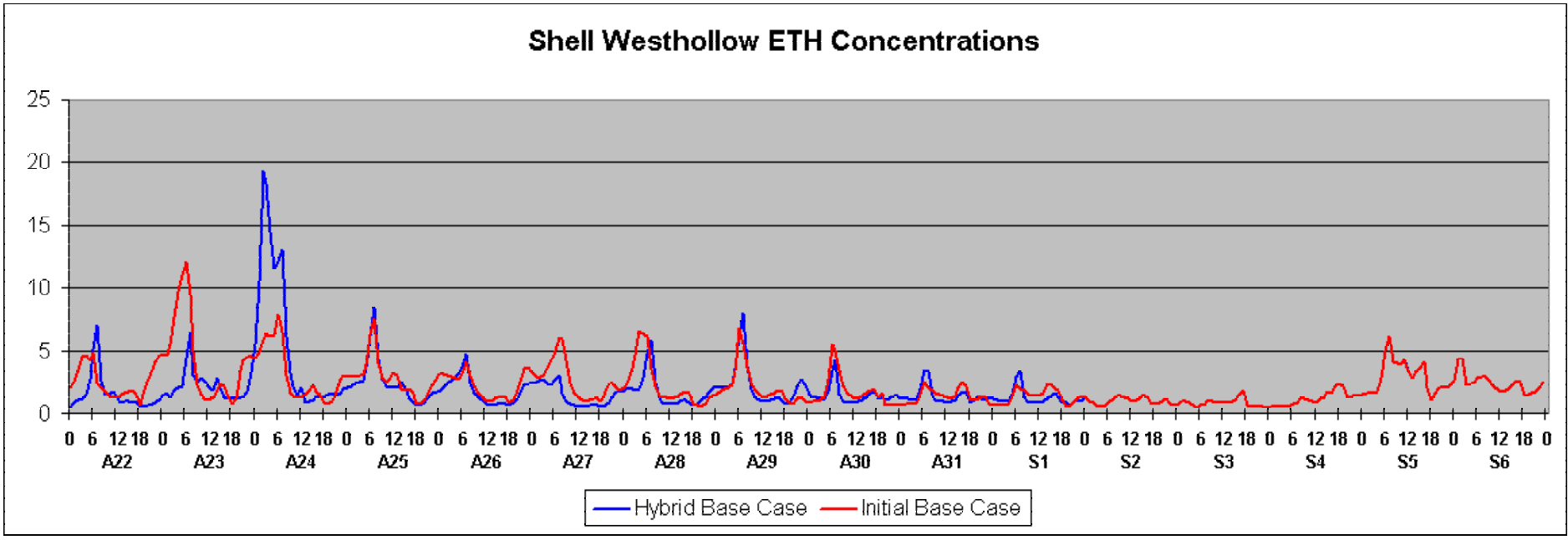


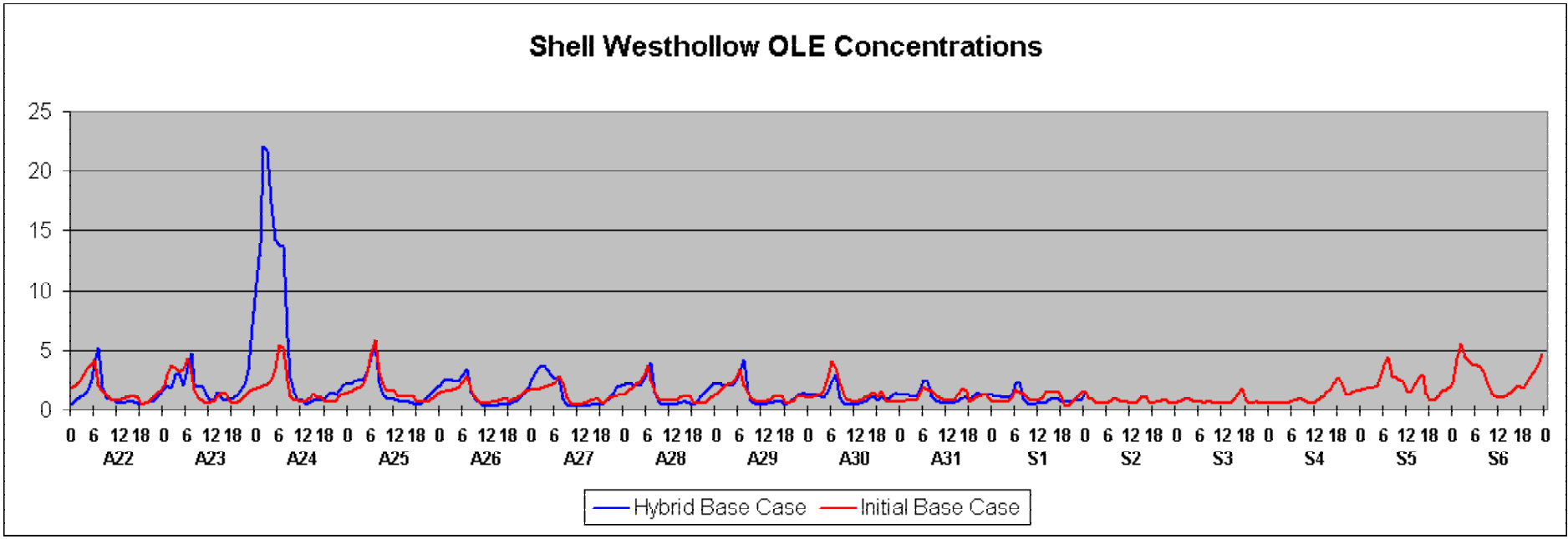
Shell Westhollow NO Concentrations



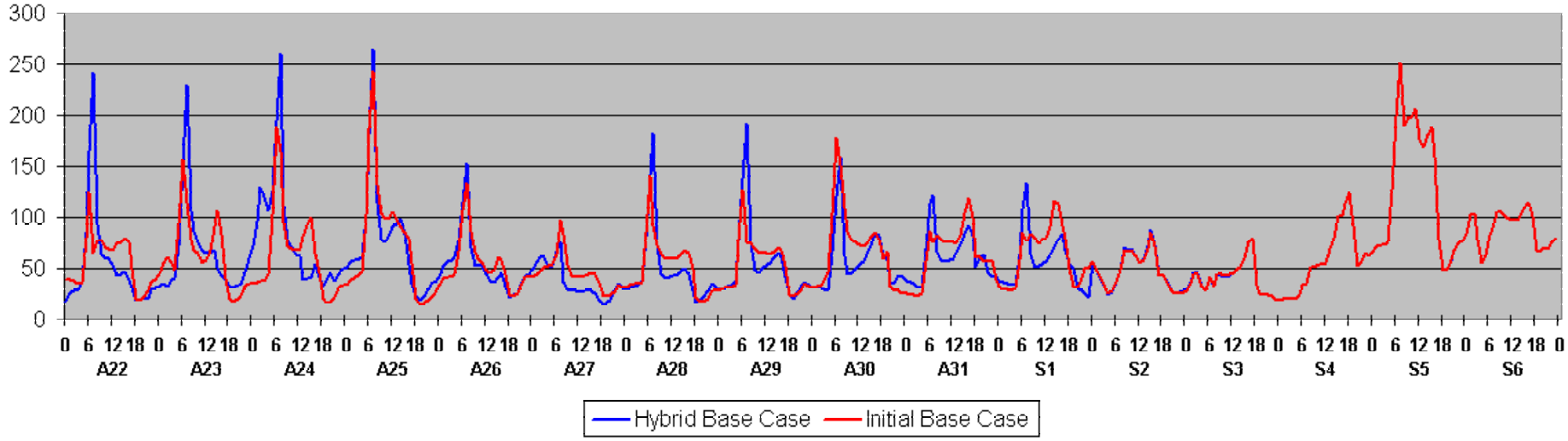

Shell Westhollow NO2 Concentrations
90
80
70
60
50
40
30
20
10
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Shell Westhollow CO Concentrations
2500
2000
1500
1000
500
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

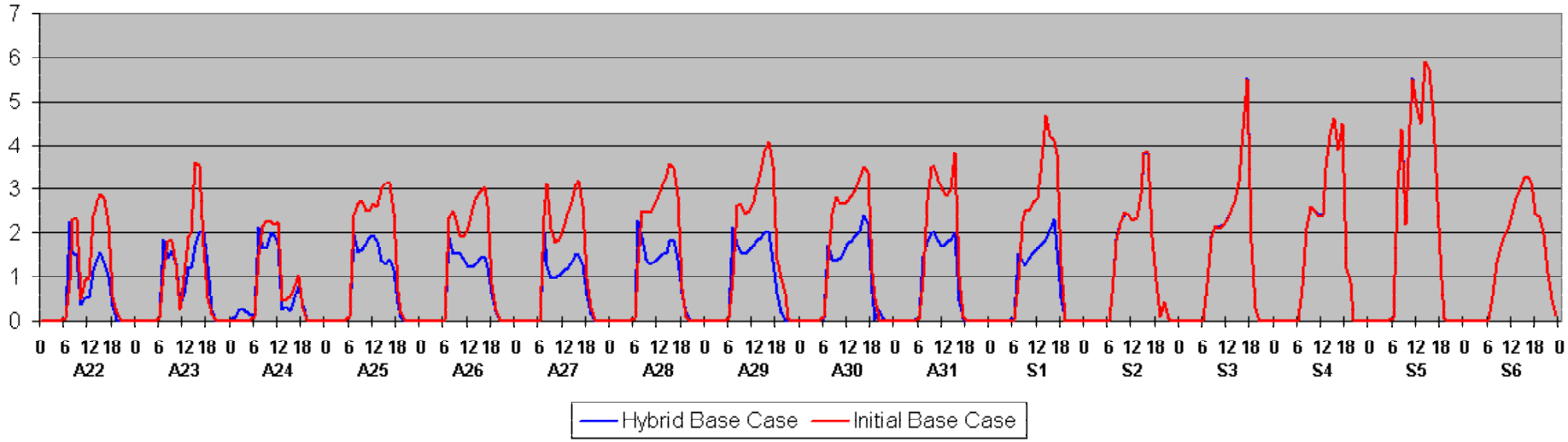

Shell Westhollow ETH Concentrations
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Shell Westhollow OLE Concentrations
25
20
15
10
5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

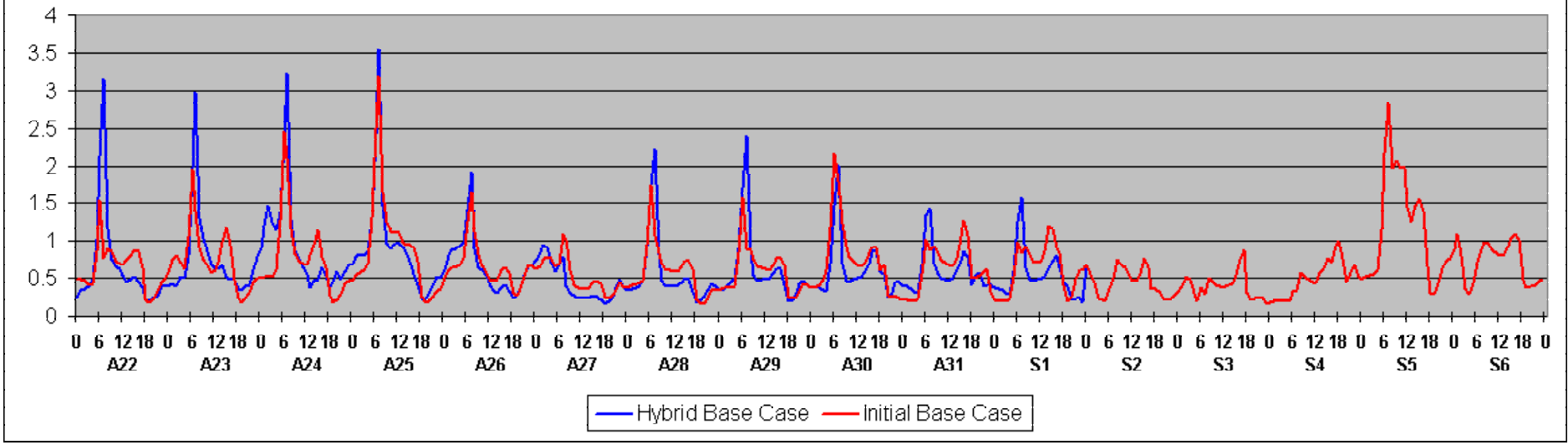
Shell Westhollow PAR Concentrations



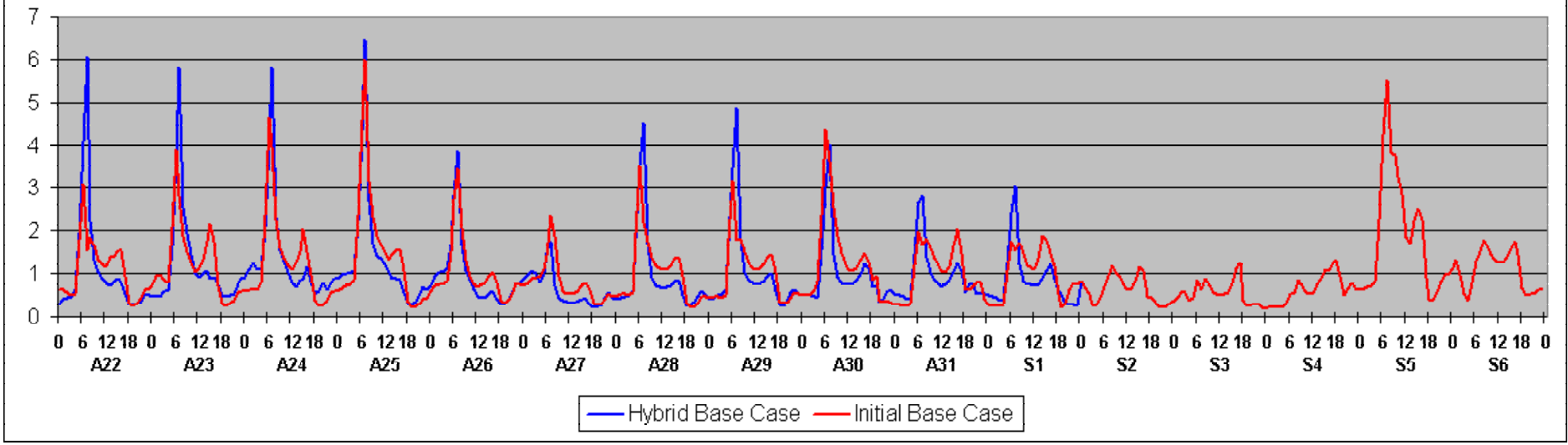
Shell Westhollow ISOP Concentrations

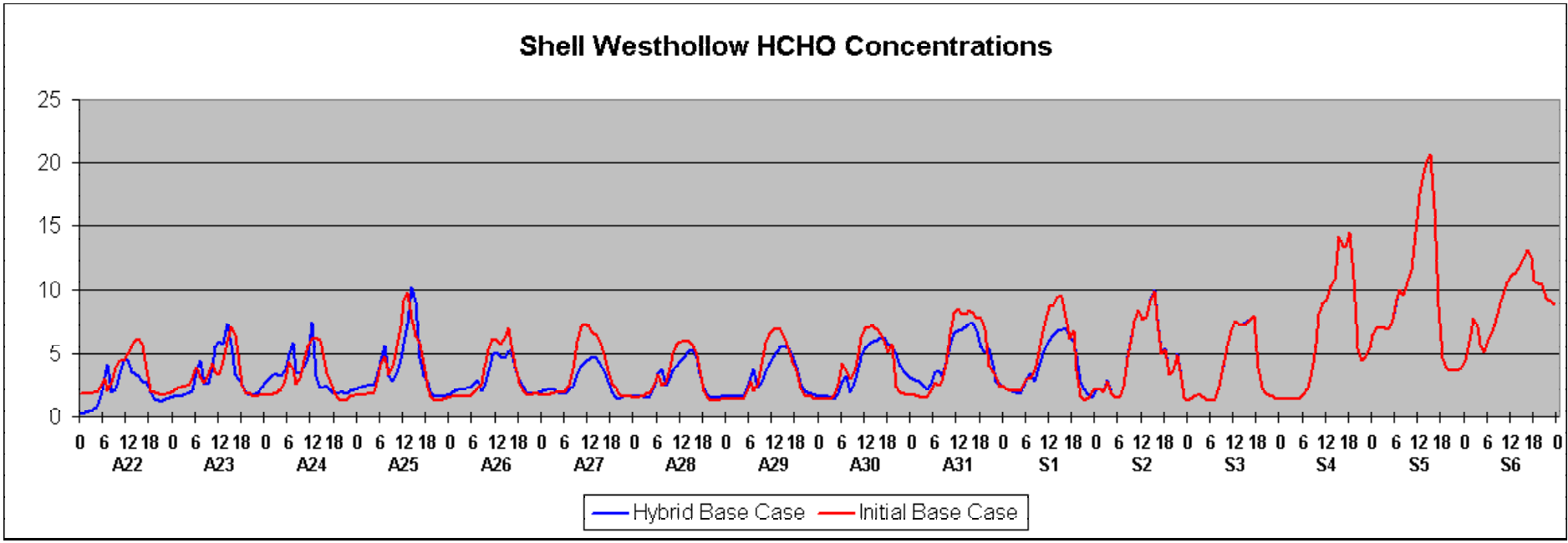


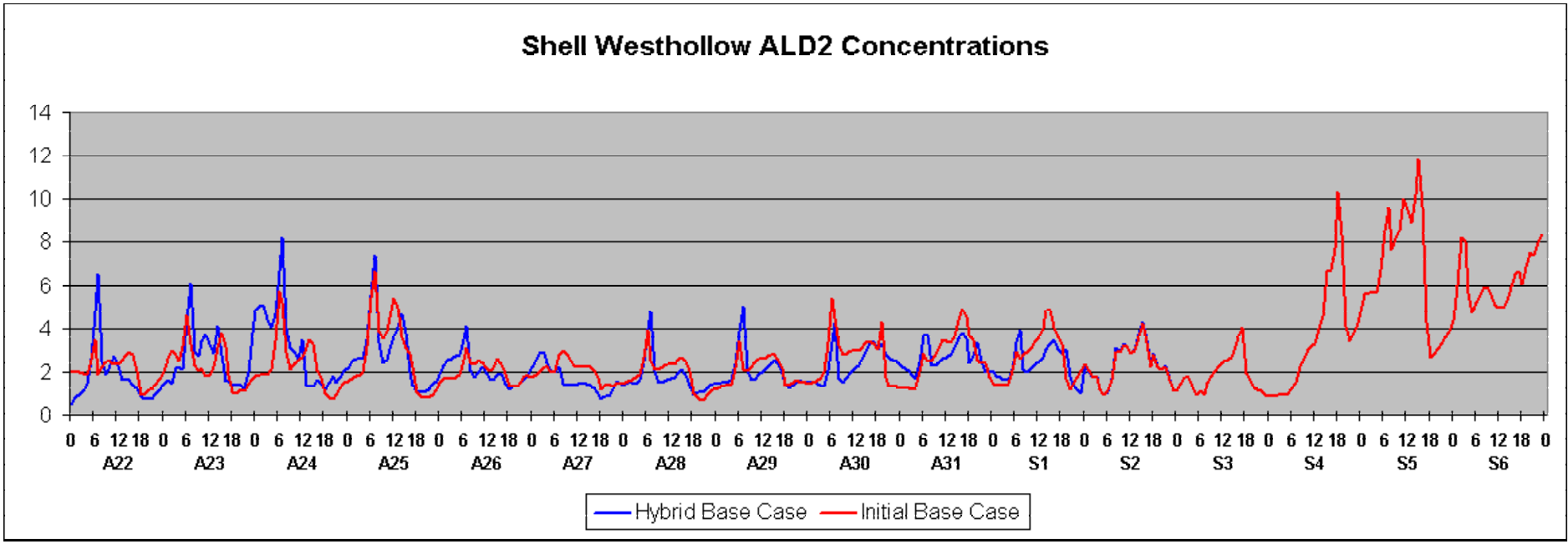
Shell Westhollow TOL Concentrations

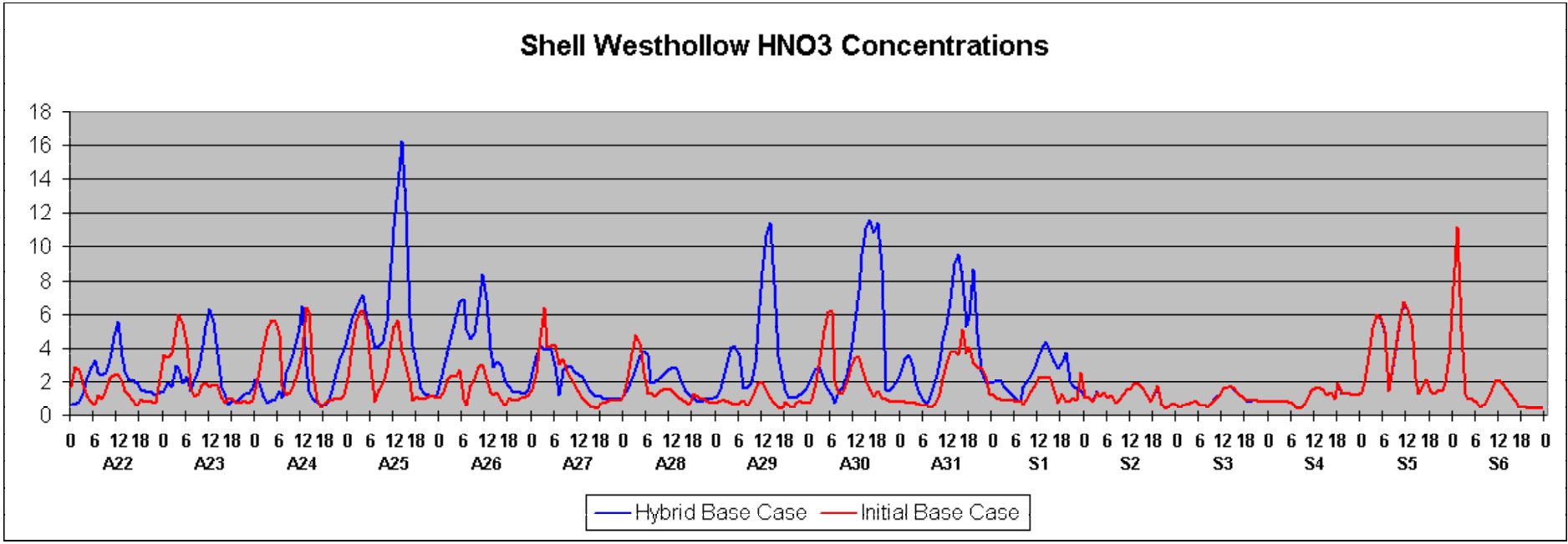


Shell Westhollow XYL Concentrations



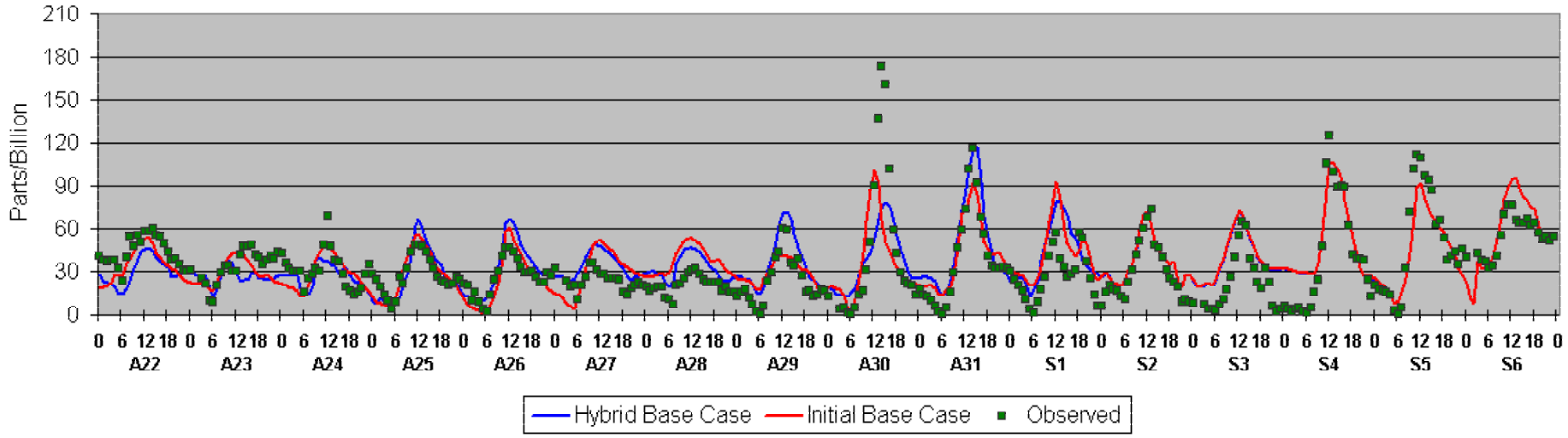

Shell Westhollow HCHO Concentrations
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Shell Westhollow ALD2 Concentrations
14
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

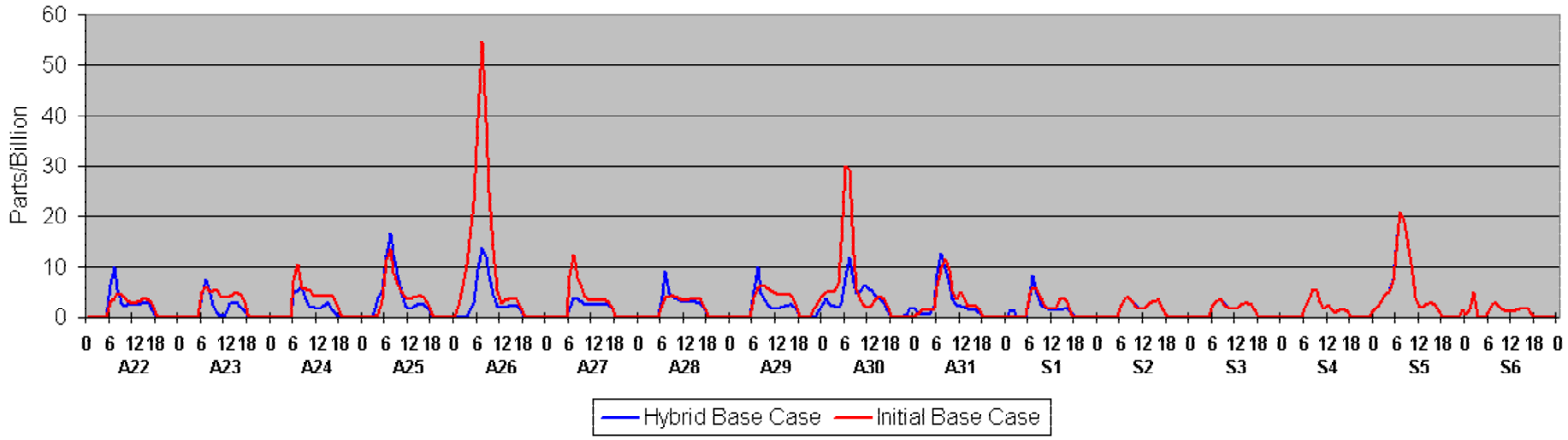

Shell Westhollow HNO3 Concentrations
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

La Marque Time Series

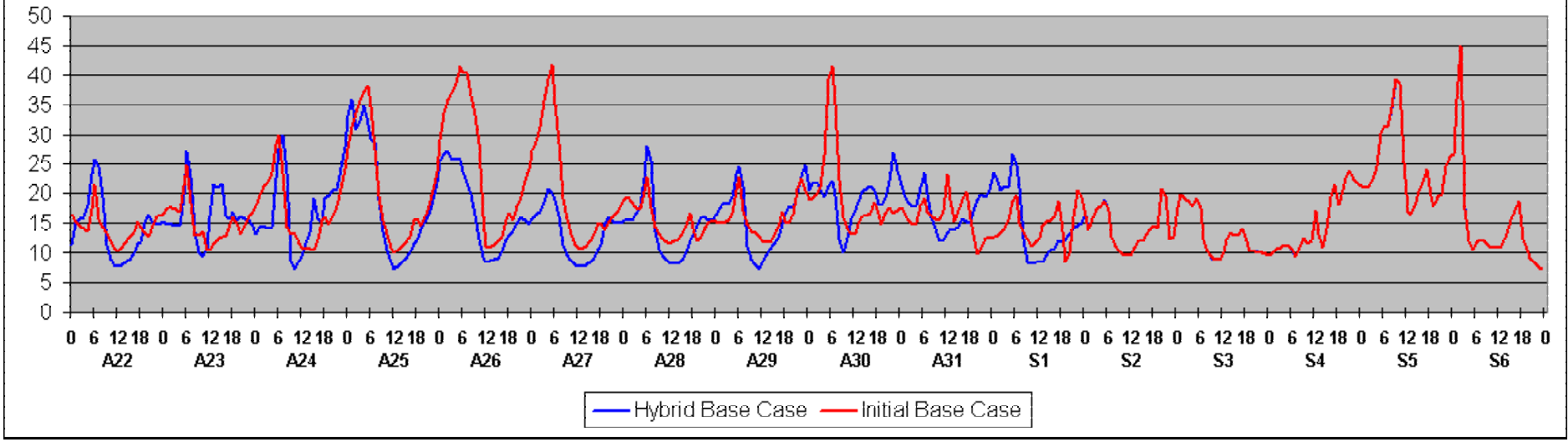
La Marque Ozone Concentrations



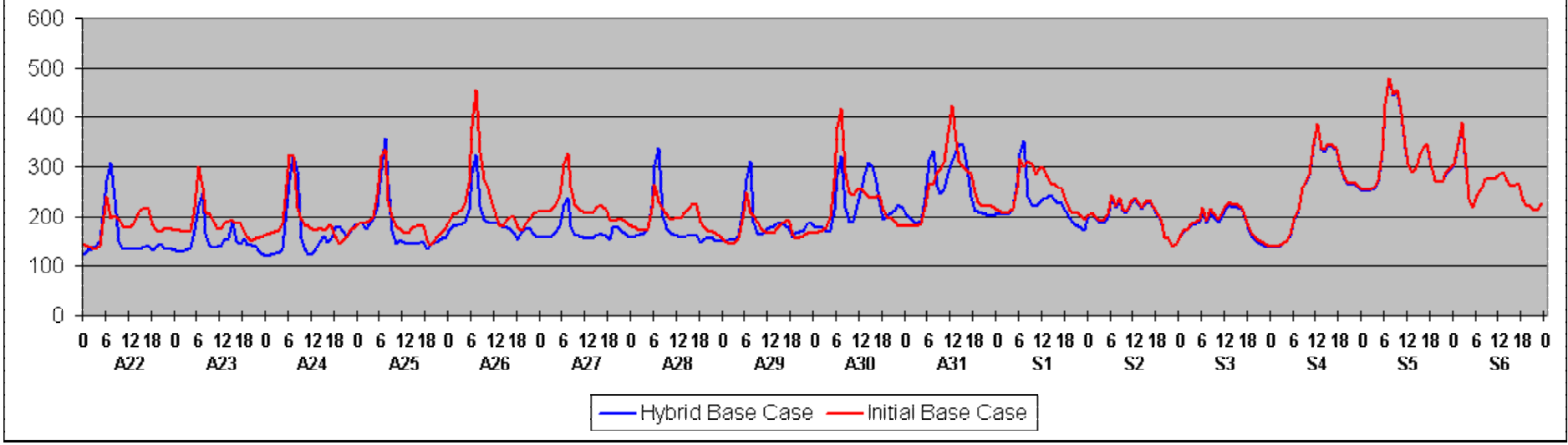
La Marque NO Concentrations



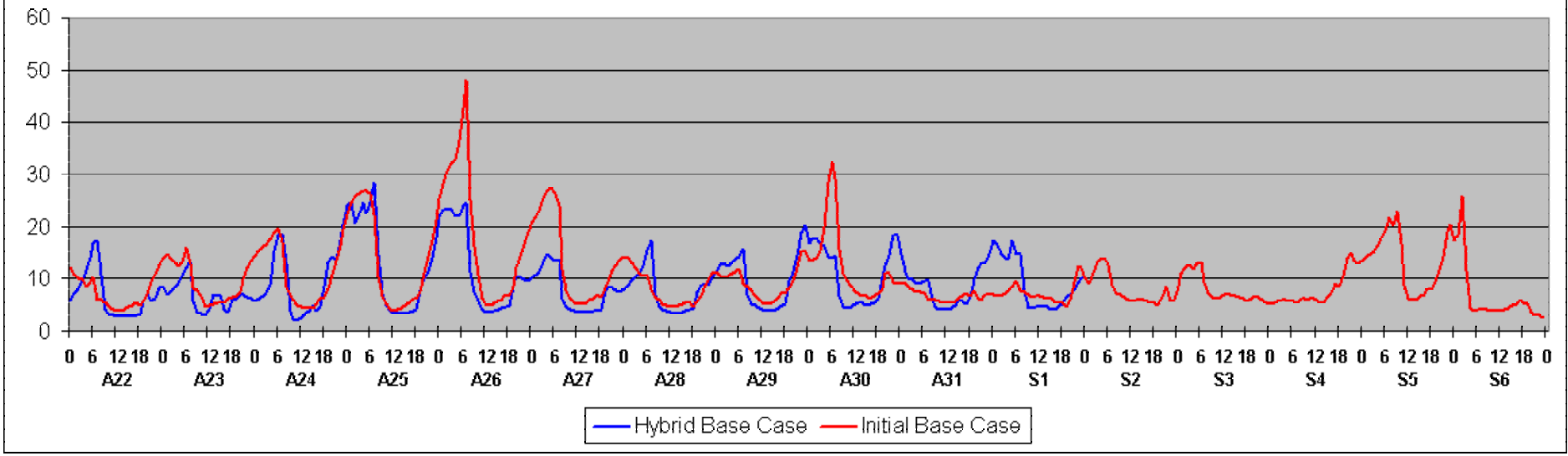
La Marque NO2 Concentrations



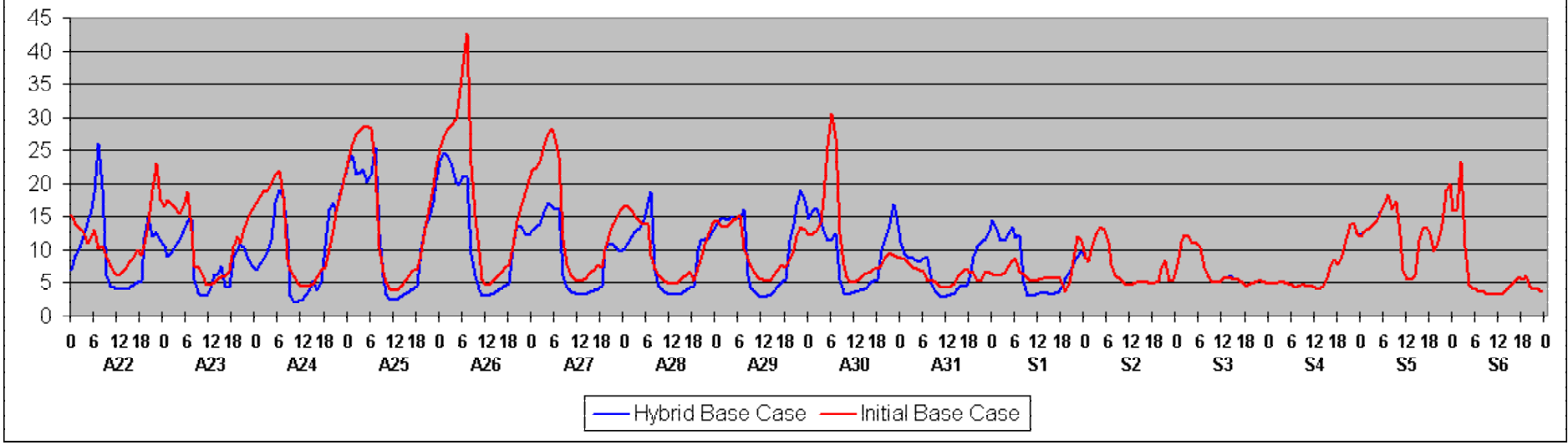
La Marque CO Concentrations



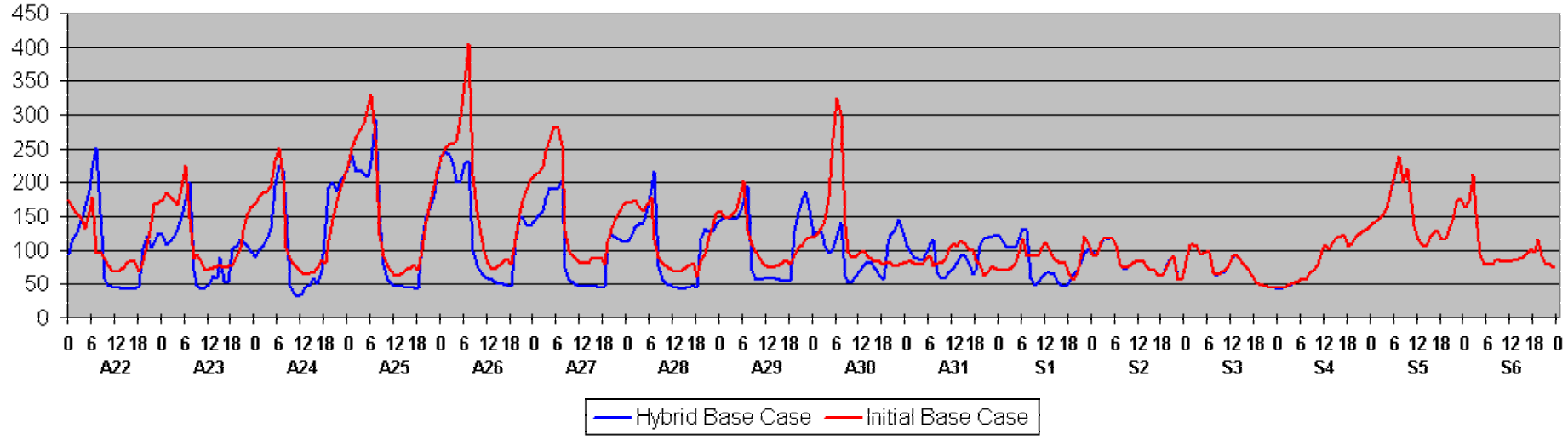
La Marque ETH Concentrations



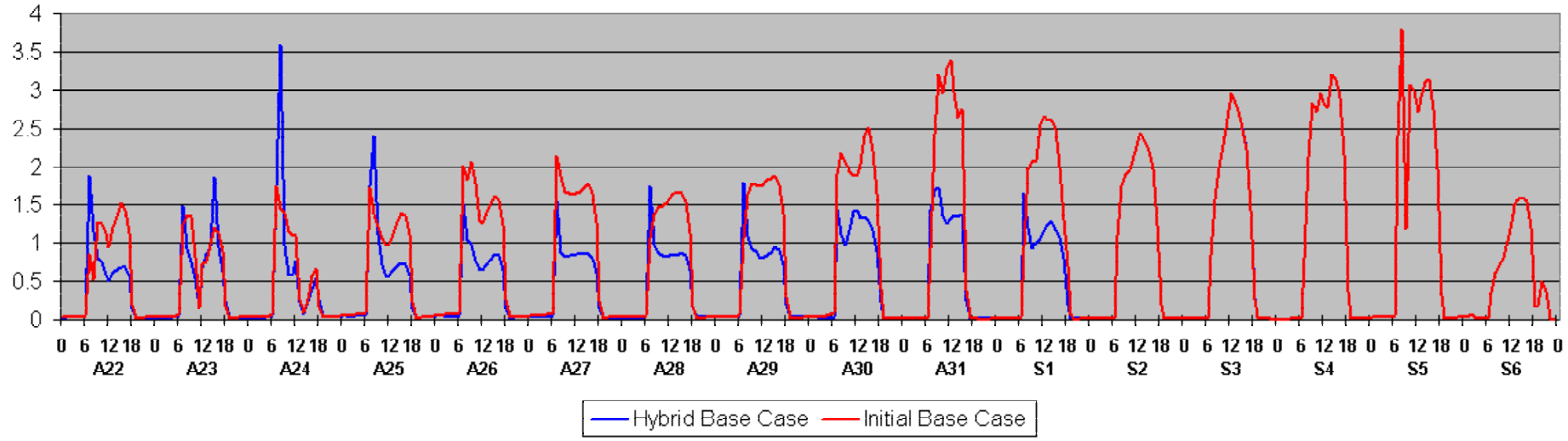
La Marque OLE Concentrations

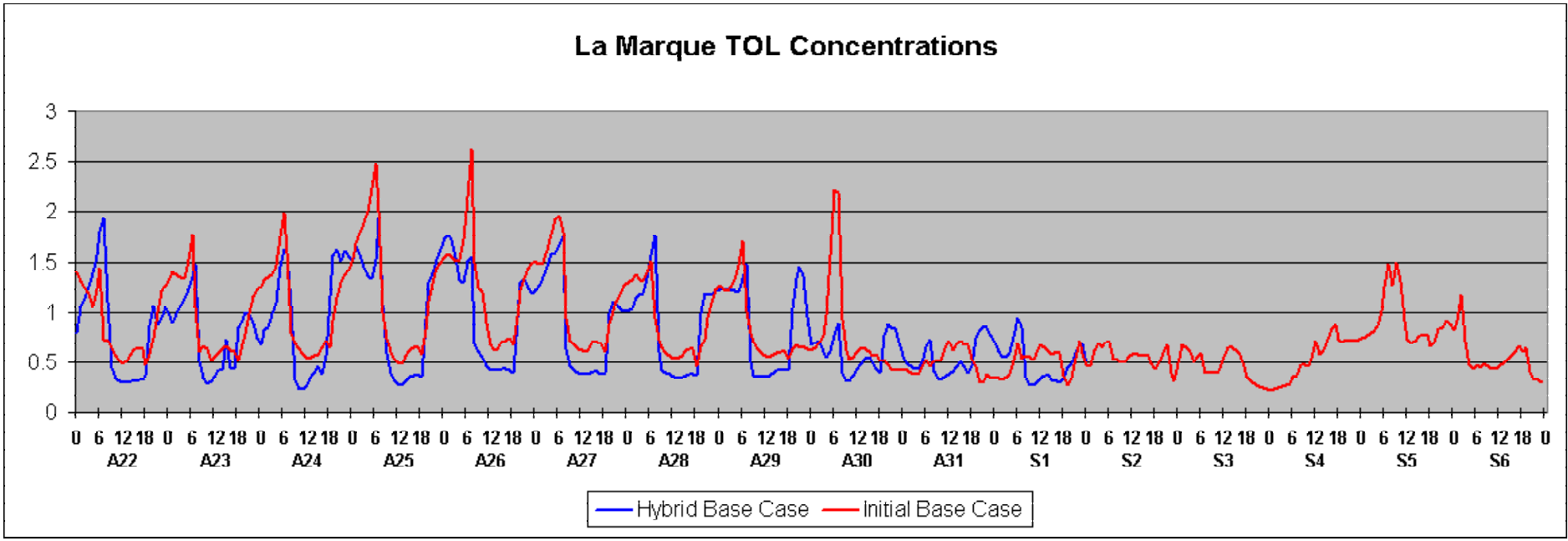


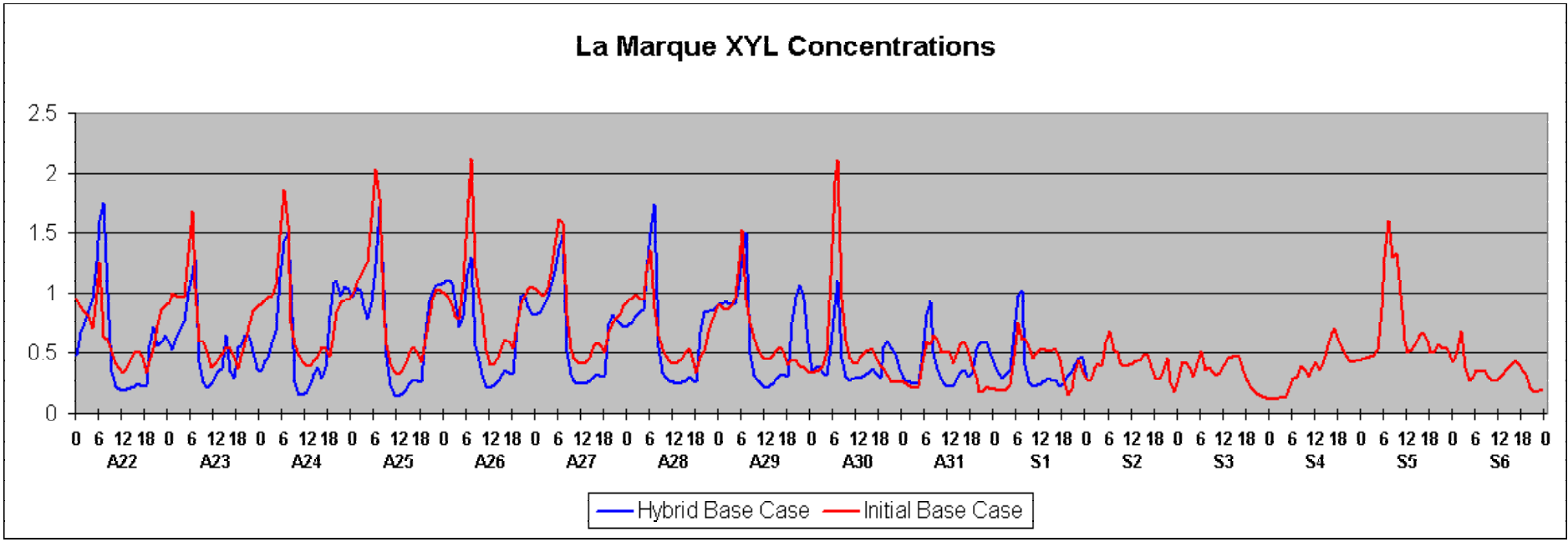
La Marque PAR Concentrations

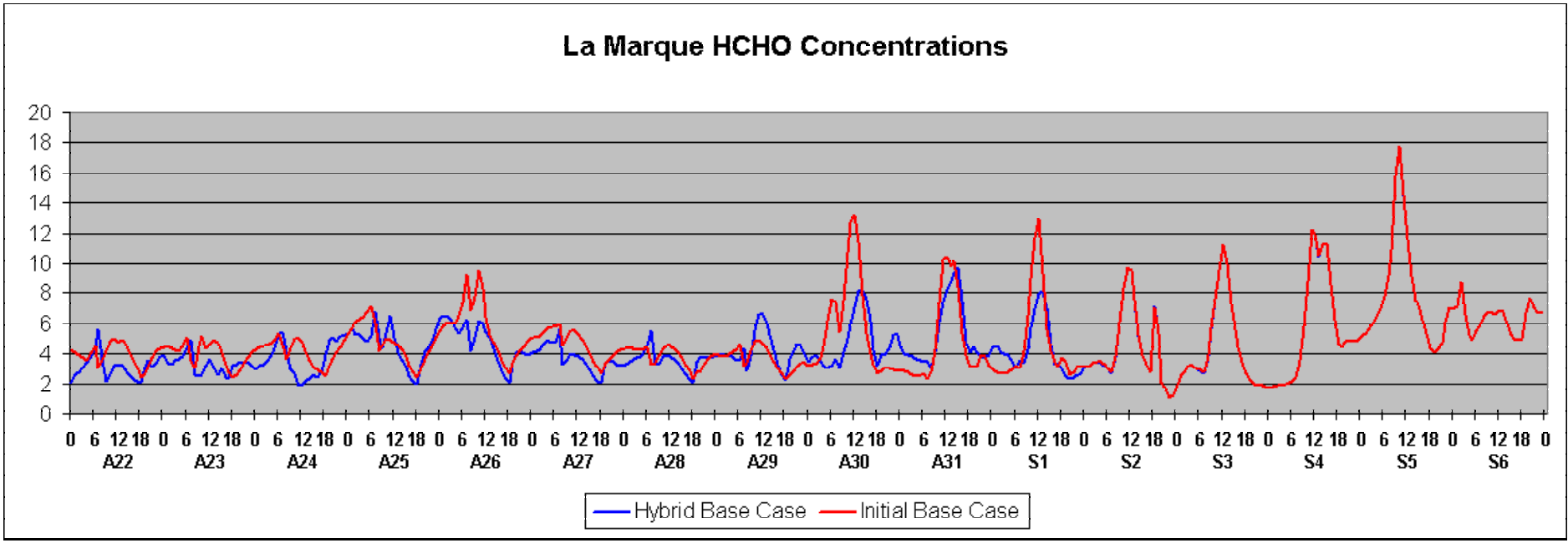


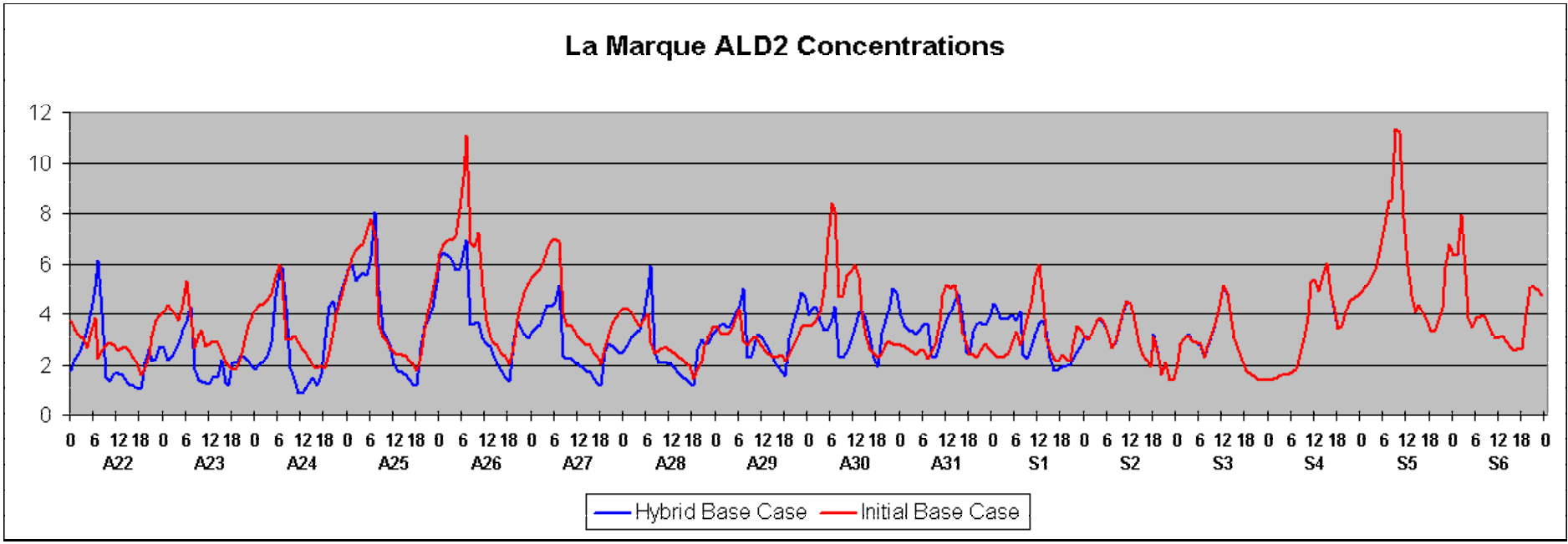
La Marque ISOP Concentrations

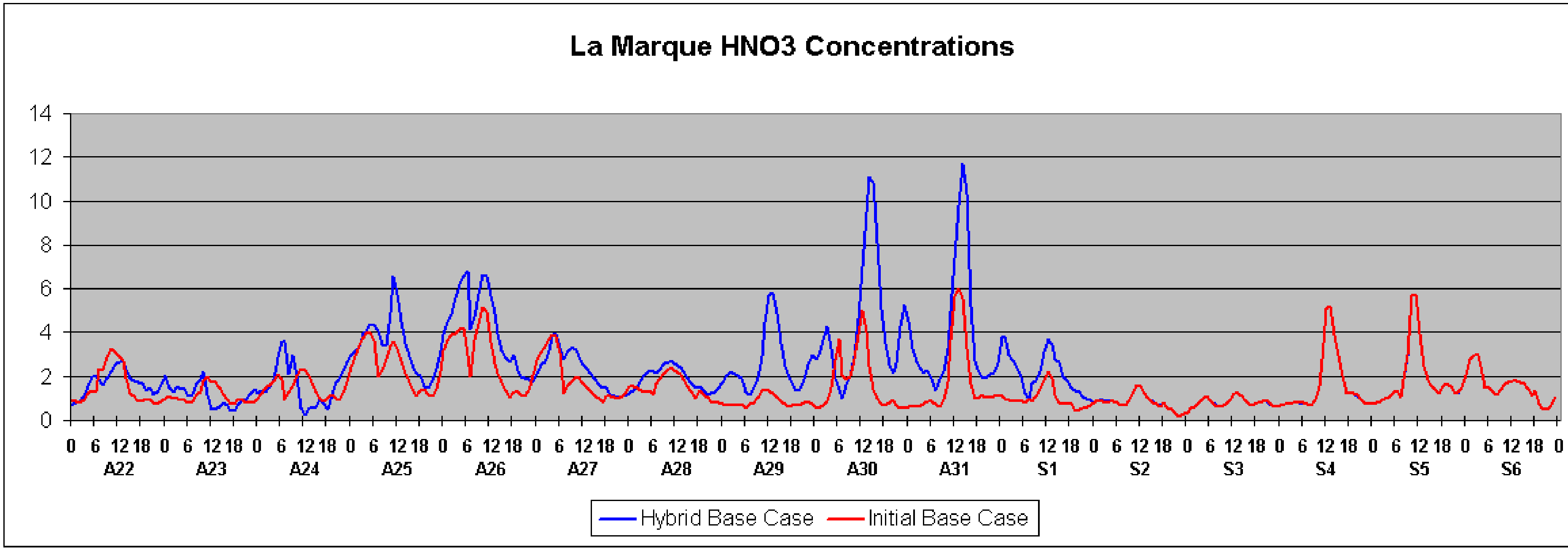



La Marque TOL Concentrations
3
2.5
2
1.5
1
0.5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


La Marque XYL Concentrations
2.5
2
1.5
1
0.5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

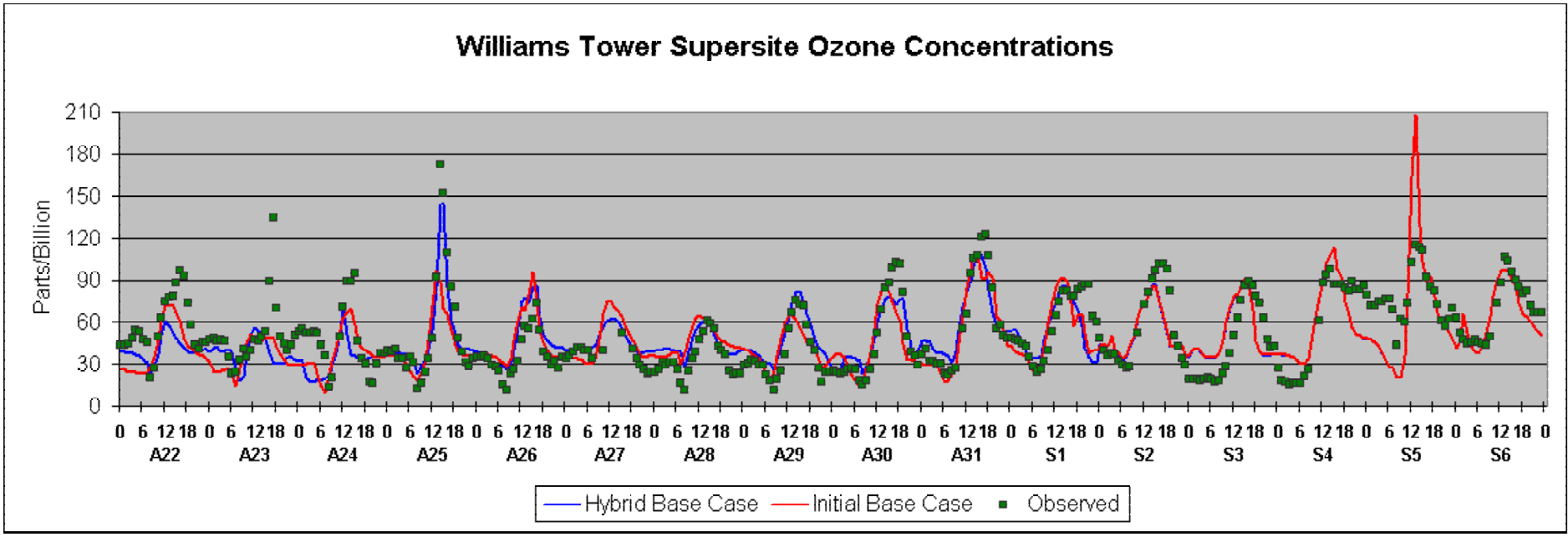

La Marque HCHO Concentrations
20
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

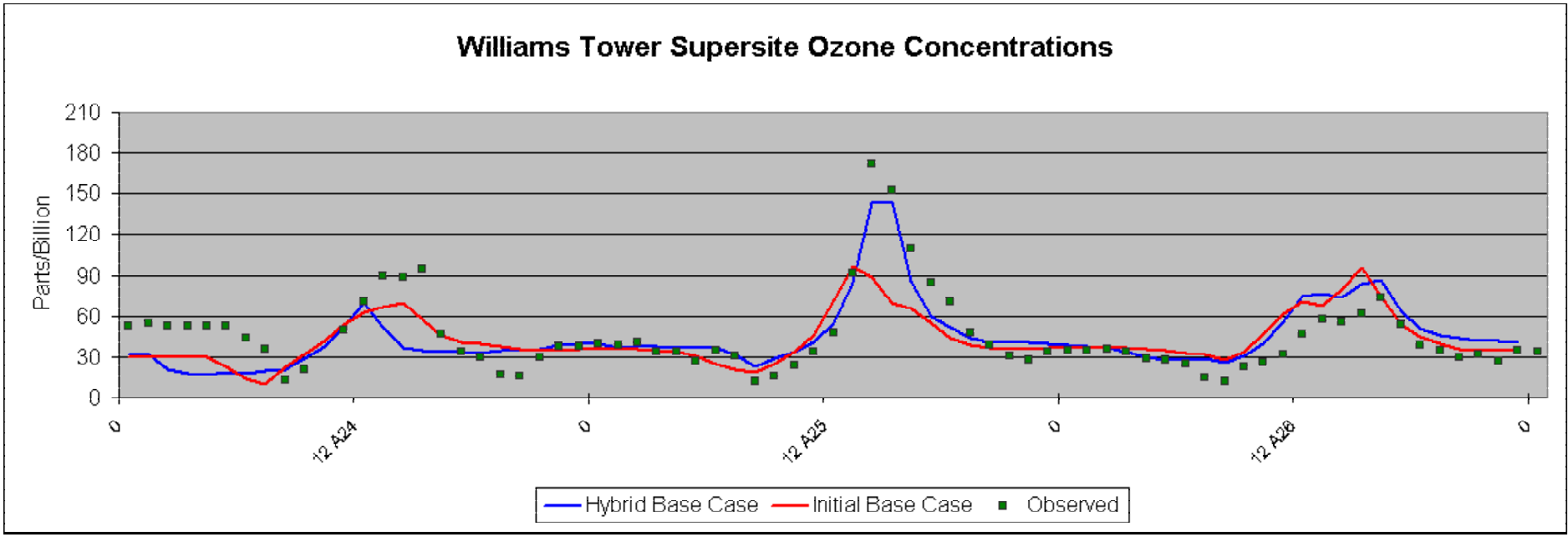

La Marque ALD2 Concentrations
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case



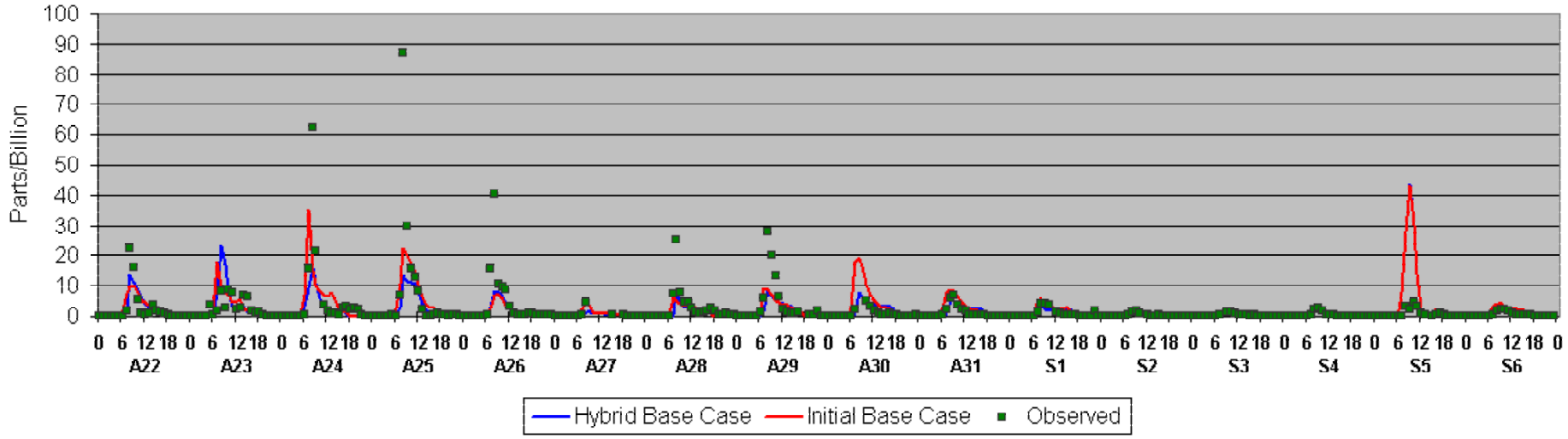
La Marque HNO3 Concentrations
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Williams Tower Supersite Time Series

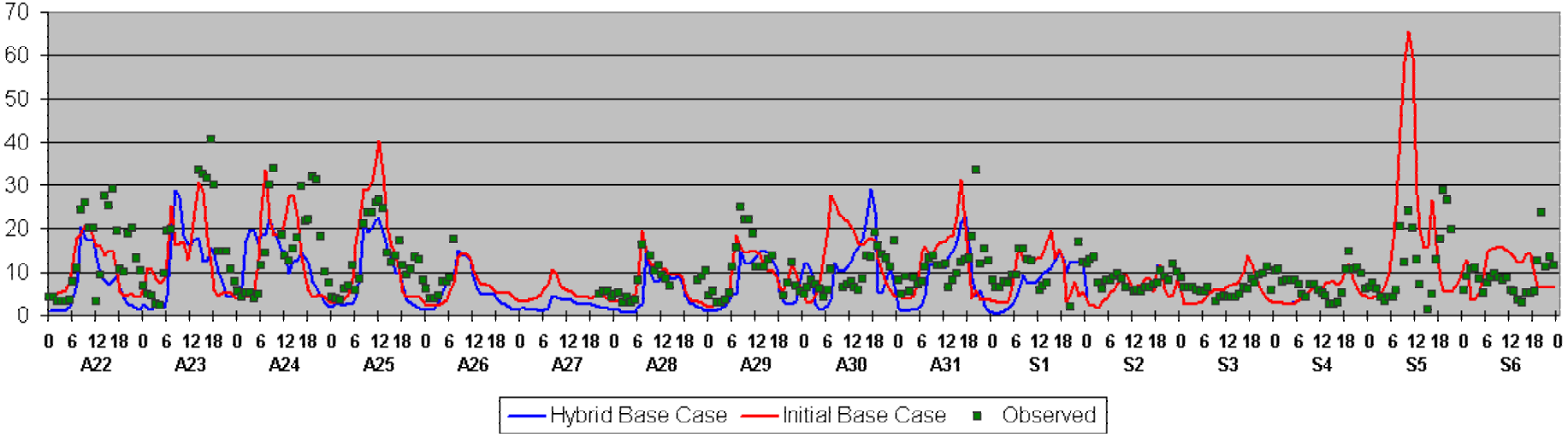

Williams Tower Supersite Ozone Concentrations
Parts/Billion
210
180
150
120
90
60
30
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

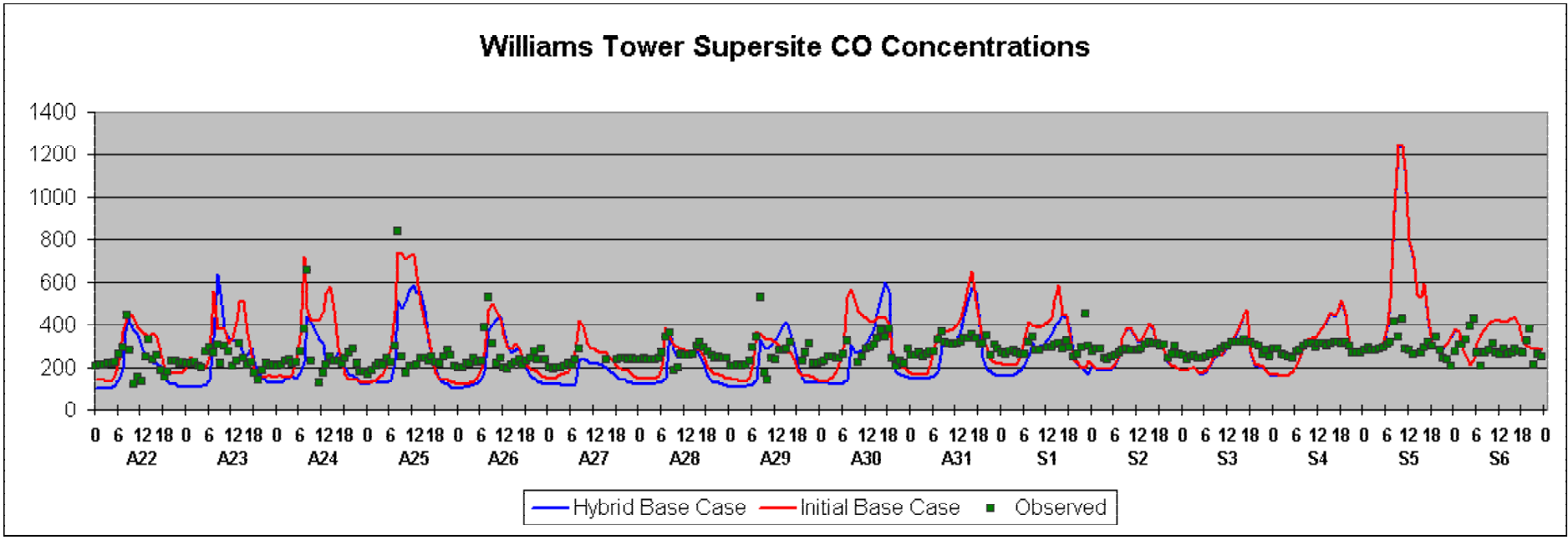

Williams Tower Supersite Ozone Concentrations
Parts/Billion
210
180
150
120
90
60
30
0
0
12 A24
0
12 A25
0
12 A26
0
Hybrid Base Case
Initial Base Case
Observed

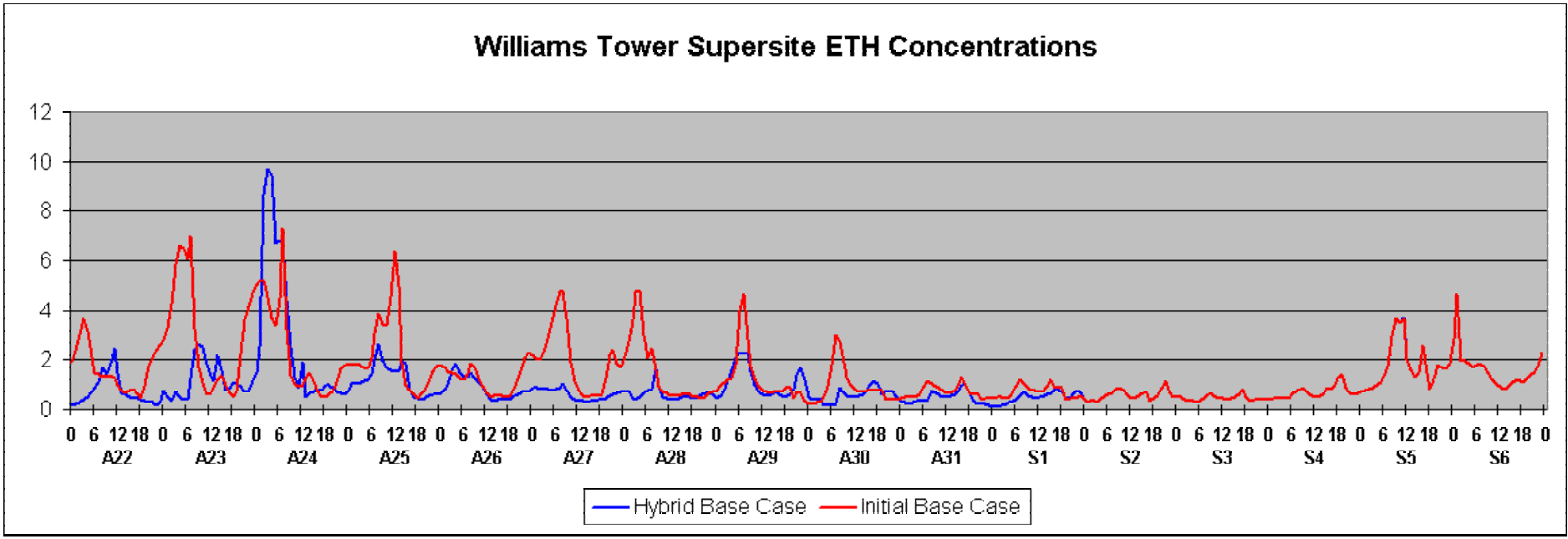
Williams Tower Supersite NO Concentrations



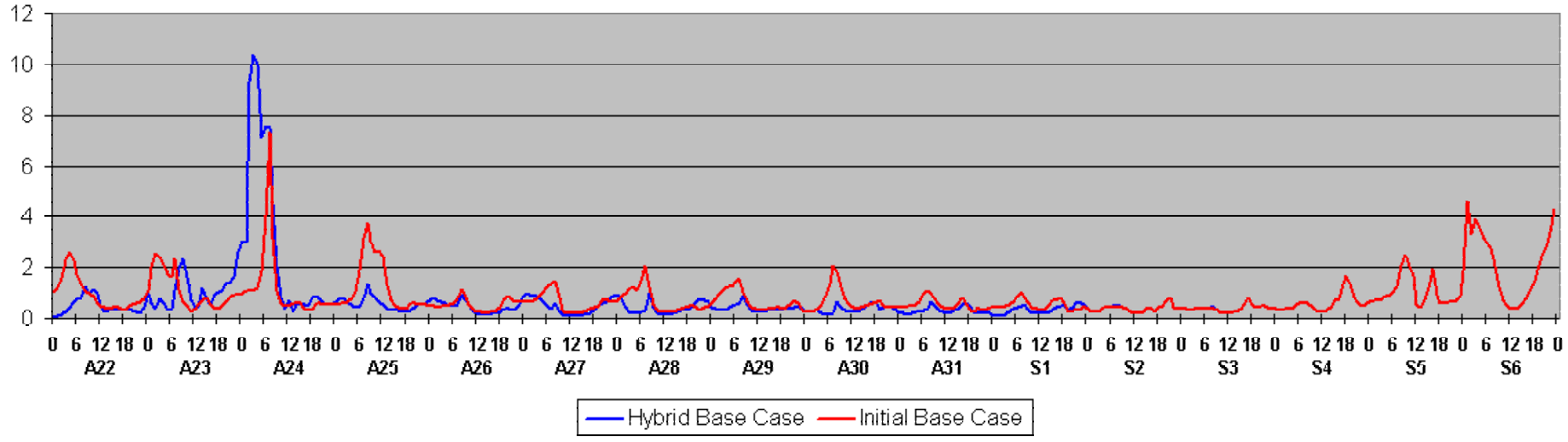
Williams Tower Supersite NO2 Concentrations



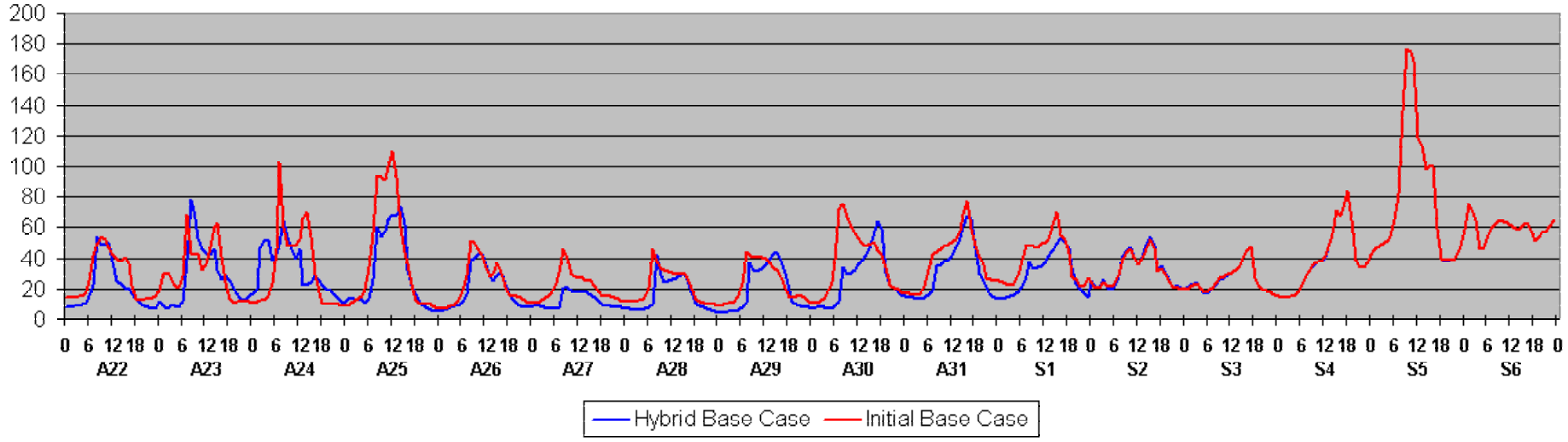

Williams Tower Supersite CO Concentrations
1400
1200
1000
800
600
400
200
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

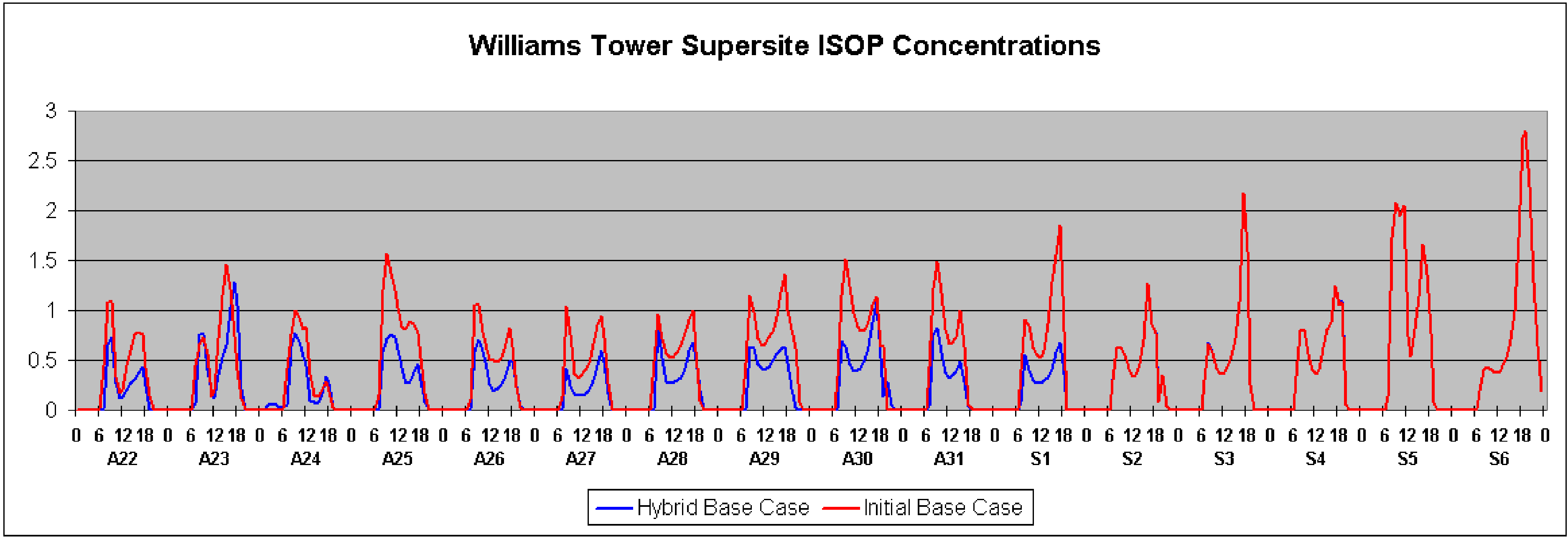

Williams Tower Supersite ETH Concentrations
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

Williams Tower Supersite OLE Concentrations

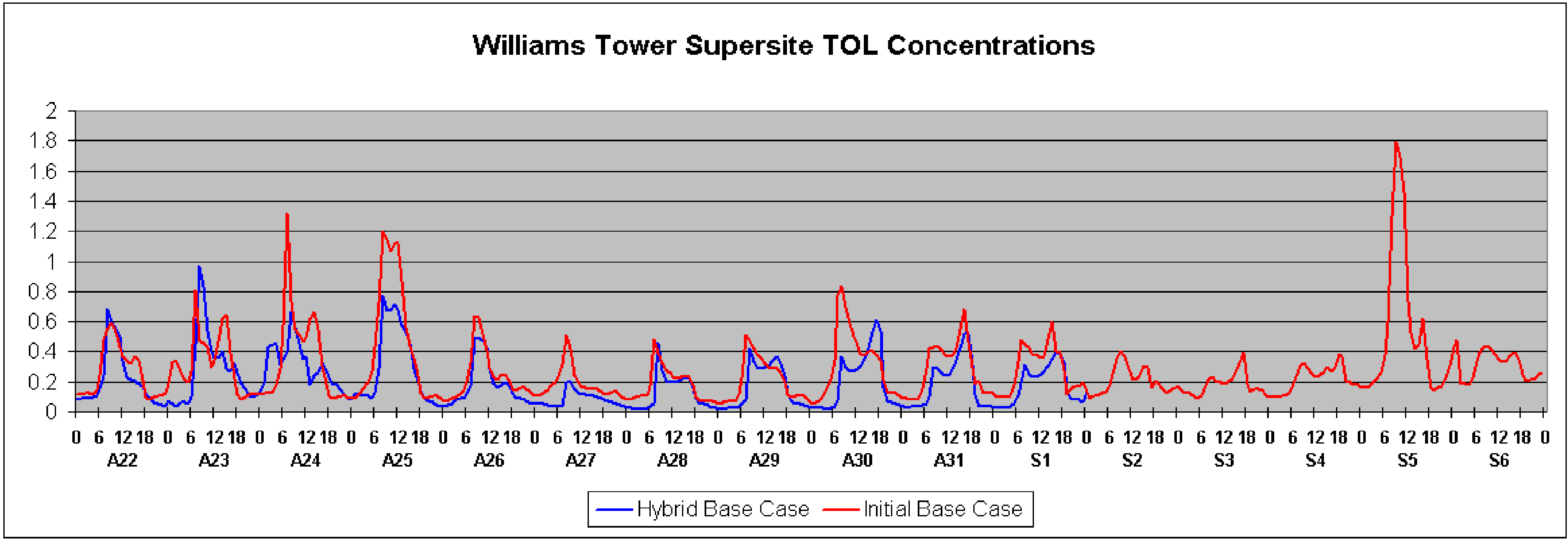


Williams Tower Supersite PAR Concentrations

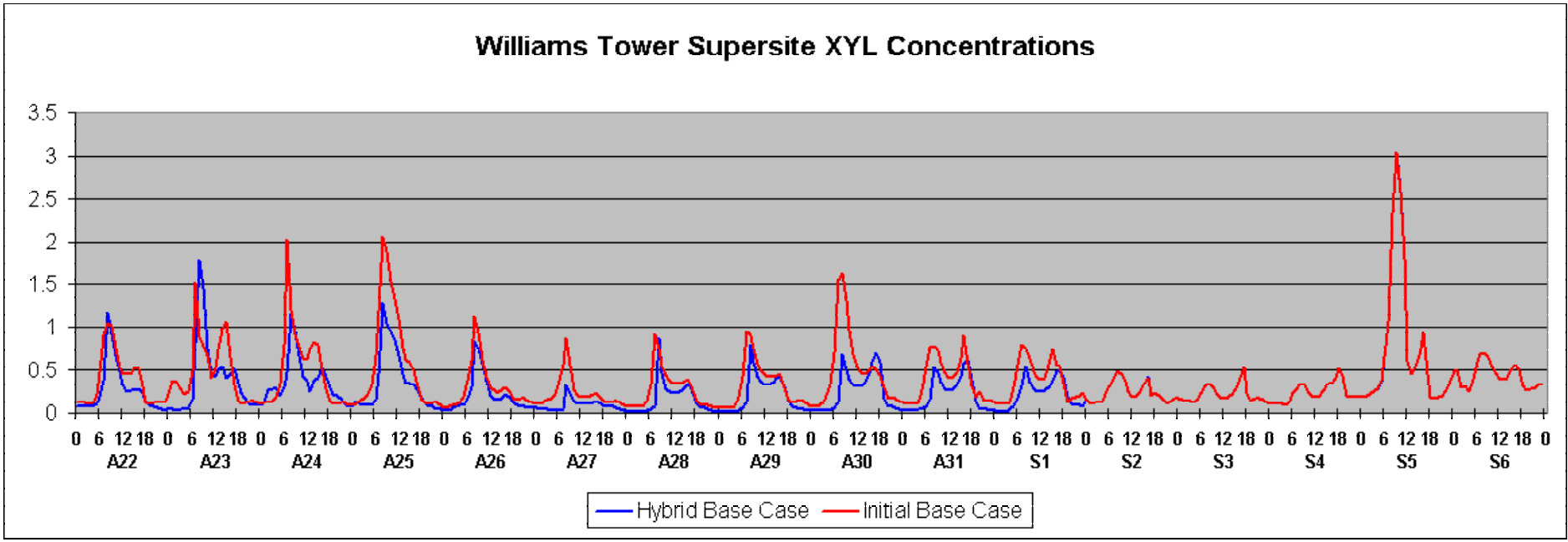


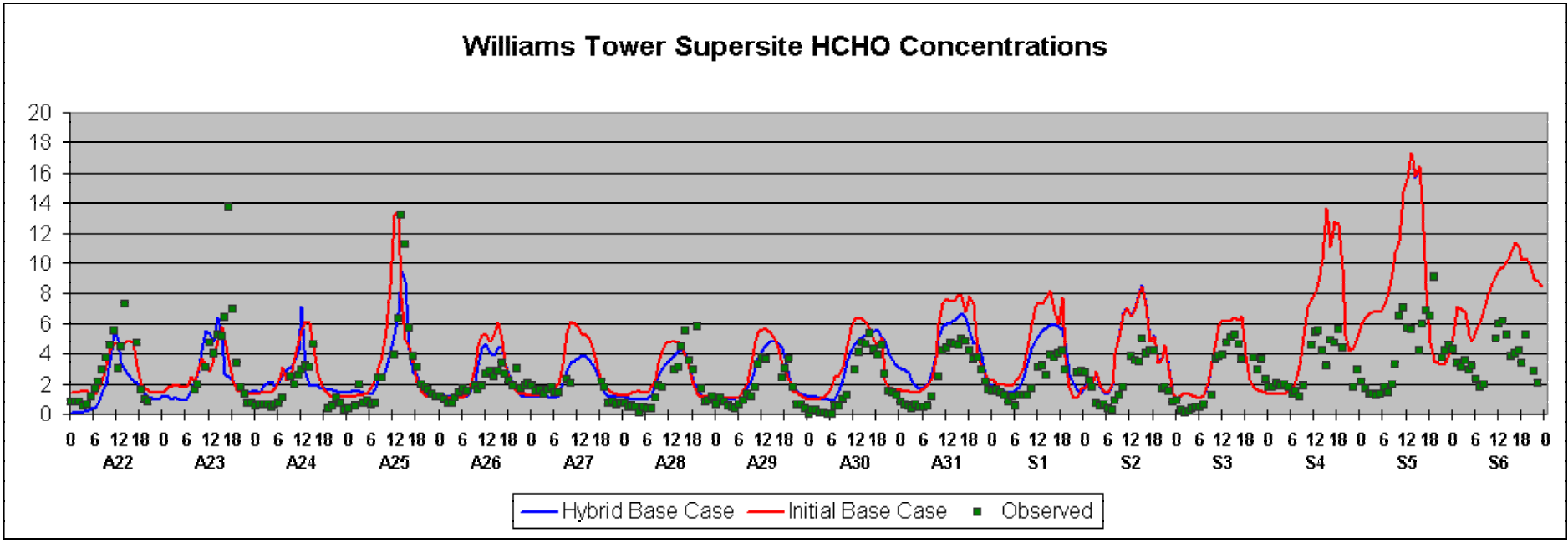


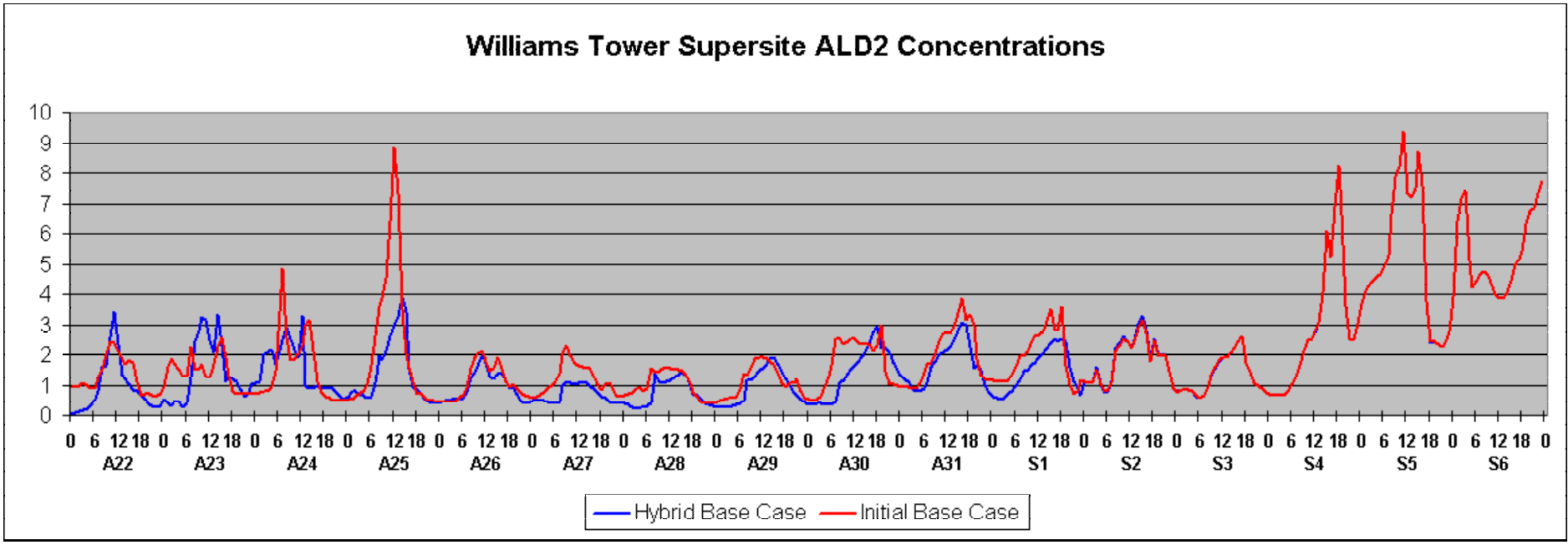
Williams Tower Supersite ISOP Concentrations
3
2.5
2
1.5
1
0.5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

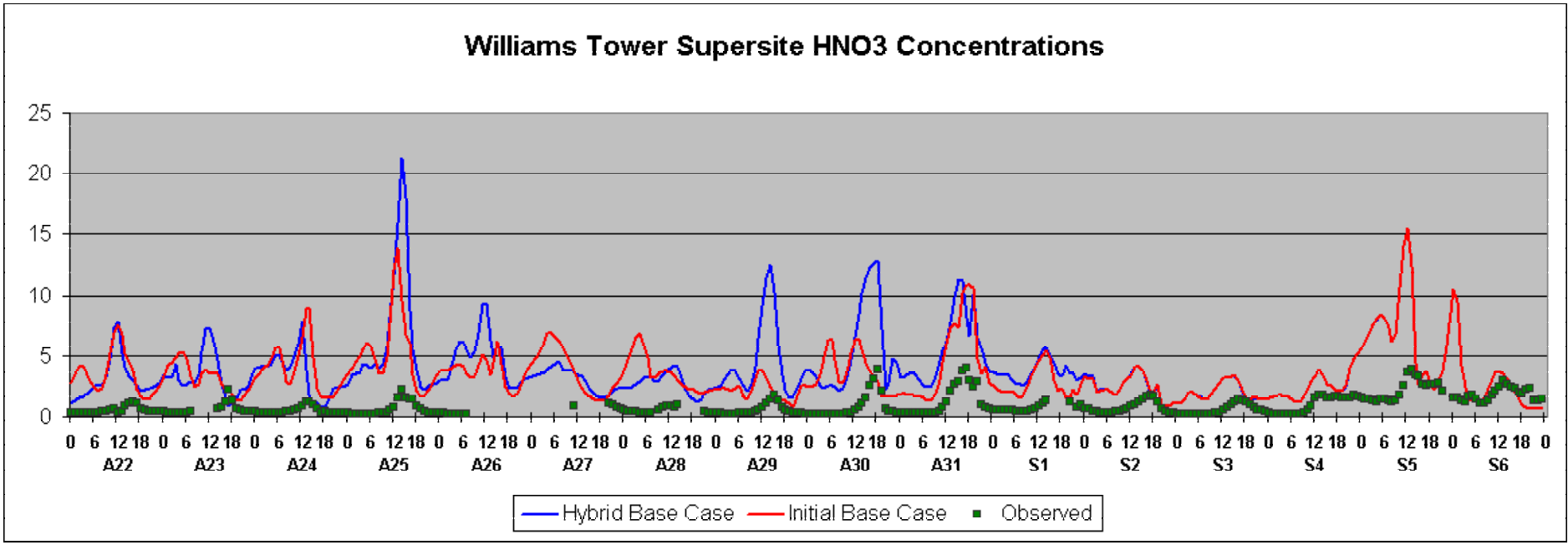


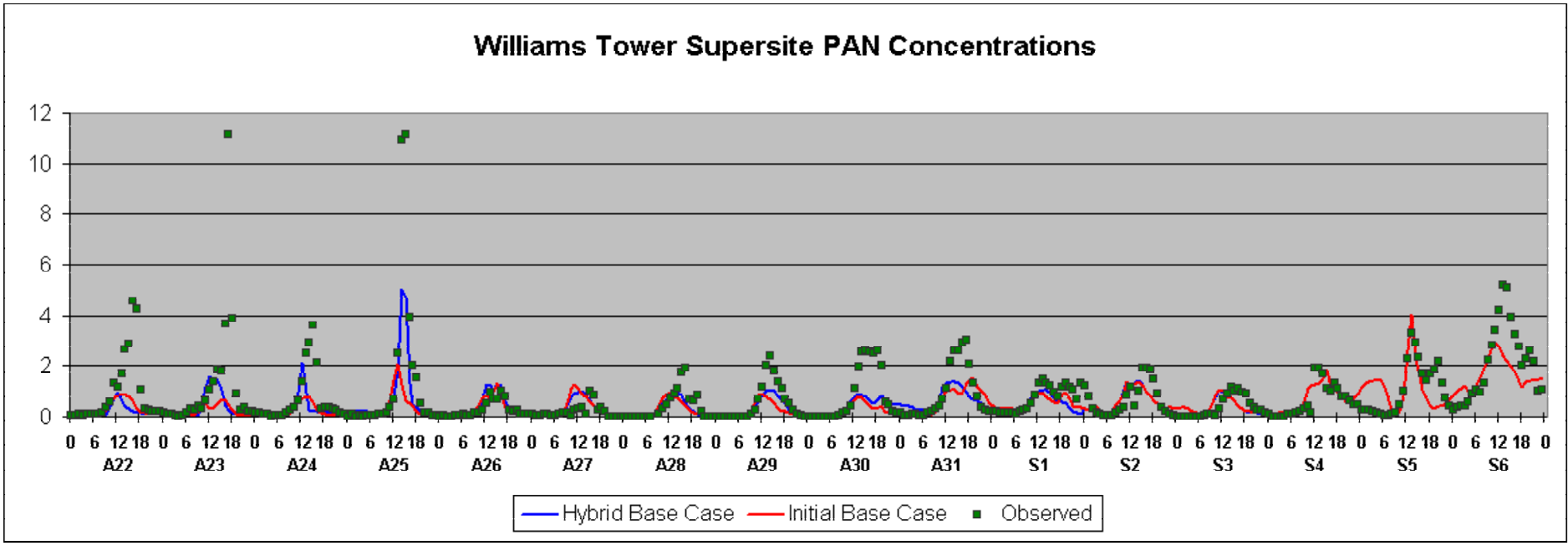
Williams Tower Supersite TOL Concentrations
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

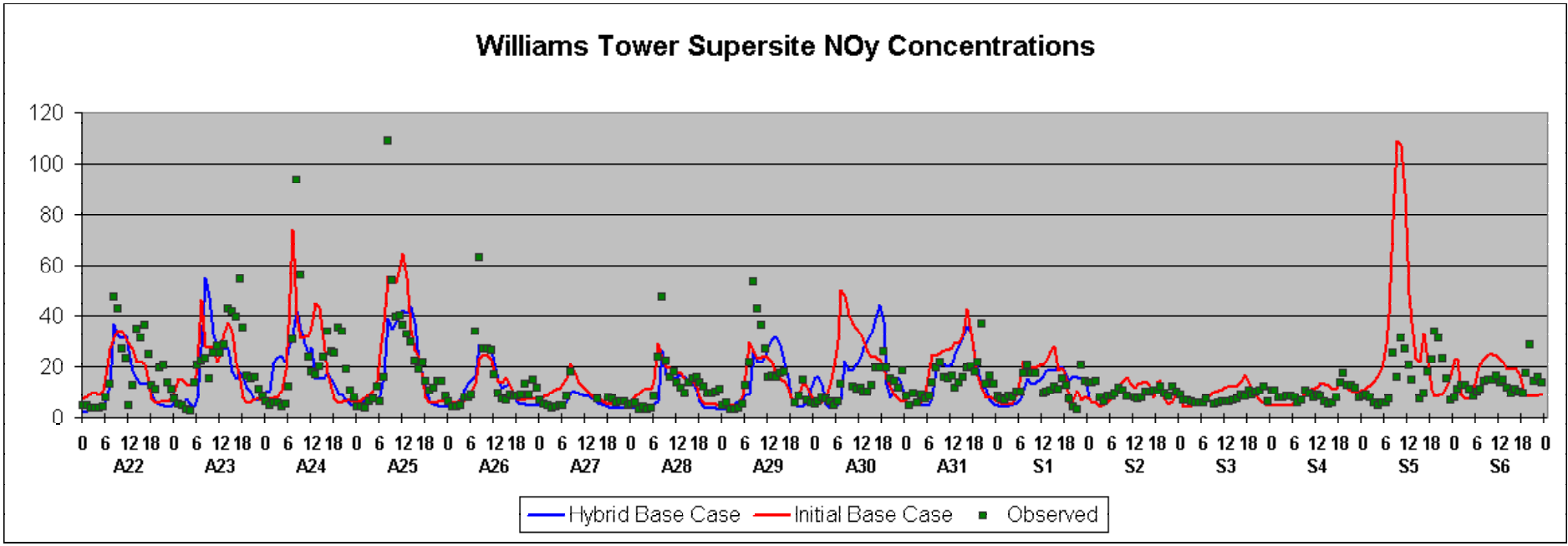

Williams Tower Supersite XYL Concentrations
3.5
3
2.5
2
1.5
1
0.5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

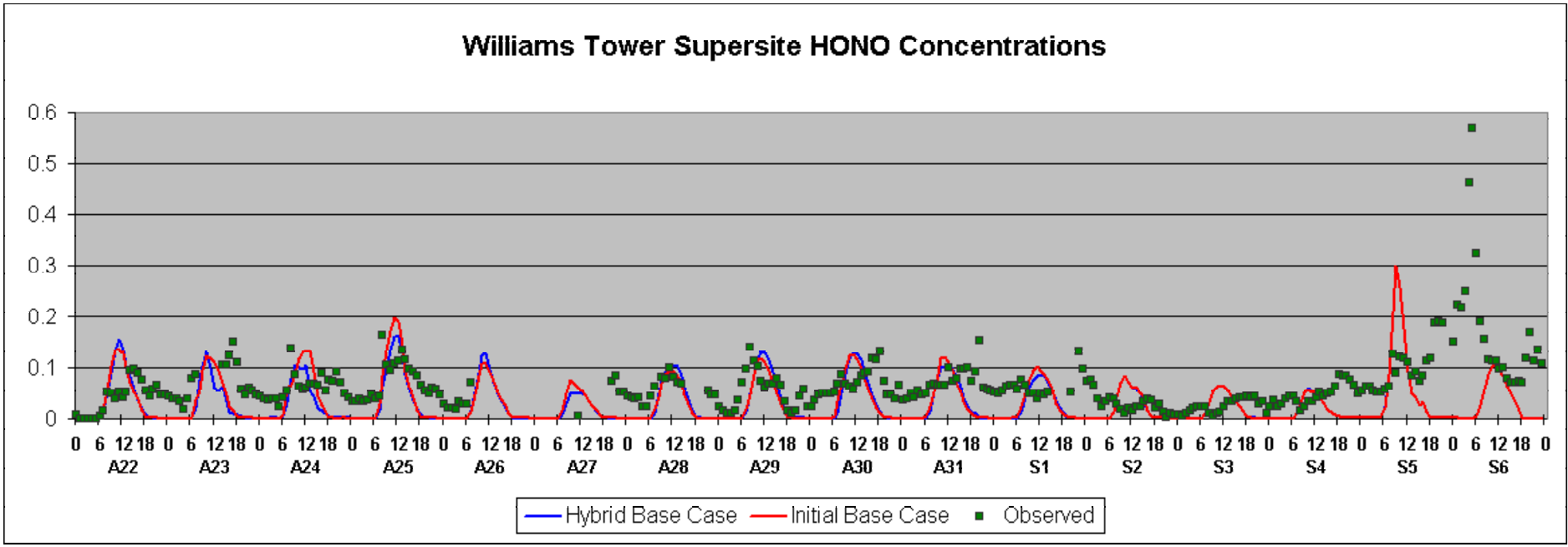

Williams Tower Supersite HCHO Concentrations
20
18
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

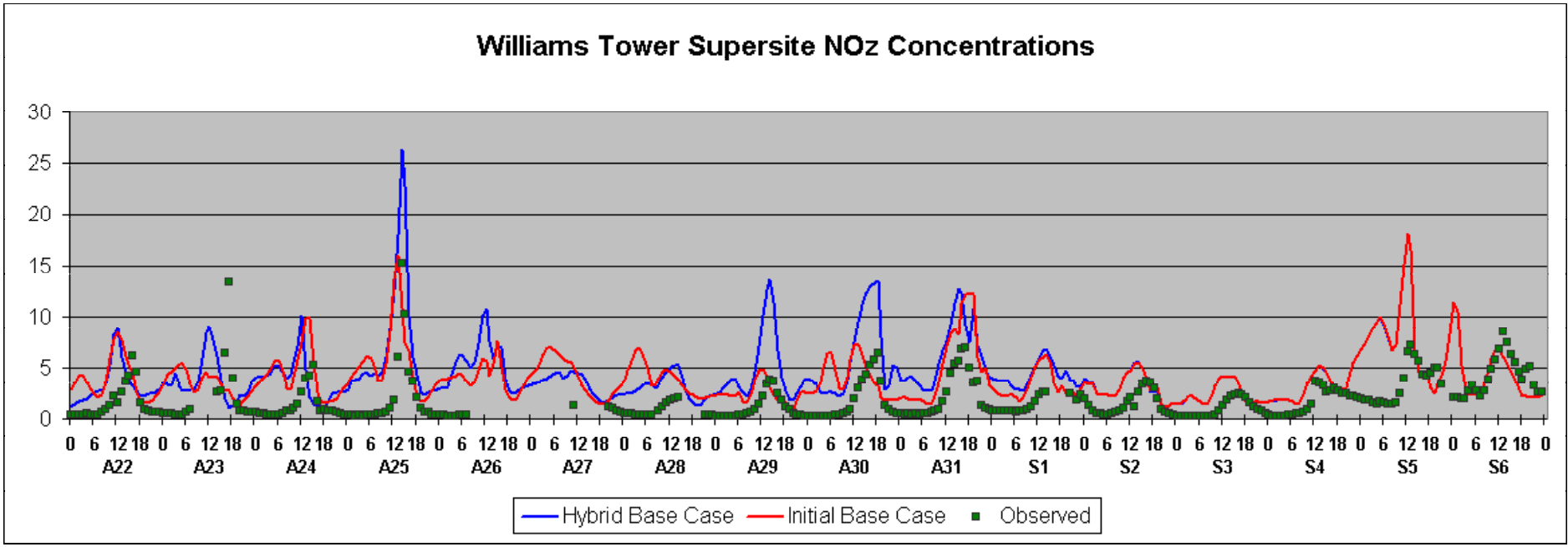

Williams Tower Supersite ALD2 Concentrations
10
9
8
7
6
5
4
3
2
1
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


Williams Tower Supersite HNO3 Concentrations
25
20
15
10
5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


Williams Tower Supersite PAN Concentrations
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

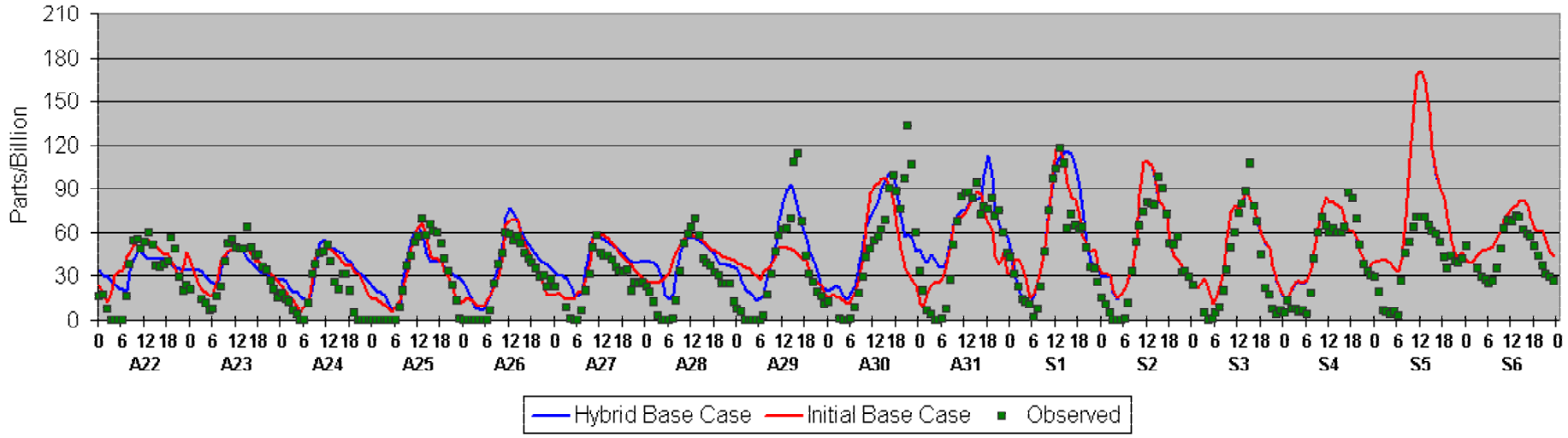

Williams Tower Supersite NOy Concentrations
120
100
80
60
40
20
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed


Williams Tower Supersite HONO Concentrations
0.6
0.5
0.4
0.3
0.2
0.1
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

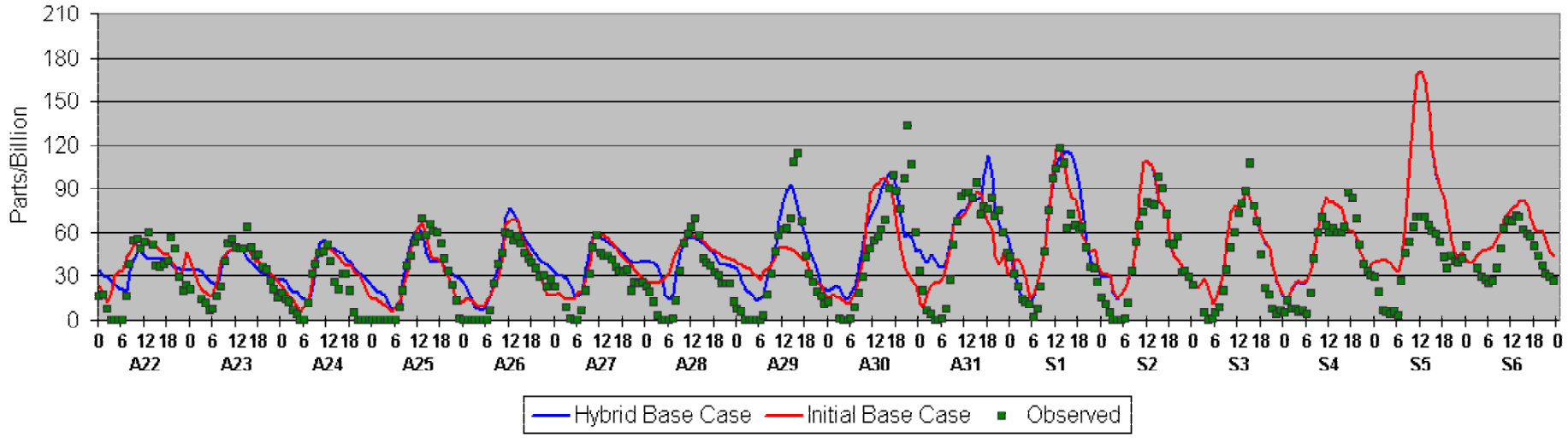

Williams Tower Supersite NOz Concentrations
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

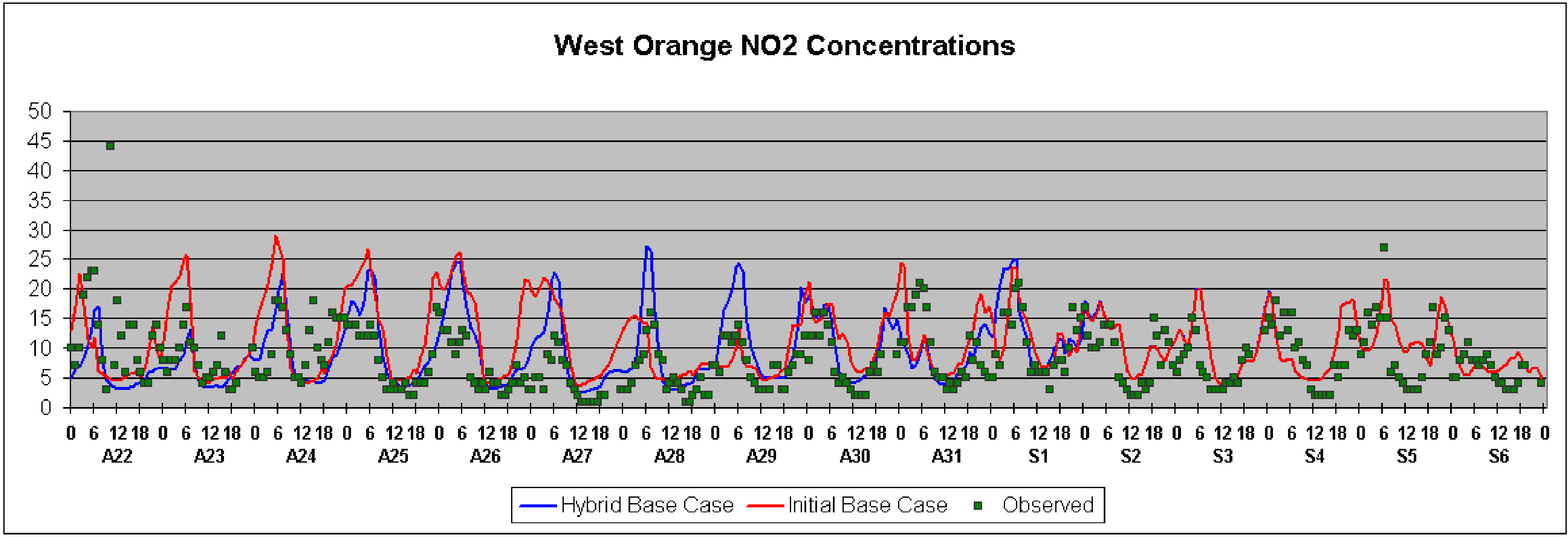
West Orange Time Series

West Orange Ozone Concentrations

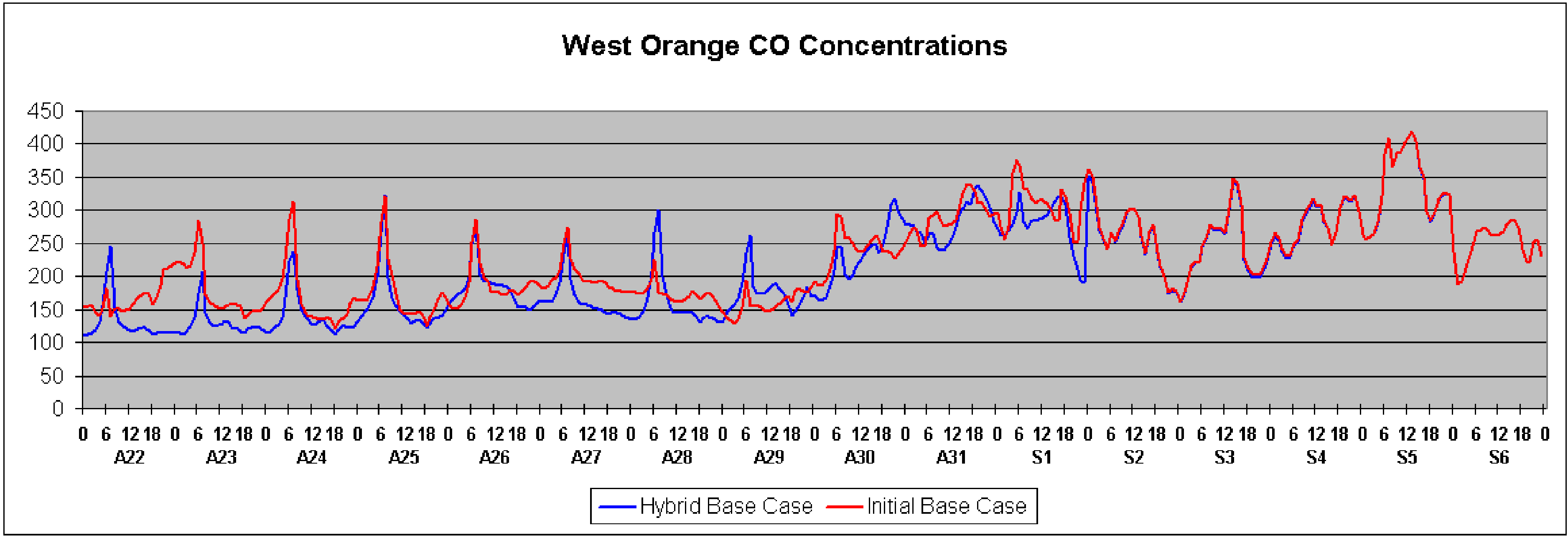


West Orange Ozone Concentrations

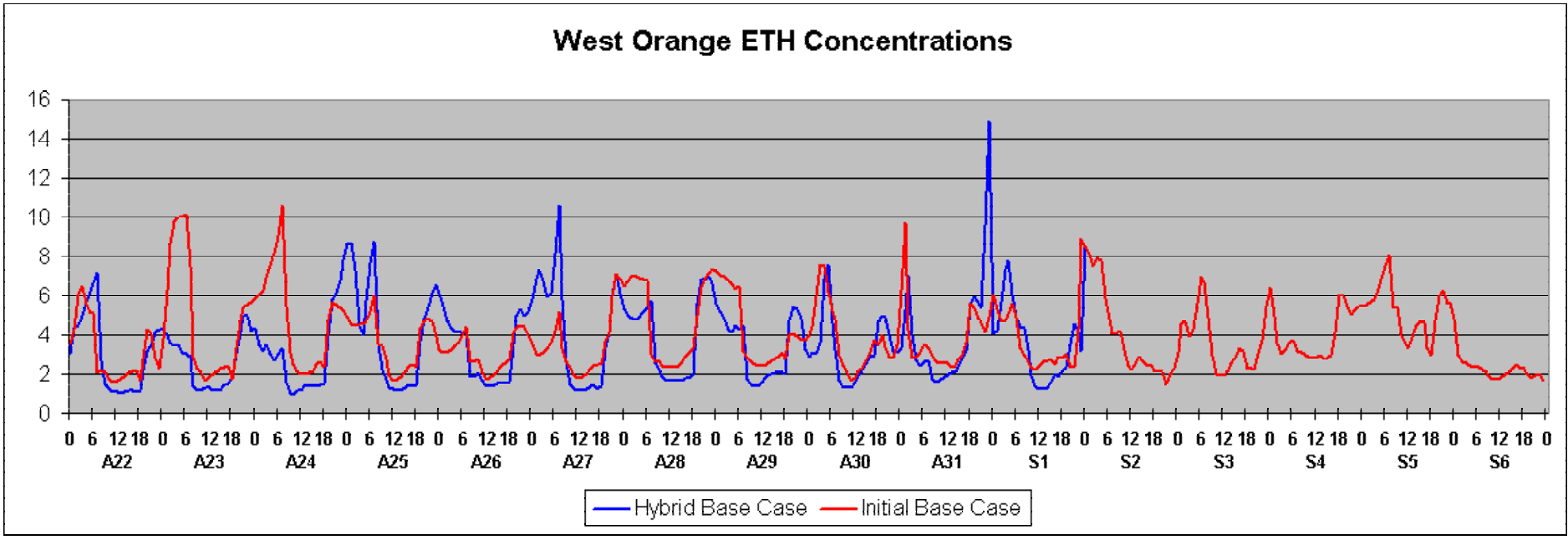


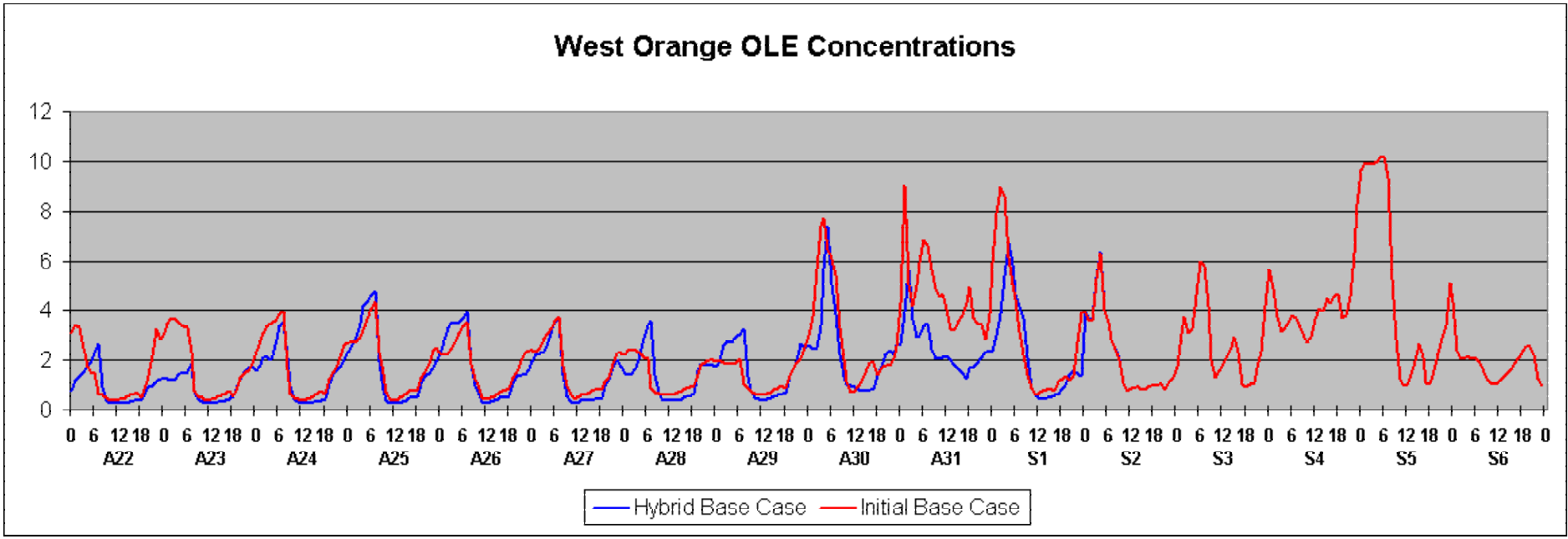


West Orange NO2 Concentrations
50
45
40
35
30
25
20
15
10
5
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case
Observed

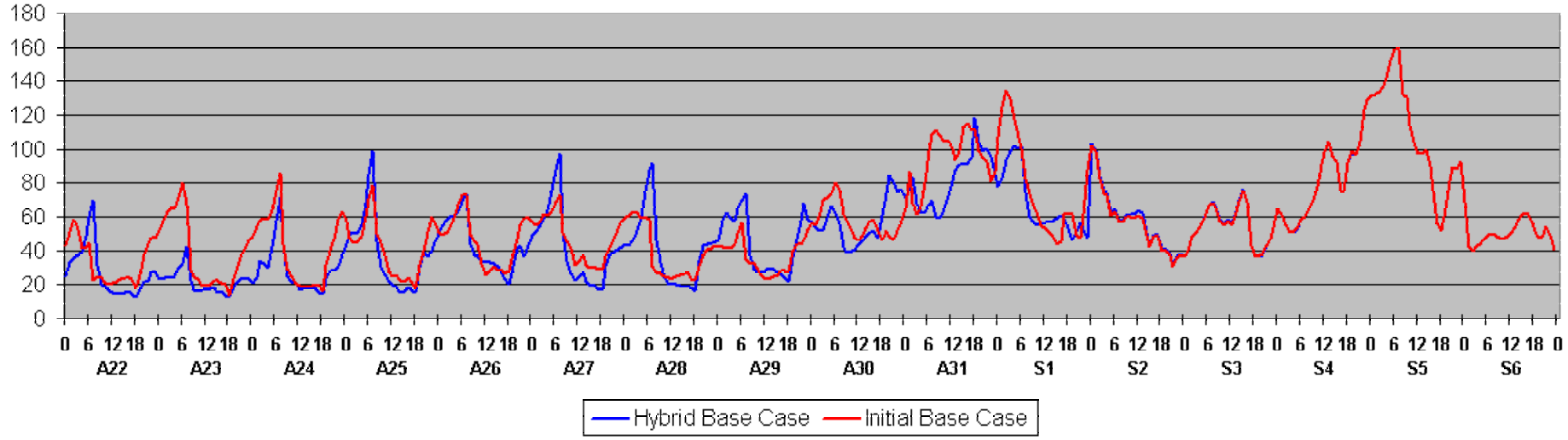


West Orange CO Concentrations
450
400
350
300
250
200
150
100
50
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

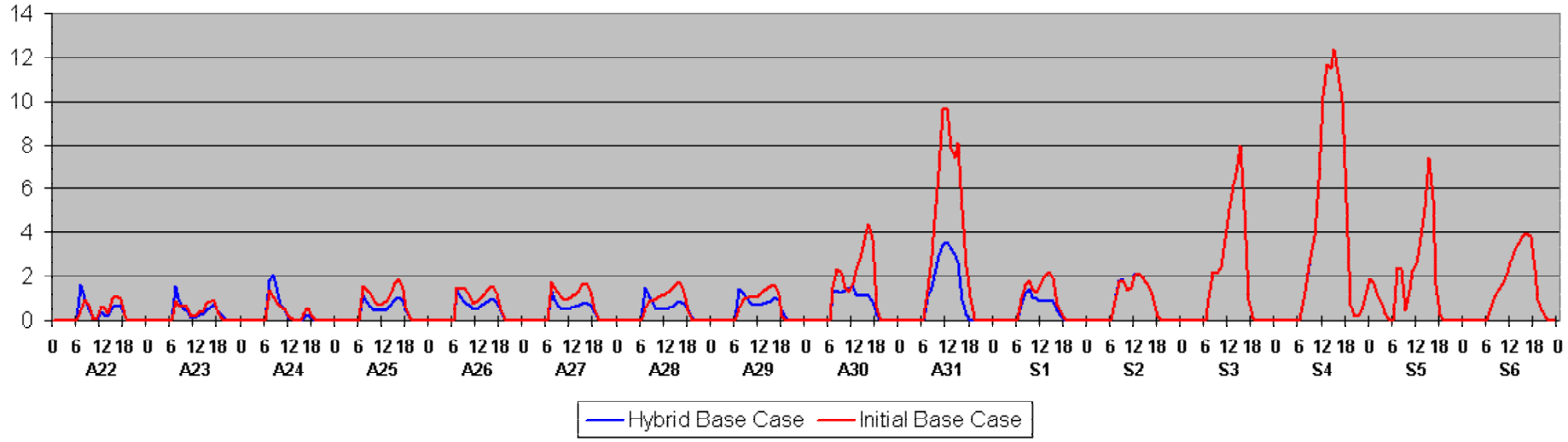

West Orange ETH Concentrations
16
14
12
10
8
6
4
2
0
0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


West Orange OLE Concentrations
12
10
8
6
4
2
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case

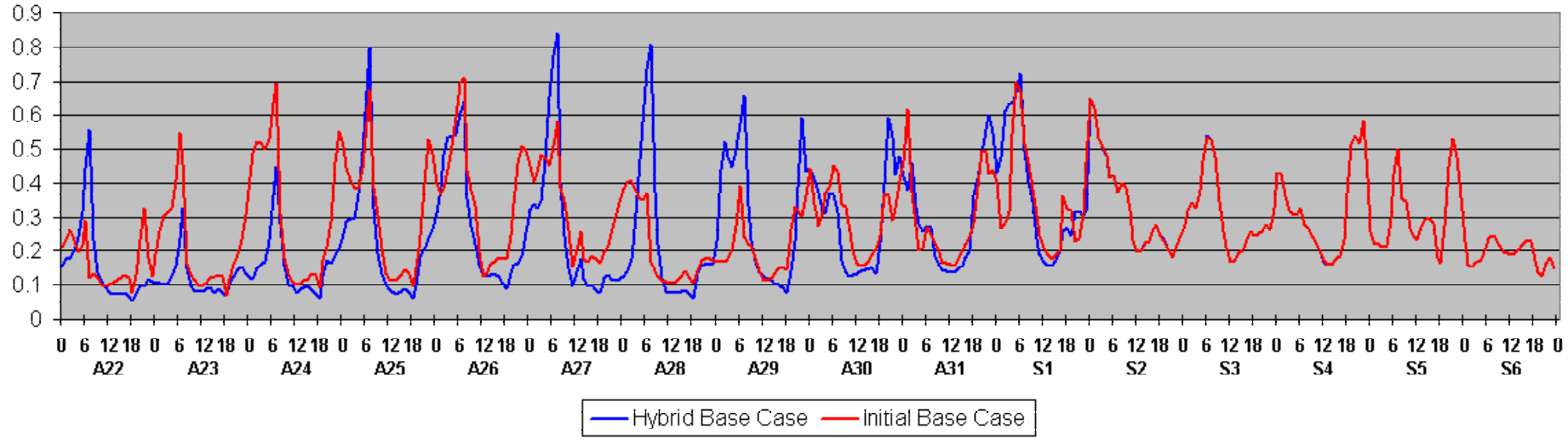
West Orange PAR Concentrations



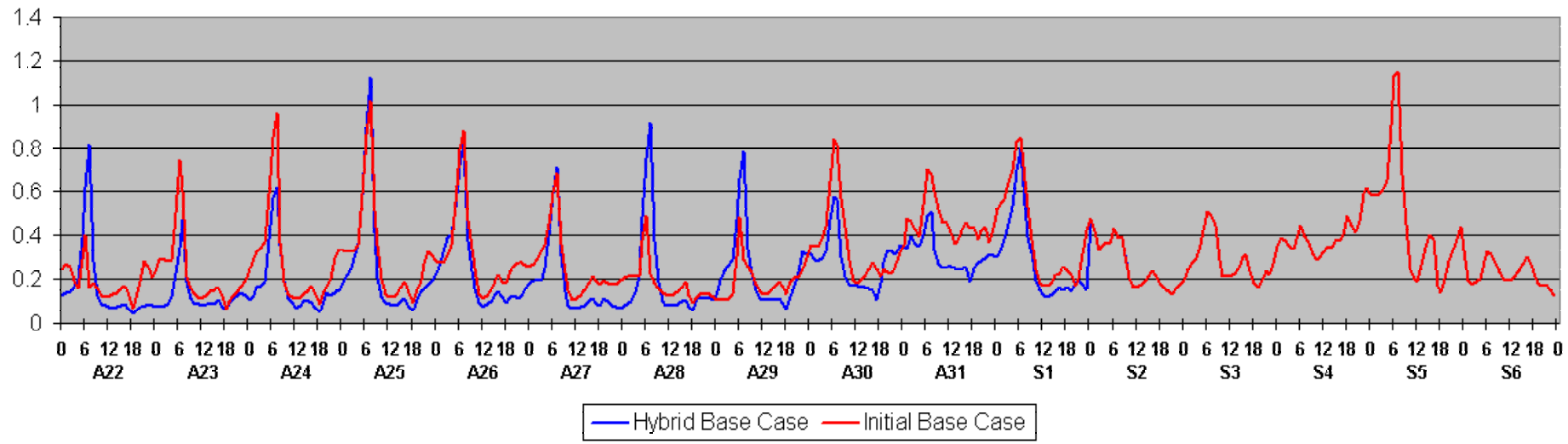
West Orange ISOP Concentrations

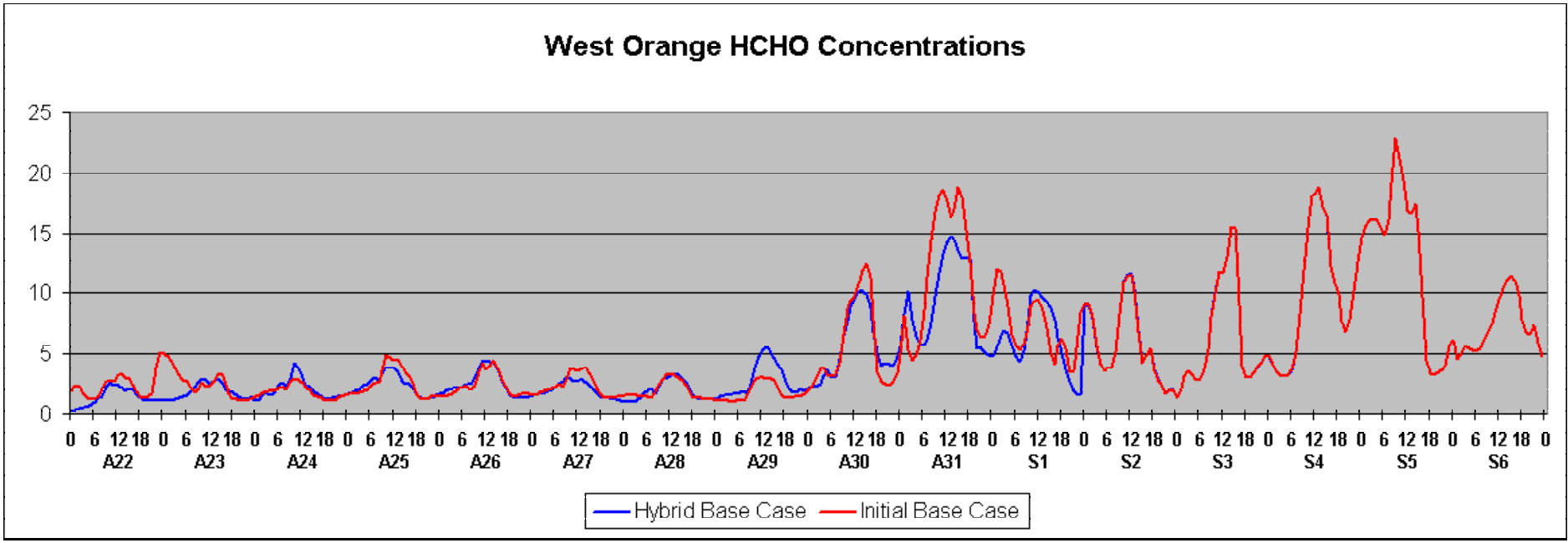


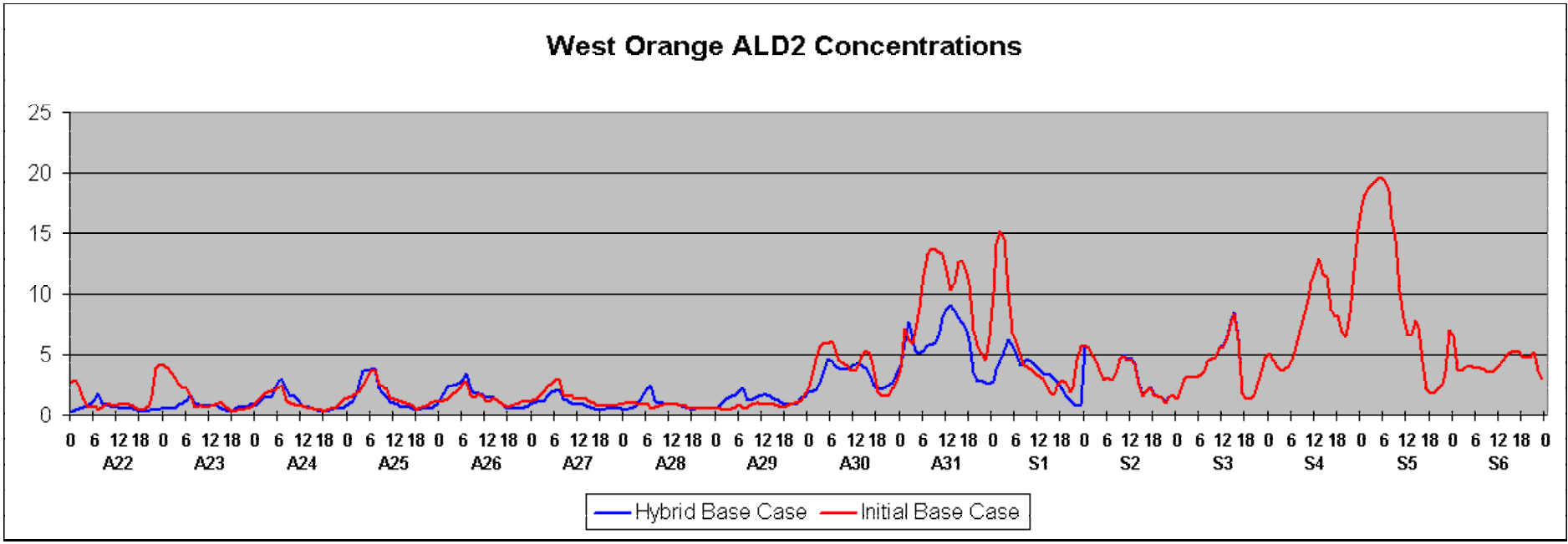
West Orange TOL Concentrations

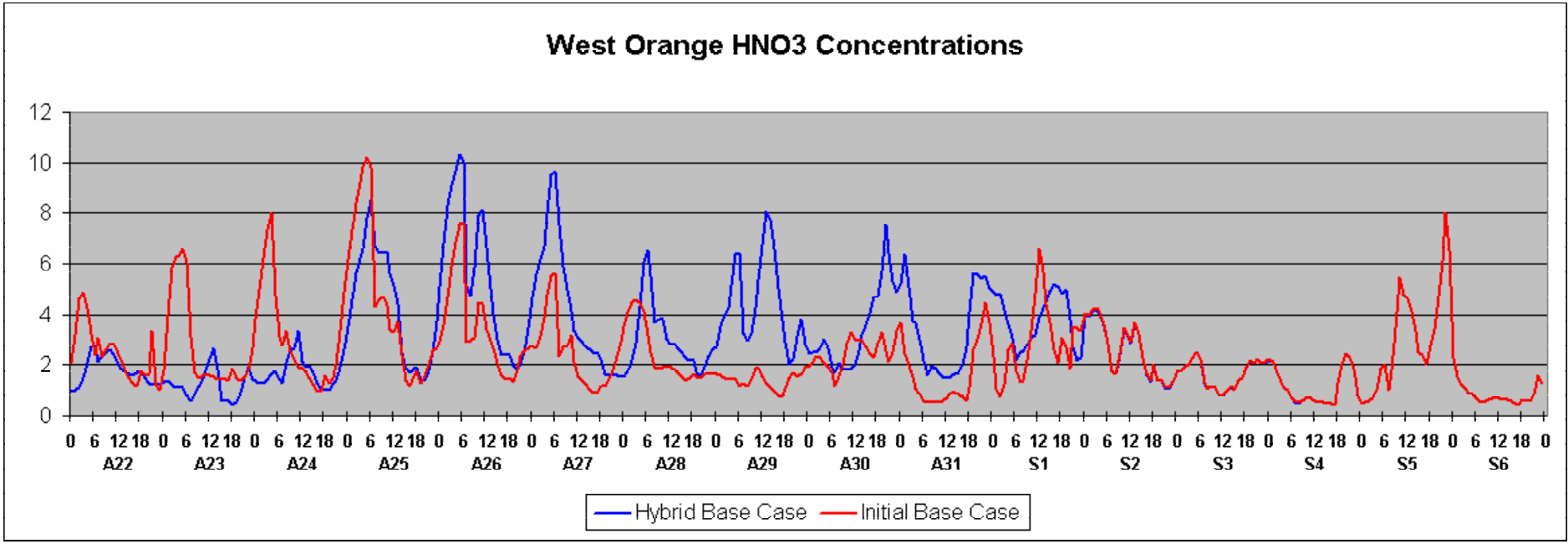


West Orange XYL Concentrations




West Orange HCHO Concentrations
25
20
15
10
5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


West Orange ALD2 Concentrations
25
20
15
10
5
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
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case


West Orange HNO3 Concentrations
12
10
8
6
4
2
0
0 6 12 18 0
A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 S1 S2 S3 S4 S5 S6
Hybrid Base Case
Initial Base Case