Tunable Diode Laser Measurements of CH_2O on the DC-8

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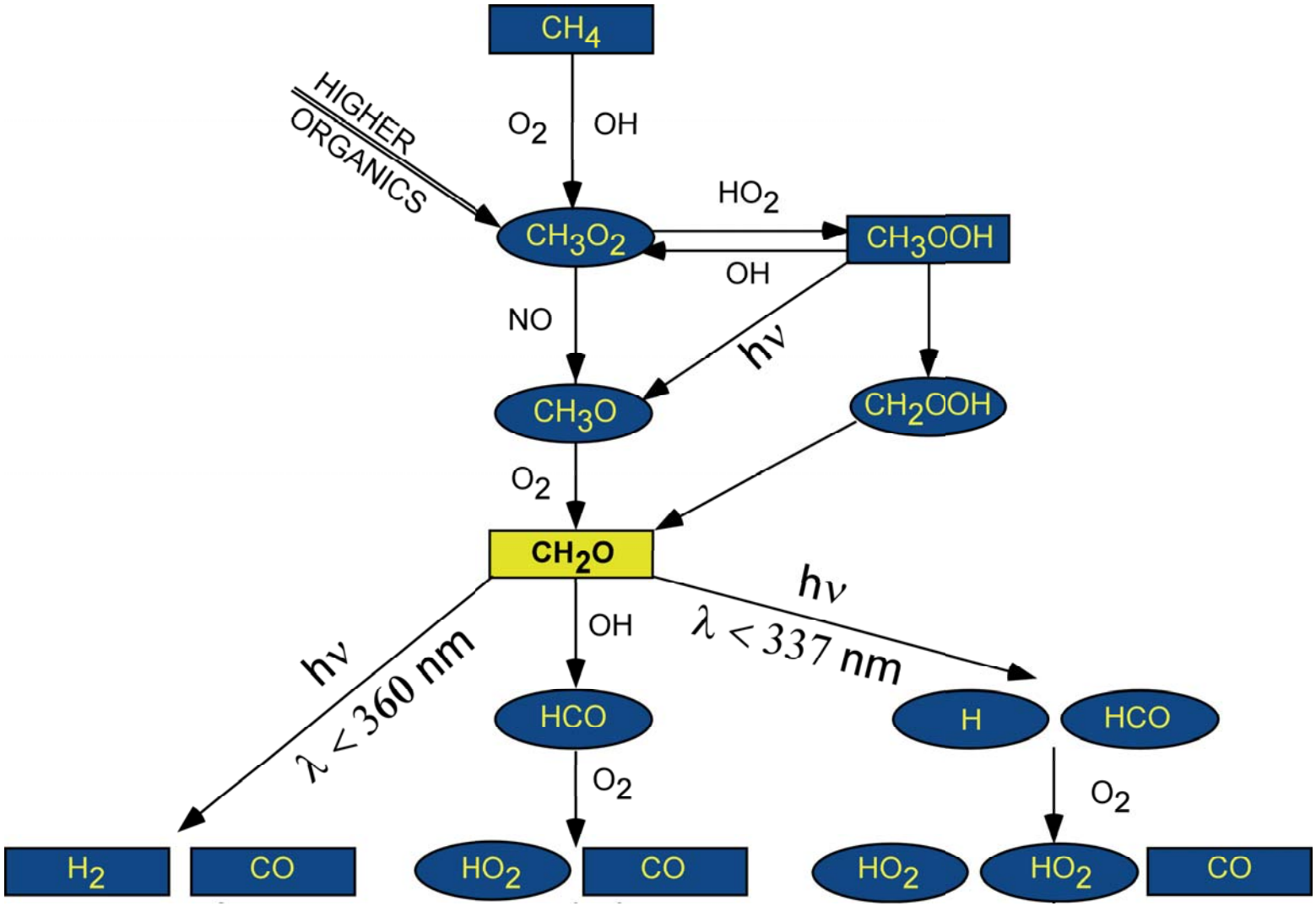
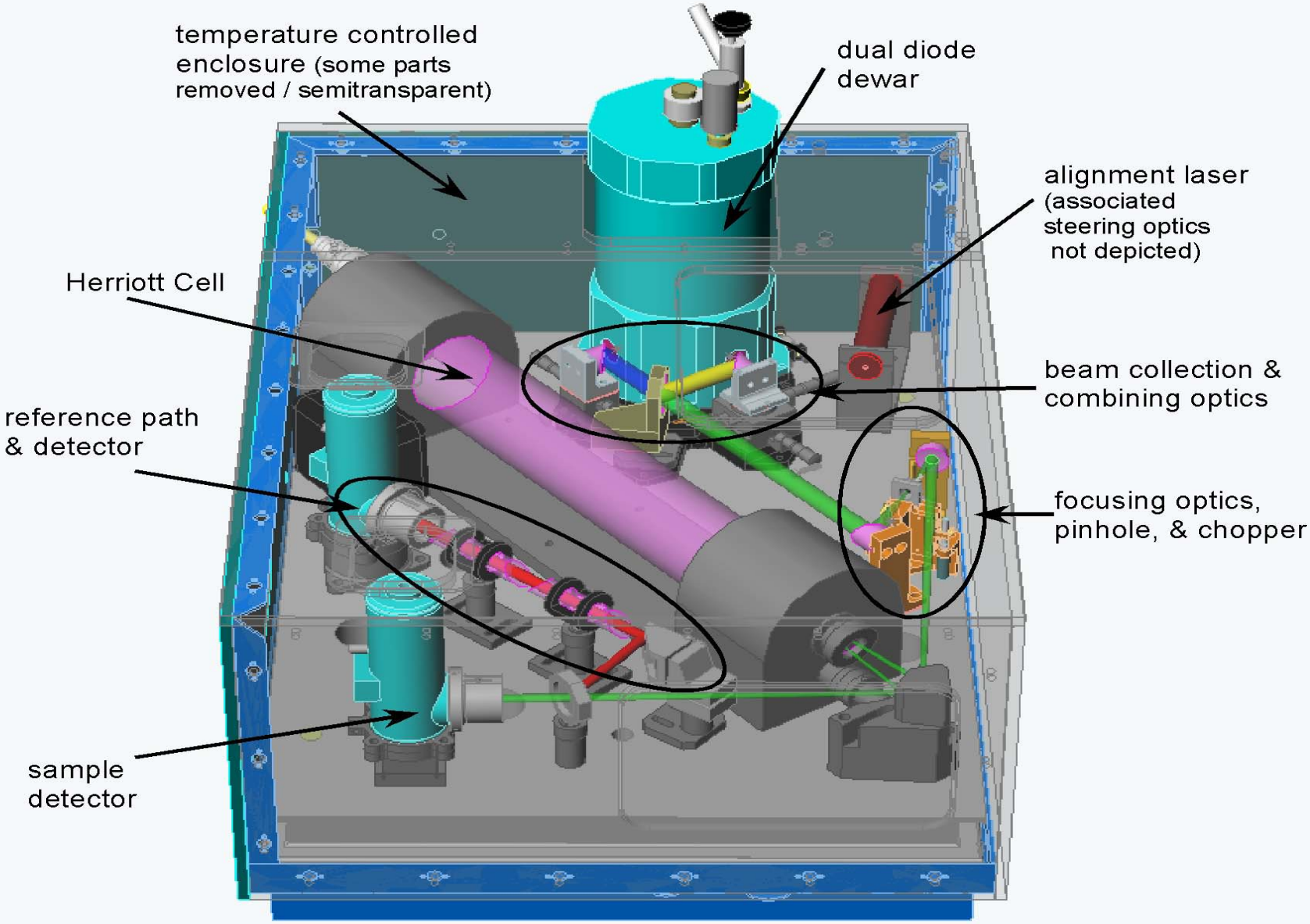
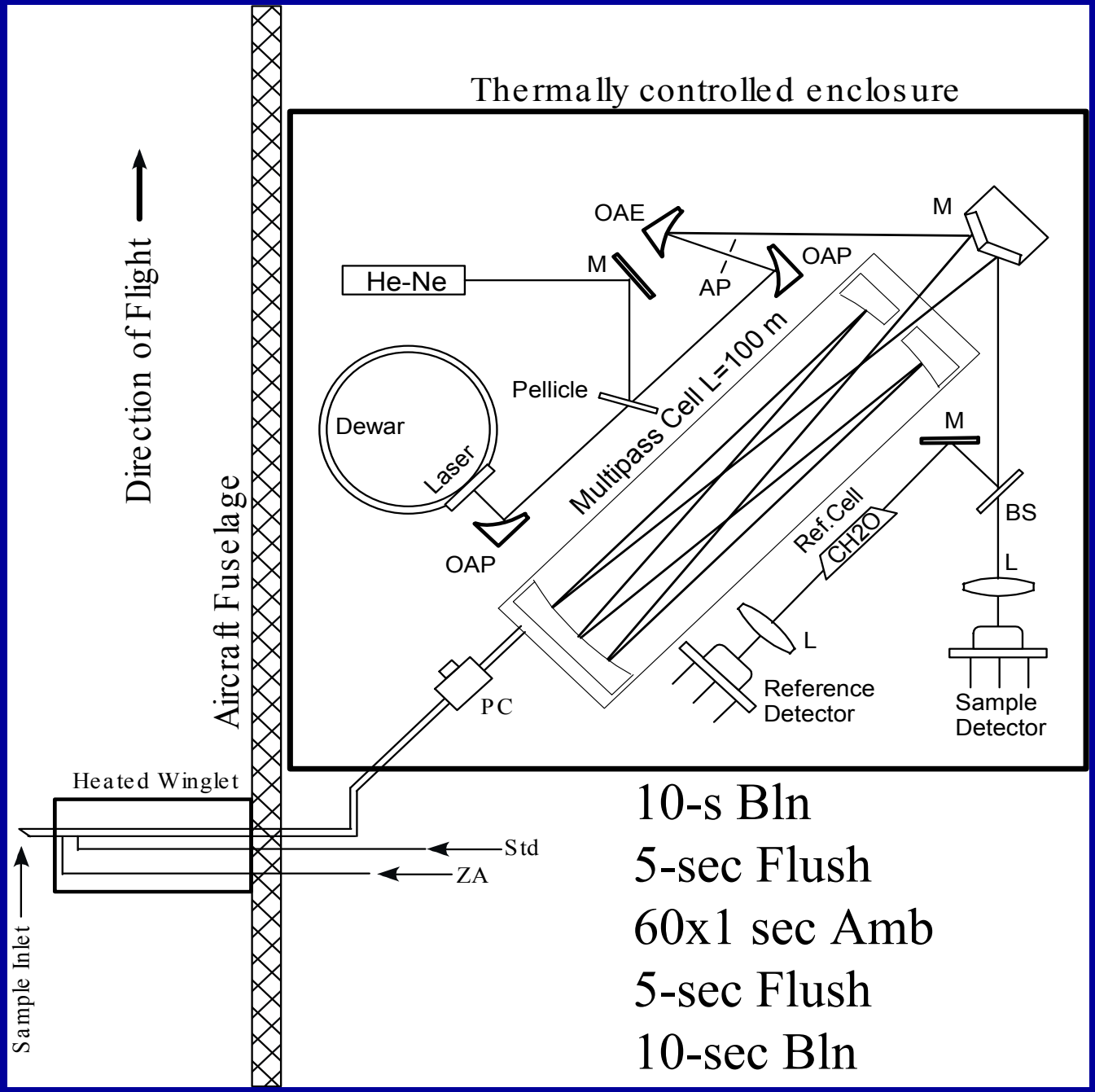
CH_2O Production & Destruction From Methane



Tunable Diode Laser Absorption Spectrometer

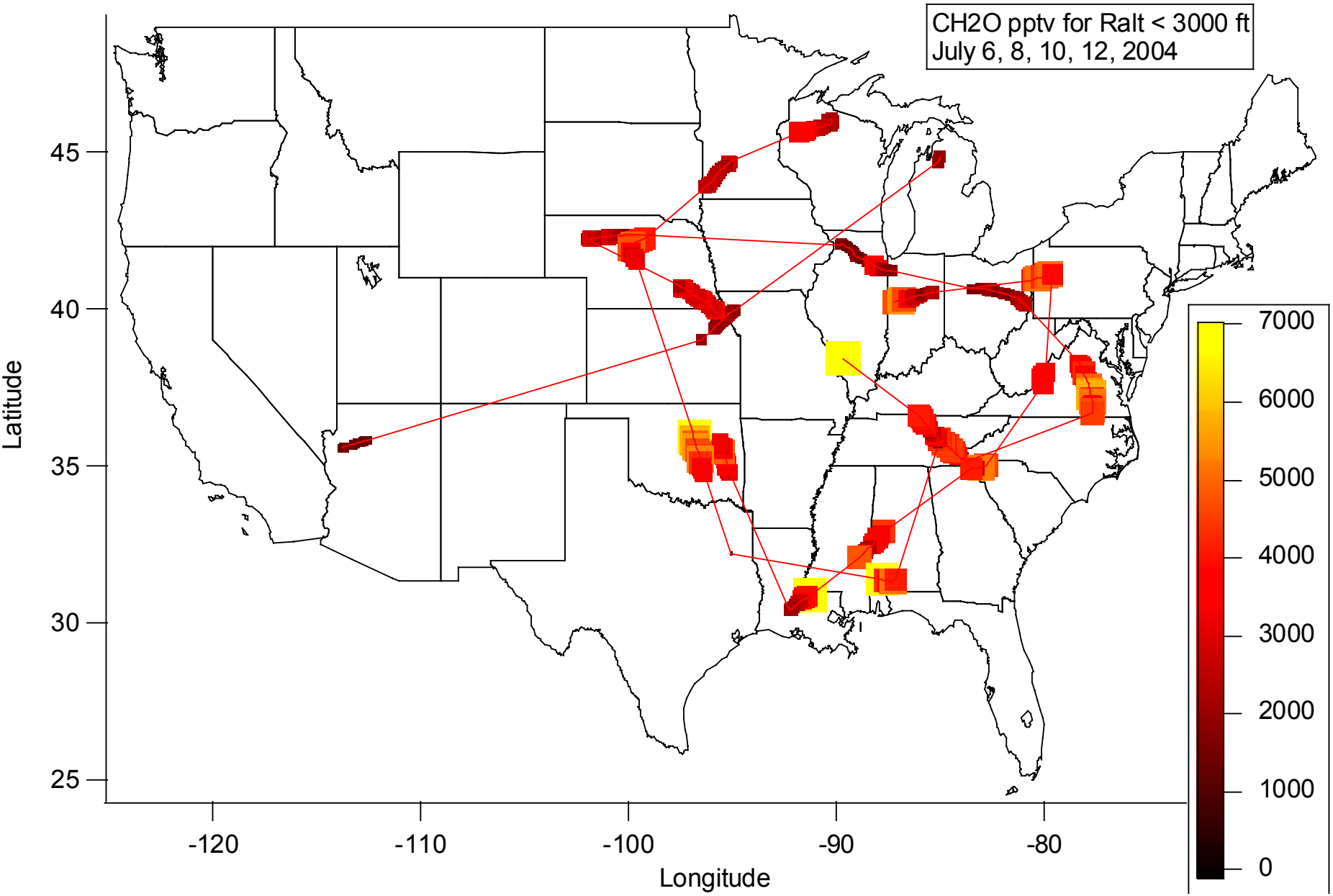


Inlet

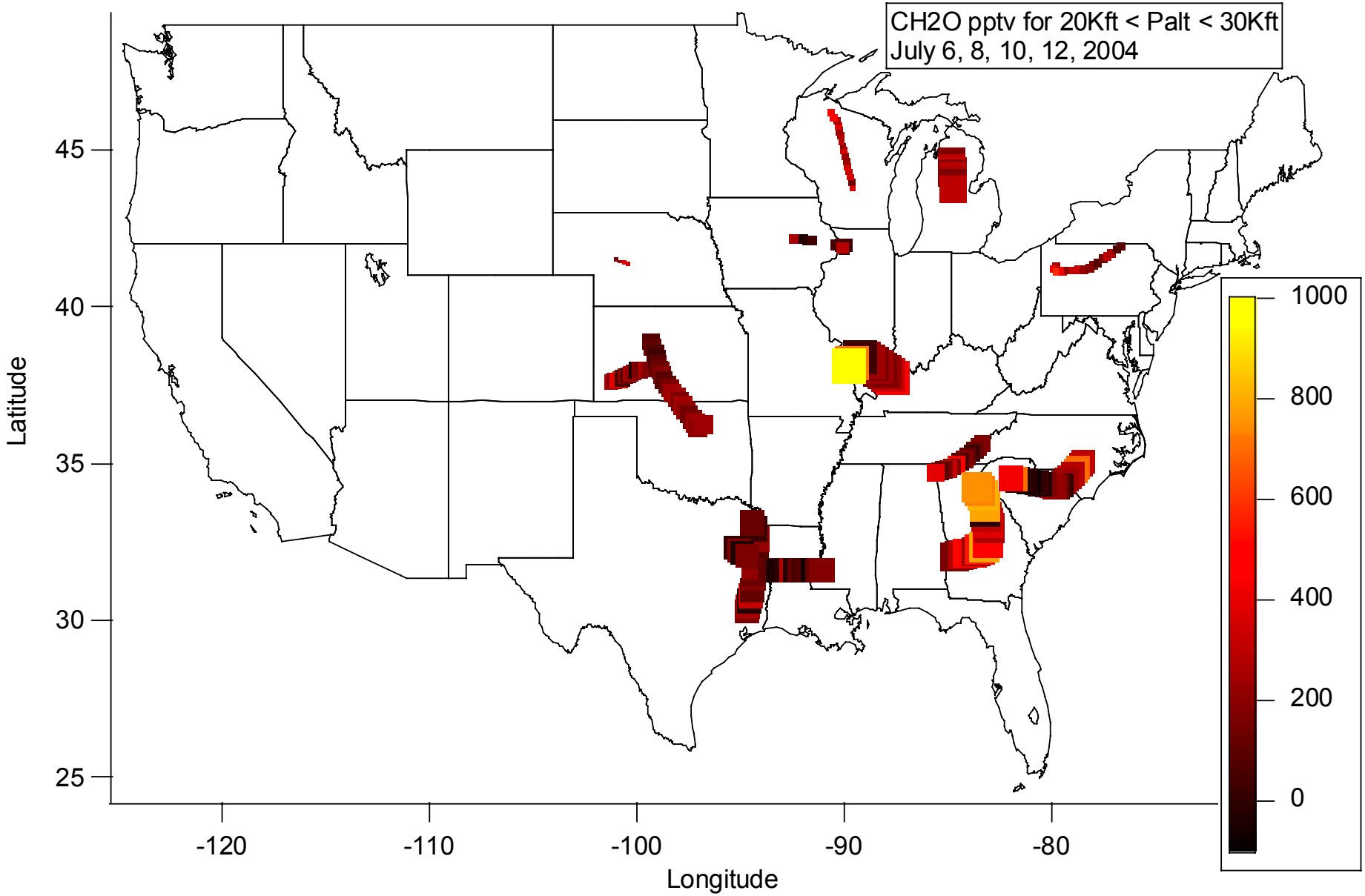

Thermally controlled enclosure
Direction of Flight
Aircraft Fuselage
He-Ne
M
OAE
OAP
AP
M
Pellicle
Dewar
Laser
OAP
Multipass Cell L=100 m
M
BS
Ref.Cell
CH2O
L
L
Reference Detector
Sample Detector
PC
Heated Winglet
Std
ZA
Sample Inlet
10-s Bln
5-sec Flush
60x1 sec Amb
5-sec Flush
10-sec Bln

NCAR
Greenland
CANADA
COMPUTER SOLUTIONS

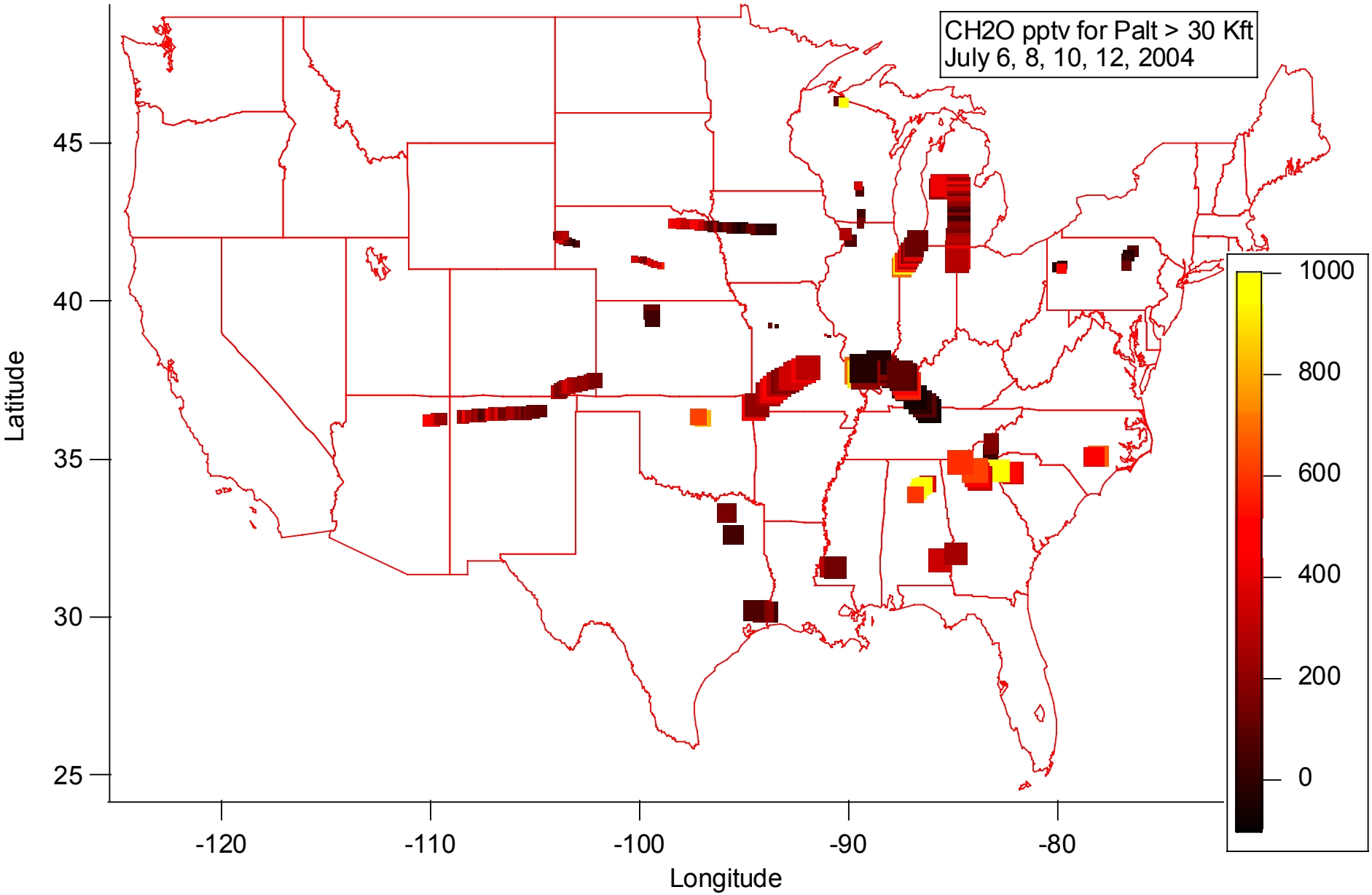
CH_2O in the Boundary Layer



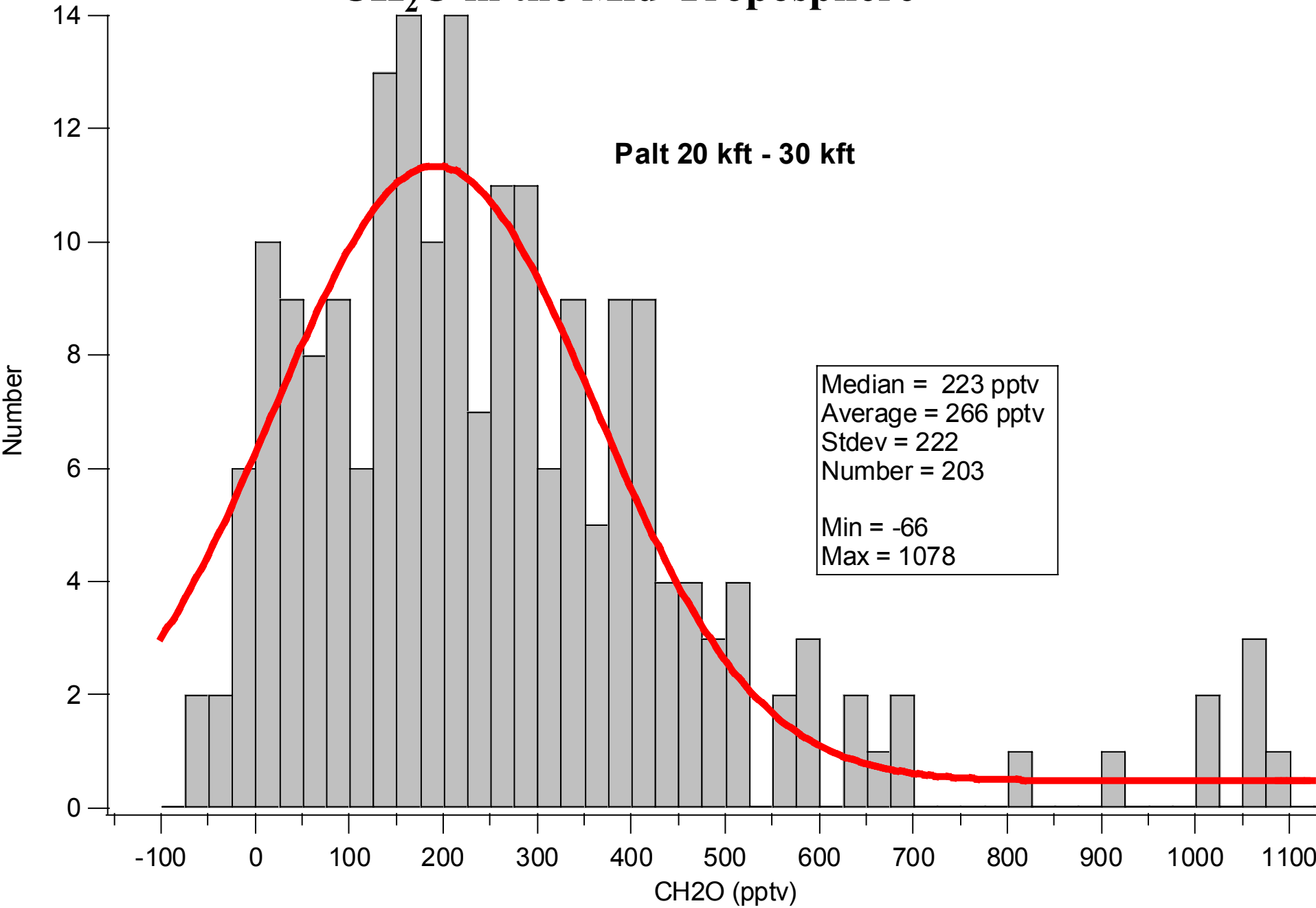
CH_2O in the Mid-Troposphere



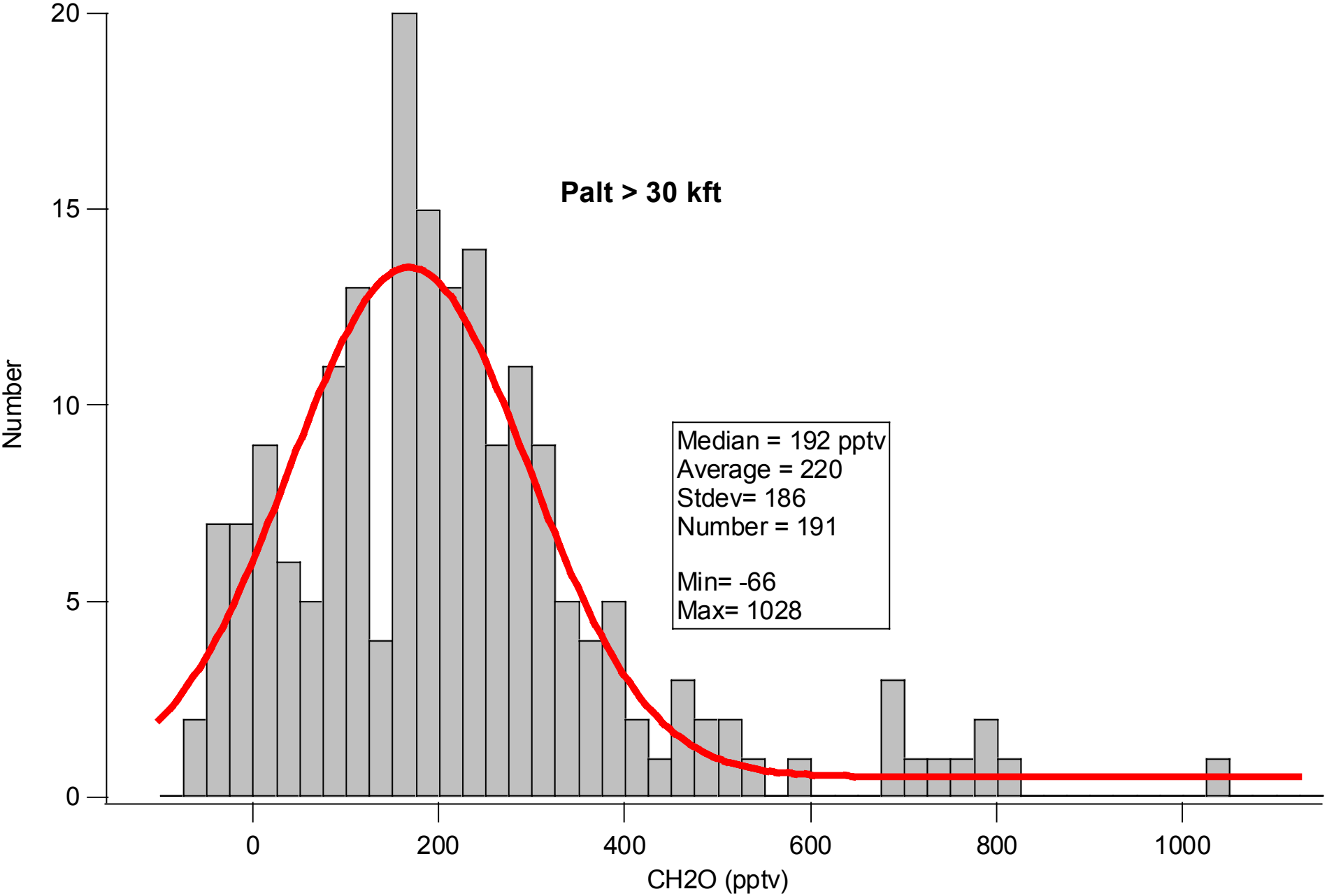
CH_2O in the Upper Troposphere

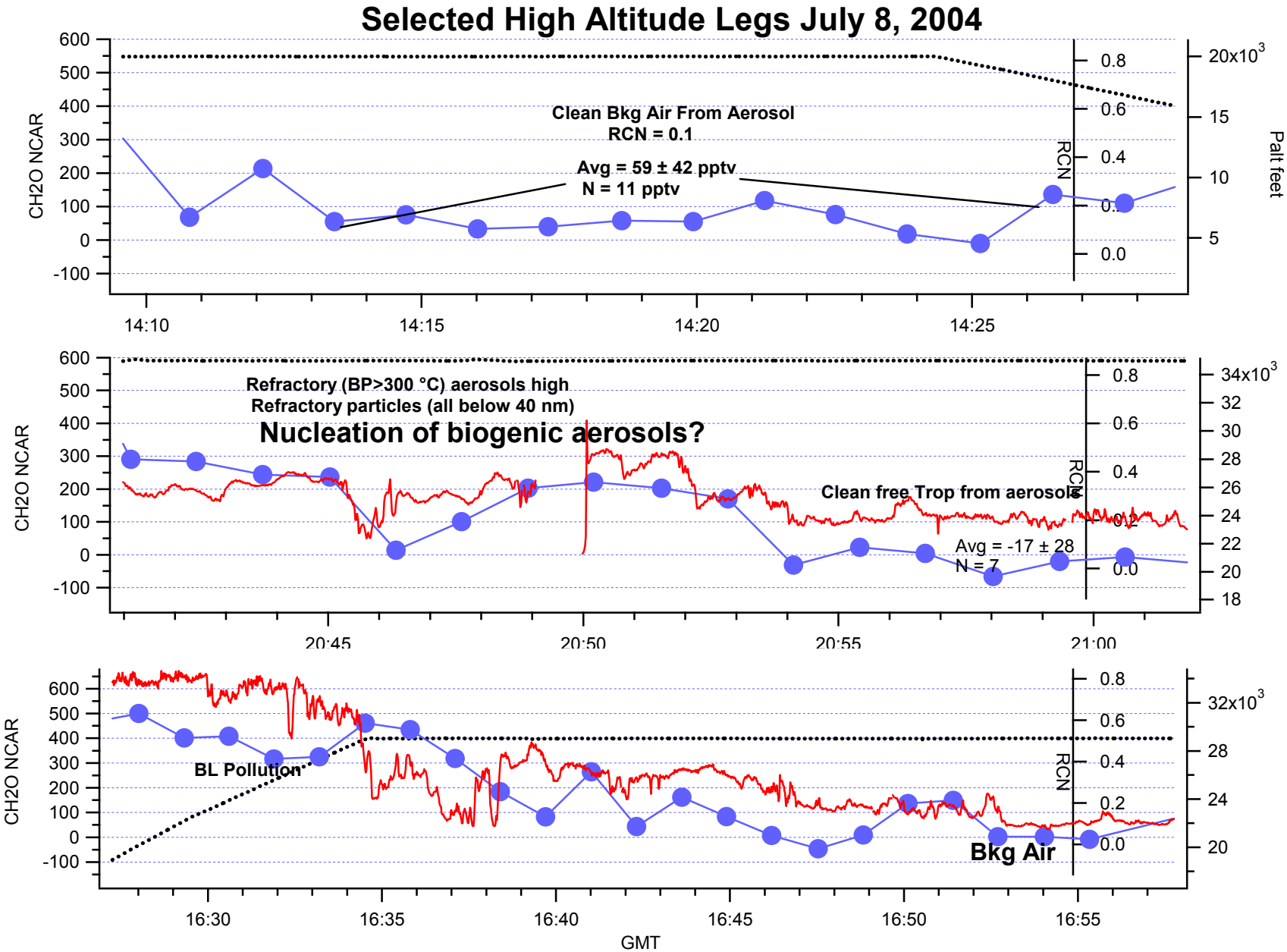


CH_2O in the Mid-Troposphere



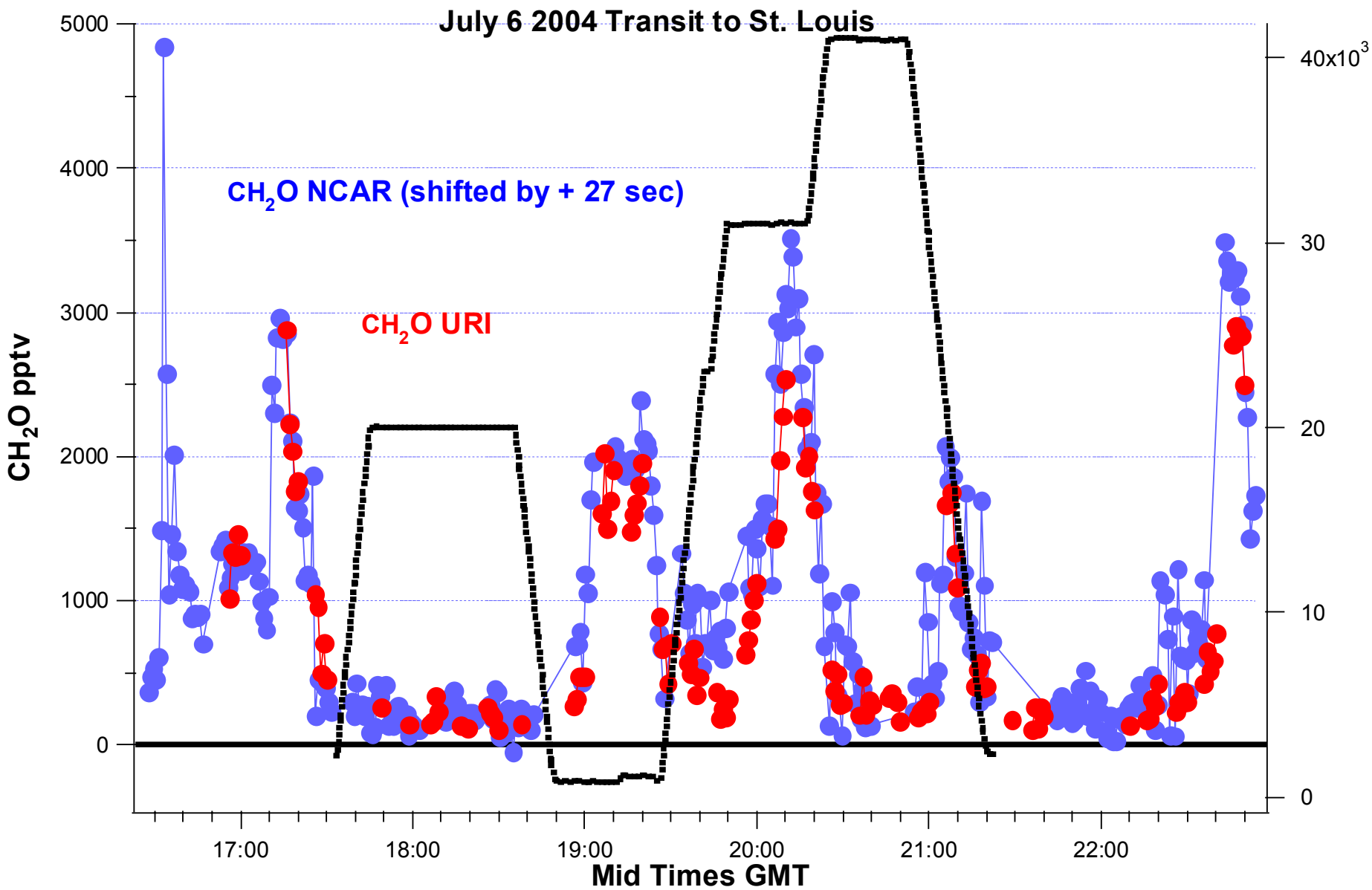
CH_2O in the Upper Troposphere

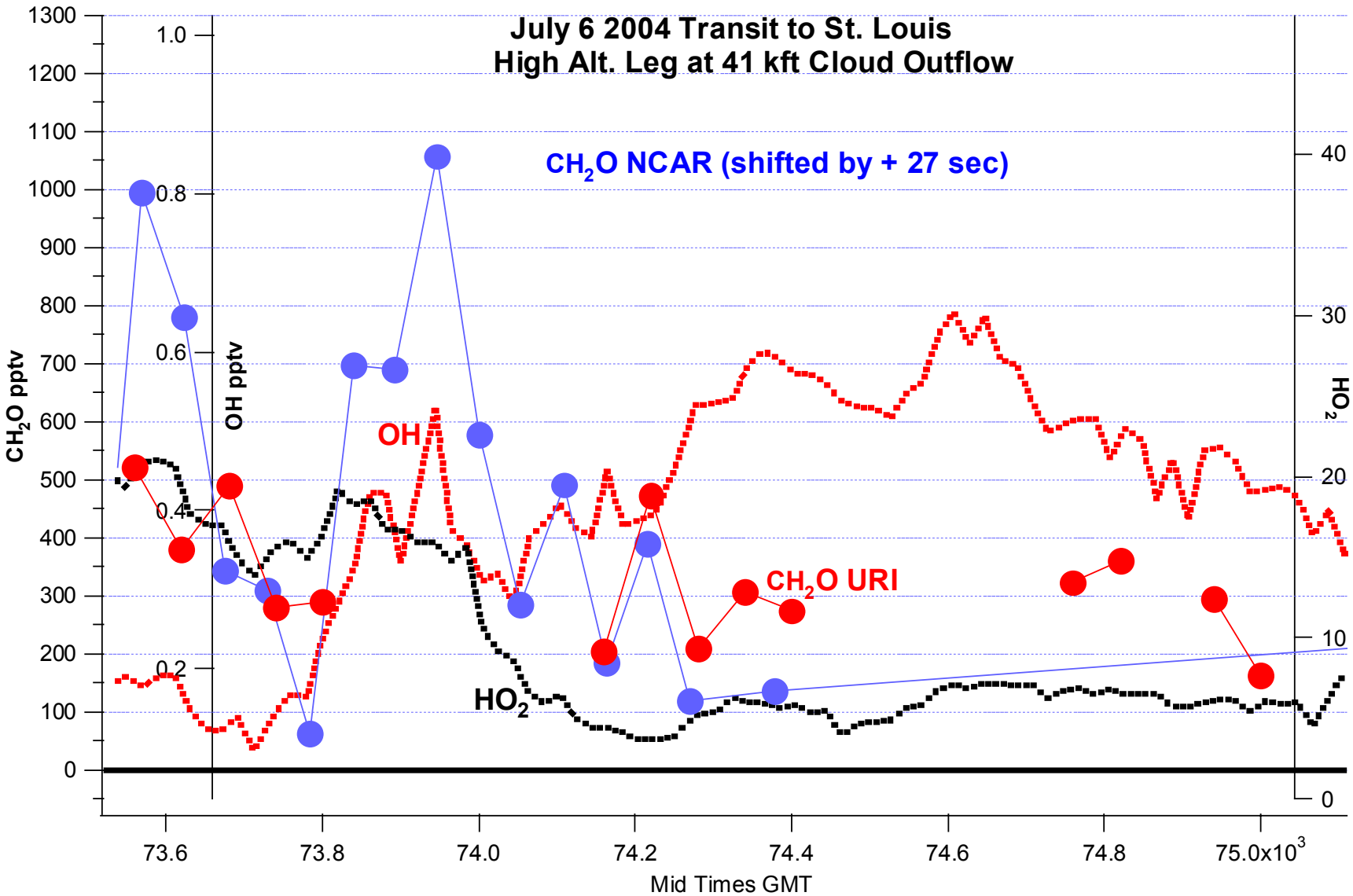


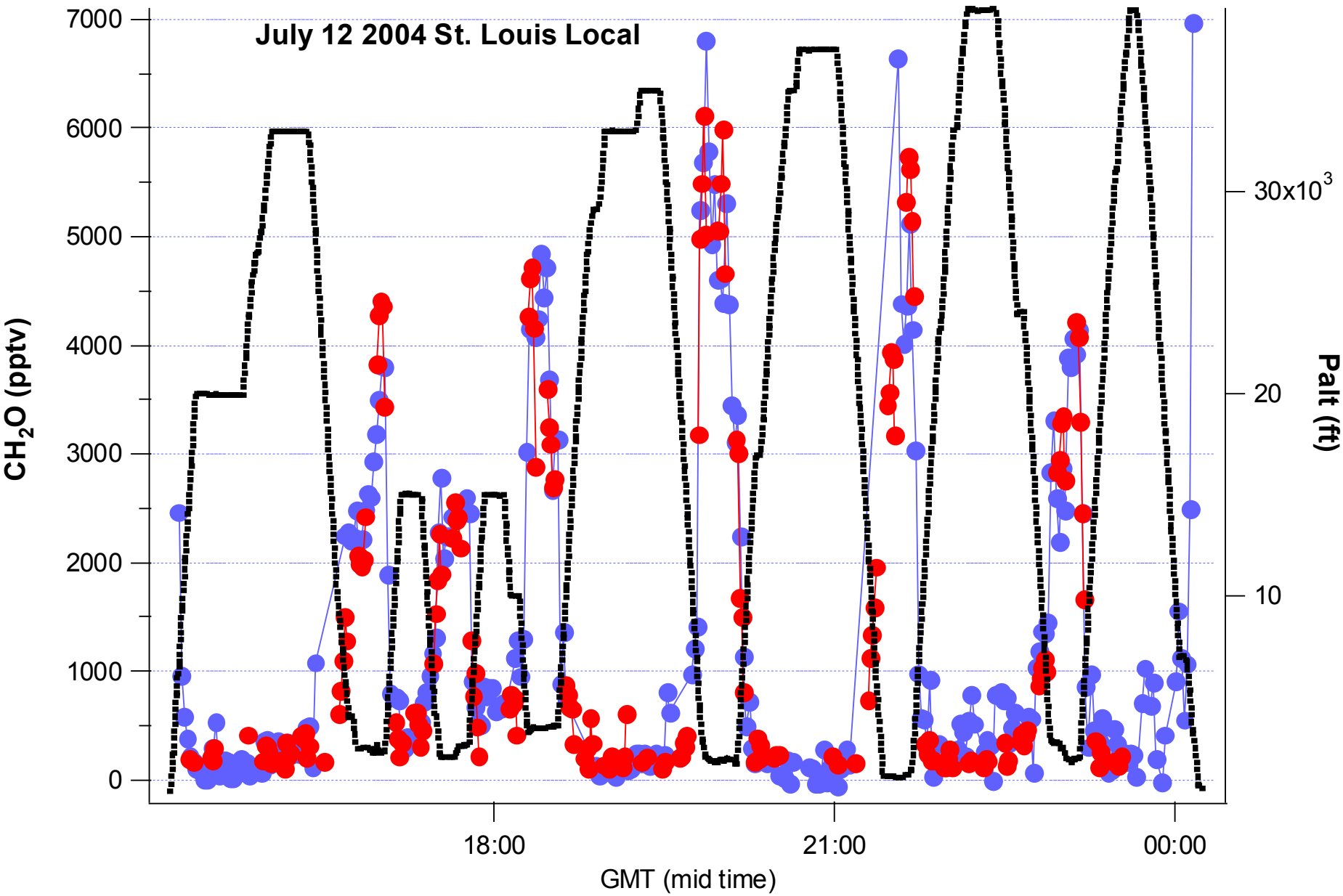

Selected High Altitude Legs July 8, 2004
CH2O NCAR
RCN
Palt feet
Clean Bkg Air From Aerosol
RCN = 0.1
Avg = 59 ± 42 pptv
N = 11 pptv
14:10
14:15
14:20
14:25
Refractory (BP>300 °C) aerosols high
Refractory particles (all below 40 nm)
Nucleation of biogenic aerosols?
Clean free Trop from aerosols
Avg = -17 ± 28
N = 7
20:45
20:50
20:55
21:00
BL Pollution
Bkg Air
16:30
16:35
16:40
16:45
16:50
16:55
GMT

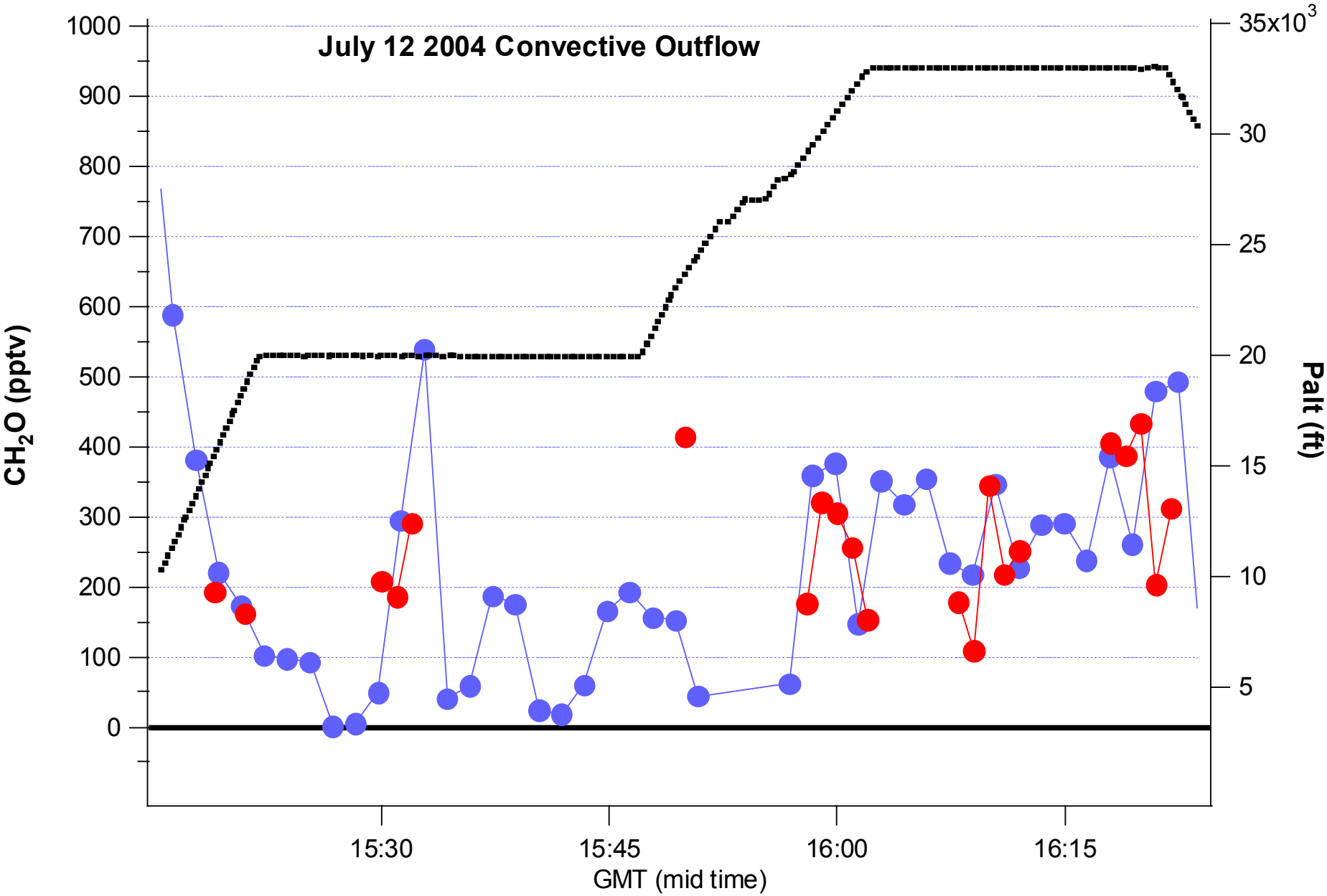
NCAR- URI
CH_2O Relationships

(1 Min Data)


July 6 2004 Transit to St. Louis
CH2O NCAR (shifted by + 27 sec)
CH2O URI
CH2O pptv
5000
4000
3000
2000
1000
0
40x10^3
30
20
10
0
17:00
18:00
19:00
20:00
21:00
22:00
Mid Times GMT


July 6 2004 Transit to St. Louis
High Alt. Leg at 41 kft Cloud Outflow
CH2O NCAR (shifted by + 27 sec)
OH
CH2O URI
HO2
CH2O pptv
OH pptv
HO2
Mid Times GMT
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
1.0
0.8
0.6
0.4
0.2
40
30
20
10
0
73.6
73.8
74.0
74.2
74.4
74.6
74.8
75.0x10^3


July 12 2004 St. Louis Local
7000
6000
5000
4000
3000
2000
1000
0
CH_2O (pptv)
30x10^3
20
10
Palt (ft)
18:00
21:00
00:00
GMT (mid time)


July 12 2004 Convective Outflow
CH_2O (pptv)
1000
900
800
700
600
500
400
300
200
100
0
35x10^3
30
25
20
15
10
5
Palt (ft)
15:30
15:45
16:00
16:15
GMT (mid time)