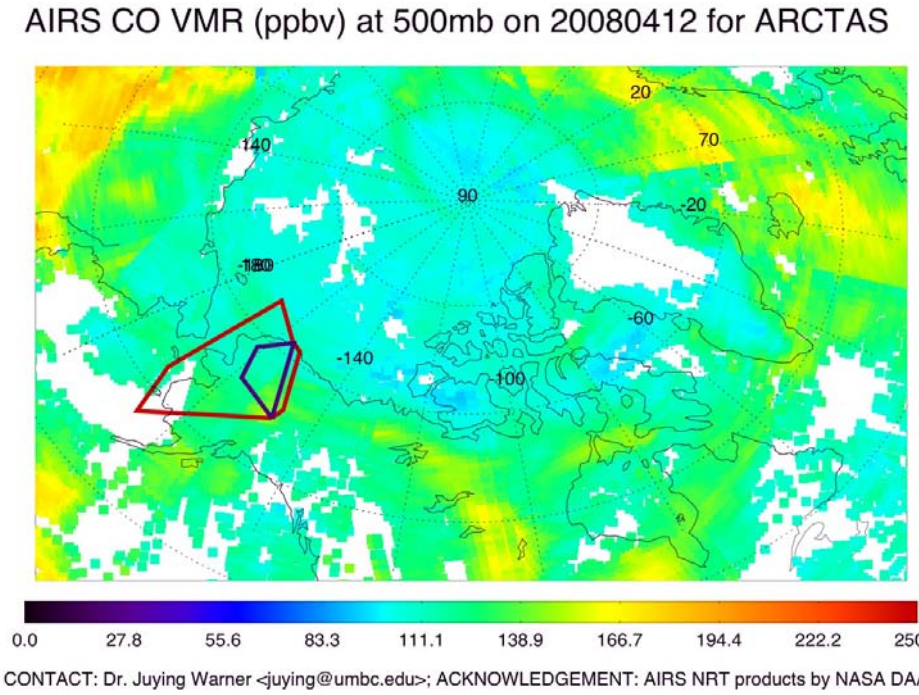
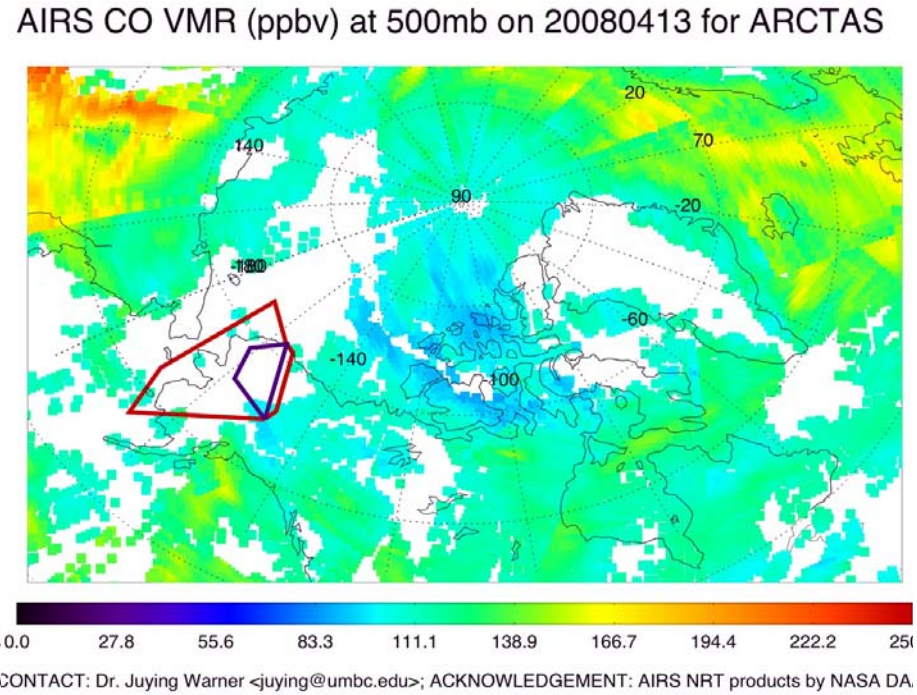
AIRS NRT ARCTAS Support: Latest AIRS CO

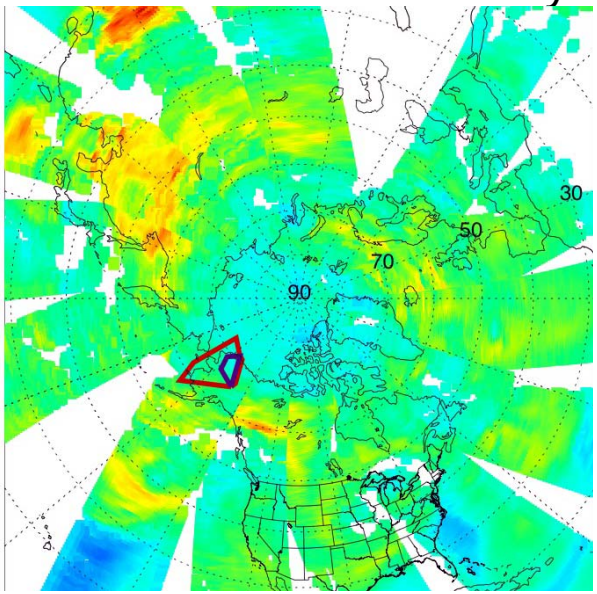




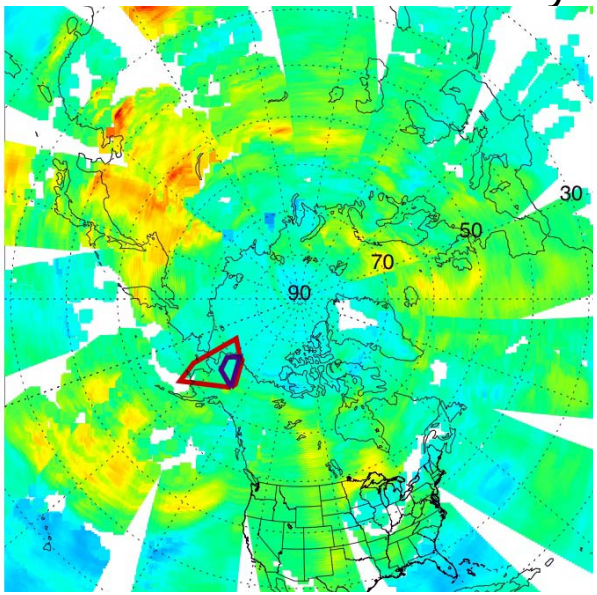
- Asian transport not entering the Arctic circle directly in large amounts.
- Transport from the European side into the Arctic circle increases.
- Asian transport increases in intensity.

AIRS NRT ARCTAS Support:

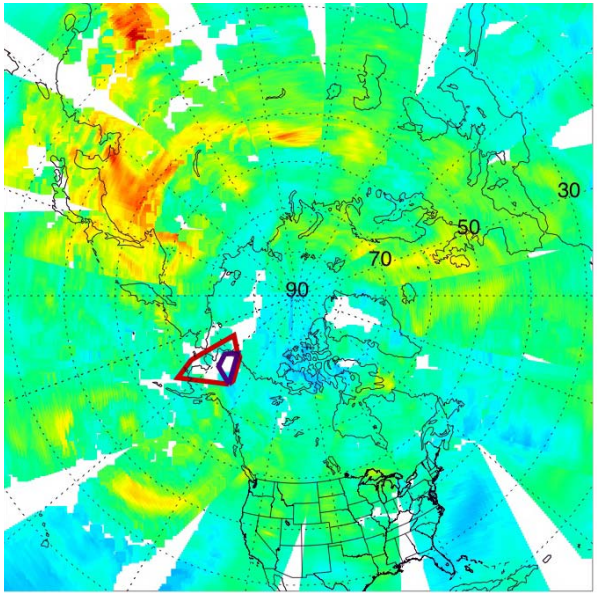
CO 500mb 20080411 day



CO 500mb 20080412 day



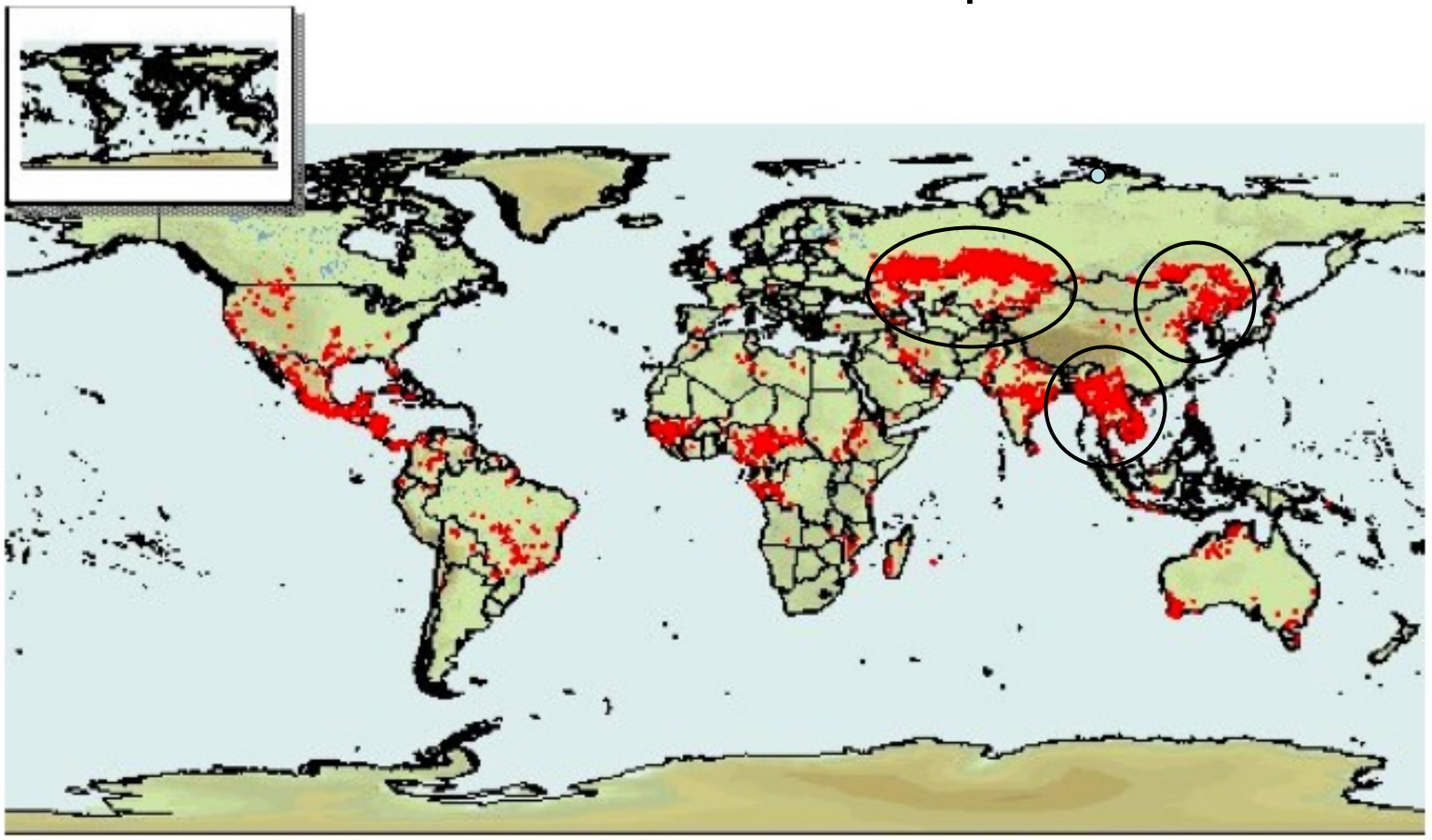
CO 500mb 20080413 Full



CONTACT: Dr. Juying Warner <juying@umbc.edu>; ACKNOWLEDGEMENT: AIRS NRT products by NASA DAAC

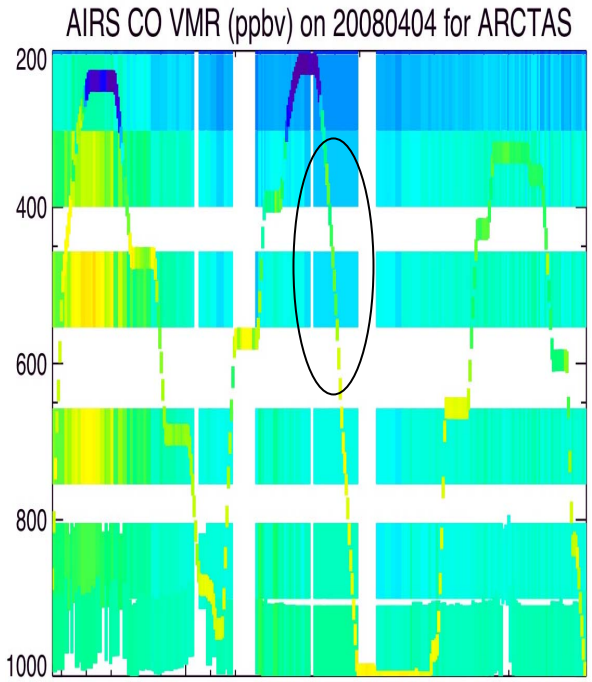
- Transport from the European side into the Arctic circle
- Asian Transport Continues due to largely biomass burning

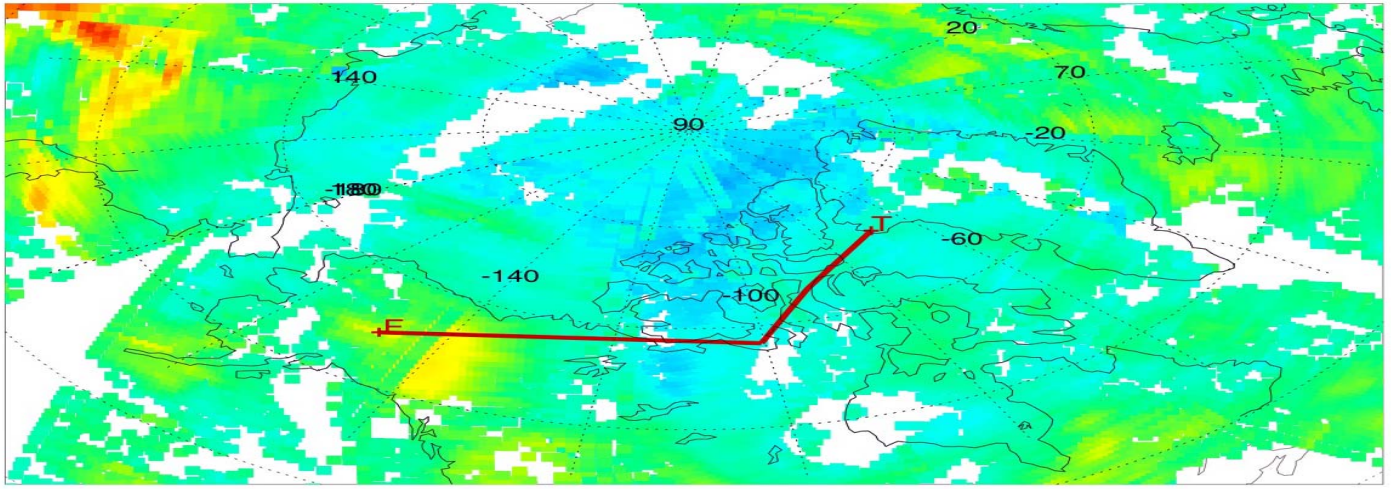
MODIS Global Active Fire Count Map In Last 24 hours)



Active fire counts increase in those 3 regions as shown in the web site http://maps.geog.umd.edu/activefire_html

AIRS NRT ARCTAS Support:

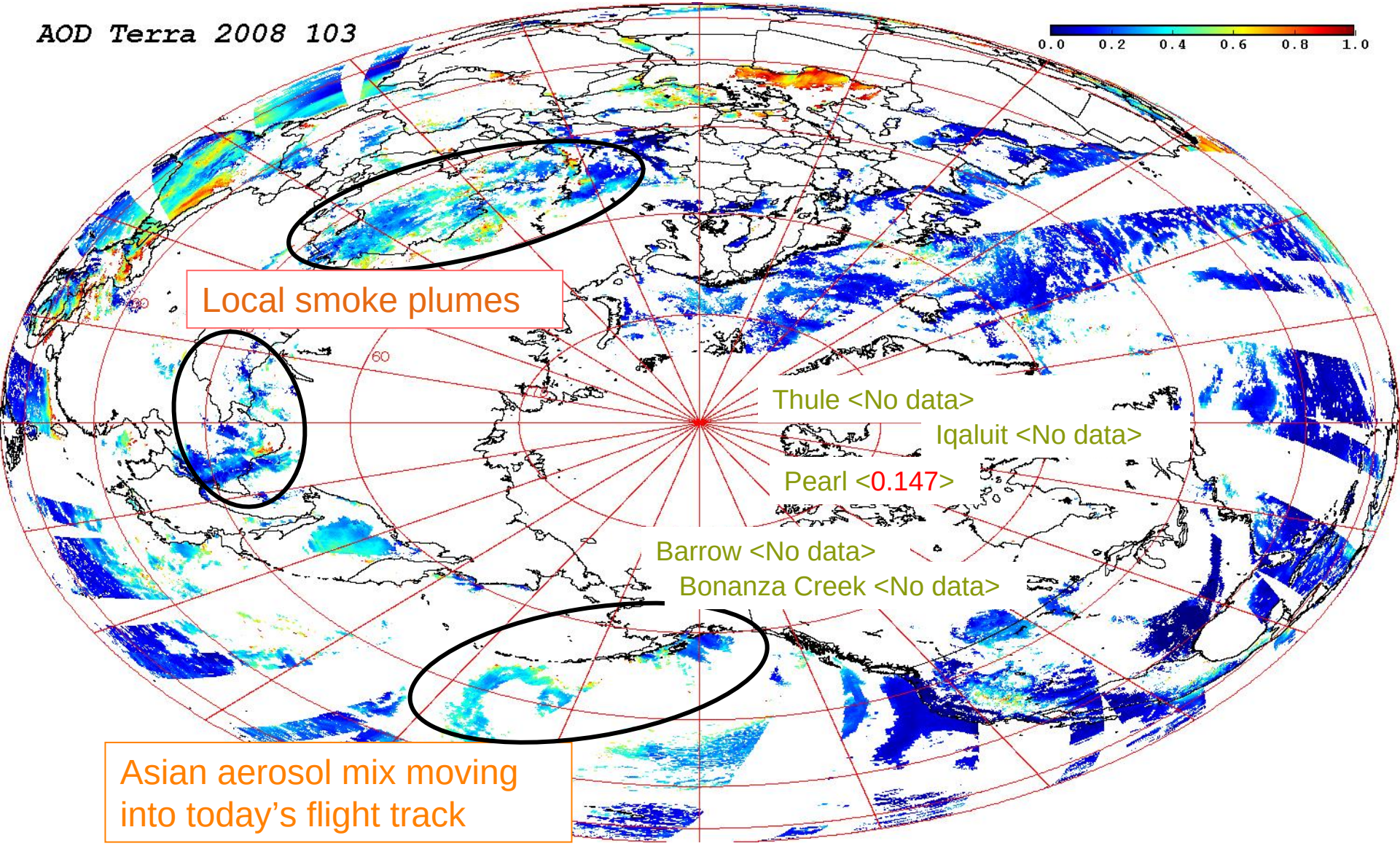




0.0 27.8 55.6 83.3 111.1 138.9 166.7 194.4 222.2 250

Day 103 (April 12) Saturday

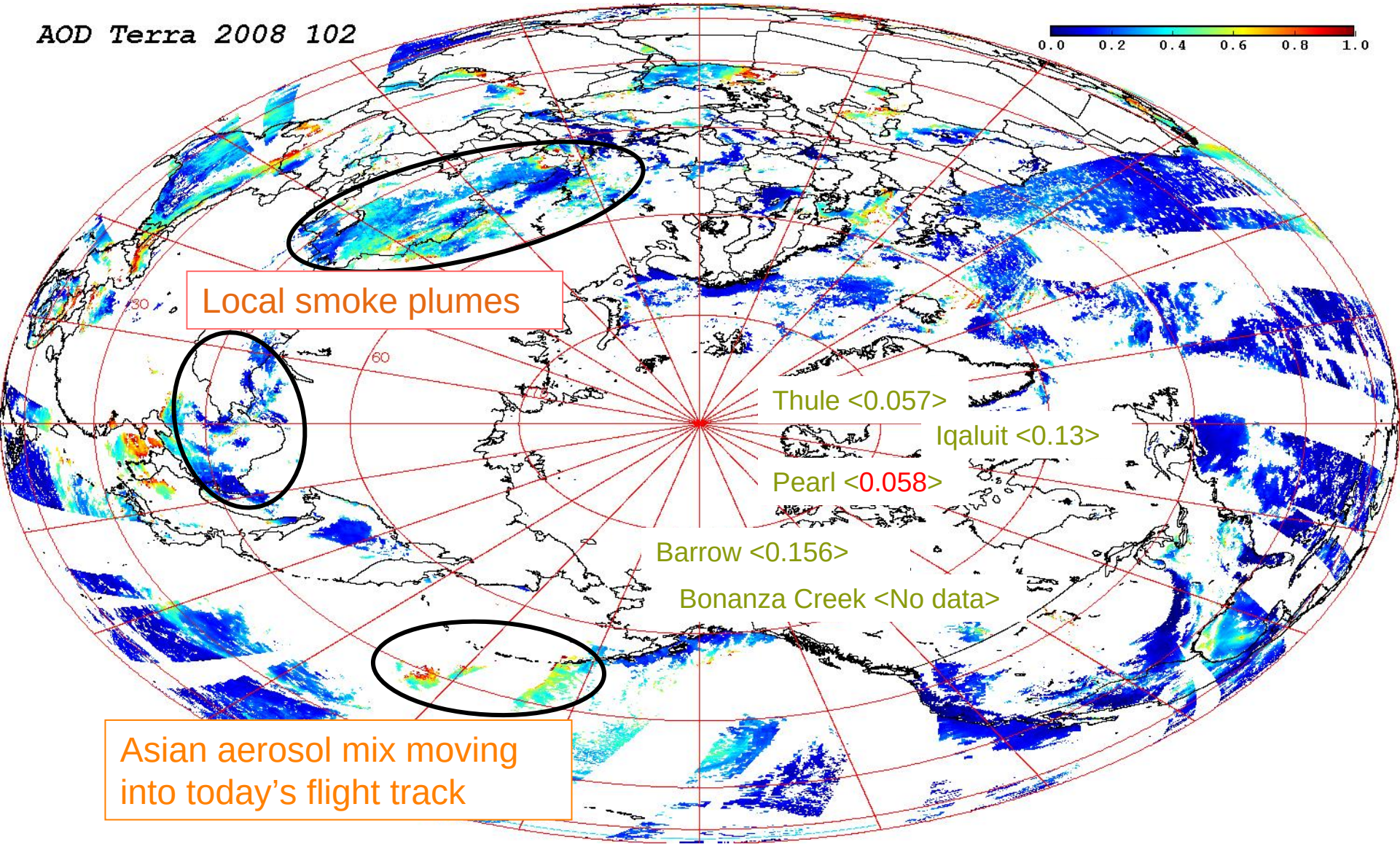
MODIS AOD Hot Spots in Northern Hemisphere (0° - 90°N)



MODIS AOD at 550 nm and AERNOET daily mean <AOD> at 500 nm

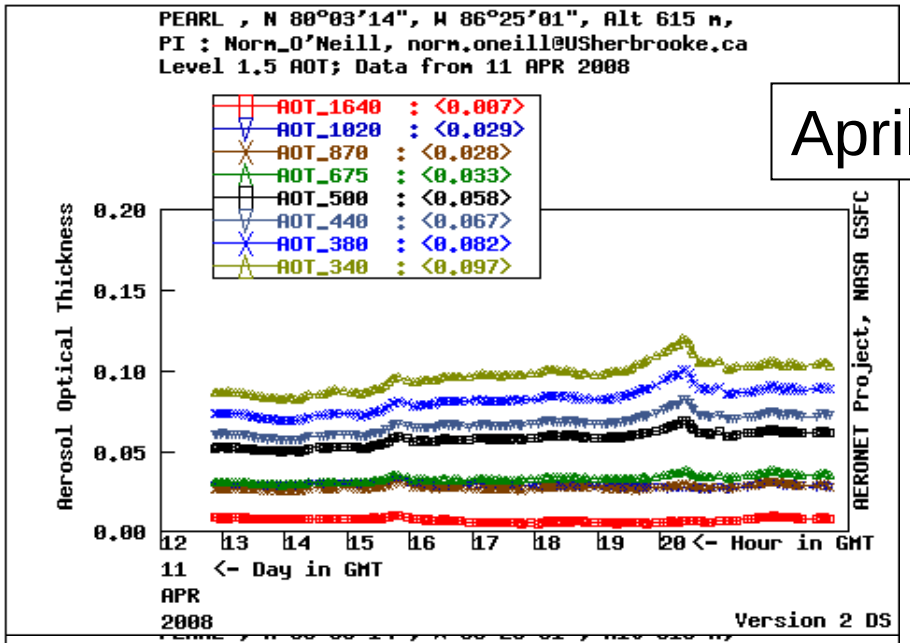
Day 102 (April 11) Friday

MODIS AOD Hot Spots in Northern Hemisphere (0° - 90°N)

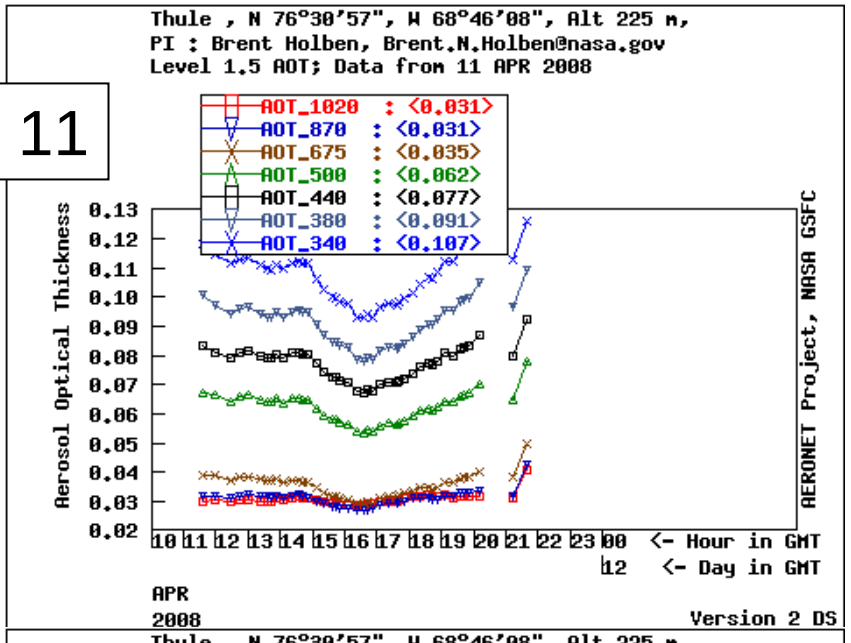


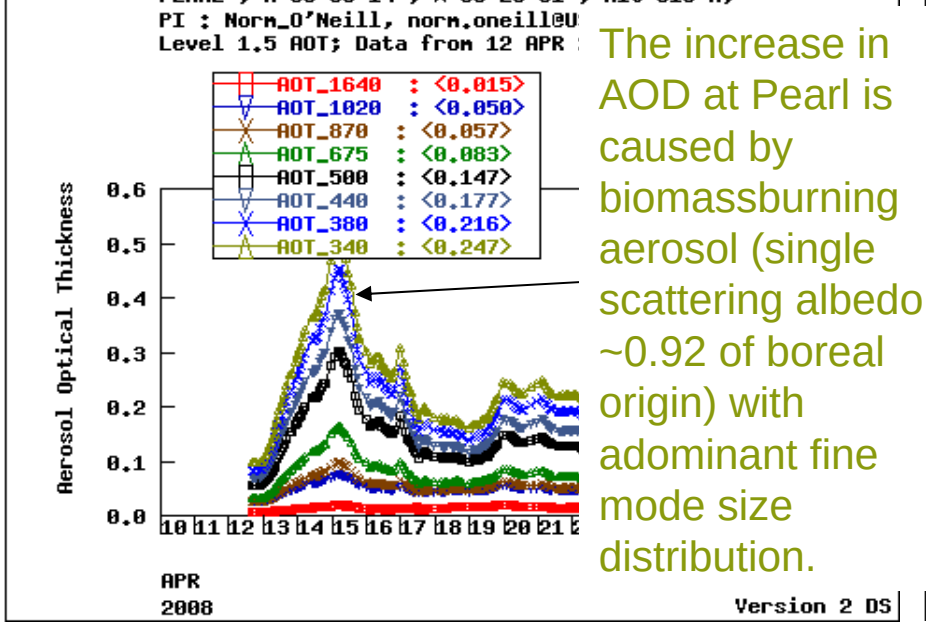
MODIS AOD at 550 nm and AERNOET daily mean <AOD> at 500 nm

AERONET at Pearl (Left) and Thule (Right)

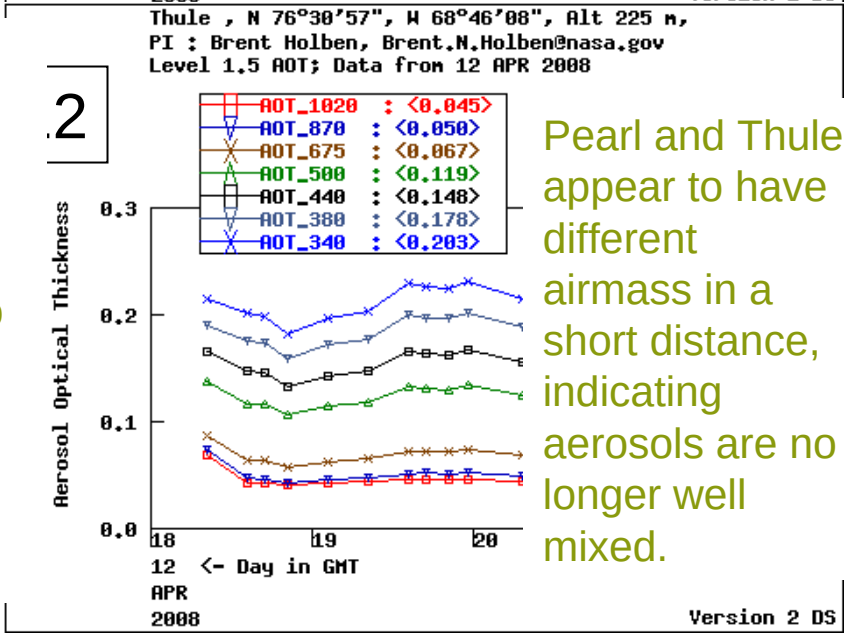


April 11



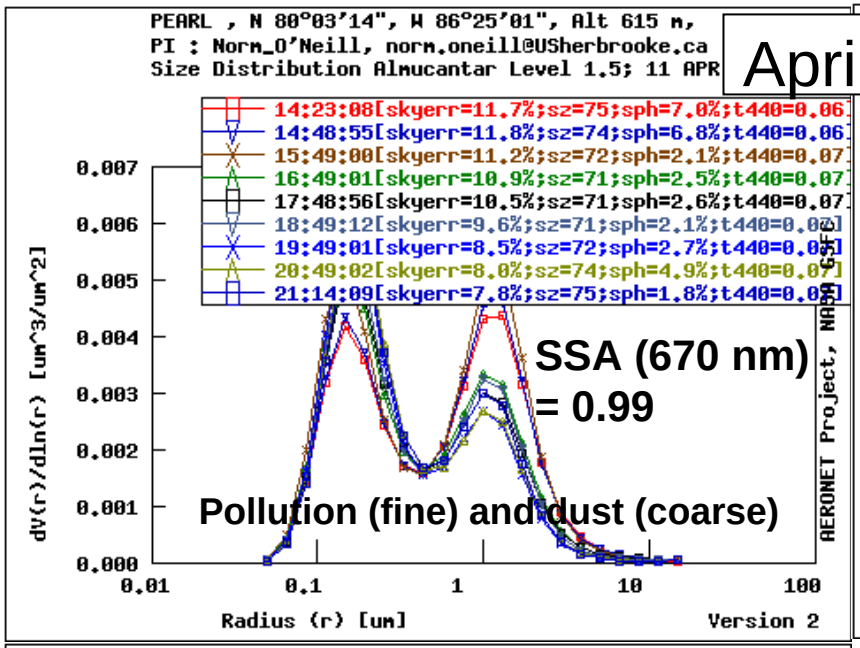


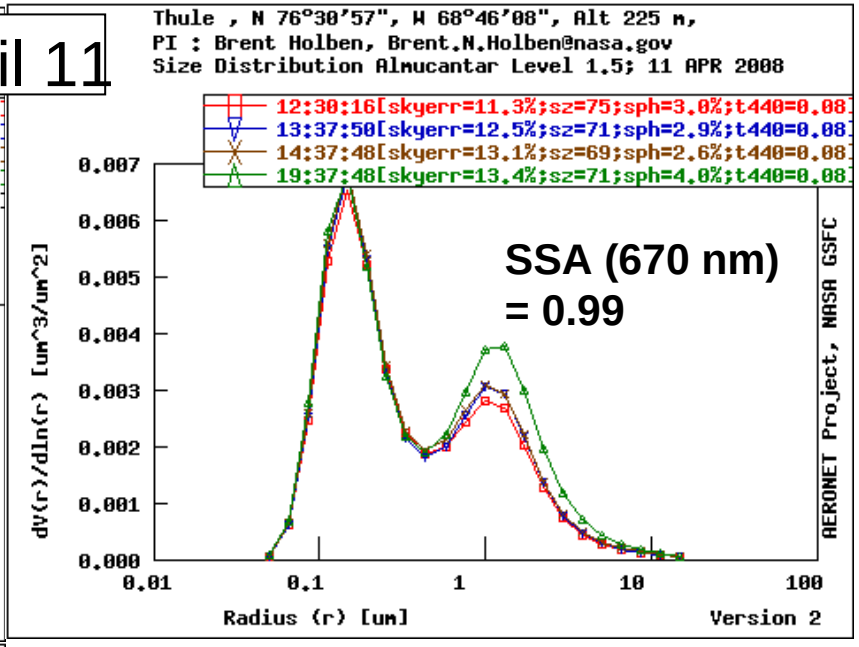
The increase in AOD at Pearl is caused by biomassburning aerosol (single scattering albedo ~0.92 of boreal origin) with adominant fine mode size distribution.

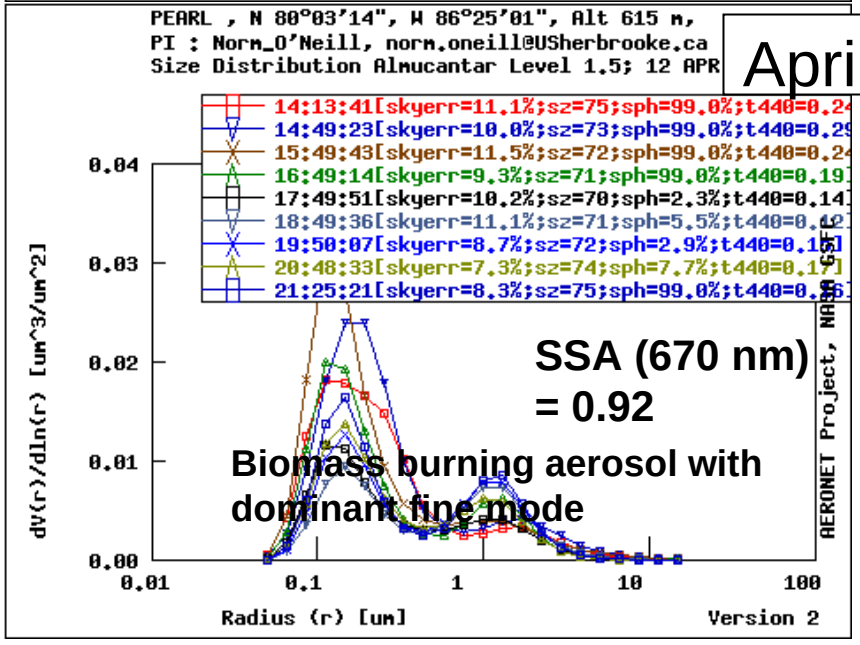


Pearl and Thule appear to have different airmass in a short distance, indicating aerosols are no longer well mixed.

AERONET at Pearl (Left) and Thule (Right)



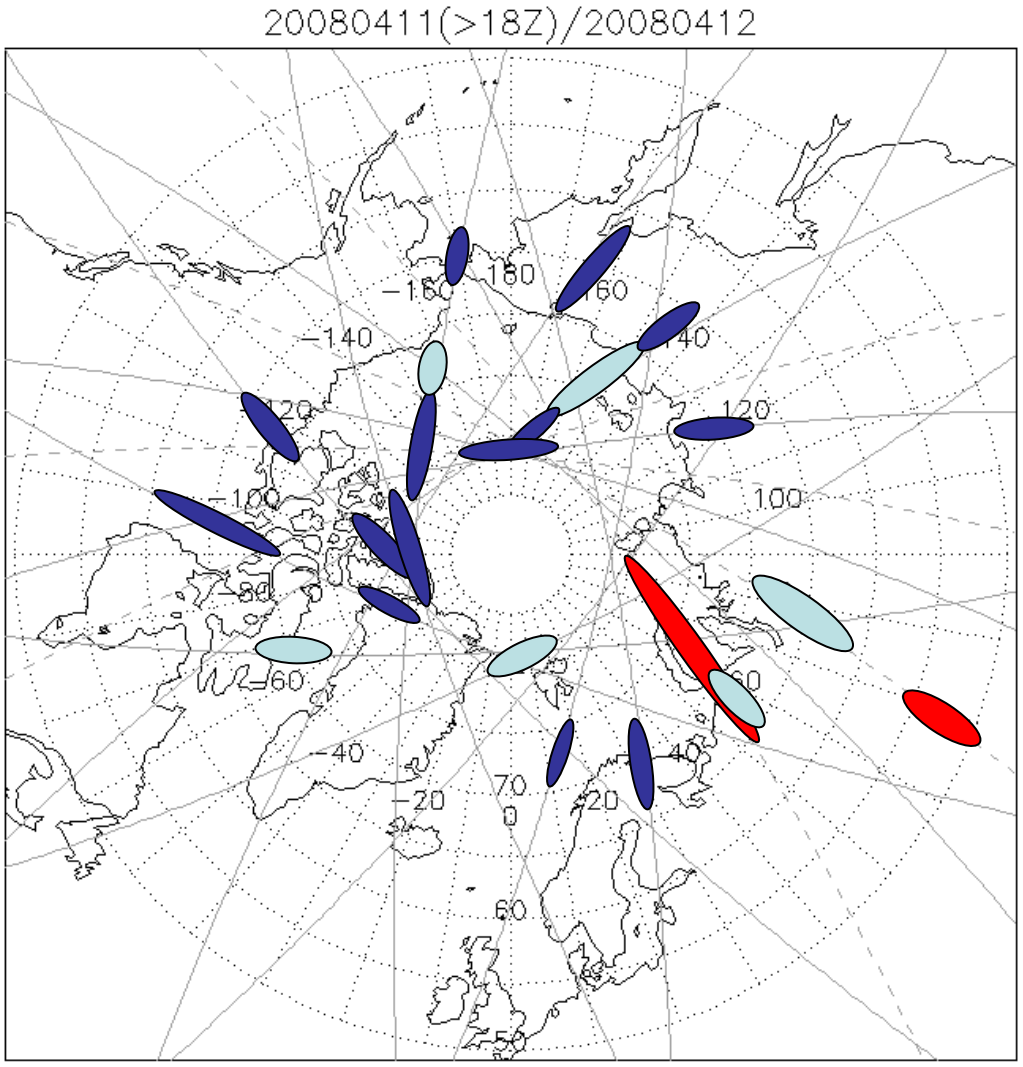




- The sudden increase in AOD at Pearl on April 12 is caused by absorbing aerosol (mostly biomass burning of boreal origin); A good case study.
- Pearl and Thule appear to have different airmass in a short distance, indicating aerosols are no longer well mixed.
- April 9 also showed the BB signature but not as pronounced

CALIPSO Observations 11/12 April 2008

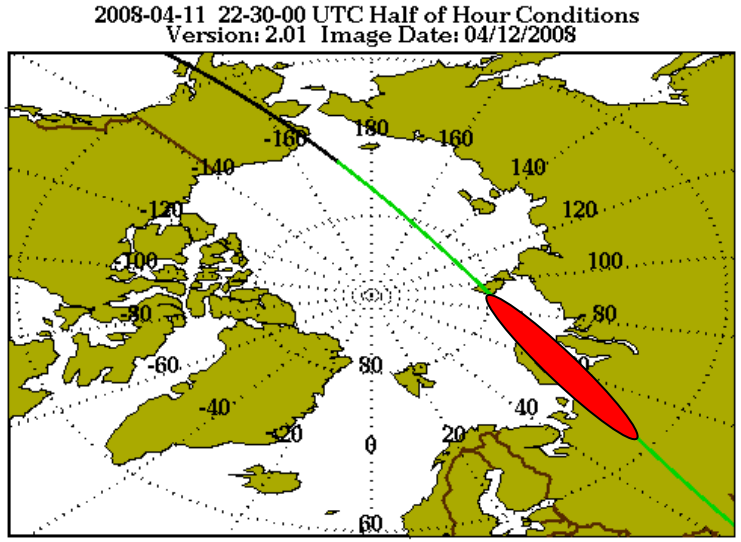
CALIPSO Hot Spots – 11/12

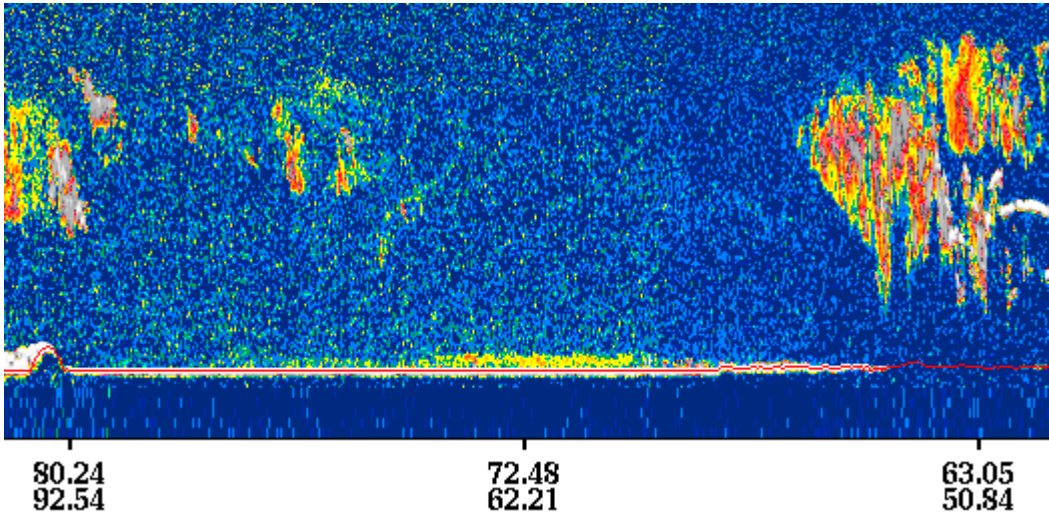


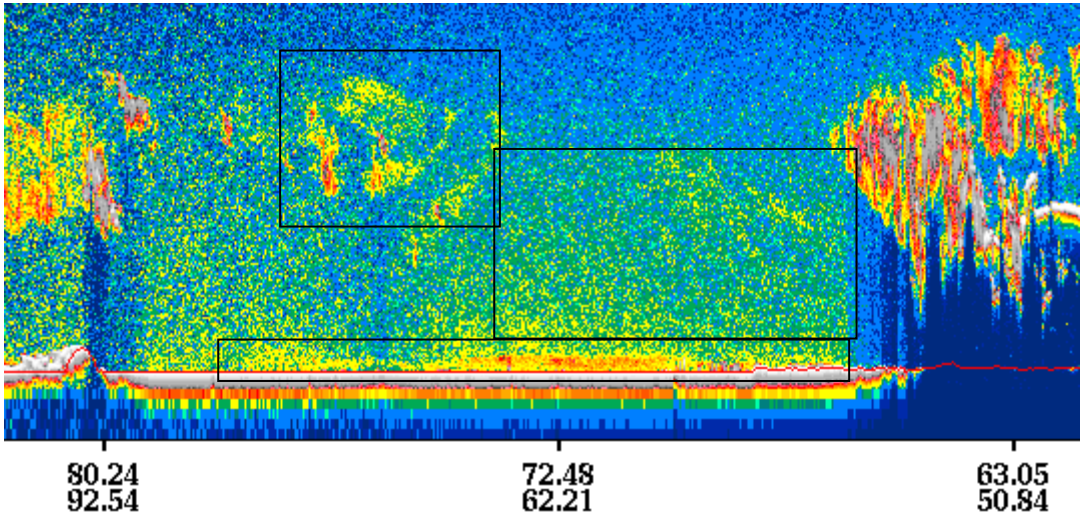
Color key

- **distinct layer at surface**
- **distinct layer aloft**
- **weak, diffuse aerosol**
- **high depol (dust)**
- **cloudy**

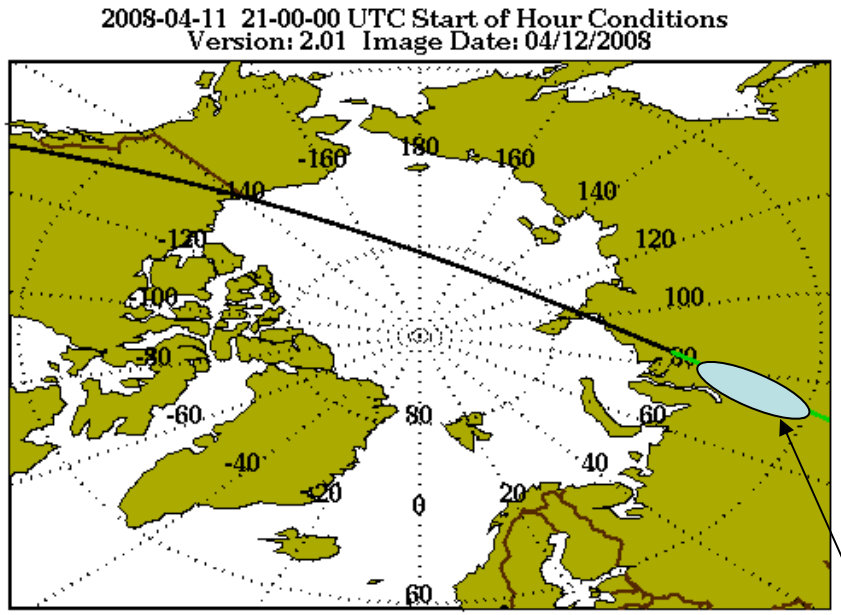
11 April 2230Z

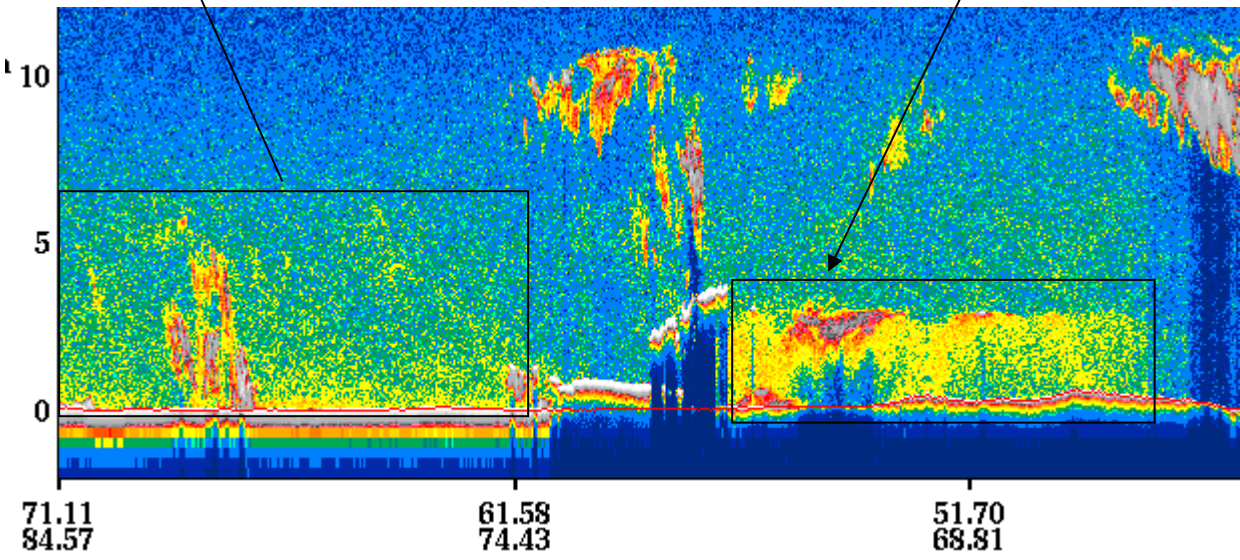




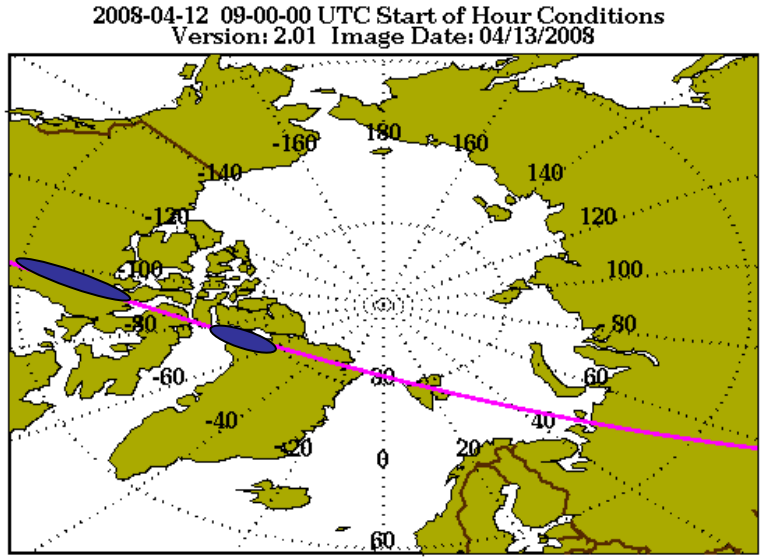


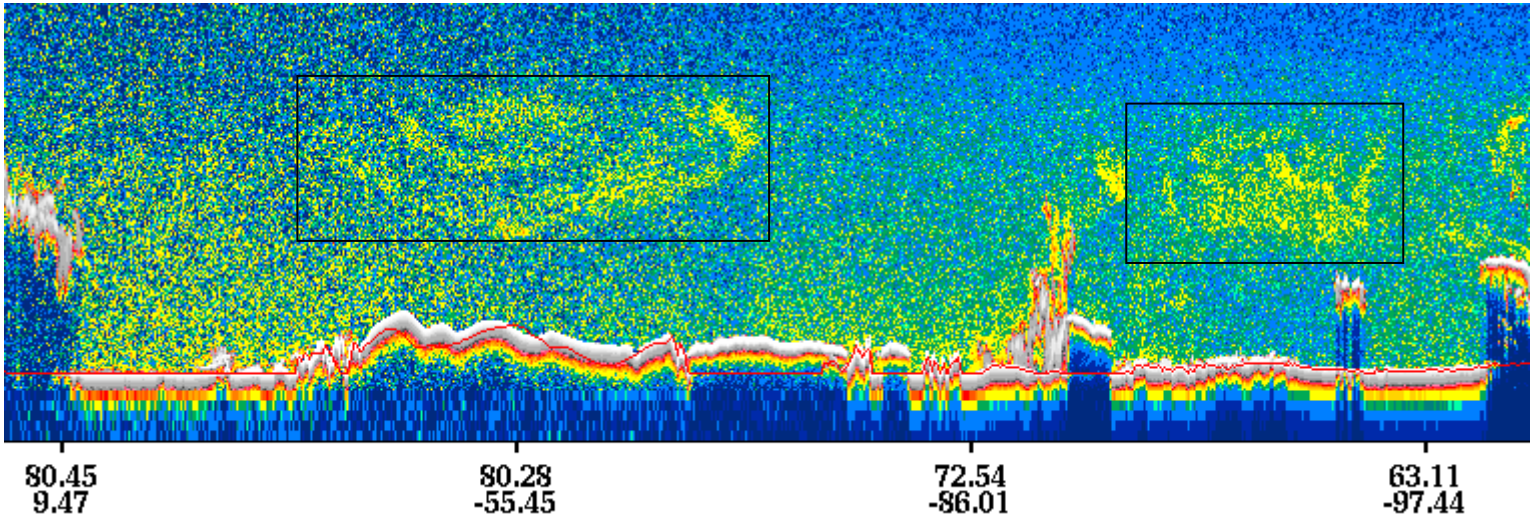
11 April 2100Z



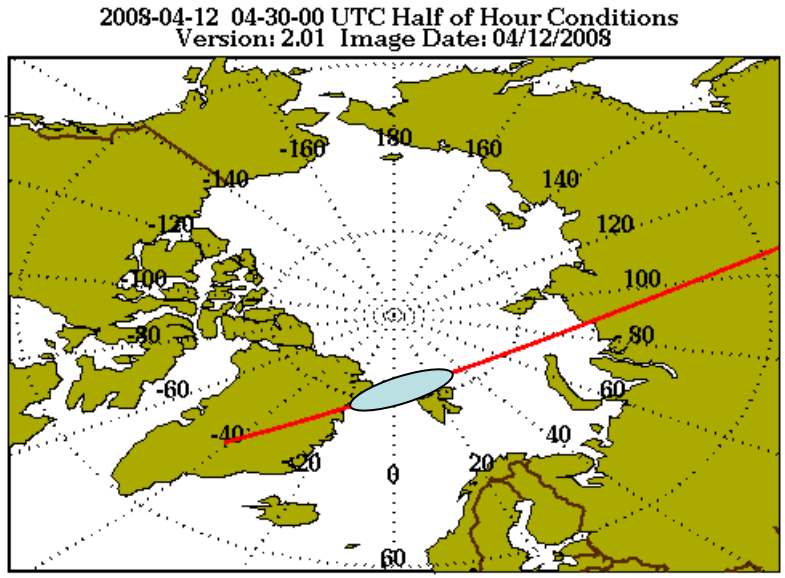


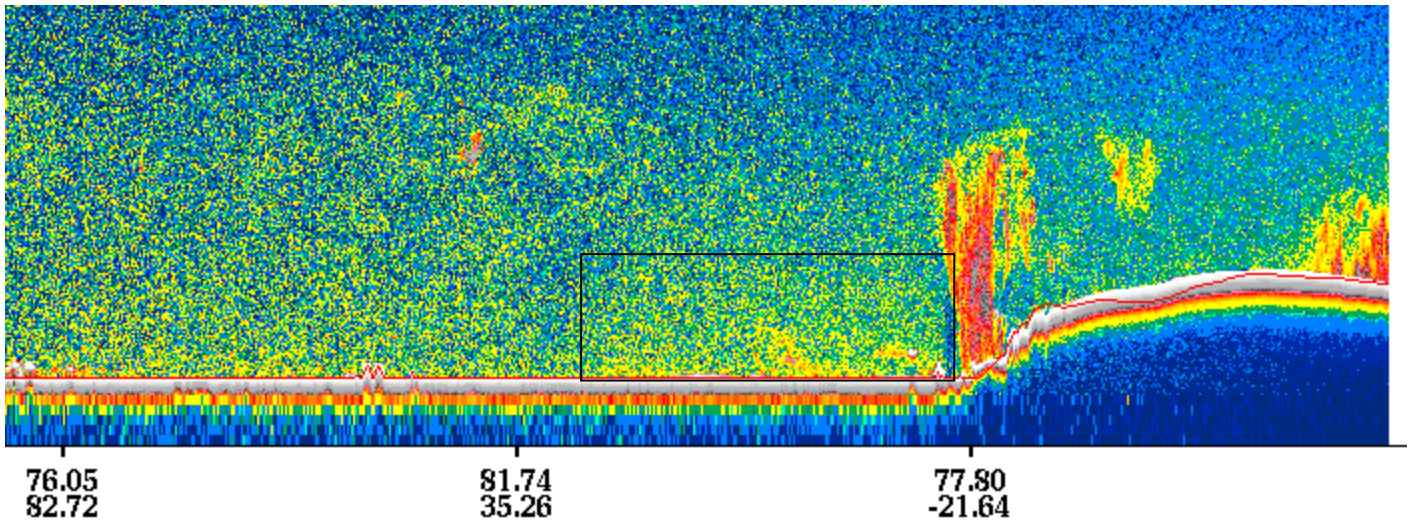
12 April 0900Z

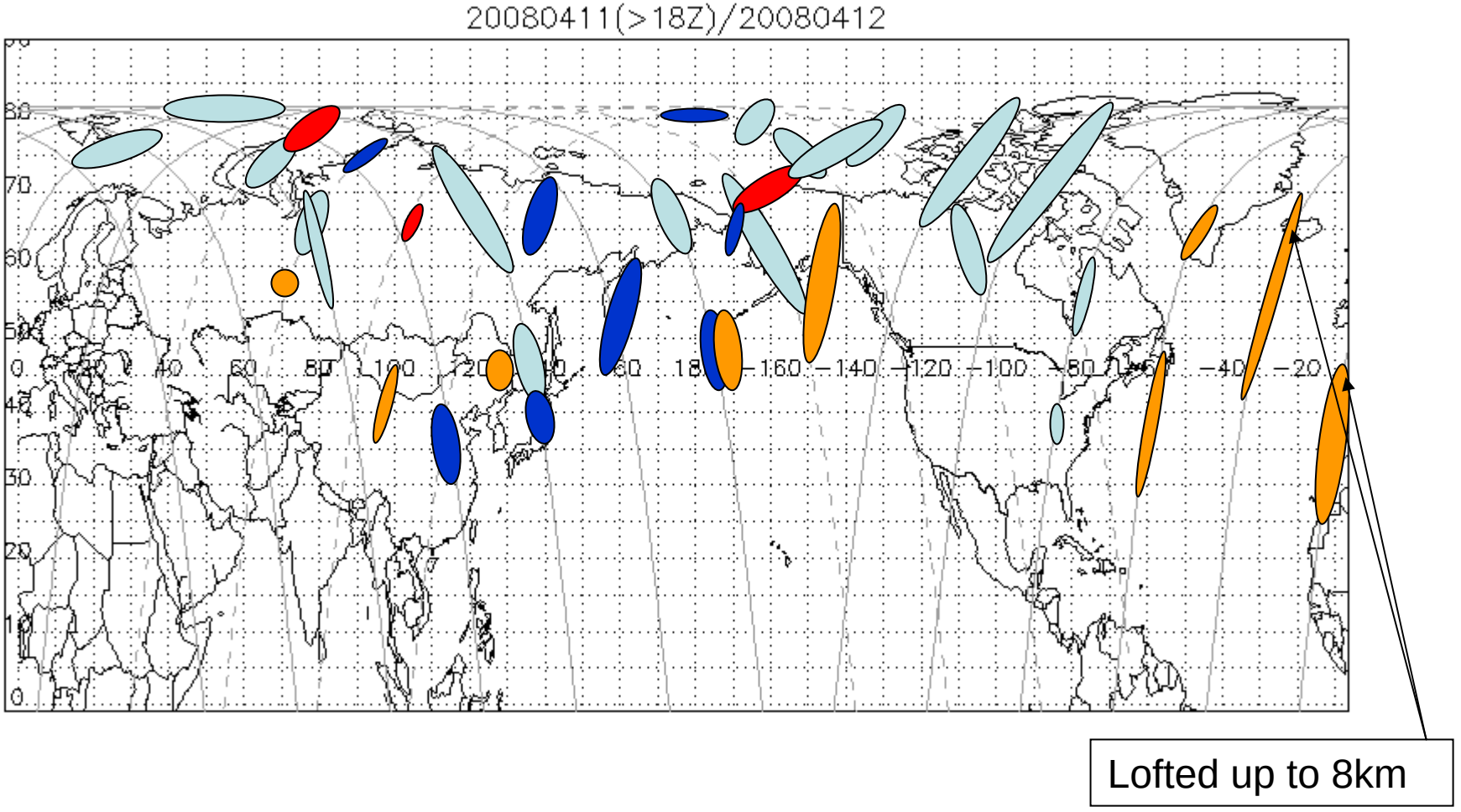




12 April 0430Z

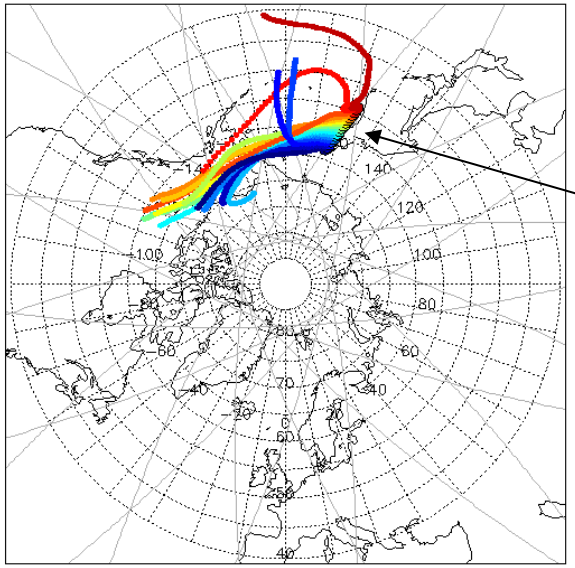


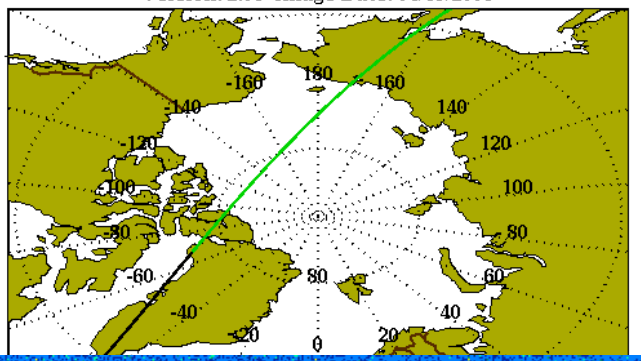


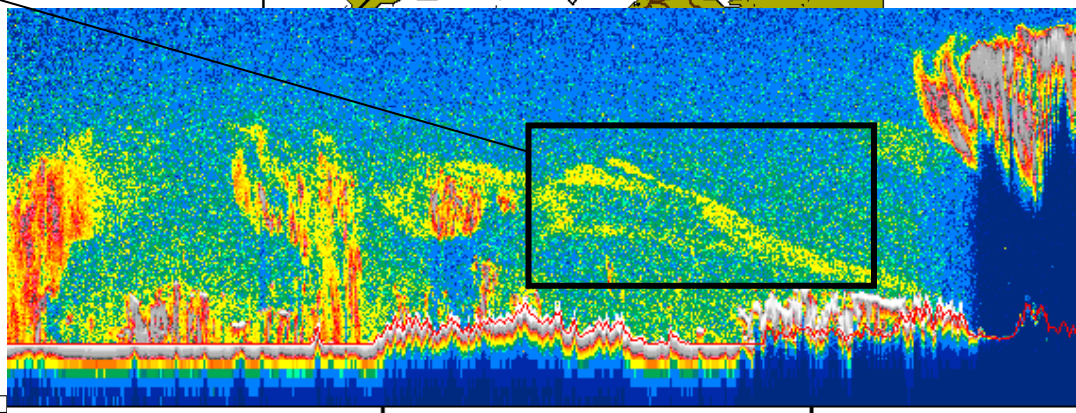

20080411(>18Z)/20080412
Lofted up to 8km

84hr CALIPSO Trajectories Initialized 2008041200 Valid 2008041512

Valid at 12Z 4/15 Initial Altitude: 5000m

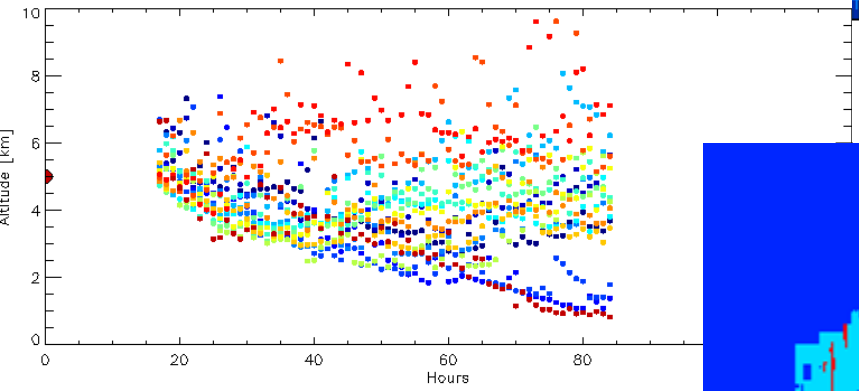


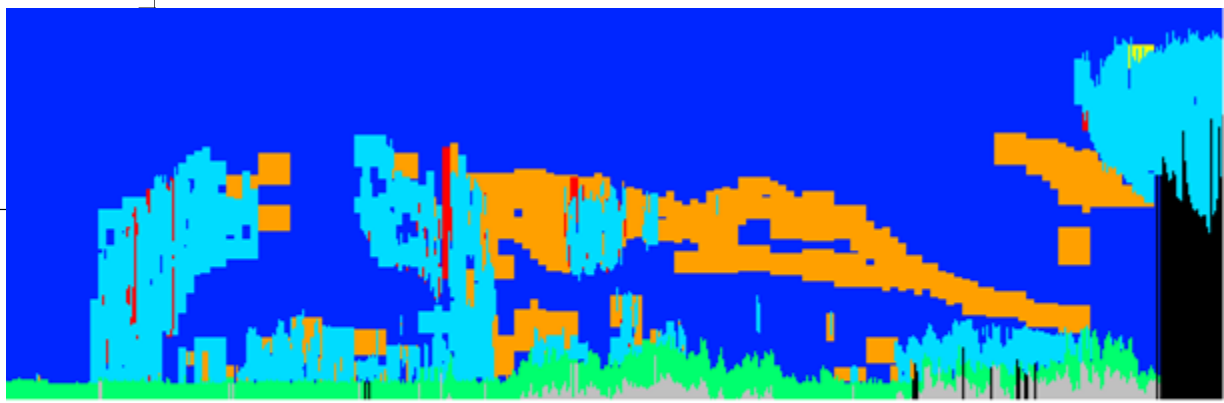




68.54
169.07

58.88
160.68



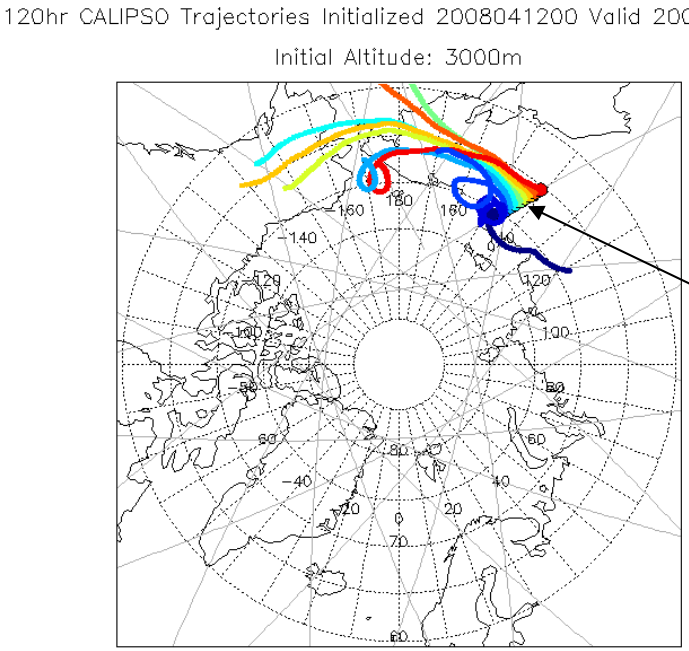


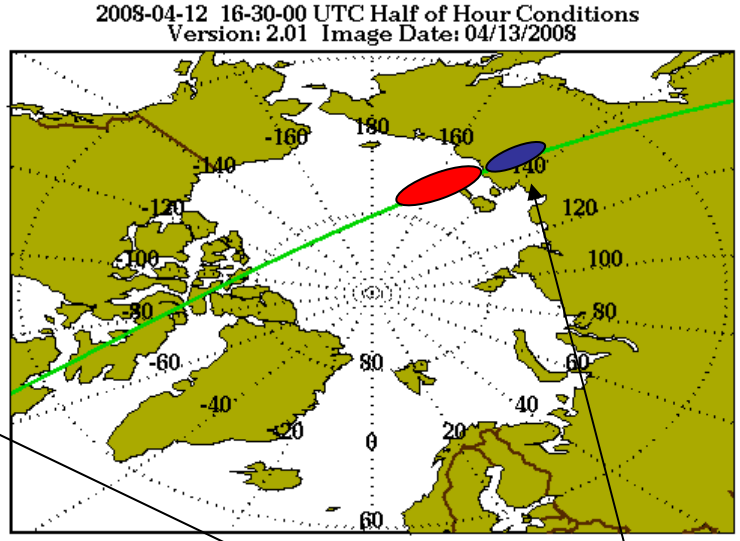
77.35
-171.87

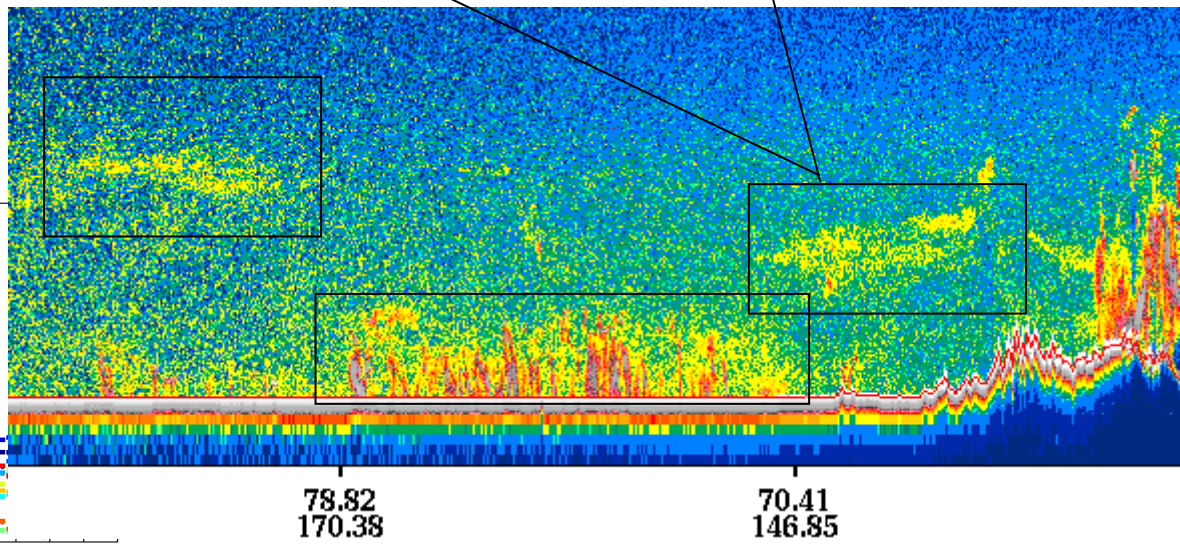
68.54
169.07

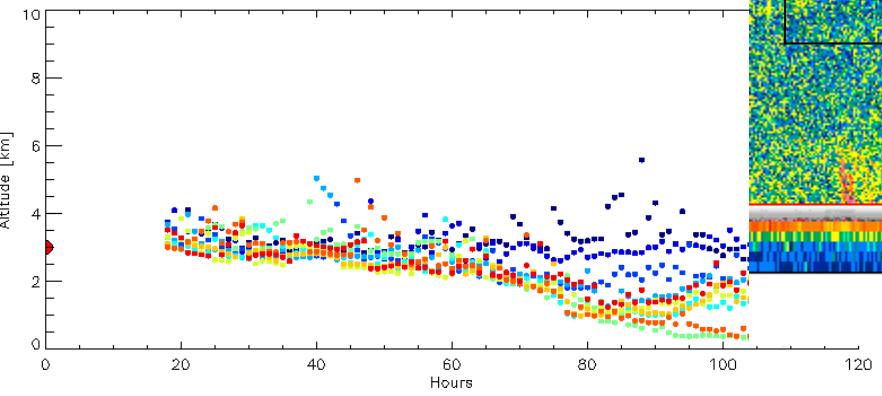
58.84
160.65

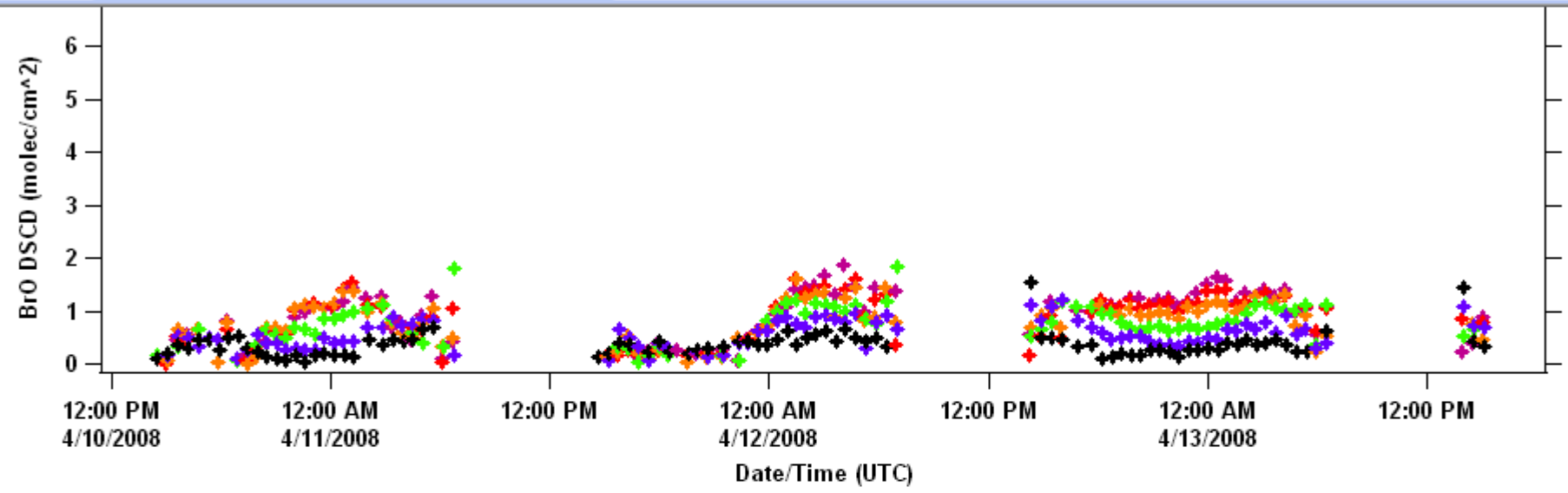
12 April 1630Z

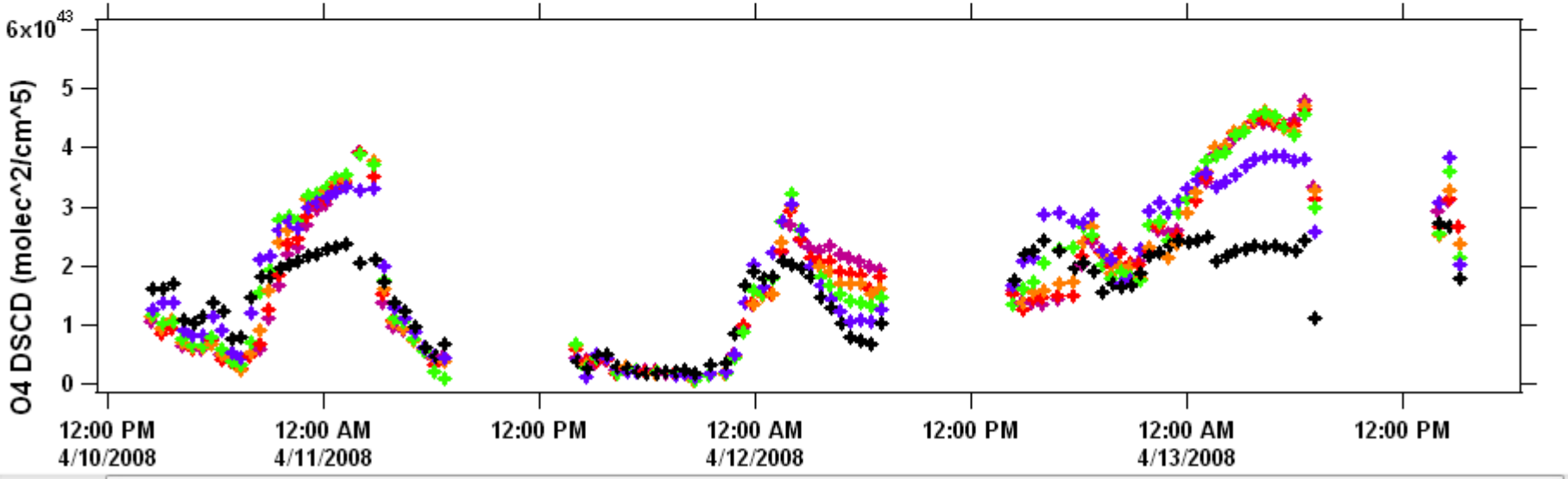


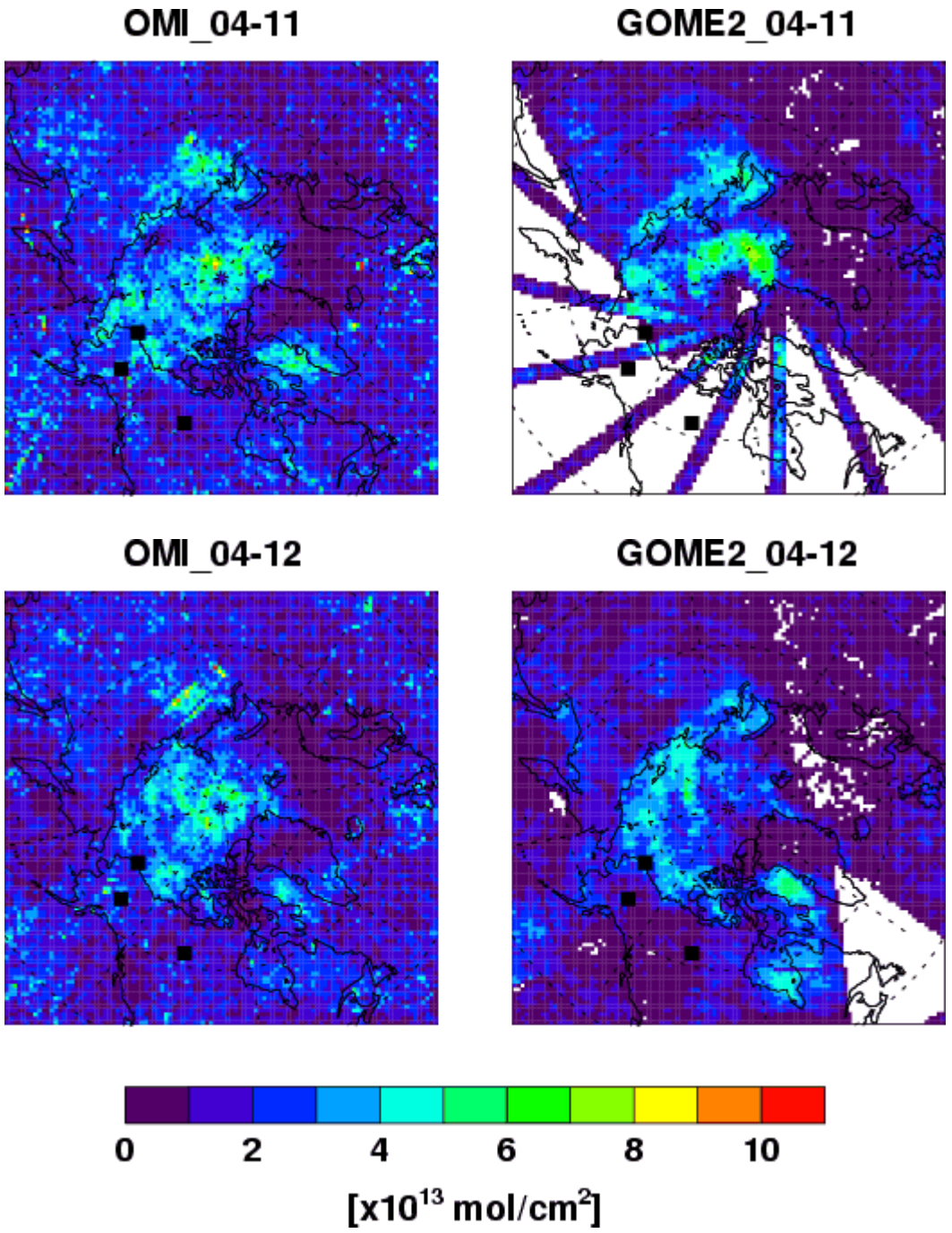


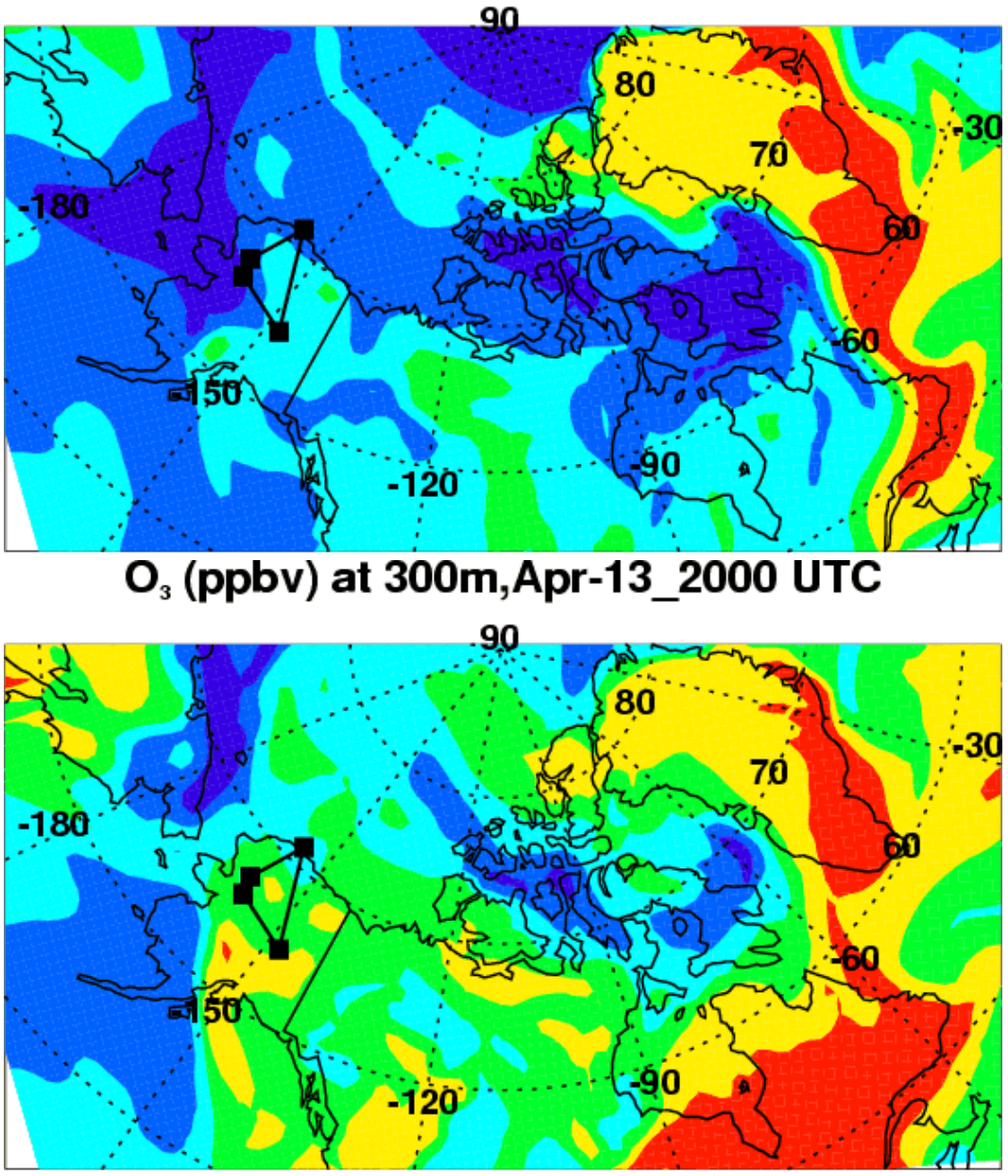






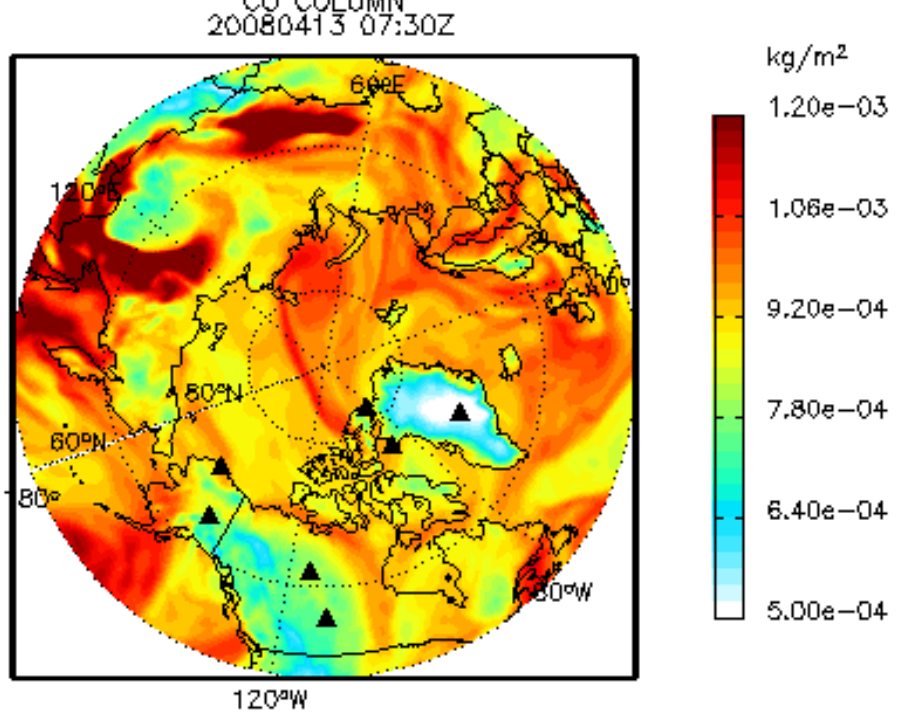



OMI_04-11
GOME2_04-11
OMI_04-12
GOME2_04-12
0
2
4
6
8
10
[x10^13 mol/cm^2]

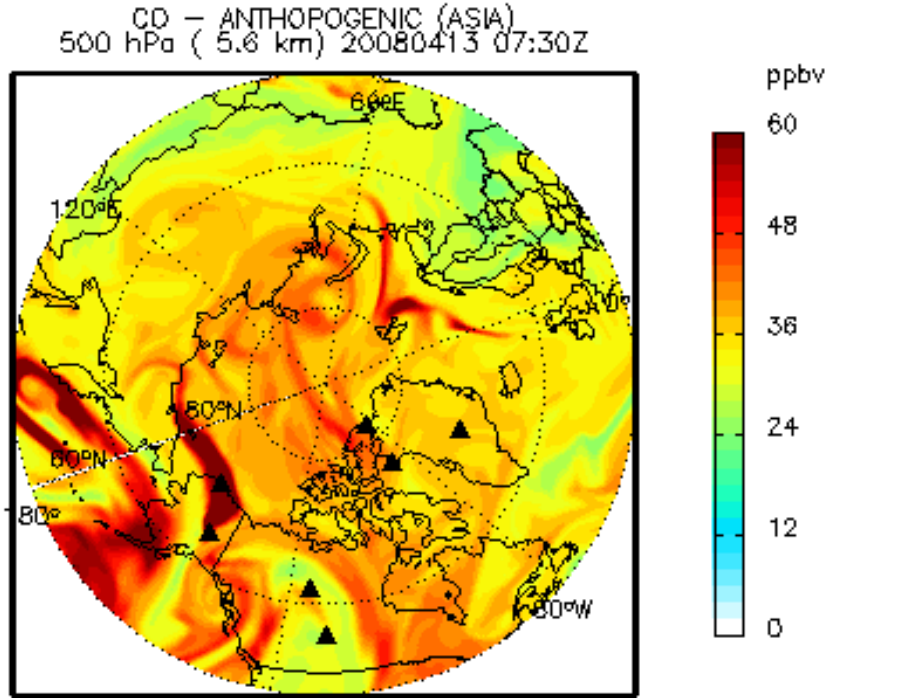

O3 (ppbv) at surface,Apr-13_2000 UTC
90
80
70
60
-30
-60
-90
-120
-150
-180
O3 (ppbv) at 300m,Apr-13_2000 UTC
90
80
70
60
-30
-60
-90
-120
-150
-180
0
10
20
30
40
50

GEOS5 Fx 20080413_06Z
Animation 4/13 – 4/17

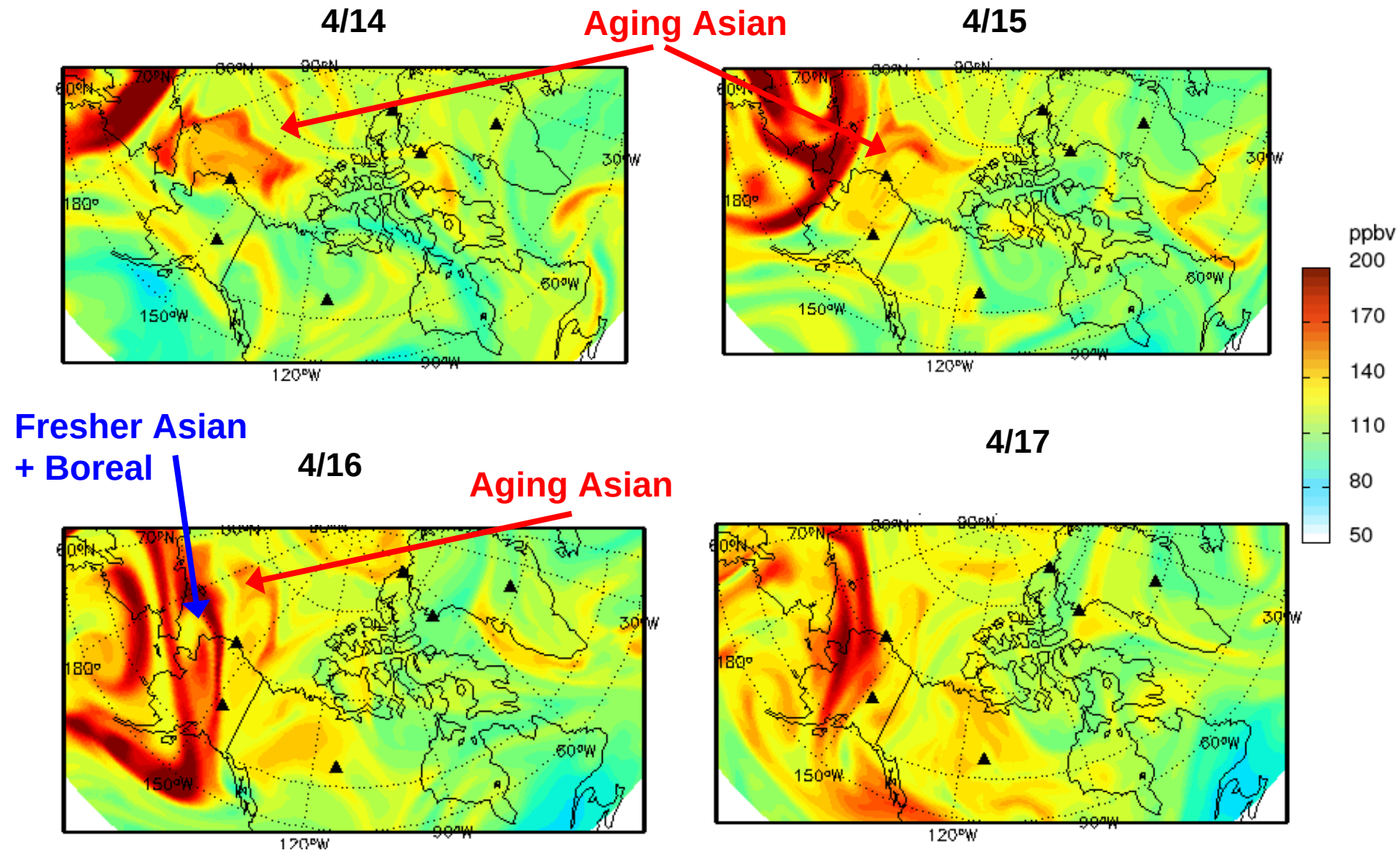
CO Column



Asian Anthropogenic CO (ppbv)
500 mb



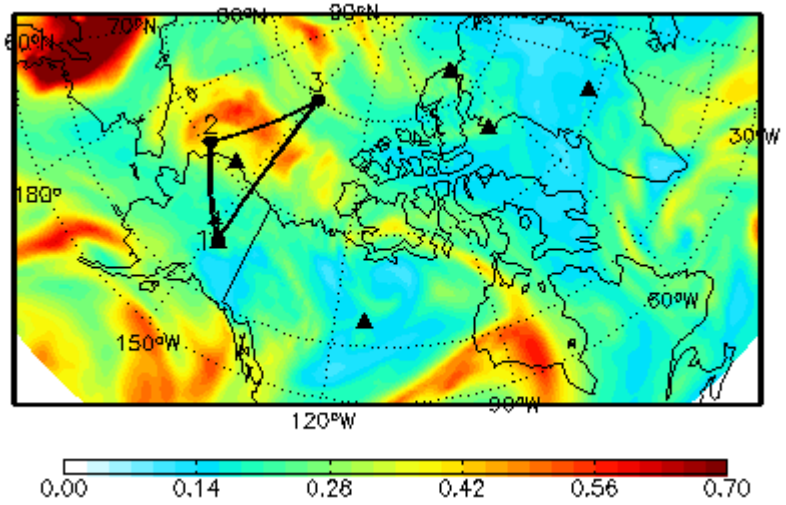
Total CO 500 hPa



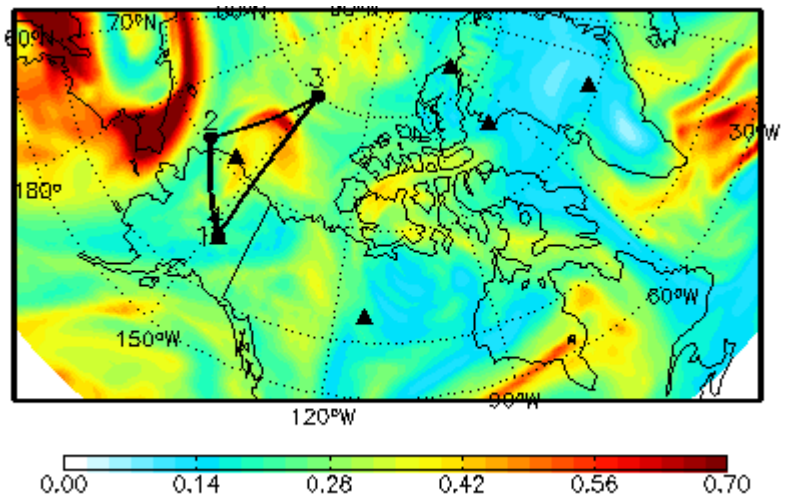
Using 4/13 6z forecast

GEOS5 forecast total AOT initialized at 20080413_06z

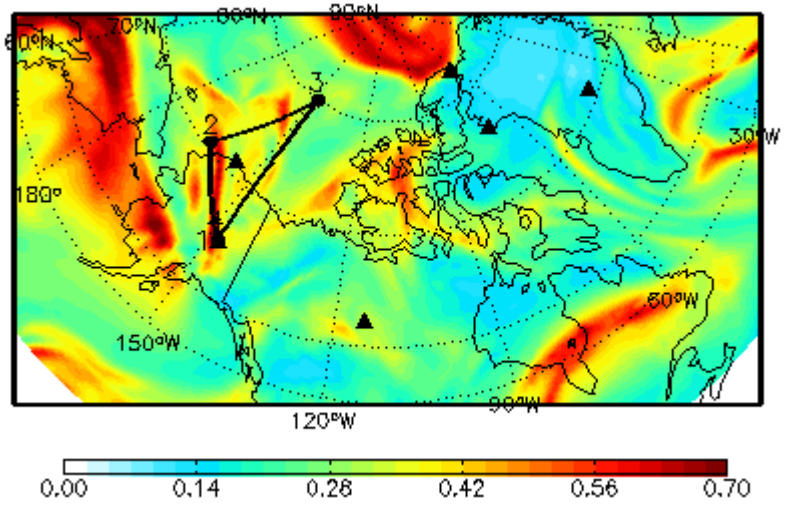
Total AOT Apr 14



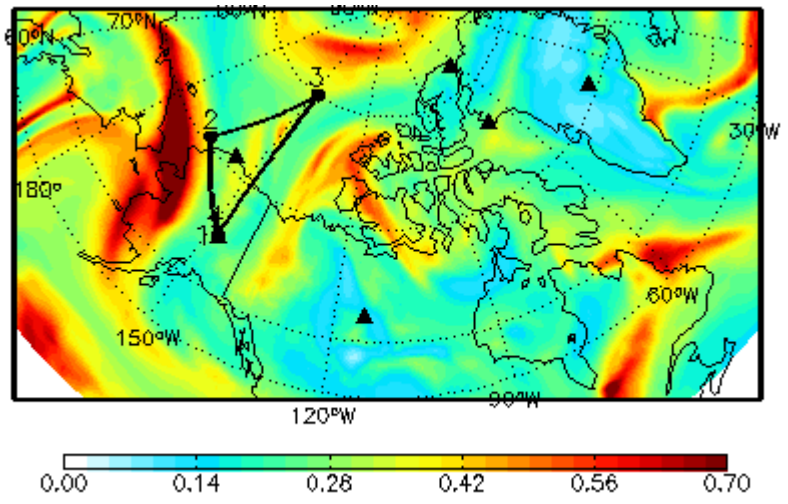
Total AOT Apr 15



Total AOT Apr 16



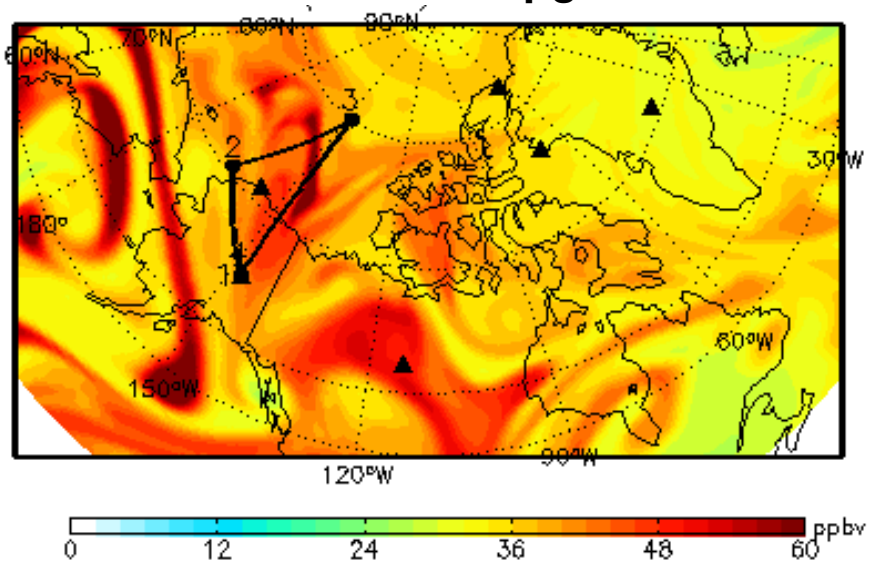
Total AOT Apr 17



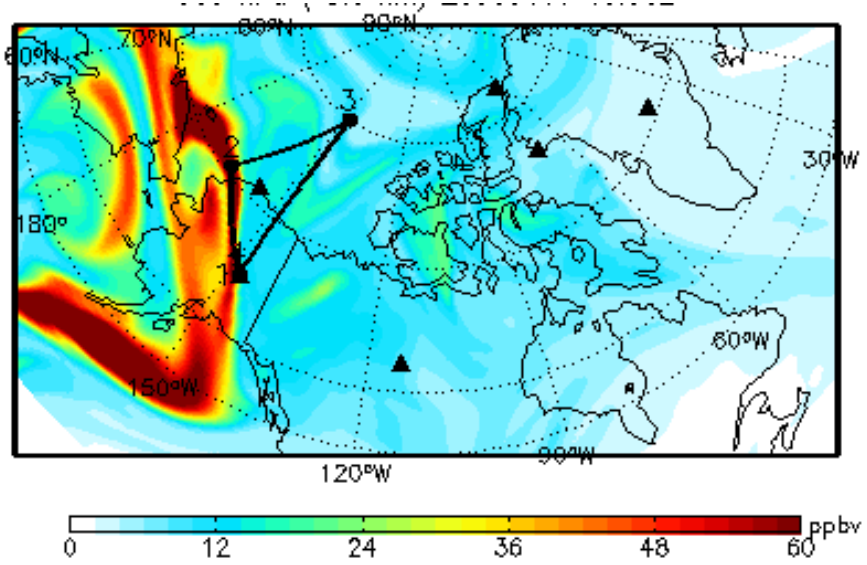
500 hPa : 4/16

Using 4/13 6z forecast

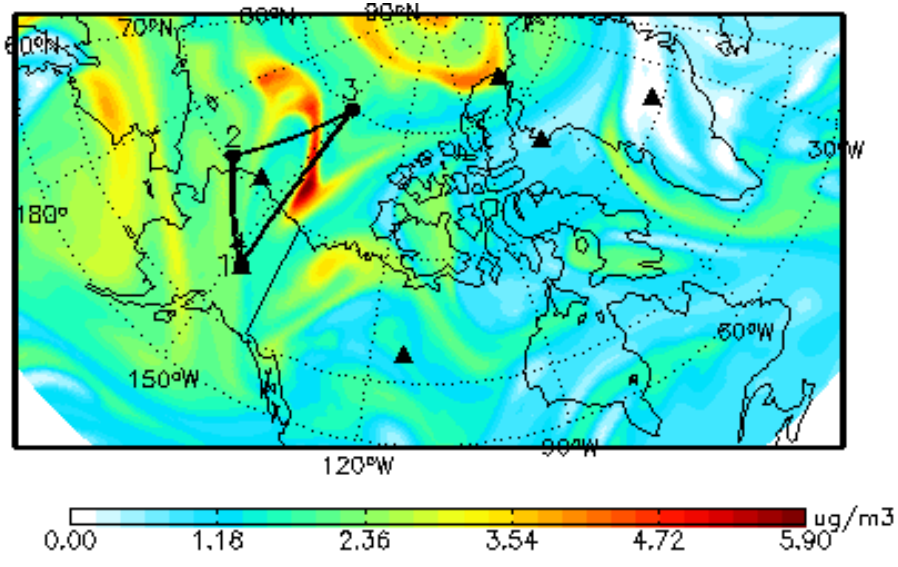
Asian Anthropgenic



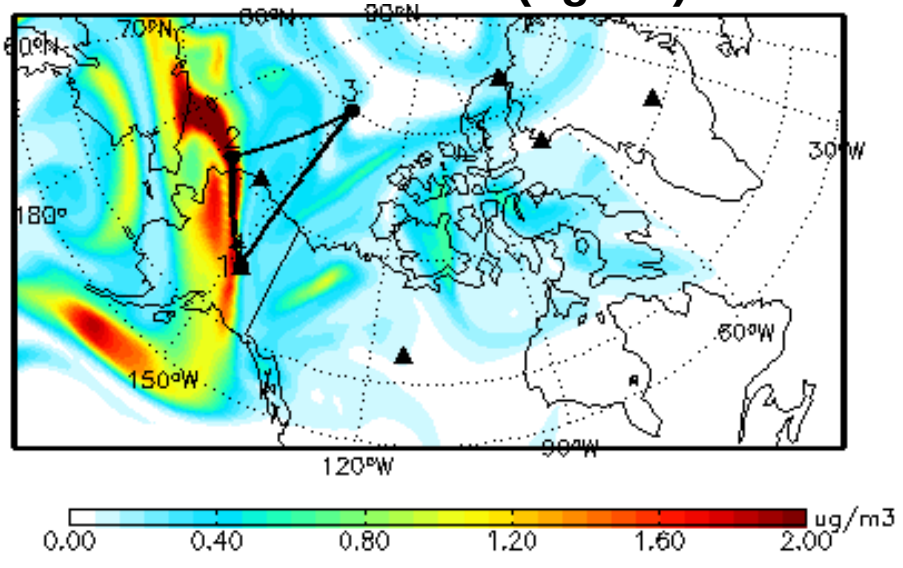
Boreal CO

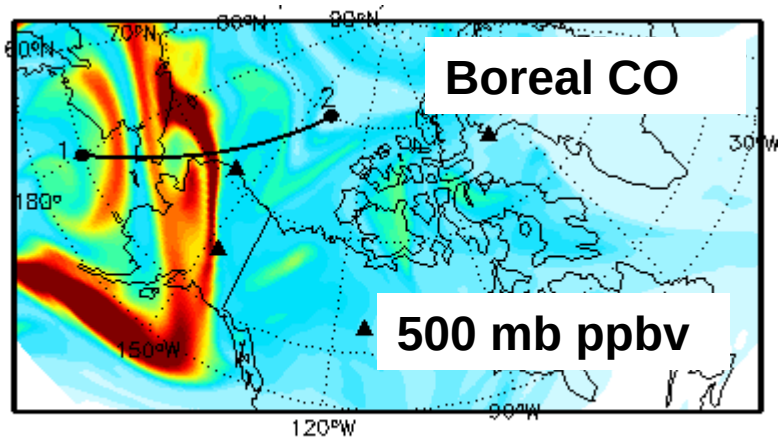


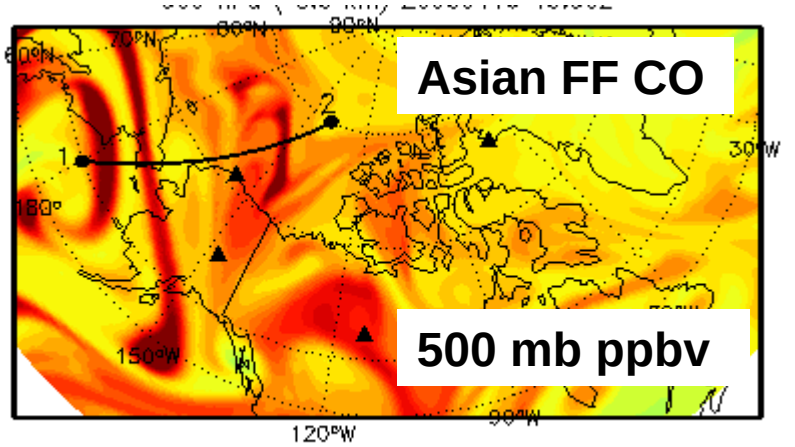
Sulfate (ug/m3)



Boreal BB OC (ug/m3)

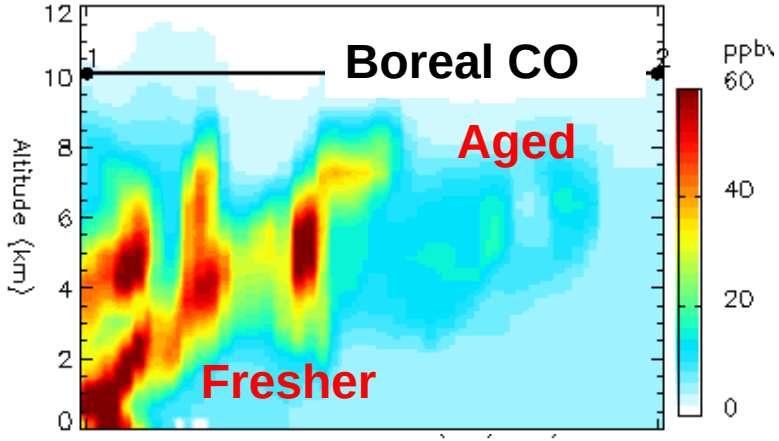


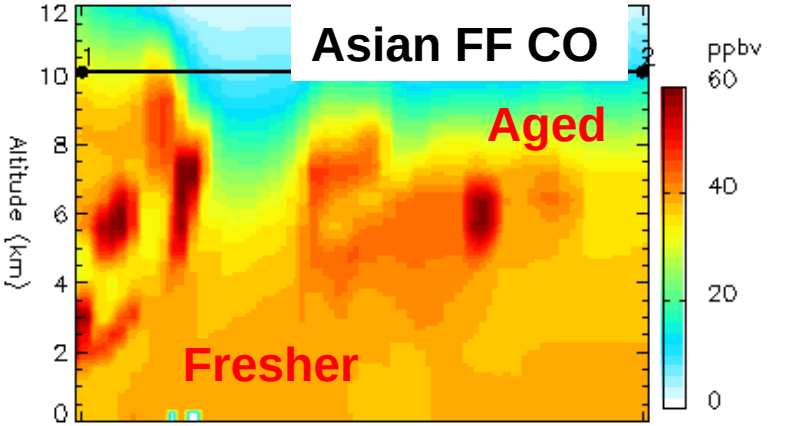

Boreal CO
500 mb ppbv
70°N
60°N
80°N
60°N
180°
150°W
120°W
90°W
30°W
1
2

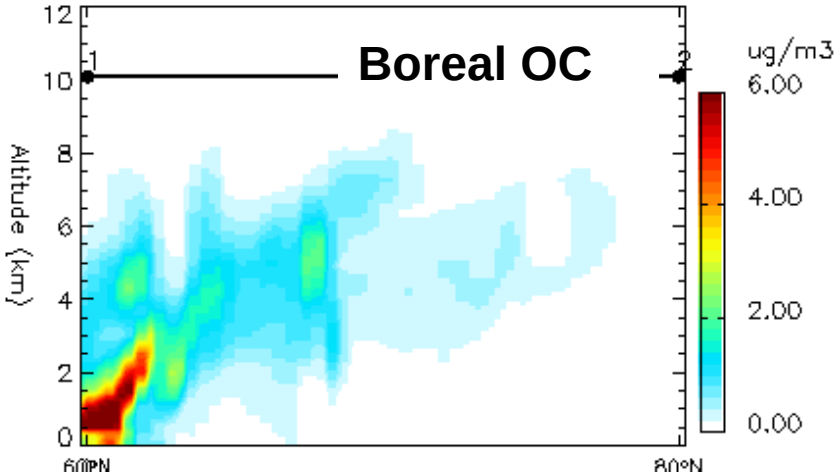

Asian FF CO
500 mb ppbv
70°N
60°N
80°N
60°N
180°
150°W
120°W
90°W
30°W
1
2

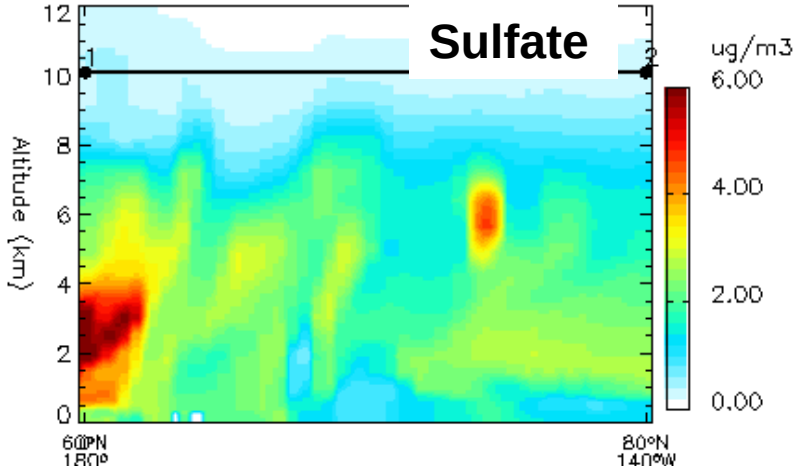

0
12
24
36
48
60
ppbv


0
12
24
36
48
60
ppbv


Boreal CO
Aged
Fresher
Altitude (km)
ppbv
60
40
20
0
1
2


Asian FF CO
Aged
Fresher
Altitude (km)
ppbv
60
40
20
0
1
2

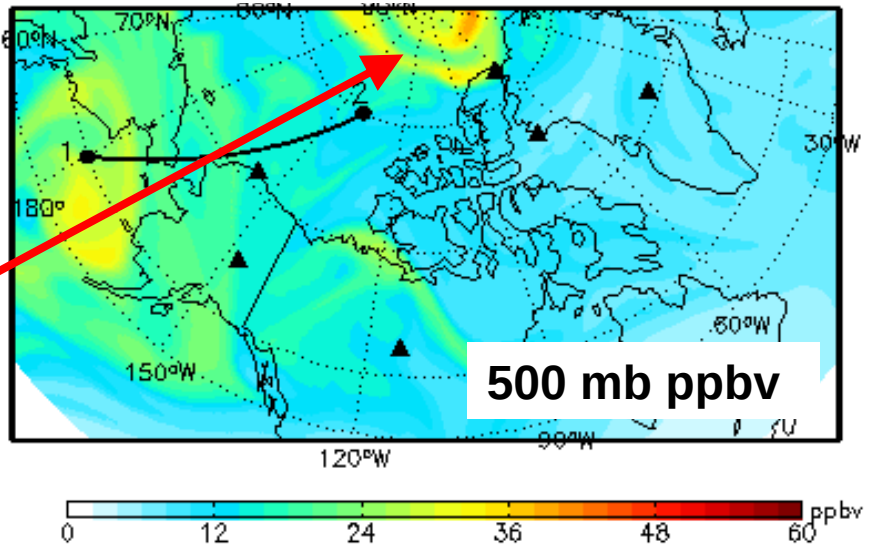

Boreal OC
Altitude (km)
ug/m3
6.00
4.00
2.00
0.00
1
2
60°N
80°N


Sulfate
Altitude (km)
ug/m3
6.00
4.00
2.00
0.00
1
2
60°N
180°
80°N
140°W

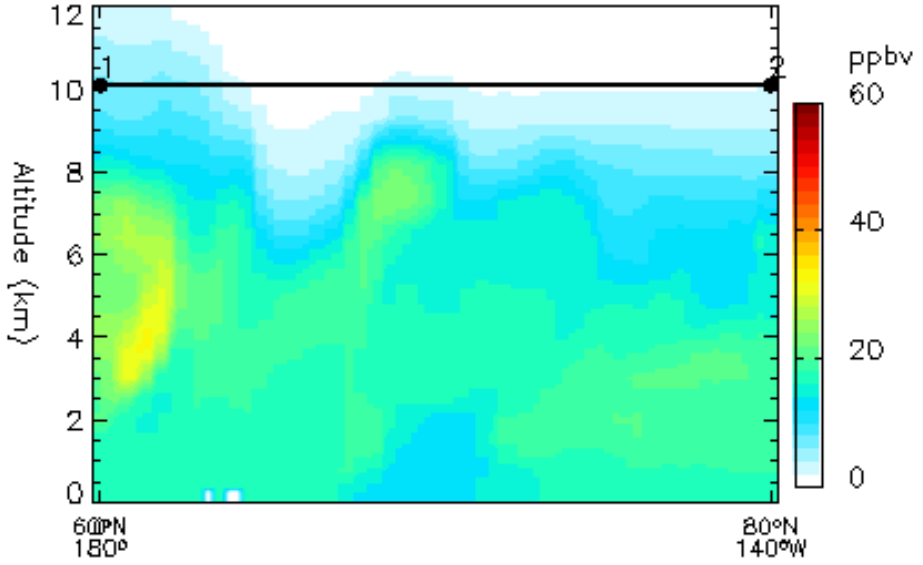
April 16th

Plume crossing pole

Europe CO



Europe CO

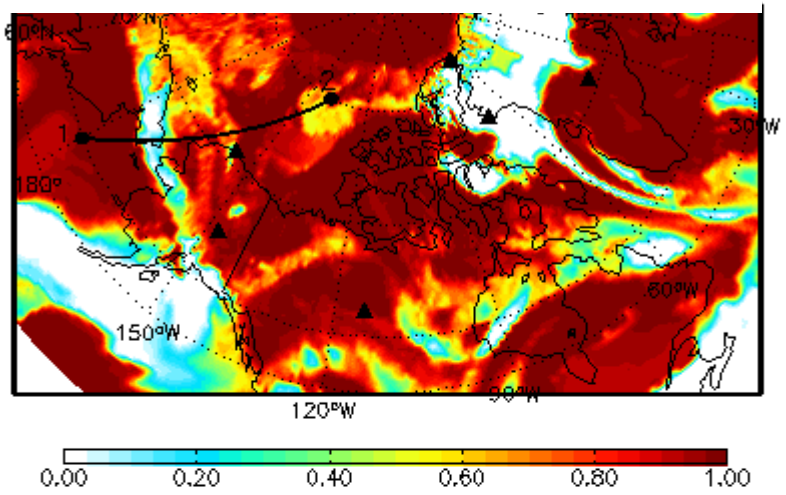


Cloud Fraction : 4/16

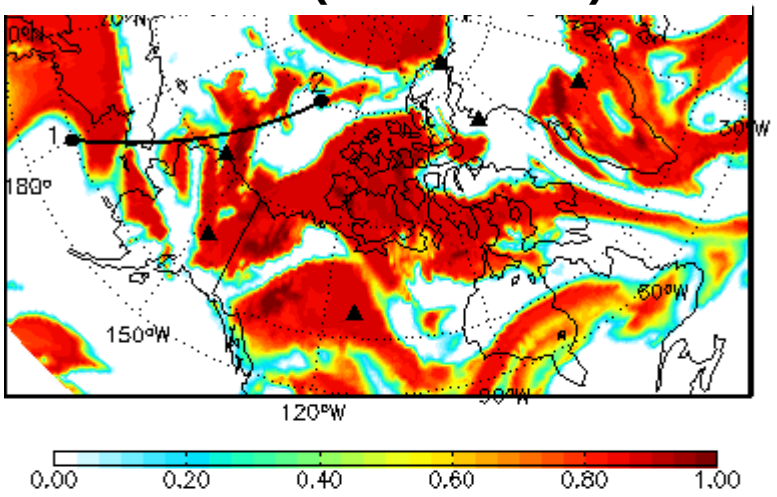
GEOS-5 forecast: 20080413_06z

GEOS-5 forecast: 20080413_06z

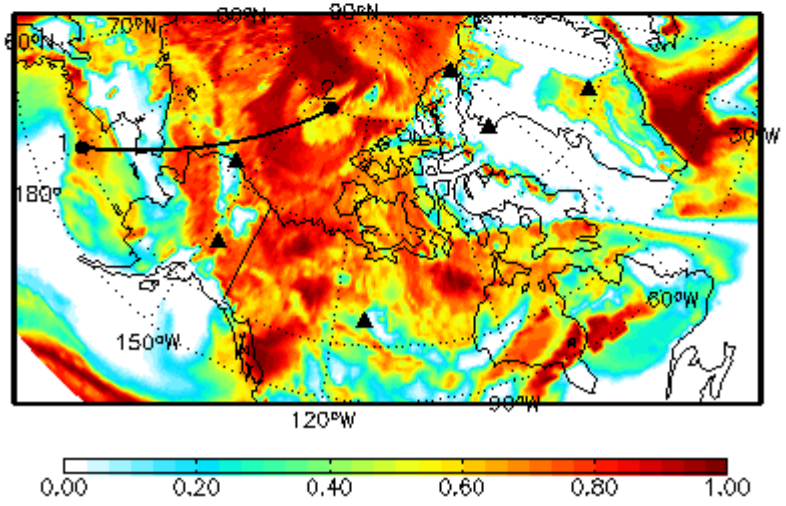
Total



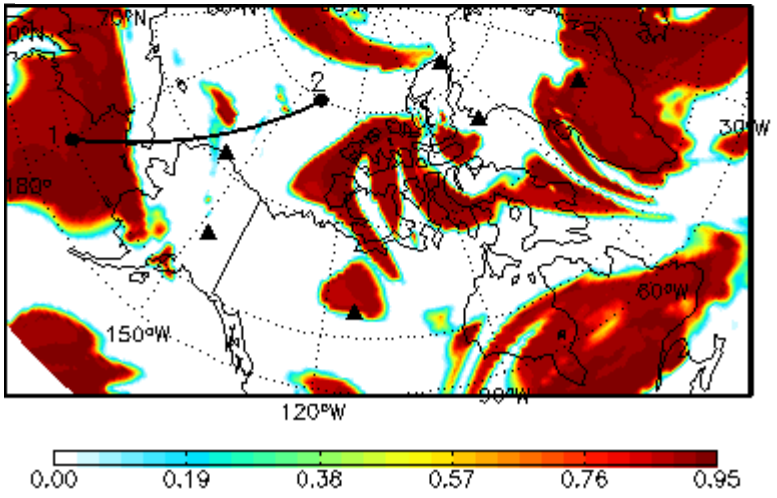
Middle (400-700 mb)



Low (700-1000 mb)

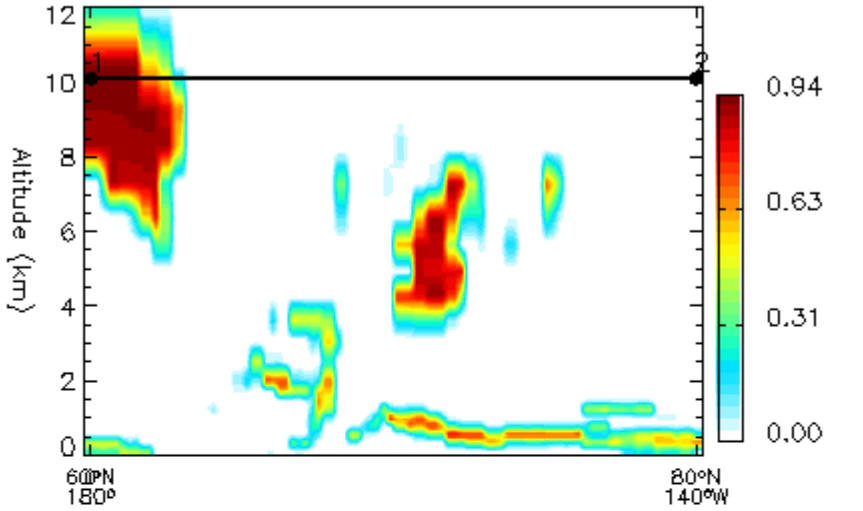


High (<400 mb)

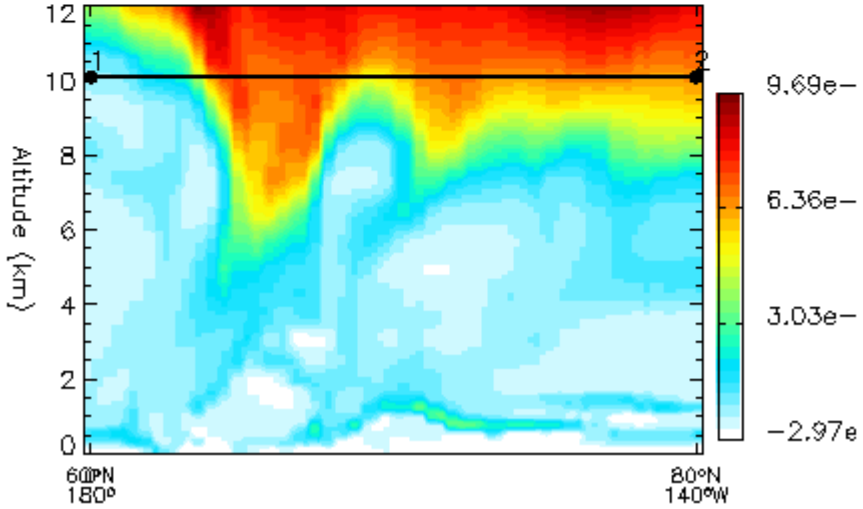


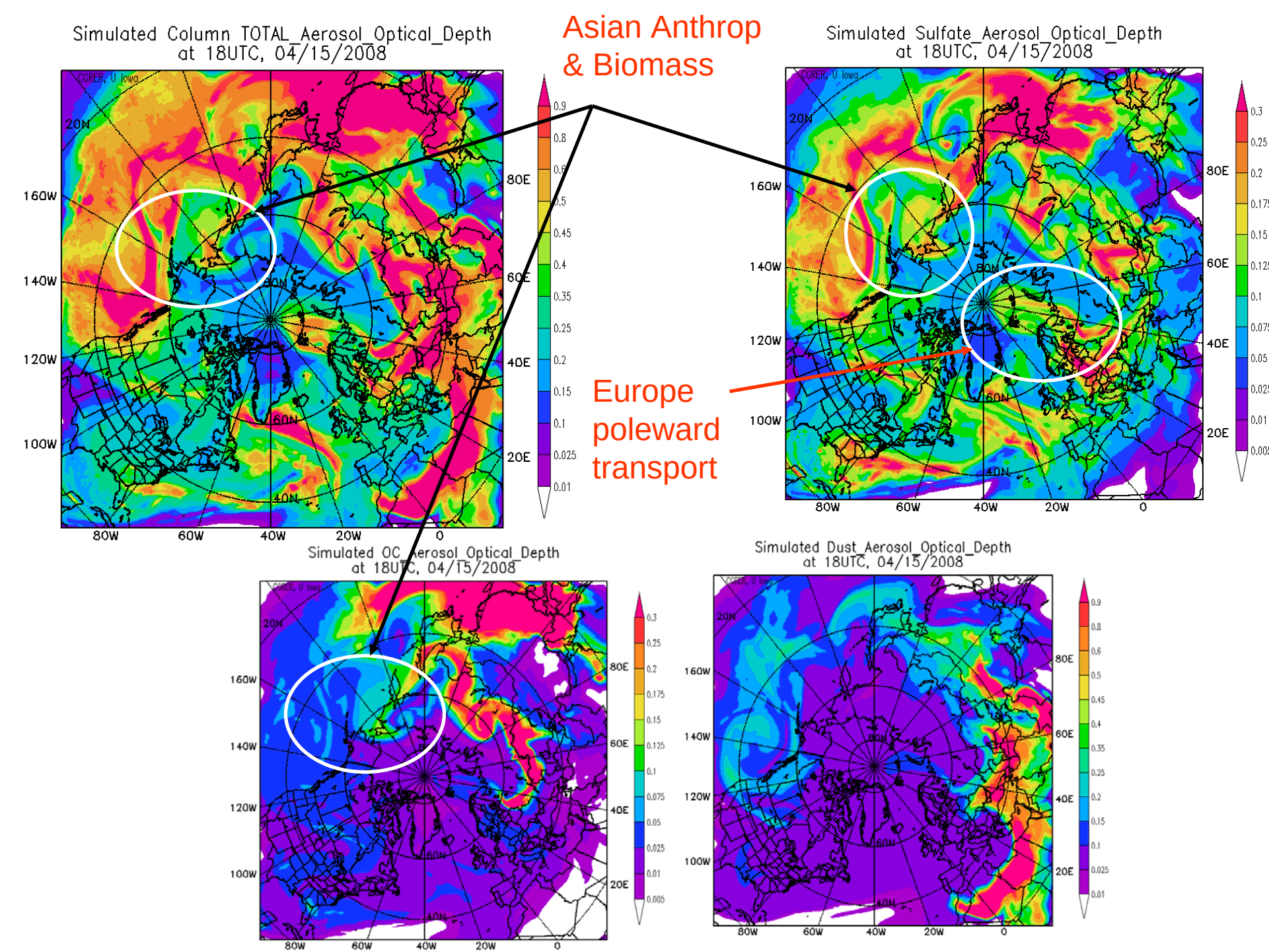
GEOS−5 forecast: 20080413_06z

Cloud Area Fraction

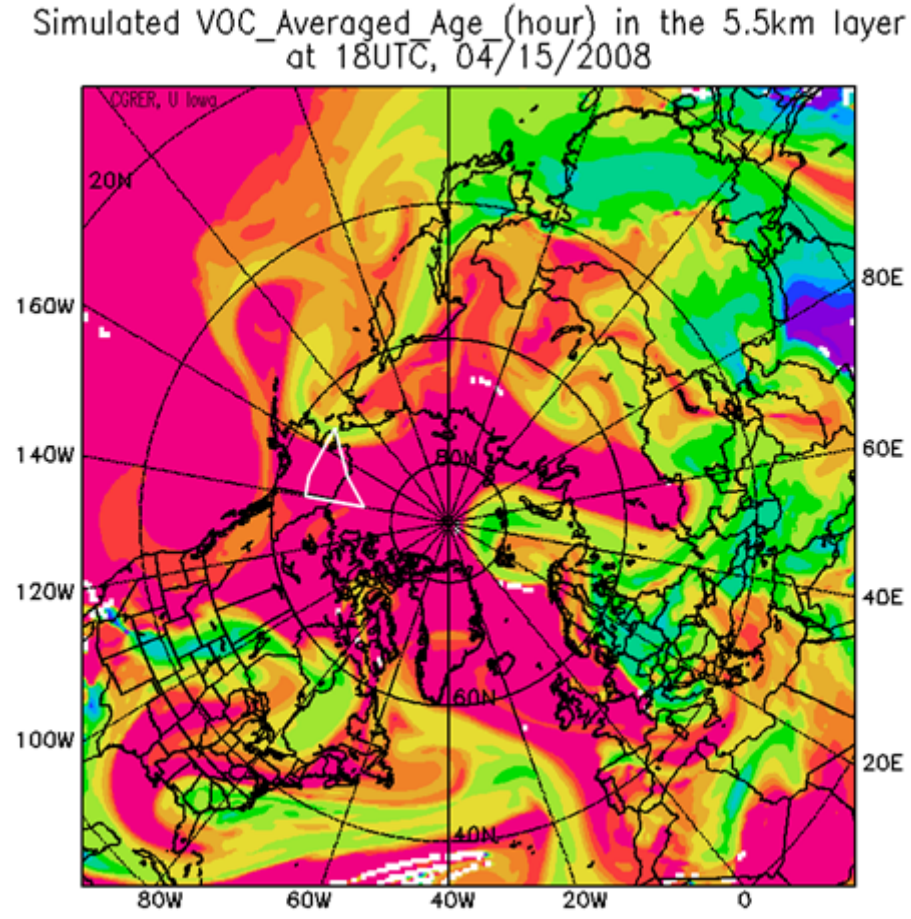


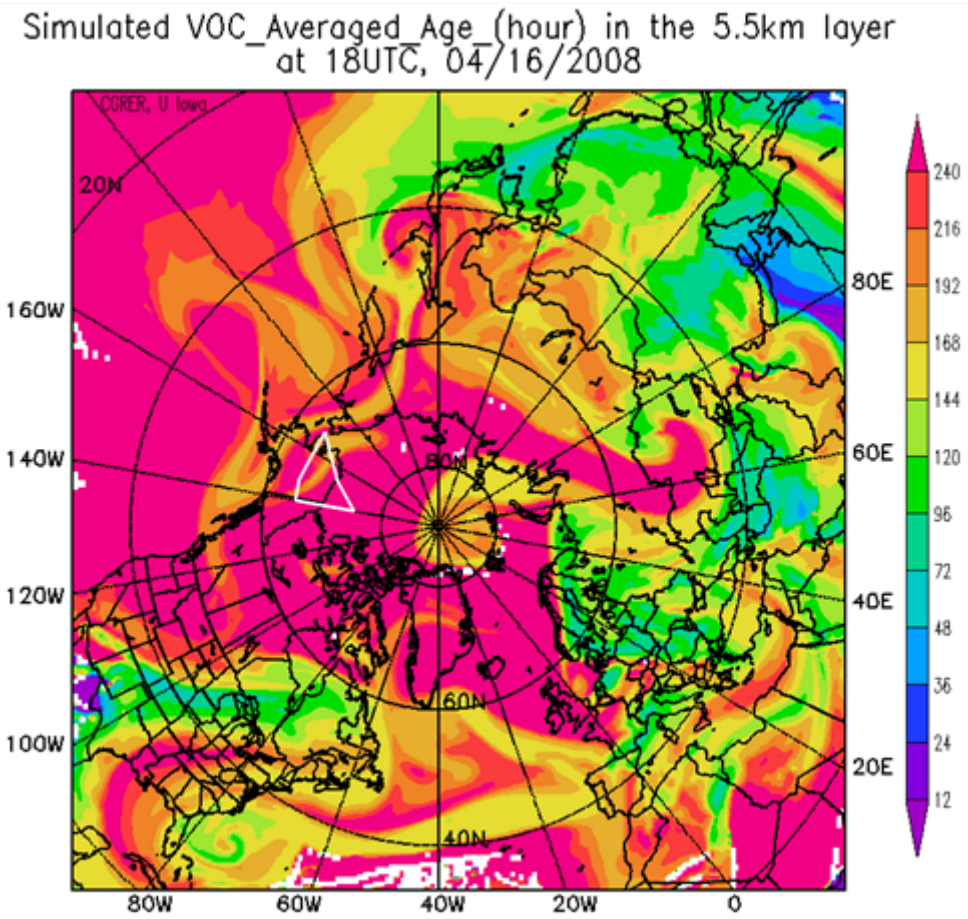
EPV




Simulated Column TOTAL_Aerosol_Optical_Depth
at 18UTC, 04/15/2008
Asian Anthrop
& Biomass
Simulated Sulfate_Aerosol_Optical_Depth
at 18UTC, 04/15/2008
Europe
poleward
transport
Simulated OC_Aerosol_Optical_Depth
at 18UTC, 04/15/2008
Simulated Dust_Aerosol_Optical_Depth
at 18UTC, 04/15/2008

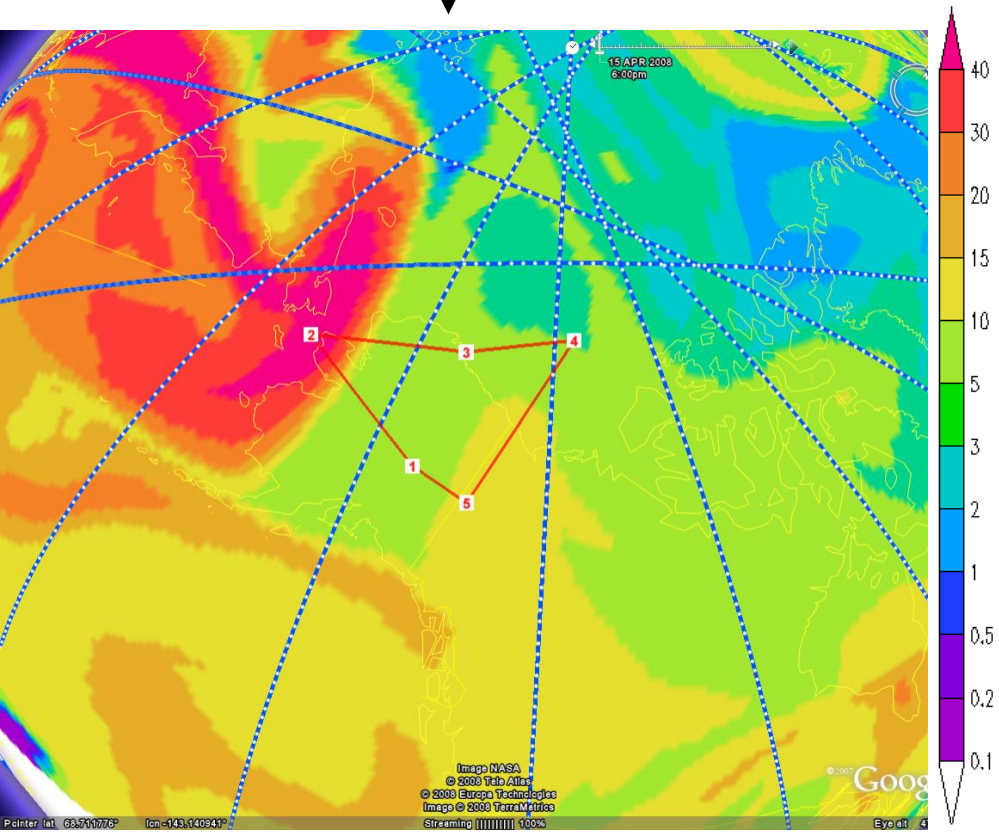
Fresh/Aged Airmass



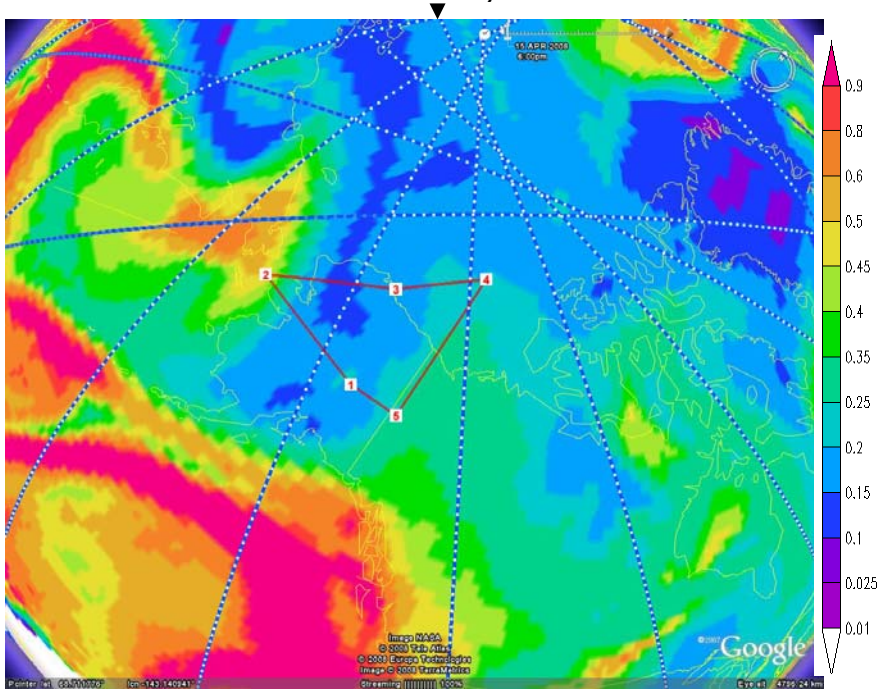


April 15th, 18Z (66hr)

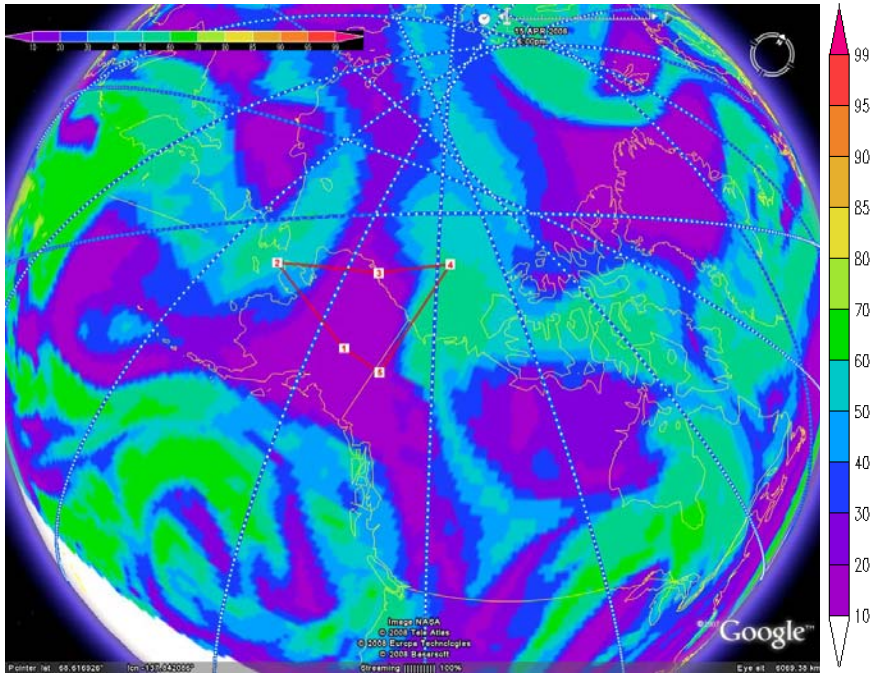
Biomass CO, 5.4 km (ppb)



Column AOD, 5.4km

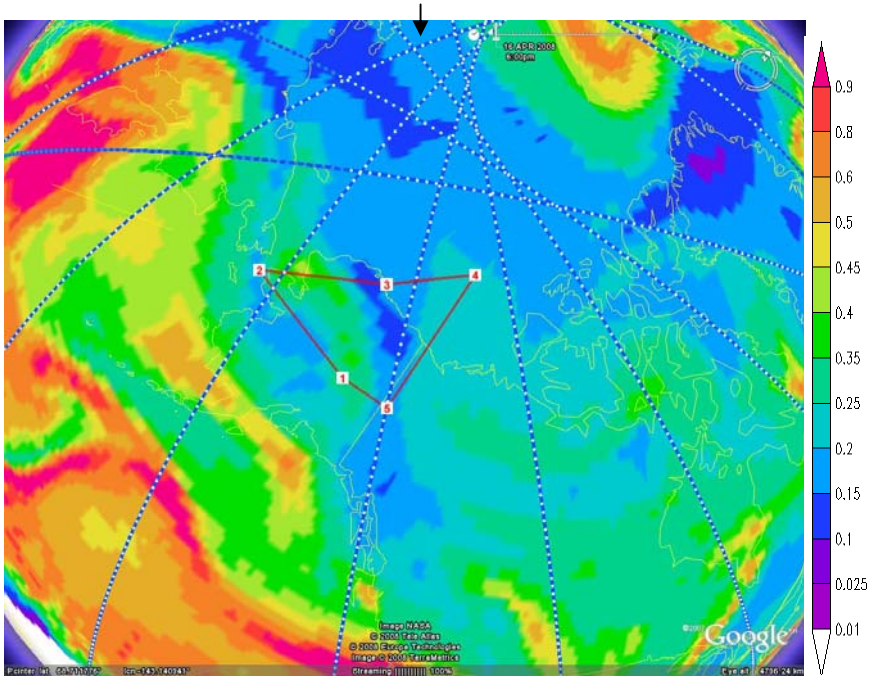


RH at 8.4 km

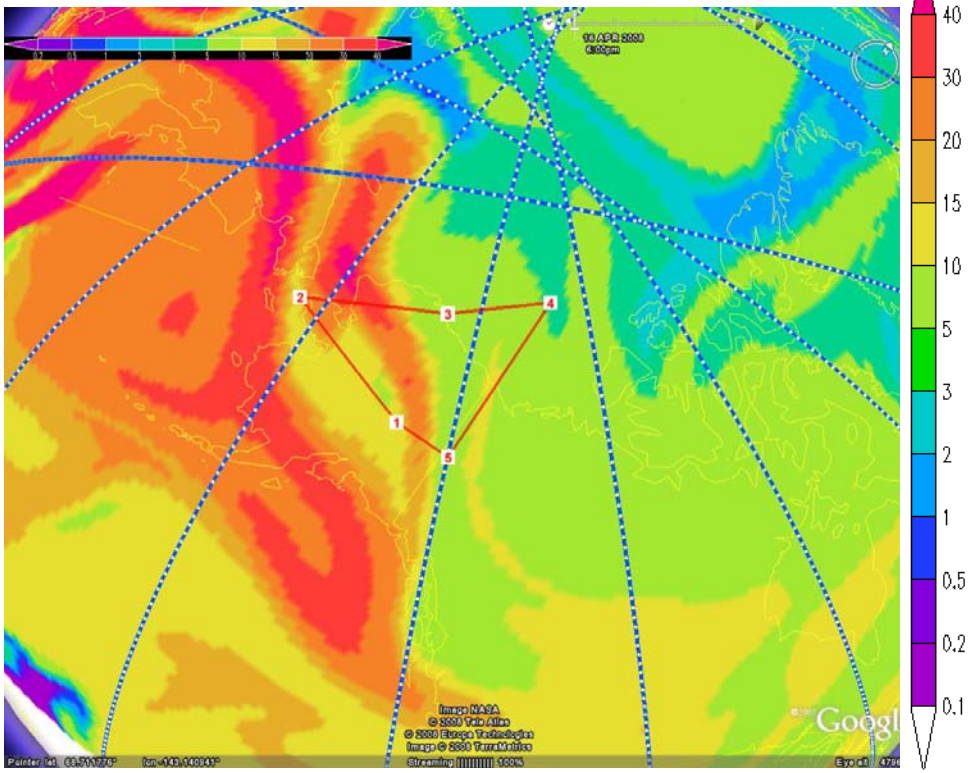


April 16th, 18Z (90hr)

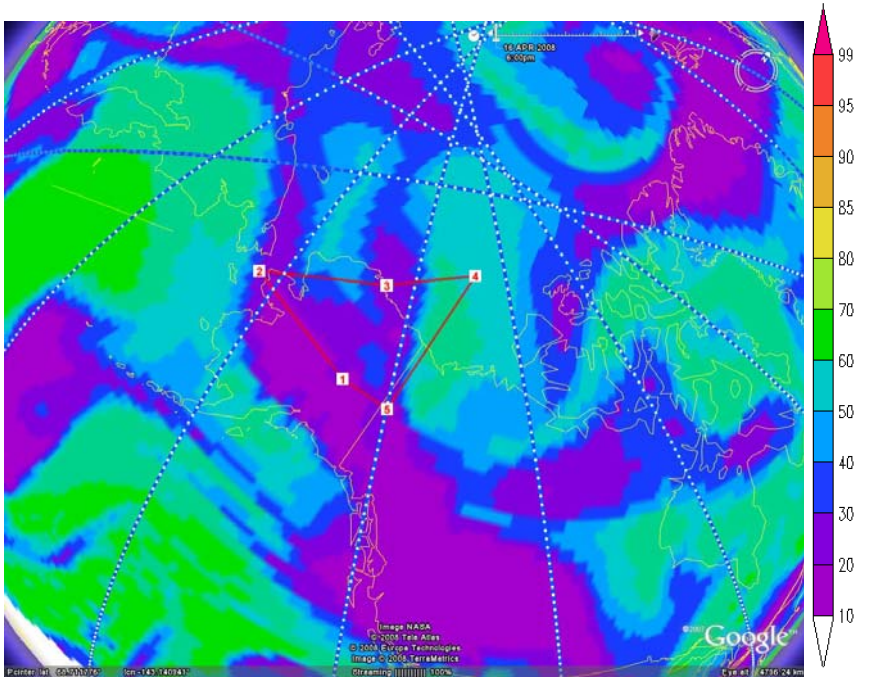
Column AOD

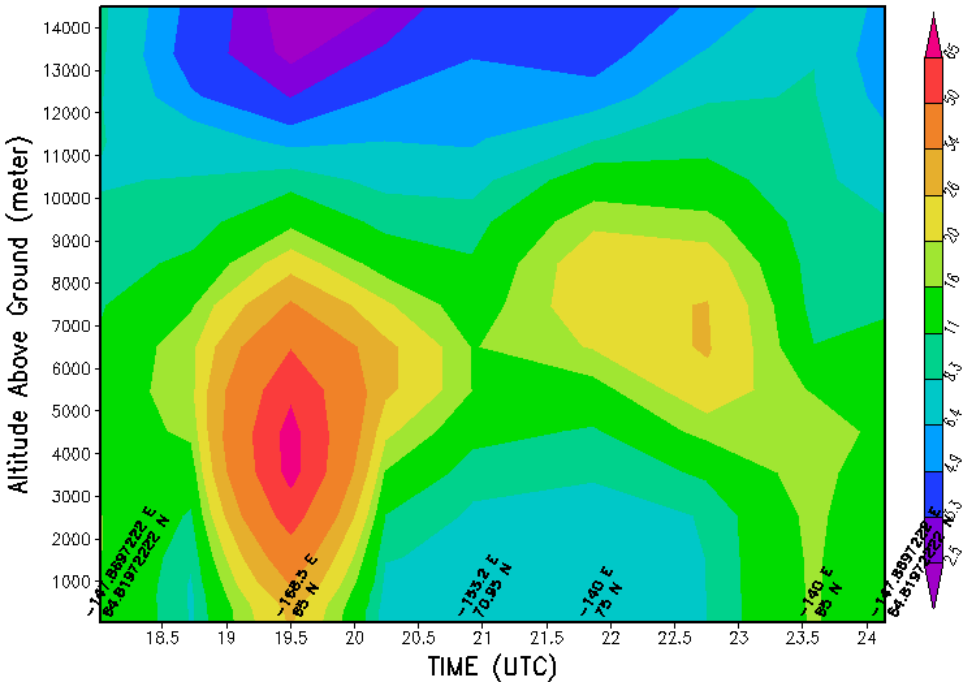


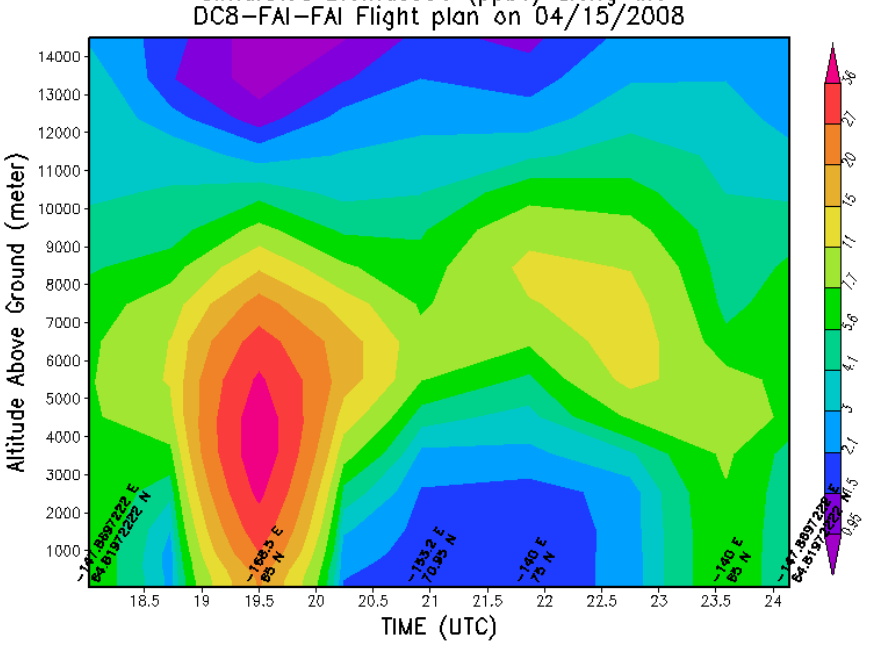
Biomass CO, 5.4km (ppb)

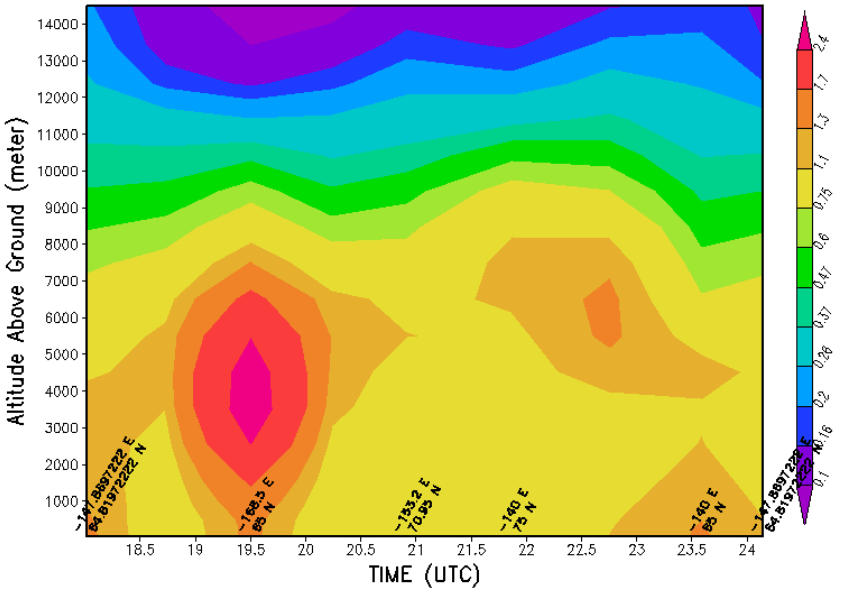


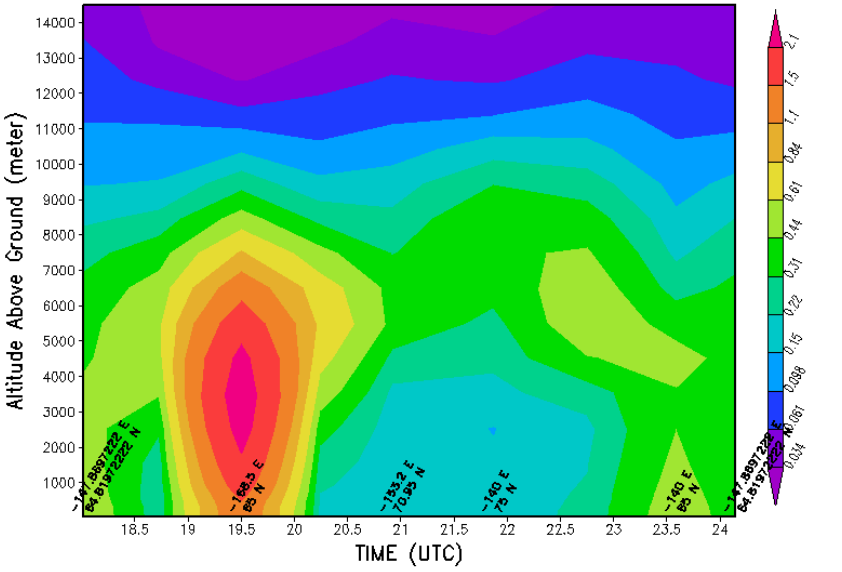
RH at 8.4 km →

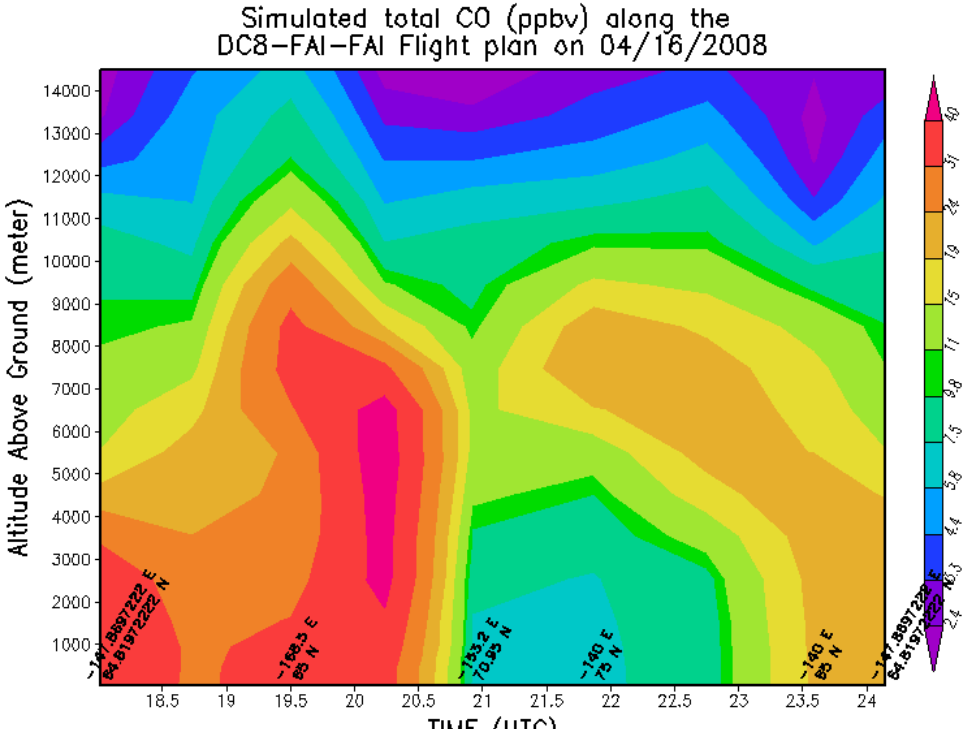


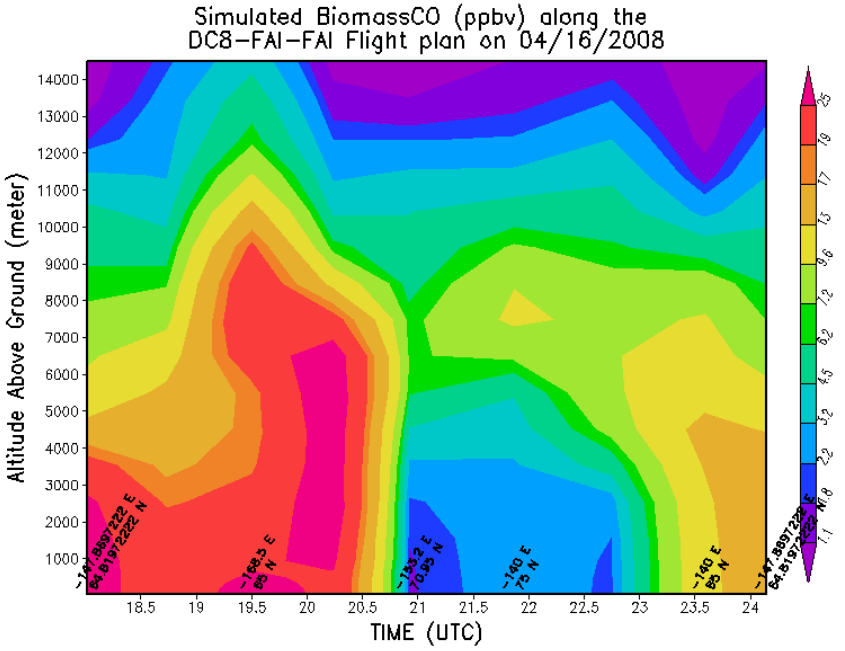

Simulated total CO (ppbv) along the
DC8-FAI-FAI Flight plan on 04/15/2008
Altitude Above Ground (meter)
TIME (UTC)

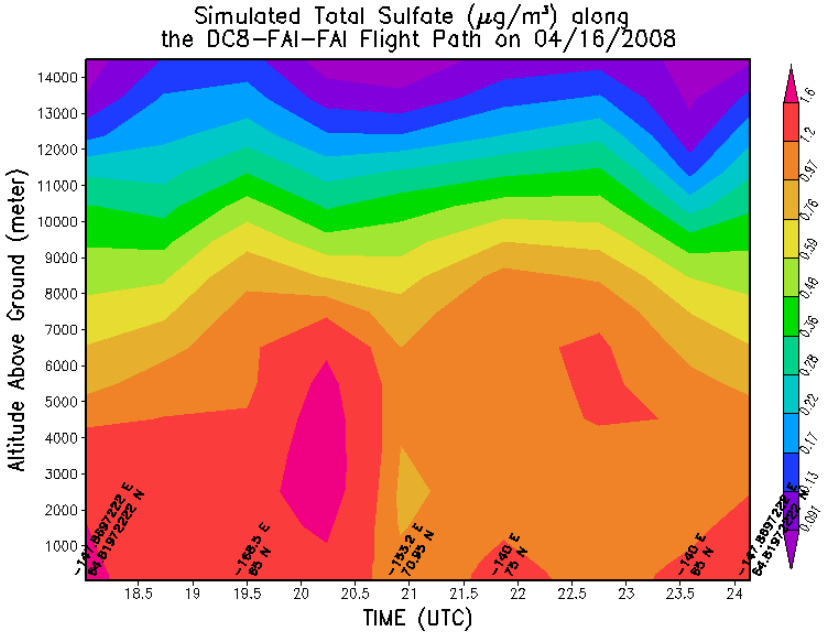

Simulated BiomassCO (ppbv) along the
DC8-FAI-FAI Flight plan on 04/15/2008
Altitude Above Ground (meter)
TIME (UTC)

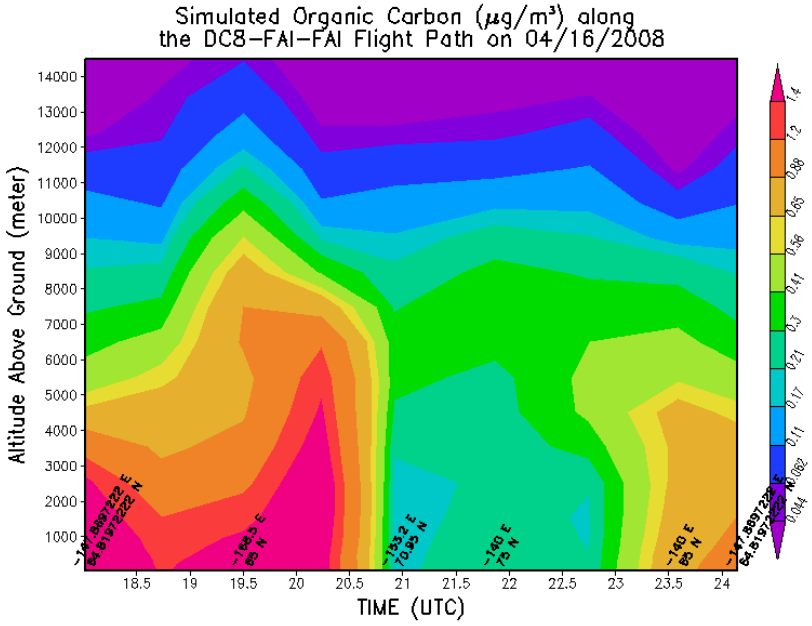

Simulated Total Sulfate (μg/m³) along
the DC8-FAI-FAI Flight Path on 04/15/2008
Altitude Above Ground (meter)
TIME (UTC)


Simulated Organic Carbon (μg/m³) along
the DC8-FAI-FAI Flight Path on 04/15/2008
Altitude Above Ground (meter)
TIME (UTC)

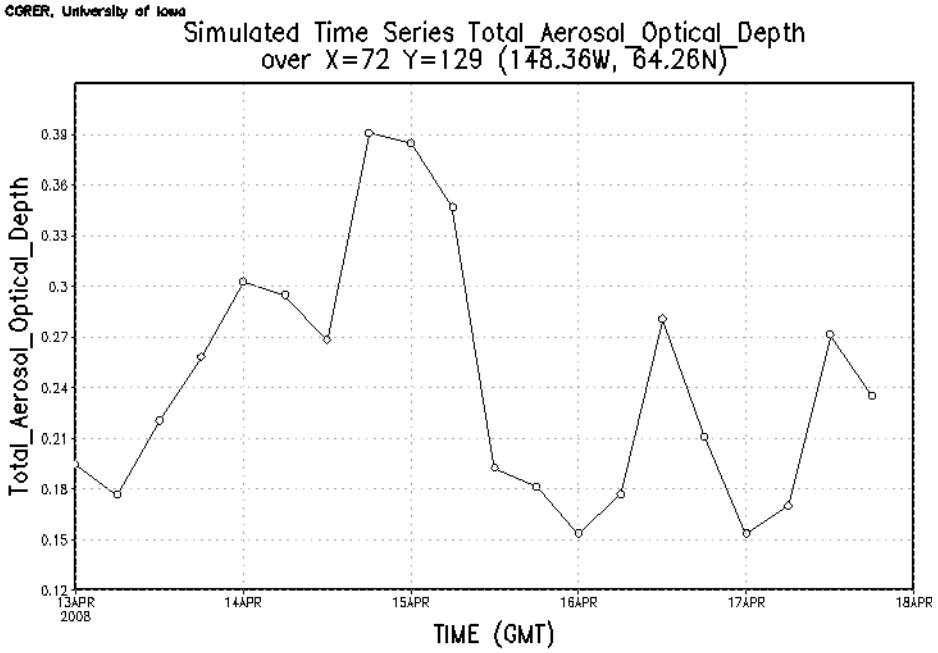

Simulated total CO (ppbv) along the
DC8-FAI-FAI Flight plan on 04/16/2008
Altitude Above Ground (meter)
TIME (UTC)

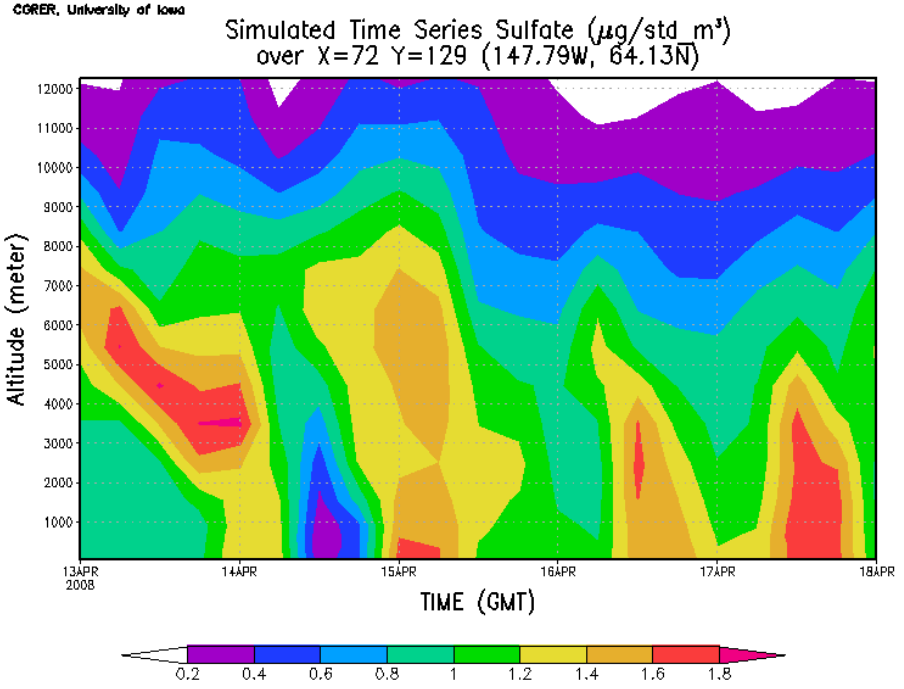

Simulated BiomassCO (ppbv) along the
DC8-FAI-FAI Flight plan on 04/16/2008
Altitude Above Ground (meter)
TIME (UTC)

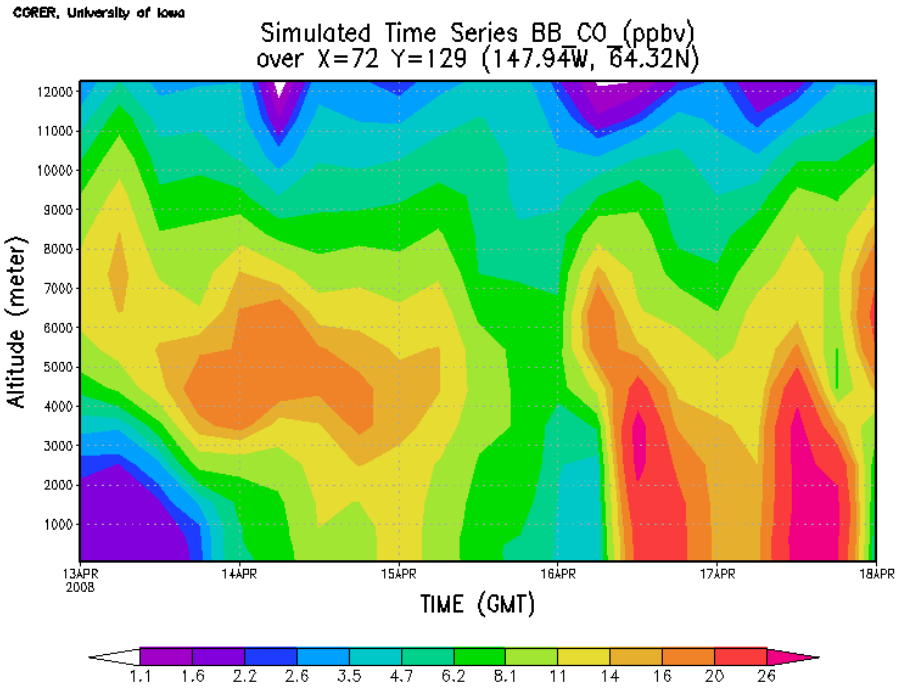

Simulated Total Sulfate (μg/m³) along
the DC8-FAI-FAI Flight Path on 04/16/2008
Altitude Above Ground (meter)
TIME (UTC)


Simulated Organic Carbon (μg/m³) along
the DC8-FAI-FAI Flight Path on 04/16/2008
Altitude Above Ground (meter)
TIME (UTC)

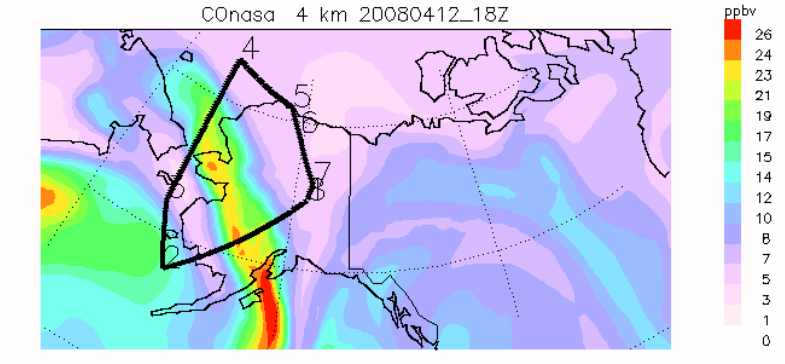
Fairbanks & Surrounding 5 day Outlook

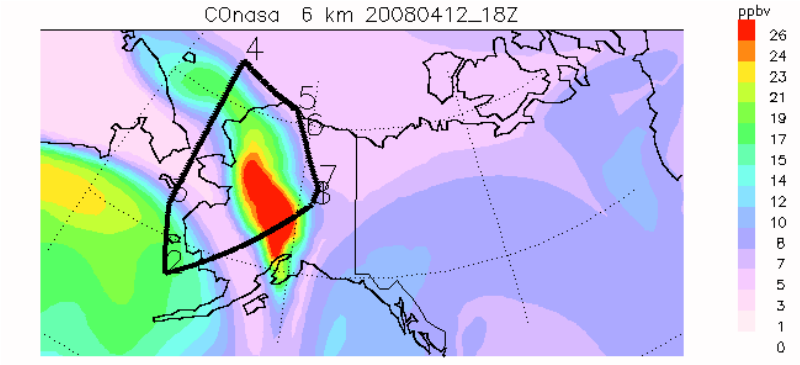


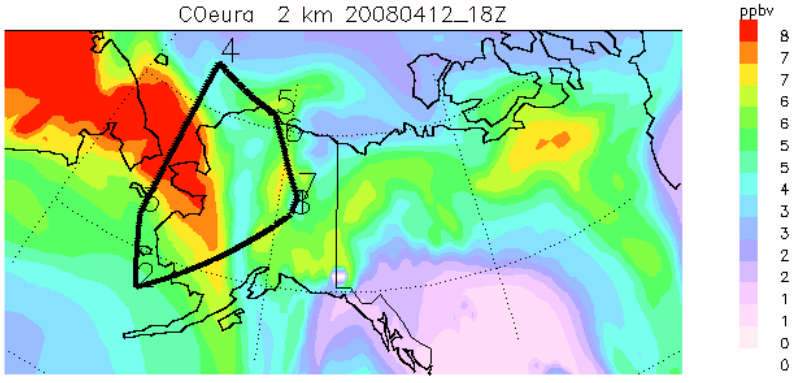




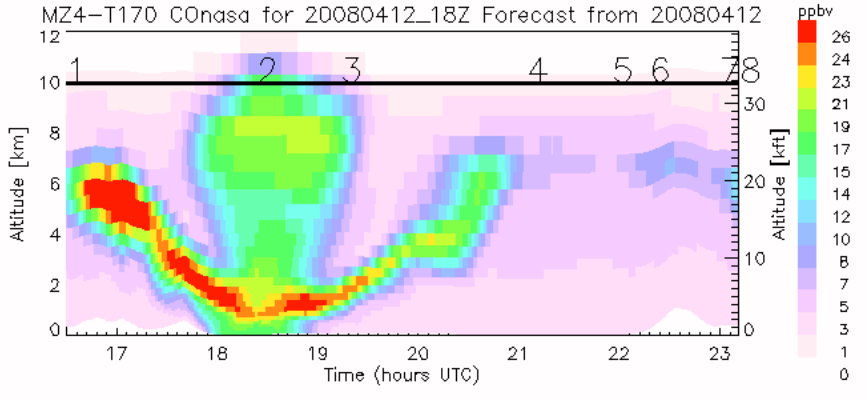
Yesterday - DC8 flight



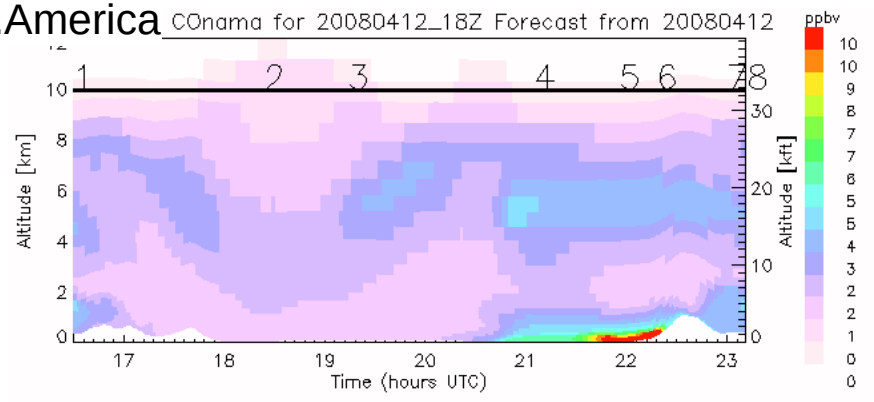




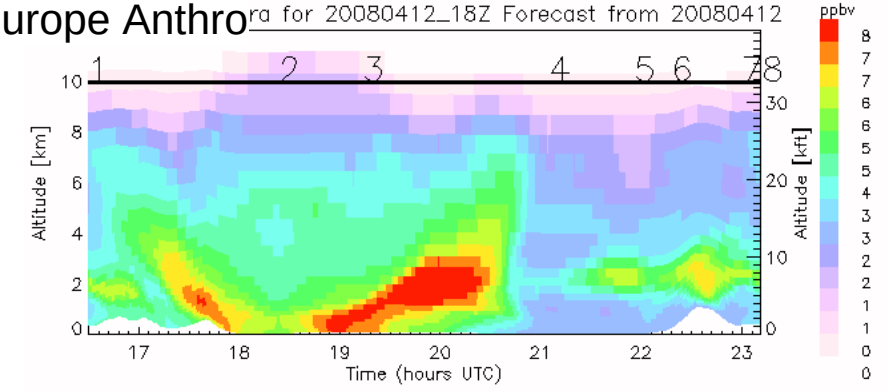
N.Asia Anthro



N.America

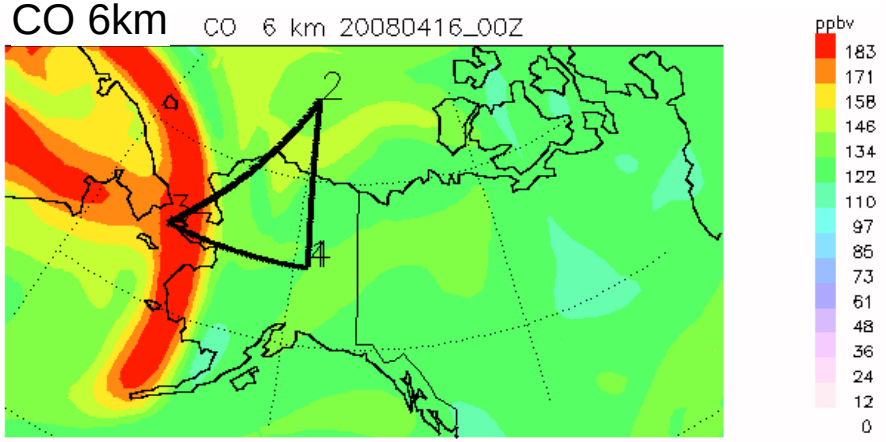


Europe Anthro

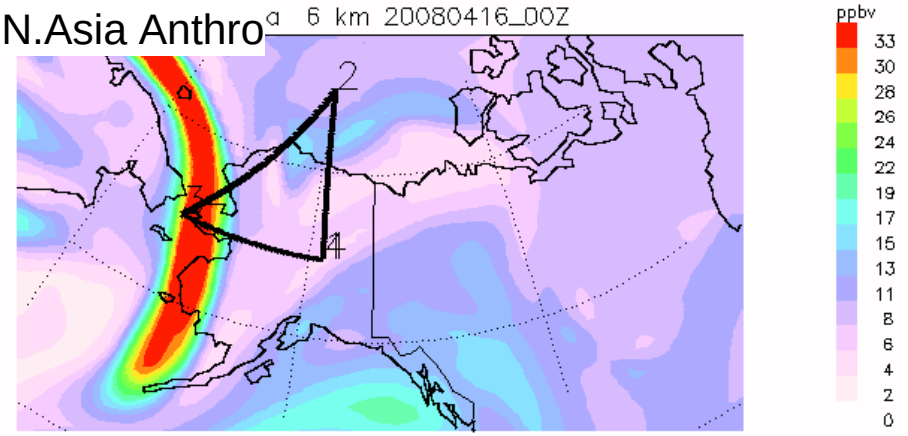


MZ4/GFS Apr 16 0Z
forecast from Apr 13

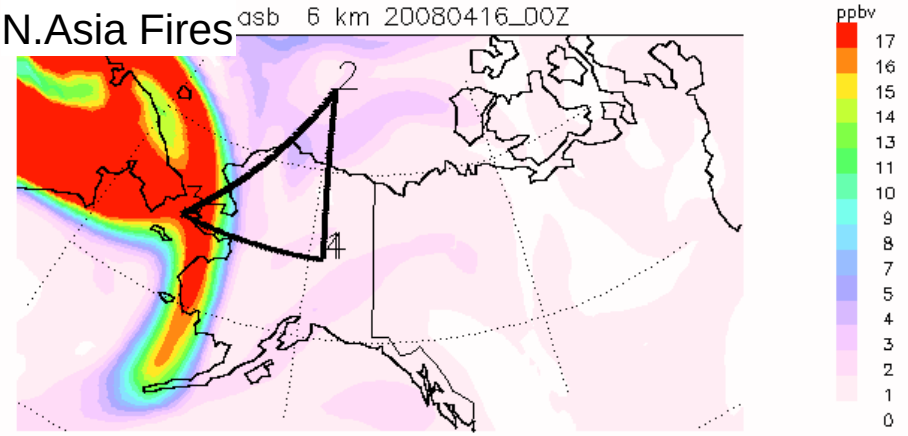
CO 6km



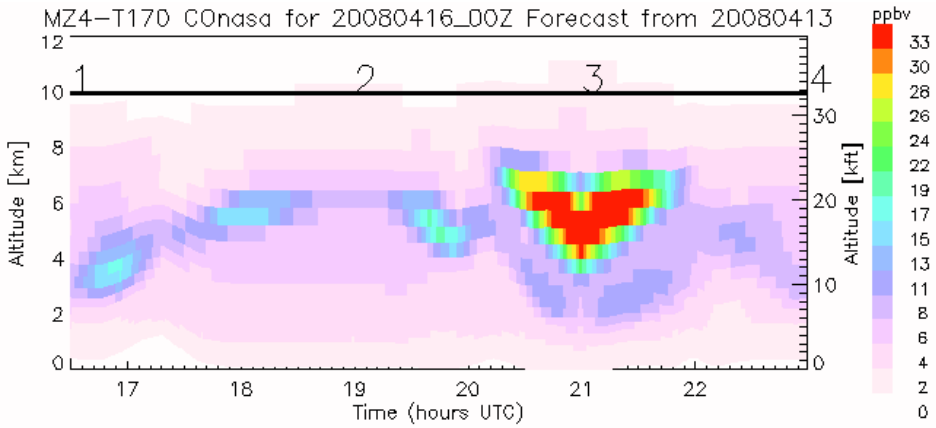
N.Asia Anthro



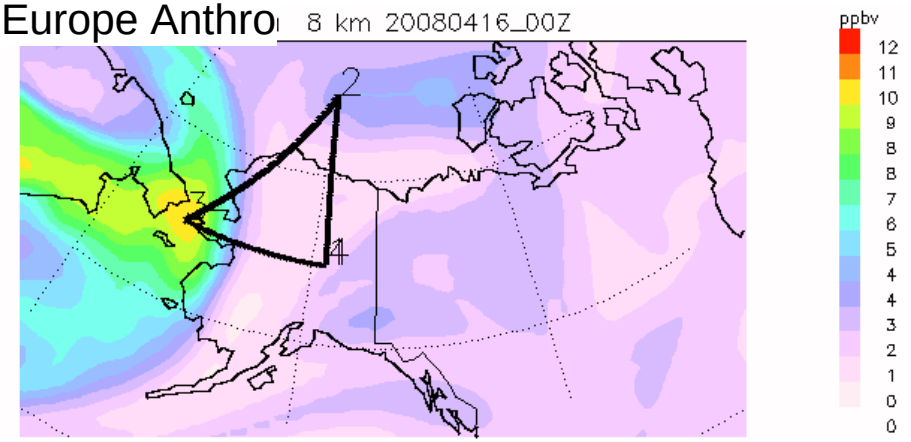
N.Asia Fires



CO

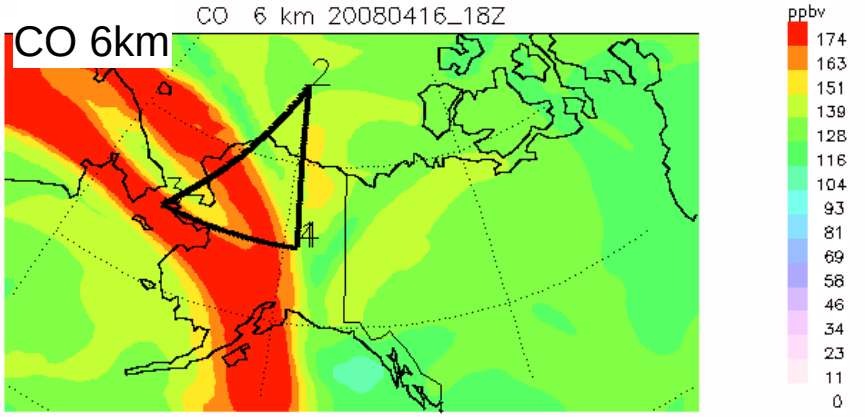


Europe Anthro

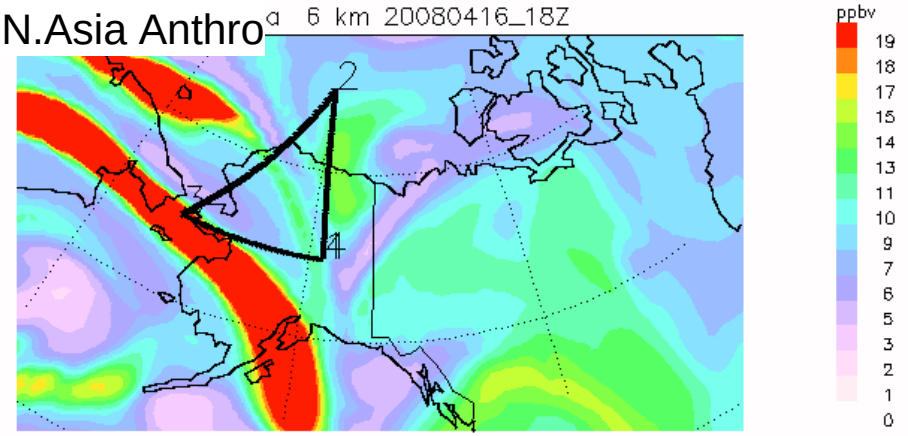


MZ4/GFS Apr 16 18Z
forecast from Apr 13

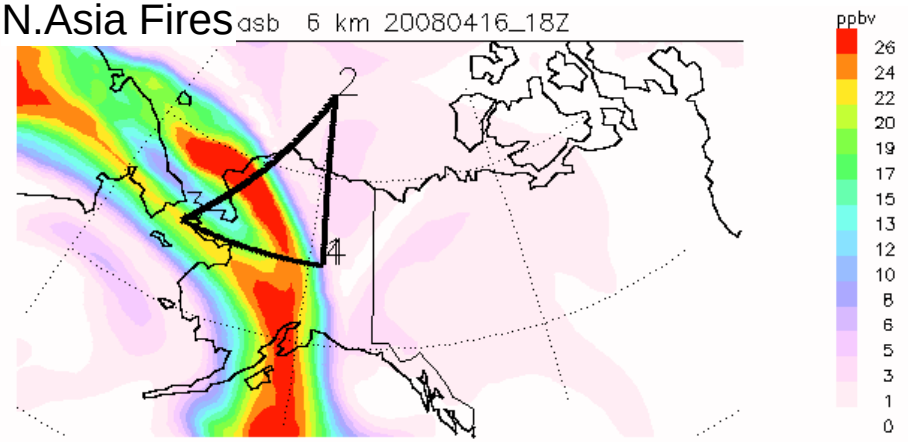
CO 6km



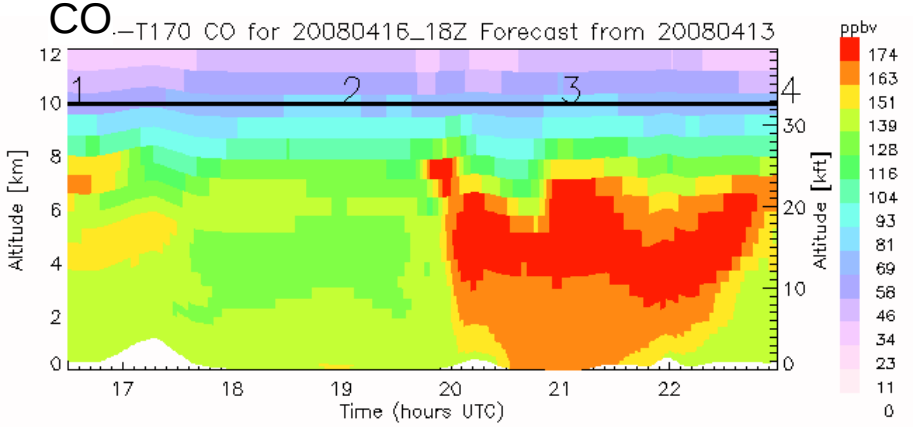
N.Asia Anthro



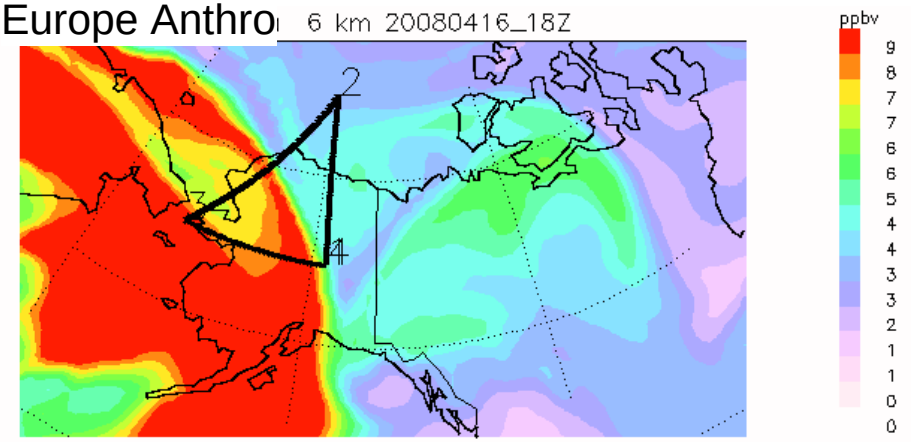
N.Asia Fires



CO

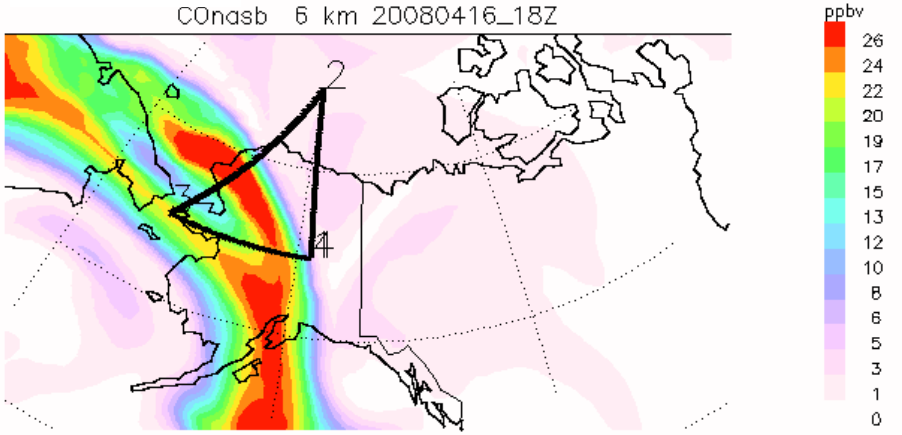


Europe Anthro

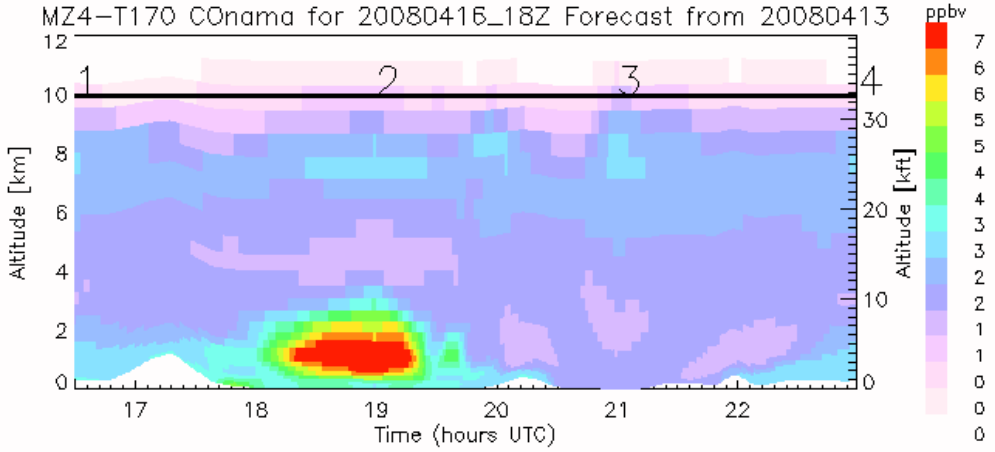


MZ4/GFS Apr 16 18Z
forecast from Apr 13

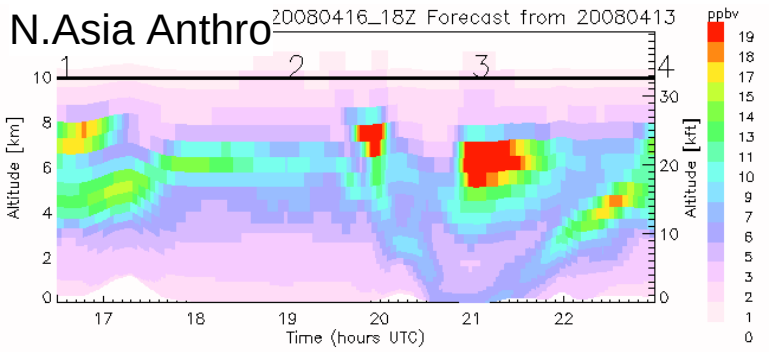
N. Asia 6km



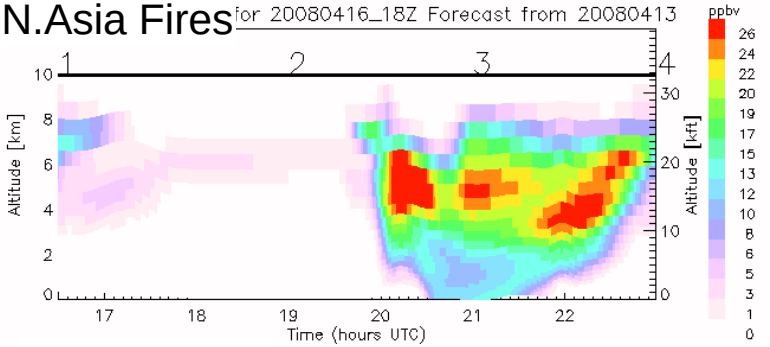
N.America anthro



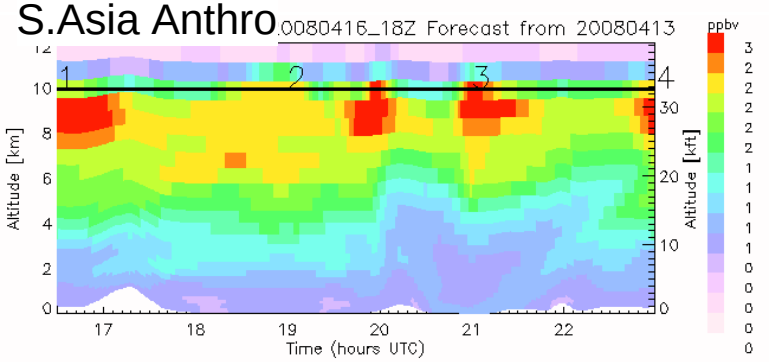
N.Asia Anthro



N.Asia Fires



S.Asia Anthro



Europe Anthro