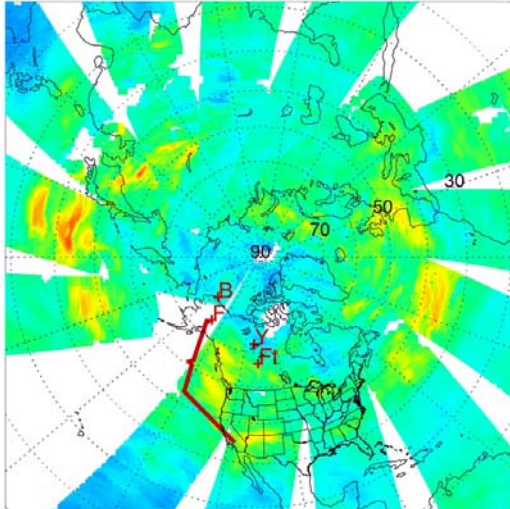
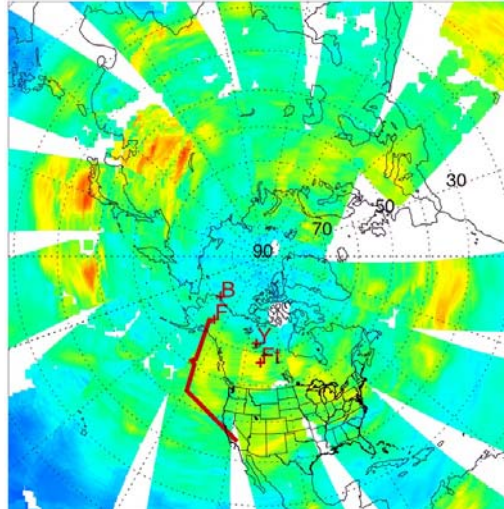


AIRS NRT ARCTAS Support: CO Transport

20080329 Night

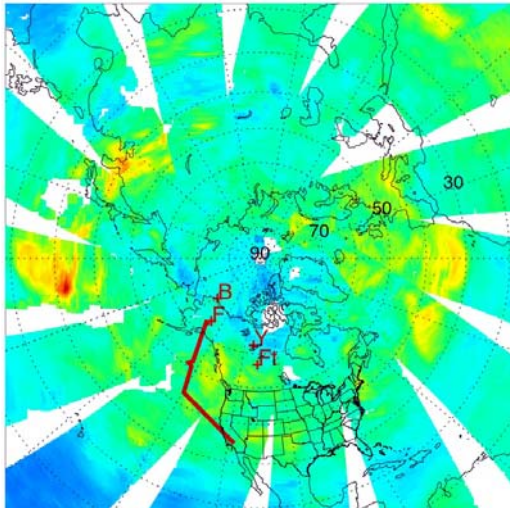


20080329 Day

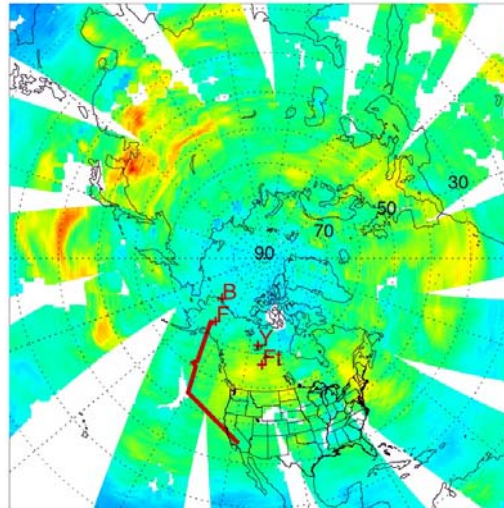


Asian transport splits into Northern and Southern components and is dissipating. DC-8 may capture the plume near Alaska.

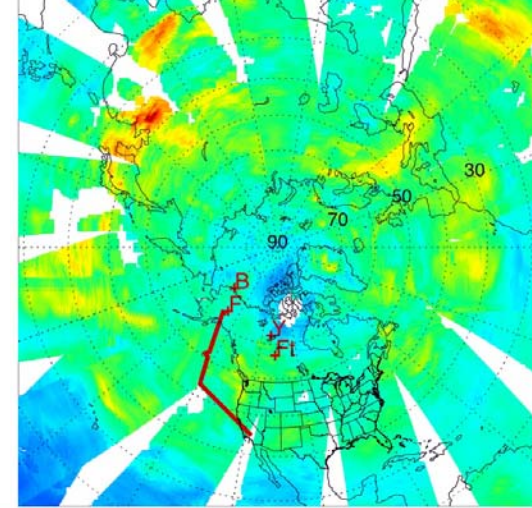
20080330 Night



20080330 Day



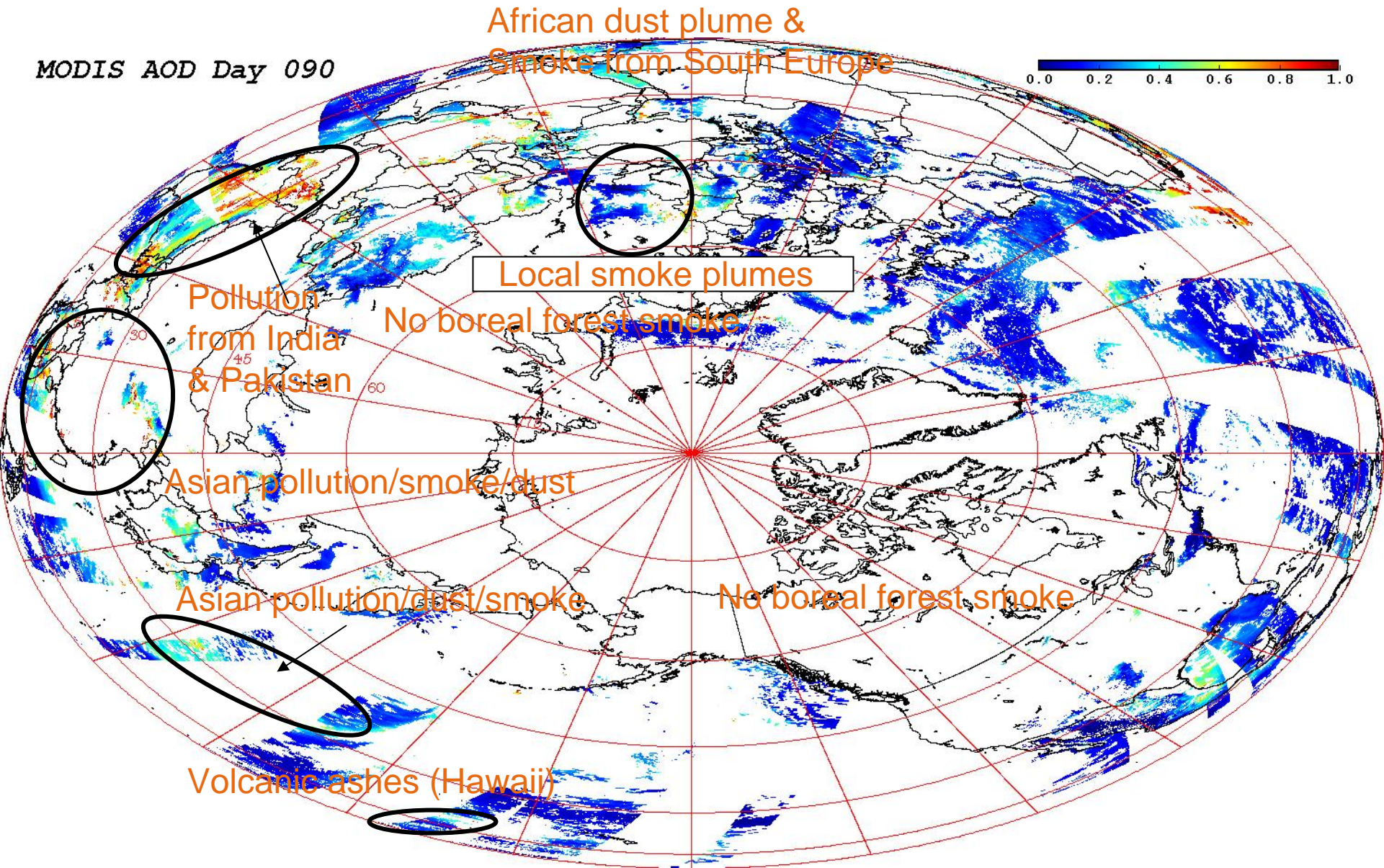
20080331 Full



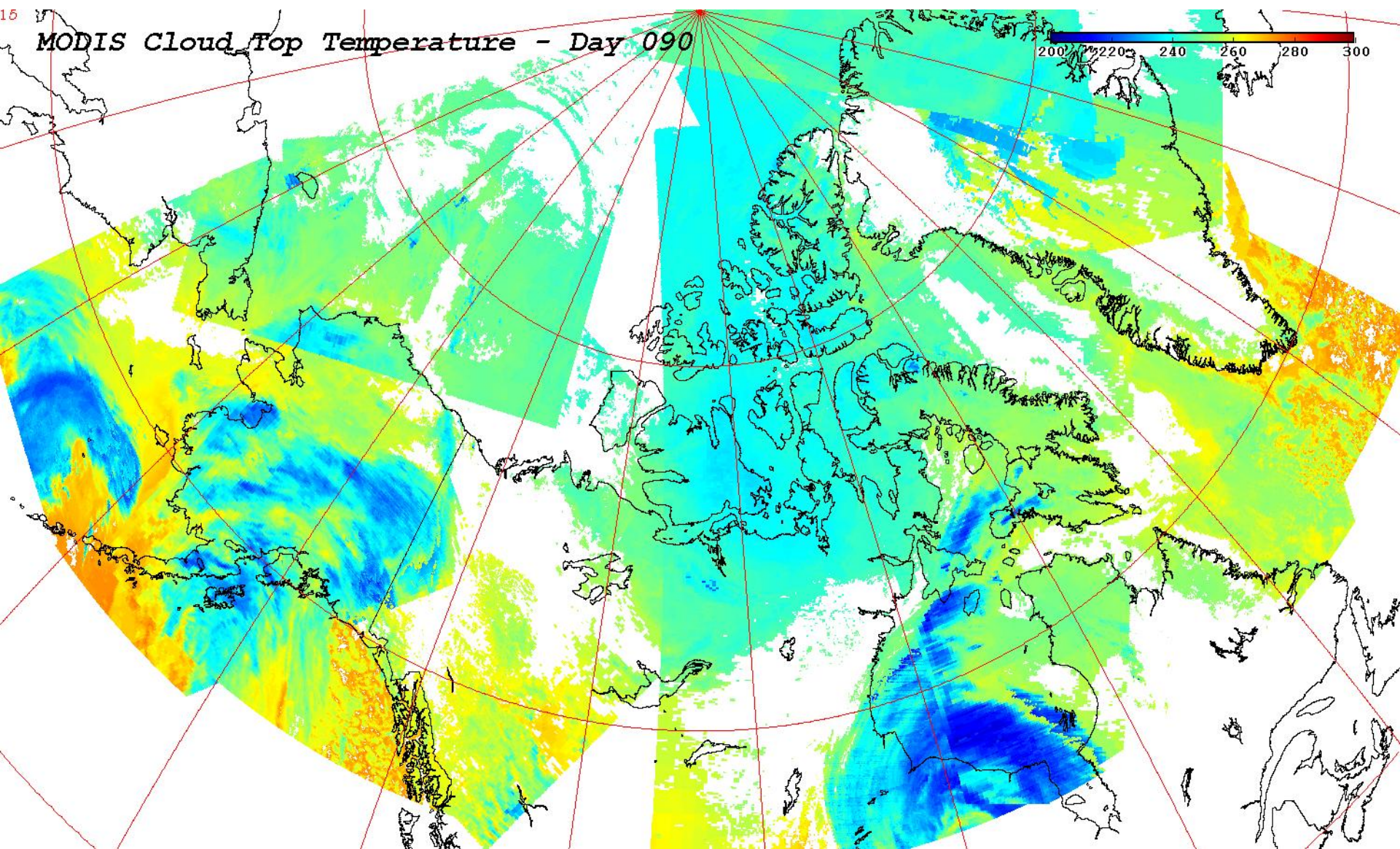
0.0 27.8 55.6 83.3 111.1 138.9 166.7 194.4 222.2 250.0

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

MODIS AOD Day 090



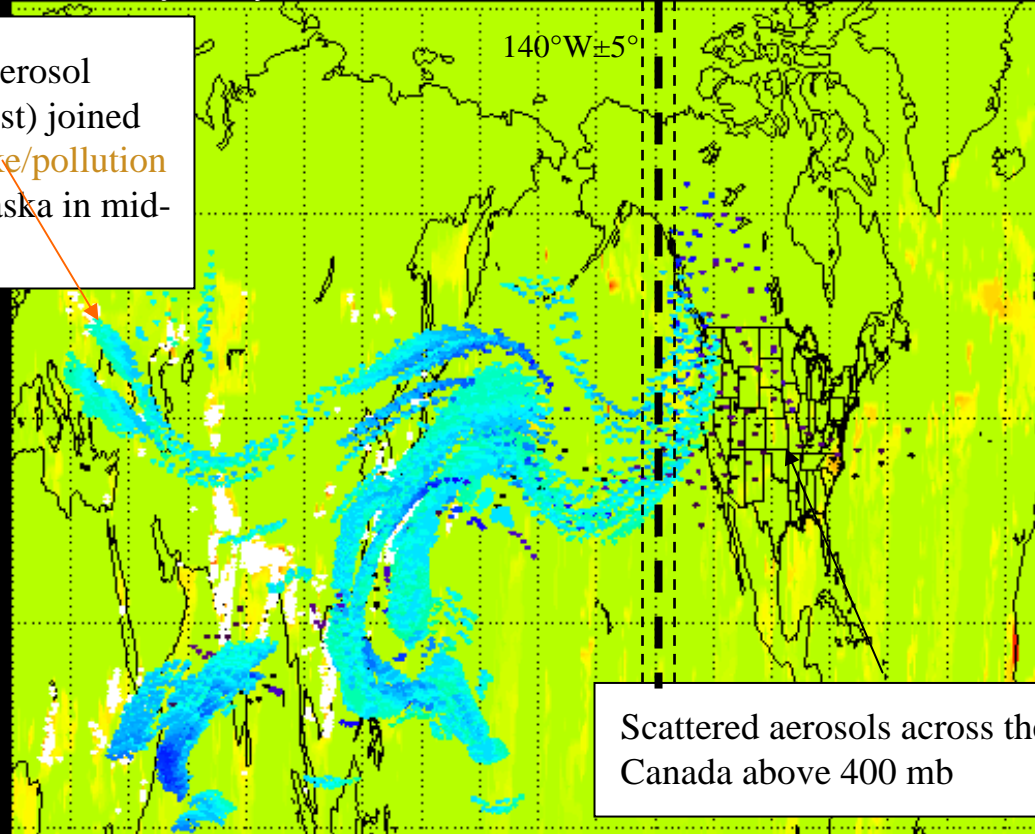
MODIS Cloud Top Temperature in Flight Domain



Aerosol Trajectory Based Upon MODIS AOD and GEOS-5 Winds

MODIS Trajectory Initialized 2008032800Z Valid 2008040118Z

Asian (including SE Asia) aerosol plumes (pollution/smoke/dust) joined by Southern European smoke/pollution aerosol moving towards Alaska in mid-atmosphere (700-850 mb)

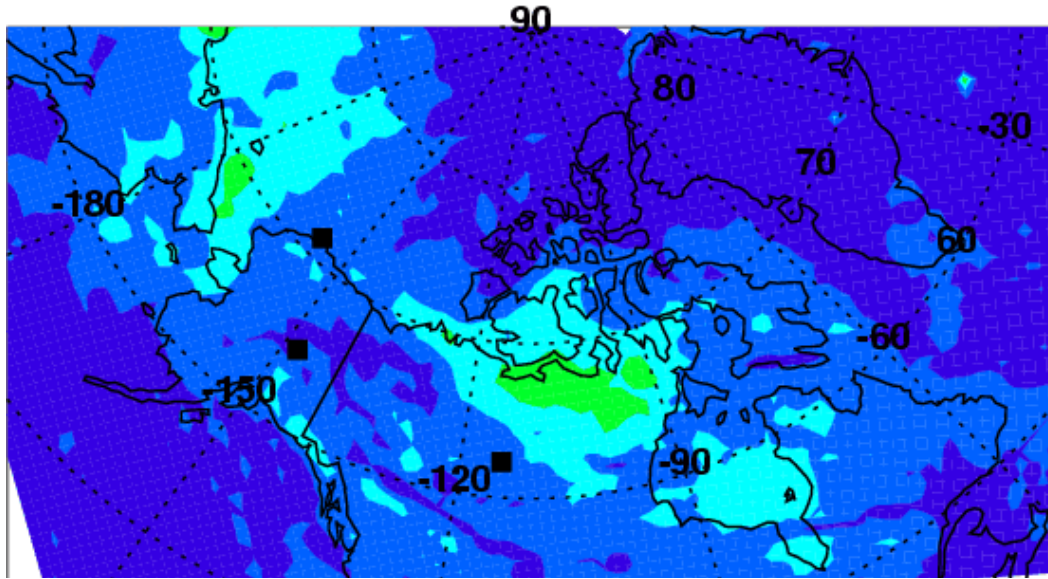


Scattered aerosols across the US and Canada above 400 mb

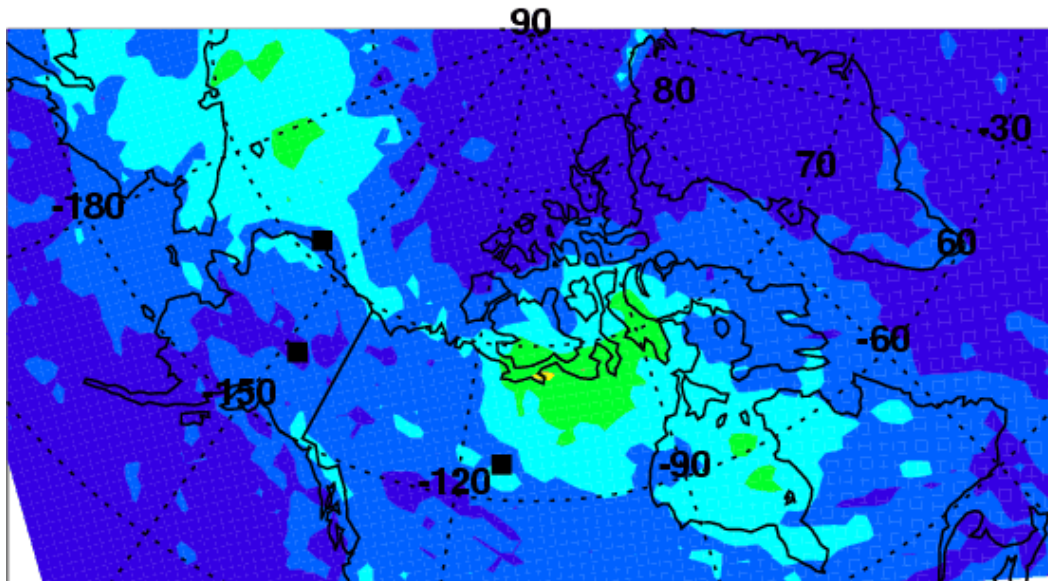


(Courtesy: Brad Pierce & Duncan Fairlei for Trajectory Package)

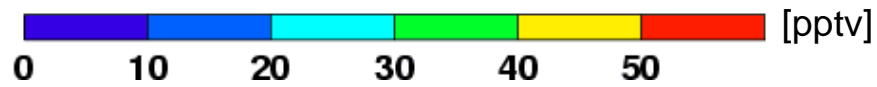
Boundary BrO in the last 2 days



March 29

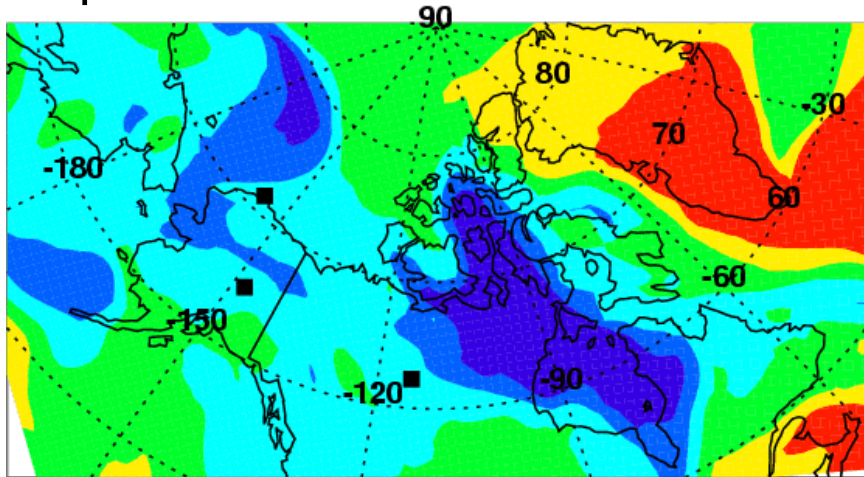


March 30

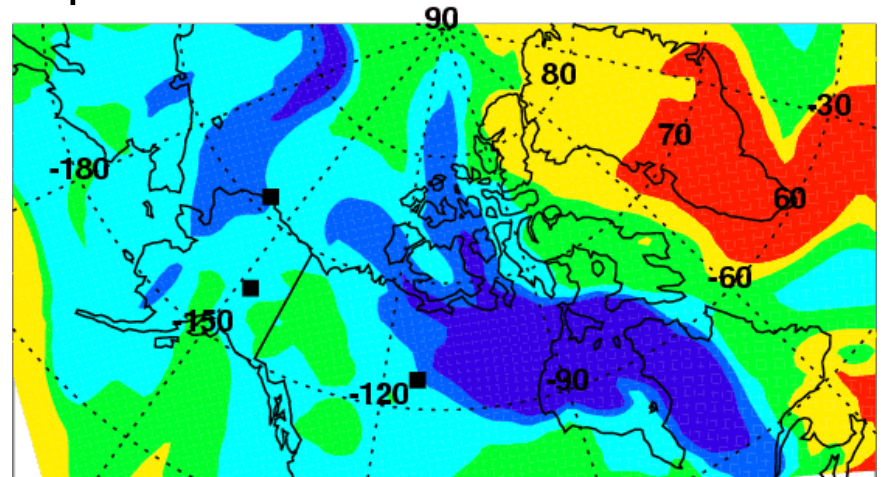


Surface O₃ at noon (Fairbanks LT) in the next 4 days

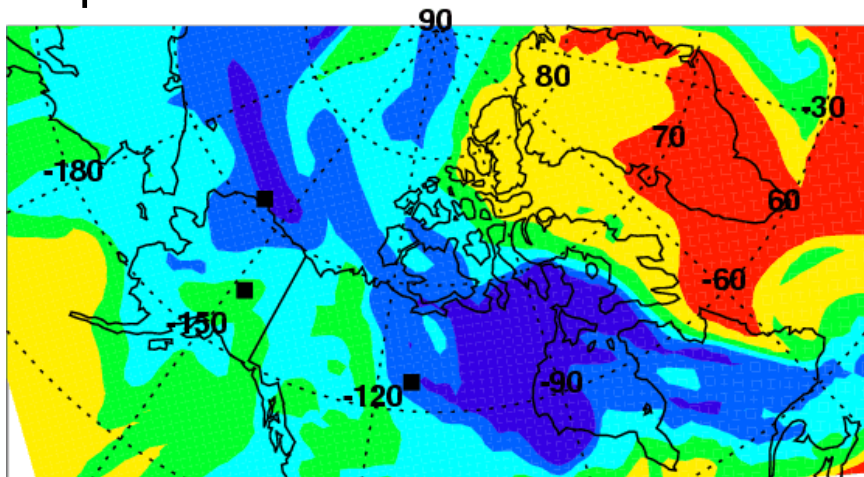
April 1



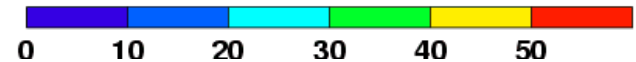
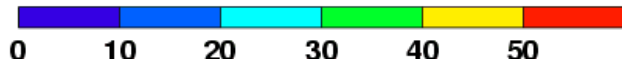
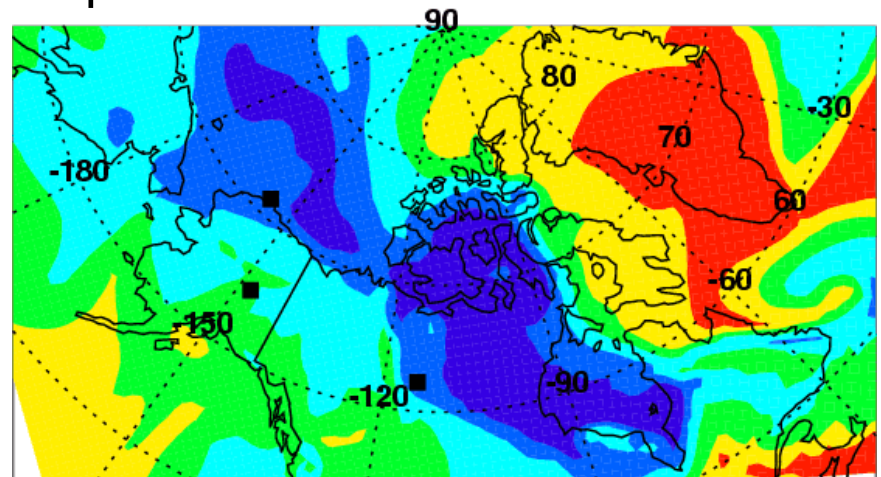
April 2



April 3

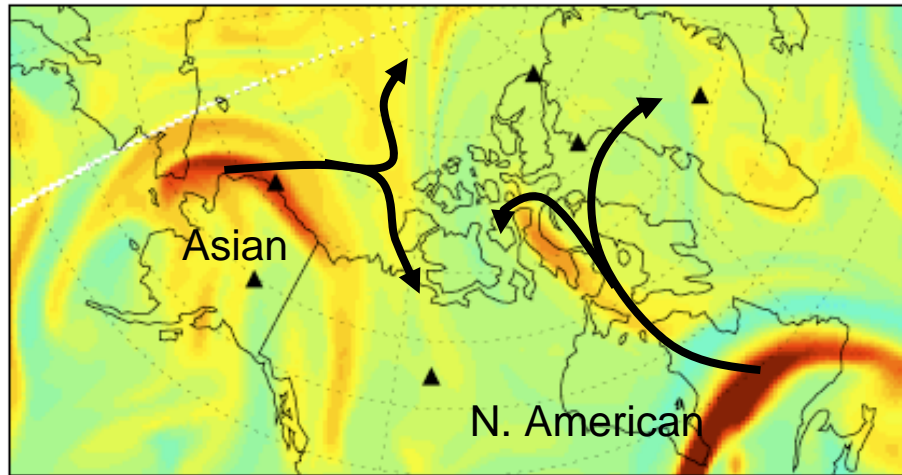


April 4

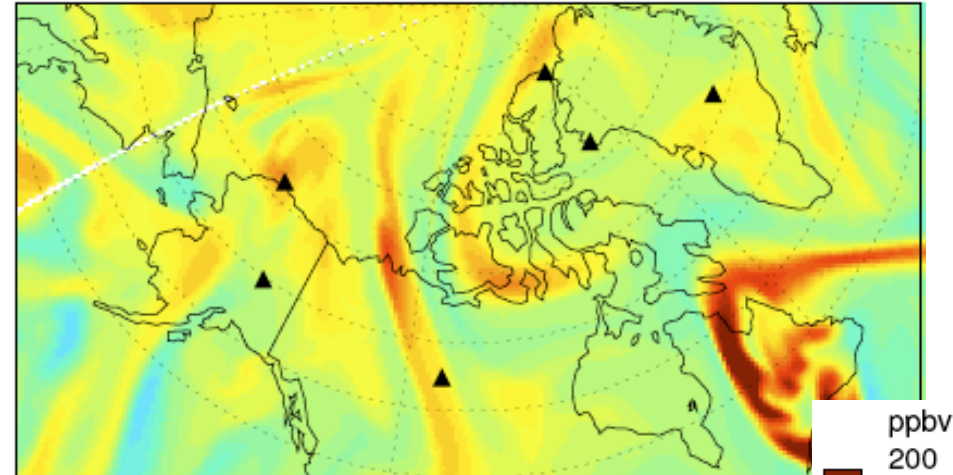


GEOS Total CO 500 hPa

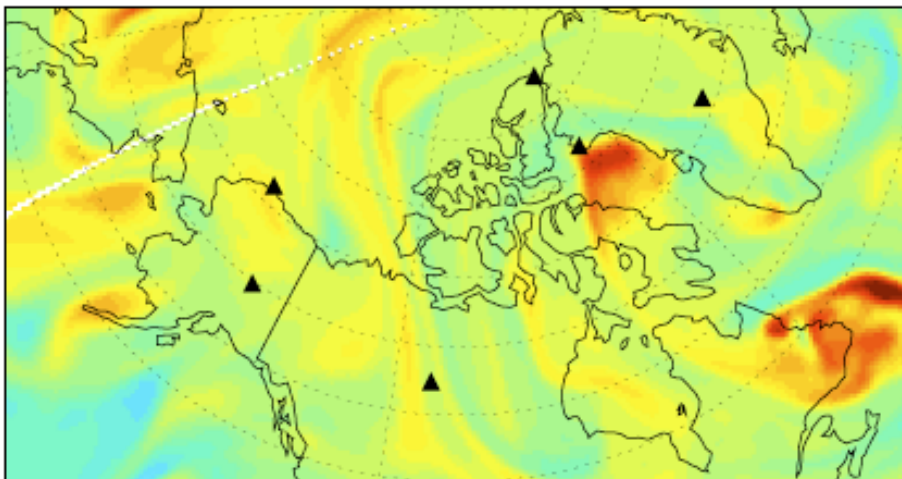
4/1



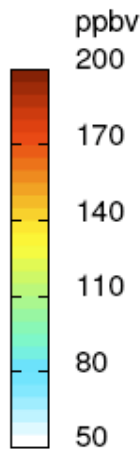
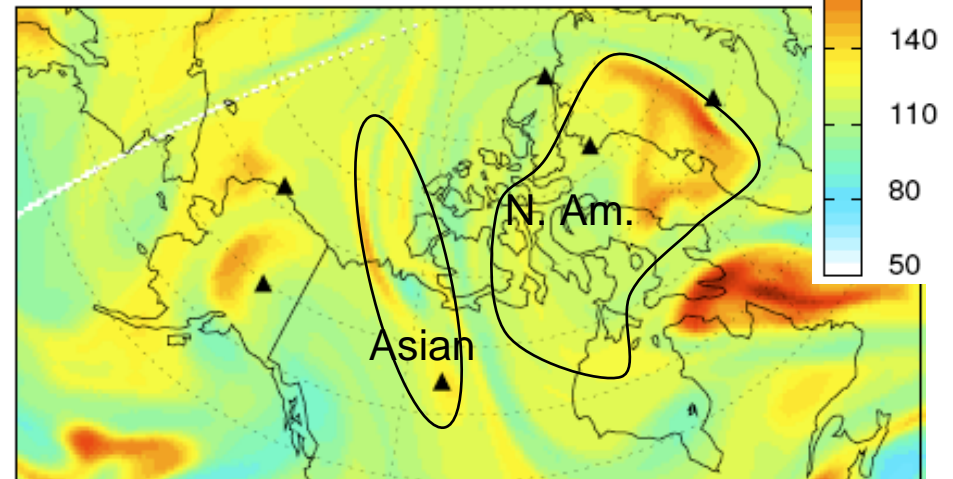
4/2



4/3



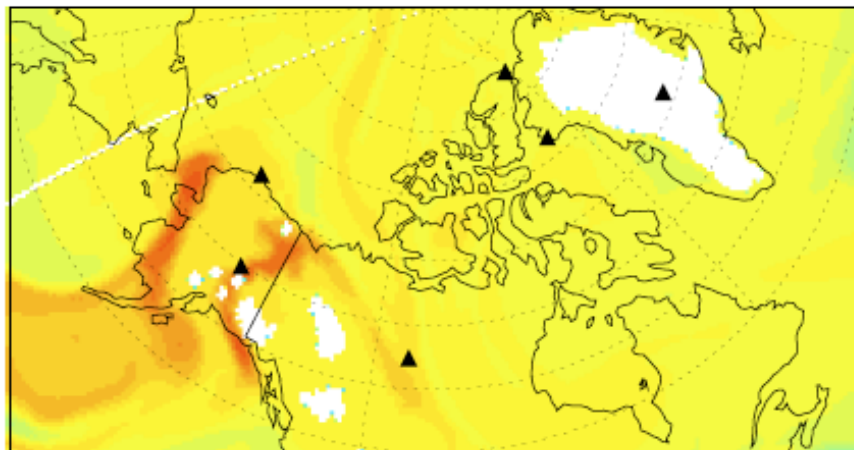
4/4



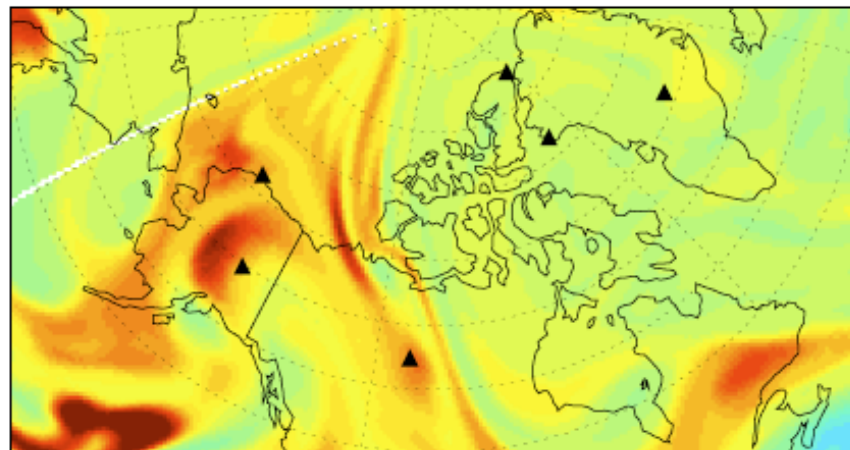
DC-8 Flight Opportunity

4/4 DC-8 Flight Opportunity Asian CO

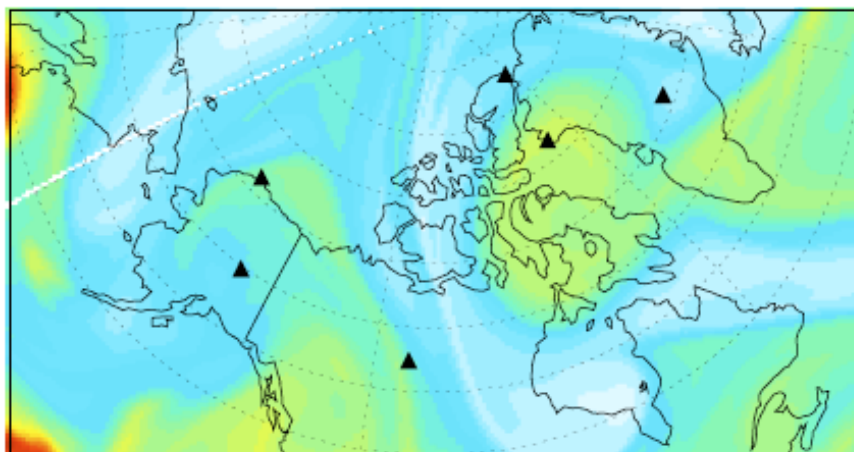
850 hPa (1.5 km)



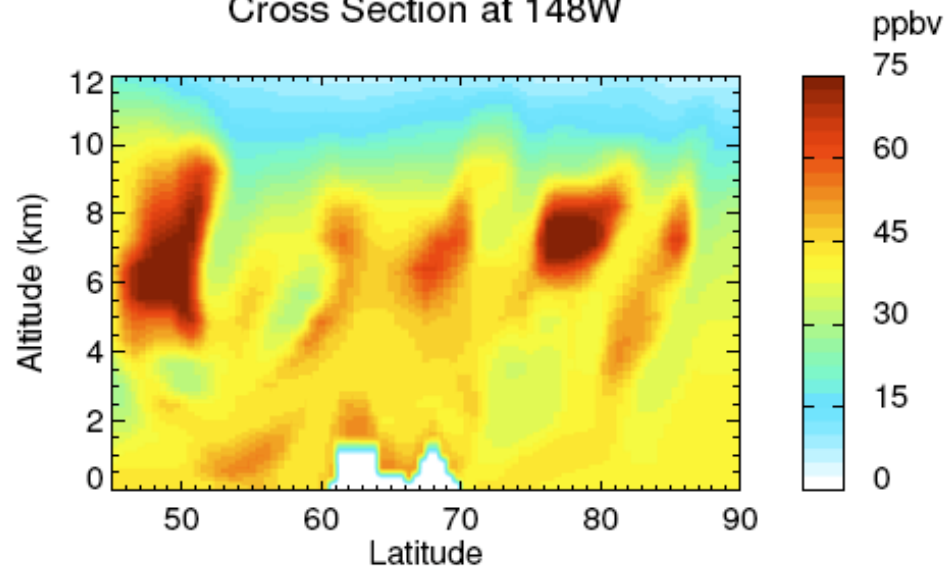
500 hPa (5.6 km)



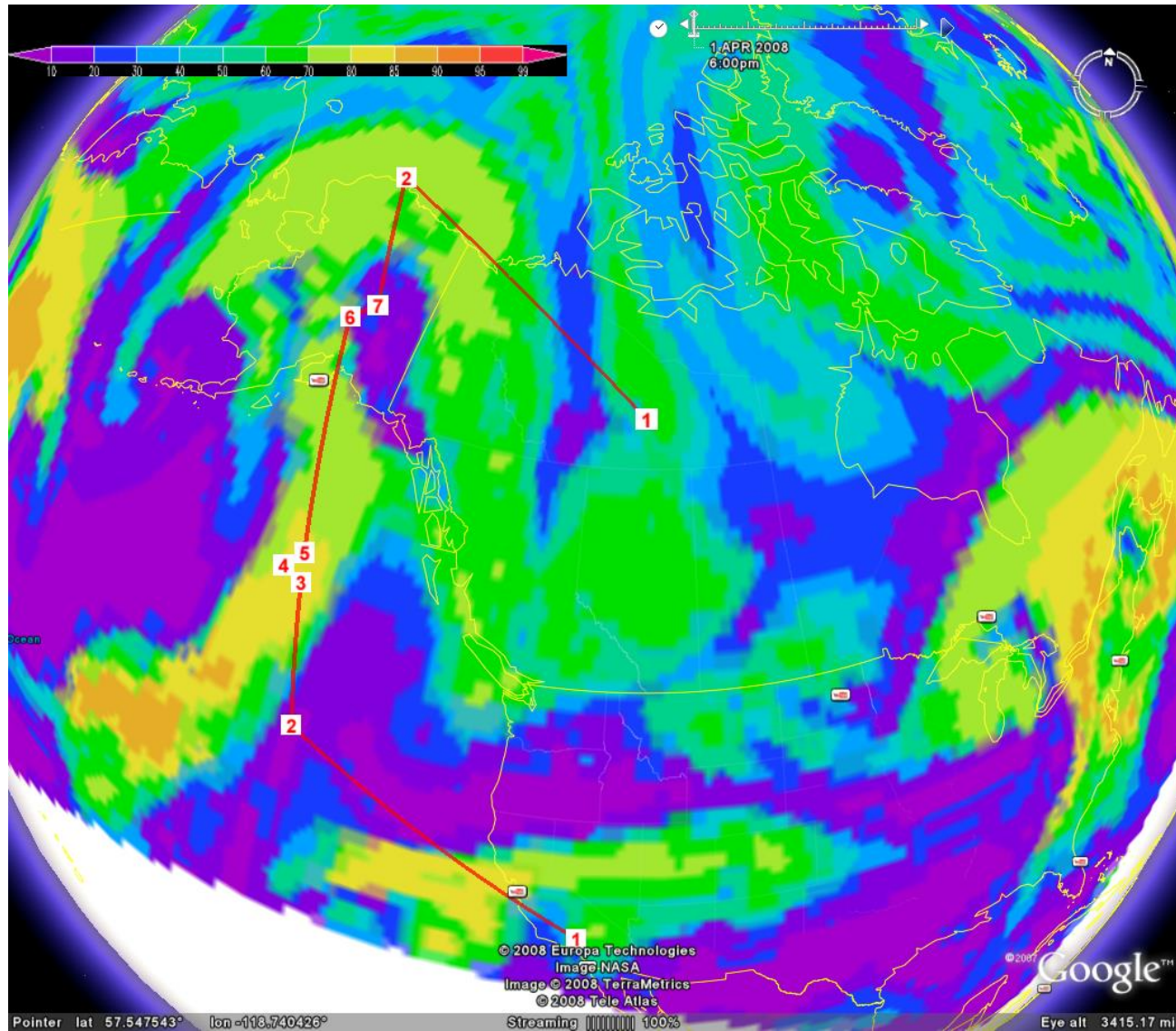
250 hPa (10.4 km)



Cross Section at 148W

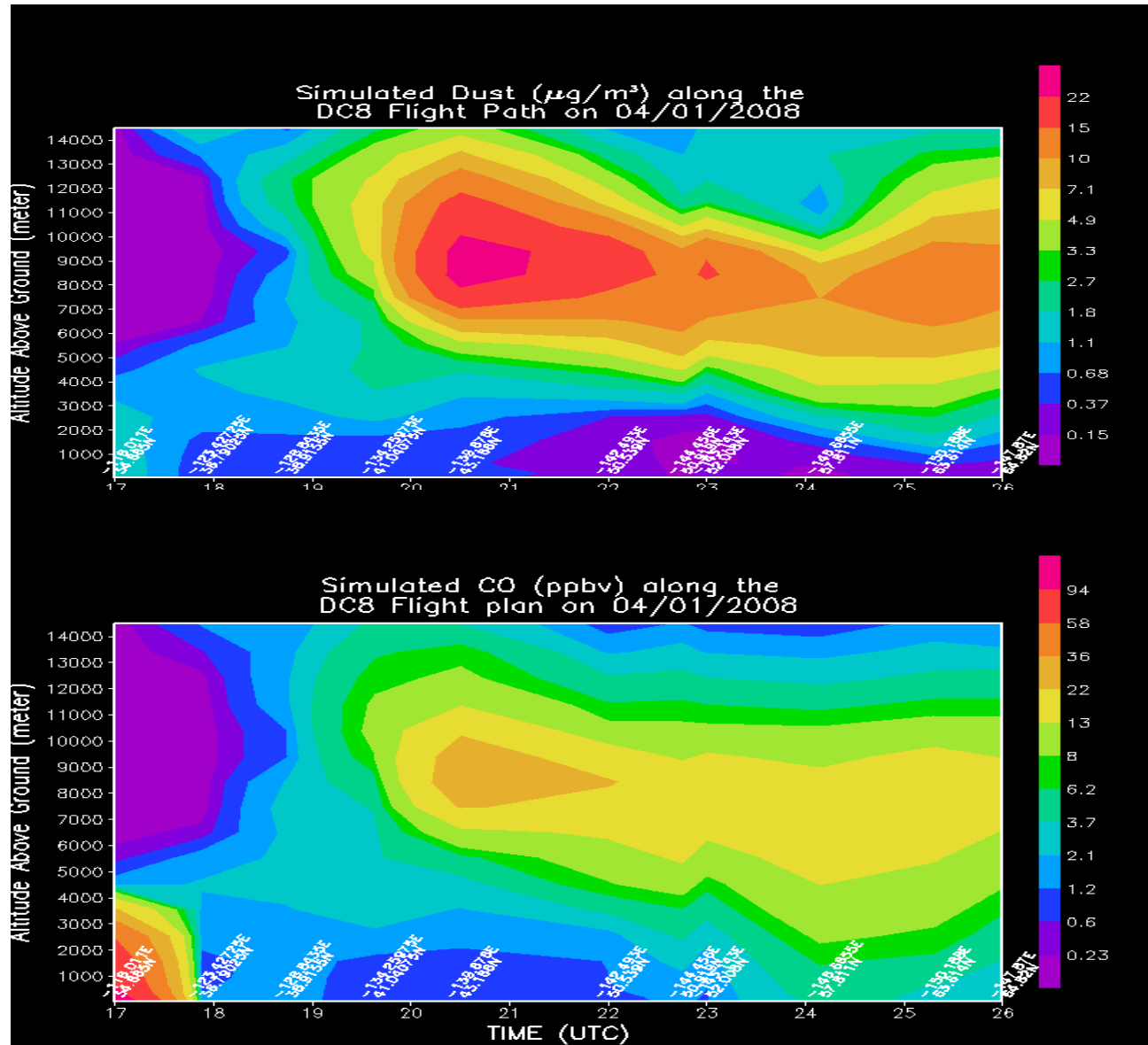


STEM April 1 18z: CO at 5.5 km

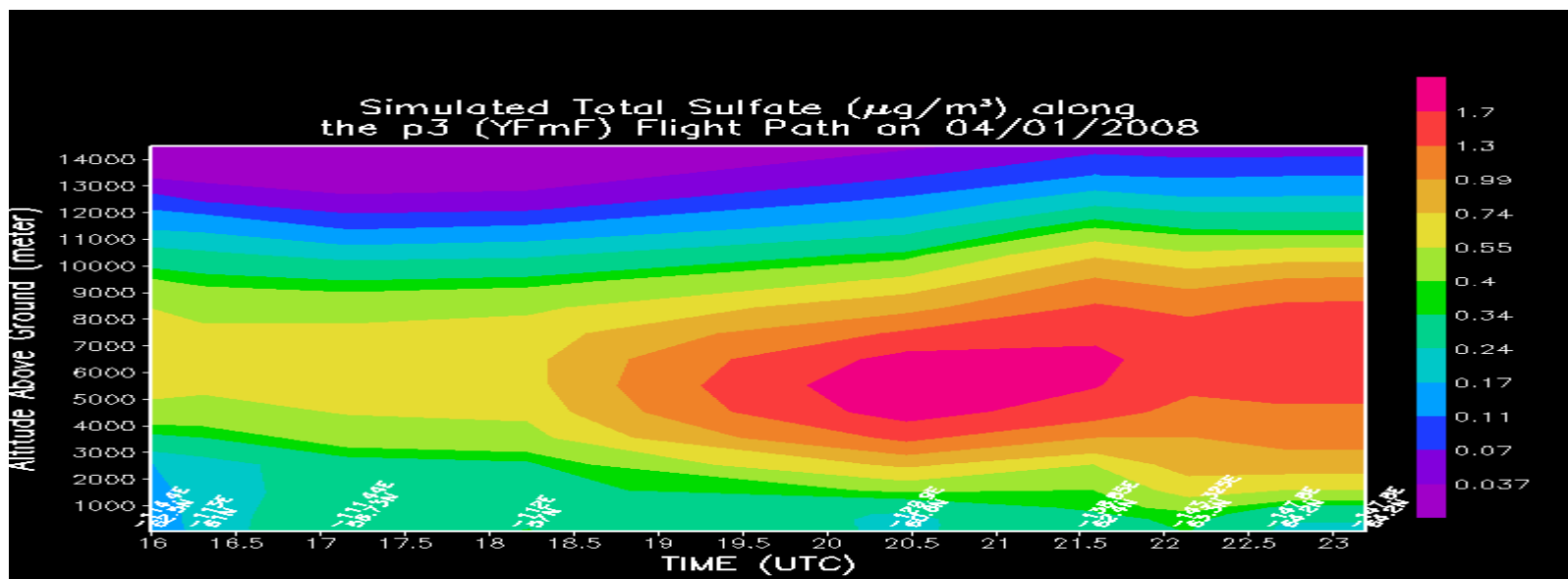
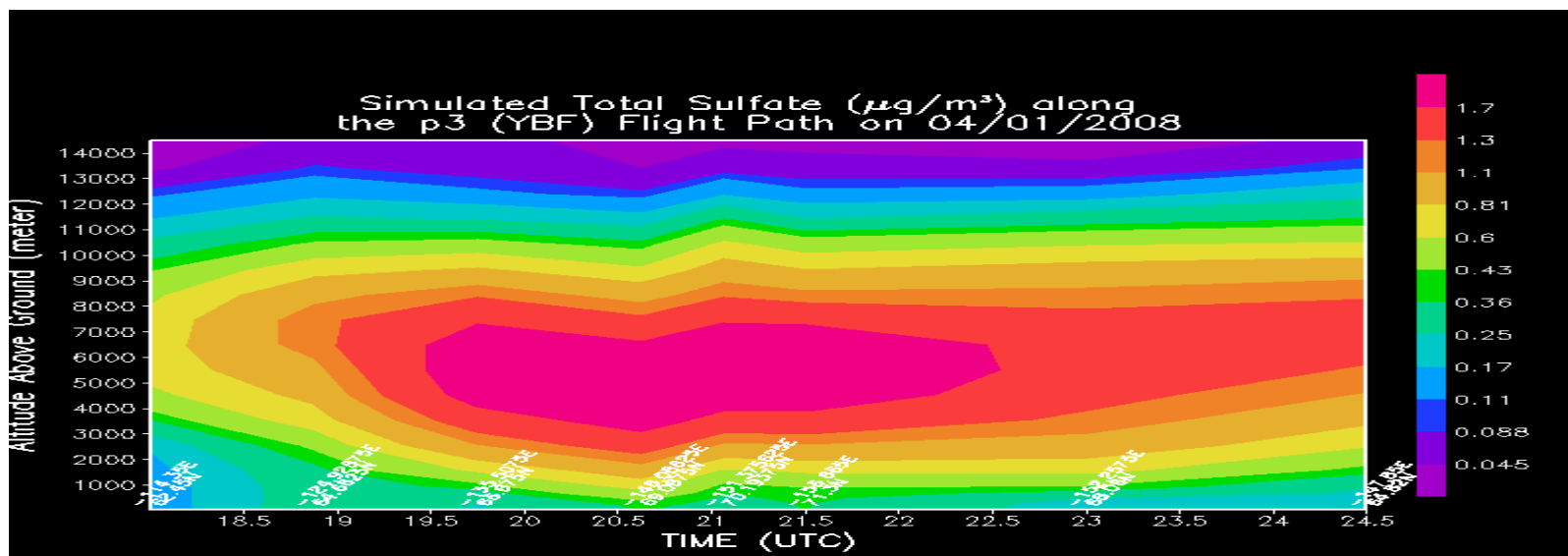


STEM April 1: DC8 Curtain Plots

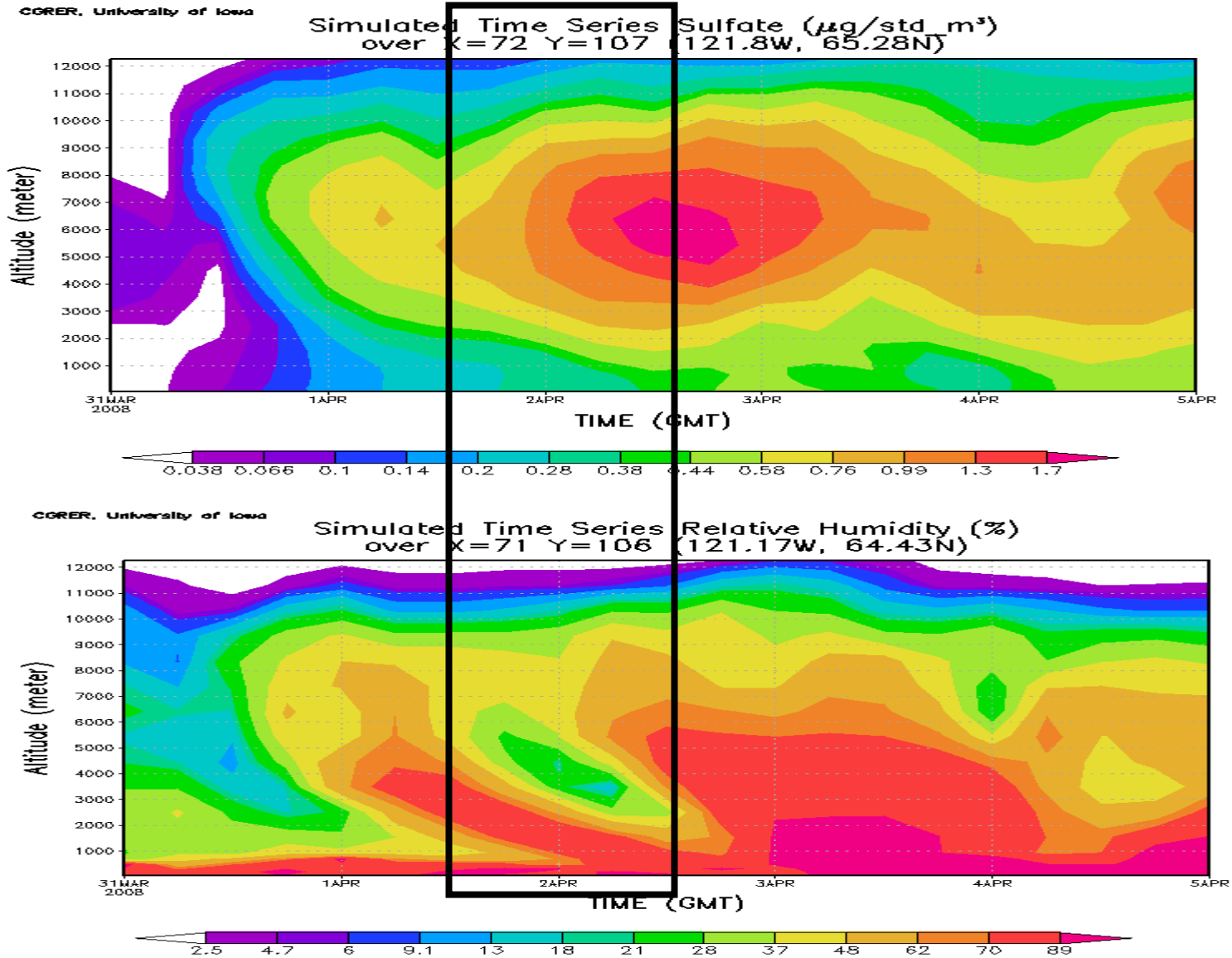
Dust & CO



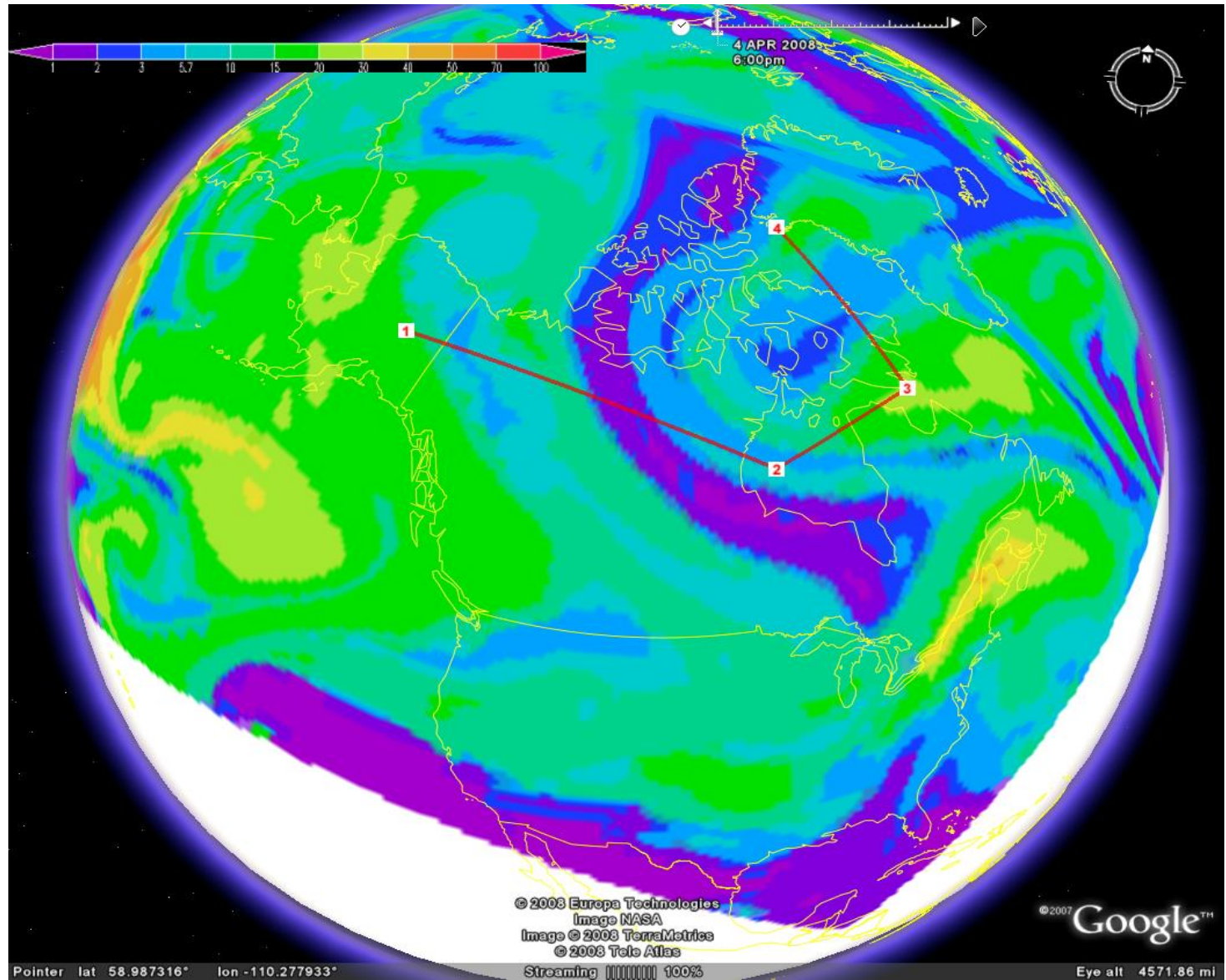
STEM April 1 P3 Curtain Plots: Top YBF; Bottom YFmF



STEM RH and Sulfate Sounding at 122W/65N Low Clouds with Aerosol Aloft



STEM April 4:18z CO at 5.5 km

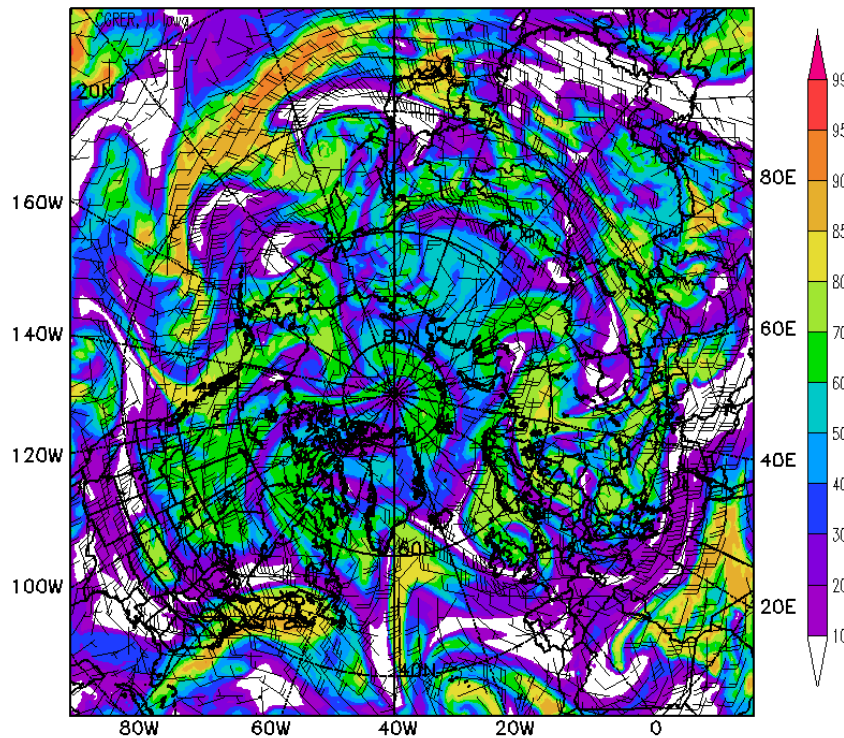


STEM Forecast for April 4 18Z: RH and AOD

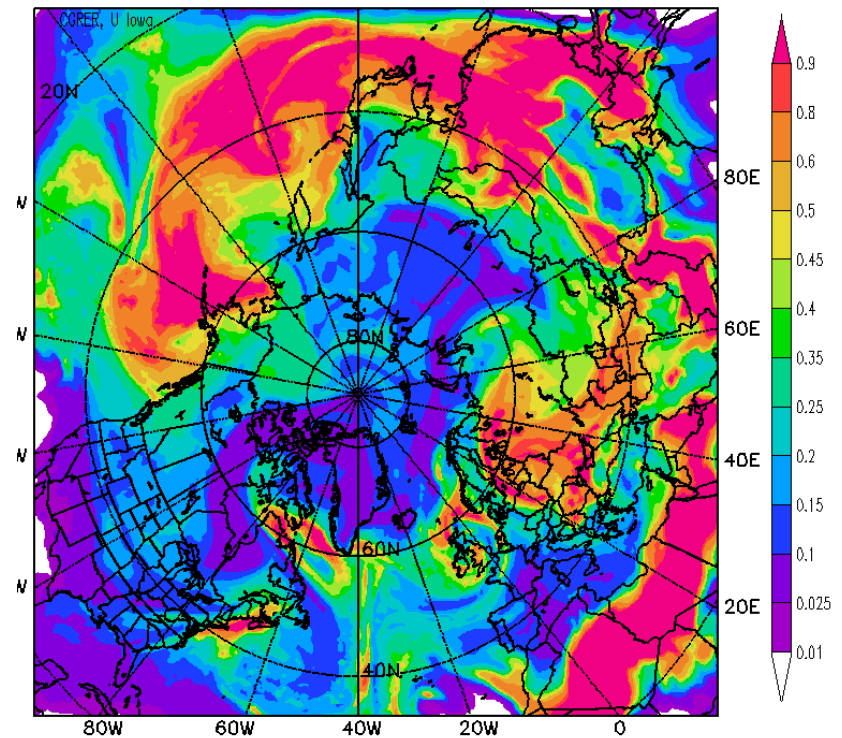
Air masses from Asia; Europe and USA from West to East

Low Altitude Pollution over Alaska

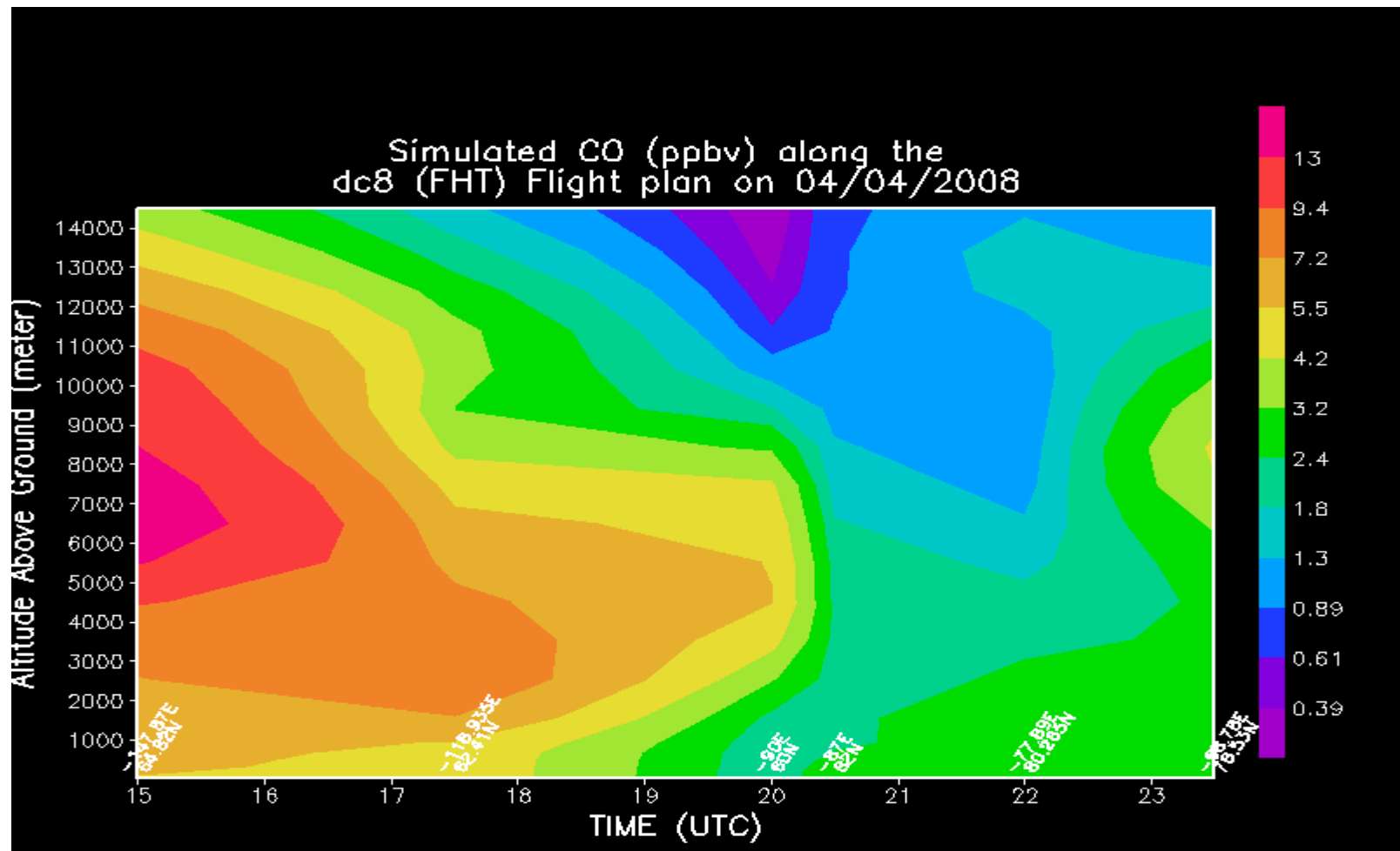
Simulated Relative Humidity(%) in the 5.5km layer
at 18UTC, 4/4/2008



Simulated Column TOTAL Aerosol Optical_Depth
at 18UTC, 4/4/2008



STEM April 4 Curtain Plot FHT Flight Path Asia, Europe and North American Sources



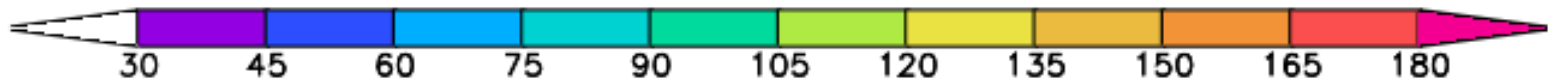
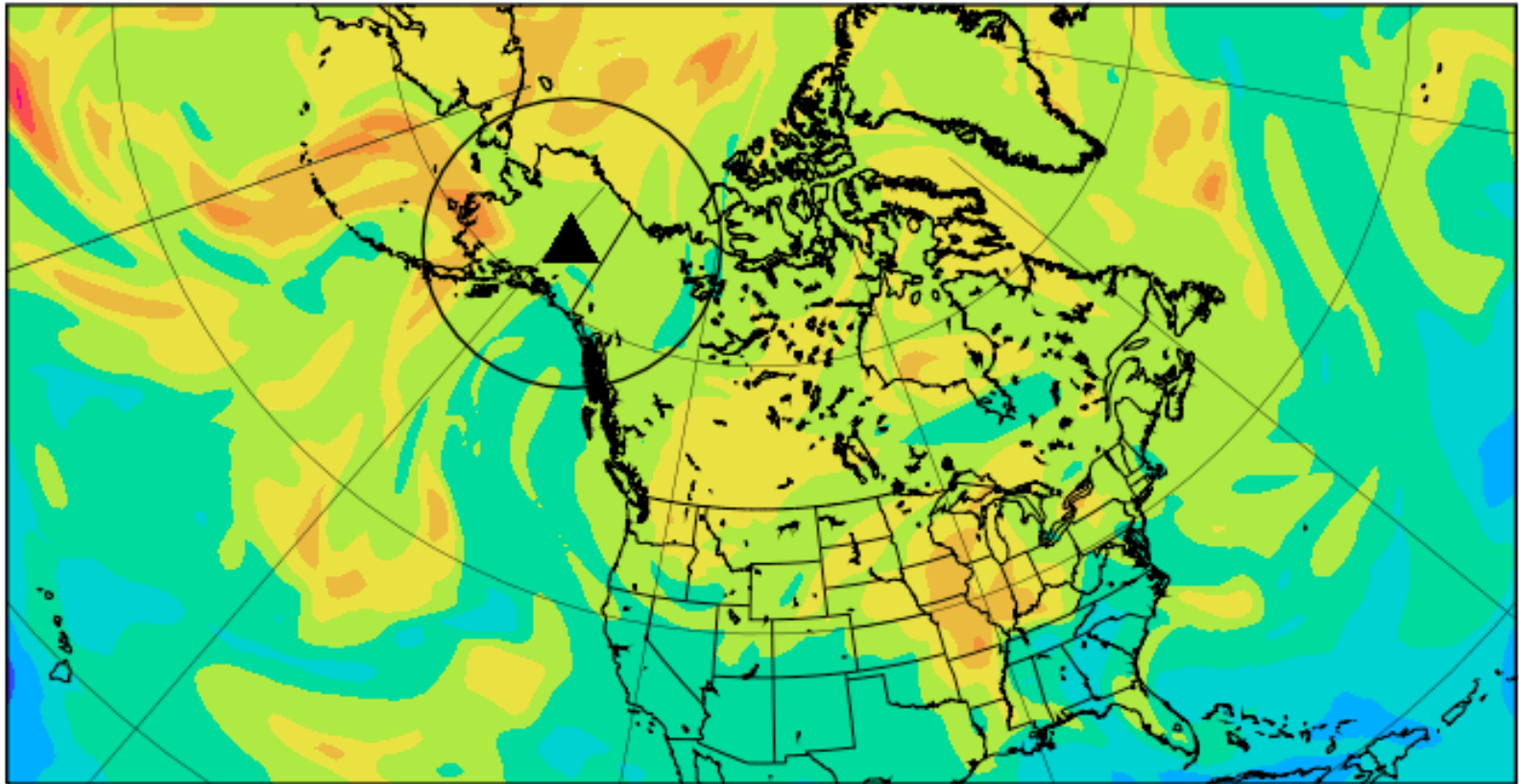
GEOS-5 CO/Aerosols forecasts
forecast from 20080331_06Z

GMAO 03/31 06Z Fx

CO evolution

500 hPa CO

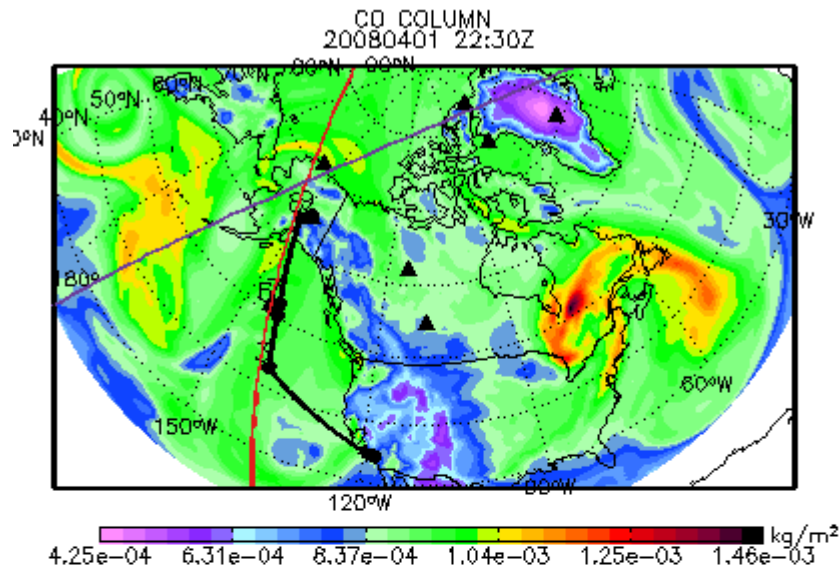
CO [ppbV] on 07:30Z31MAR2008



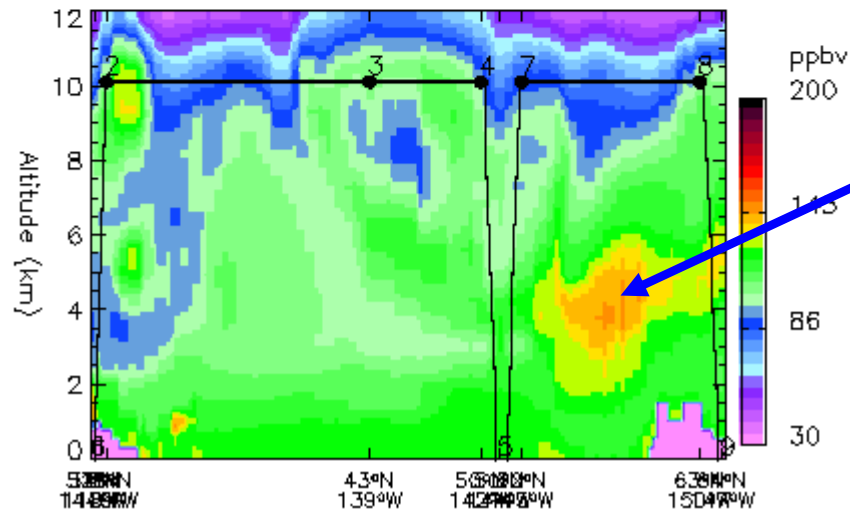
Palmdale to Fairbanks 4/1

GEOS-5 forecast: 20080331_06z

Total CO



Curtain plot
CO MIXING RATIO 20080401 22:30Z

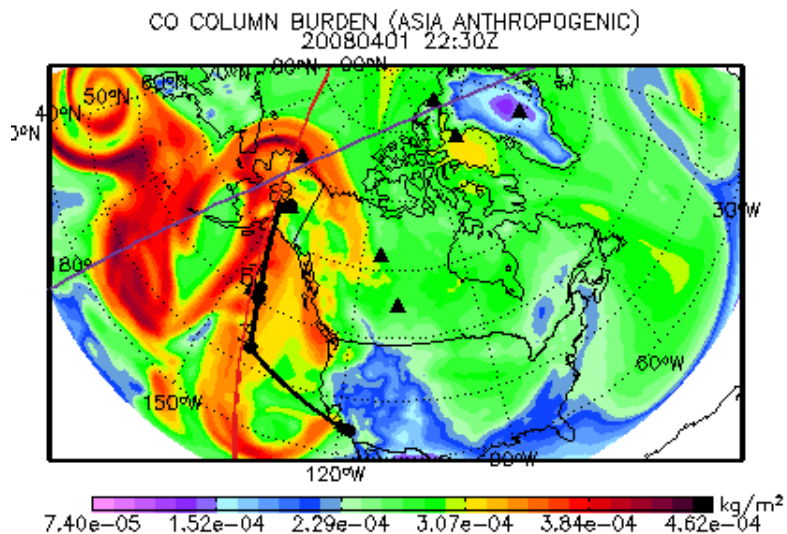


Mostly Asian FF CO

Palmdale to Fairbanks 4/1

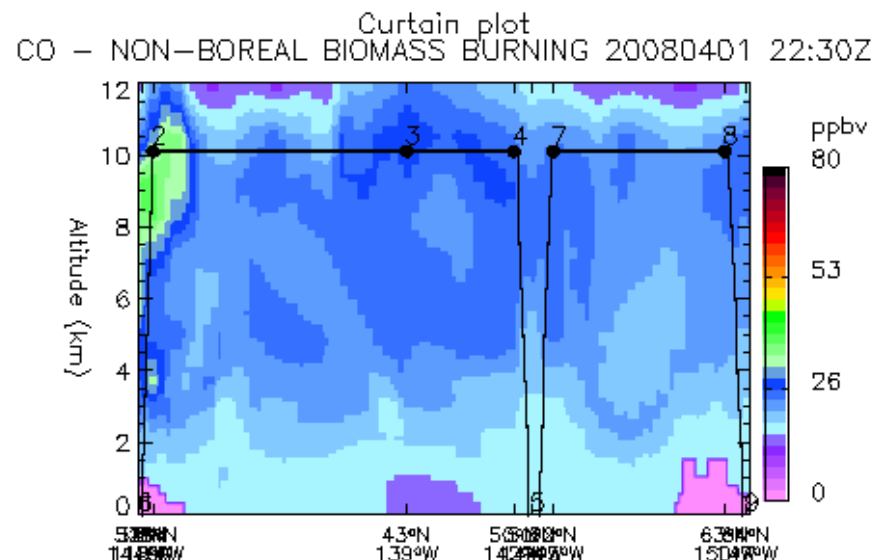
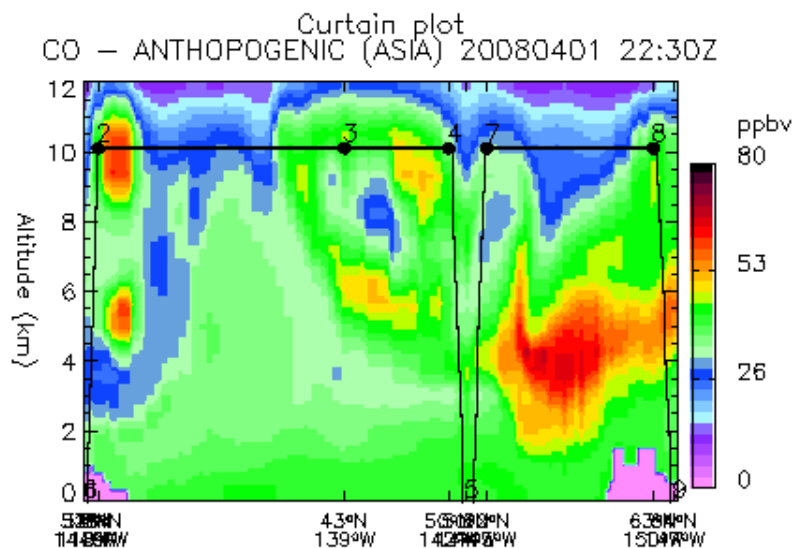
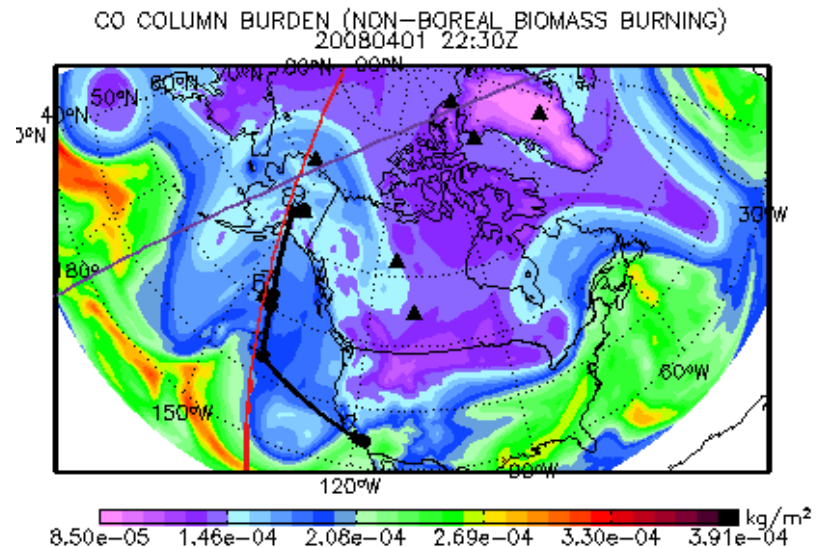
Asian Anthropogenic CO

GEOS-5 forecast: 20080331_06z



Non-Boreal Biomass Burning CO

GEOS-5 forecast: 20080331_06z

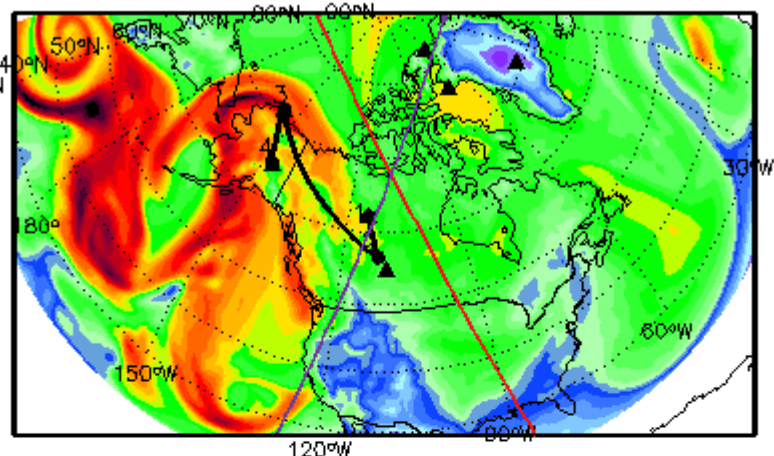


Yellowknife to Fairbanks 4/1

Asian Anthropogenic CO

GEOS-5 forecast: 20080331_06z

CO COLUMN BURDEN (ASIA ANTHROPOGENIC)
20080401 19:30Z

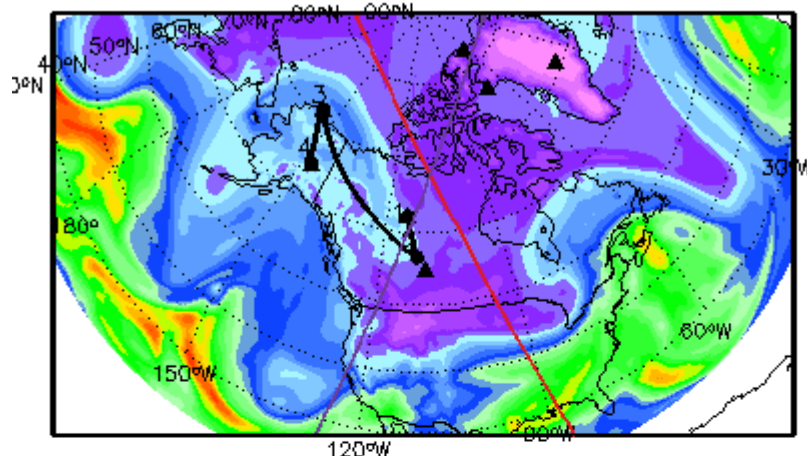


7.47e-05 1.51e-04 2.26e-04 3.02e-04 3.78e-04 4.54e-04 kg/m²

Asian Biomass Burning CO

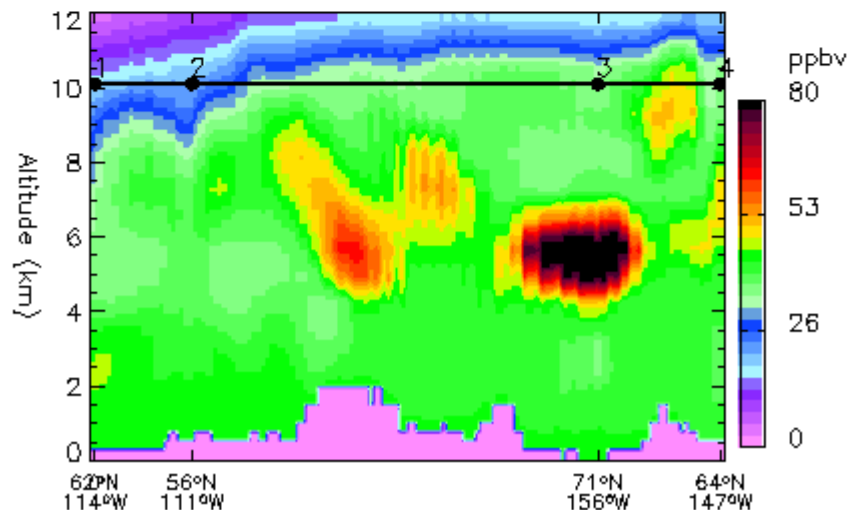
GEOS-5 forecast: 20080331_06z

CO COLUMN BURDEN (NON-BOREAL BIOMASS BURNING)
20080401 19:30Z

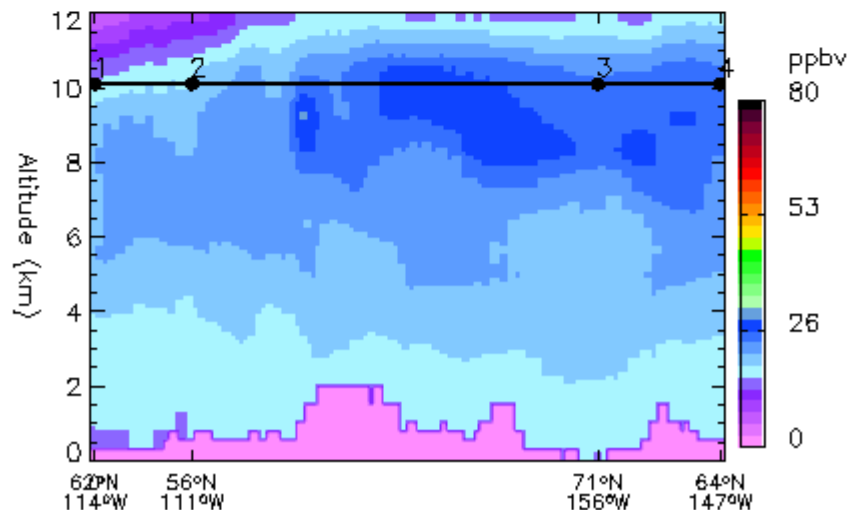


8.58e-05 1.47e-04 2.09e-04 2.70e-04 3.31e-04 3.93e-04 kg/m²

Curtain plot
CO - ANTHOPOGENIC (ASIA) 20080401 19:30Z



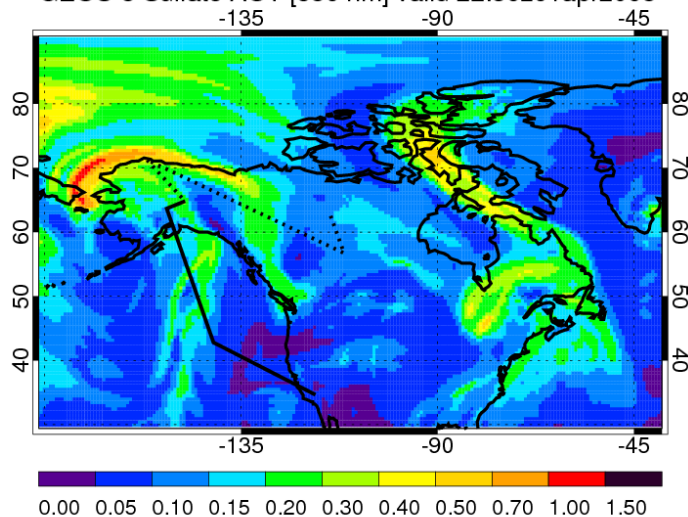
Curtain plot
CO - NON-BOREAL BIOMASS BURNING 20080401 19:30Z



4-1-2008: P-3 Yellowknife –

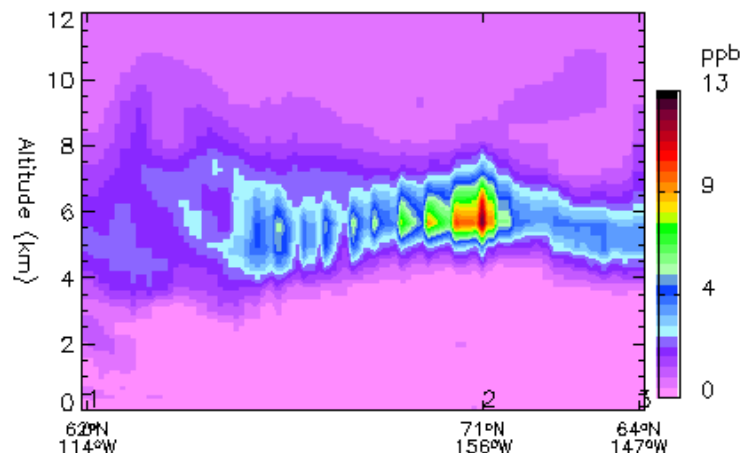
– F

GEOS-5 Sulfate AOT [550 nm] valid 22:30z01apr2008

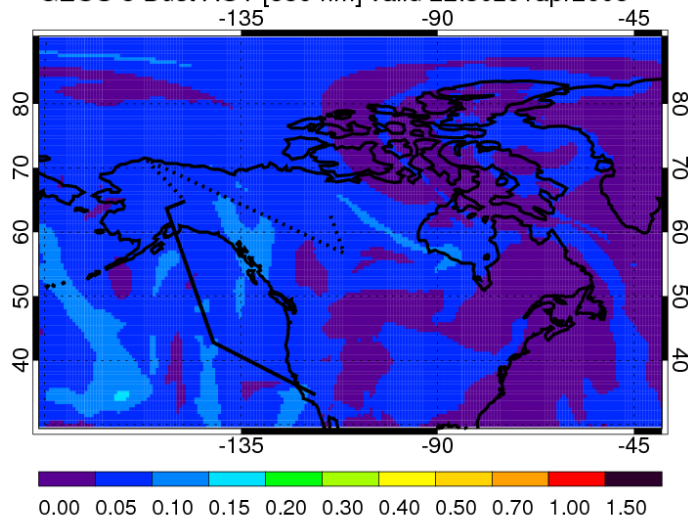


GEOS-5 forecast: 20080331_06z

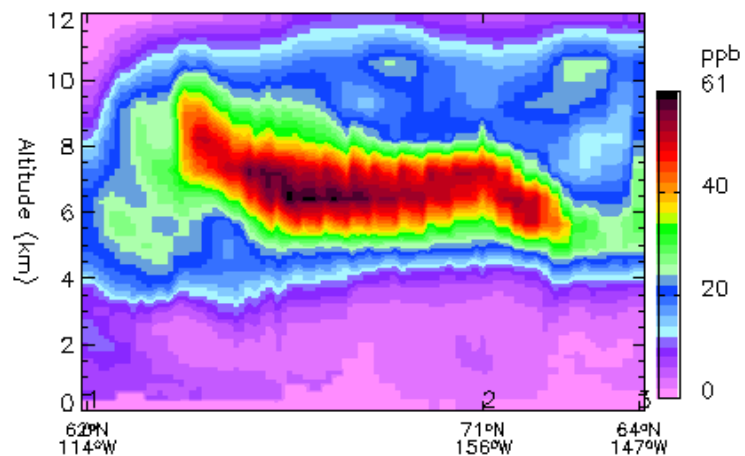
Curtain plot
SULPHATE AEROSOL 20080401 22:30Z



GEOS-5 Dust AOT [550 nm] valid 22:30z01apr2008



Curtain plot
DUST MASS MIXING RATIO 20080401 22:30Z



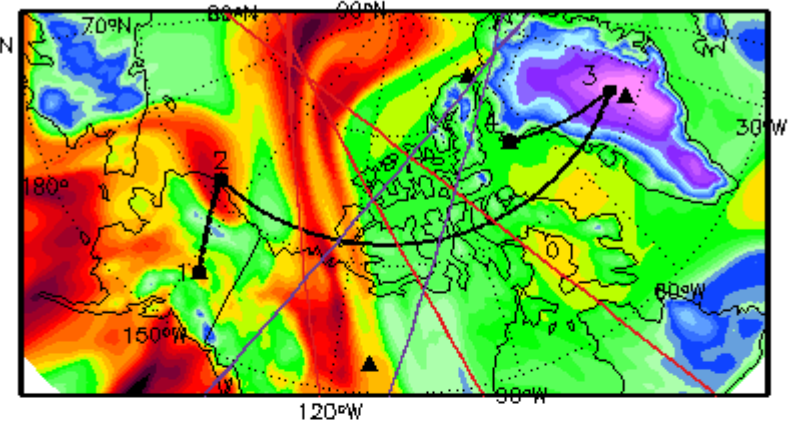
Fairbanks to Thule 4/3

Asian BB – UT
Eur FF – LT

Asian FF CO

GEOS-5 forecast: 20080331_06z

CO COLUMN BURDEN (ASIA ANTHROPOGENIC)
20080403 19:30Z

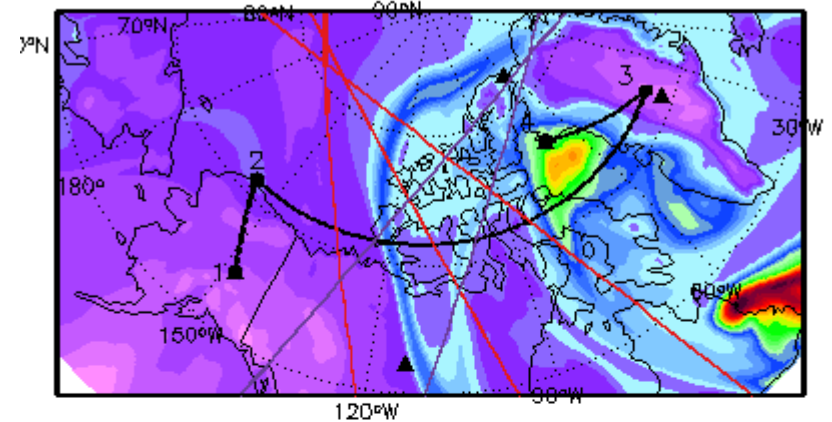


1.43e-04 1.94e-04 2.45e-04 2.96e-04 3.47e-04 3.98e-04 kg/m²

N. American FF CO

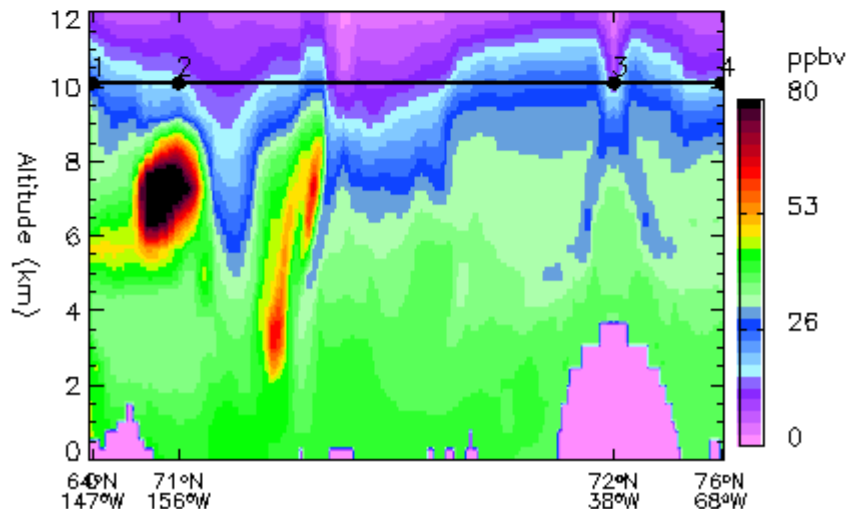
GEOS-5 forecast: 20080331_06z

CO COLUMN BURDEN (NORTH AMERICAN ANTHROPOGENIC)
20080403 19:30Z

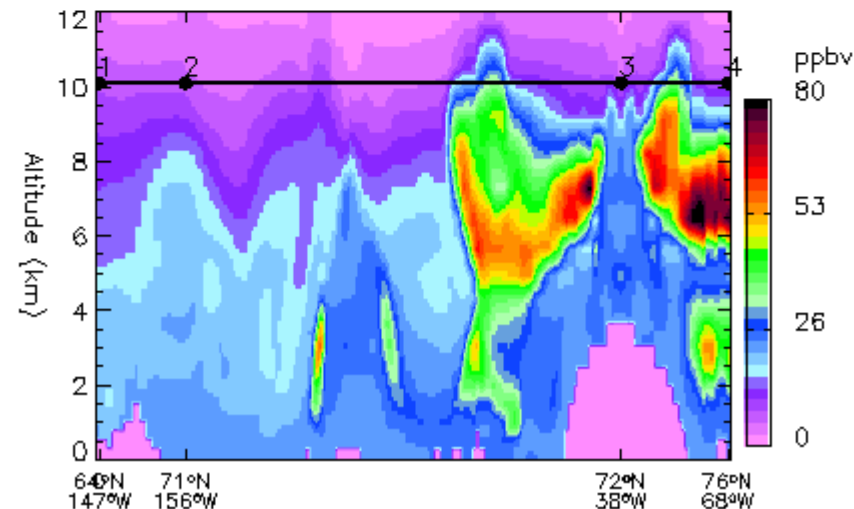


7.20e-05 1.64e-04 2.56e-04 3.48e-04 4.40e-04 5.32e-04 kg/m²

Curtain plot
CO – ANTHROPOGENIC (ASIA) 20080403 19:30Z

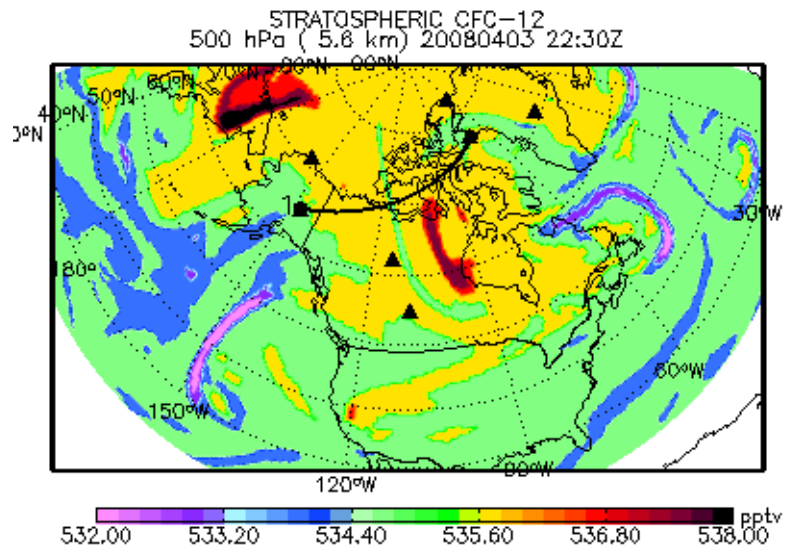


Curtain plot
CO – ANTHROPOGENIC (NORTH AMERICA) 20080403 19:30Z

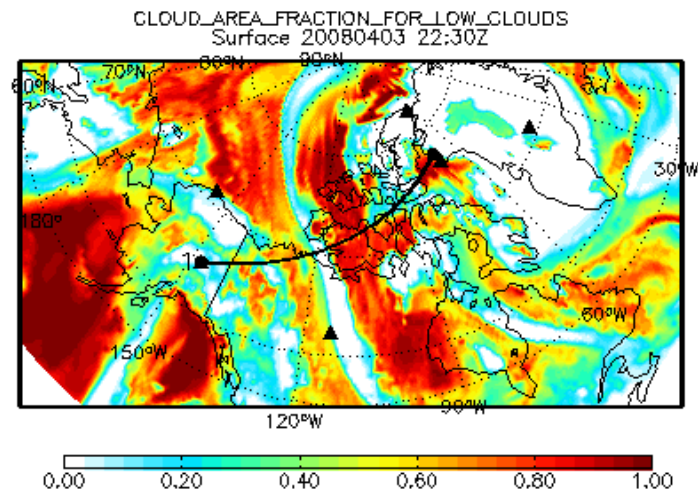


Fairbanks to Thule 4/3

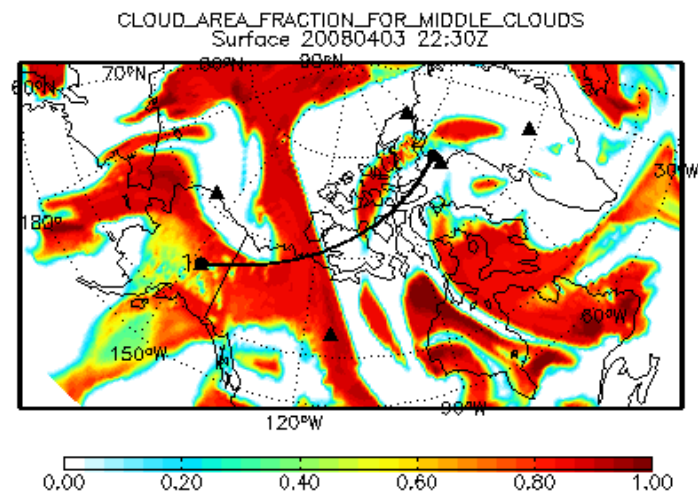
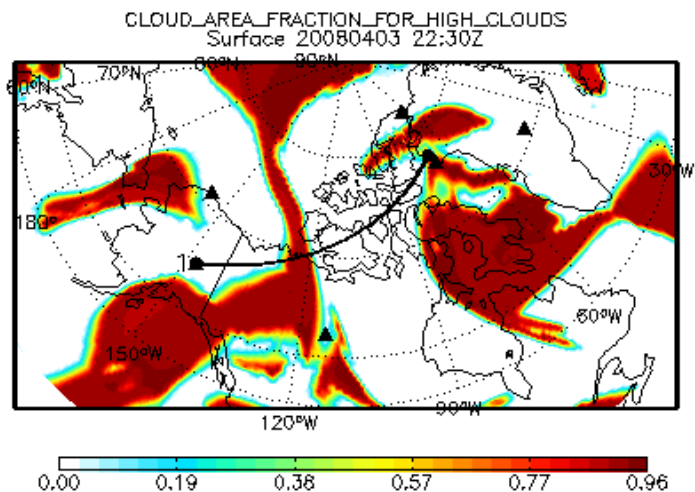
GEOS-5 forecast: 20080331_06z



GEOS-5 forecast: 20080331_06z

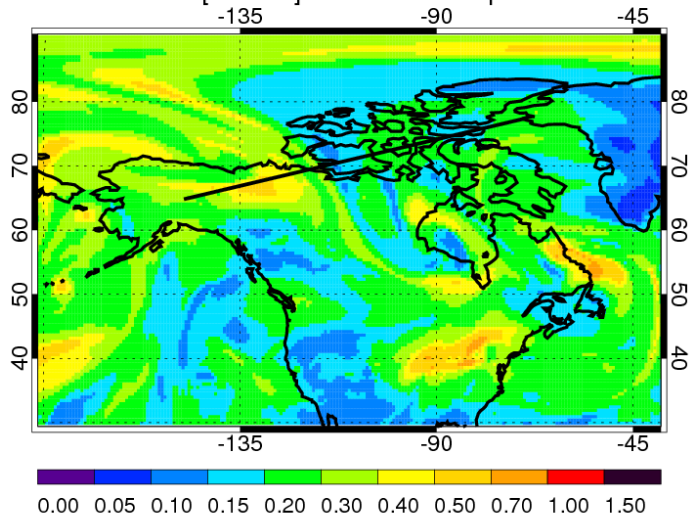


GEOS-5 forecast: 20080331_06z

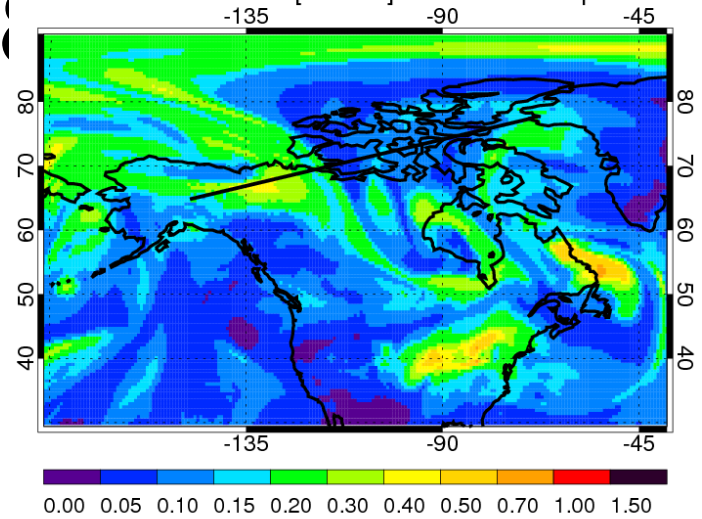


DC-

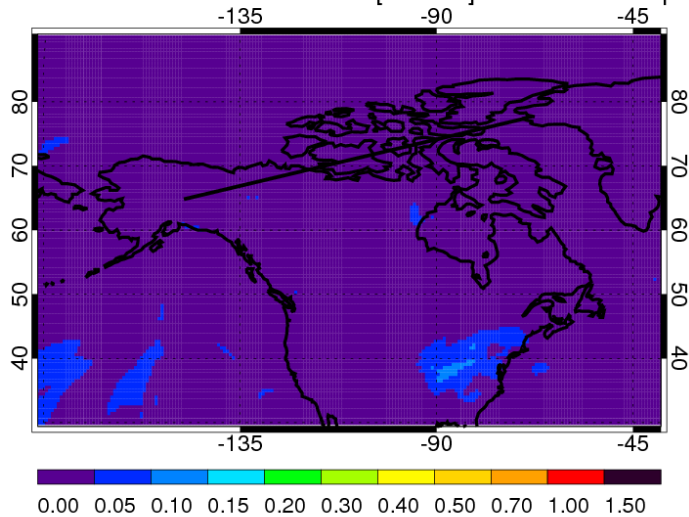
GEOS-5 AOT [550 nm] valid 22:30z03apr2008



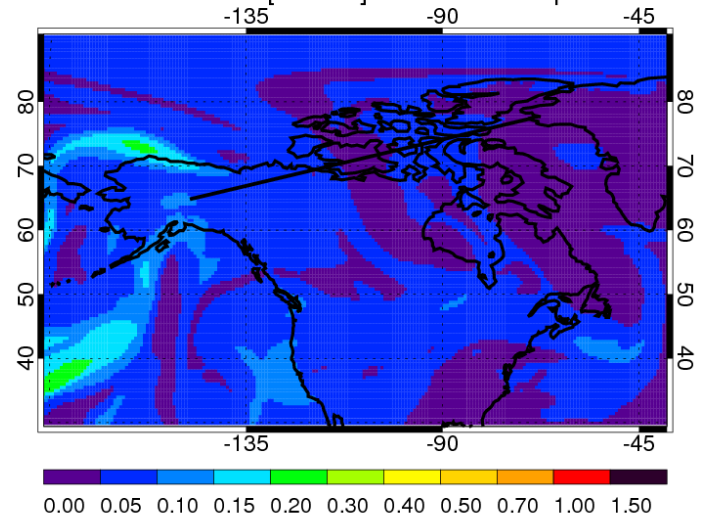
GEOS-5 Sulfate AOT [550 nm] valid 22:30z03apr2008



GEOS-5 Carbonaceous AOT [550 nm] valid 22:30z03apr2

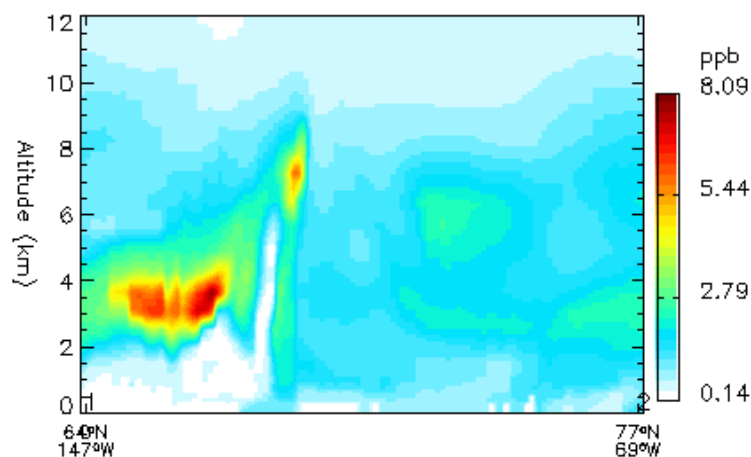


GEOS-5 Dust AOT [550 nm] valid 22:30z03apr2008



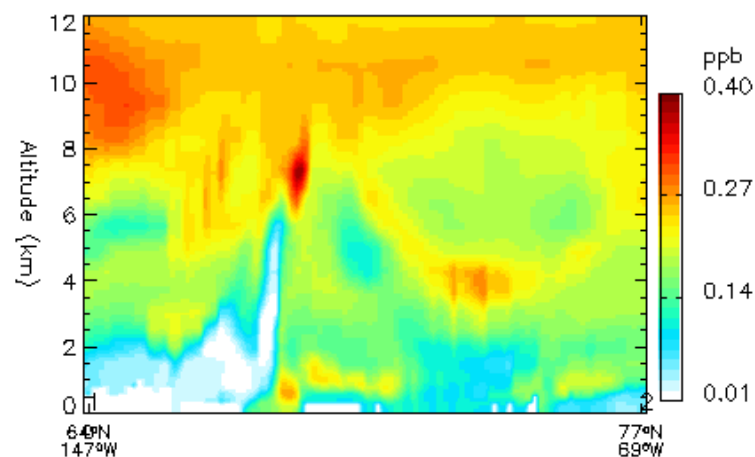
GEOS-5 forecast: 20080331_06z

Curtain plot
SULPHATE AEROSOL 20080403 22:30Z

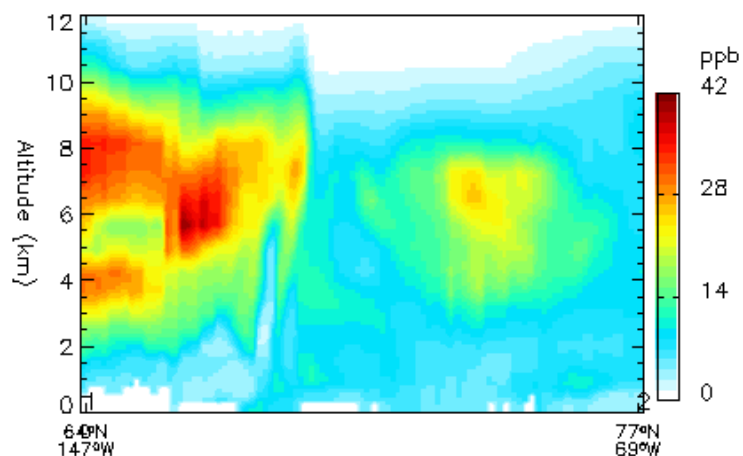


GEOS-5 forecast: 20080331_06z

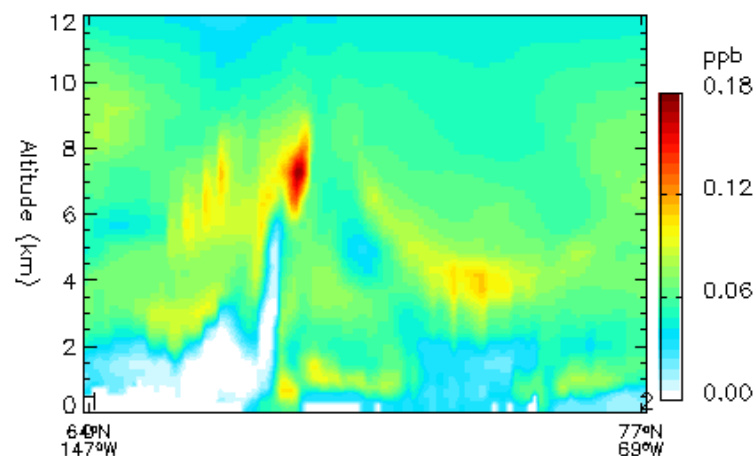
Curtain plot
ORGANIC CARBON MASS MIXING RATIO 20080403 22:30Z



Curtain plot
DUST MASS MIXING RATIO 20080403 22:30Z



Curtain plot
BLACK CARBON MASS MIXING RATIO 20080403 22:30Z



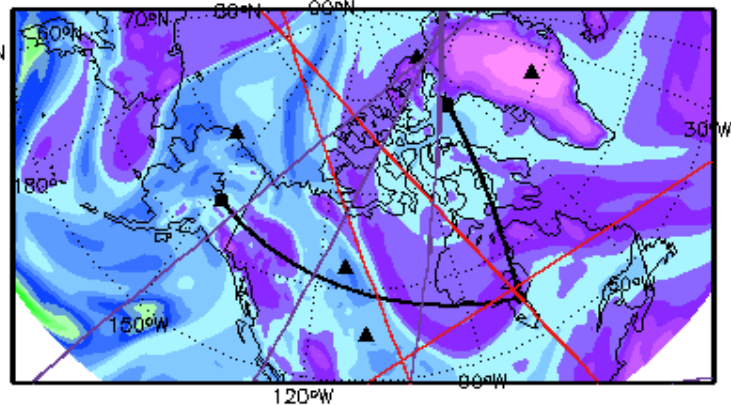
Thule to Fairbanks to 4/4 Asian BB – UT

EU FF - LT

Asian FF CO

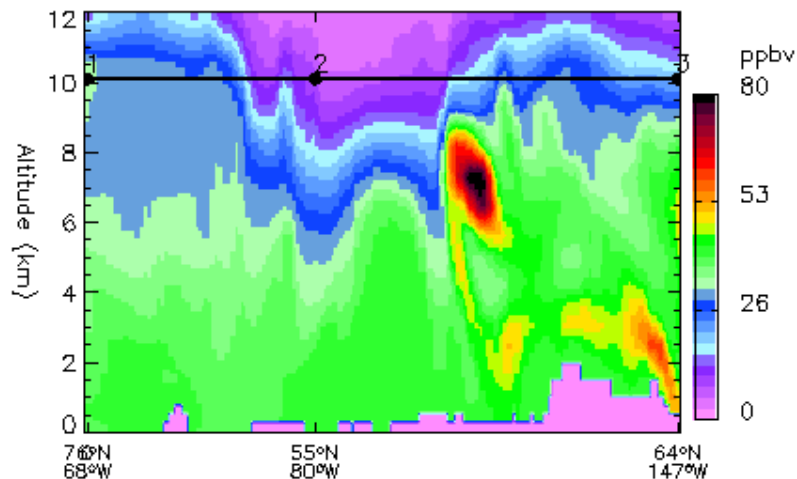
GEOS-5 forecast: 20080331_06z

CO COLUMN BURDEN (ASIA ANTHROPOGENIC)
20080404 19:30Z



1.46e-04 2.79e-04 4.11e-04 5.44e-04 6.76e-04 8.09e-04 kg/m²

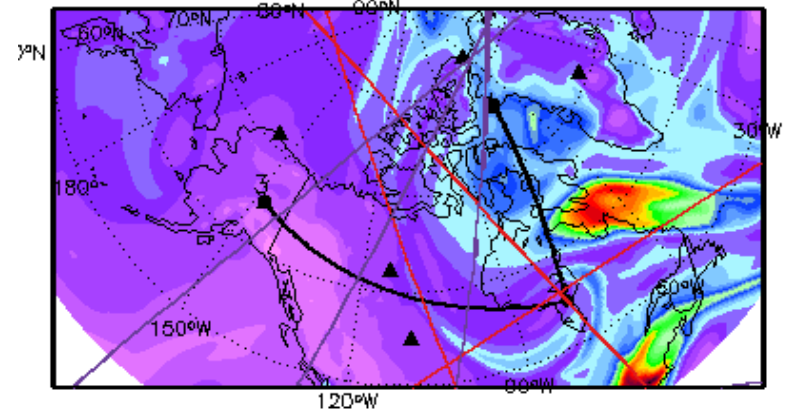
Curtain plot
CO – ANTHOPOGENIC (ASIA) 20080404 19:30Z



N. American CO

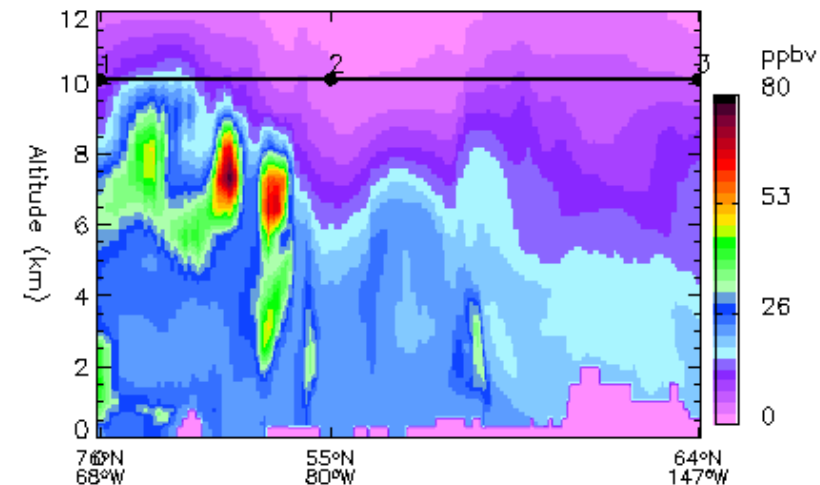
GEOS-5 forecast: 20080331_06z

CO COLUMN BURDEN (NORTH AMERICAN ANTHROPOGENIC)
20080404 19:30Z



6.54e-05 1.72e-04 2.79e-04 3.86e-04 4.93e-04 6.00e-04 kg/m²

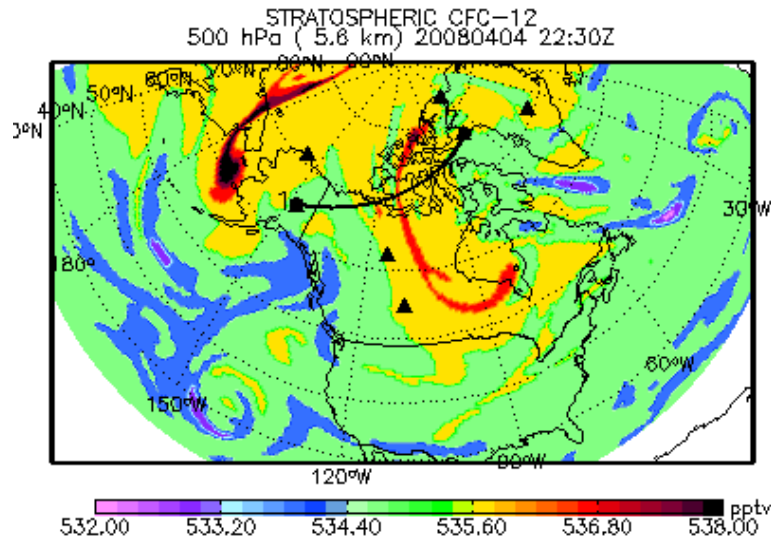
Curtain plot
CO – ANTHOPOGENIC (NORTH AMERICA) 20080404 19:30Z



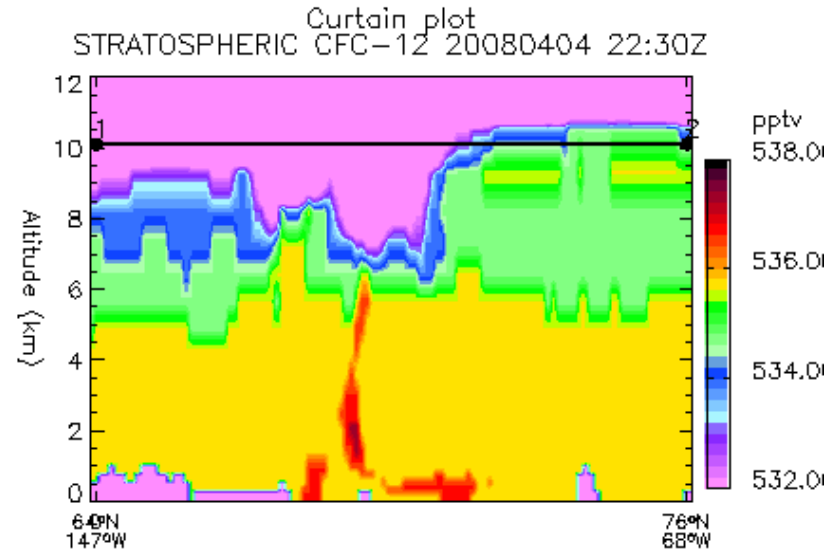
Thule to Fairbanks to 4/4

GMAO 03/31 06Z Fx - 04/04 CFC12

GEOS-5 forecast: 20080331_06z



GEOS-5 forecast: 20080331_06z

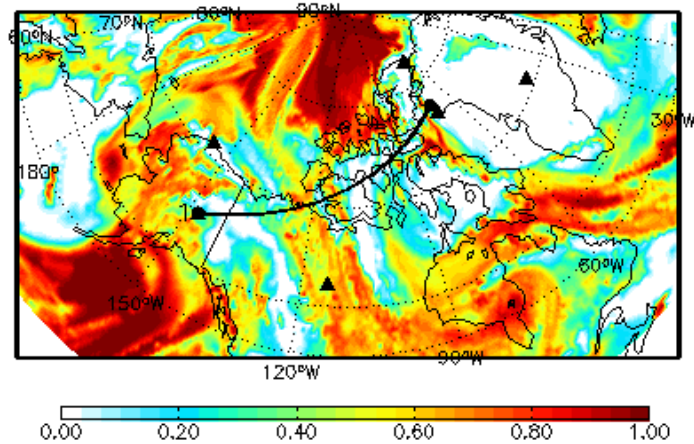


4-4-2008: DC-8 to Thule

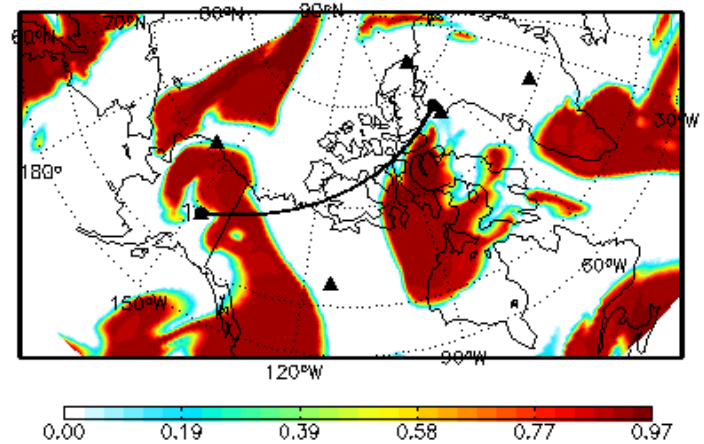
GEOS-5 forecast: 20080331_06z

GEOS-5 forecast: 20080331_06z

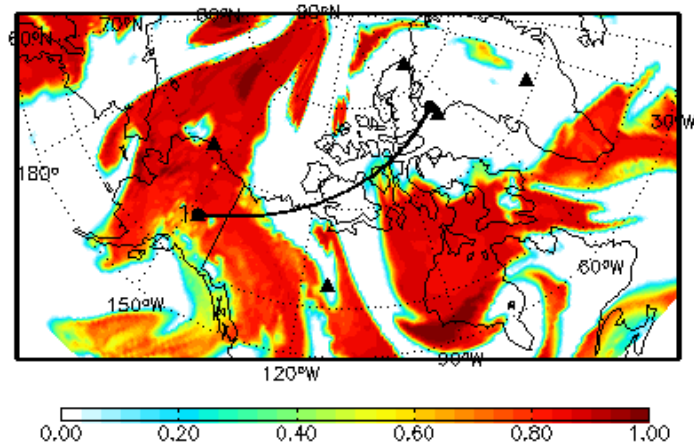
CLOUD_AREA_FRACTION_FOR_LOW_CLOUDS
Surface 20080404 22:30Z



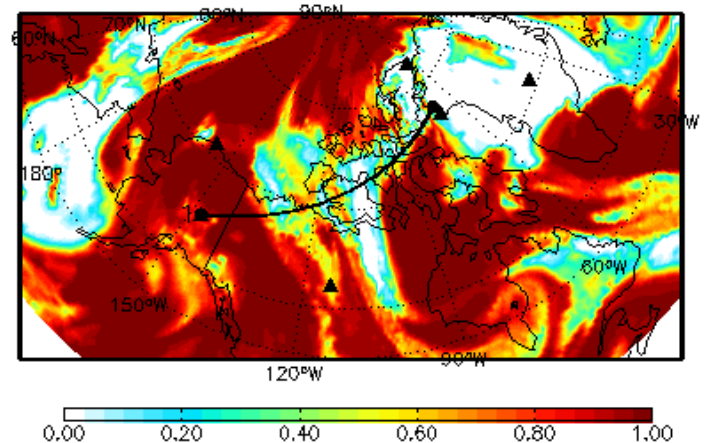
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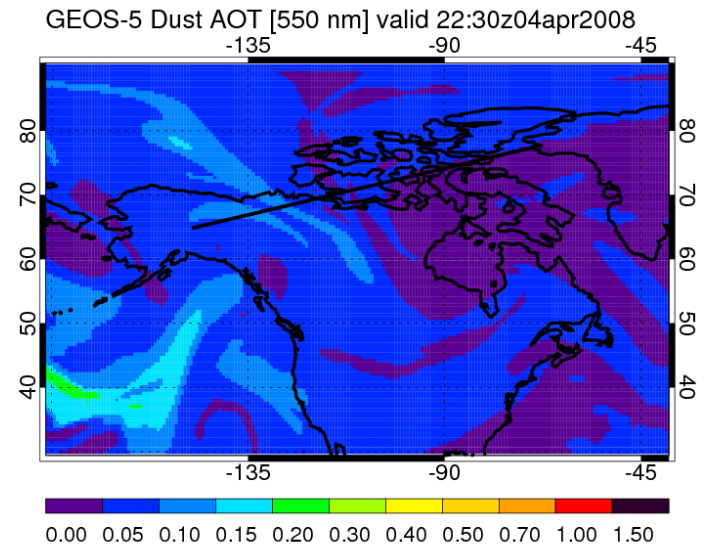
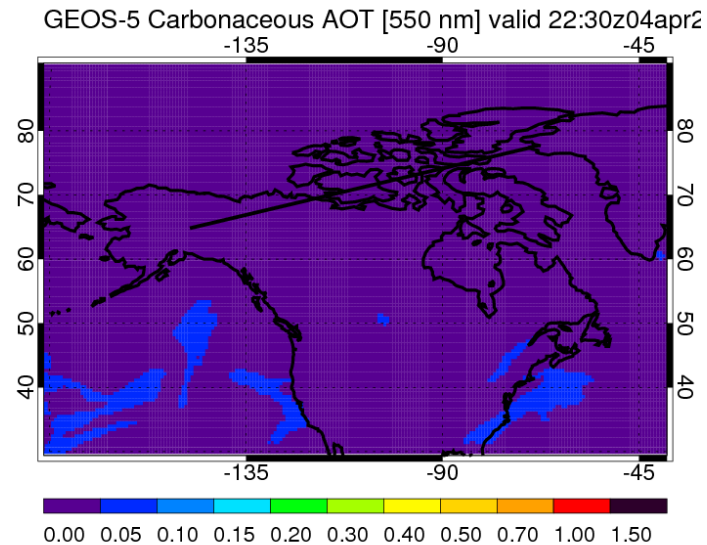
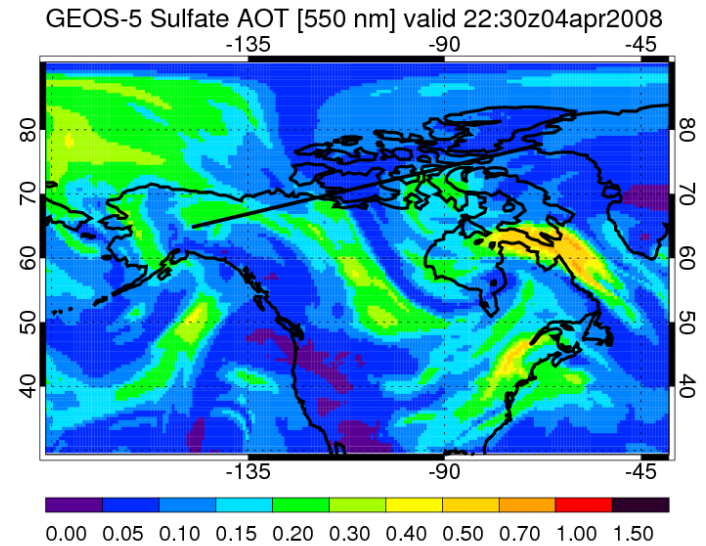
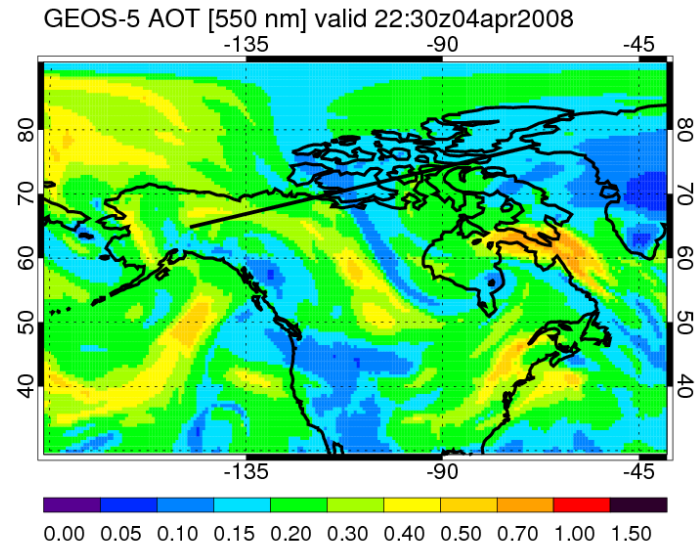
CLOUD_AREA_FRACTION_FOR_MIDDLE_CLOUDS
Surface 20080404 22:30Z



TOTAL_CLOUD_AREA_FRACTION
Surface 20080404 22:30Z



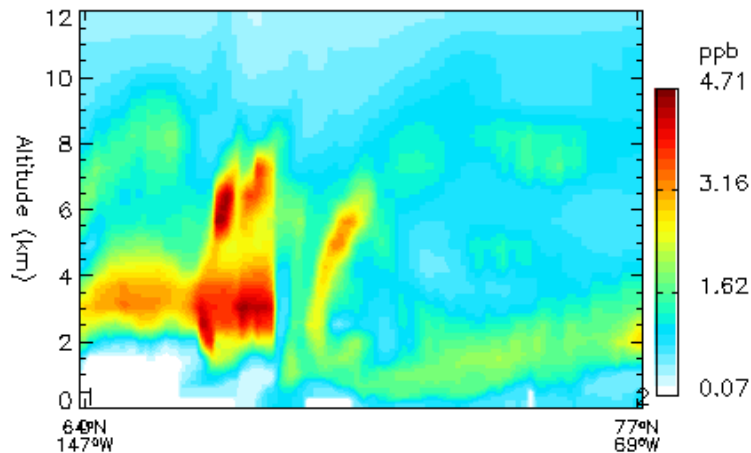
4-4-2008: DC-8 to Thule



4-4-2008: DC-8 to Thule

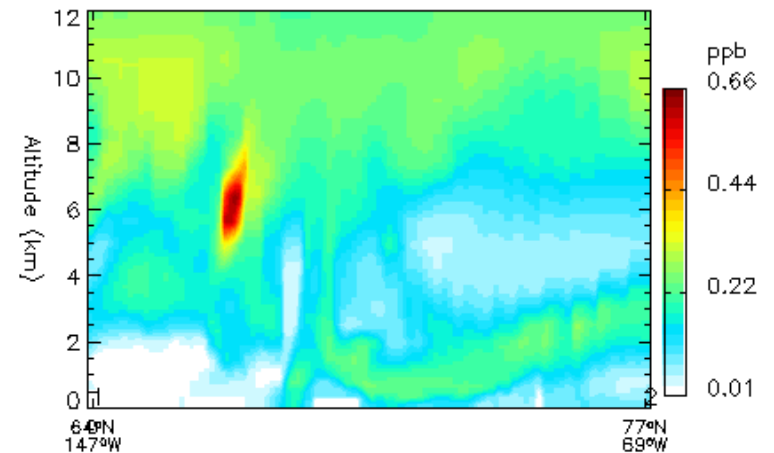
GEOS-5 forecast: 20080331_06z

Curtain plot
SULPHATE AEROSOL 20080404 22:30Z

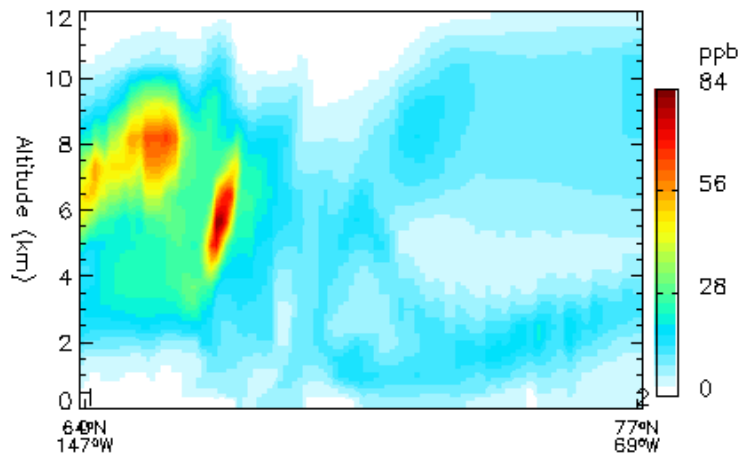


GEOS-5 forecast: 20080331_06z

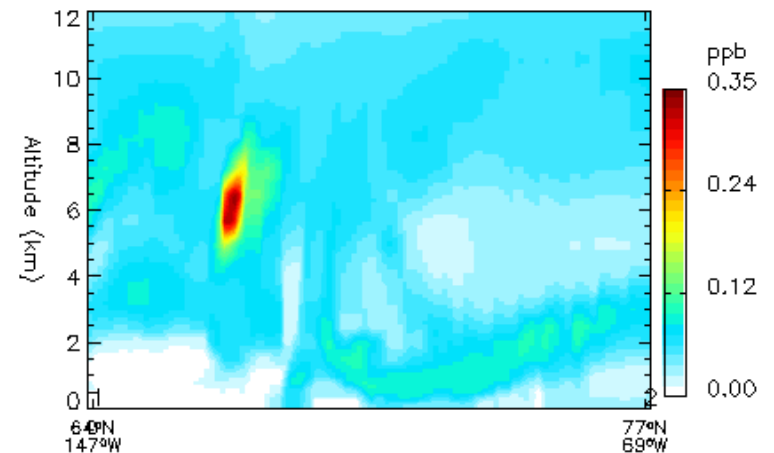
Curtain plot
ORGANIC CARBON MASS MIXING RATIO 20080404 22:30Z



Curtain plot
DUST MASS MIXING RATIO 20080404 22:30Z



Curtain plot
BLACK CARBON MASS MIXING RATIO 20080404 22:30Z



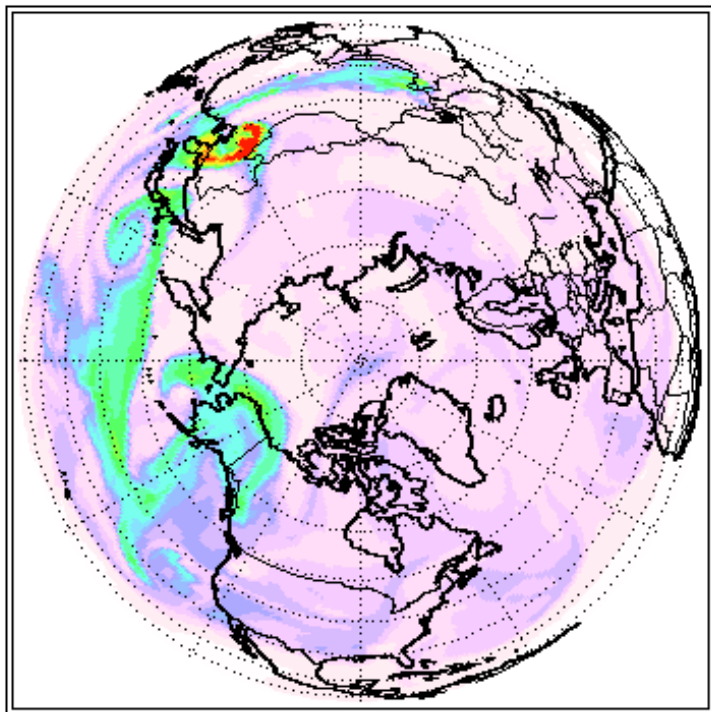
Apr 1 DC-8 Palmdale to Fairbanks

MZ4 and CAM forecasts from Mar 30 for Apr 1 18Z

- Plume locations generally similar, but strength and altitudes differ between 2 models

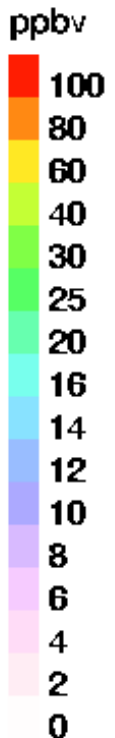
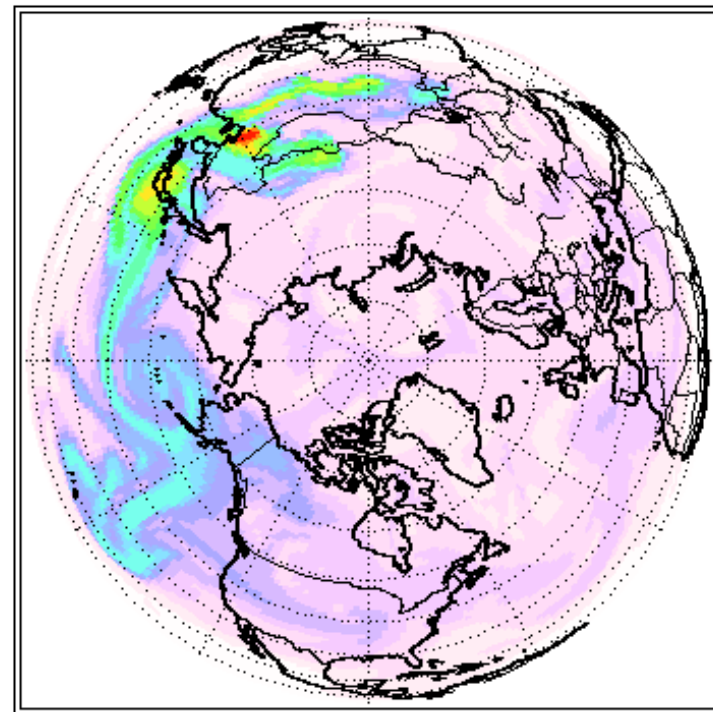
MOZART-4/GFS - N.Asia Anthro

CO₂ 20080401-18Z 6km



CAM-Chem/DART - N.Asia Anthro

CO₂ 20080401-18Z 6km



MOZART Forecast from 20080330

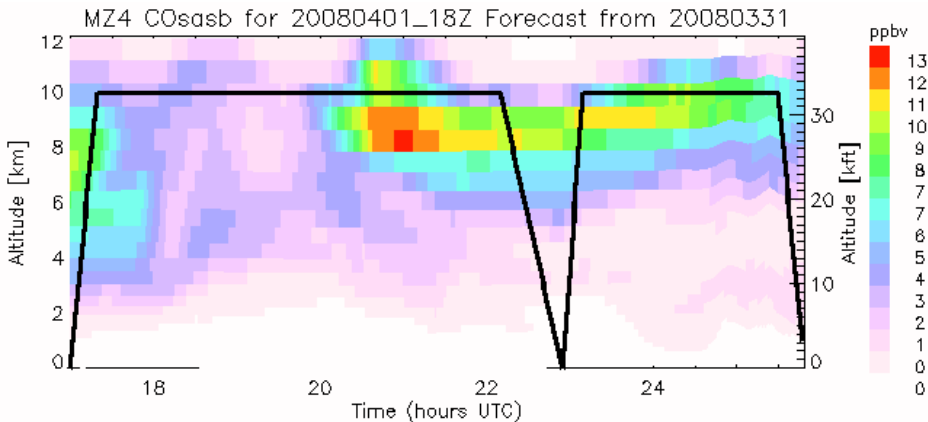
CAM Forecast from 20080330

Apr 1 DC-8 Palmdale to Fairbanks

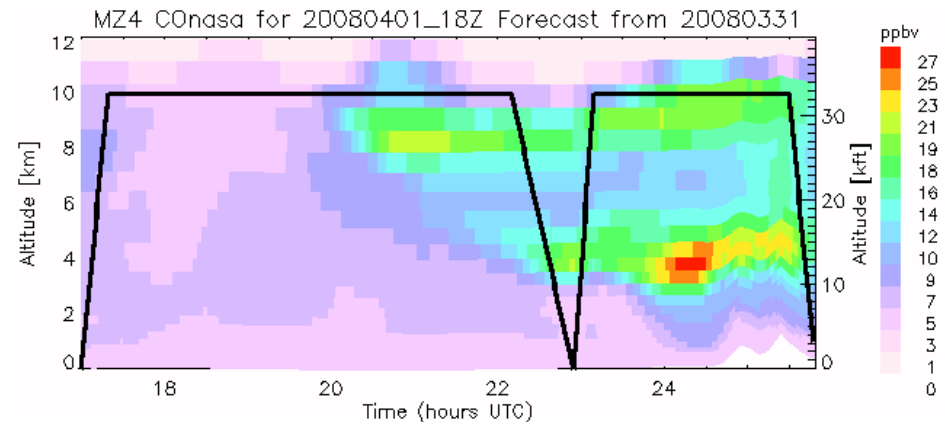
MOZART-4/GFS forecasts from Mar 31 for Apr 1 18Z

- Asian biomass burning and anthro plume 8-9 km
- Another Asian plume at 4-5 km at north end of flight

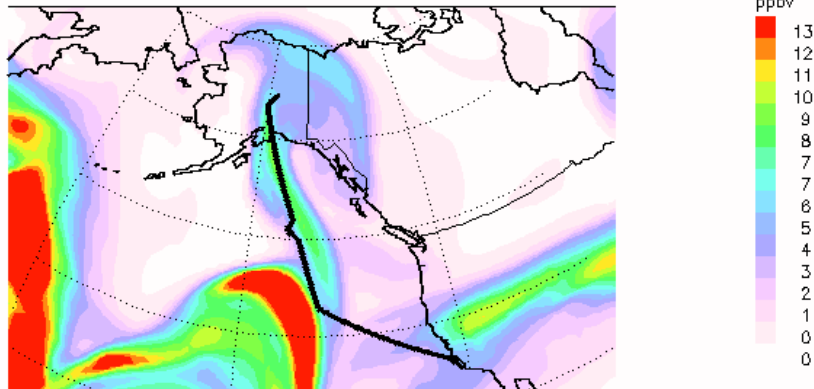
S.Asia Fires



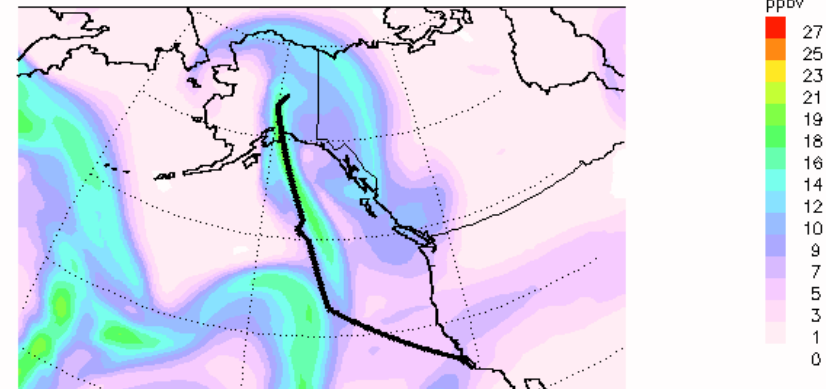
N.Asia Anthro



CO_{sasb} 10 km 20080401_18Z



CO_{nasa} 10 km 20080401_18Z

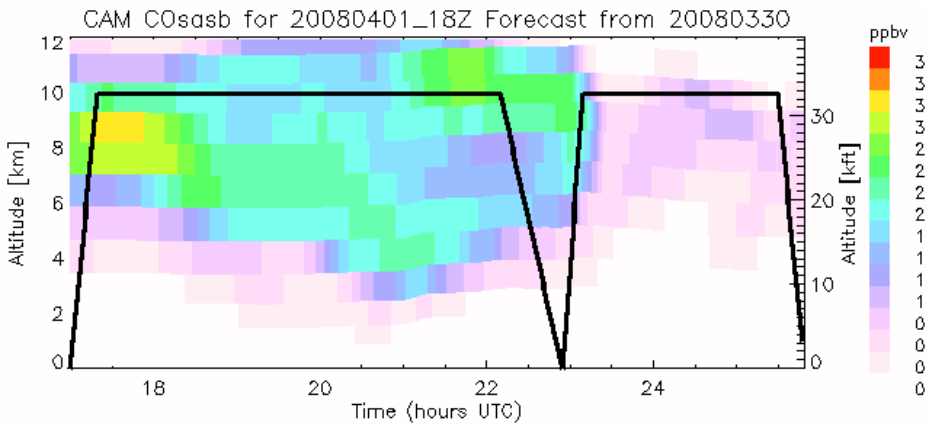


Apr 1 DC-8 Palmdale to Fairbanks

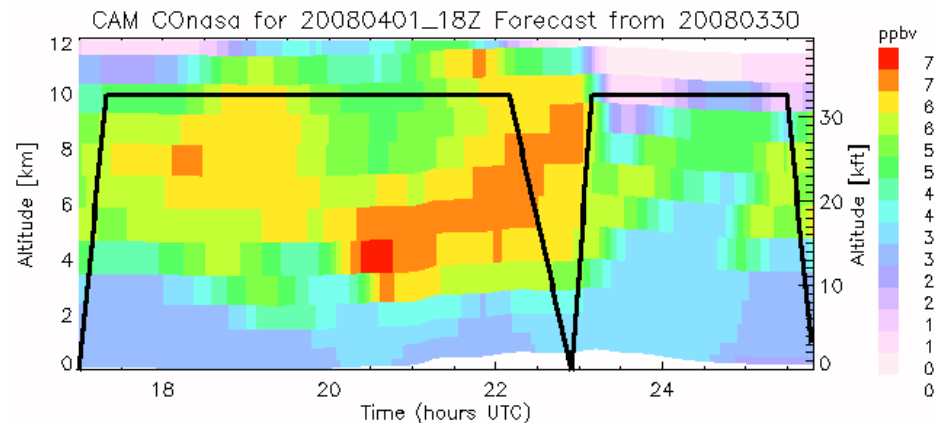
CAM-chem/DART forecasts from Mar 30 for Apr 1 18Z

- Asian biomass burning plume 8-9 km out of Palmdale
- Asian plume along Aura track lower than in MOZART

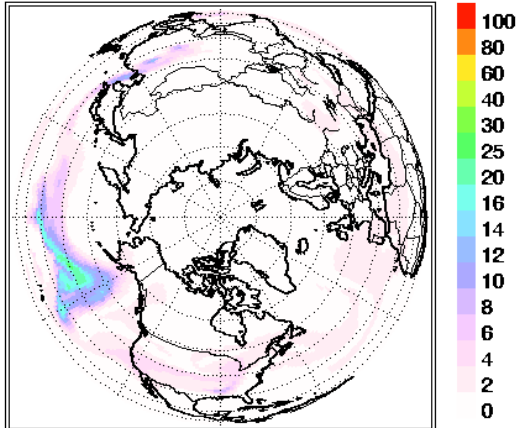
S.Asia Fires



N.Asia Anthro

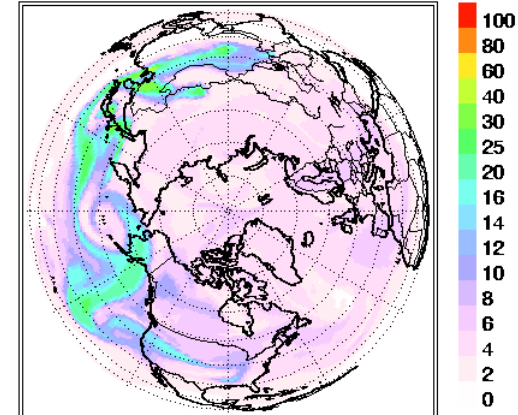


CO_{asb} 20080401-18Z 9km



CAM Forecast from 20080330

CO_{nasa} 20080401-18Z 9km



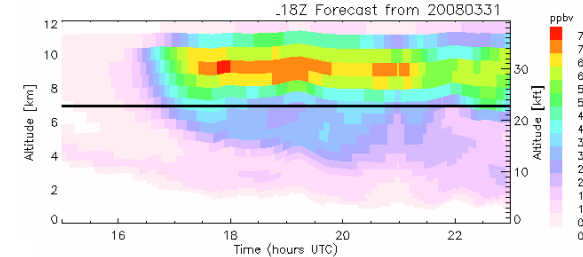
CAM Forecast from 20080330

Apr 1 P-3 Yellowknife to Fairbanks via Barrow

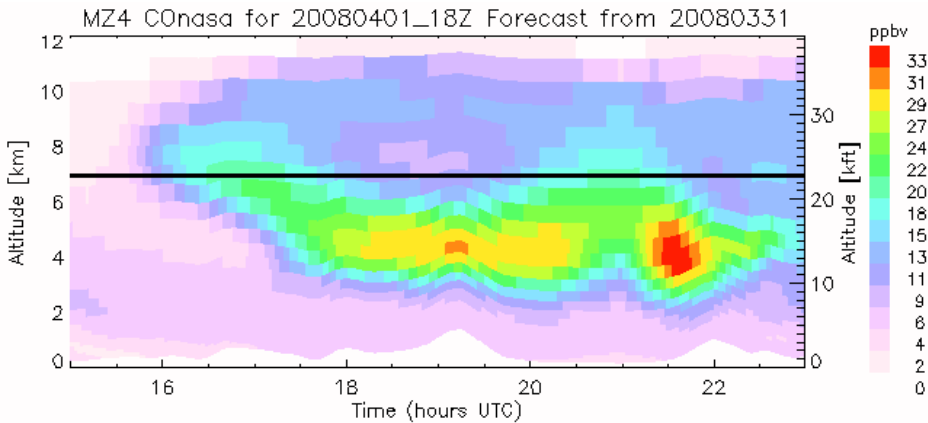
MOZART-4/GFS forecasts from Mar 30 for Mar 31 18Z

- S. Asia biomass burning mostly above P-3 alt
- Anthro Asian pollution 4-6 km near Barrow
- European plume over Yellowknife

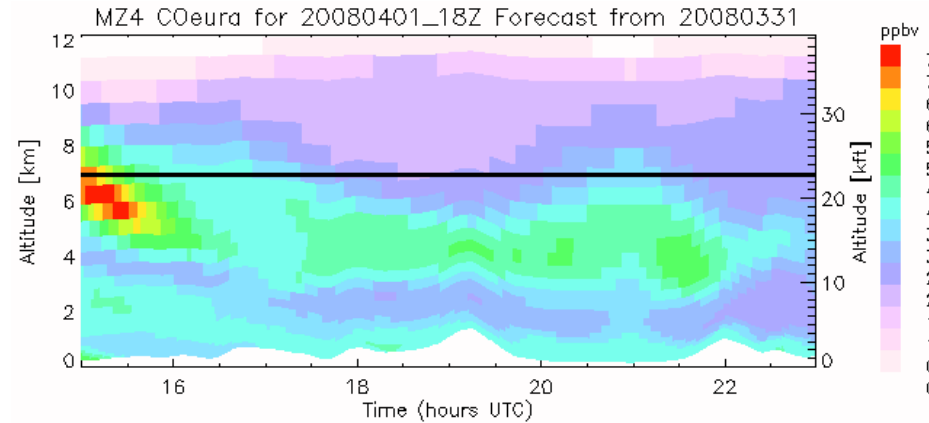
S.Asia Fires



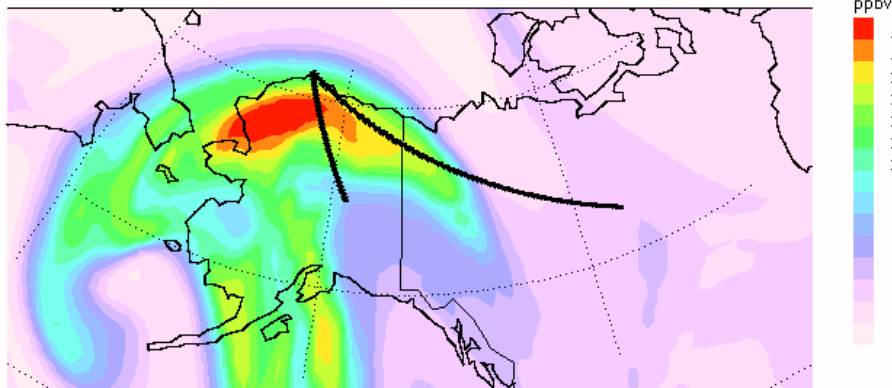
N.Asia Anthro



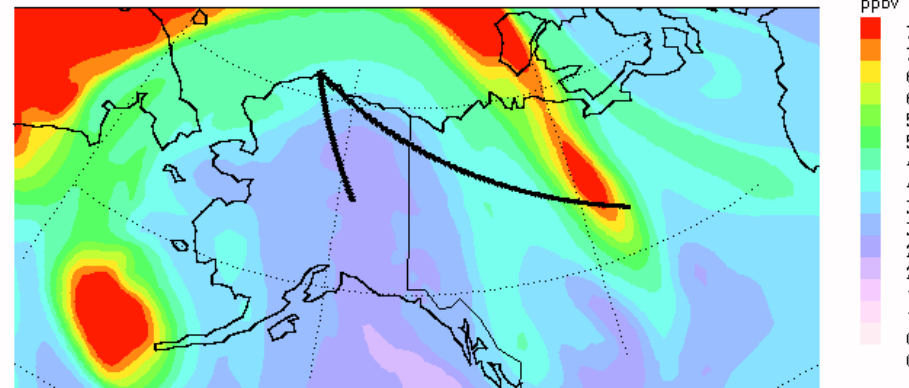
Europe Anthro



CO_{nasa} 4 km 20080401_18Z



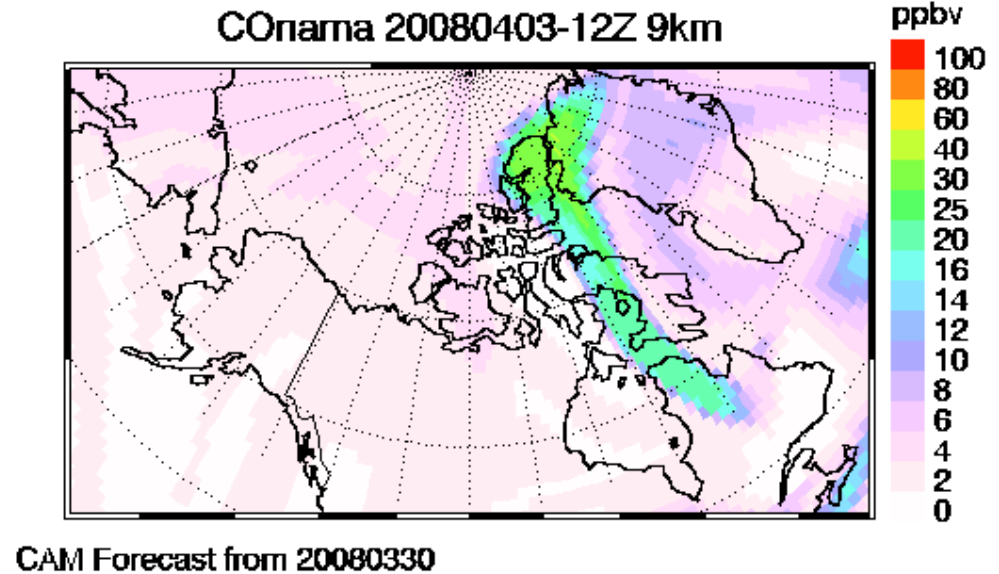
CO_{eura} 6 km 20080401_18Z



Fairbanks to Thule - Apr 3 or 4

- See no need for Thule flight to be April 3 instead of 4
- Asian and European pollution diffuse

April 3



April 4

