Enhanced Ozone Over Western North America From Biomass Burning in Eurasia During April 2008

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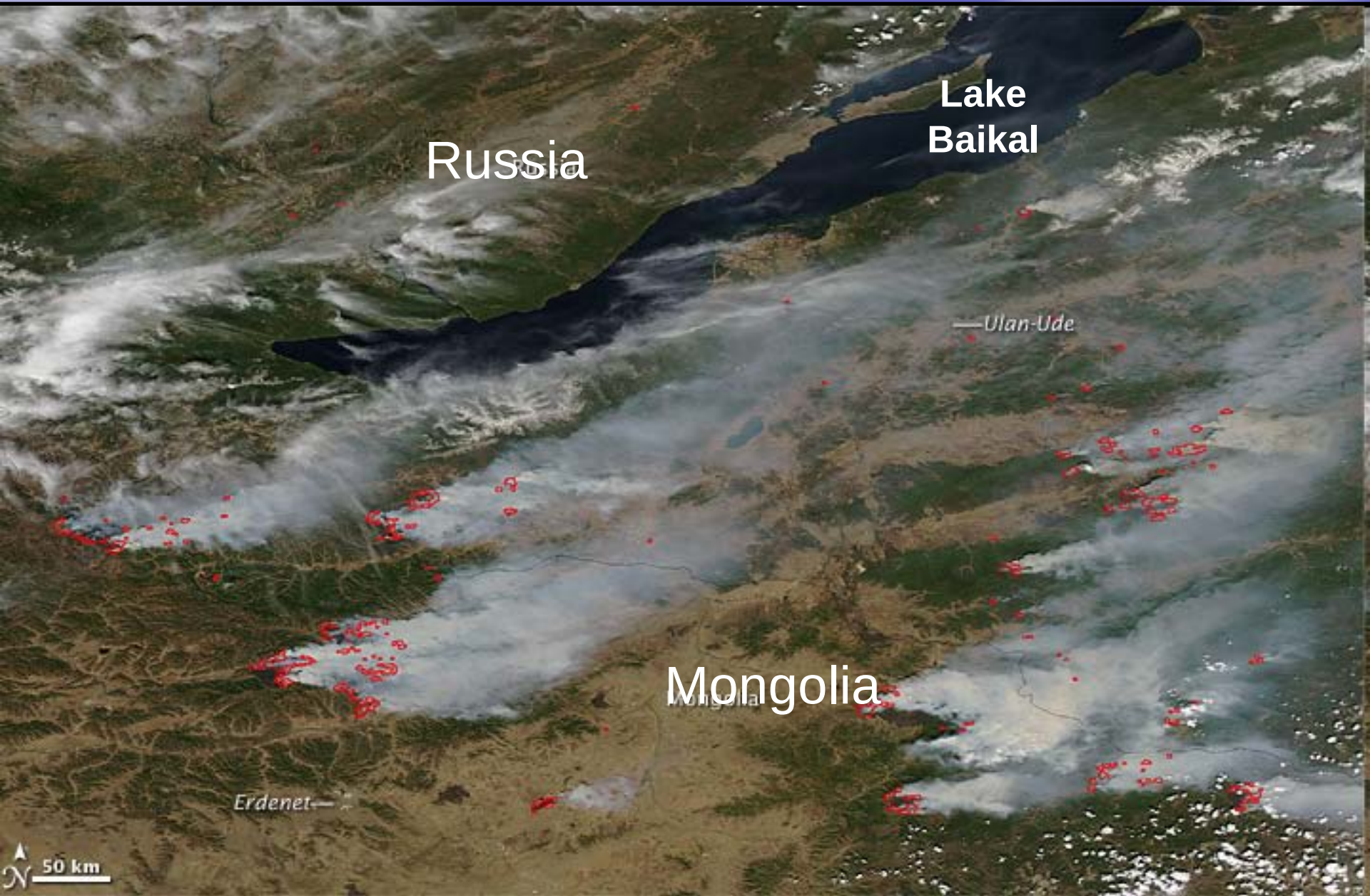
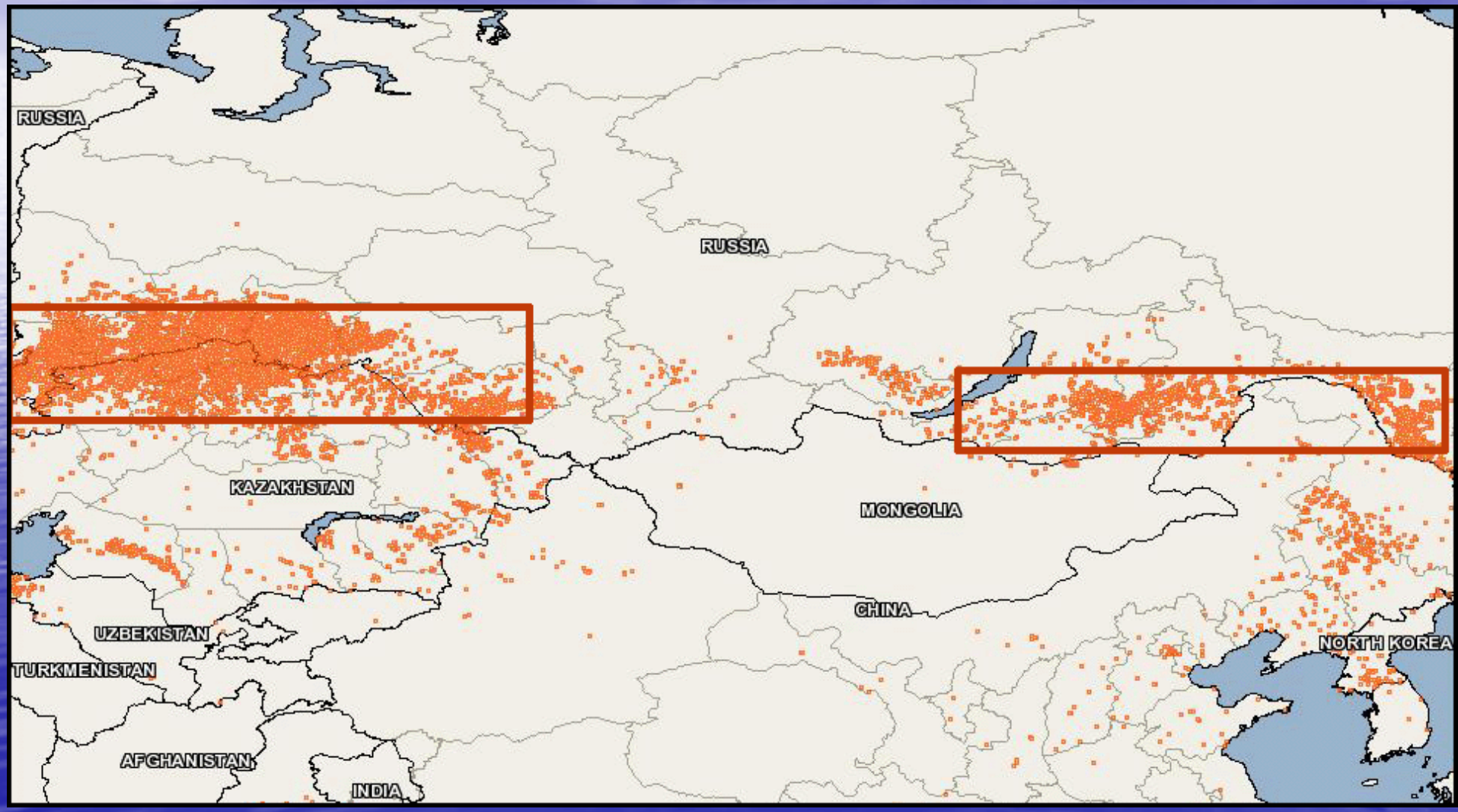
Several Key Points About April 2008

- Highest surface ozone measured at Denali National Park, Alaska (one hour average 79 ppb, 8-hour average 75 ppb) in the 22 year record.
- Highest April surface ozone value (55 ppb) at Barrow, Alaska in the 37 year record.
- Widespread evidence of episodic high ozone values in western North America.
- Early beginning and numerous fires in central and eastern Russia.
- Two large field campaigns (ARCTAS and ARCPAC) as part of the International Polar Year with a large suite of observations including daily ozonesondes at a number of locations.

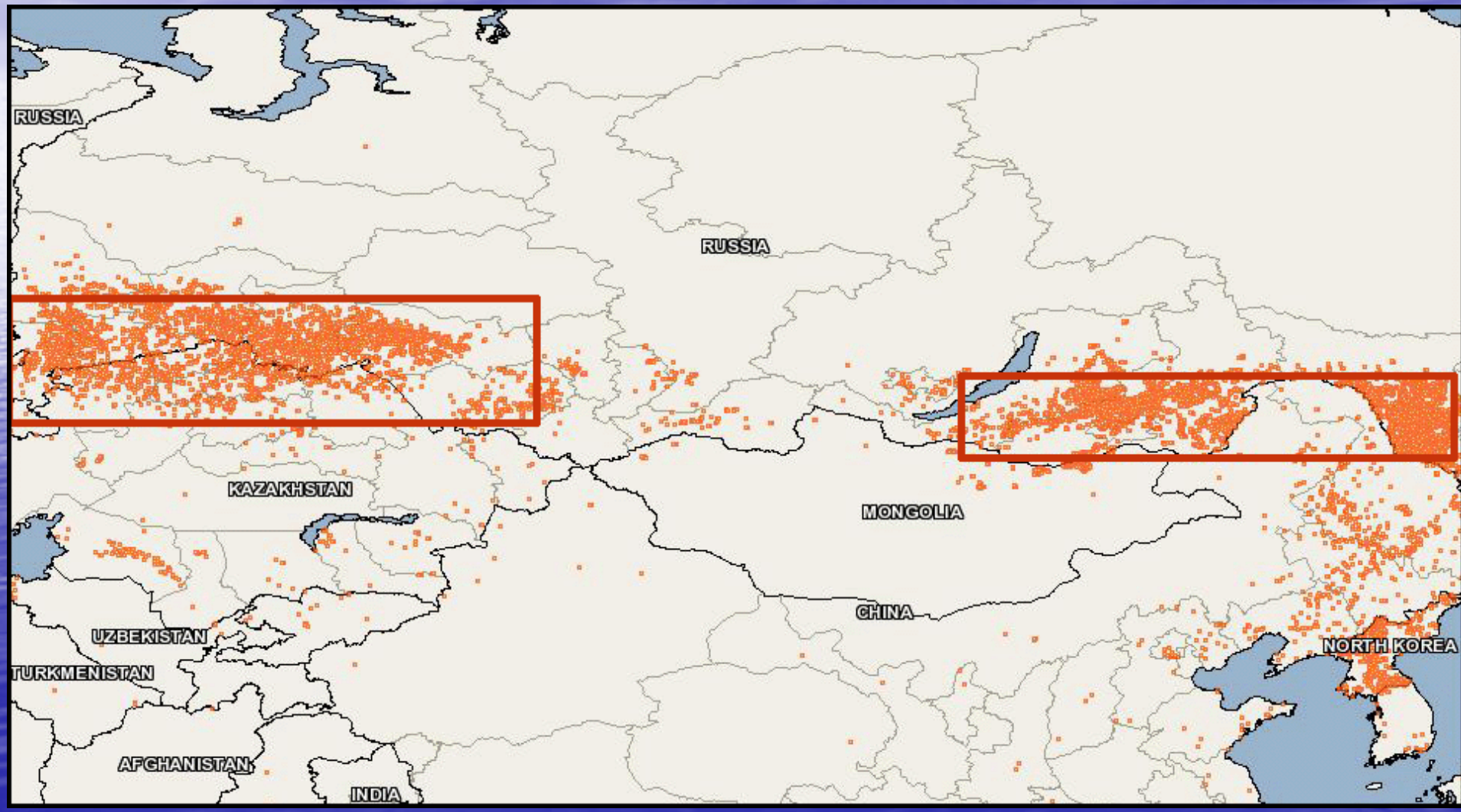
Spring Burning in Russia



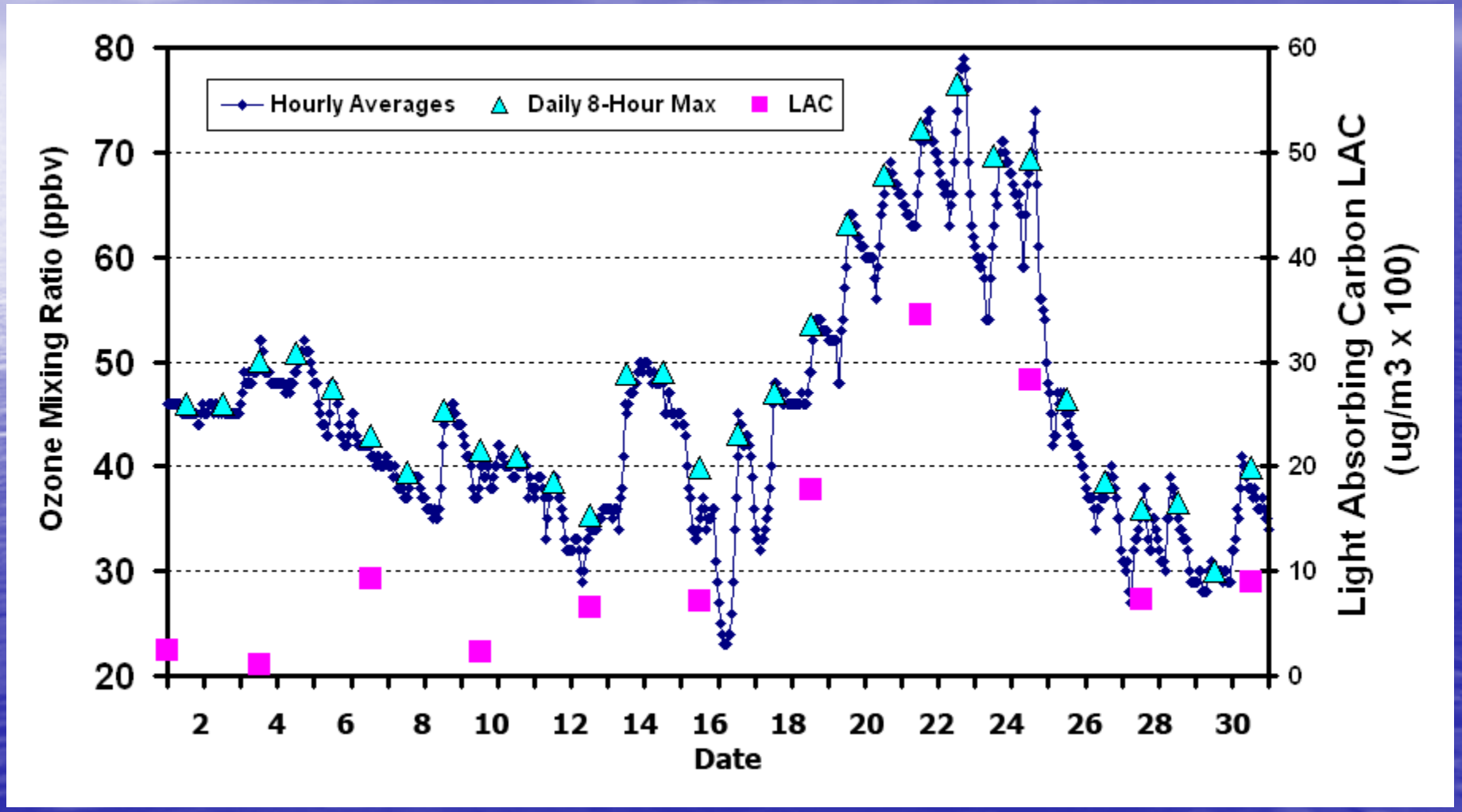
Fire/Hotspots for 7-13 April 2008



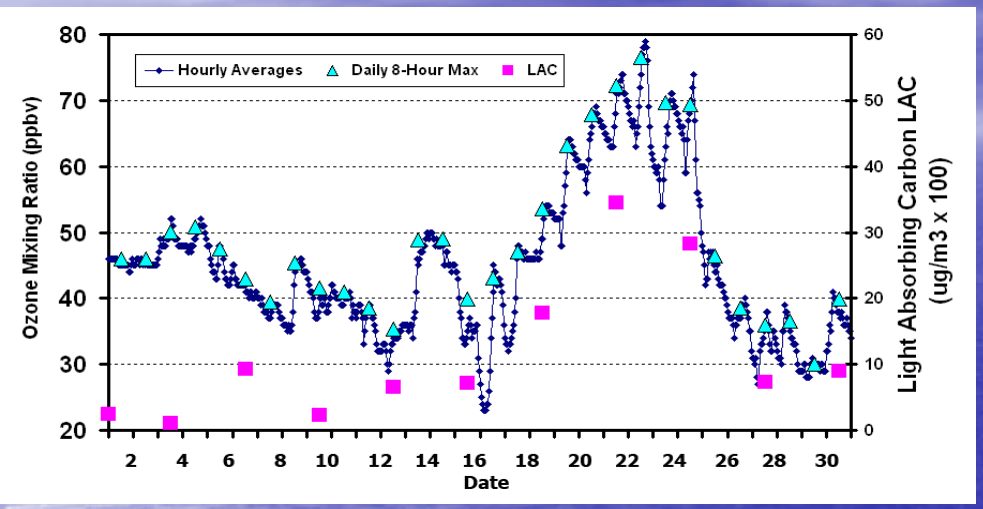
Fire/Hotspots for 14-20 April 2008

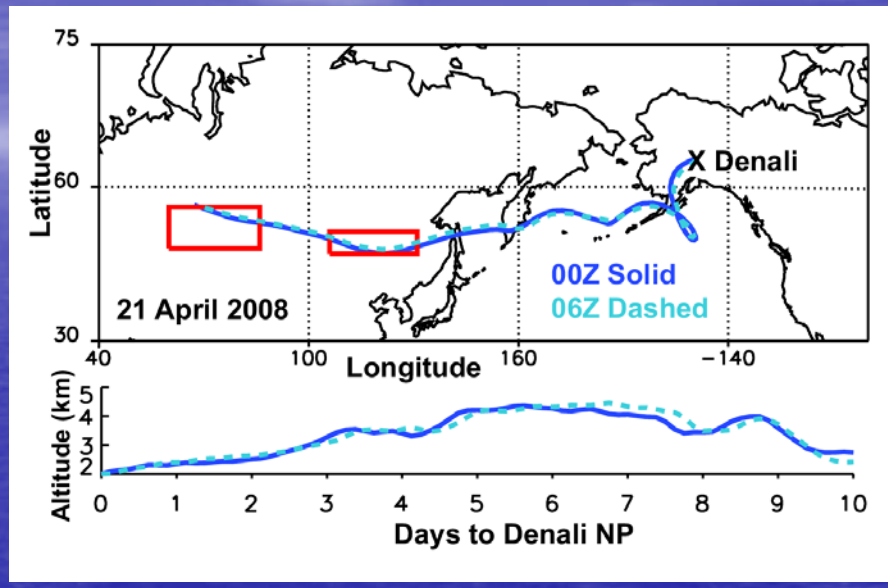


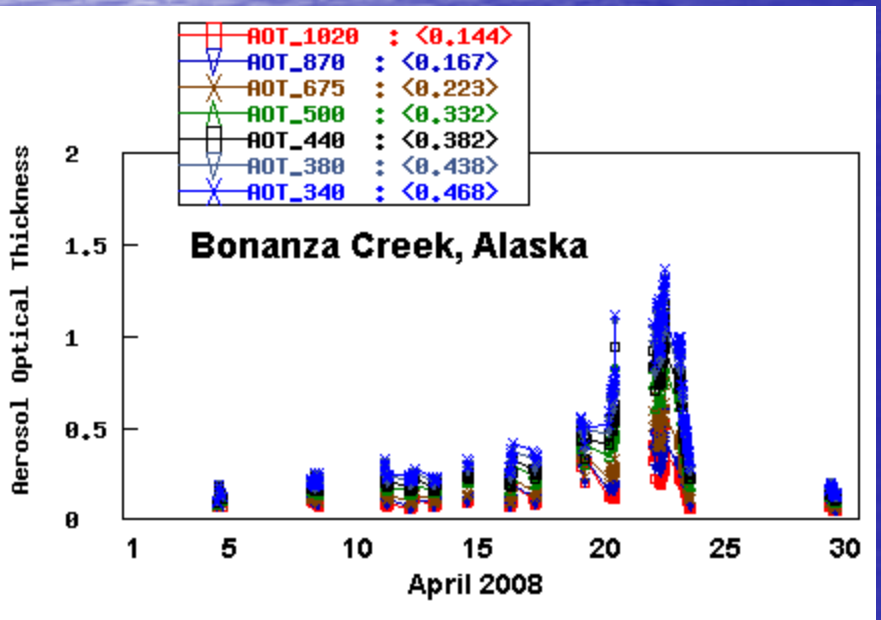
Surface Ozone and Light Absorbing Carbon at Denali National Park, Alaska in April 2008

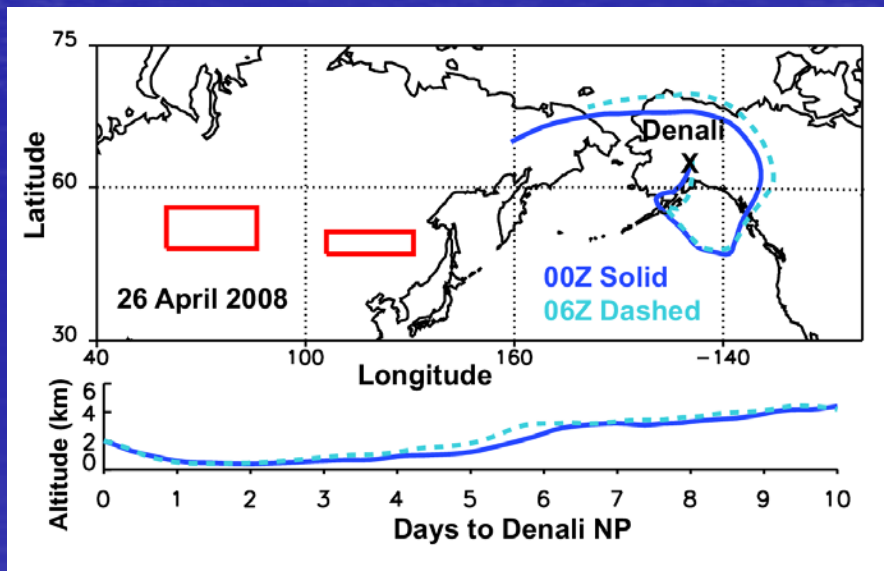


Surface Ozone at Denali and Aerosol Optical Thickness at a Nearby Site (~100 km) in April 2008 With Back Trajectories During (21 April) and at the End of the Event (26 April)

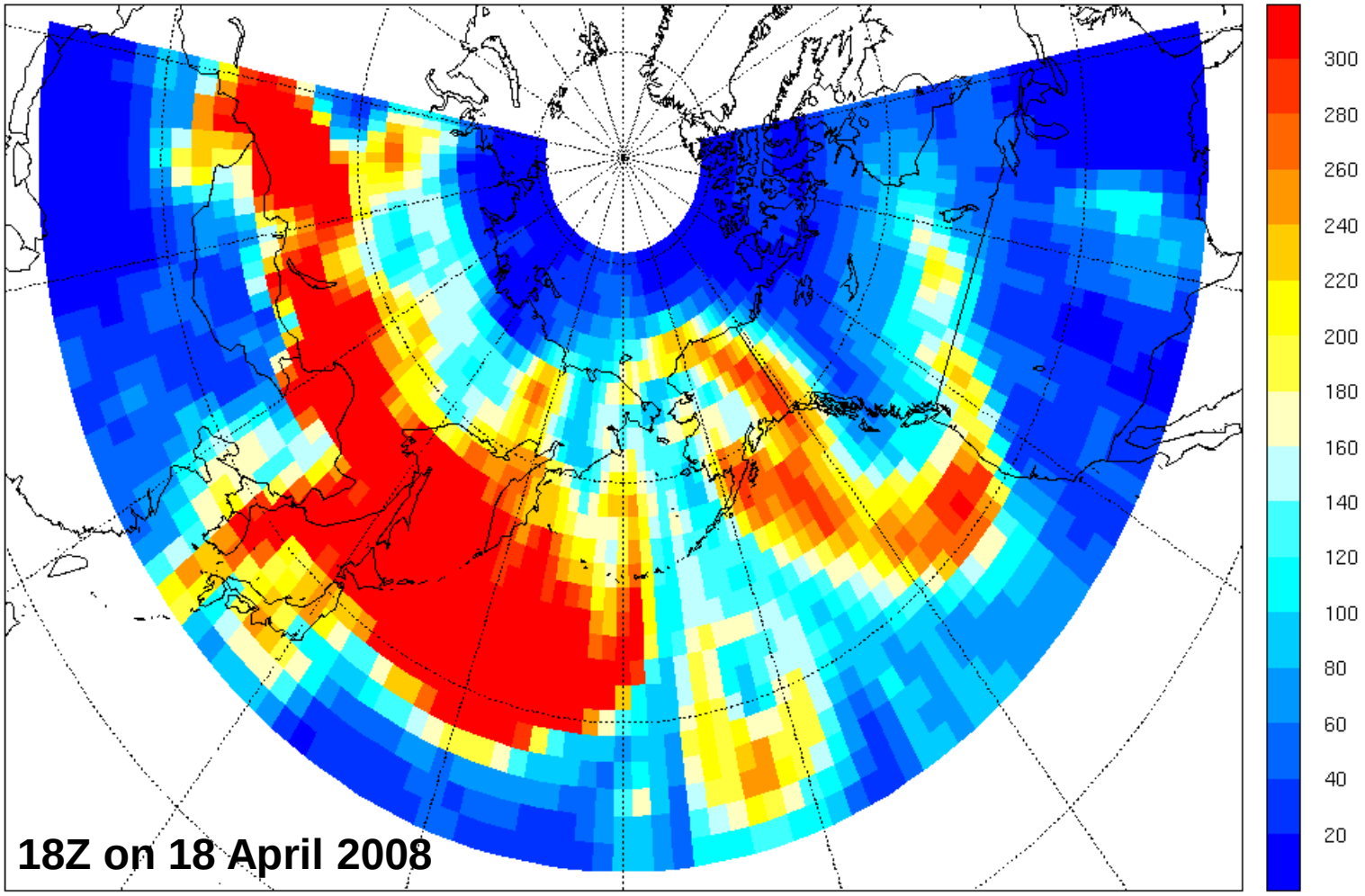


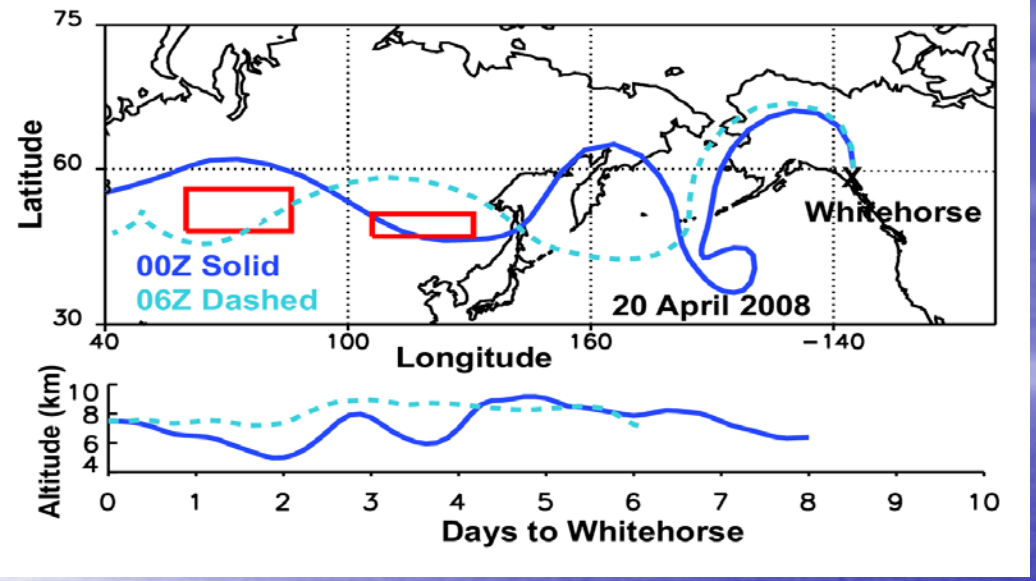




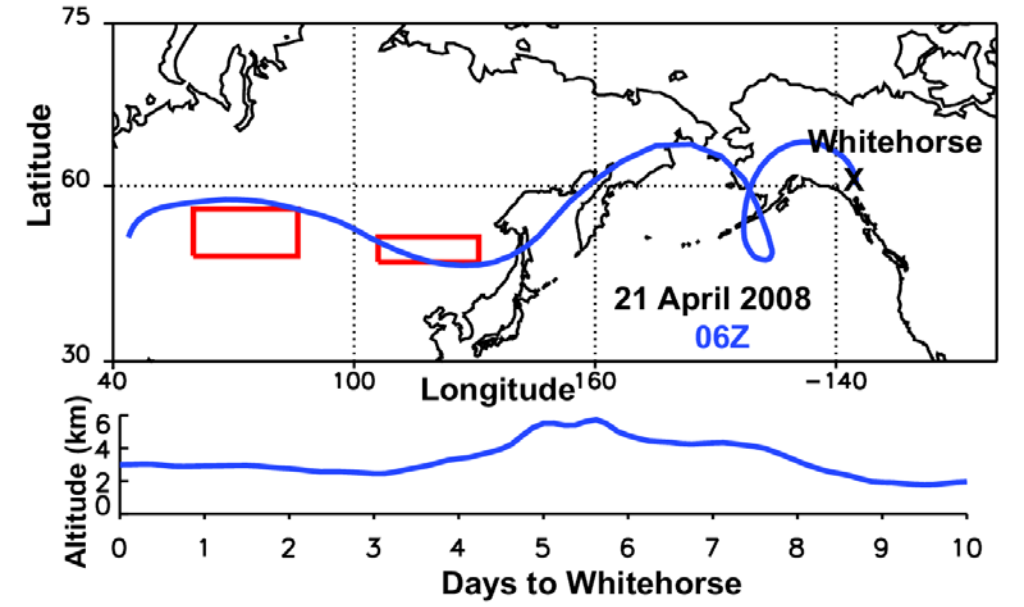


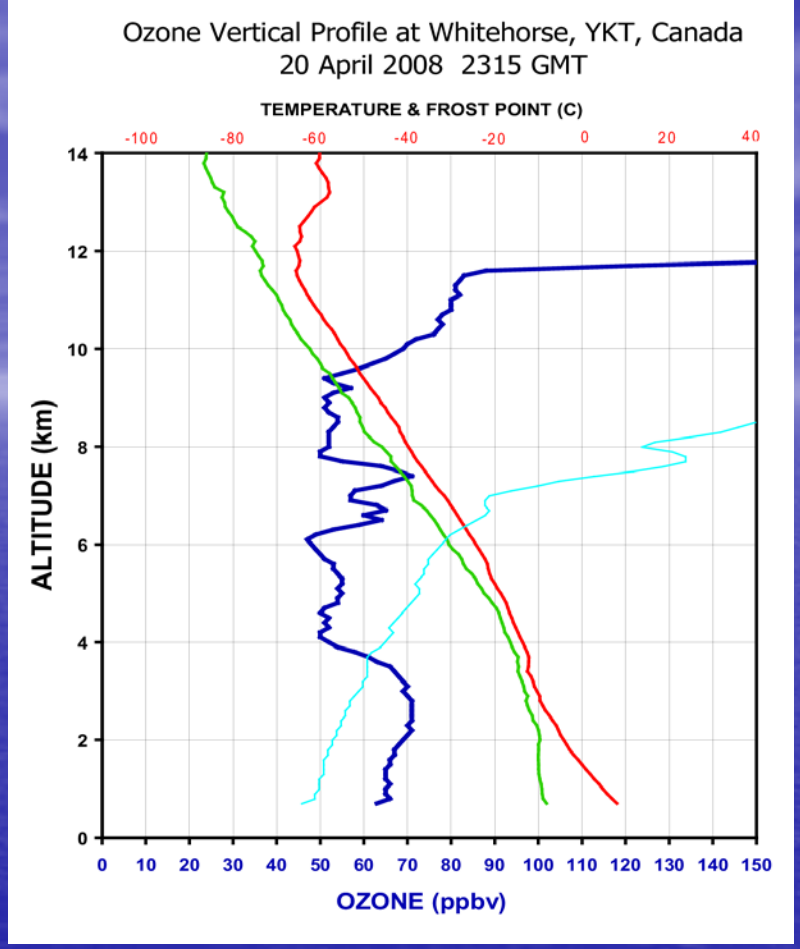
Dispersion of “Fire Trajectories” Released From Burning Regions in Eurasia Beginning 1 April 2008





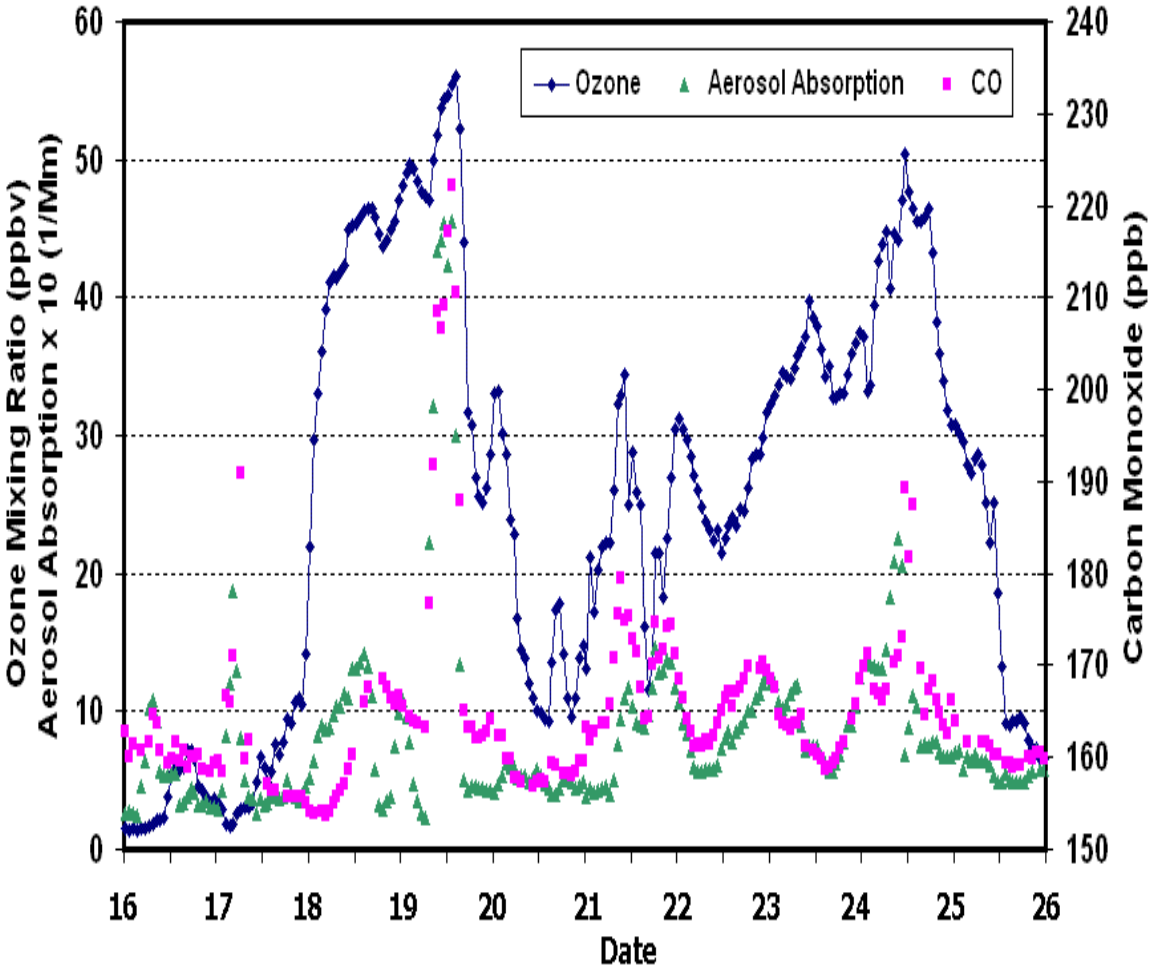
Back trajectories from Whitehorse, YKT corresponding to the enhanced ozone layers at 3 and 7.5 km on 20-21 April 2008

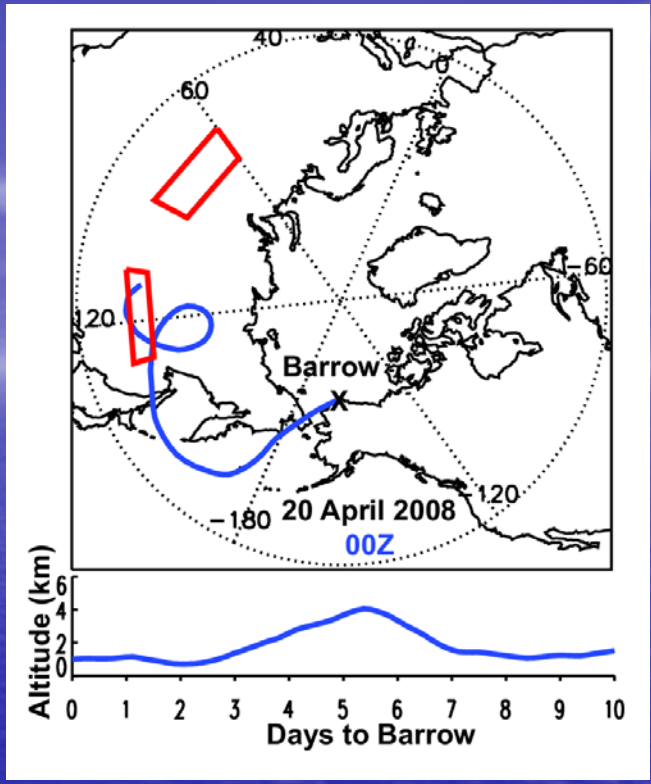




Ozone vertical profile (dark blue curve) at Whitehorse, Yukon Terr. on 20 April 2008. Light blue curve is the average for the month. Red = temperature. Green = frost point temperature.

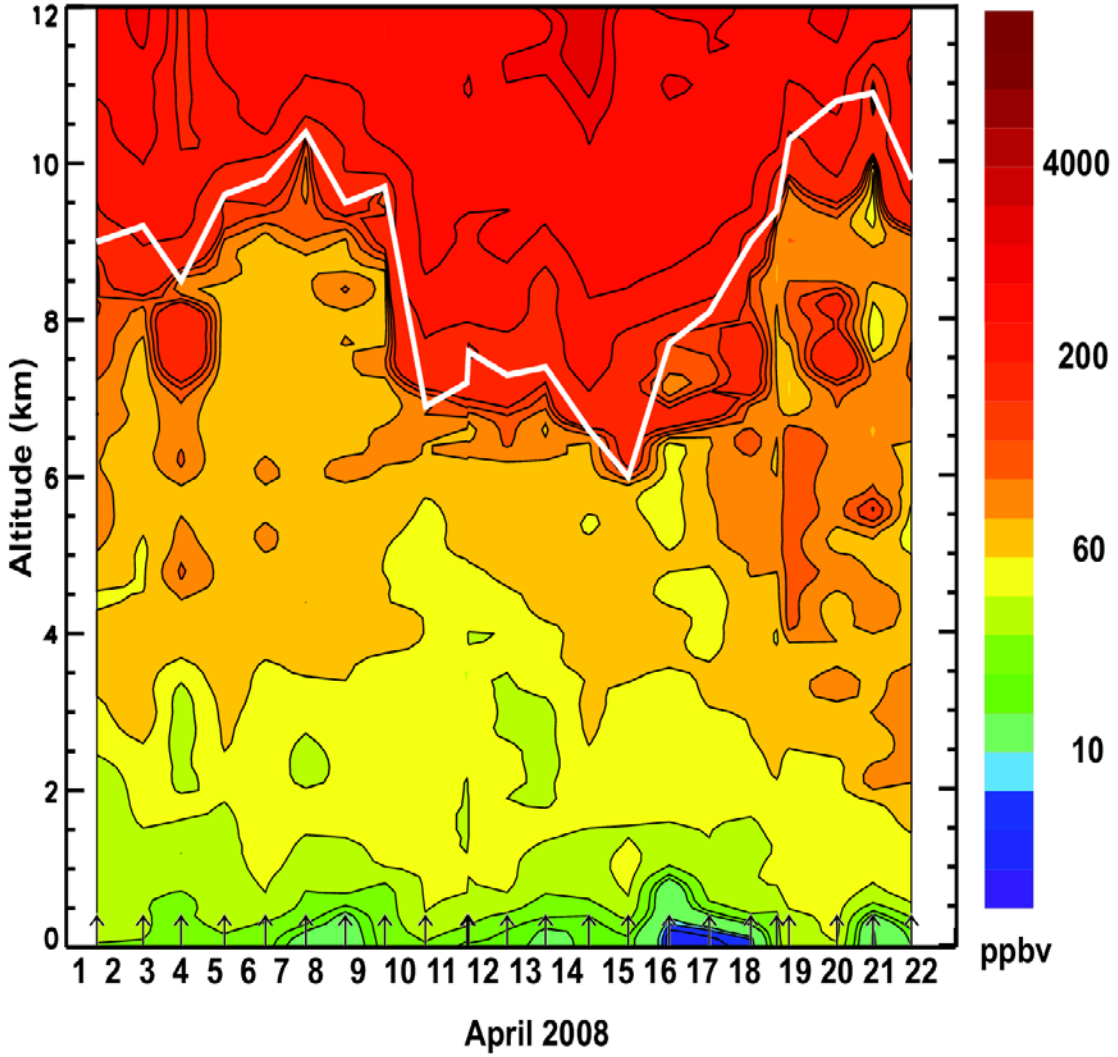
Surface Ozone, Carbon Monoxide, and Aerosol Absorption at Barrow for 16-25 April 2008

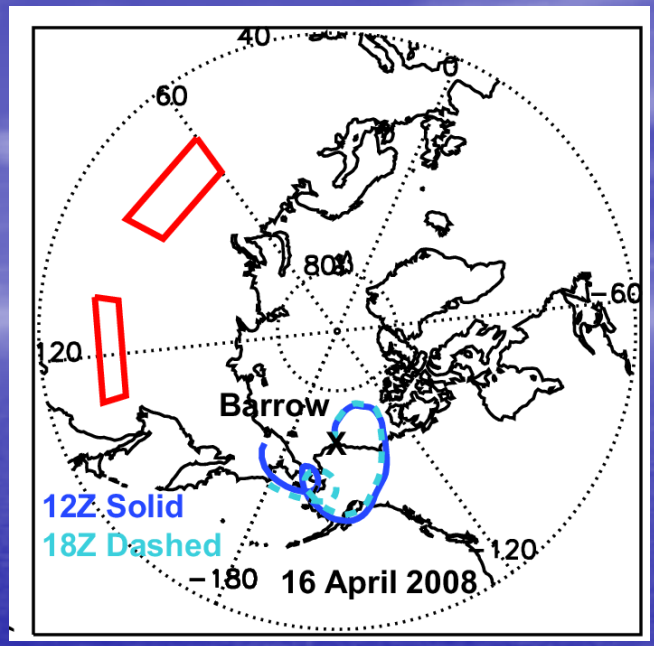


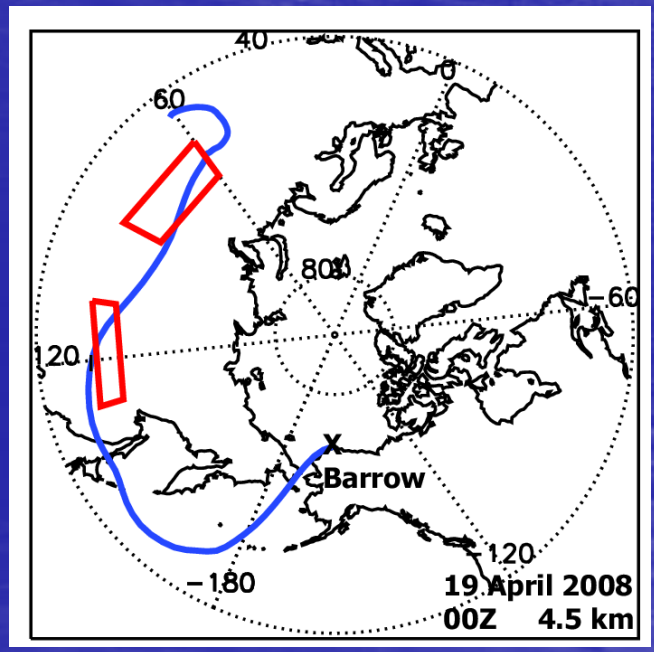


Back trajectory from Barrow at 00Z on 20 April (15 LST on 19 April) at 1 km.

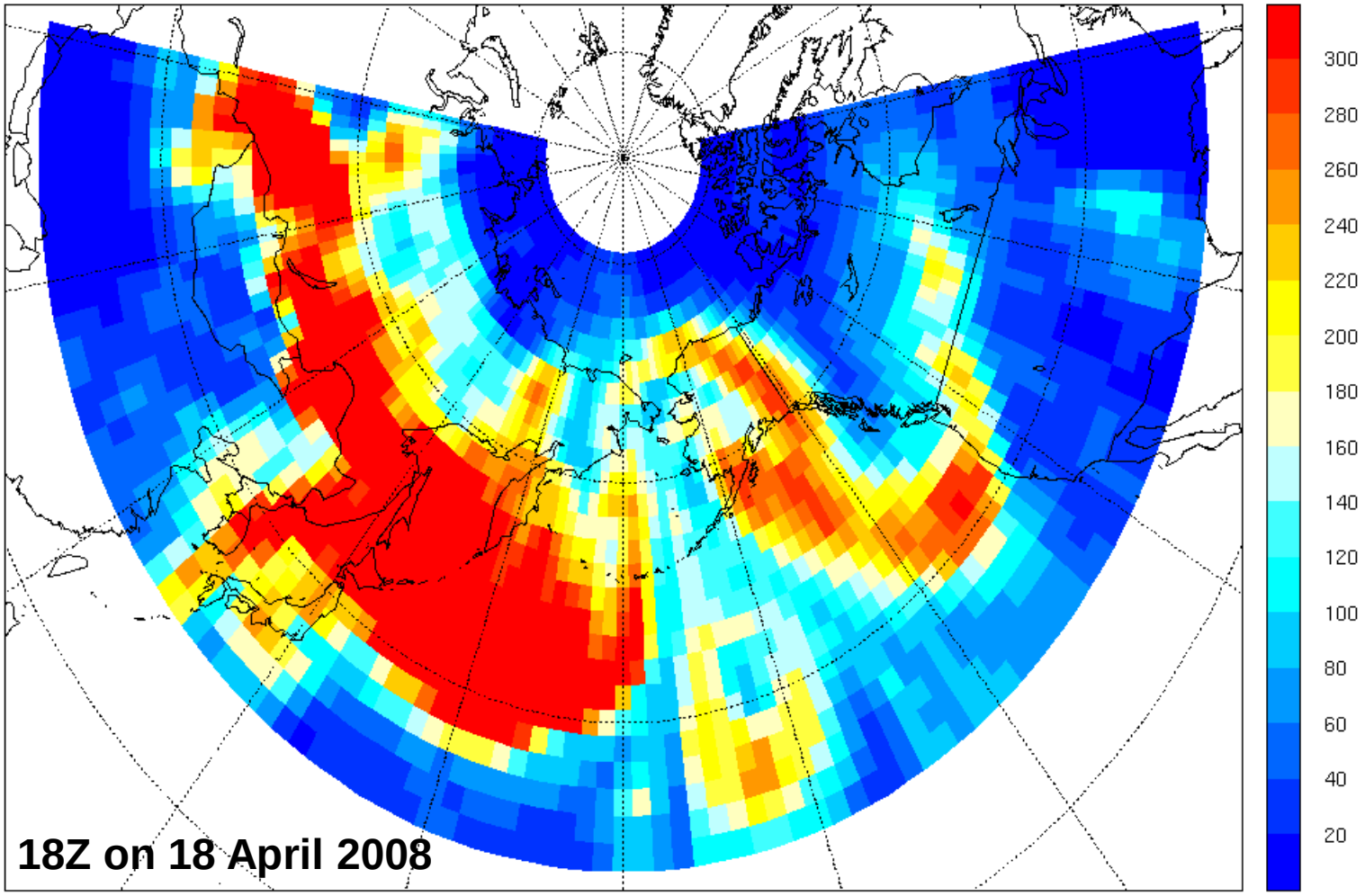
Cross-section of Ozone at Barrow for 1-22 April 2008 With Trajectories Before and During Ozone Enhanement



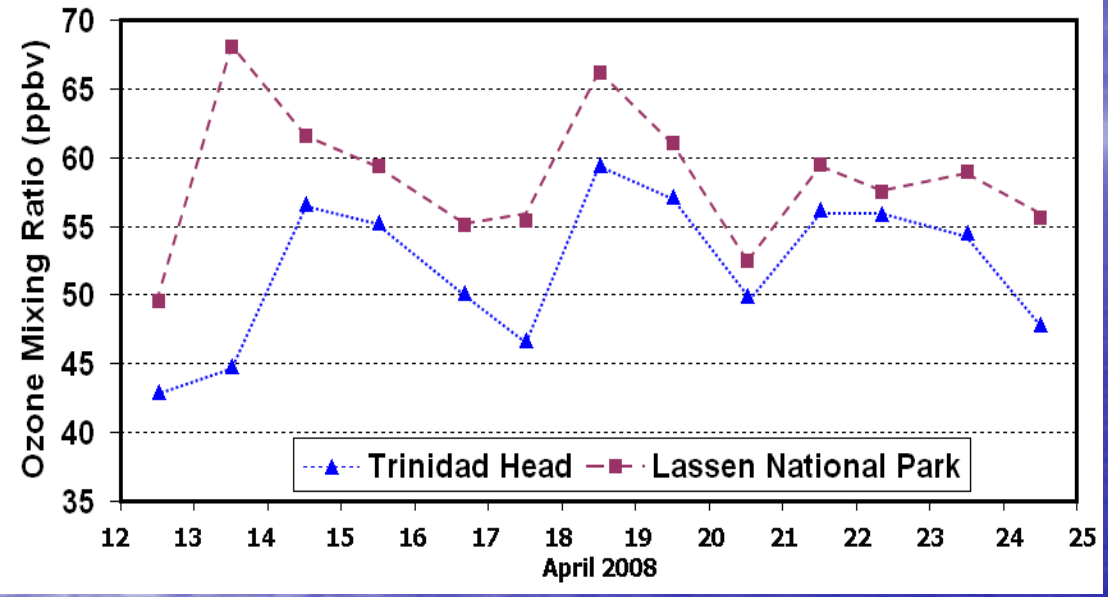


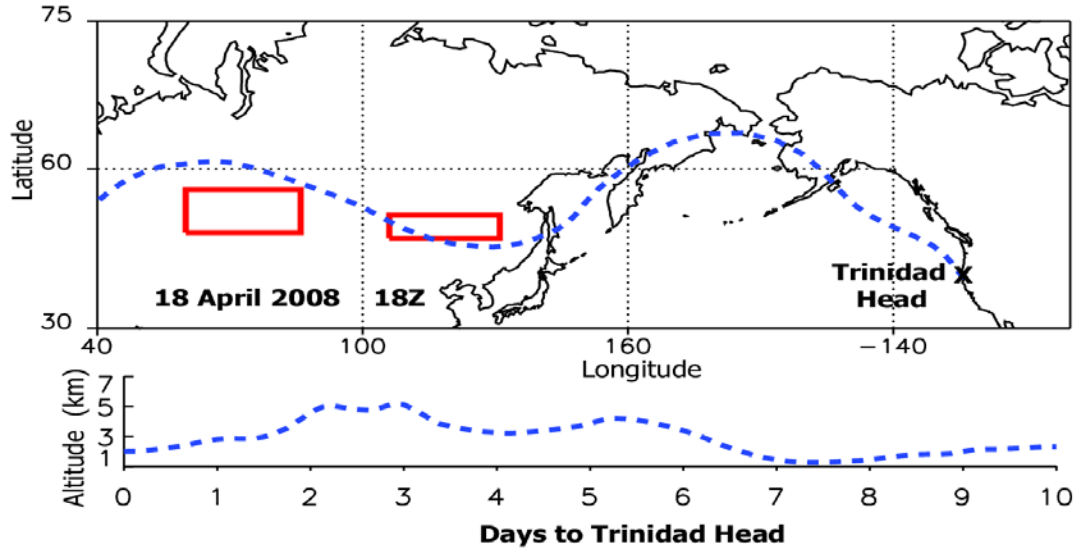


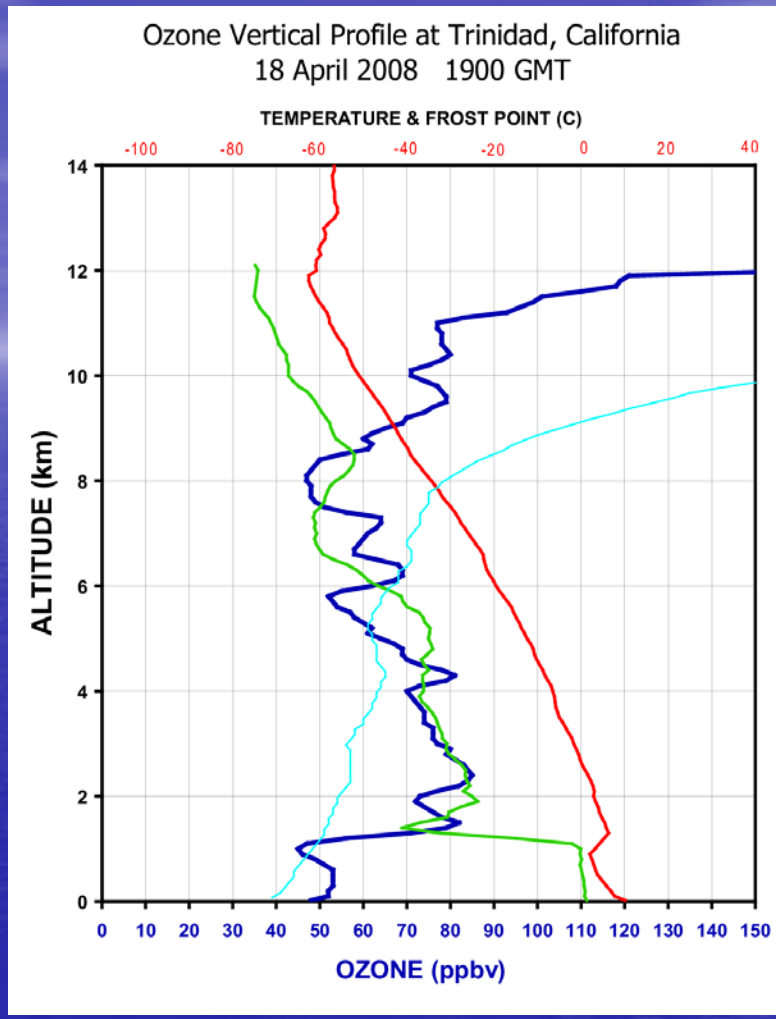
Dispersion of “Fire Trajectories” Released From Burning Regions in Eurasia Beginning 1 April 2008



Surface Ozone 8-hour Maximum at Trinidad Head and Lassen NP for 12-24 April 2008

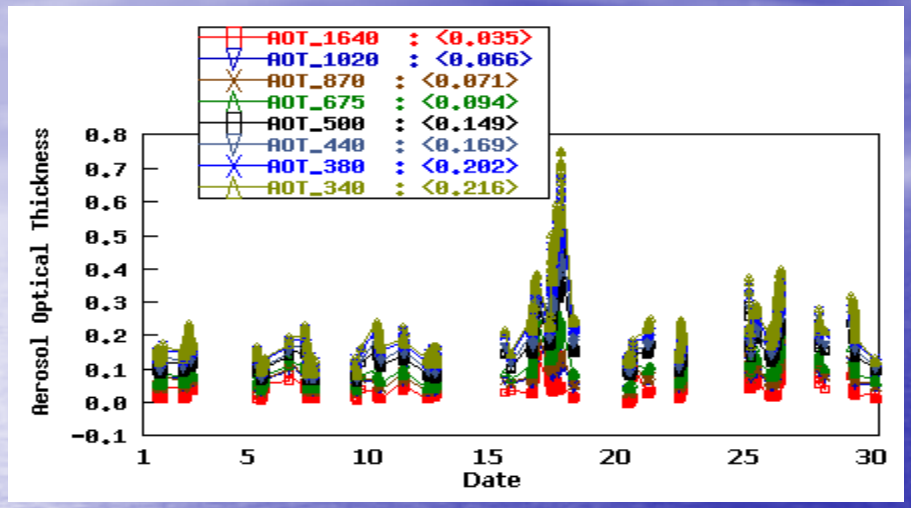


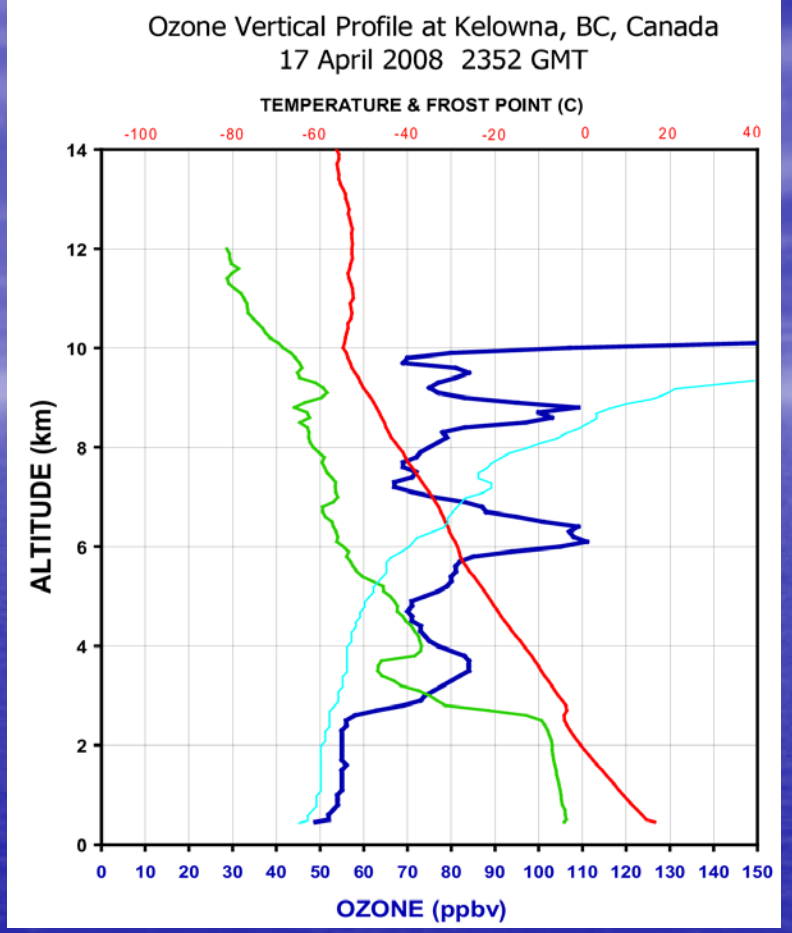




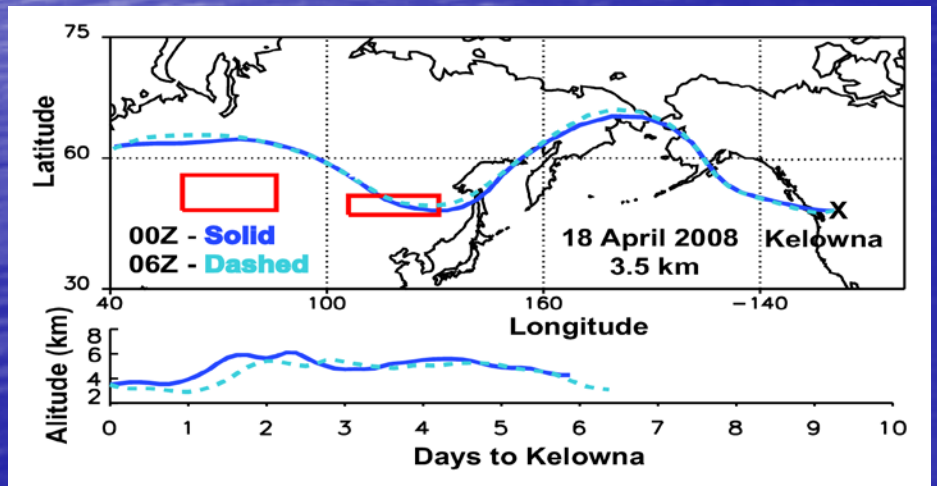
Back trajectory from Trinidad Head at 18Z on 18 April (11 LST on 18 April) at 2 km. Also near the altitude of Lassen NP.

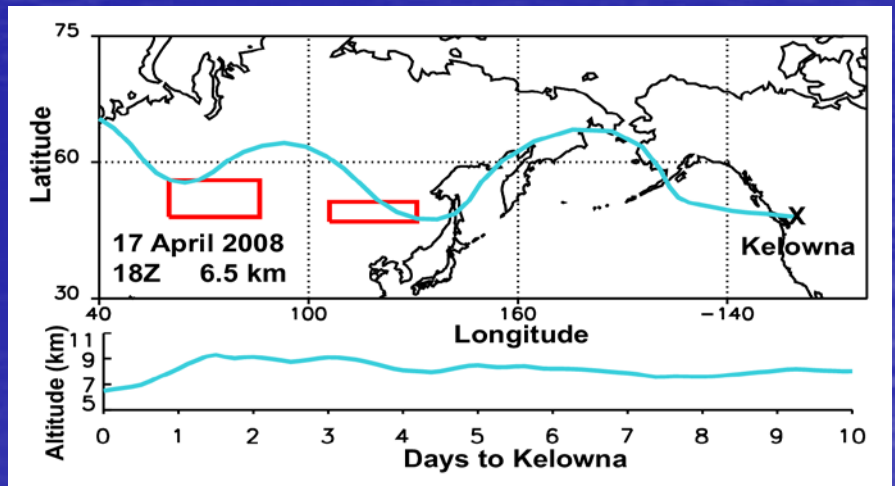
Aerosol Optical Thickness (AOT) at Kelowna, British Columbia during April 2008



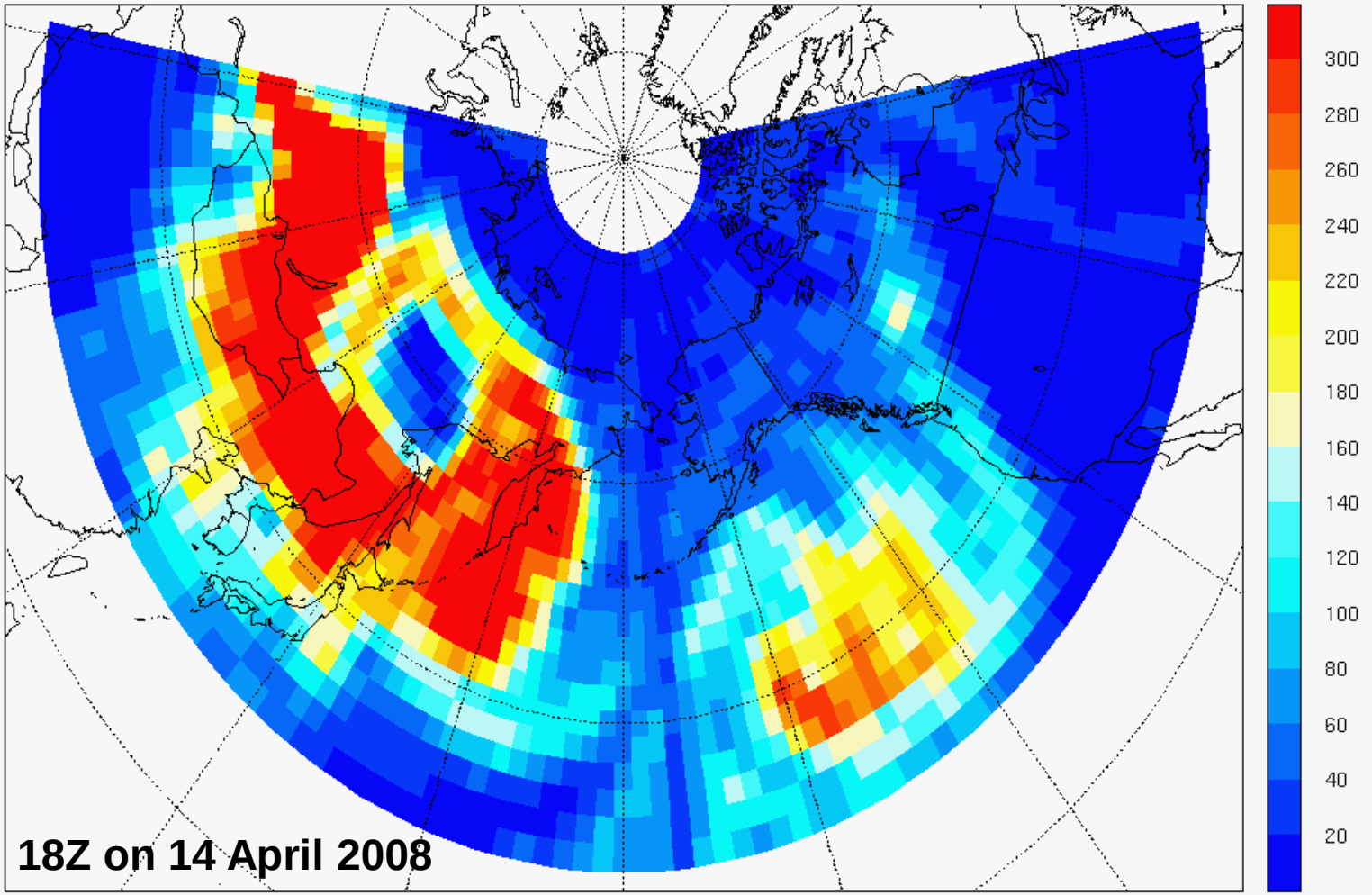


Back trajectories from Kelowna, BC corresponding to the enhanced ozone layers at 3.5 and 6.5 km on 17 April 2008

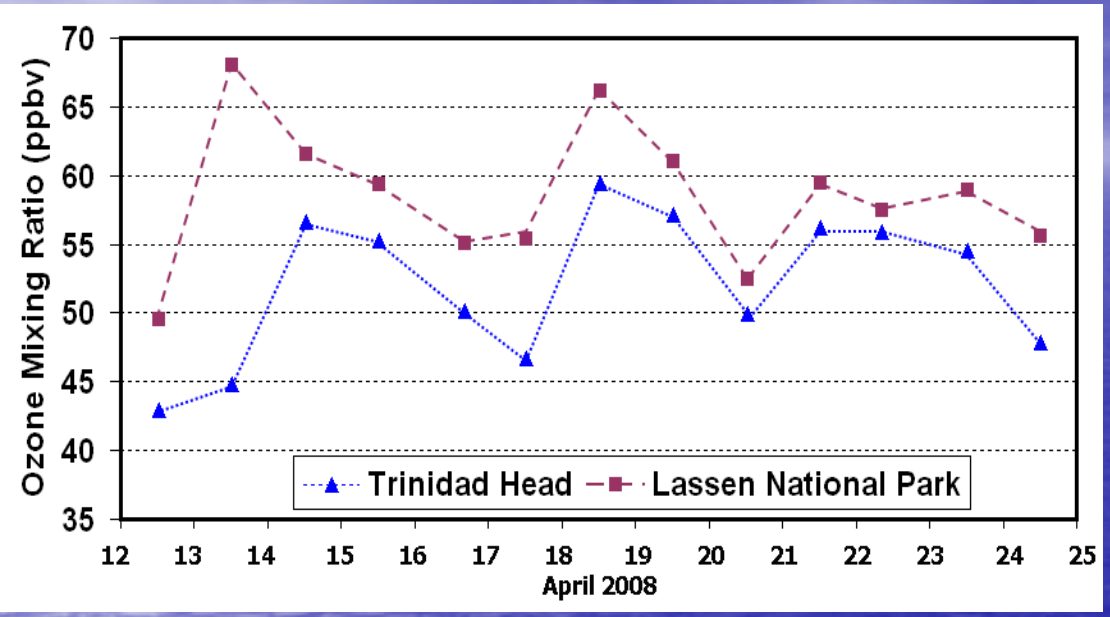


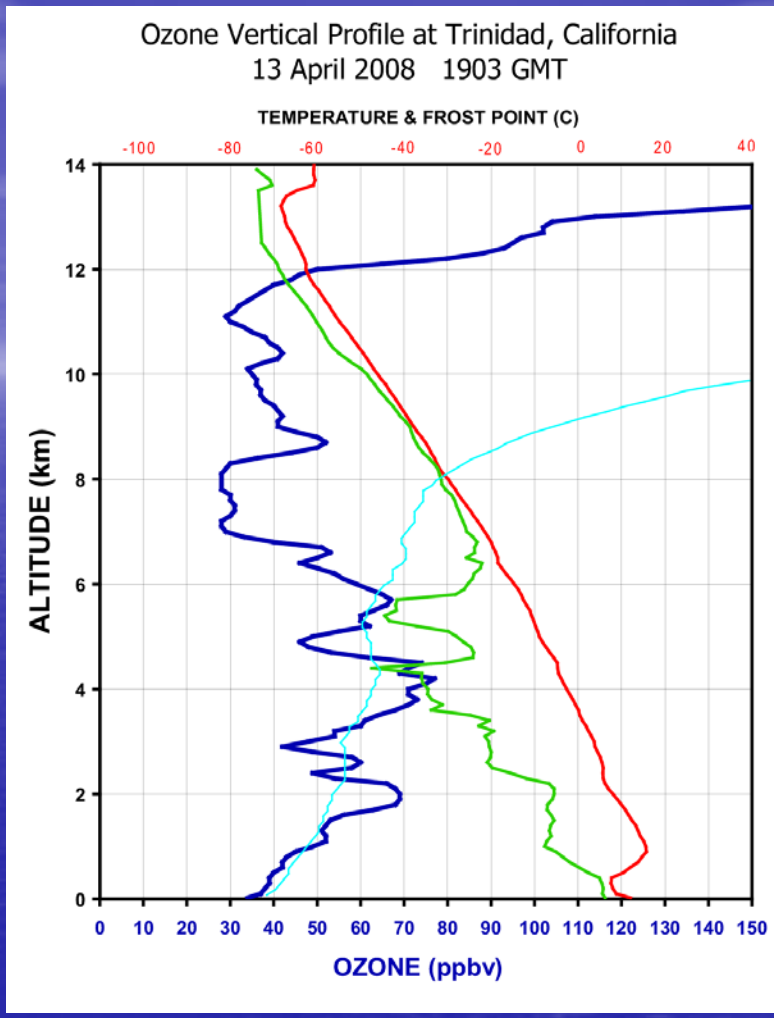


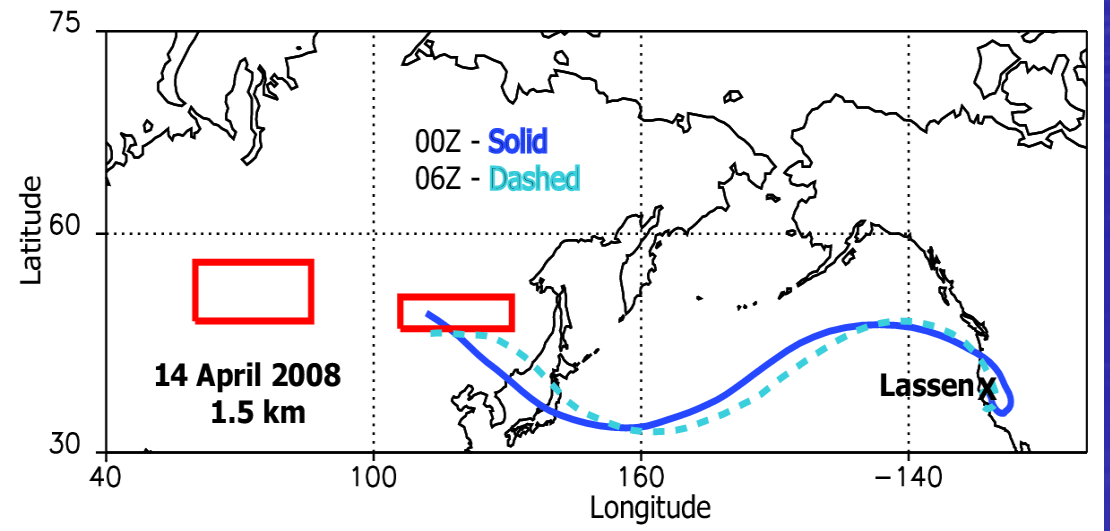
Dispersion of “Fire Trajectories” Released From Burning Regions in Eurasia Beginning 1 April 2008



Surface Ozone 8-hour Maximum at Trinidad Head and Lassen NP for 12-24 April 2008

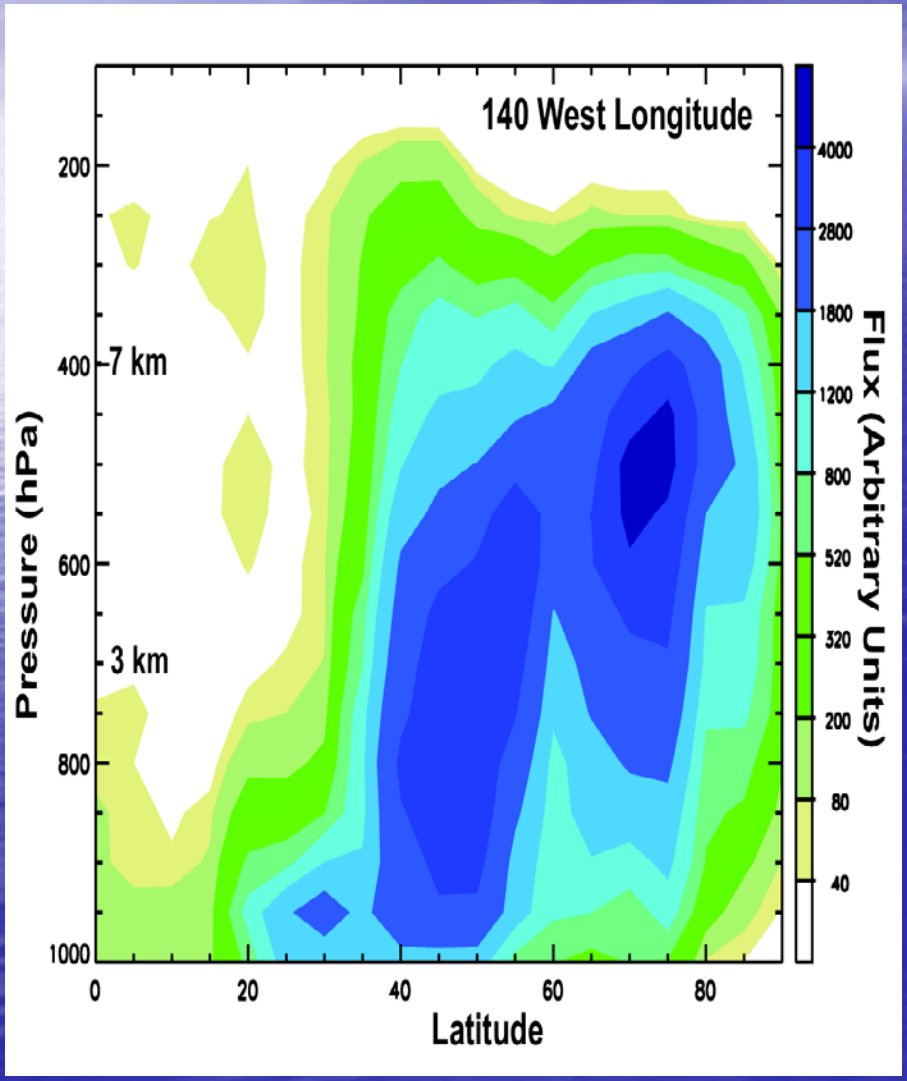


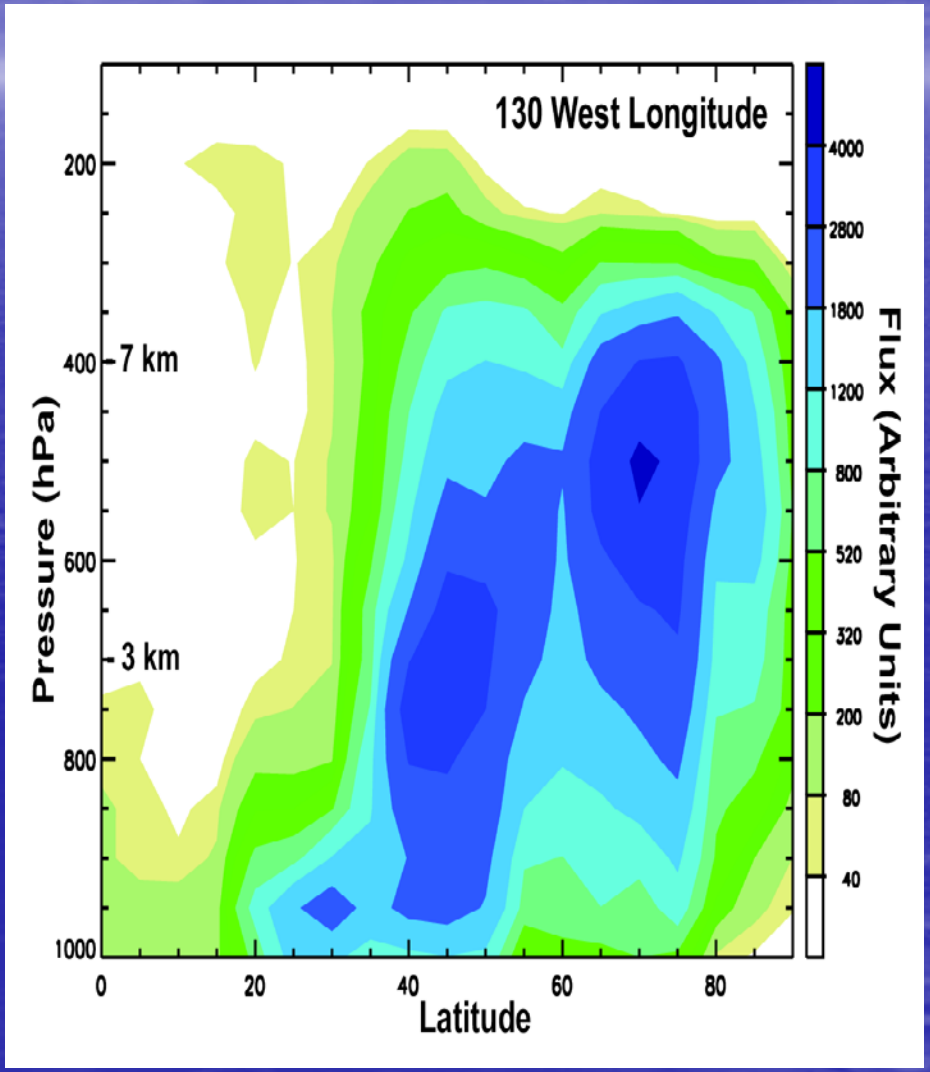


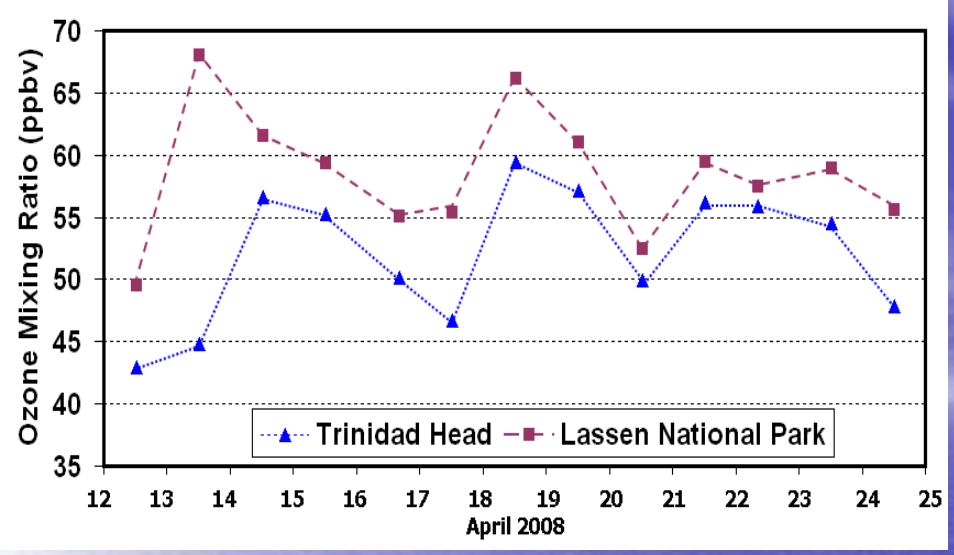


Back trajectory from Lassen NP 00Z & 06Z on 14 April (17 and 23 LST on 13 April) at 1.5 km.

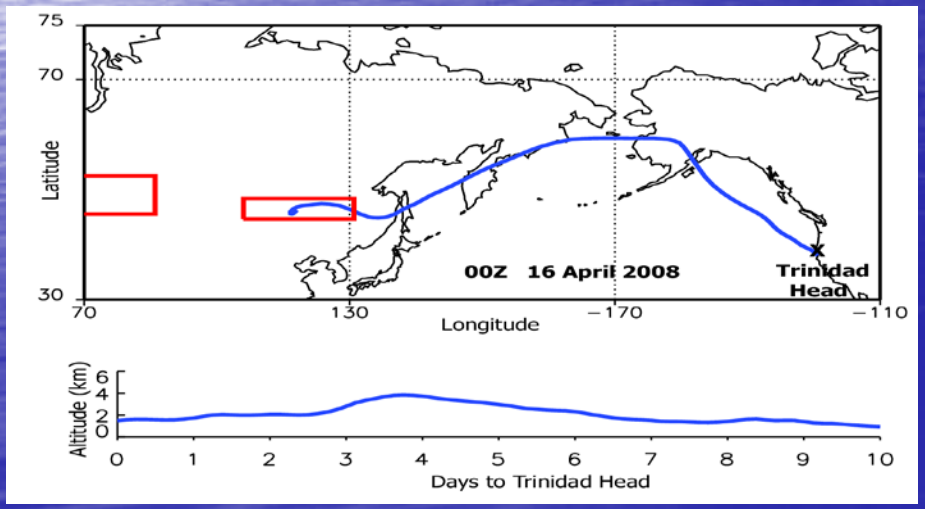
Integrated Flux of "Fire Trajectories" During April 2008 Released From Burning Regions in Eurasia From 1-25 April Passing Through Longitudes 140 W and 130 W



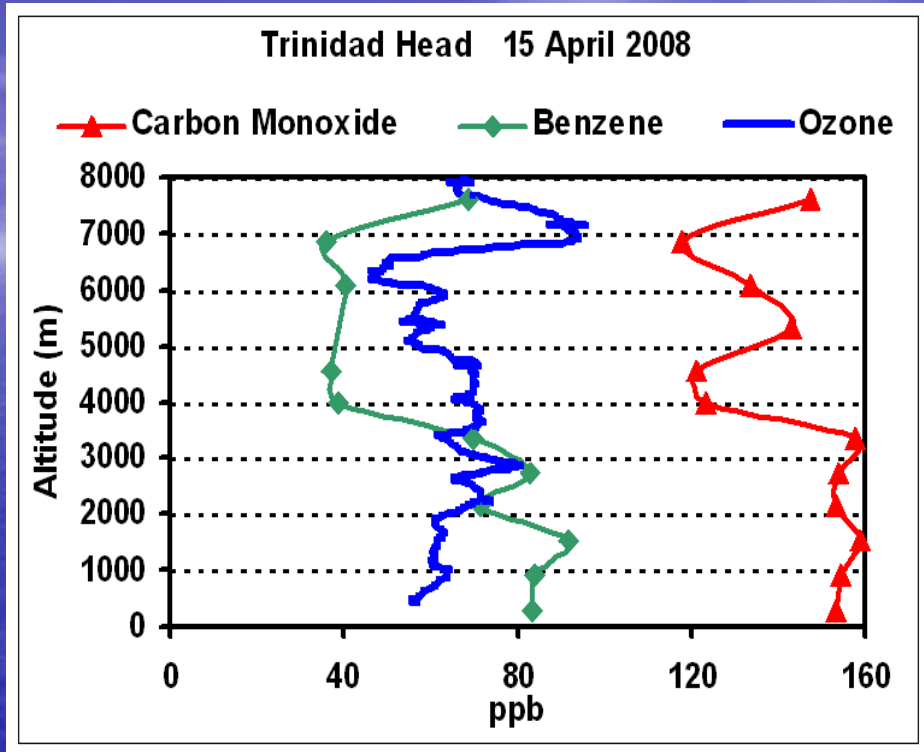




Surface Ozone 8-hour Maximum at Trinidad Head and Lassen NP for 12-24 April 2008.

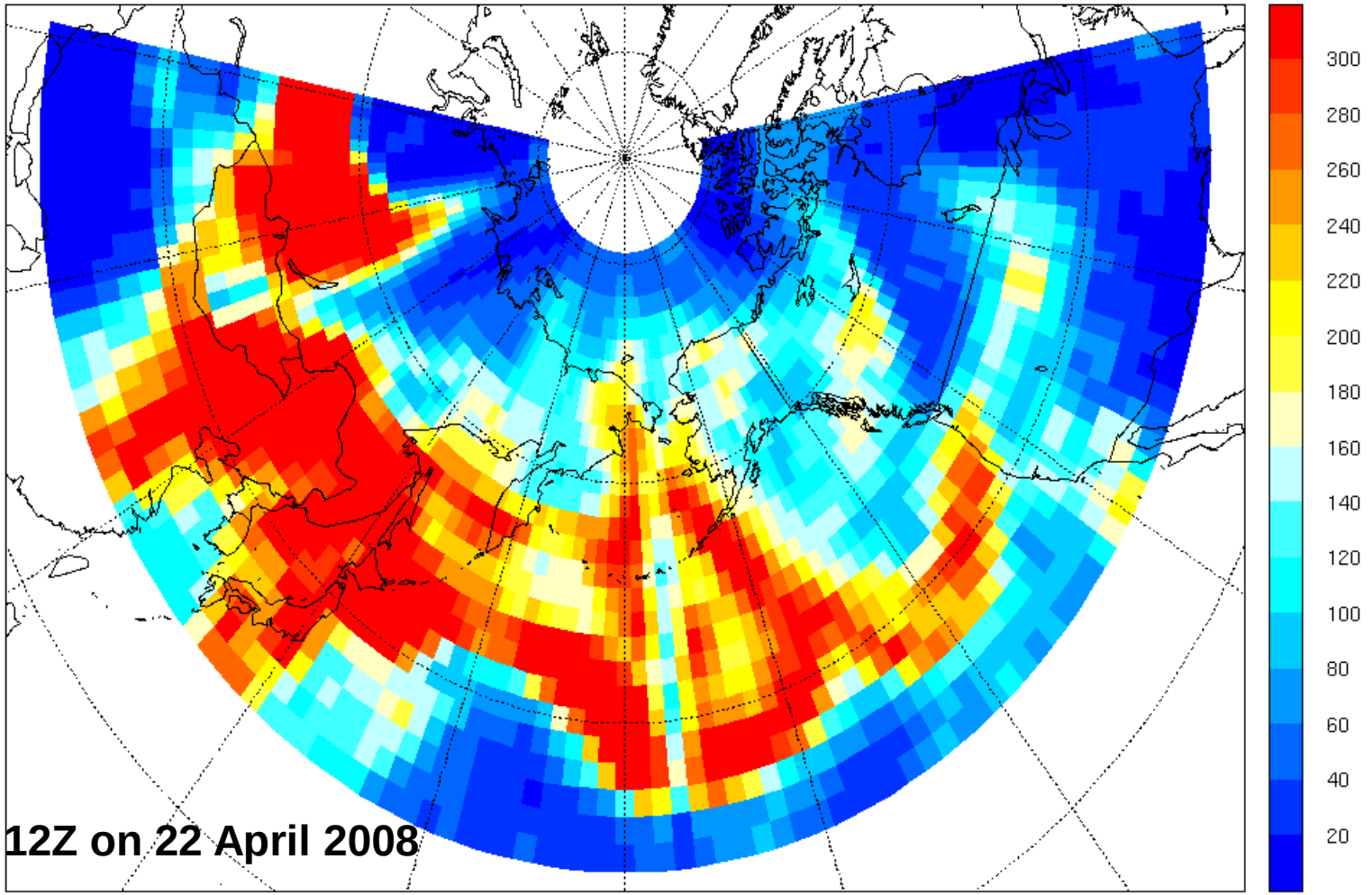


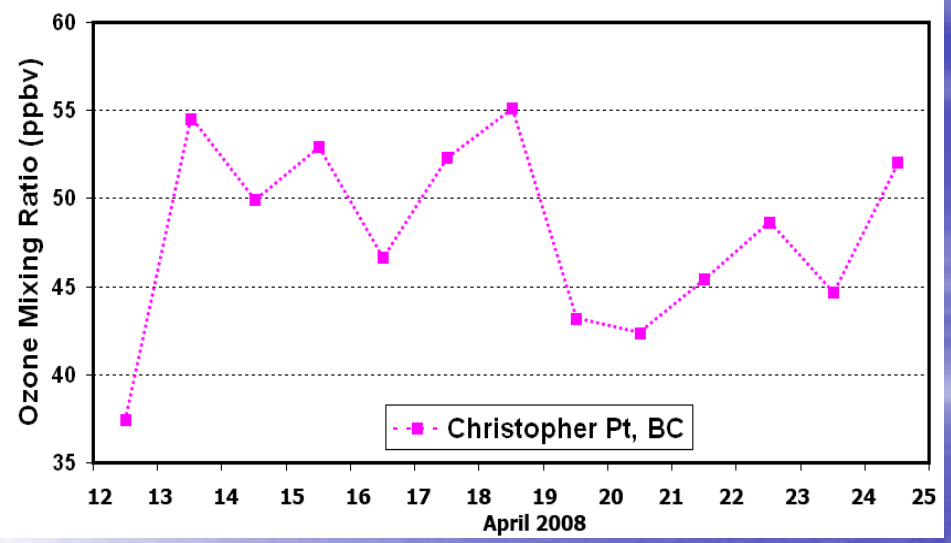
Back trajectory from Trinidad Head at 00 on 16 April at 1.5 km.



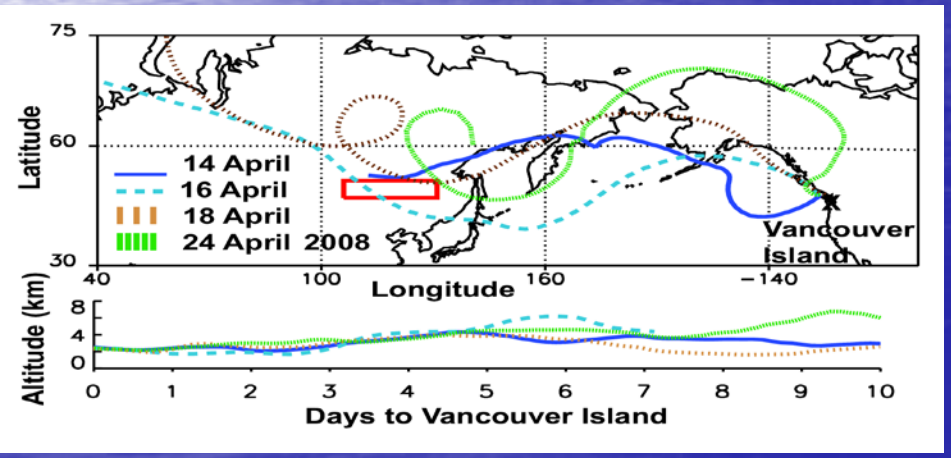
Vertical profiles of several gases from aircraft flask samples and ozone analyzer made near Trinidad Head on 15 April 2008.

Dispersion of “Fire Trajectories” Released From Burning Regions in Eurasia Beginning 1 April 2008

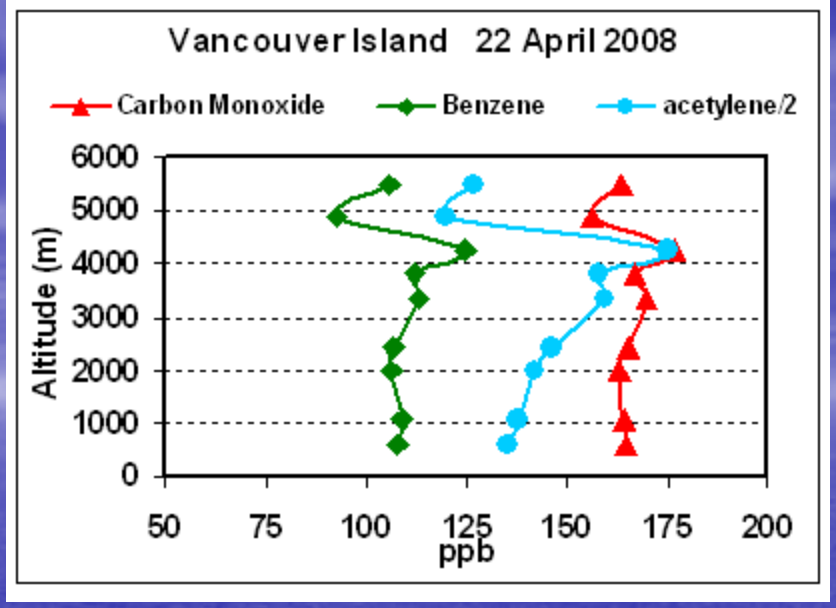




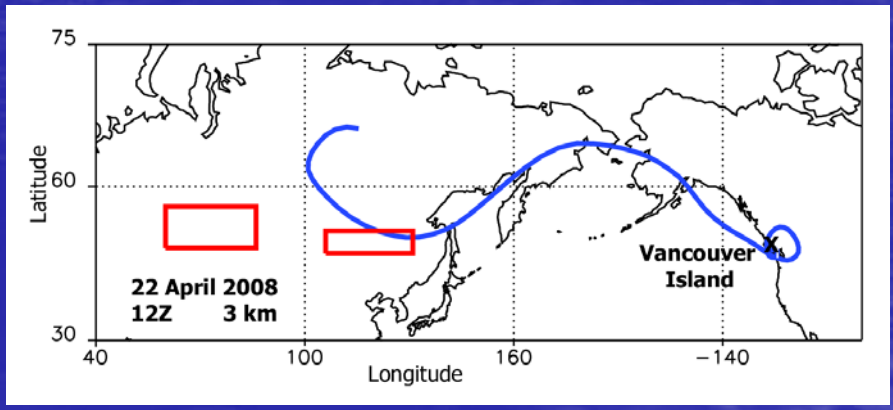
Surface Ozone 8-hour Maximum at Christopher Pt., Vancouver Isl. for 12-24 April 2008



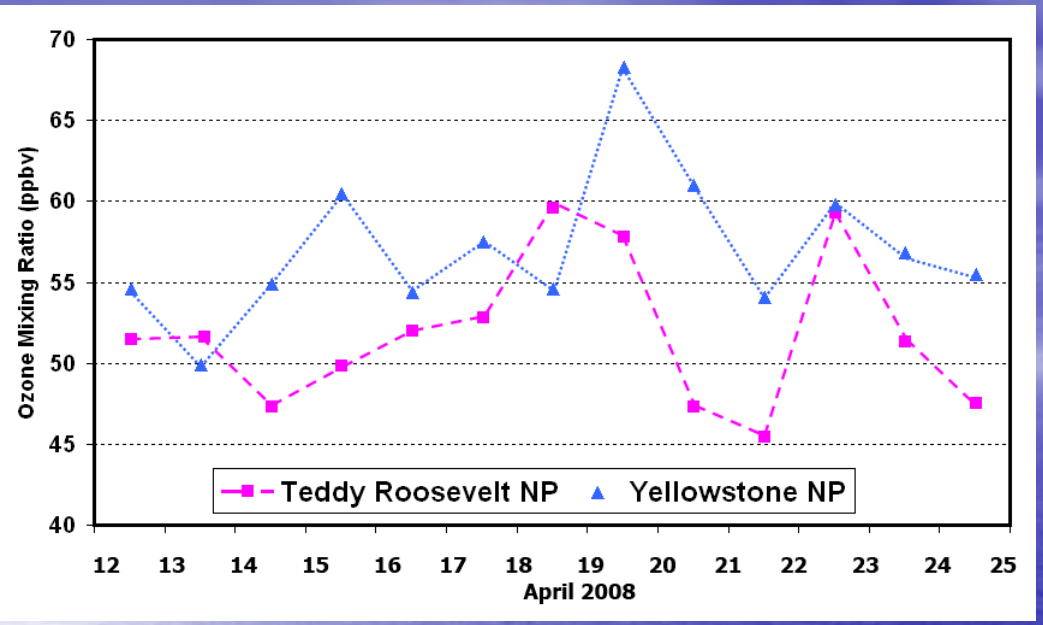
Back trajectory from Vancouver Isl. at 14, 16, 18, and 24 April at 2.5 km.



Vertical profiles of several gases from aircraft flask samples at Vancouver Isl. on 22 April 2008

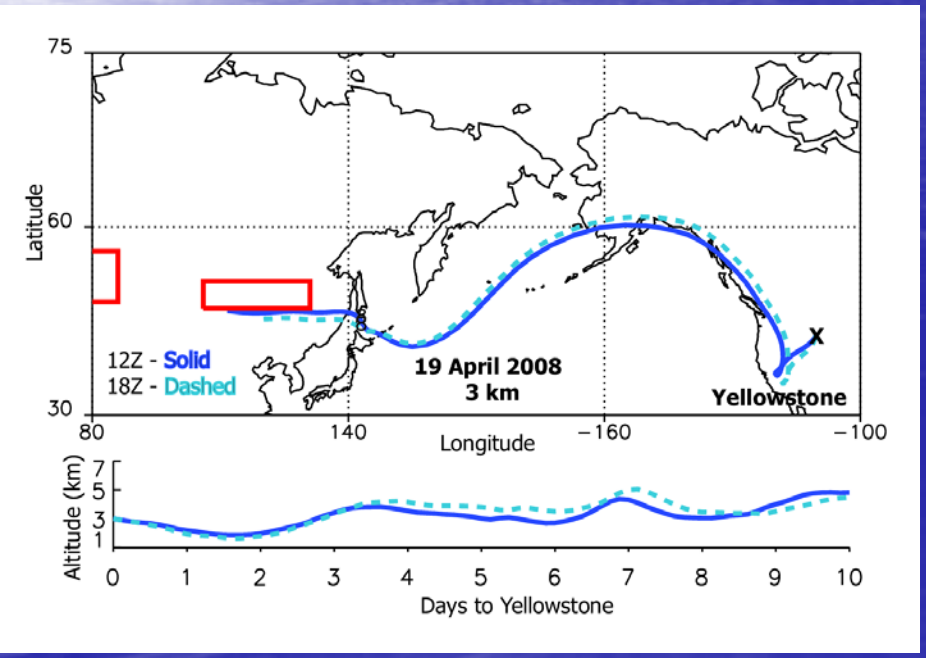


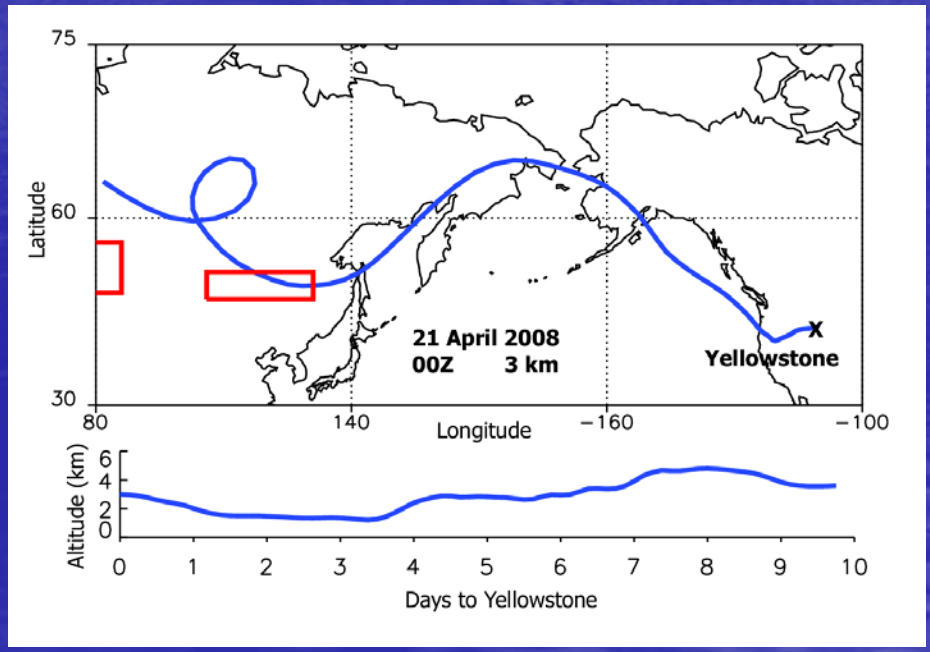
Back trajectory from Vancouver Isl. at 12Z on 22 April at 3 km.



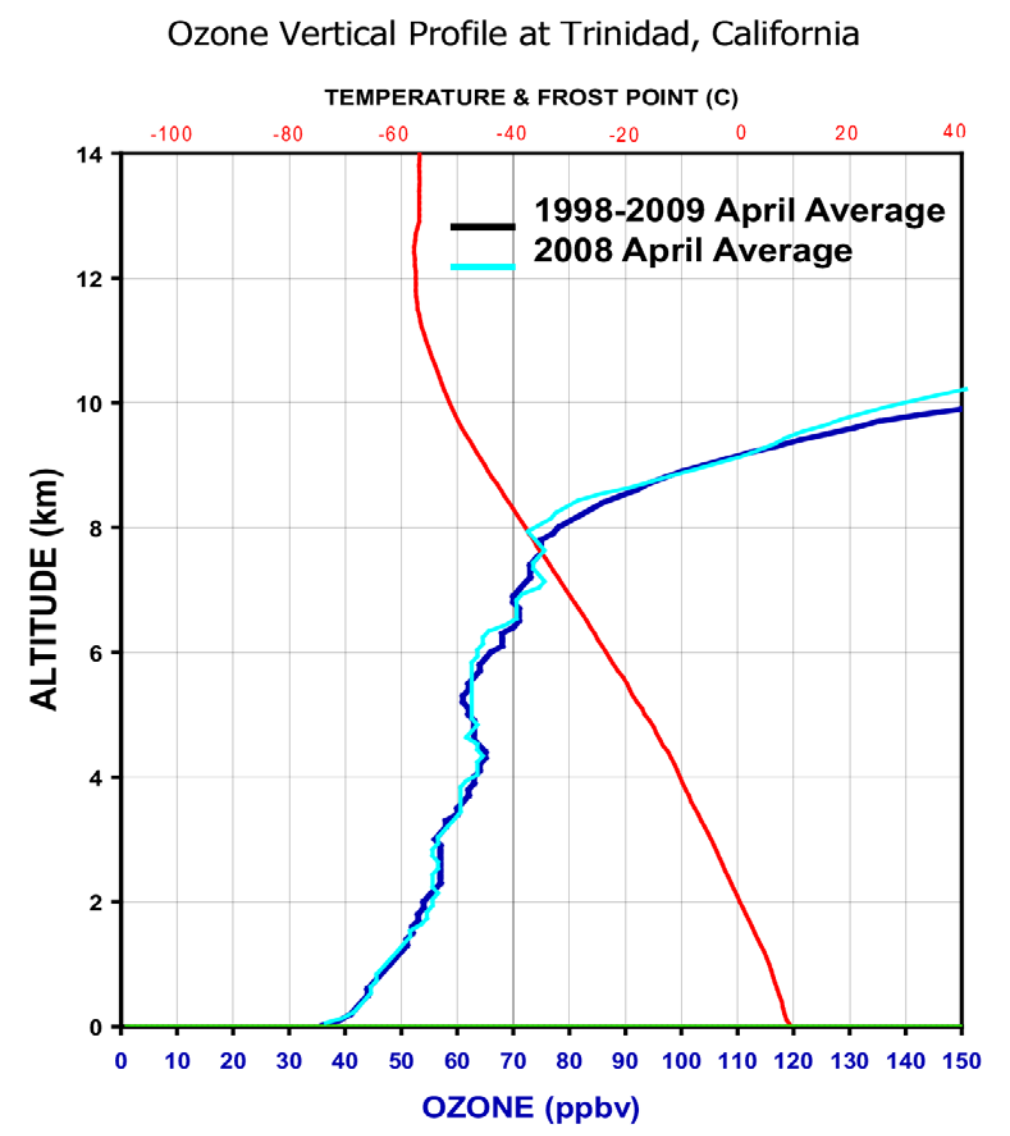
Surface Ozone 8-hour Maximum at Yellowstone NP, WY and Teddy Roosevelt NP, ND for 12-24 April 2008

Back trajectories from Yellowstone NP 00Z & 06Z on 19 April and 00Z on 21 April at 3 km.





Comparison of Average Ozone ProfileDuring April 2008 With the Long-term April Average



Conclusions

- Active early fire season in April 2008.
- Strong transport pathways from Eurasia to western North America.
- Extensive areas effected.
- Strong episodic impacts.
- Overall impact on the seasonal ozone distribution was limited.