Tim and Art's charge

"identify gaps in our understanding of the role of biomass burning (BB) in climate change and to continue to foster collaborative research within the DOE ASR/ARM community (and beyond),...."

Lets narrow focus:

- Instruments for Next Gen Biomass Burn Expts – suggestions based on BBOP
  Topics for off-line discussions
    Flight restrictions
    Instrument time response
    Particle probe coincidence limits
    Filter based light absorption measurements
    SP-AMS measurements of BC coating
    Dark Matter – Can an AMS see tar balls (Sedlacek et al)

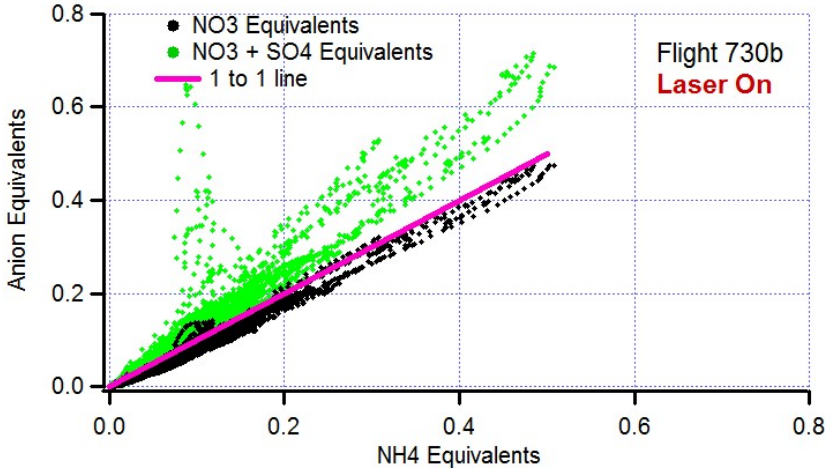
- Next 3 slides: Science

- Important DOE research
  Instrument development - Most bang for the buck

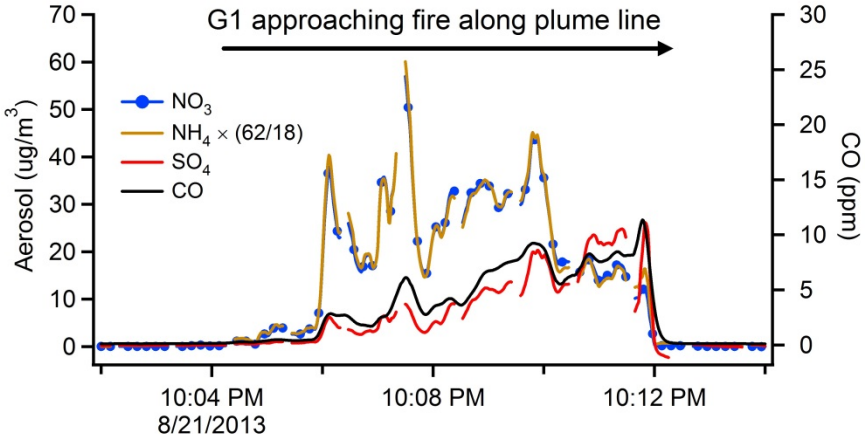
Aerosol “neutralization”

There is enough NH_4^+ to neutralize NO_3^-, no more, no less

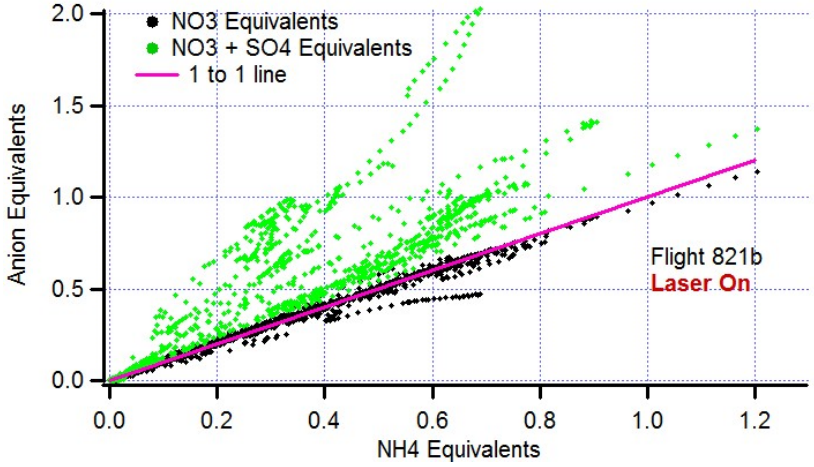
Flight 730b Black dots on 1 to 1 line

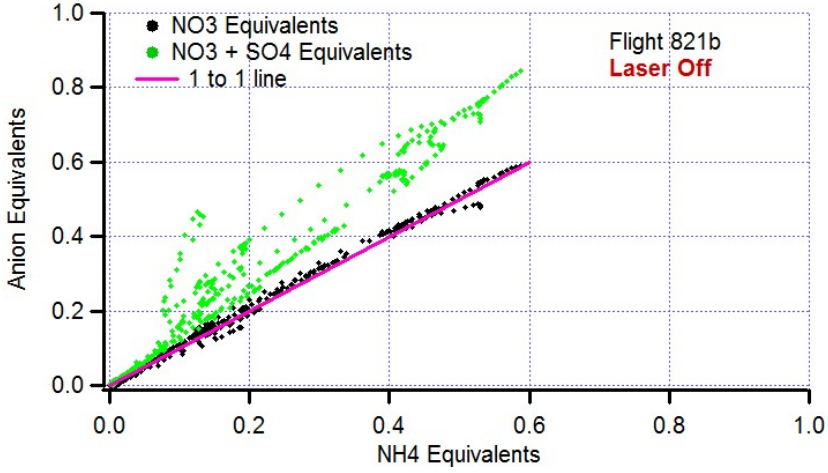


Flight 821b Brown line hides blue line



Flight 821b Black dots on 1 to 1 line for NO_3 = NH_4 equivalents, laser on and laser off



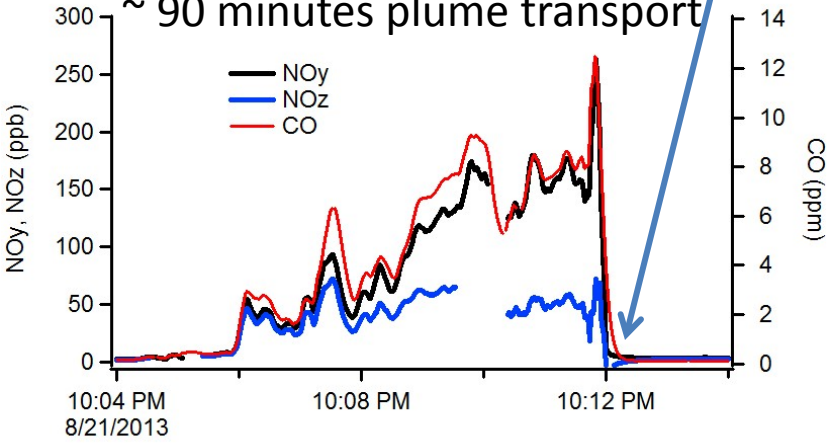


Rapid Photochemistry

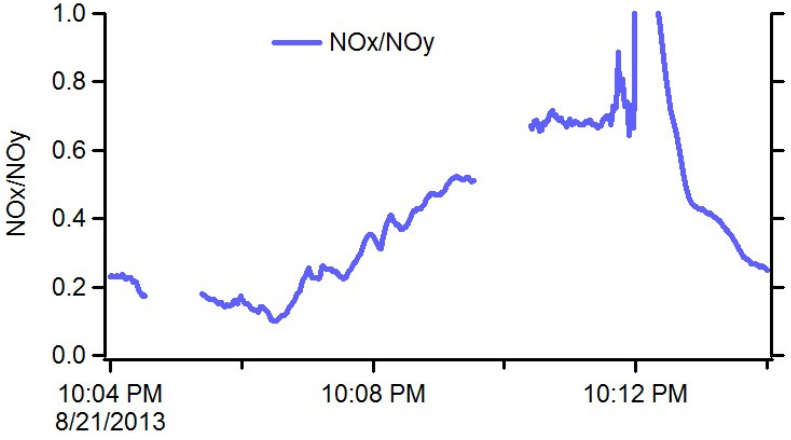
NO_y dilutes similar to CO

At 10:12, 70 ppb NO_z appears in seconds

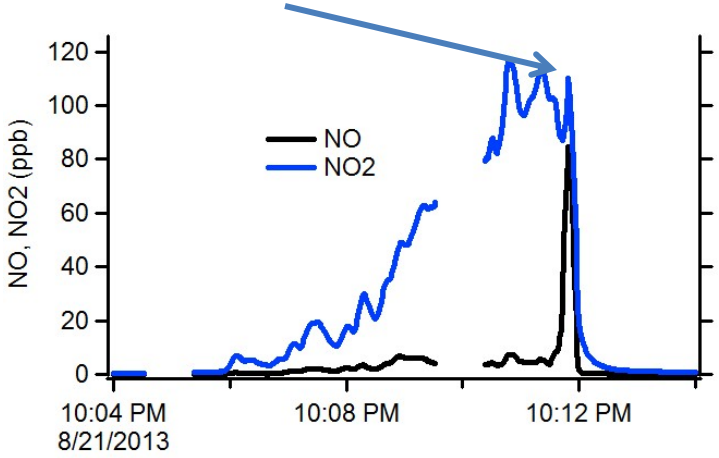
~ 90 minutes plume transport

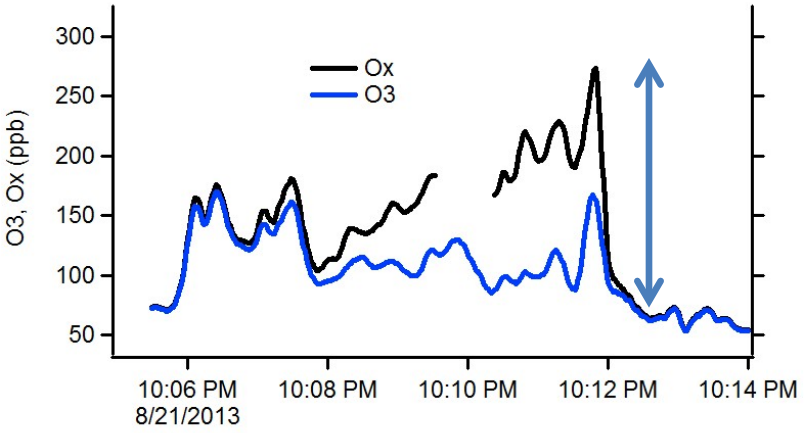


NO_x/NO_y decreases by ~ order of magnitude in 90 minutes.



Initial NO_2 ~ 120 ppb. That is most O_x that can come from fire. But O_x increases by 225 ppb

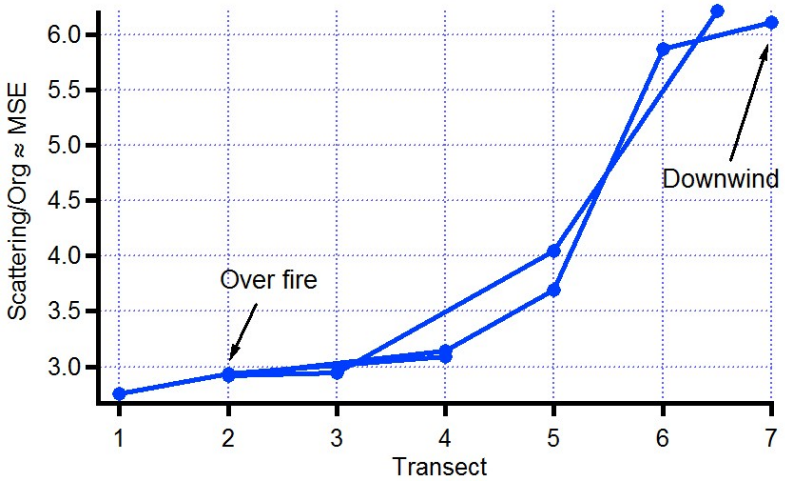


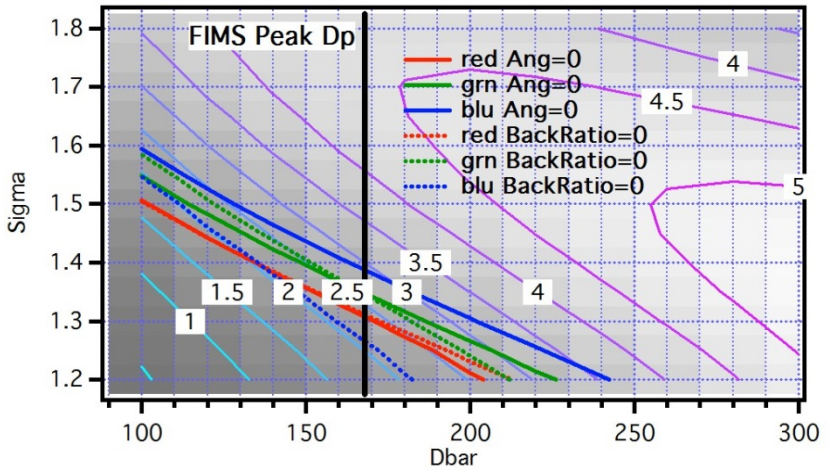


Rapid Increase in Scattering and MSE (Mass Scattering Efficiency) Flight 731a

Ratios: Downwind/Over fire: Scattering/CO = 1.68, Scattering/Org = 2.08, Org/CO = 0.81

Scattering increases by 68% due to a greater than 2-fold increase in MCE and a 19% decrease in Aerosol





Plot on right is long story. An attempt to retrieve size distribution from scattering and FIMS peak dN/dLogD (see poster)

We can reproduce observed MSE over fire, using an AMS CE = 1

But we cannot get an MSE above ~ 4.5 using downwind data. We need a 5.5.

Dark matter (tar balls) increase actual Aerosol Mass and decreases MSE.