

1. Houston Deployment Plans
2. California data progress, schedule, and preliminary analysis
3. Ongoing analysis of Maryland observations
4. Recent publications and plans for future publications



Key Contacts for Texas



David Allen – University of Texas / Texas Air Quality Research Program

Raj Nadkarni – Texas Commission on Environmental Quality

Vince Torres – University of Texas

Barry Lefer – University of Houston

Vince Torres (UT) – DISCOVER-AQ ground sites infrastructure support

Johan Mellqvist and Barry Lefer (Chalmers/UH): Quantification of industrial emissions of VOCs, NO₂, and SO₂ by SOF and mobile DOAS during DISCOVER-AQ

Rob Griffin and Barry Lefer (Rice/UH): Surface measurements of PM, VOCs, and photochemically relevant gases in support of DISCOVER-AQ

Gary Morris and Barry Lefer (Valparaiso/UH): Ozonesonde launches from the University of Houston and Smith Point, Texas in support of DISCOVER-AQ

Rebecca Sheesley and Sascha Usenko (Baylor): Collect, analyze, and archive filters at two DISCOVER-AQ Houston focus areas: Initial characterization of PM formation and emission

Xinrong Ren and Winston Luke (UMD/NOAA): Surface measurement of trace gases in support of DISCOVER-AQ

Lea Hildebrandt Ruiz and Greg Yarwood (UT): Interactions between Organic Aerosol and NO_y: Influence on Oxidant Production



Ground Based Additions for Houston



The following additions are either offered or under negotiation and will need to be considered in the ground site plans

NOAA Radiation Group (Kathy Lantz and Joe Michalsky, NOAA) – this group was located at Porterville during the California study

Aerodyne Mobile Facility (Scott Herndon, Aerodyne) – in discussion

MOPS - Measurement of Ozone Production (Bill Brune, Penn State)

TOLNet - Tropospheric Ozone Lidar Network (TBD possible to have one or two ground-based ozone lidars)

EPA (Jim Szykman and Russell Long) - Research trailer to assess NO₂ measurement techniques and other research-grade measurements for future monitoring; interested in near-road measurements

Small AQ Sensors (Rod Jones and Iq Mead, Cambridge UK) – we hope to have a small dense network of sensors for O₃, NO₂, CO, and SO₂ and possibly some small OPCs for PM. Details are still being negotiated.

GEO-CAPE ship cruise (Antonio Mannino and Maria Tzortziou, NASA GSFC)

Dates: 9-22 September

Connection: Overflight of ship with King Air over Galveston Bay and northeastern Texas shelf with ACAM and HSRL. Both instruments can provide valuable information on both ocean color and atmospheric correction for trace gases and aerosols. King Air flights would not take precedence over primary DISCOVER-AQ duties.

Geo-TASO flights (Jim Leitch, Ball Aerospace)

Dates: TBD

Connection: Validation flights of the GeoTASO UV-Vis spectrometer onboard the NASA LaRC Falcon aircraft to take advantage of DISCOVER-AQ trace gas and aerosol measurements. These flights would not require any changes to DISCOVER-AQ plans or operations.



P-3B Payload Options for Houston



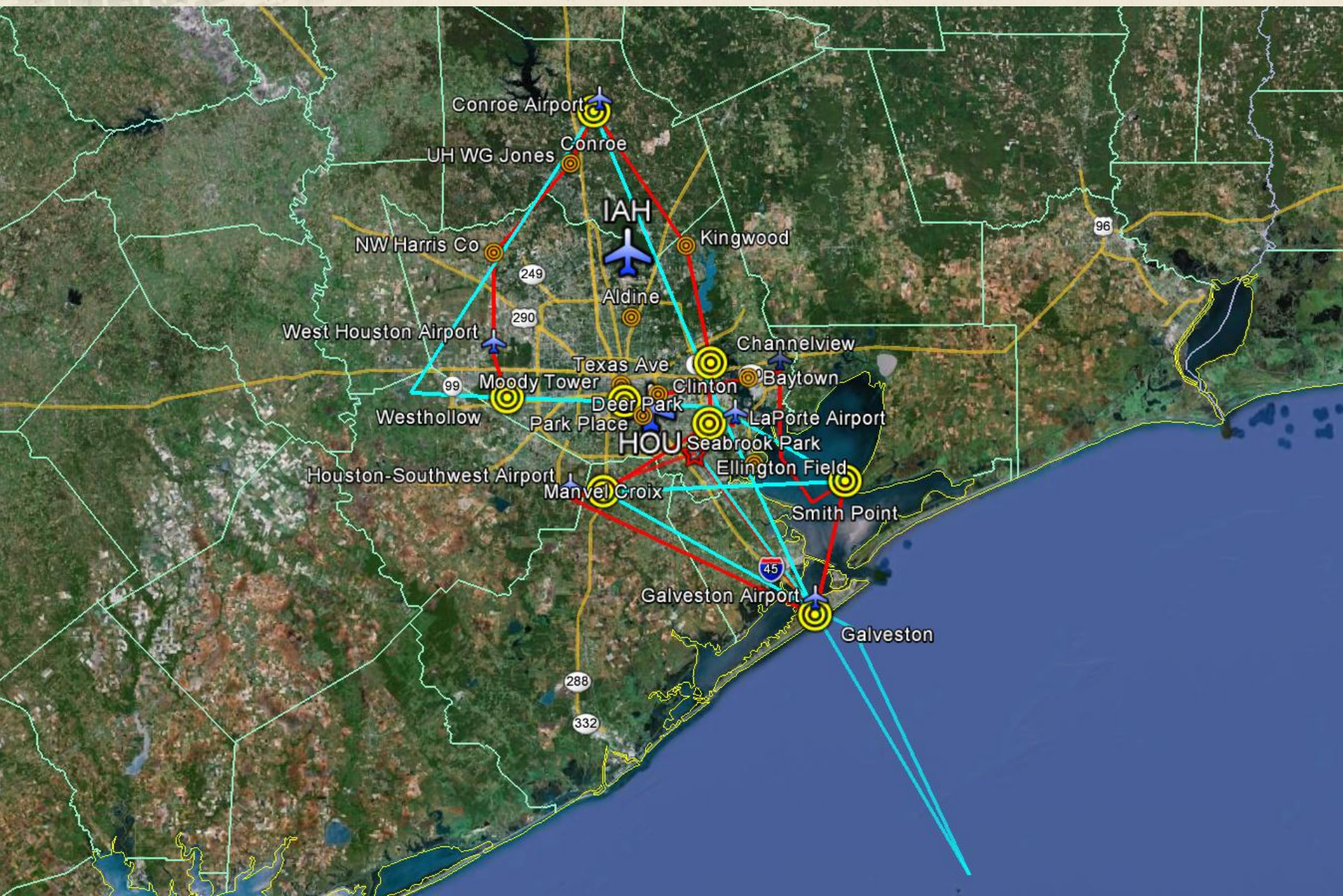
Additions to the payload are undergoing evaluation and consideration.
The final decision on this will need to be made VERY soon, but your input is welcome.

CAR (Charles Gatebe, UMBC) - located in nose of aircraft

SO₂ (John Holloway, NOAA) – we would have to supply an operator (NH₃ rack)

Ethylene (Joost Degouw, NOAA or TCEQ) – in rack used for NH₃ in California

Picarro CH₄ (Melissa Yang) – added to AVOCET rack



Taken from Site Survey Report

Site Name	Spiral Y/N	Pandora Y/N	Aeronet Y/N	Missed Approach?	other DISCOVER-AQ Augmentation
Seabrook Park	N	Y	Y	N	Mobile Facility?
LaPorte Airport	N	N	N	Y	Mobile Facility?
Deer Park	Y	Y	Y	N	True NO2?
Baytown	N	N	TBD	N	
Channelview	Y	Y	Y	N	True NO2?
Clinton	N	Y	Y	N	True NO2?
Texas Avenue	N	Y	Y	N	Mobile Facility? True NO2?
Park Place	N	N	TBD	N	
Moody Tower	Y	Y(2)	Y	N	
Galveston	Y	Y	Y	Y	Mobile Facility?
Manvel Croix	Y	Y	Y	N	Mobile Facility? True NO2?
Westhollow	Y	Y	Y	N	True NO2?
Aldine	N	N	TBD	N	Mobile Facility?
Conroe (Airport)	Y	Y	Y	Y	Mobile Facility? True NO2?
UH WG Jones	N	N	N	N	AMS/NO2 (Hildebrandt Ruiz)
NW Harris Co	N	Y	Y	N	
Smith Point	Y	Y(2)	Y	N	NATIVE (Thompson), Tethered Balloon (Clark), True NO2?
Baytown Airport	N	N	N	TBD	Possible missed approach enroute from Smith Point to Moody Tower
Houston SW Airport	N	N	N	TBD	Possible missed approach (8 km west of Manvel Croix)
West Houston Airport	N	N	N	TBD	Possible missed approach enroute from Westhollow to NW Harris Co

Plans for a domestic deployment continue to evolve. I have submitted a 2-page brief on considerations that include both campaigns.


Logistical Considerations: making a case for Houston as a common base

“In some cases, new instruments are being built to accomplish the work and often, the cache of spare parts and repair equipment are a shared resource that may be needed by either or both instruments depending on circumstances. While basing the aircraft together does not relieve the need for operators on two aircraft, it could allow some groups to require fewer personnel on the ground and enable rotation of personnel to reduce time spent in the field.”


Investigator	Measurement/Role	New Instrument?
Diskin	DACOM and DLH	Yes for DACOM
Anderson	LARGE (aerosols)	No spares
Cohen	TD-LIF (NO ₂ and reactive nitrogen)	Upgrades to an older instrument
Fried	DFGAS (CH ₂ O)	Modifications to an existing instrument
Wisthaler	PTR-MS	
Beyersdorf/Yang	AVOCET (CO ₂)	
Ferrare	HSRL (DAQ) / ER-2 lead (SEAC ⁴ RS)	

Science considerations:

1. UV DIAL ozone observations over Houston: 30-45 minutes at the end of a flight
2. Remote sensing validation/ACE observing strategies: Overflight of ER-2 remote sensing payload under appropriate circumstances (e.g., long range transport of dust or smoke) similar to PODEX overflights in California
3. Direct support of SEAC⁴RS with P-3B: Subject to DISCOVER-AQ priorities, but 10 flights over Houston could be accomplished alongside a couple of additional sorties in support of SEAC⁴RS.


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DISCOVER-AQ

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PLANNING >>
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Reports
Forecasting
Calendar
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Logistics

DISCOVER-AQ

Today September 2013 Print Week Month Agenda

Sun	Mon	Tue	Wed	Thu	Fri	Sat
Sep 1	2 Transit to Houston	3	4 Nominal 1st scienc	5	6	7
8	9 Nominal ship cruise	10	11	12	13	14
15	16 Nominal ship cruise	17	18	19	20	21
22 Nominal ship crui	23	24	25	26	27	28
29	30 Return to WFF&Lal	Oct 1	2	3	4	5

Events shown in time zone: Eastern Time

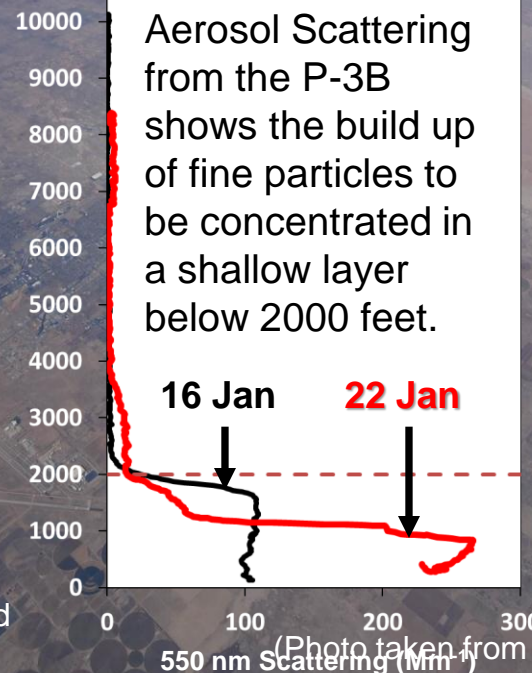
Google Calendar

- Unlike California, we will not need to introduce margin into the schedule for fog. Therefore, we have a much firmer schedule.
- 2 Sep - Transit to Houston (yes, I know that it is Labor Day)
- 4 Sep - First possible science flight
- 1 Oct - Return to WFF
- The rest of the calendar will be constructed around these key dates.

HSRL-2 on the King Air Maps the Spatial Distribution of Aerosol between ground monitors across the valley

Fresno

Bakersfield PM2.5
(16 January - 7 February)



*Orange line (36 ug/m³) is the 24hr average threshold for violating National Ambient Air Quality Standards

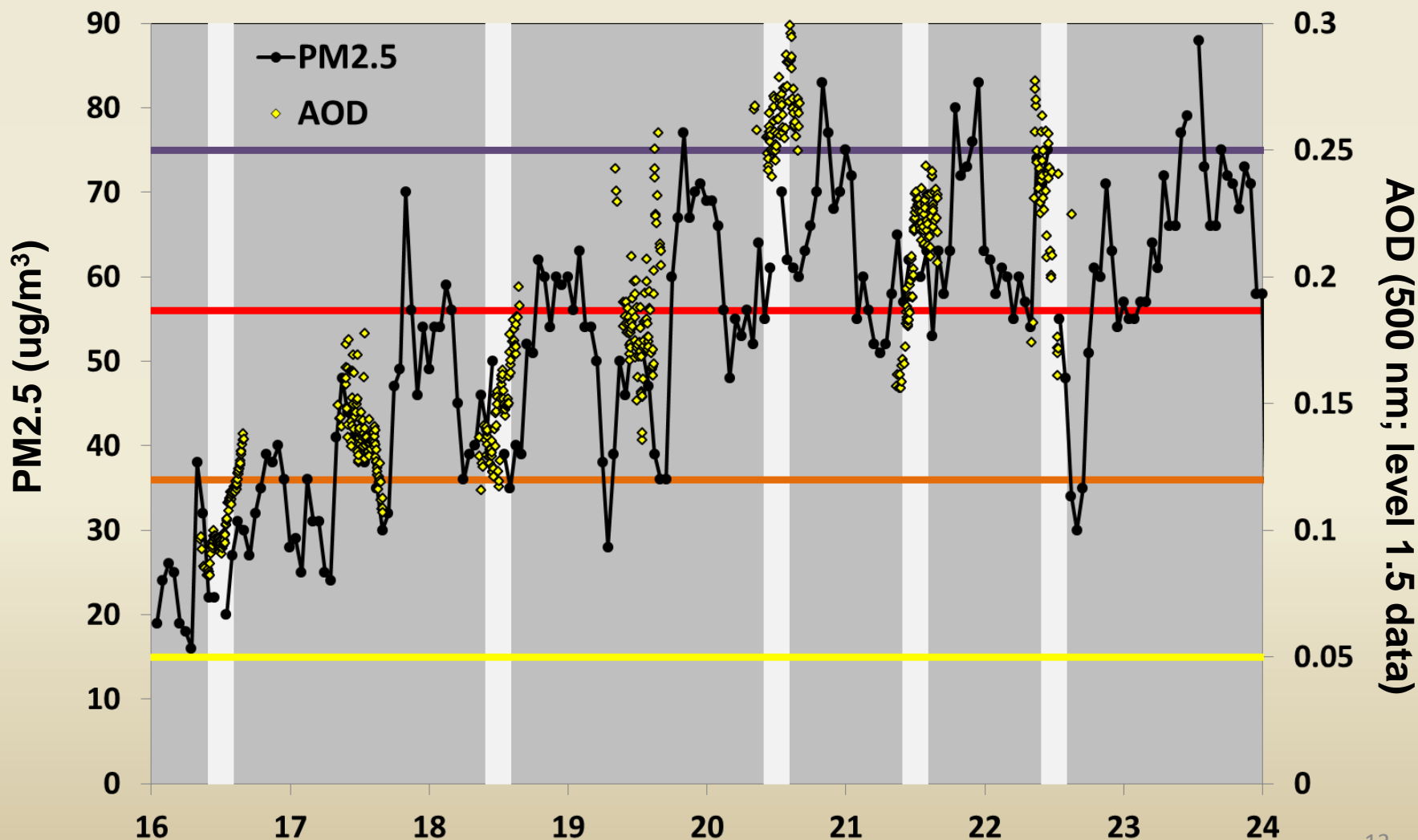
Aerosol Scattering from the P-3B shows the build up of fine particles to be concentrated in a shallow layer below 2000 feet.

16 Jan **22 Jan**

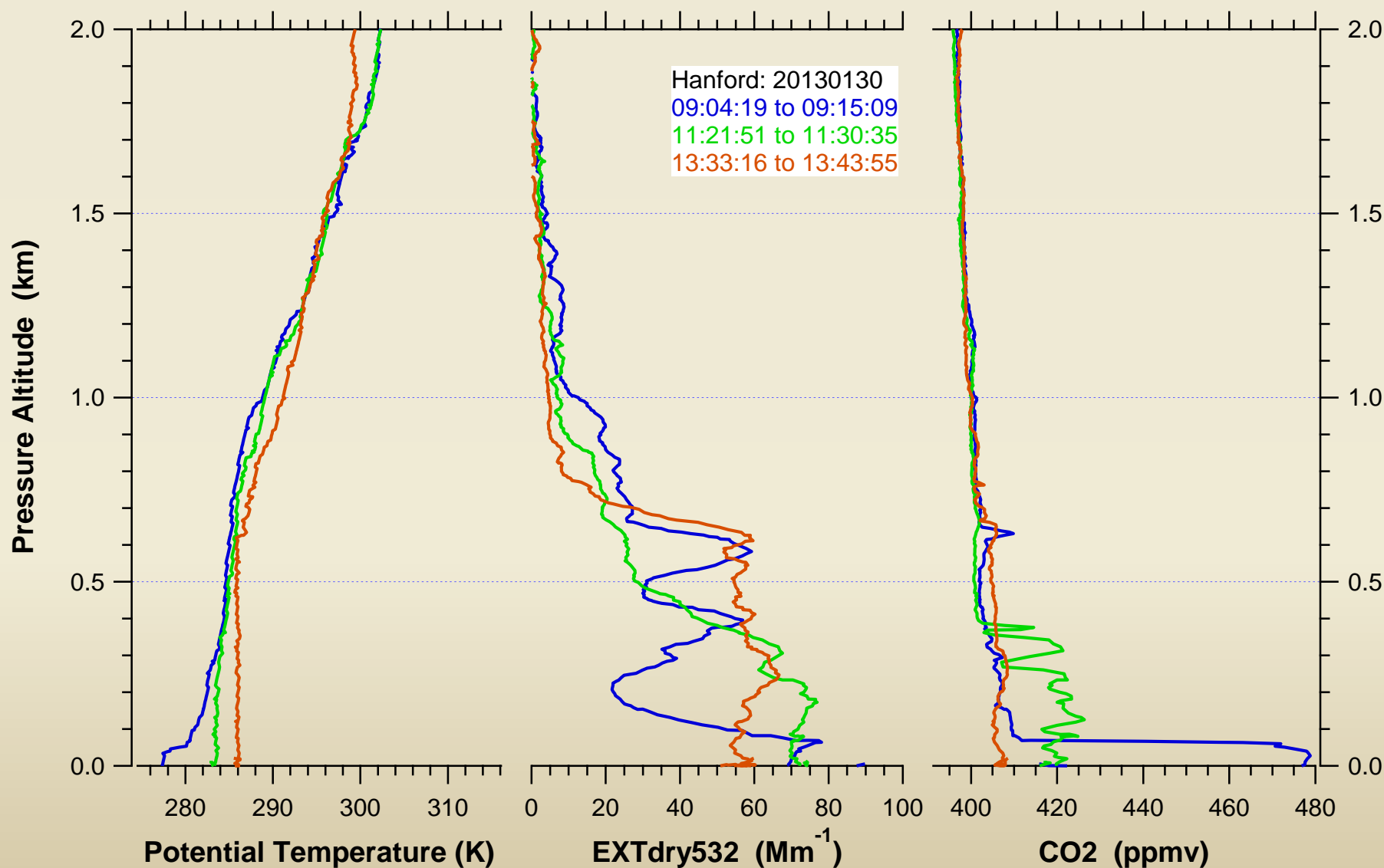
Bakersfield

(Photo taken from ER-2 during PODEX flight on 20 January)

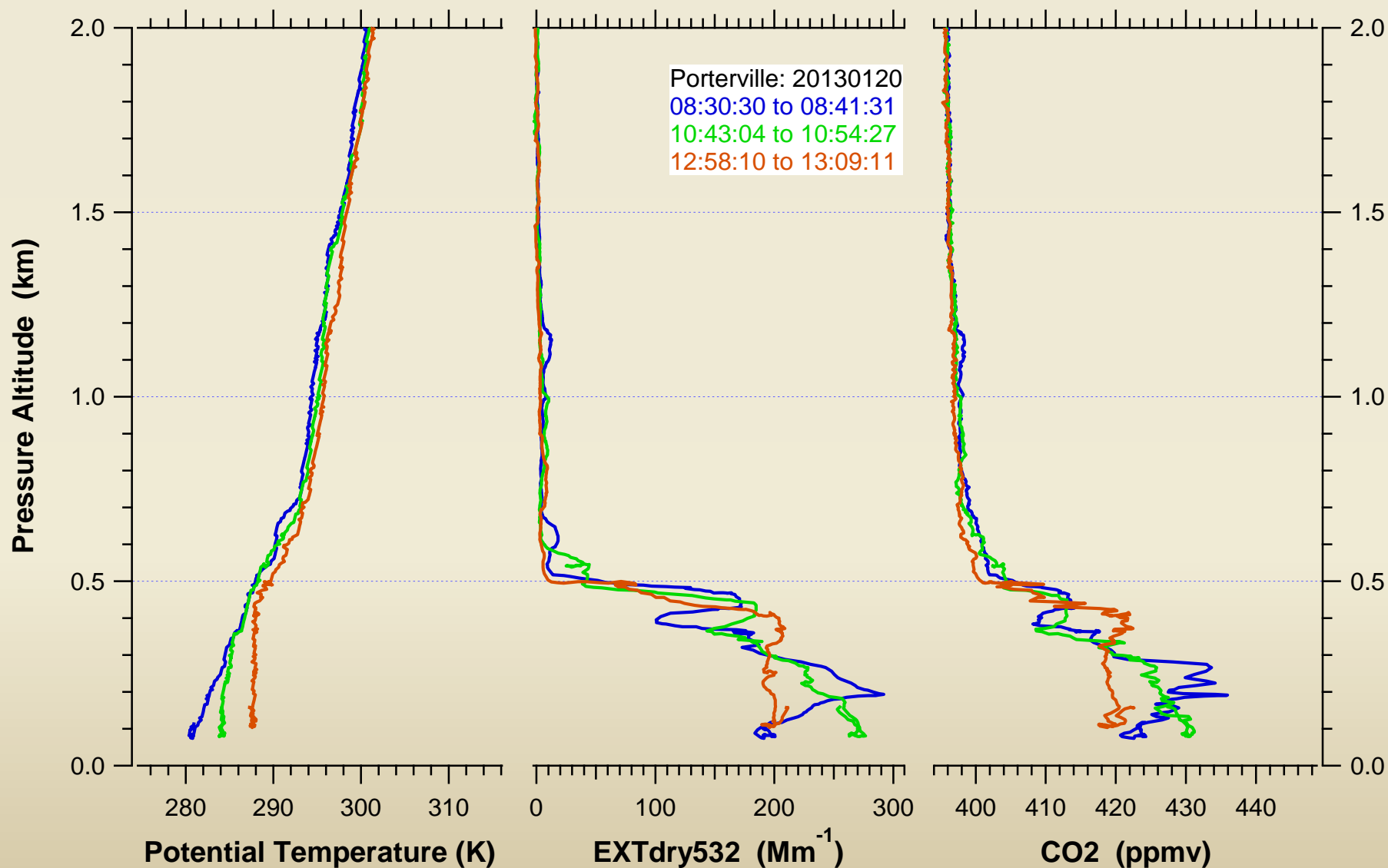
PM_{2.5} and AOD at Bakersfield during a build-up (16-24 Jan 2013)



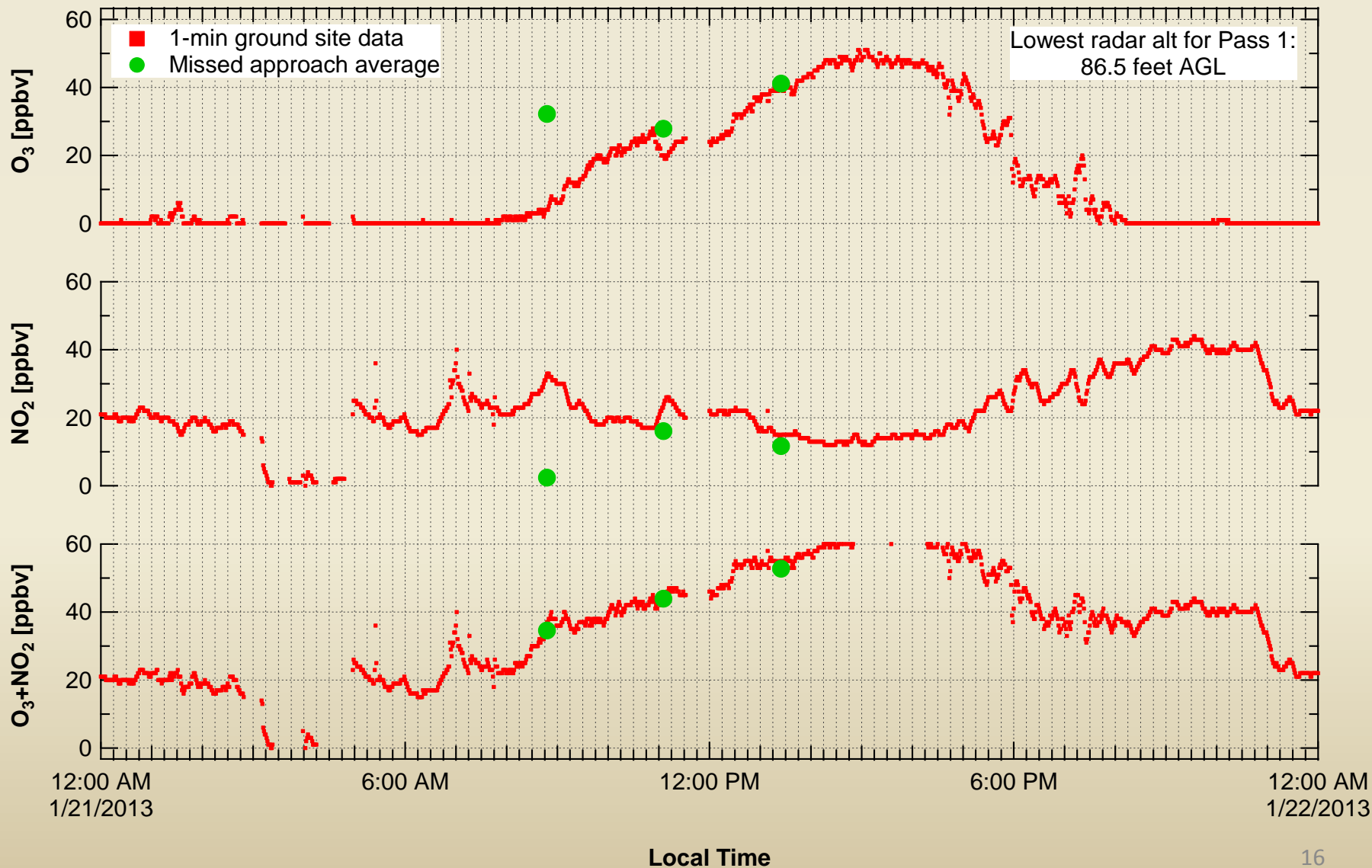
P-3B profiles of BL structure over Hanford on 30 Jan 2013



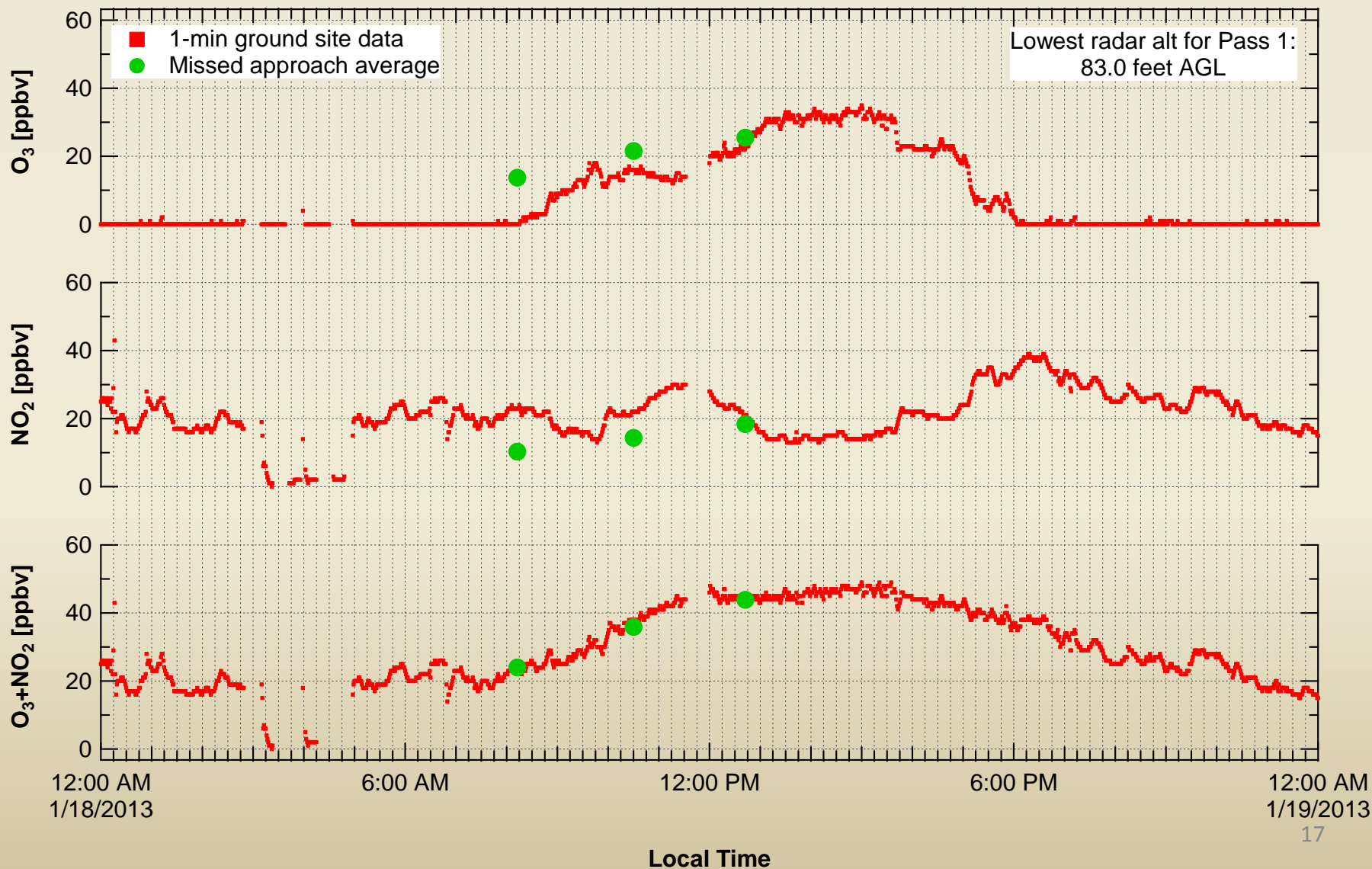
P-3B profiles of BL structure over Porterville on 20 Jan 2013



How shallow is the boundary layer? (Bakersfield, 21 Jan 2013)



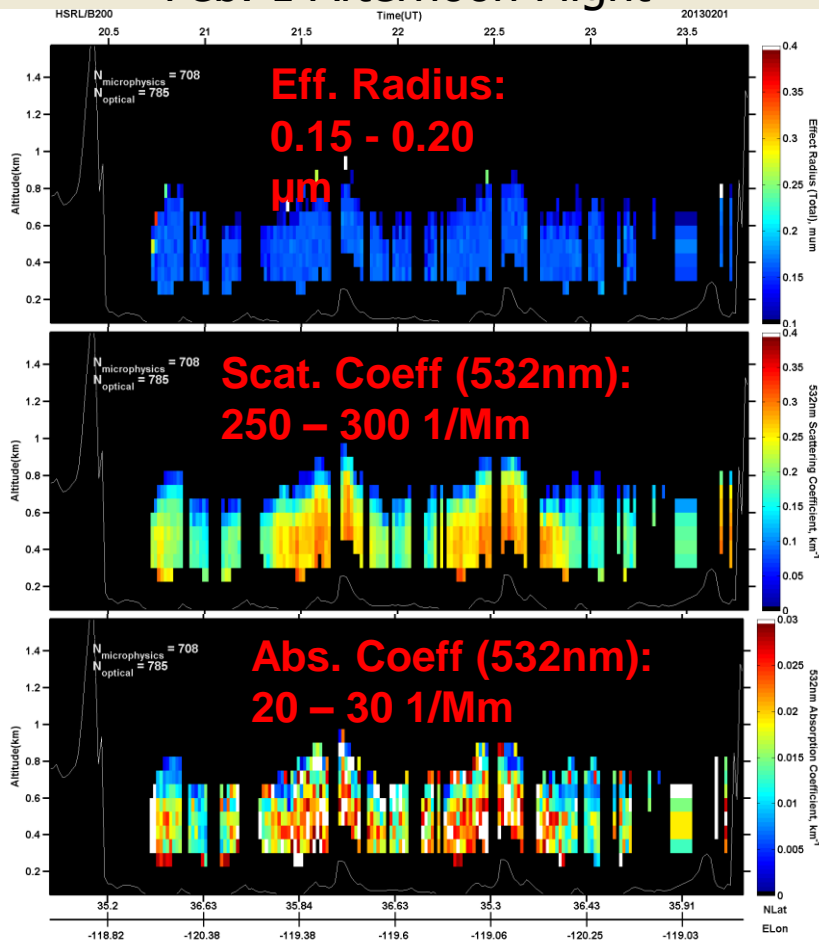
How shallow is the boundary layer? (Bakersfield, 18 Jan 2013)



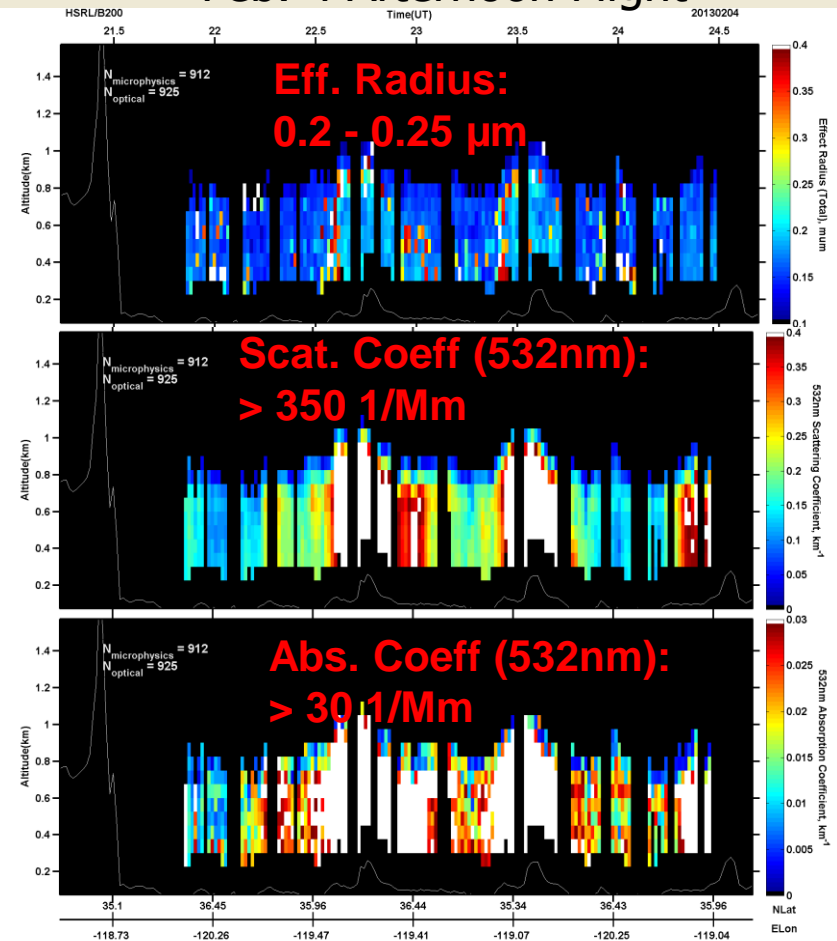
Changes in Aerosol Properties between Feb. 1 and Feb. 4

- Increase in effective radius
- Increase in scattering and absorption

Feb. 1 Afternoon Flight



Feb. 4 Afternoon Flight



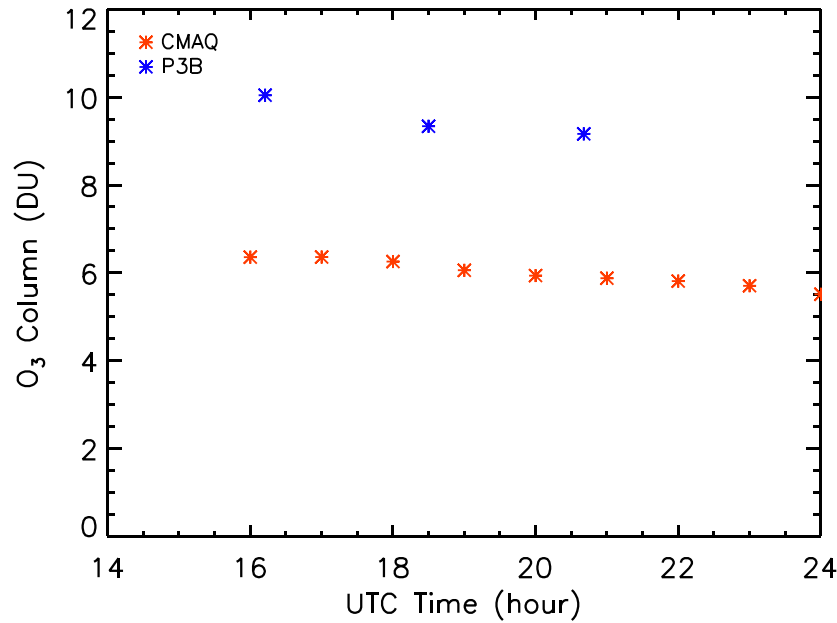
Analysis of Trace Gas Column Abundances Winter 2013

Clare Flynn

March 28, 2013

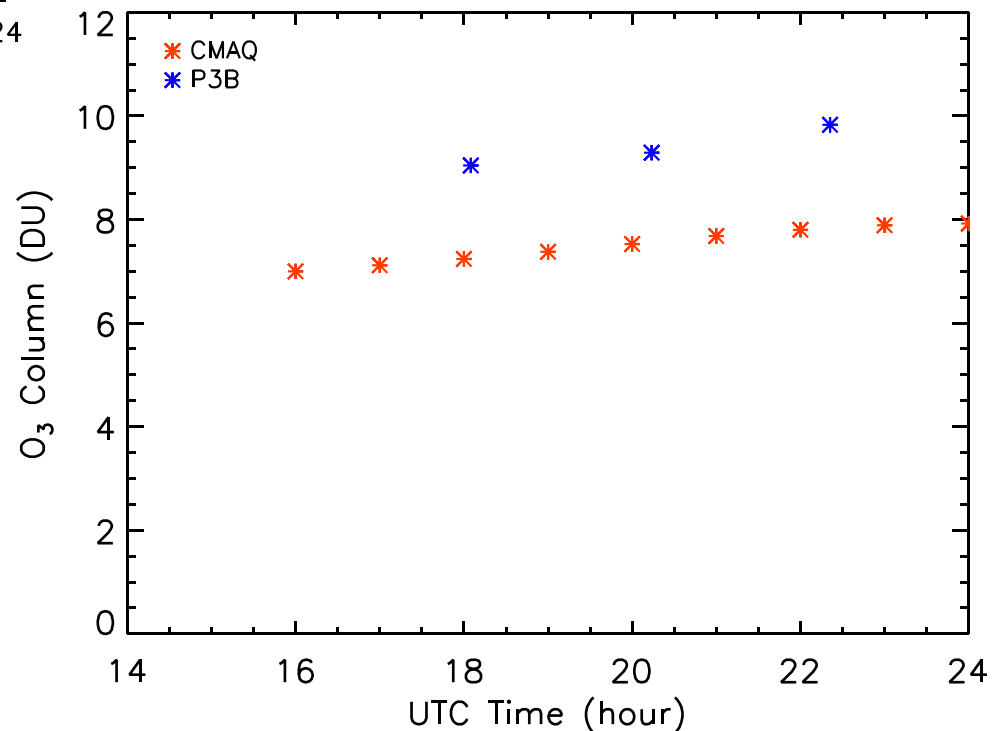
Preliminary Column Time Series: CMAQ and P3B

Column Abundances CMAQ vs. P3B
Bakersfield 20130118

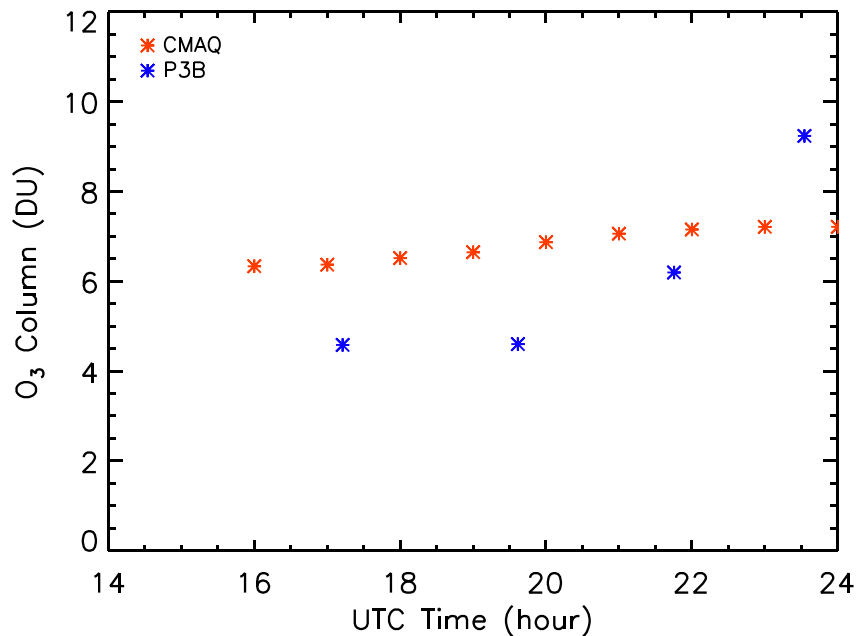


CMAQ typically demonstrates low bias relative to initial P-3B column estimates for O₃ at all sites

Column Abundances CMAQ vs. P3B
Tranquility 20130204

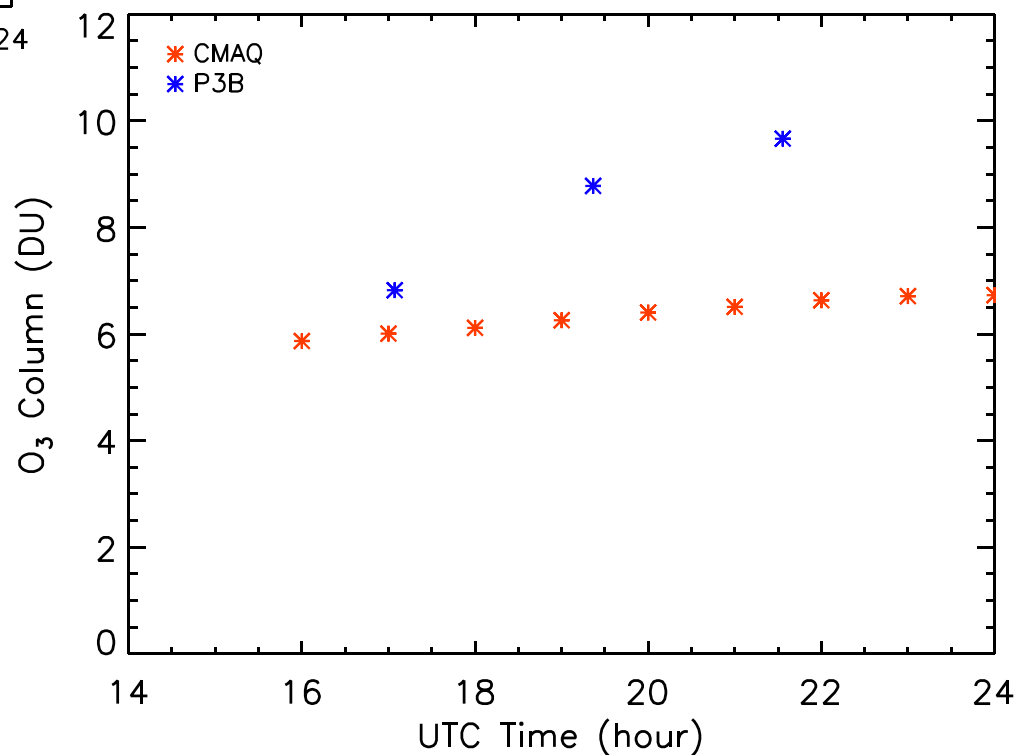


Column Abundances CMAQ vs. P3B
Porterville 20130206

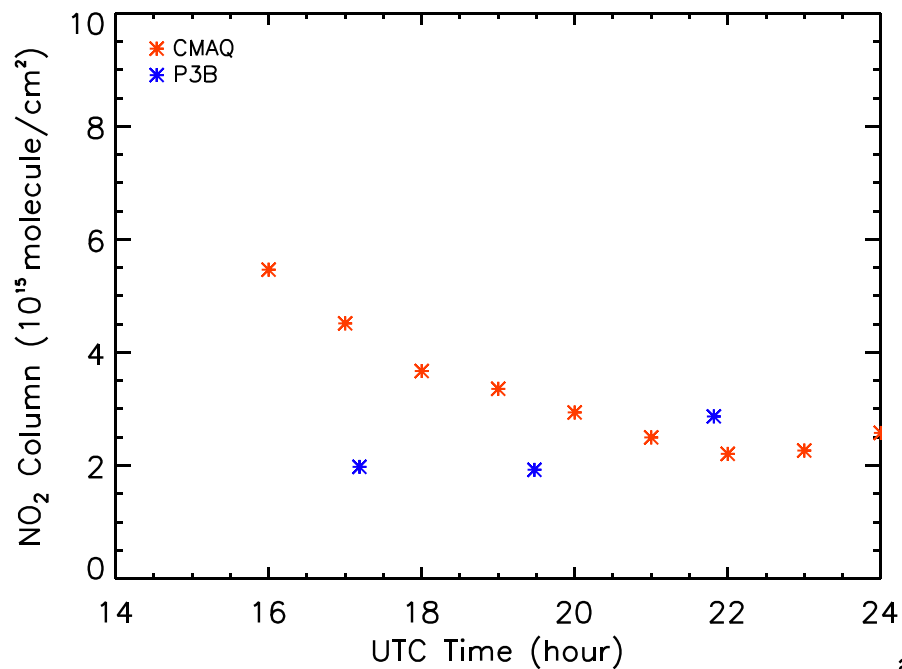


CMAQ also typically demonstrates little diurnal behavior, while P-3B sometimes displays diurnal structure towards end of the deployment

Column Abundances CMAQ vs. P3B
Hanford 20130130

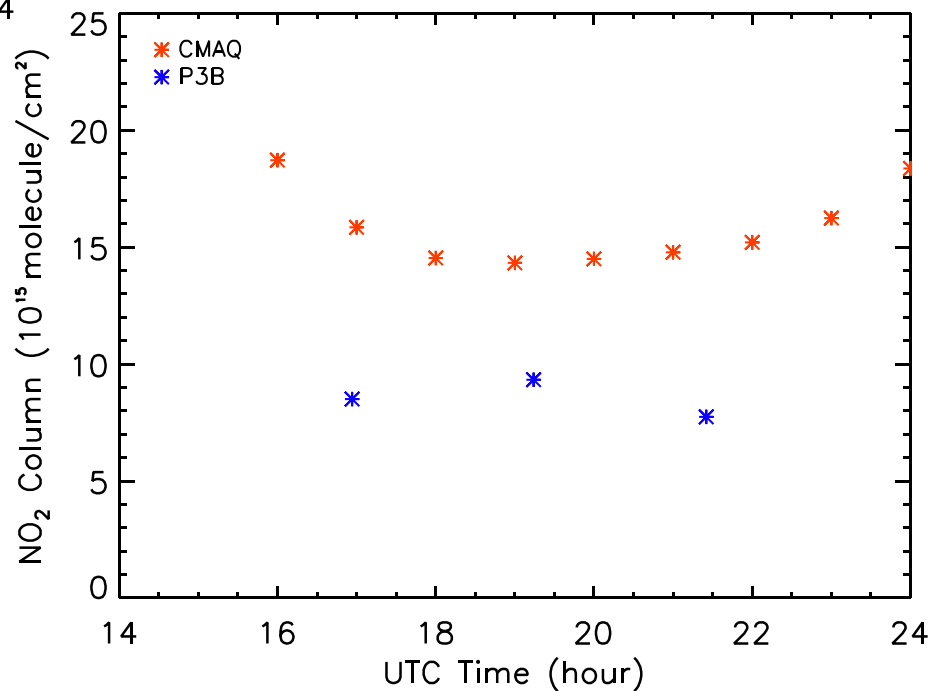


Column Abundances CMAQ vs. P3B
Huron 20130122

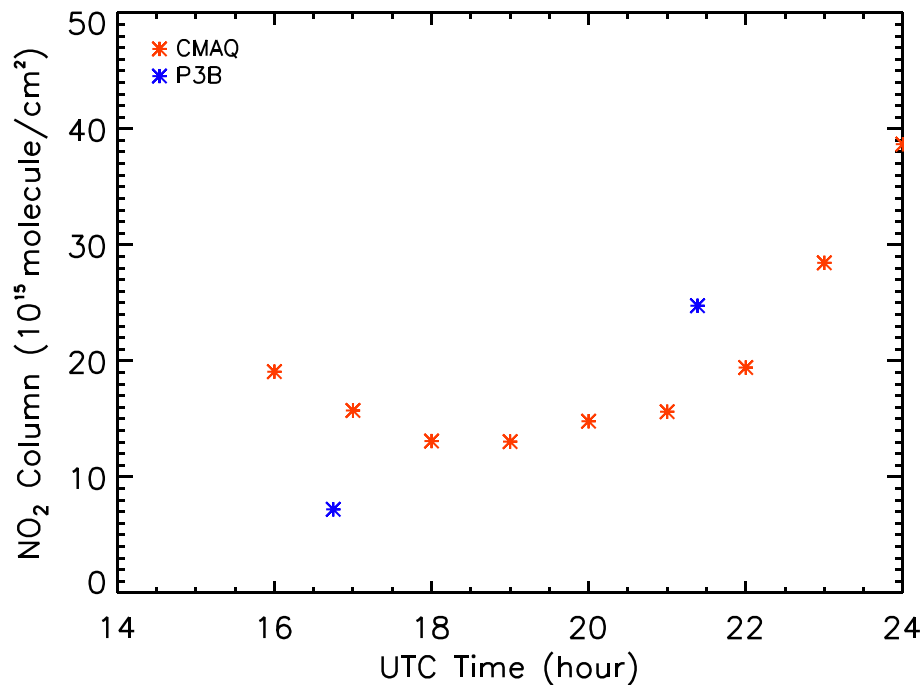


CMAQ and initial P-3B column estimates demonstrate pronounced diurnal behavior for NO₂, often inconsistent

Column Abundances CMAQ vs. P3B
Hanford 20130118

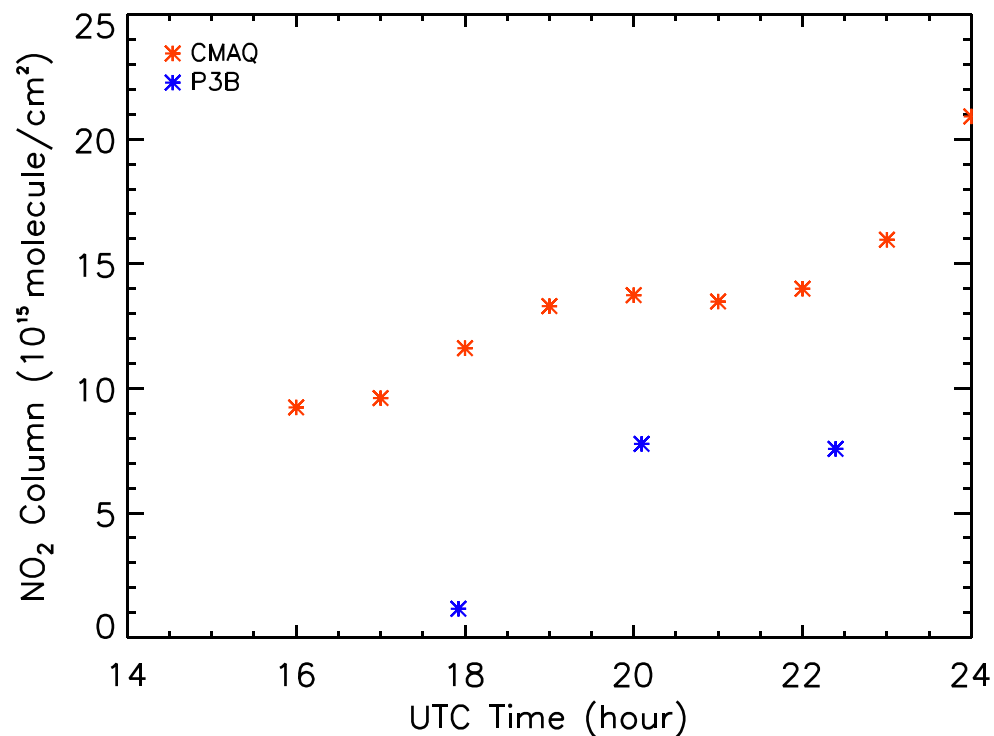


Column Abundances CMAQ vs. P3B
Bakersfield 20130201



CMAQ often demonstrates high bias relative to P-3B columns, though this is not consistent on all flight dates

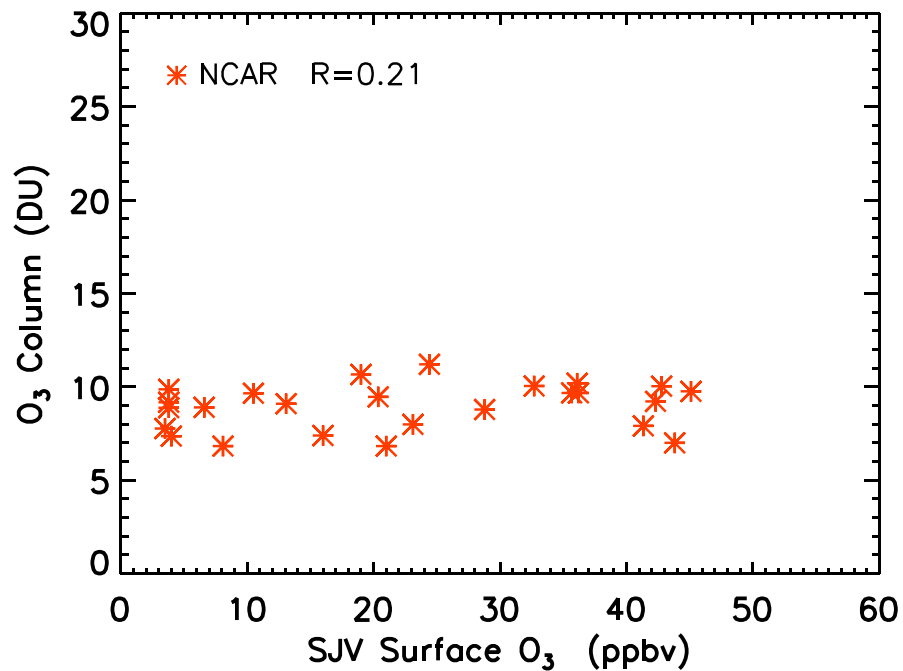
Column Abundances CMAQ vs. P3B
Fresno 20130130



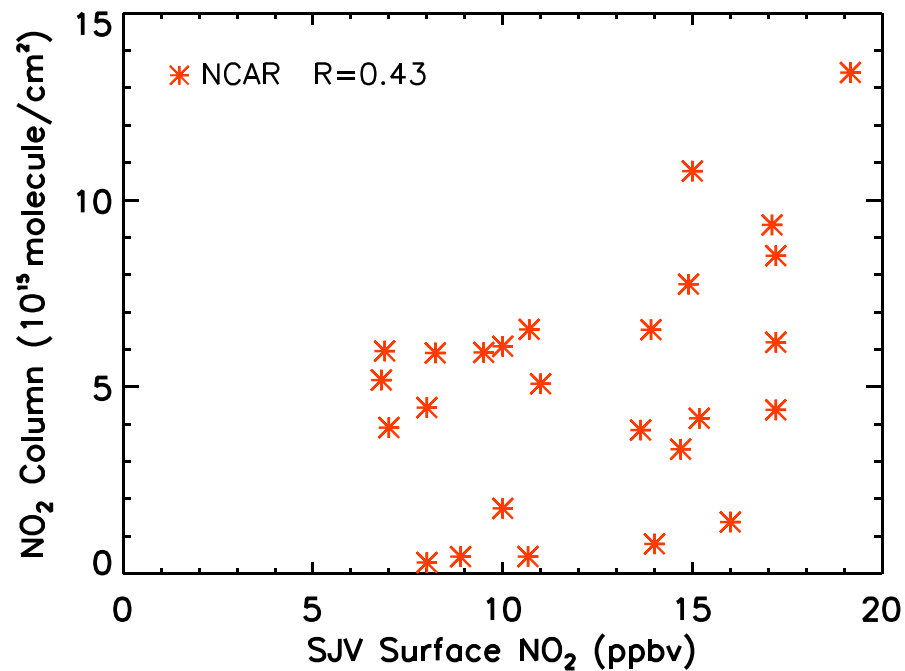
Preliminary Correlation Analysis

P-3B O₃ and NO₂ often demonstrate non-significant correlation between initial column estimates and surface mixing ratios

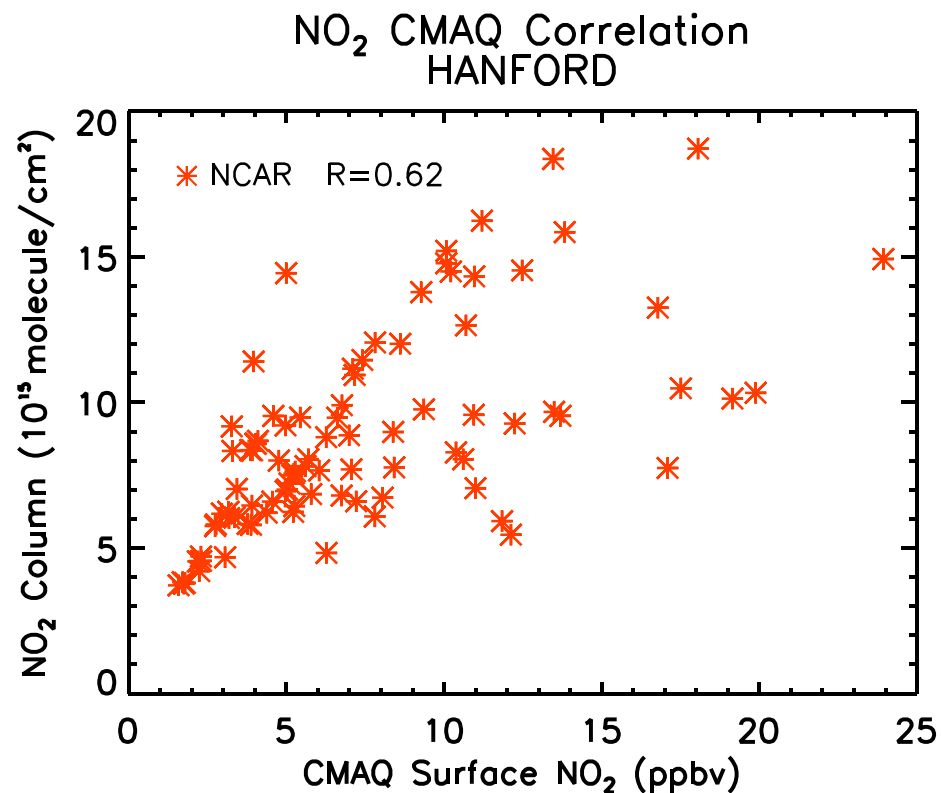
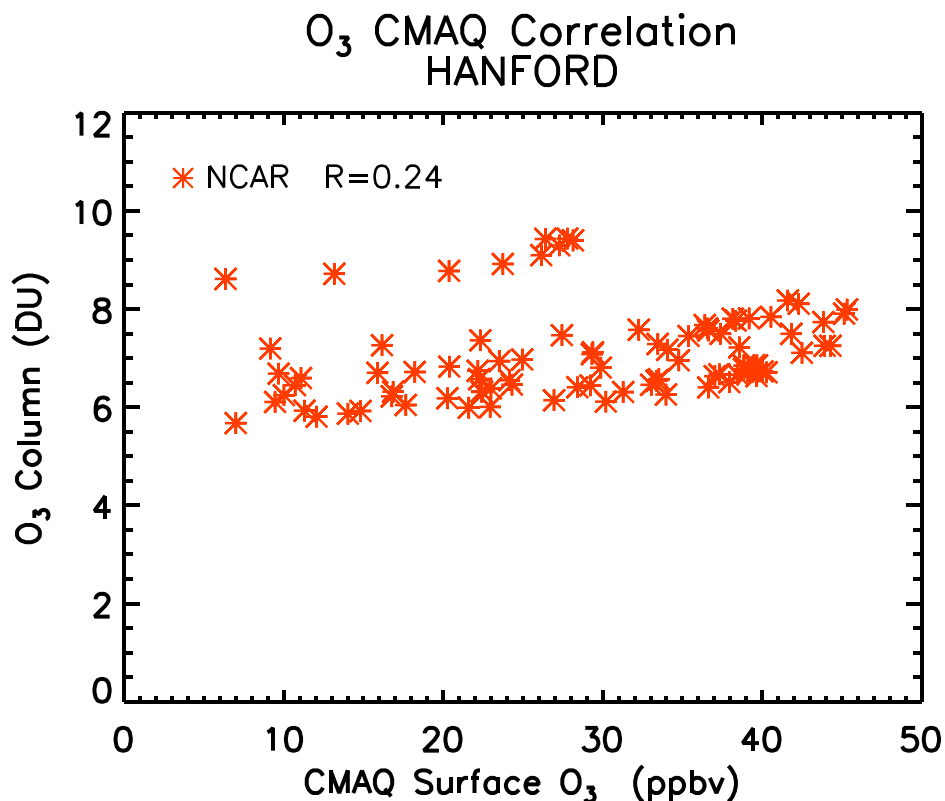
O₃ P3B–Surface Site Correlation
HANFORD



NO₂ P3B–Surface Site Correlation
HANFORD



CMAQ O₃ and NO₂ often demonstrate non-significant correlations, but low correlation for O₃ when significant and moderate correlations for NO₂ when significant



Journal of Atmospheric Chemistry

Processes Impacting NEar-Surface Atmospheric Pollutants (PINESAP)

Article Title	Current Status	Author name
Nocturnal isoprene declines in a semi-urban environment	Final decision accept	David Doughty
Bay Breeze Influence on Surface Ozone at Edgewood, MD During July 2011	Final decision accept	Ryan Michael Stauffer
Estimating surface NO ₂ and SO ₂ mixing ratios from fast-response total column observations and potential application to geostationary missions	Editor Assigned	Travis Knepp
Chemical composition and concentration of particulate matter and volatile organic compounds during a bus strike in Ottawa, Canada	Revise	Jose D Fuentes
Processes controlling the vertical distribution of biogenic hydrocarbons and oxidants within a mixed deciduous forest	Revise	Wai-Yin Stephen Chan
Modeling the fate of biogenic volatile organic compounds, their reaction products, and oxidants in a forest canopy	Revise	Wai-Yin Stephen Chan
Evaluation of NAQFC Model Performance in Forecasting Surface Ozone during the 2011 DISCOVER-AQ Campaign	Final decision accept	Gregory George Garner
Ozone Correlations Between Upper Air Partial Columns and the Near-Surface at Two Mid-Atlantic Sites during the DISCOVER-AQ Campaign in July 2011	Under review	Douglas K. Martins
Effects of Local Meteorology and Aerosols on Ozone and Nitrogen Dioxide Retrievals from OMI and Pandora Spectrometers in Maryland, USA during DISCOVER-AQ 2011	Final decision accept	Andra Jenn Reed
Bay Breeze Climatology at Two Sites along the Chesapeake Bay from 1986-2010: Implications for Surface Ozone	Under review	Ryan Michael Stauffer
Spatial and temporal variability of ozone and nitrogen dioxide over a major urban estuarine ecosystem	Final decision accept	Maria Tzortziou
Ozonesonde Climatology and Satellite Product Evaluation: Tropospheric Ozone in the Mid-Atlantic U.S. from 2005-2010	Under review	Caroline P. Normile
Ozone Profiles in the Baltimore-Washington Region (2006-2011): Satellite Comparisons and DISCOVER-AQ Observations	Revise	Anne M Thompson

...A few (~4) more papers will be submitted by the deadline

Deadline for submission: March 31, 2013

Open Source Articles: <http://link.springer.com/journal/10874/onlineFirst/page/1>