BAYLOR UNIVERSITY

INSTITUTE FOR AIR SCIENCE

FOR EXCELLENCE IN ENVIRONMENTAL RESEARCH, EDUCATION AND PUBLIC SERVICE

UNIVERSITY of HOUSTON

ENVIRON

Initial Results from NETAC's 2005 Aircraft Study

Max Shauck, Sergio Alvarez, James Flynn and Grazia Zanin; Baylor

Barry Lefer and Bernhard Rappenglück; University of Houston

Greg Yarwood; ENVIRON

Presentation to the TERC Science Advisory Committee

November 14, 2005

Program Overview

- Sponsored by NETAC: Northeast Texas Air Care
  - Multi-stakeholder group
  - Responsible for the 8-hour ozone Early Action Compact for the Longview/Tyler/Marshall area
- Seven science flights between August 24 and September 9, 2005
- Characterize ozone from local sources and regional transport

Project Team

Max Jimmy

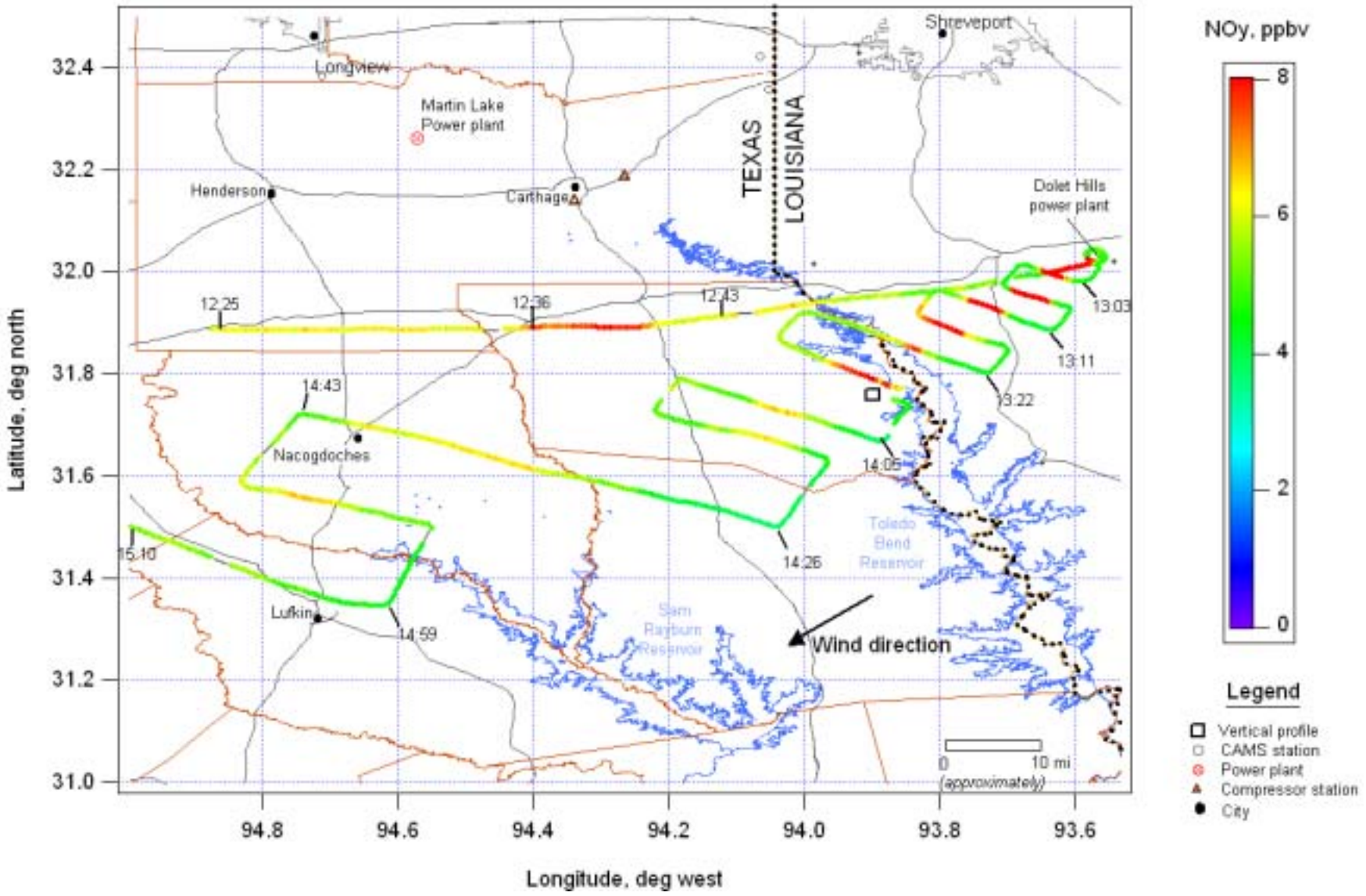
Grazia Sergio

- Baylor University: Flight Operations
  - Piper Aztec
  - Pilots: Max Shauck and Sergio Alvarez
  - Instrumentation: Jimmy Flynn
  - Study Design: Grazia Zanin
- University of Houston: Flight Plans and Independent Data QA
- ENVIRON: Flight Plans

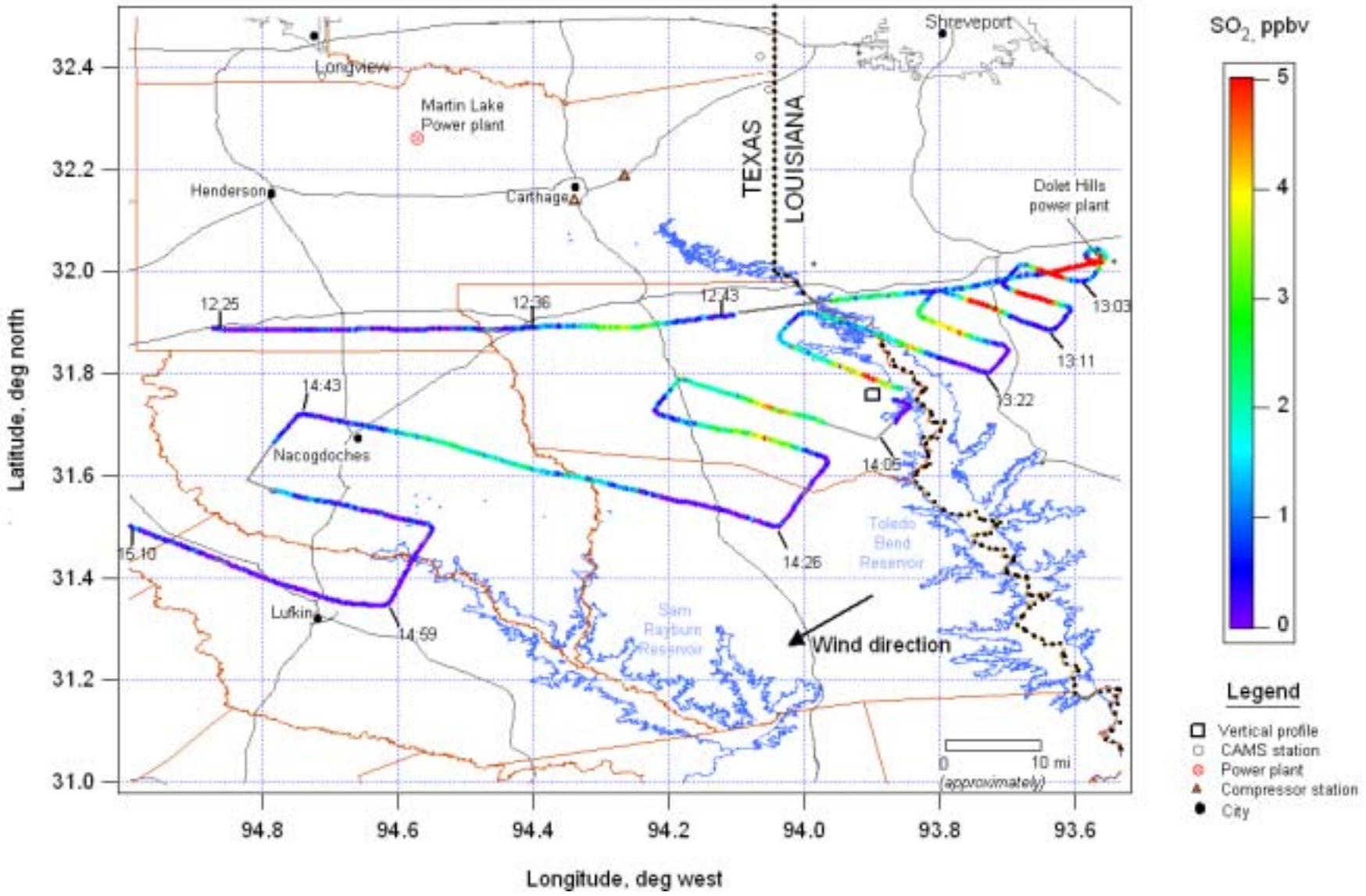
Sept 8, 2005: Dolet Hills EGU

- Single, 650 MW, lignite fired EGU near Mansfield in Desoto Parish, LA
- Isolated source location and northeasterly wind direction kept the Dolet Hills plume separated from other major sources
- One week after Katrina: Background air quality may be atypical for the meteorological conditions

NOy Track


Latitude, deg north
Longitude, deg west
32.4
32.2
32.0
31.8
31.6
31.4
31.2
31.0
94.8
94.6
94.4
94.2
94.0
93.8
93.6
Longview
Martin Lake Power plant
Henderson
Carthage
TEXAS
LOUISIANA
Shreveport
Dolet Hills power plant
12:25
12:36
12:43
13:03
13:11
13:22
14:05
14:26
14:43
15:10
14:59
Nacogdoches
Lufkin
Toledo Bend Reservoir
Sam Rayburn Reservoir
Wind direction
0
10 mi
(approximately)
NOy, ppbv
8
6
4
2
0
Legend
Vertical profile
CAMS station
Power plant
Compressor station
City

SO2 Track


Latitude, deg north
Longitude, deg west
32.4
32.2
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31.8
31.6
31.4
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94.8
94.6
94.4
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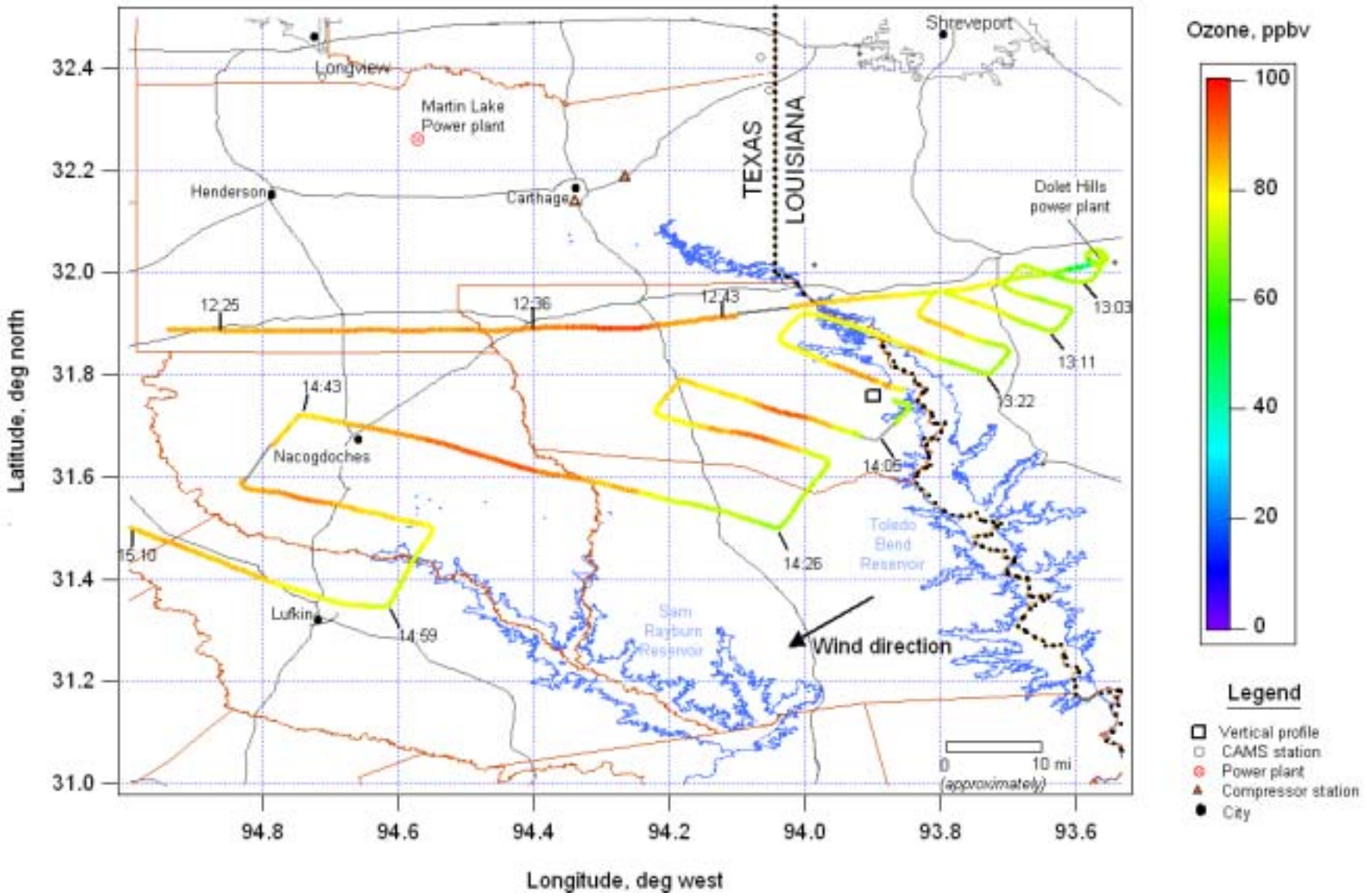
14:05
14:26
14:43
Nacogdoches
15:10
14:59
Lufkin
Toledo Bend Reservoir
Sam Rayburn Reservoir
Wind direction
0
10 mi
(approximately)
SO2, ppbv
5
4
3
2
1
0
Legend
Vertical profile
CAMS station
Power plant
Compressor station
City

Ozone Track


Latitude, deg north
Longitude, deg west
32.4
32.2
32.0
31.8
31.6
31.4
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13:22
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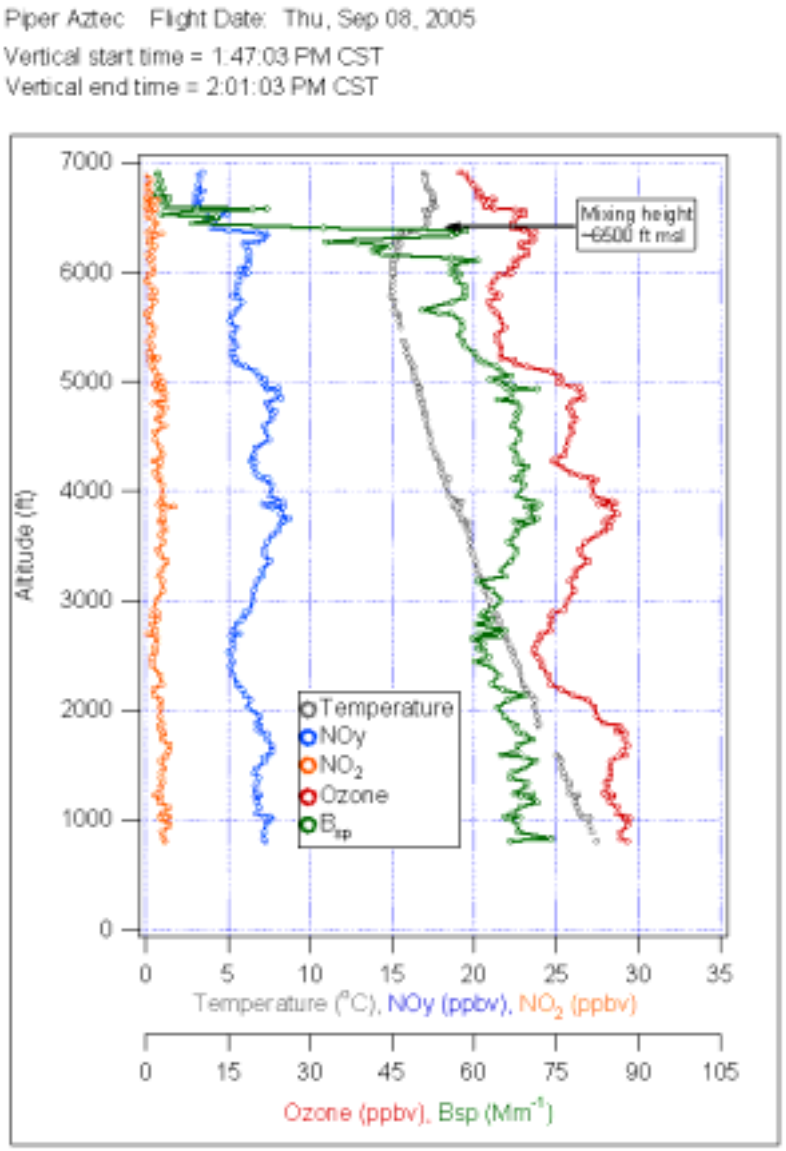
14:26
14:43
Nacogdoches
15:10
Lufkin
14:59
Toledo Bend Reservoir
Sam Rayburn Reservoir
Wind direction
0
10 mi
(approximately)
Ozone, ppbv
100
80
60
40
20
0
Legend
Vertical profile
CAMS station
Power plant
Compressor station
City

Vertical Profiles and Summary



SUMMARY

- Followed EGU plume ~75 miles from Mansfield to Lufkin
- Windspeeds of ~5 mph imply plume age of 0-15 hours
- Plume ozone “bump-up” of 15-20 ppb on top of ~60 ppb
- Plume impacts dispersed at ~75 km downwind
- Plume spanned mixed layer at TX-LA border