Overview of Baylor University Airborne Measurements during TexAQSI

TCEQ Principal Findings Workshop
May 29, 2007
Outline

- overview of measurement systems and flights conducted
  - Piper Aztec
    - HARC and NETAC
  - Cessna 172
    - CAPCOG and City of Waco

- example data from the different programs
  - Interstate transport
  - Intrastate transport
  - Houston area emissions
<table>
<thead>
<tr>
<th>parameter</th>
<th>method</th>
<th>frequency</th>
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<tr>
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<td>CO</td>
<td>VUV fluorescence</td>
<td>1-sec, 5-sec</td>
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<tr>
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<td>Fluorescence</td>
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<td>Hydrocarbons</td>
<td>GC/FID/MS – Univ Houston canisters</td>
<td>1-min fill time</td>
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2006 flight tracks  150 flight hours

interstate transport
Impact of local emissions

intrastate transport
urban point source

emissions

Waco, C-172 (25 hours)

NETAC, Aztec (50 hours)

HARC, Aztec (50 hours)

CAPCOG, C-172, 25 hours
• Overall goal was to document the impact of regional urban and point source emissions on the Austin air quality

• Greatest focus on the impact of regional power plants

intrastate transport - CAPCOG
intrastate transport

- Documented transport of the San Antonio urban plume and associated point sources through Austin
- Air composition entering Austin included \( \sim 85 \) ppbv ozone
- Impact of point sources observed
interstate transport - NETAC

- Overall goal of this ongoing program is to examine the role of interstate transport of air pollutants on regional air quality and the impact of local EGU and petrochemical sources.
interstate transport - NETAC

• Back trajectory analysis indicates low level transport of air from the midwest through Louisiana
• Surface flow at Longview was easterly
NOAA Lidar observations indicate a fairly uniform ~80 ppbv background of ozone entering the state.

Higher concentrations observed downwind of Shreveport.
interstate transport - NETAC

- Baylor observations are consistent with the NOAA observations
- Impact of the incoming air pollutants on the local and regional air quality is under evaluation
Houston area flights - HARC

- Focus included:
  - TDEV and SOF
  - Vertical mixing
August 31 morning flight
August 31 morning flight
August 31 morning flight

Flight path is colored as a function of [HCHO].

HCHO hot spots observed in the Ship channel region and to a lesser extent west of the city.
August 31 morning flight

Ozone and primary species

Time

8:00 AM 8:30 AM 9:00 AM 9:30 AM 10:00 AM 10:30 AM

8/31/2006

$O_3$, NOy, RAD, SO$_2$, CO, HCHO
August 31 morning flight
All Houston flight data

Symbol color $f(t)$
Symbol size $f([\text{HCHO}])$
summary

• 150 flight hours
  – Emission evaluation and product formation
  – Effects of stationary fronts on air composition
  – Vertical mixing experiment
  – transport

• Rich data set of primary and secondary pollutants collected in both the source area and broader region

• Both inter- and intra- state transport of air pollutants well documented

• Formaldehyde measurements suggest either very rapid formation or a primary source in Houston
acknowledgements

• Jay Olaguer, HARC
• Greg Yarwood, Environ/NETAC
• Mike Fishburn, CAPCOG
• City of Waco