Alkene/NO$_y$ Emission Ratios observed from the Baylor Aztec during the 2006 TexAQS II study and Comparison with results obtained during 2001-2002

rapid science synthesis workshop
October 12, 2006

Martin Buhr
Air Quality Design, Inc.
Golden, Colorado

Sergio Alvarez
Levi Kaufman
Maxwell Shauck
Grazia Zanin

Baylor University
Waco, Texas
outline

- measurement system and flights conducted
- review results from 2001-2002
- initial results from 2006
- comparison of observations and inventory results
measurement systems

• NO, NO$_2$, NO$_y$
  – Chemiluminescence with photolytic and catalytic converters

• Alkenes
  – Reactive Alkene Detector (RAD) - chemiluminescence.
  – Instrument has been characterized for response to ethene, propene, butadiene, and isoprene. Results reported as propene.
2001-2002 measurements

- **baylor twin otter**
- 130 VOC canisters – 10 second integrated samples in HGA plumes (DRI canister analysis)
- 60 samples *positively identified* with individual source plumes
- **results** compared with *inventory* values
2001-2002 measurements - continued

[Map with markers indicating point source locations, flight tracks, and VOC canister sample locations.]
2006 measurements

- eight flights coordinated with the SOF team
  - Ship channel
  - Freeport
  - Texas city
  - Sweeney
sweeny emissions

Graph showing changes in RAD/NOy over time with peaks at various times:
- RAD/NOy = 1.61 at 2:55 PM
- RAD/NOy = 1.55 at 3:00 PM
- RAD/NOy = 3.02 at 3:05 PM
- RAD/NOy = 1.9 at 3:10 PM
- RAD/NOy = 0.46 at 3:15 PM

Time, CDT
freeport emissions

![Graph showing emissions over time with specific RAD/NOy values marked at different times.](image)
## Comparisons

<table>
<thead>
<tr>
<th></th>
<th>Sweeny observations</th>
<th>Sweeny inventory</th>
<th>Freeport observations</th>
<th>Freeport inventory</th>
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</thead>
<tbody>
<tr>
<td><strong>2001</strong>&lt;br&gt;1999 inventory; Salkenes/NOy</td>
<td>3.7 +/- 3.1&lt;br&gt;9 canisters</td>
<td>0.108</td>
<td>2.0 +/- 2.4&lt;br&gt;9 canisters</td>
<td>0.047 +/- 0.01</td>
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<tr>
<td><strong>2006</strong>&lt;br&gt;2004 inventory; RAD/NOy</td>
<td>1.5 +/- 0.96&lt;br&gt;6 plume transects</td>
<td>0.06</td>
<td>0.26 +/- 0.13&lt;br&gt;3 multi-plume transects</td>
<td>0.001</td>
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summary

• **initial** look at the 2006 data set

• 2001 observation/inventory **comparison** showed a factor of **2-20 underestimate** of emissions in the inventory

• 2006 observations are **lower** in magnitude than the 2001 results – but within the standard deviation

• Comparison to the 2004 inventory shows **similar results** to the 2001 results (gross underestimate of ratio)