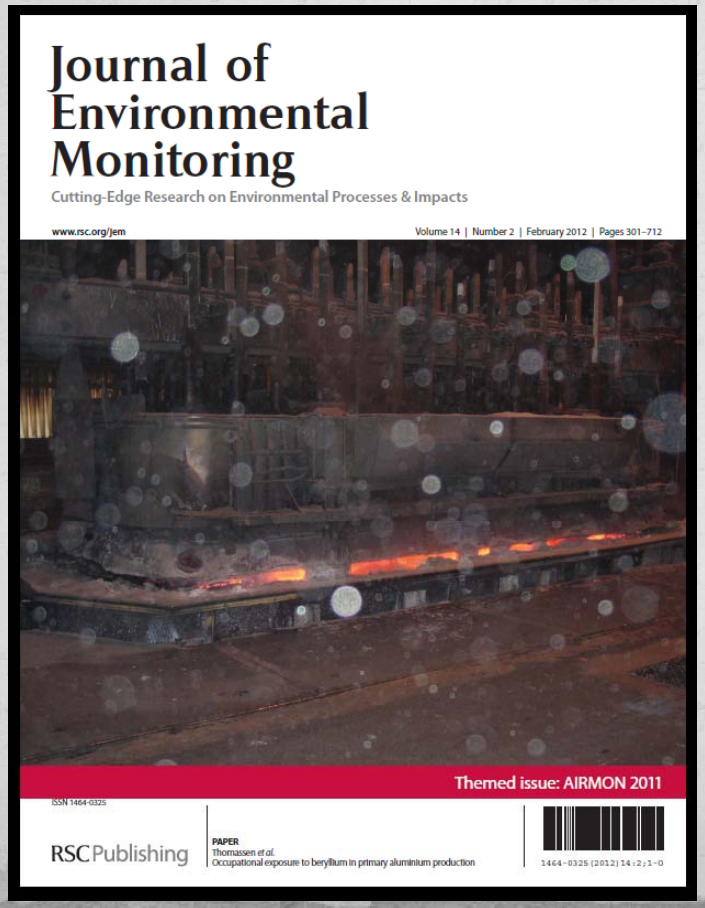
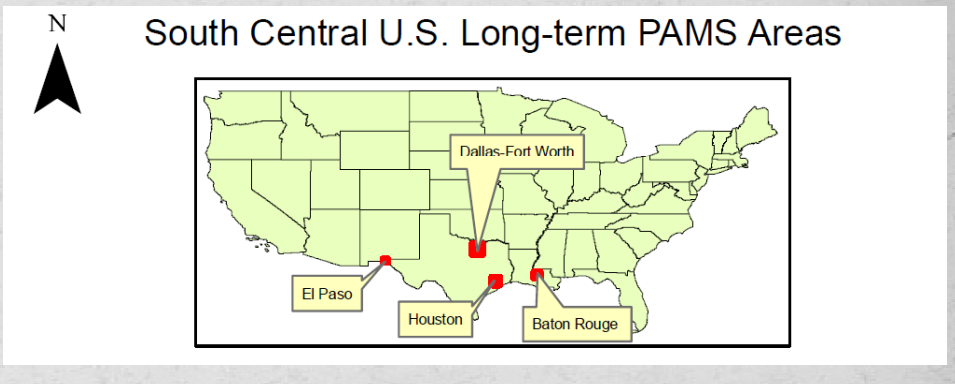
Update of long-term trends analysis of ambient 8-hour ozone and precursor monitoring data in the South Central U.S.; encouraging news

- **Mark Sather**
- **U.S. EPA Region 6, Air Quality Analysis Section**
- **Dallas, Texas**
- **(214) 665-8353**
- **sather.mark@epa.gov**

Introduction

- This presentation provides a summary of the paper by Sather and Cavender published in the February, 2012 edition of the ***Journal of Environmental Monitoring*** (M.E. Sather and K. Cavender, *J. Environ. Monit.*, 2012, **14**, 666-676).

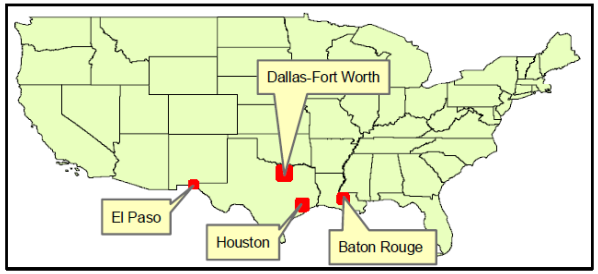


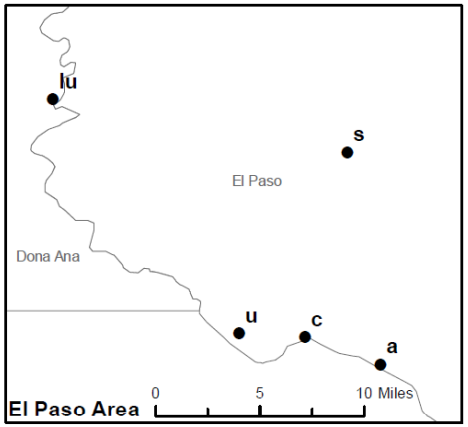


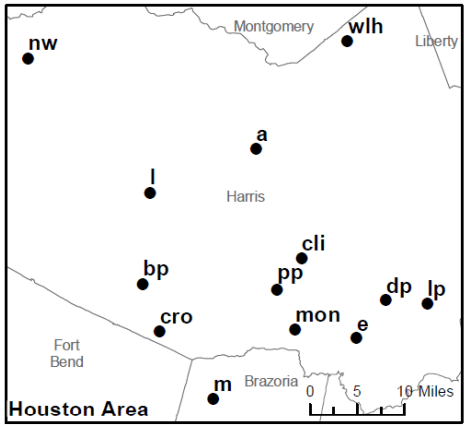
Impact of Data Analyses

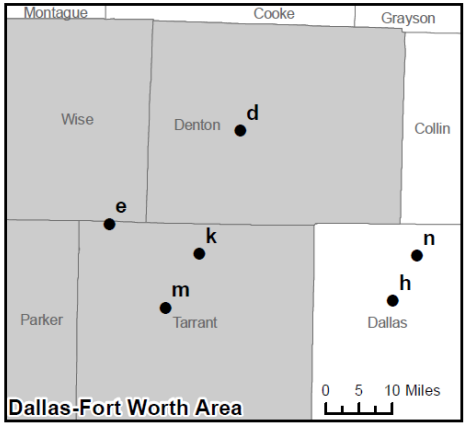
- Encouraging news seen in this latest long-term ozone and precursor trends data analysis for the south central U.S., looking at the past 25 years 1986-2010.
- Data from AQS; collected, reviewed and validated by TX and LA.
- Data evaluated in non-overlapping 5-year blocks to smooth out effects of: (a) annual meteorological changes, (b) annual local emission source changes, and (d) annual variability in individual pollutant monitor measurement p/a.
- Progress being made in meeting 8-hour ozone standards as low as 75 ppb.
- Accountability assessment: Statistically significant decreases in both NOx and VOC concentrations have been recorded in areas required to implement both NOx and VOC emission control regulations, including HRVOC controls.

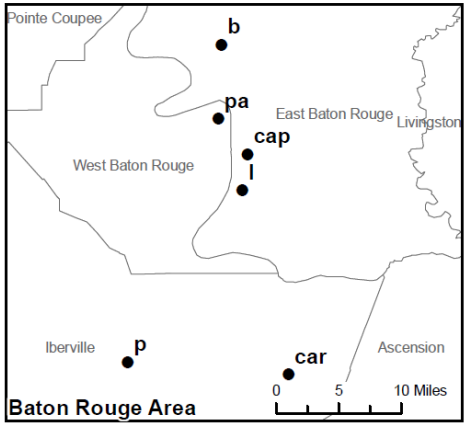
South Central U.S. Long-term PAMS Areas











Air Monitoring Sites

Counties in Barnett Shale

County

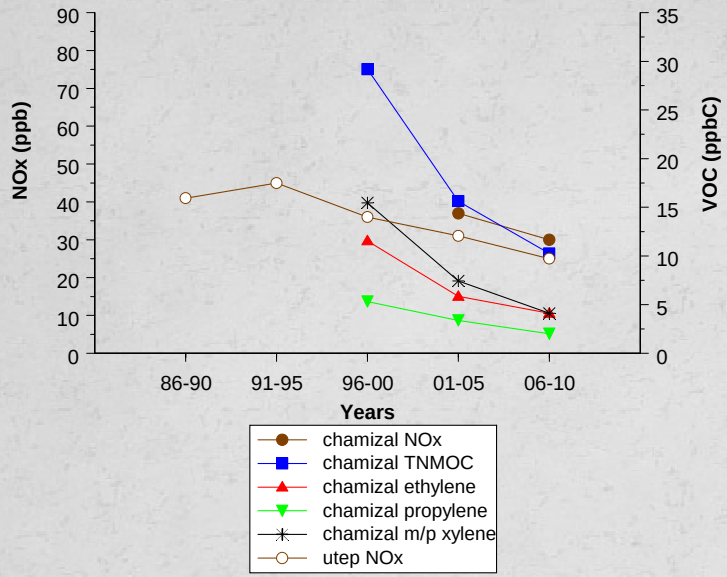
EPA Region 6
GIS M2P2 Division
September 28, 2011

20110928DEG

El Paso Area

NOx and VOC Concentration Trends

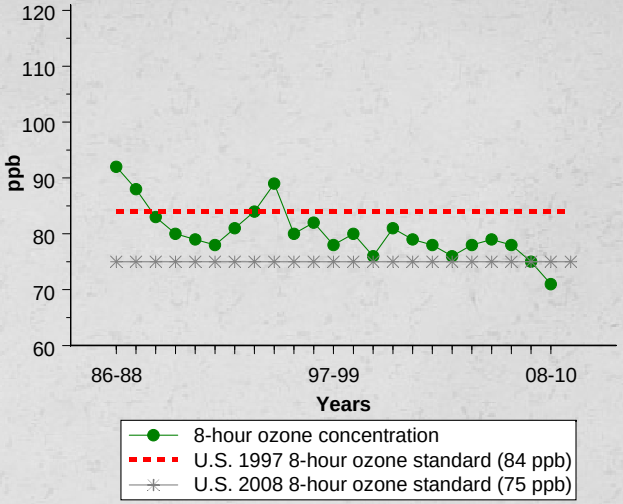
June-August Weekdays; 0500-0800 LST; TNMOC concentration x 10



8-Hour Ozone Trends

3-year averages of annual 4th highs

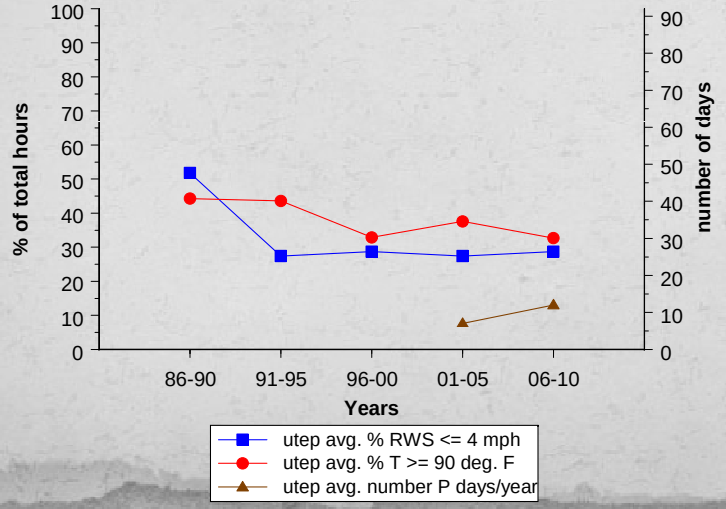
highest site in network each 3-year period



High Temperature/Stagnation/Precipitation Trends

June-August; 0500-1900 LST

T=temperature, RWS=resultant wind speed, P=precipitation



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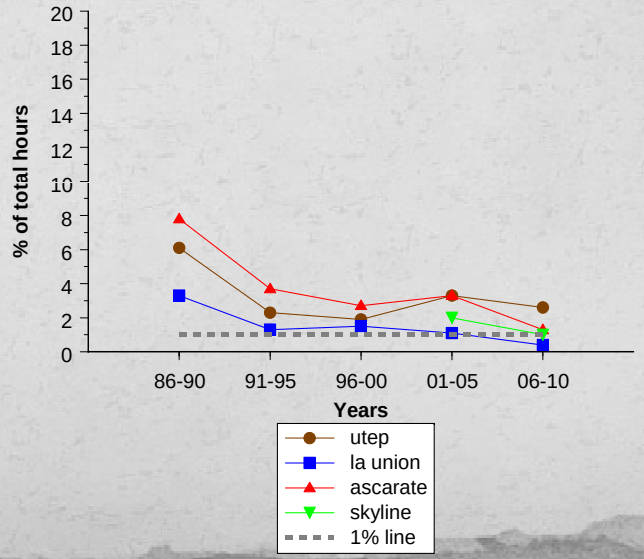
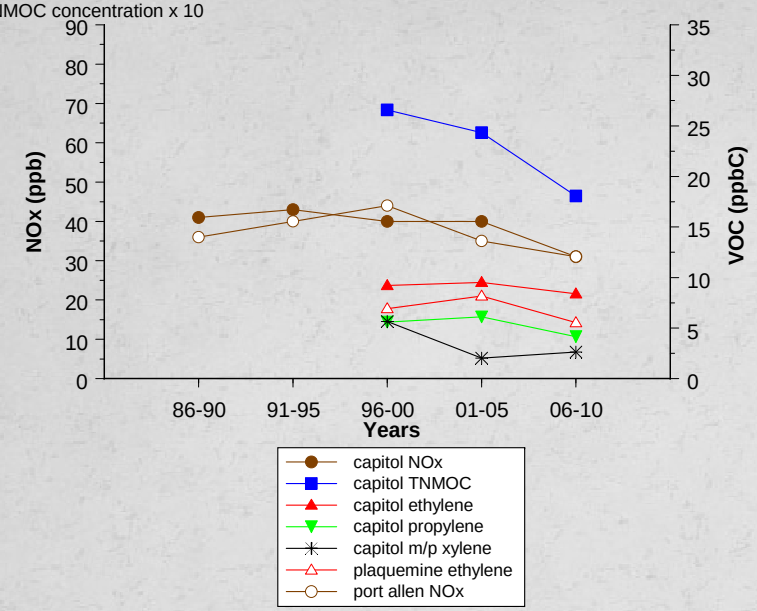
avg. % 8-hour [ozone] > 75 ppb; June-August; 0800-1900 LST



Baton Rouge Area

NOx and VOC Concentration Trends

June-August Weekdays; 0500-0800 LST (0300-0600 and 0600-0900 LST for 3-hr speciated VOC data);
TNMOC concentration x 10



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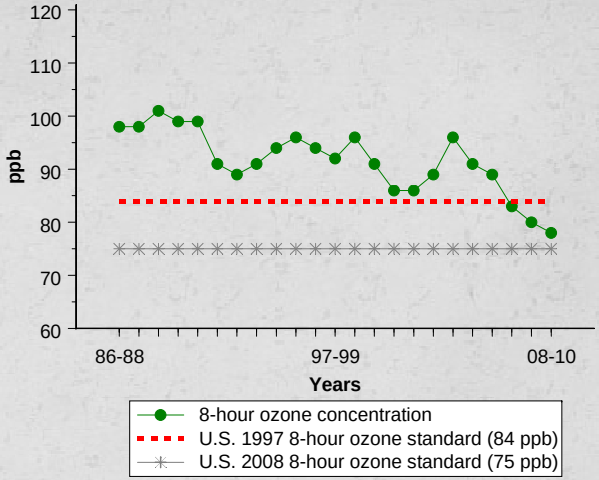

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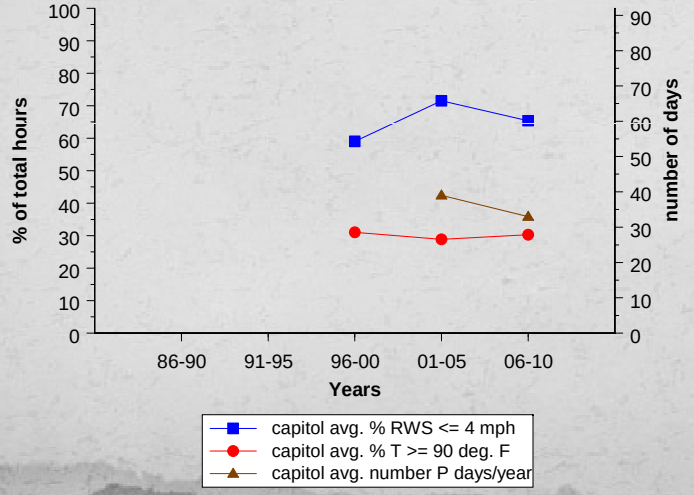

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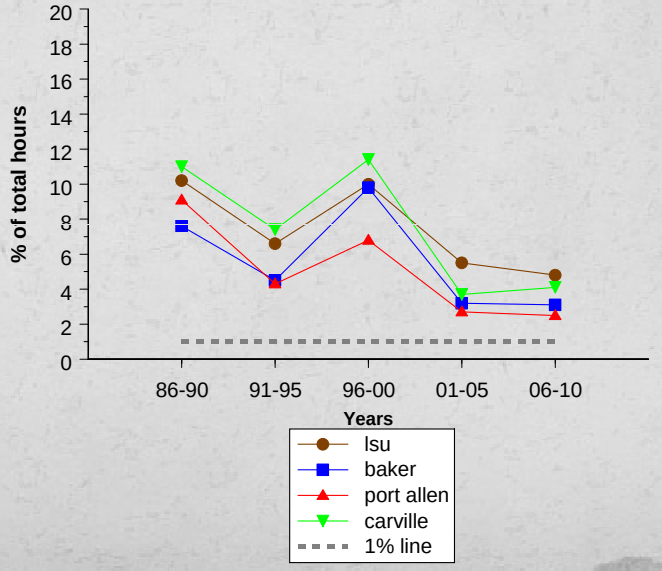
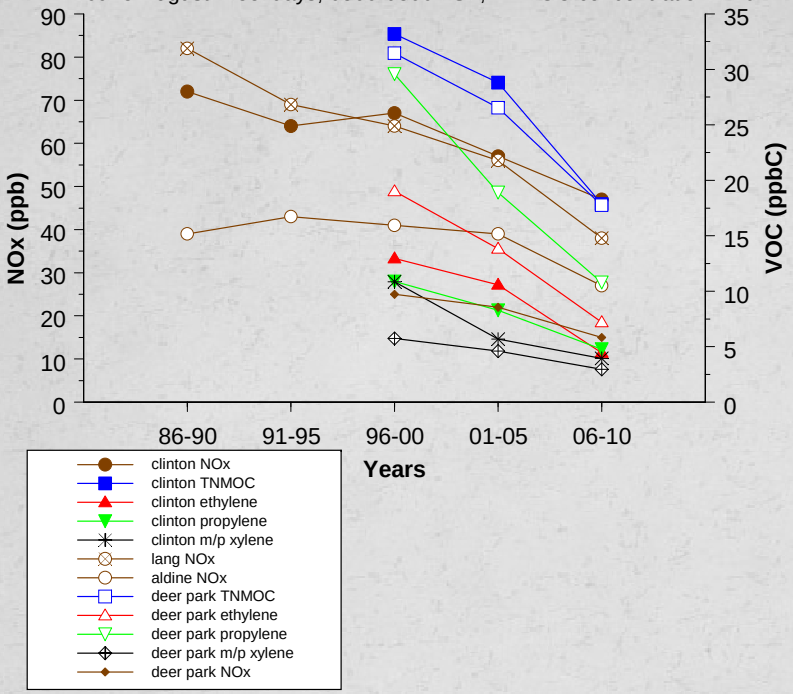


Houston Area

NOx and VOC Concentration Trends

June-August Weekdays; 0500-0800 LST; TNMOC concentration x 10



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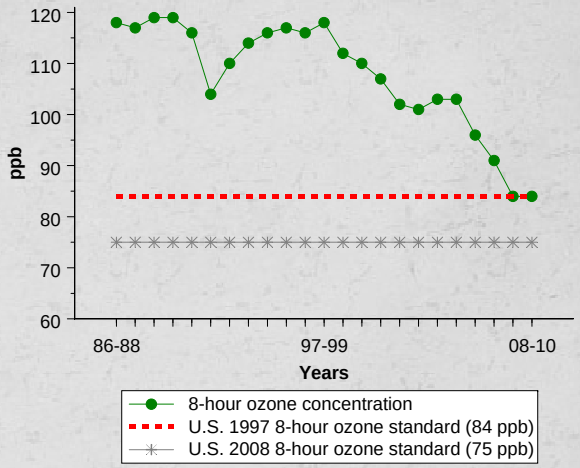

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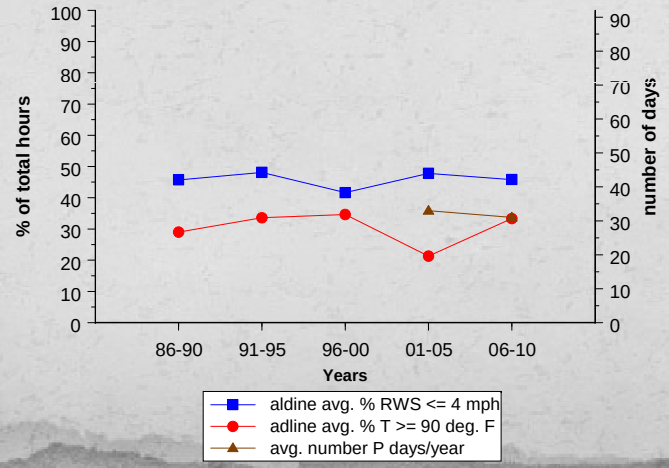

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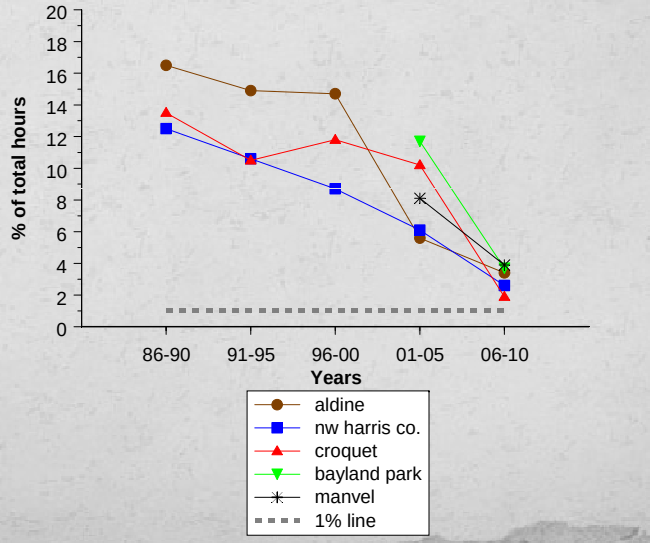
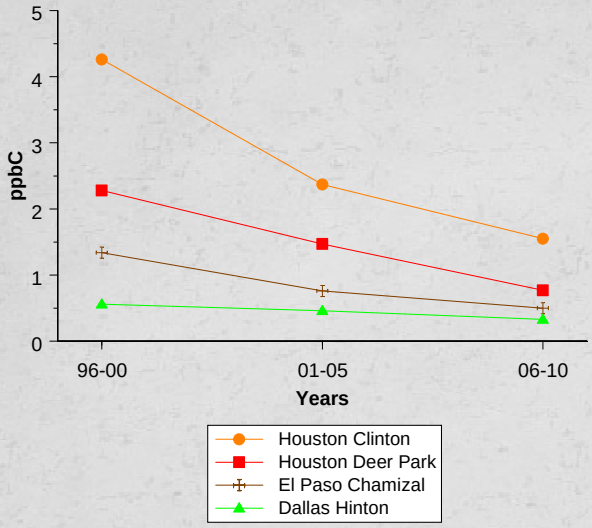


HRVOC Time Series

1,3-Butadiene Concentration Trends

June-August 6-9 AM Weekday Arithmetic Means



1-Butene Concentration Trends

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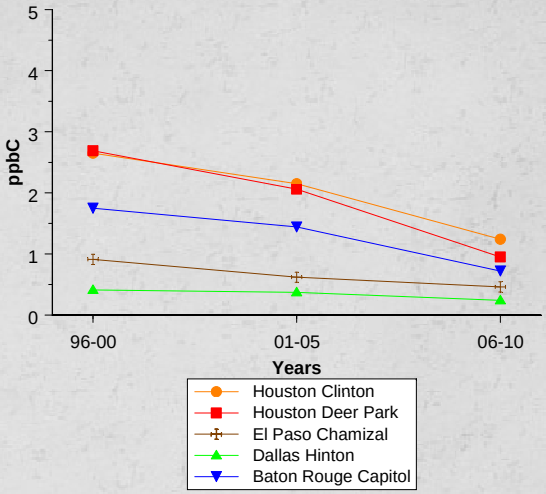
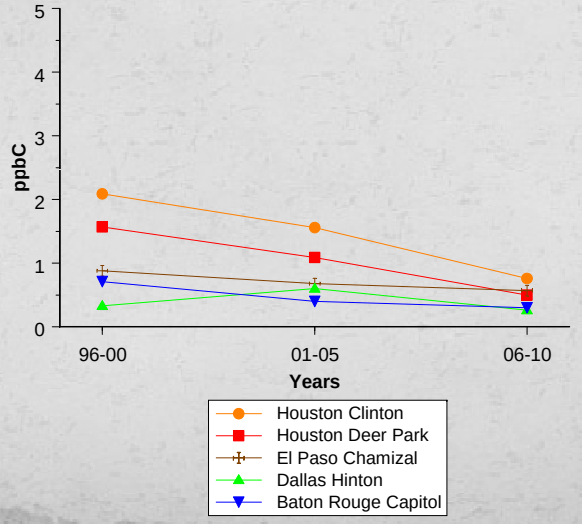


Trans -2-Butene Concentration Trends

June-August 6-9 AM Weekday Arithmetic Means



Cis -2-Butene Concentration Trends

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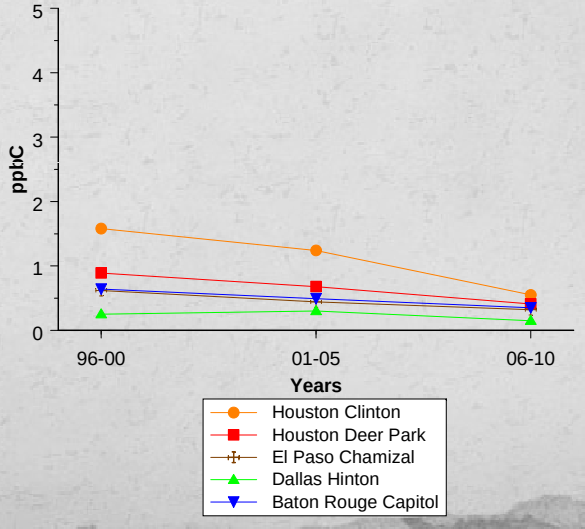
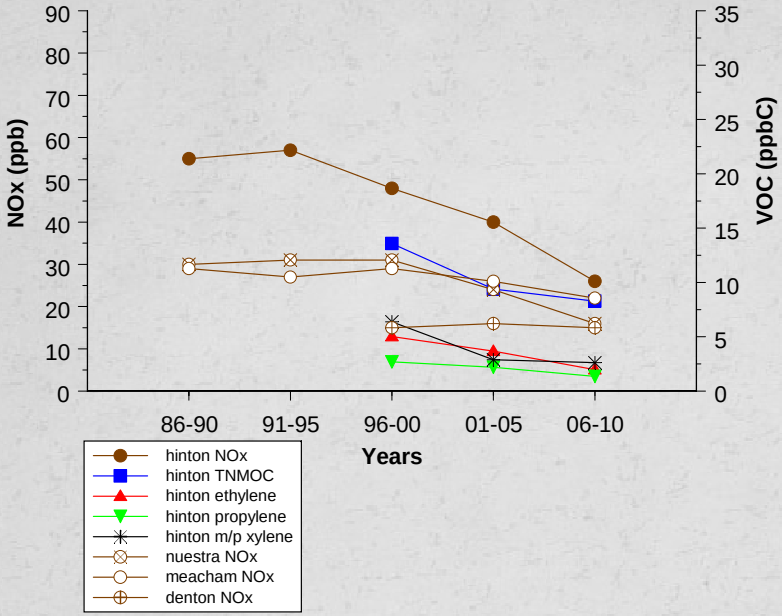


DFW Area

NOx and VOC Concentration Trends

June-August Weekdays; 0500-0800 LST; TNMOC concentration x 10



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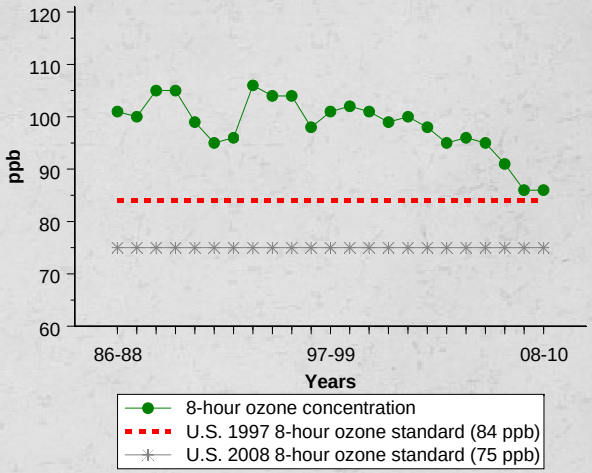

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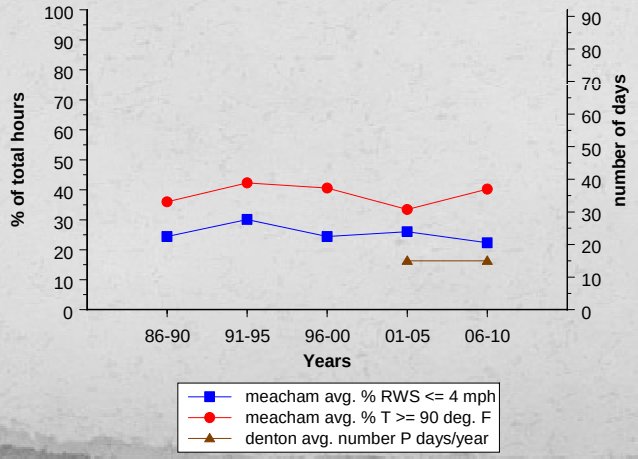

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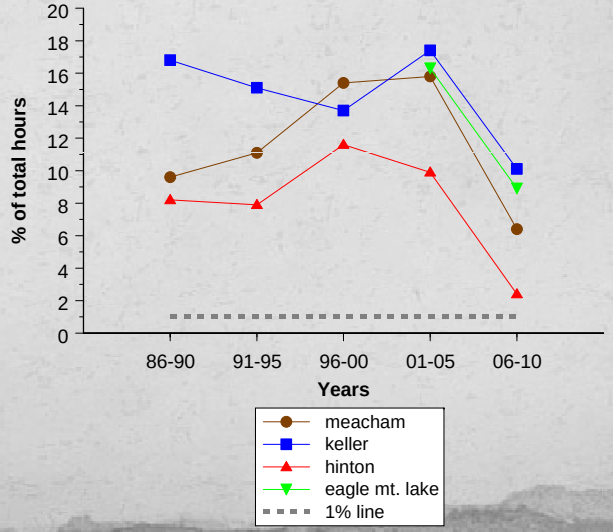
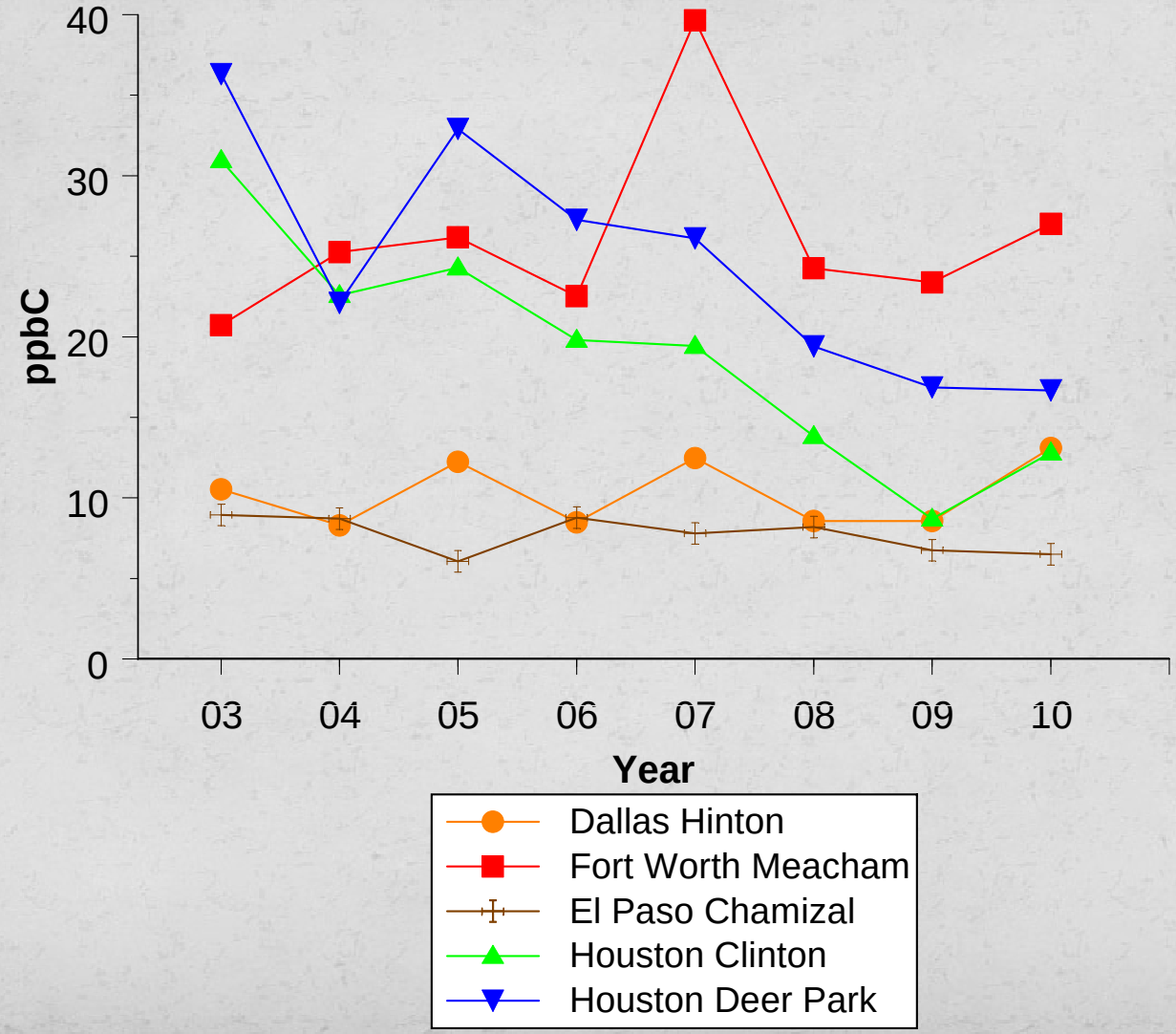


Ethane Concentration Trends

June-August 6-9 AM Weekday Arithmetic Means



Conclusions

- Across all four cities there were large statistically significant long-term declines in summer weekday morning ambient NO_x, TNMOC and HRVOC concentrations.
- 24%-54% for NO_x
- 32%-65% for TNMOC

- PAMS VOC data used to check effectiveness of HRVOC emission controls implemented in Houston from 2004-2007, and to track VOC emissions (ethane used as an indicator) from oil/gas production emissions.

- El Paso area meeting 75 ppb 8-hour ozone standard; Baton Rouge meeting 84 ppb 8-hour ozone standard; Houston met 84 ppb 8-hour ozone standard from 2007-2009 and 2008-2010; DFW close to meeting 84 ppb 8-hour ozone standard from 2008-2010.

- Future challenges: controlling NO_x/VOC emissions from notable population growth areas and from oil/gas production activity, such as in the areas around the Denton and Meacham air monitoring sites in DFW.