



Denver Department of Environmental Health Division of Environmental Quality

Airing on the Side of Caution:

The Denver Air Toxics Assessment – Phase III: 2005-06 Air Toxics Monitoring

November 8, 2006



**Denver
Environmental Health**

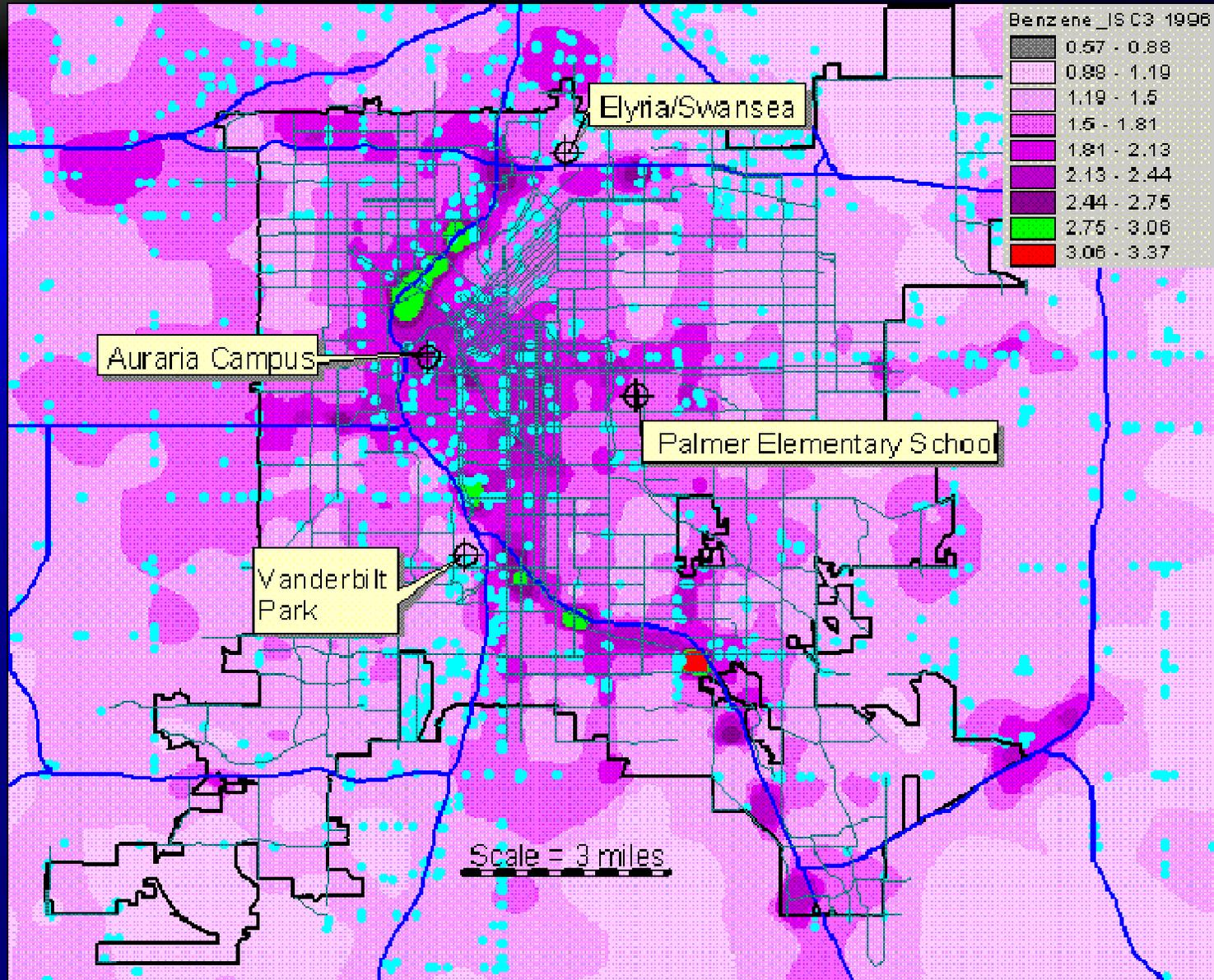
Status Report – The Good...

- Monitoring: Jun 05 – May 06
- 24 hr average VOCs & carbonyls @ 4 sites (TO-17 and TO-11A)
- Portable Trailer Site:
 - 9 months at one site, 3 months at another
 - 1hr VOC, 1hr black carbon, CO, ozone
 - 4hr VOCs and carbonyls (TO-17)
 - 24hr canister (TO-15)
 - Aethalometer and autoGC worked well
- Result = A WHOLE LOT OF DATA!

Status Report – The Not so Good...

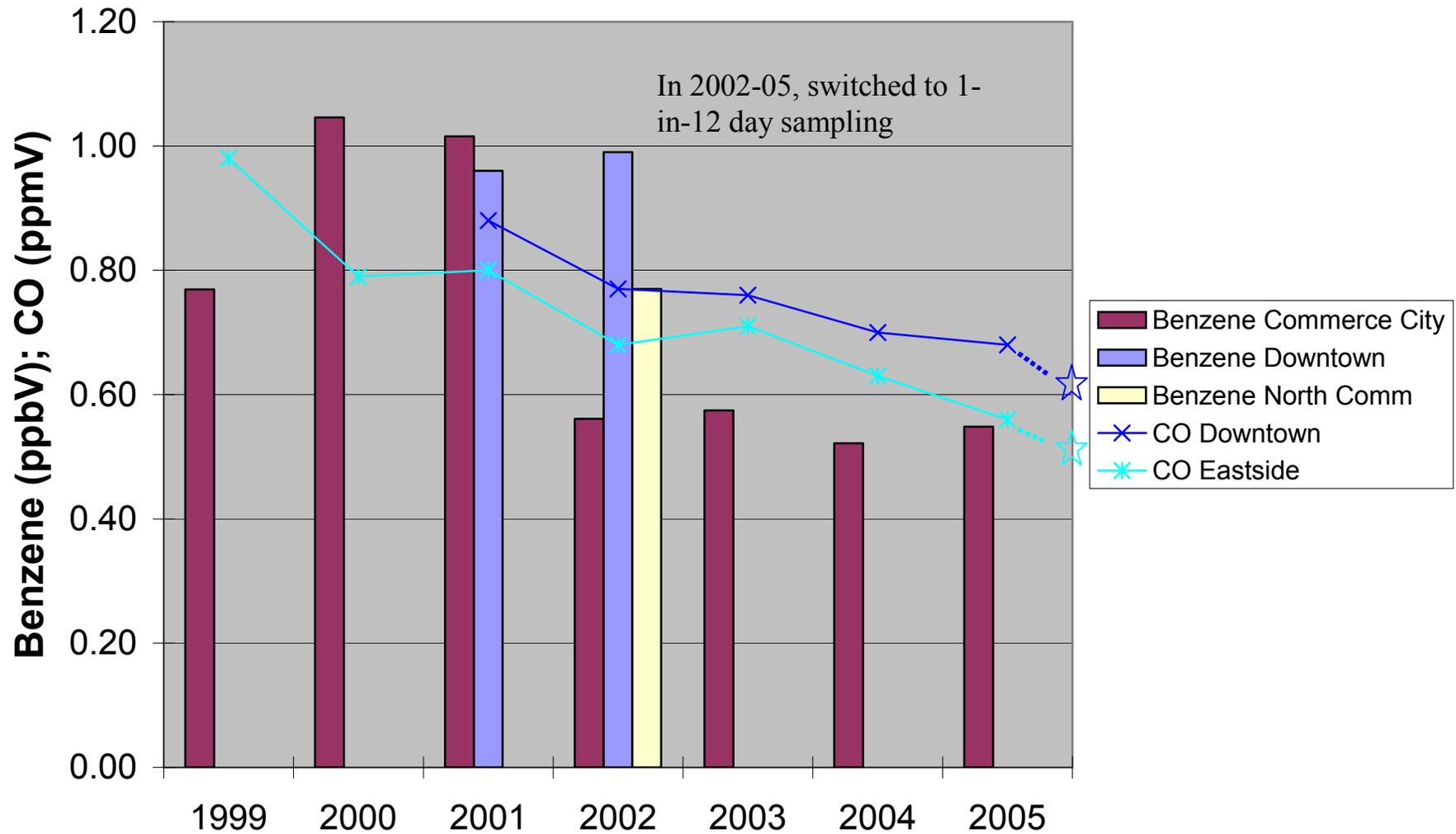
- QA/QC on post-processed data extensive
 - Sampler designs changed at least once at all sites
 - Trailer site allows us to compare values obtained with different samplers
 - VOC audit samples failed criteria; carbonyls within 10%
- Canister VOC data is consistently low
 - Benzene trends don't match other benzene data and carbon monoxide since 2002
- Very high carbonyls at 3 sites don't make sense – acetaldehyde & acetone

Site Locations



- Expected Rankings: Auraria, Swansea, Vanderbilt, Palmer

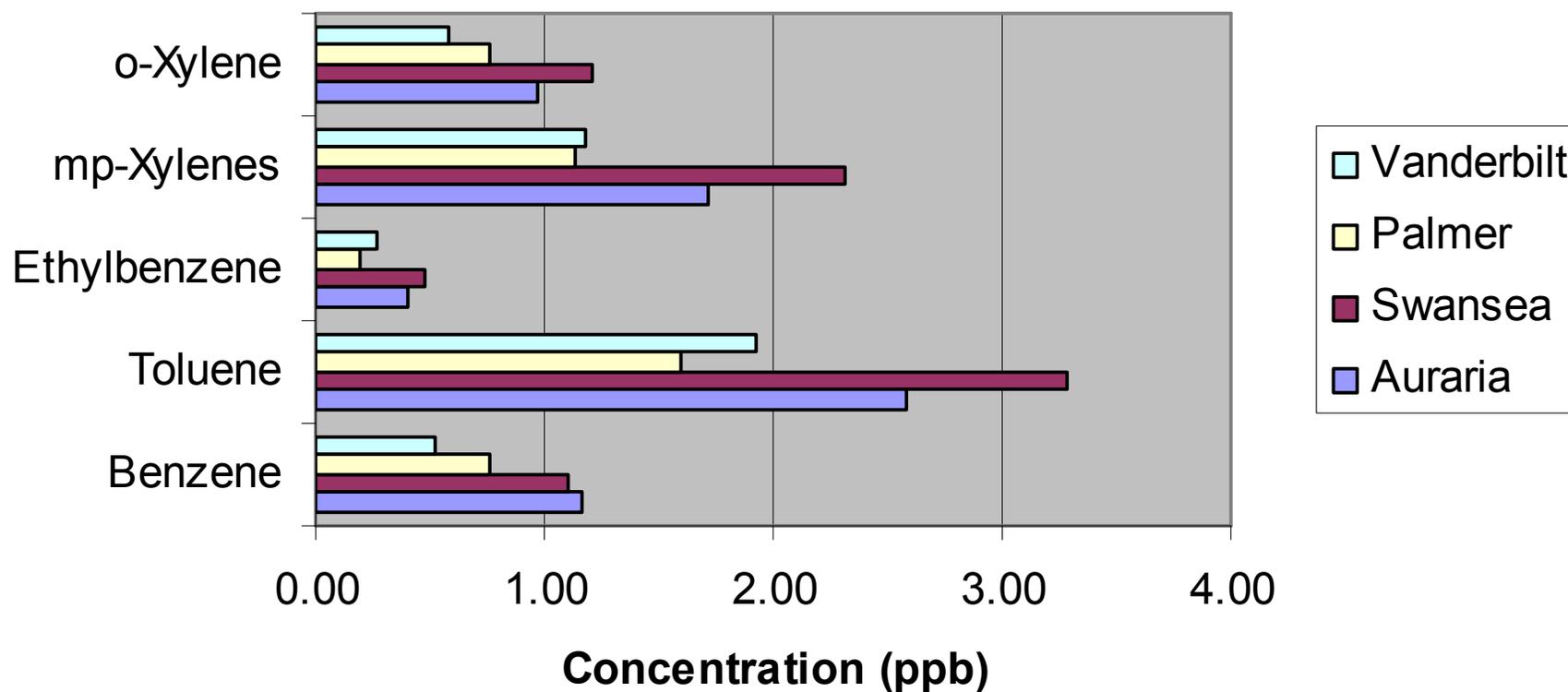
Benzene and CO Trends in Denver 1999-2005



- Expected Benzene Downtown: 0.7 – 1.0 ppbV

Results – 24hr Median BTEX

Median BTEX by Site

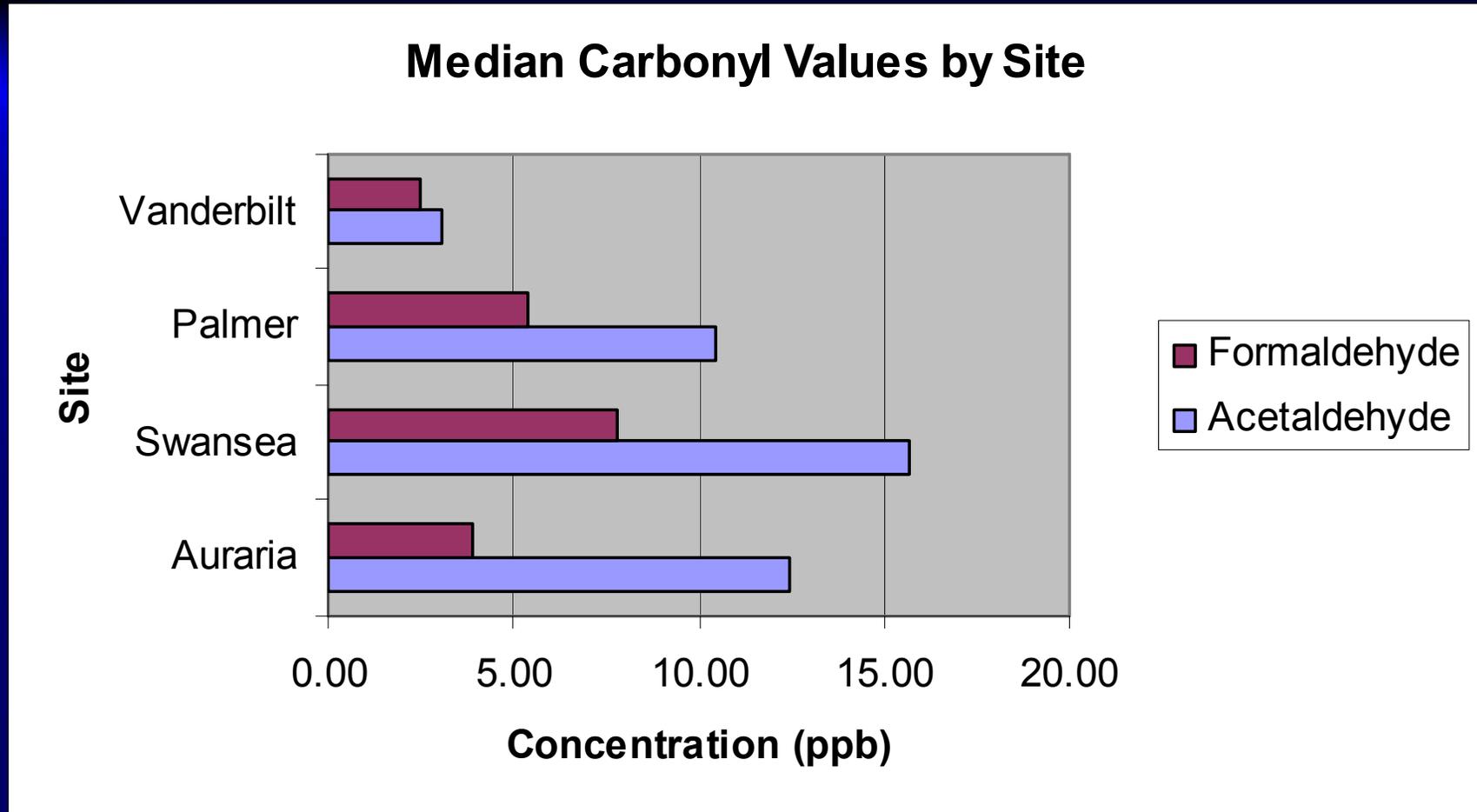


CDPHE 2002-03: Benz = 0.8, 0.9, 1.0 @ Welby, Swan, and CAMP resp.

Tolu = 2.3, 3.0, 2.6 “” “” “”

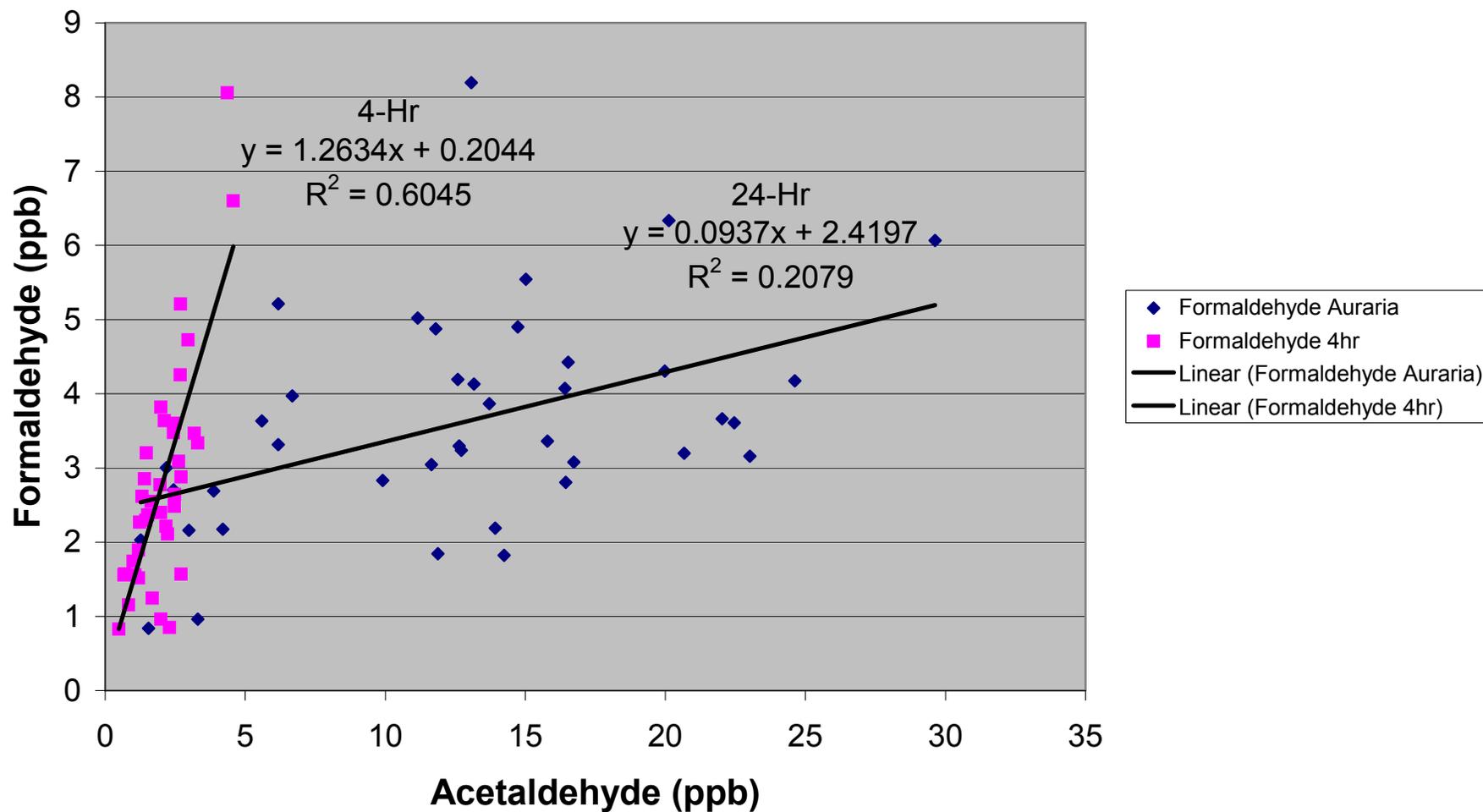
RMA: Benz & Tolu – avgs decreased 10-25% 2002-2005; medians flat to -20%

Results – 24hr Median Carbonyls

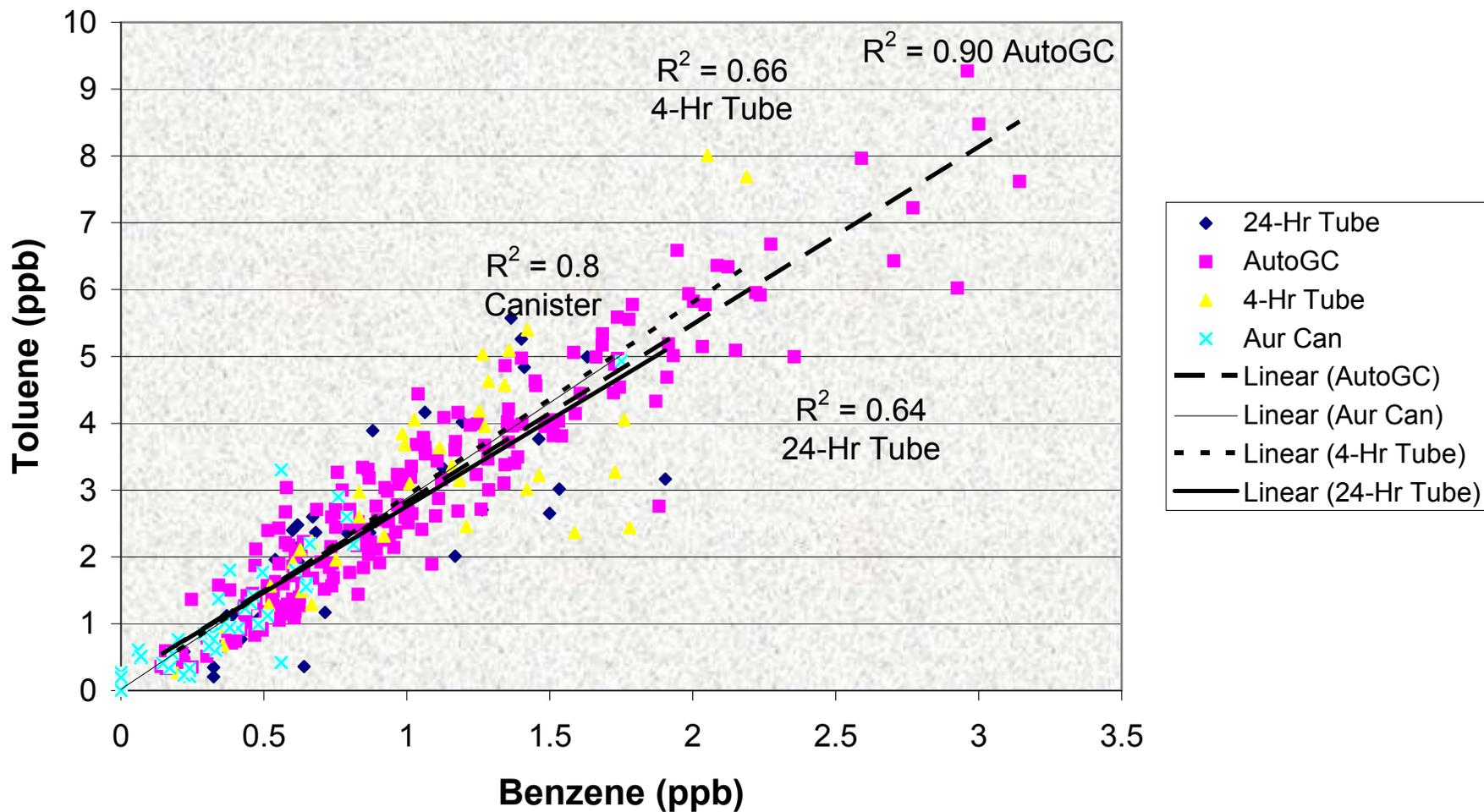


CDPHE 2002-03: Formald = 2.8, 4.1, 6.6 @ Welby, Swan, and CAMP resp.
Acetald = 1.6, 1.8, 2.3 “” “” “”

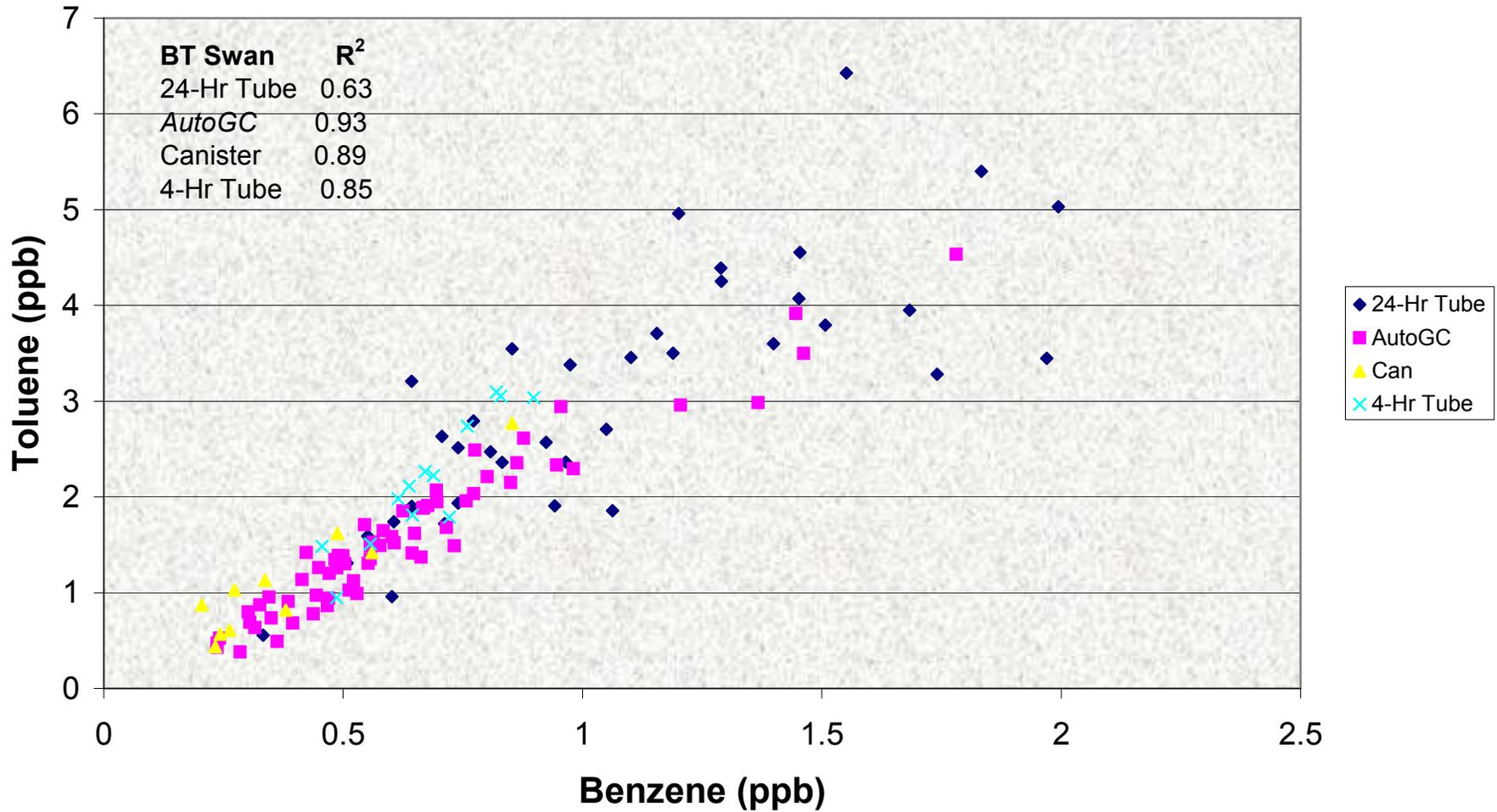
Auraria Formaldehyde vs Acetaldehyde 24-hr vs. 4-hr Composite 24-hr Average (Jun - Feb)



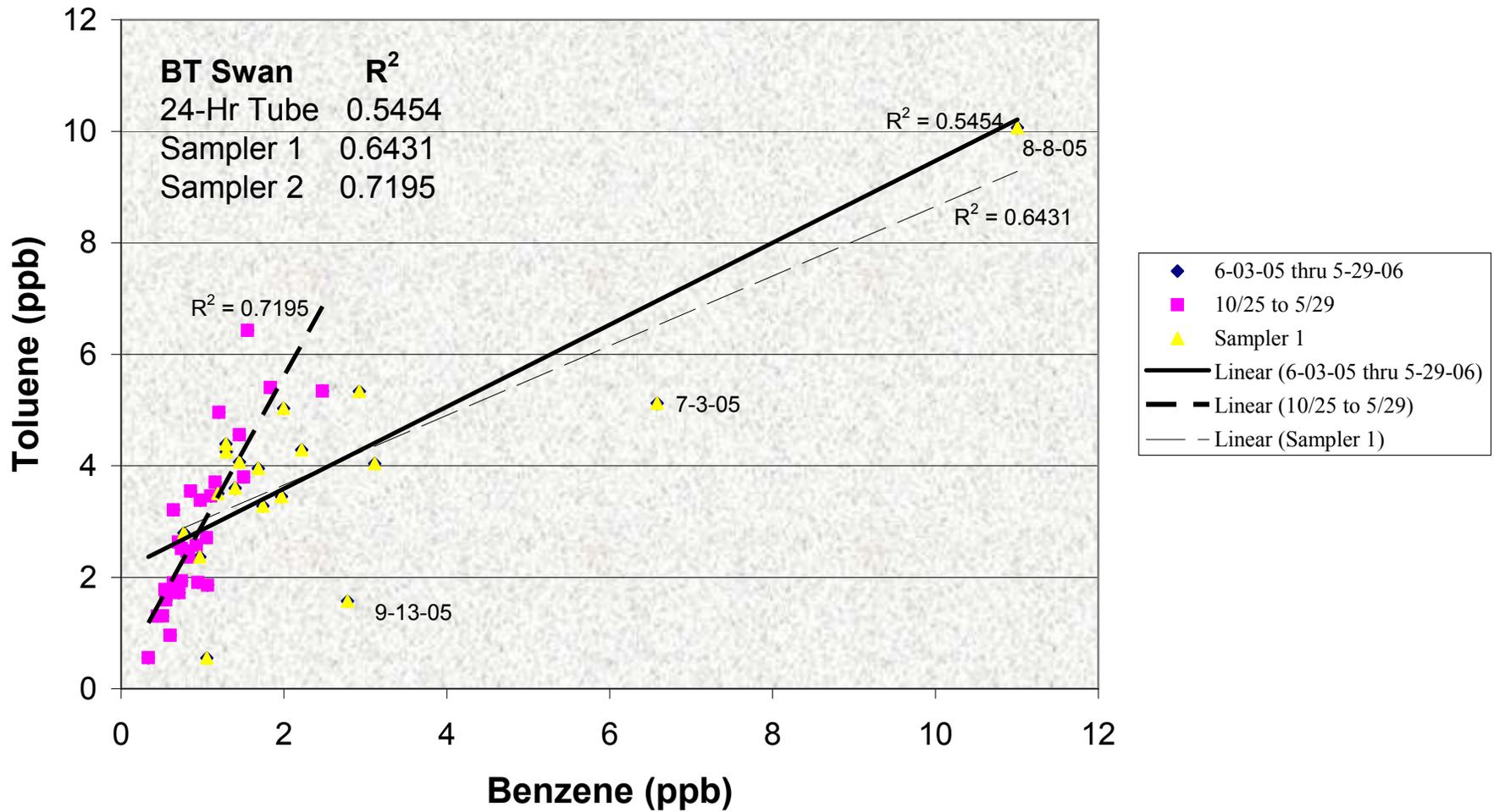
Auraria 24-Hr Average Toluene vs Benzene 6-03-05 thru 5-29-06



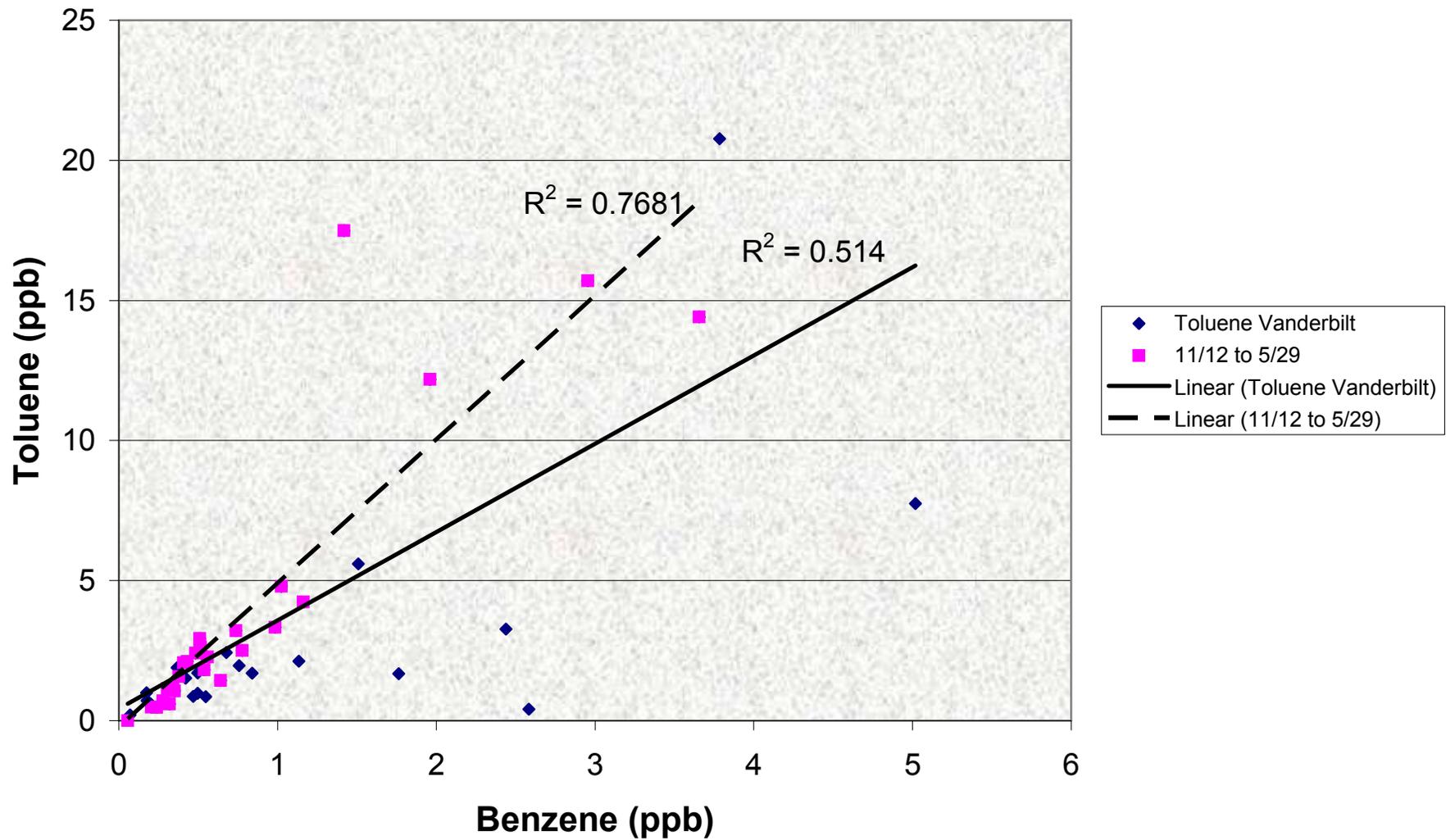
Swansea 24-Hr Average Toluene vs Benzene 6-03-05 thru 5-17-06



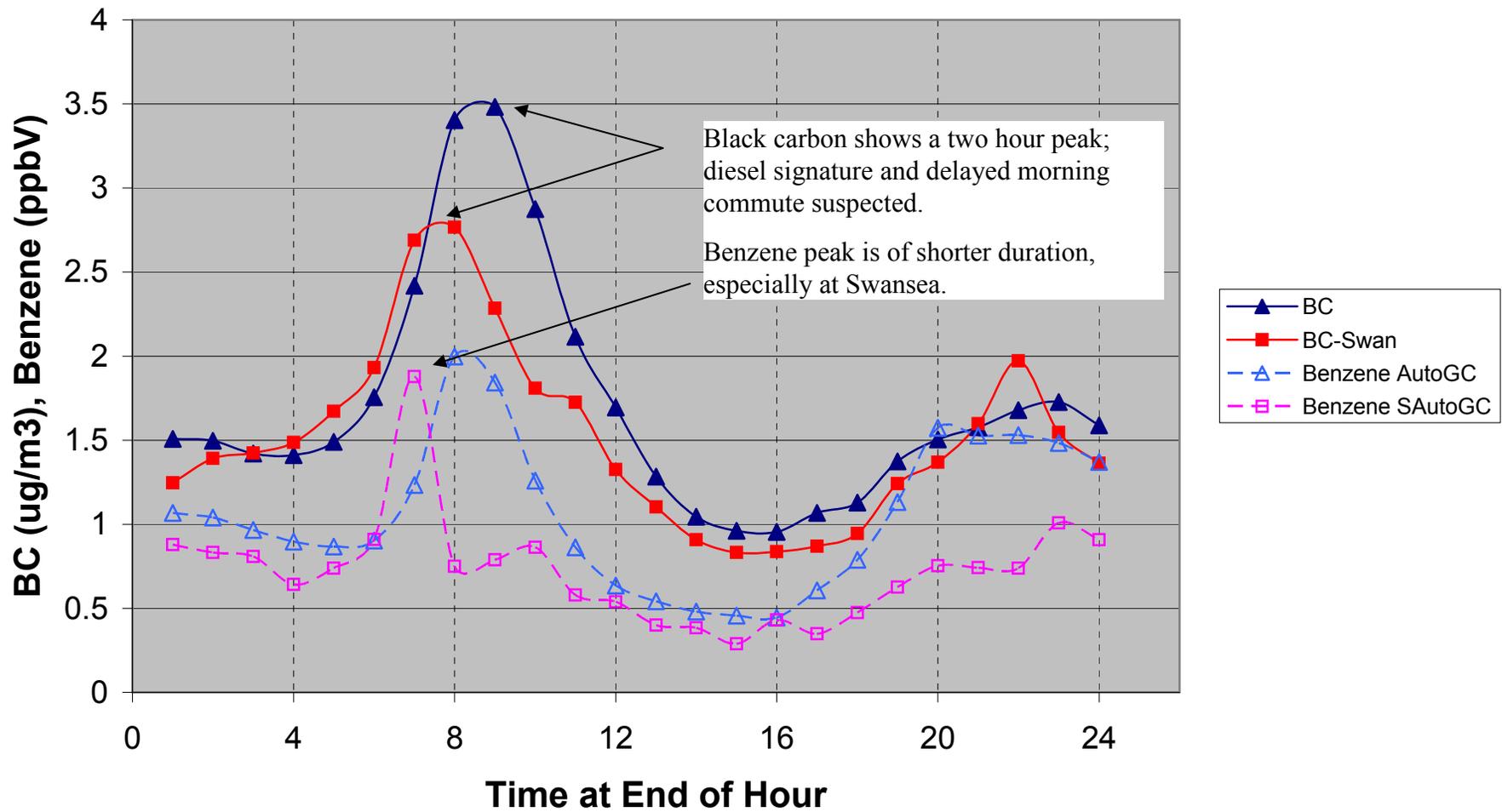
Swansea 24-Hr Average Toluene vs Benzene 6-03-05 thru 5-29-06



Vanderbilt Toluene vs Benzene



Hourly Black Carbon and Benzene at Auraria and Swansea



Lessons Learned

- Be realistic about all of the partners capabilities
 - Data deliverables
 - Processing time is significant
- Always include a ramp-up period before sampling begins
 - Problems WILL occur, especially with proprietary samplers
- Audit early (and often? \$\$?)

Next Steps

- Decide with EPA on criteria to exclude outliers
- Perform statistical analyses of remaining data
- Run dispersion model for select days
 - Steady state versus non-steady state met conditions

- THANKS to:
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 - Jeff Boon

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