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## Colorado Long Term Light-Duty Vehicle On-road Emission Trends

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First Mexico City Remote Sensing Symposium  
March 27-28, 2014

# Colorado Long Term Light-Duty Vehicle On-road Emission Trends

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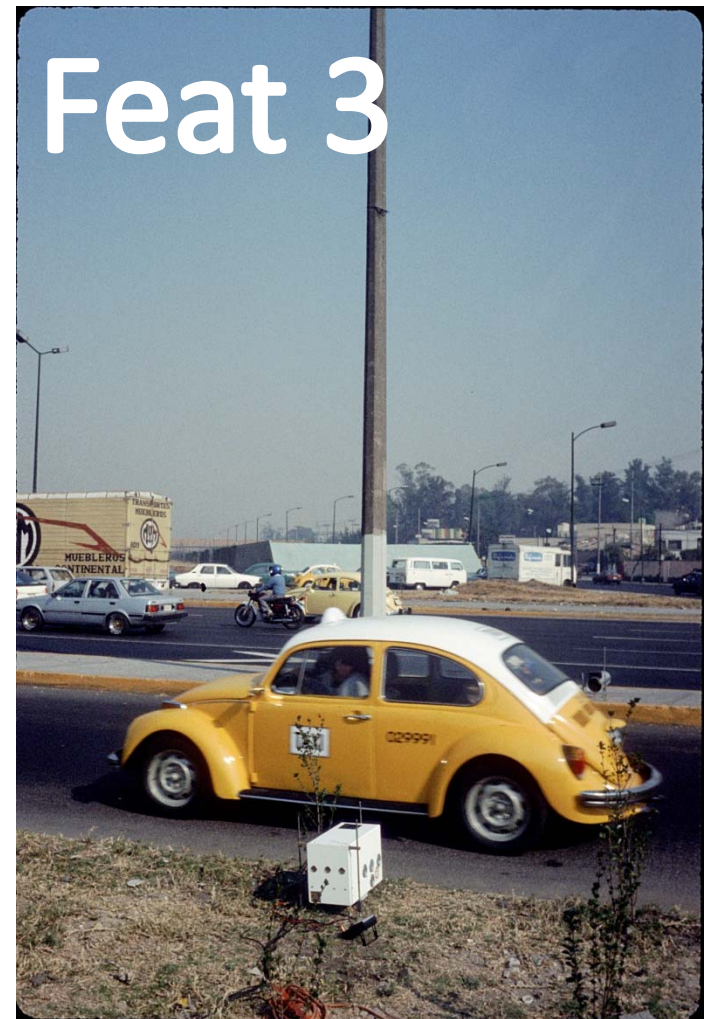
# Acknowledgments

Coordinating Research Council  
E-23 / E-106

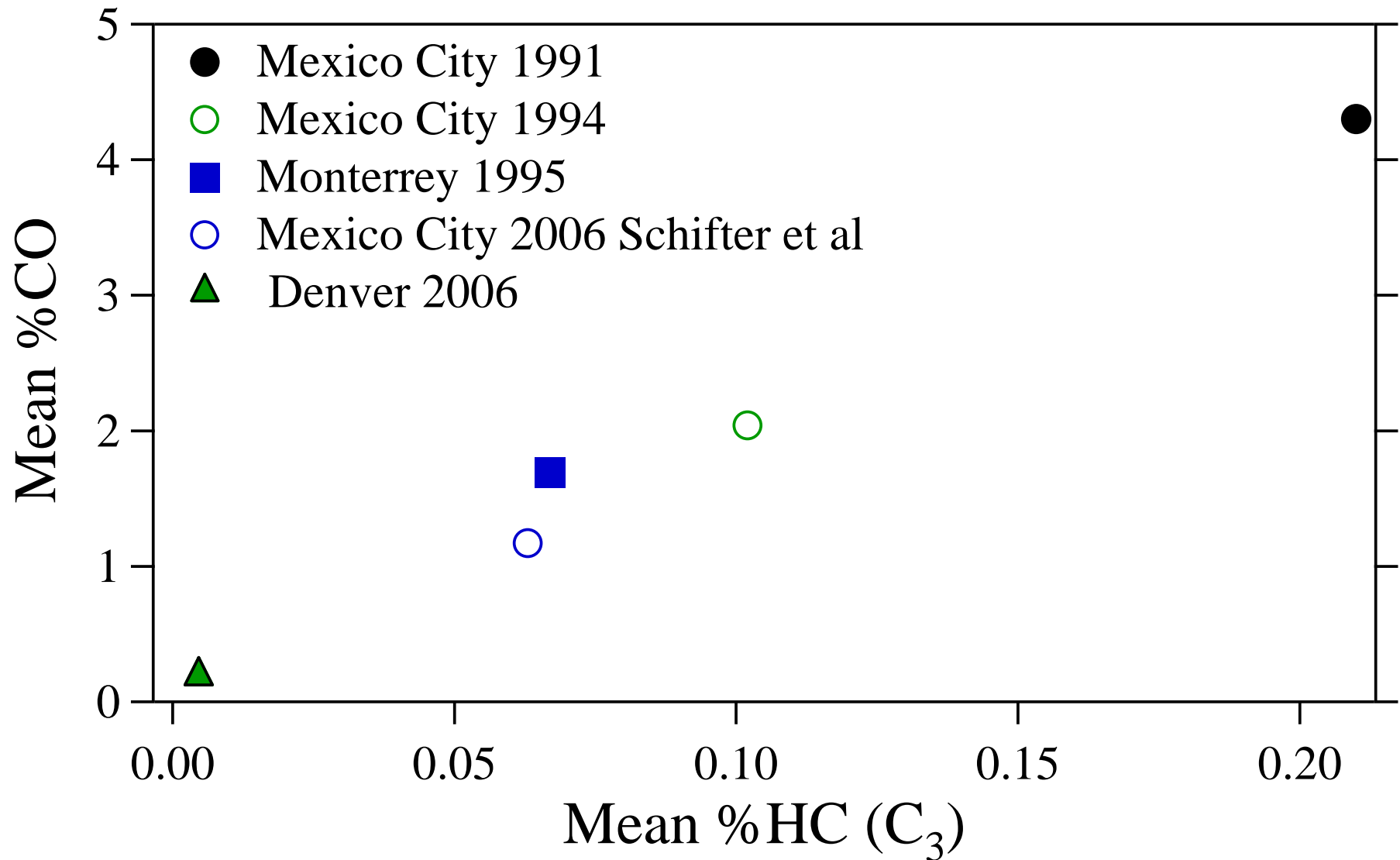
University of Denver

Jim Sidebottom of the  
Colorado Department of Public Health & Environment

# History of FEAT Hardware



# Historical Mexico City Measurements

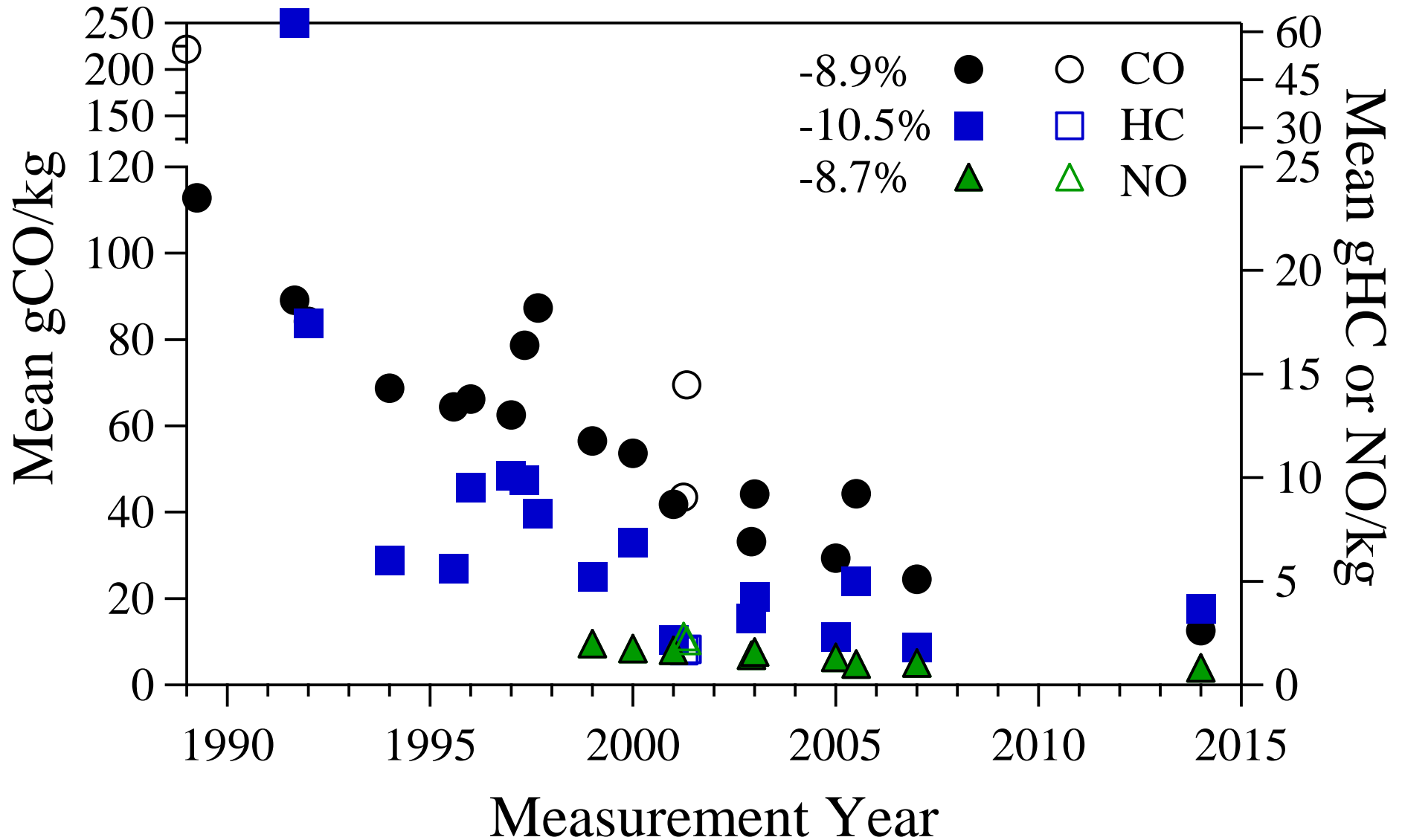


Schifter et al., Environ. Monit. Assess (2008) 137:459-470.

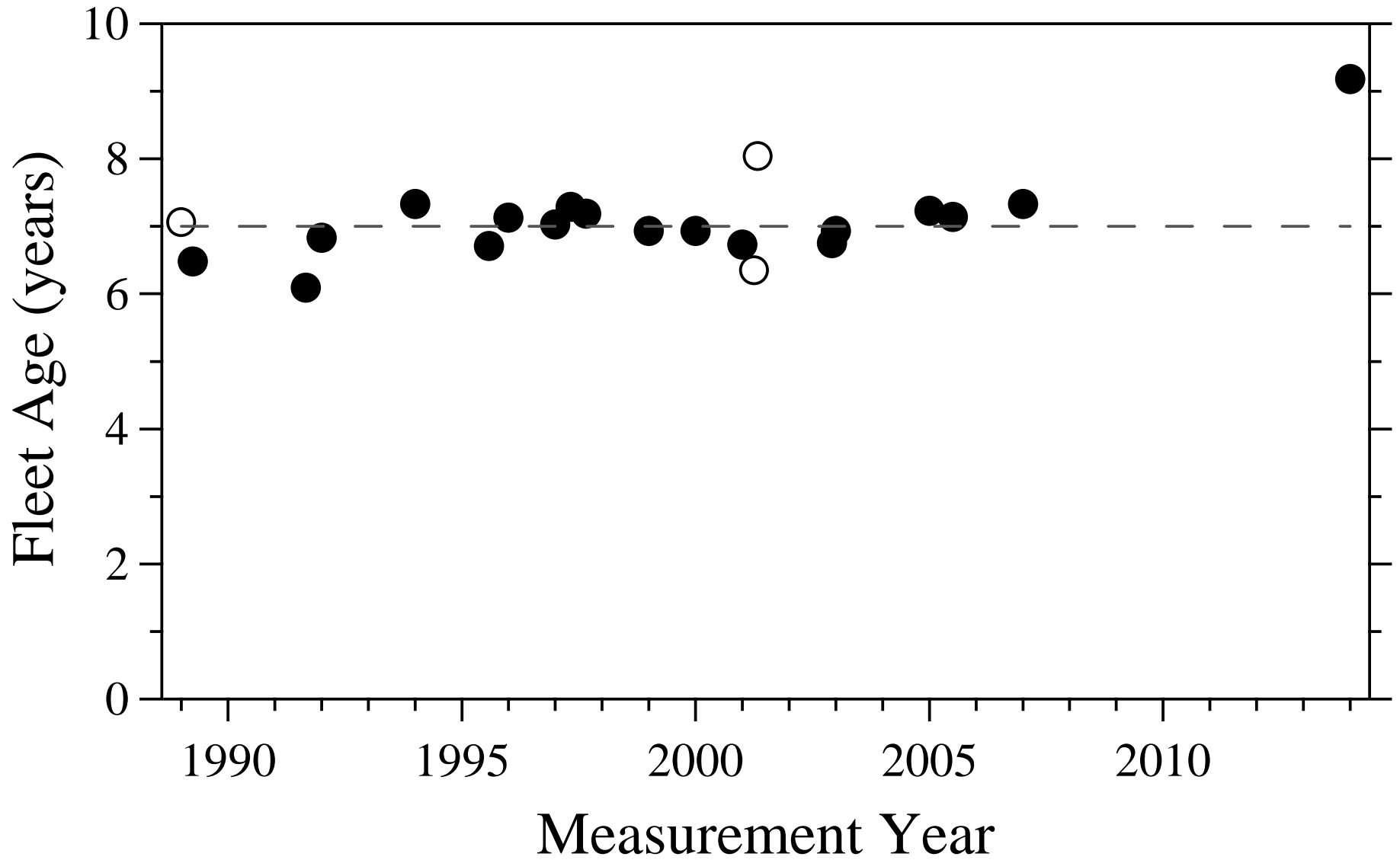
# Colorado Measurements

- Twenty one data sets from 1989 to 2014 with more than 389,000 records.
- HC measurements start in 1991 and NO measurements in 1999
- All but three of the data sets were collected in the Denver area
- All data and related publications are available at [www.feet.biochem.du.edu](http://www.feet.biochem.du.edu)

# Colorado On-Road Mean Emission Trends

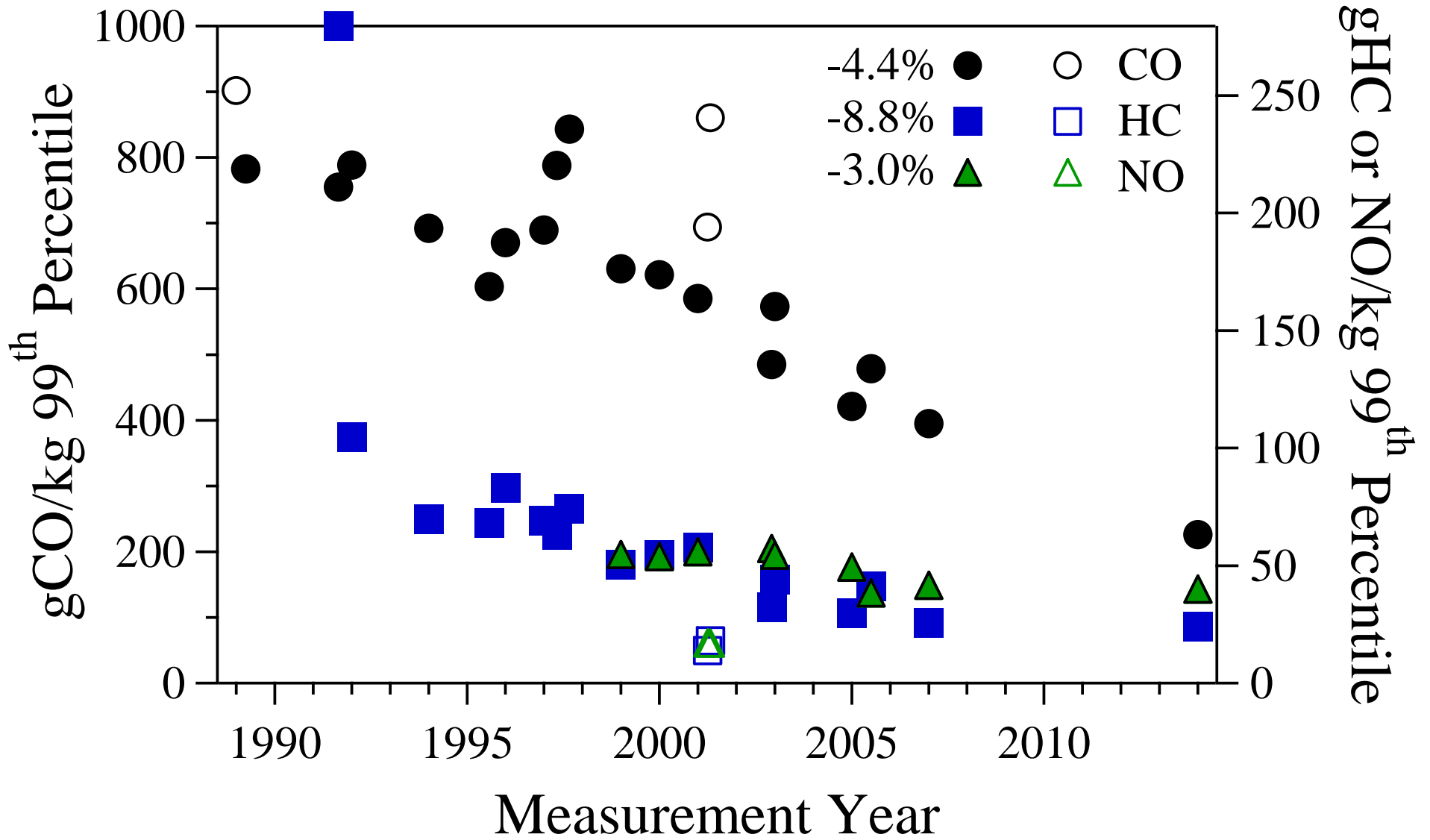


# Colorado On-road Fleet Age Trends

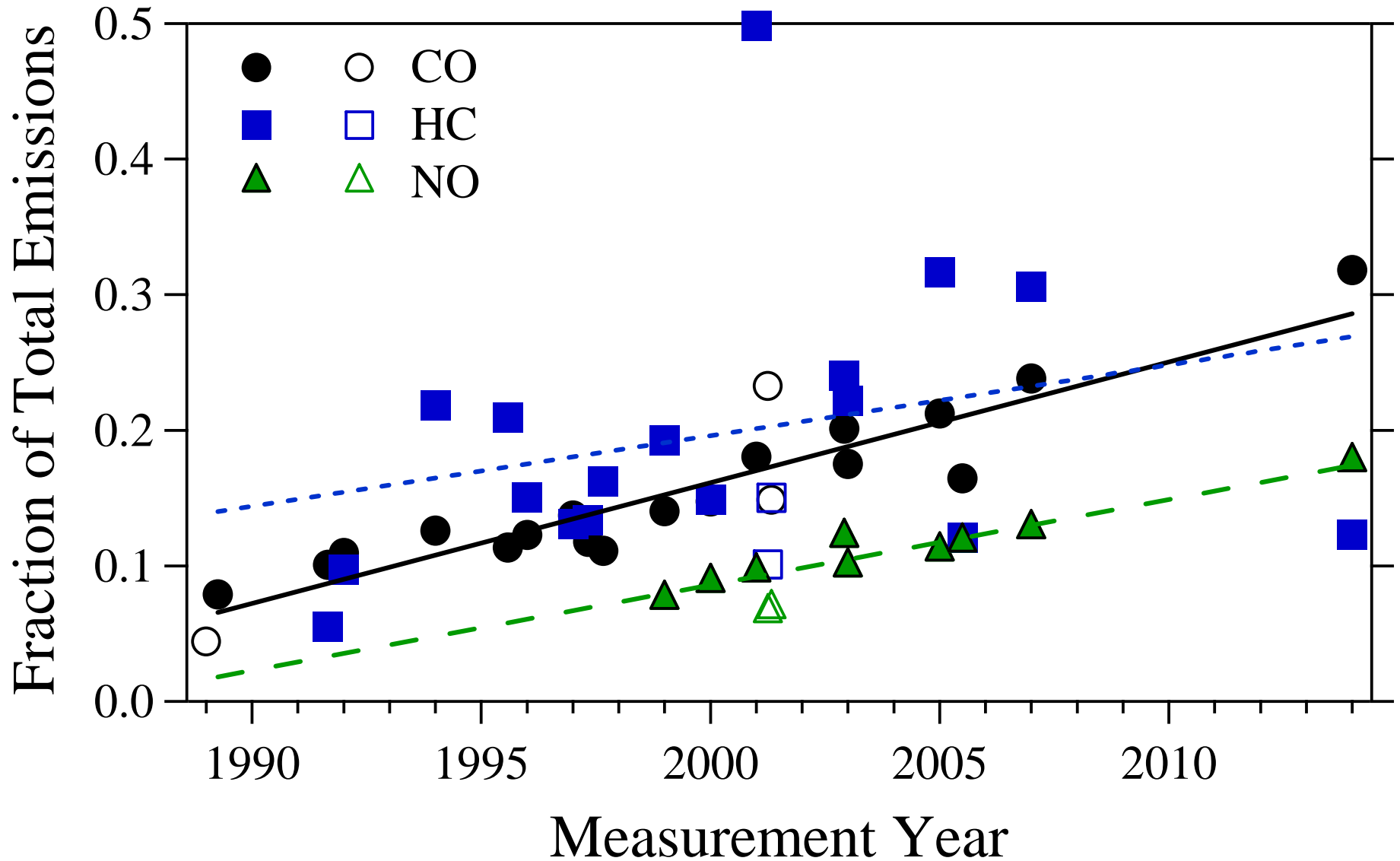




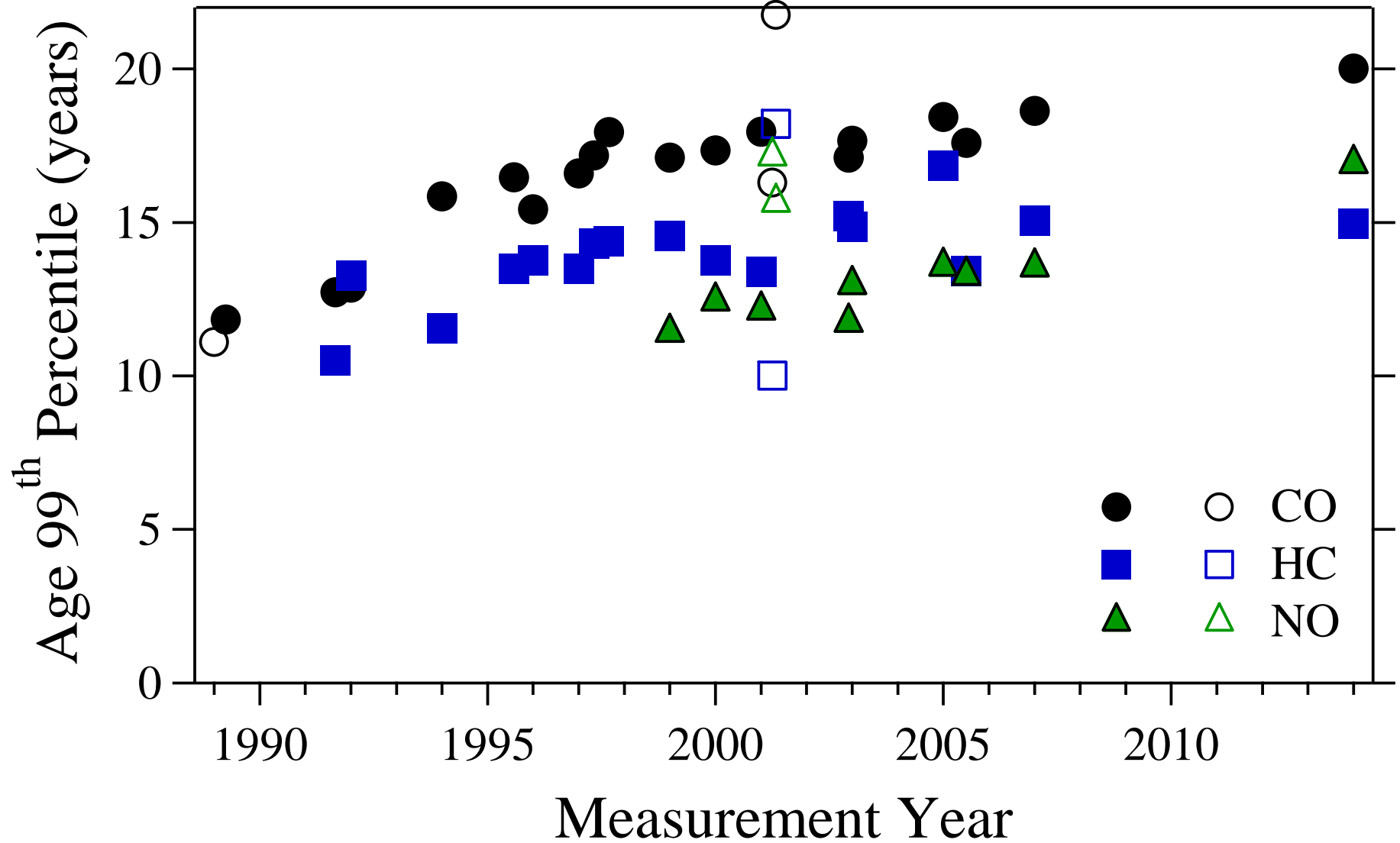
# Colorado 99<sup>th</sup> Percentile Trends



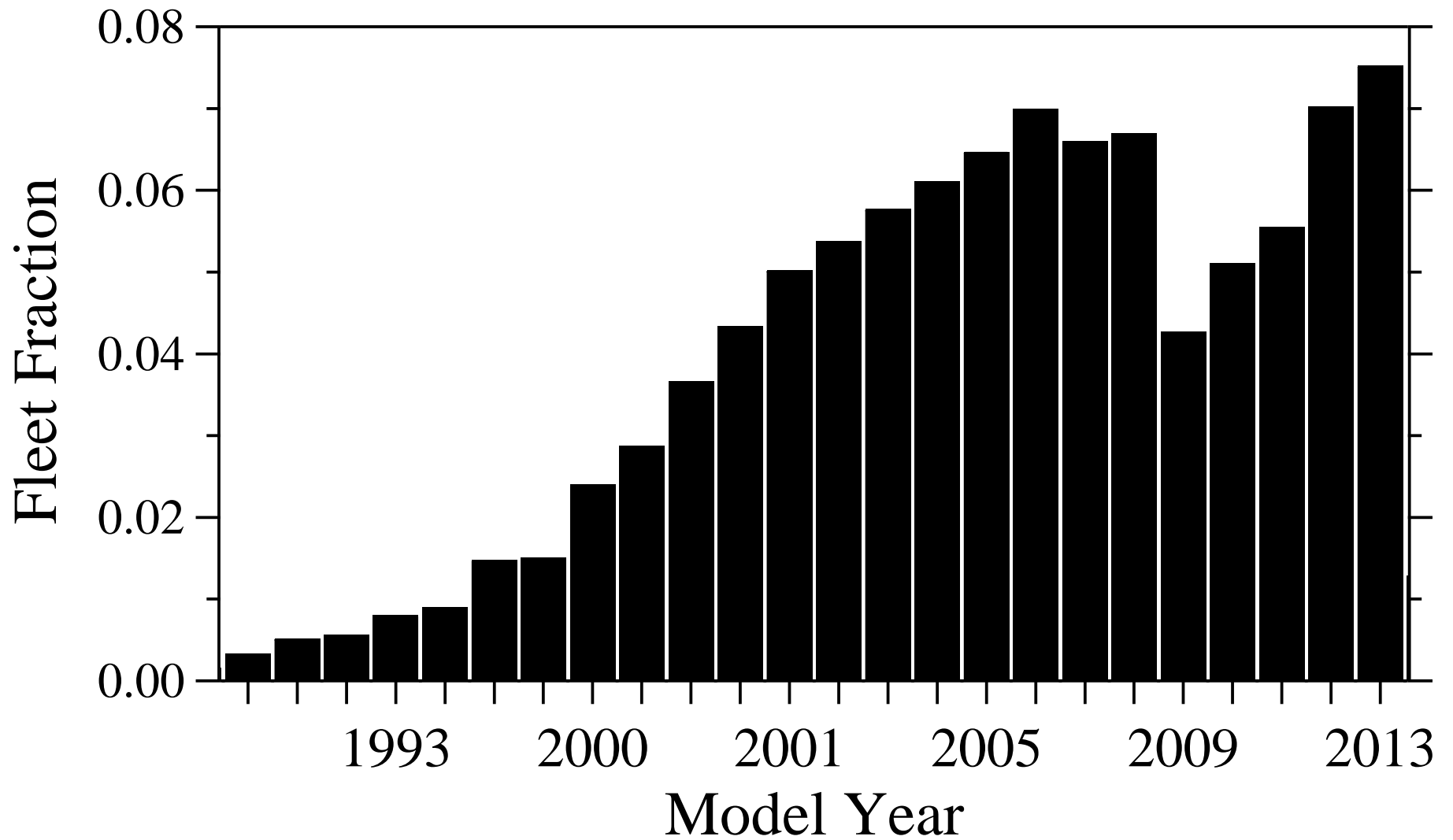
# Colorado 99<sup>th</sup> Percentile Emission Fractions



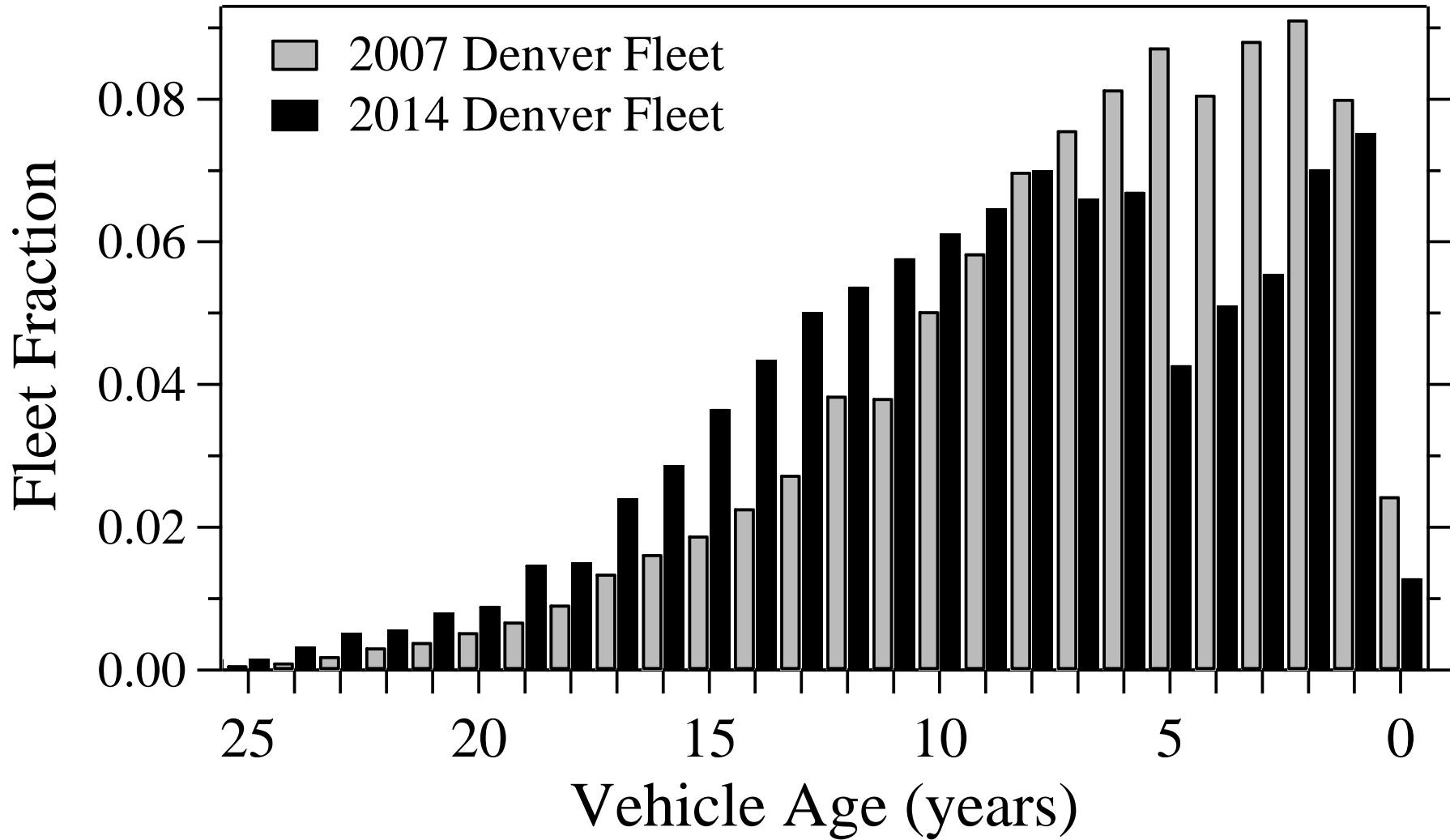
# Colorado 99<sup>th</sup> Percentile Age Trends



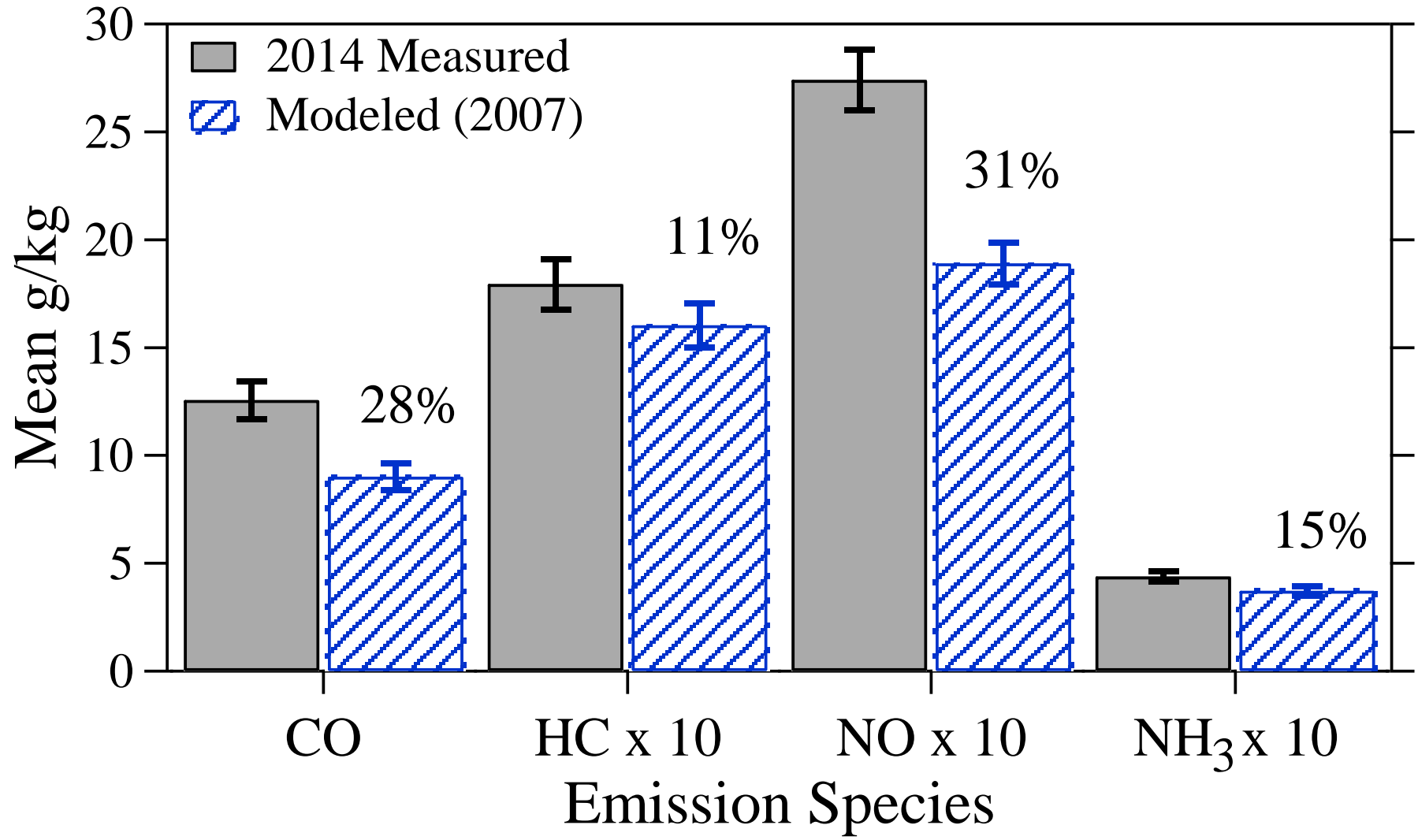
# Denver 2014 Fleet Fractions



# Denver 2014 and 2007 Fleet Age Fractions Comparison



# Denver 2014 Measured and Modeled Mean Emissions



# Conclusions

- Mean emissions in Colorado are decreasing at a faster rate than the 99<sup>th</sup> Percentile emissions.
- Emission distributions for all species are increasing in skewness with the 99<sup>th</sup> percentile for CO and HC accounting for ~30% of the total.
- The age of the 99<sup>th</sup> percentile fleet continues to increase for CO and NO
- The 2009-2010 recessions has resulted in the largest change in Colorado fleet age in the last 25 years and has slowed previous emission reduction rates.