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On Road Evaluation of New, Heavy-Duty Diesel Truck Emission Standards

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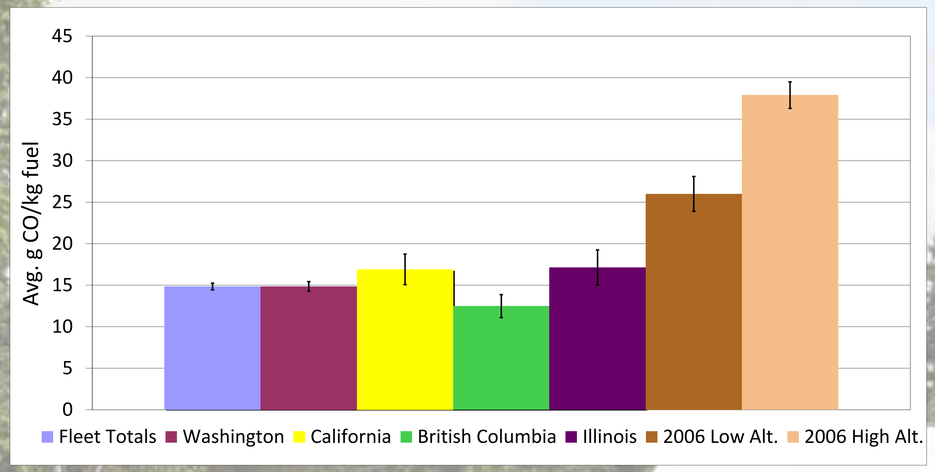
Background :

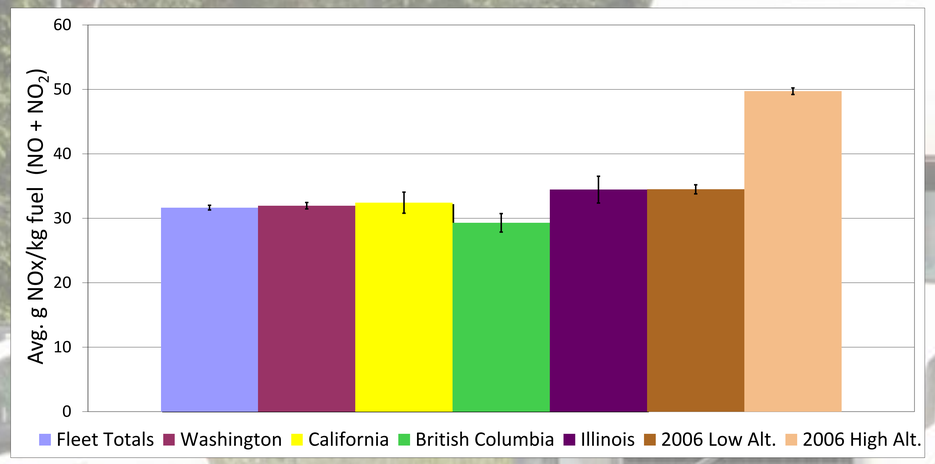
- On-road testing is essential to determine real world exhaust emissions, because differences have been found from in-lab testing
- Since 1988 the US E.P.A. has enacted increasingly stringent emission standards on particulate matter (PM), CO, CO_2, NO, NO_2, and hydrocarbons (HC).
- New standards for PM in 2007 and NO_x (NO_2 +NO) in 2010 have placed new catalytic technologies on trucks that have the potential to greatly reduce some emissions while potentially having undesirable side effects.
- On-road testing will determine if actual lab emission reductions exist in the real world.

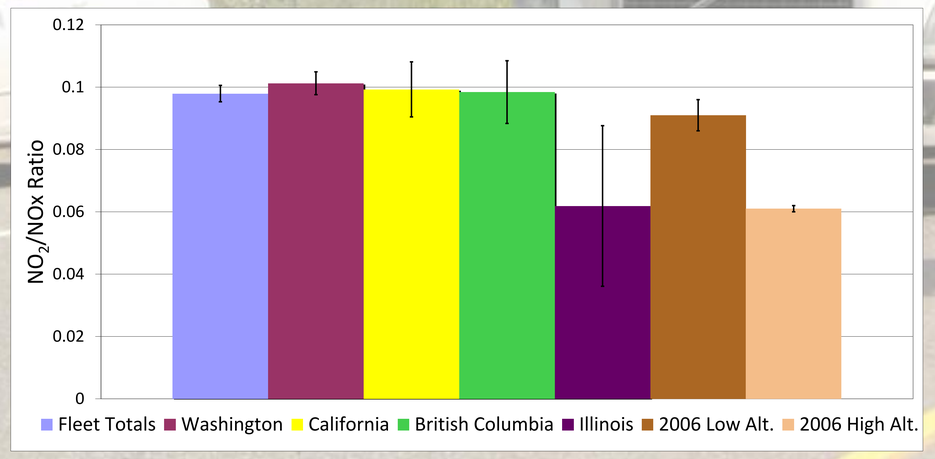
Methods:

The FEAT Remote Sensing Device works via optical absorption. A beam of both UV and IR radiation is transmitted across the road to the detector and differences in specific wavelengths of chemical pollutants in the air can be measured when the beam of light is attenuated by a truck's exhaust. This signal is converted by the computer into concentrations of each chemical pollutant.

Results :







All figures: low elevation denotes 1695m; high elevation denotes 2530m. Error bars are based on the standard errors of the mean.

Discussion:

Fleet averages of exhaust concentrations for all chemicals were lower than previously reported.[1] Possible differences can be explained by the difference in elevation. Previous research shows a linear relationship between elevation and exhaust amounts.[2] British Columbia (BC) had the lowest levels of each pollutant, but was not statistically different than the fleet average. Counter intuitively, California had increased emission averages than the fleet average for all chemical pollutants, even though California has historically had stricter emission standards. This data set will provide a good baseline for determination of both positive and negative effects of new catalytic technologies.

Future Work:

Data analysis for each individual truck will be analyzed for emission levels based on a truck's VIN number. Each truck has an individual VIN number that describes the engine manufacturer, engine model year, and other factors that can be used for further analysis. Comparison of findings will be compared to published findings to determine the effects of aftermarket technology and see if the occurrence of an ammonia slip has occurred via new catalytic technologies.

Acknowledgments

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Literature Cited

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2. Bishop, G. A.; Morris, J.A.; Stedman, D.H.; Cohen, L. H.; Countess, R. J.; Countess, S, J,; Maly, P.; Scherer, S. *Environ. Sci. Technol.* **2001** *35* (8), 1574-1578.