Advantages and Limitations of Measuring BTEX with a Commercial GC-PID System *In Situ*

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The performance of a commercial gas chromatograph with a photo-ionization detector (Series 9100 GC-PID, MOCON, Lyons, Colorado, U.S.A.) measuring Benzene, Toluene, Ethylbenzene an Xylenes (BTEX) was evaluated during the winter of 2017 and spring 2018. The objective of this work was to determine the accuracy and precision of the equipment to measure BTEX in field conditions. The overall goal of the project was to use this instrument near oil and gas pads to monitor BTEX ambient concentrations and use the data in a health impact study.

The equipment was operated inside a mobile laboratory that provided semi-controlled environmental conditions. The linearity response was verified by analyzing gravimetric standards made at ESRL/GMD. Figure 1 shows the regression analysis for the BTEX compounds. Results show that the equipment presents a linear response for all species within the 0.5-54 ppb range.

The instrument showed consistent results through the measurement period with the exception of certain events when temperature changed dramatically. These events affected the retention time of the compounds on the GC column.

This equipment presents advantages over other measurement techniques, one of them being its high frequency sampling (6 minutes/sample). This allowed us to measure BTEX in real-time over a large concentration range and to investigate sources of short-term variability in the vicinity of newly developed large oil and gas production pads.

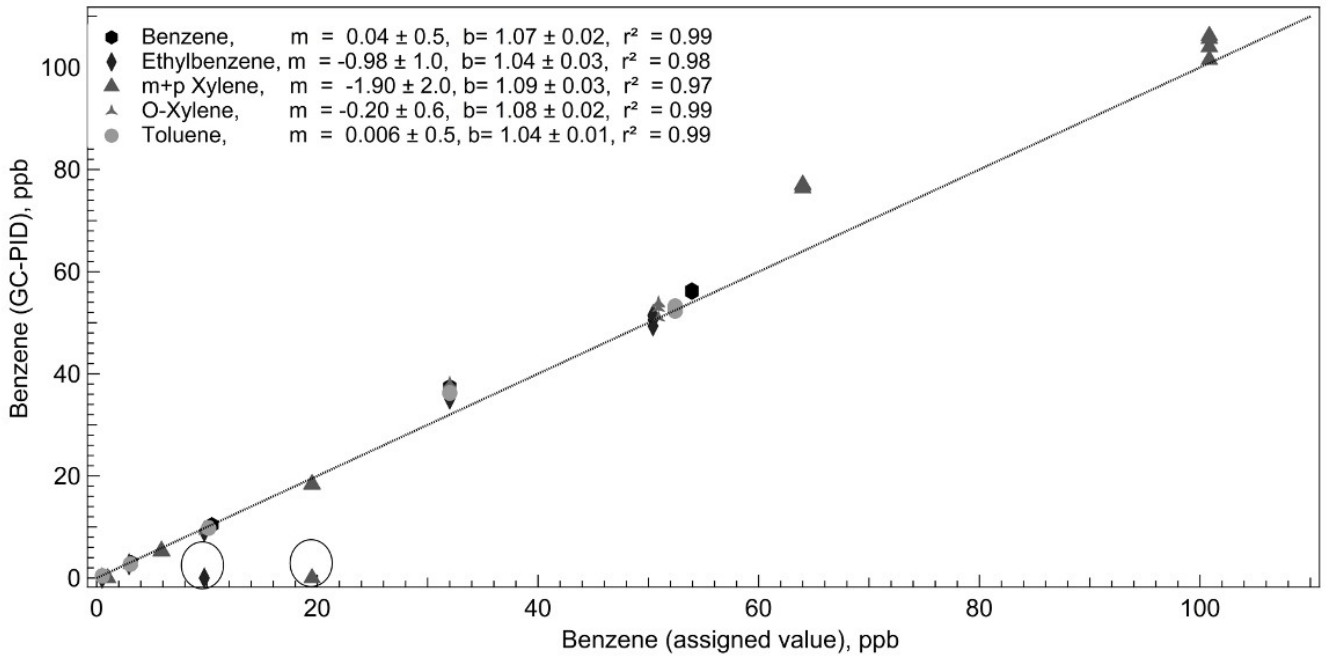

Figure 1. Regression analysis of BTEX. m and b are the correlation coefficients with 1 ± standard deviation. Circles point to anomalies due to temperature fluctuations during the analysis.