



Estimation of CO₂ baseline level using a statistical approach for near-road vehicle emission measurements

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Vehicle emission is widely accepted as one of the major air pollution problems in metropolitan. Many different experimental setups have been designed to measure the direct emission from vehicles in order to study their impact to local air quality. Near-road/roadside in-situ measurement is one of the most common methods for vehicle emission measurement, providing emission data of vehicle under real driving conditions. In addition, the measurement system can be fully automatized and provides a better way to collect vehicular emission data. Previous studies show that 5% of the total vehicles contribute 50% of the total vehicle emission. In this study, we use the roadside measurement data for the fuel-based emission factor calculation in order to identify heavy emitters. The emission factor calculation uses CO₂ as an indicator for the fuel consumption rate. However, this measurement technique suffers from high detection limit and large uncertainty of the CO₂ measurement. As a result, heavy emitters with low fuel consumption rate cannot be easily detected. A new data analysis algorithm is developed to estimate the CO₂ baseline for near-road/roadside vehicle emission measurements. We investigated the error distribution of the CO₂ measurement and use a statistical approach to identify the baseline levels. Our study provides an alternative solution for the CO₂ concentration baseline calculation.