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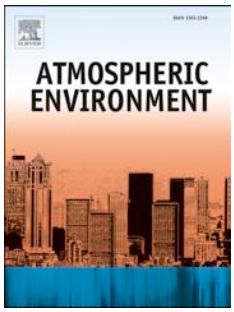

Characterization of levels and emission rates for roadside $PM_{2.5}$ and BTEX in Ho Chi Minh city, Vietnam

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Characterization of levels and emission rates for roadside $PM_{2.5}$ and BTEX in Ho Chi Minh city, Vietnam

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Abstract

A monitoring program was designed and implemented to characterize roadside levels of $PM_{2.5}$ and BTEX in Ho Chi Minh City, Vietnam, and to generate input data for CALINE (California LINE Source Dispersion Model) inverse modeling. Monitoring was done during Dec 2007-Jan 2008, on both weekdays and weekends, and yielded 284 hourly BTEX samples (adsorption tubes), 24 samples of 8h-$PM_{2.5}$ and 42 samples of 24h-$PM_{2.5}$ (by MiniVol samplers). The air sampling was done at 8 points on both sides of one street that had an average traffic flow, simultaneously meteorology data and vehicle flows were recorded. Roadside 24h-$PM_{2.5}$ levels were 97 ± 31 (53 – 151) µg m^{-3}, higher on weekdays than weekends. Diurnal BTEX variation patterns were consistent with the diurnal flows of 6 vehicle categories moving on the street. BTEX levels were reduced with the increase in downwind distance from traffic lanes (approximately by 15% for each 5 m increment). Principal component analysis also confirmed the association between roadside pollution levels and traffic. A calculation algorithm was developed to remove the urban background, contributed by other sources than traffic in the selected street, from the roadside measured pollution levels. Urban background contributed a majority of $PM_{2.5}$ (90-98%) and hourly BTEX (67-97%) with higher contributions at upwind side of the street and at late evening hours when less traffic was observed. CALINE inverse modeling produced explainable fleet hourly emission rates (g km^{-1} h^{-1}) and vehicle emission factors (EF, mg veh^{-1} km^{-1}). The obtained EF for gasoline and diesel vehicles were comparable

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