

Characteristics of Ambient Particulate Pollutants Near a Heavily Trafficked New Jersey Turnpike

Control #: 515

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Abstract

A major source of airborne particulate matter in New Jersey is traffic related vehicle emissions. This study measured levels of PM_{2.5}, total suspended particles (TSP) and associated PAHs from 50, 100, and 150 m downwind of the New Jersey Turnpike near exit 18W for periods of 24 hours and every 6 days starting in September 2007 and ending March 2008. There were no significant differences in concentration of PM_{2.5} between the different distances sampled. This supports the idea of wide-spread mixing and long-range transport of PM_{2.5}. Seasonal variations were observed with lower PM_{2.5} concentration in the winter compared to the fall. Results also show that higher PM_{2.5} concentration occurred as a result of high NO_x and fog. The concentrations of TSP, on the other hand, were significantly higher closest to the NJTPK (50 m) and different to the other two monitoring sites (100 and 150 m), indicating that coarse particles deposited quickly and therefore, is not transported over longer distances. Furthermore, a distinct concentration gradient of total PAH over distance was observed for most of PAH compounds, indicating that spatial variation from the emission source has a significant impact on the ambient total PAH levels. Finally, results show no significant difference on day-of-week effect (weekday vs. weekend) on particle concentrations.