

Evaluation of factors influencing road dust loadings in a Latin American urban center

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Abstract

Vehicle non-exhaust emissions are a major component of particle matter, including the direct wear of tires, brakes, road, and the resuspension of deposited particles. It is suggested that resuspended PM (RPM) emissions can be at the same magnitude or even larger than combustion emissions in urban centers. Factors affecting RPM can be included in four categories: road characteristics, traffic condition, land use, and meteorology. In order to study and evaluate these influencing factors, road dust less than 10 micrometers (RD10) was collected in 41 sites across Bogotá. The sampling points had diverse characteristics. RD10 levels varied between 1.0 and 45.8 mg/m² with an average of 8.9 ± 8.4 mg/m². Lower RD10 values were observed when vegetation density was high, pavement condition good, driving speeds fast and construction activities absent. On the contrary, RD10 increased under heavy-duty traffic influence and dry conditions. Among dust mitigation measures, management of land-use variables could be as important as traffic control and road maintenance. *Implications:* This study documented for the first time in Latin America dust loadings less than 10 micrometers, information that can be used to estimate resuspended particle matter emissions in the region. The influence of meteorology, traffic characteristics, road condition, and land-use variables was analyzed and quantified. The management of land-use variables could be as important as traffic control and road maintenance for road dust mitigation. Further research interests are discussed.

Keyword: dust loads, Urban center, Latin America