

ABSTRACT

Modelling the Characteristics of Polycyclic Aromatic Hydrocarbons (PAHs)
along Motorways in a Tropical Climate

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The increased presence of Polycyclic Aromatic Hydrocarbons (PAHs) in road dust in Trinidad may be directly related to the rising number of motor vehicles along the roadways.

Characterization of PAHs in this matrix revealed expected trends of increasing concentrations with increasing traffic densities and industrialization. Temporal studies indicated clear differentiations in PAH levels for samples collected during the rainy and dry seasons with total PAH concentrations ranging from 21 ng/g to 4723 ng/g and 36 ng/g to 2428 ng/g, respectively. These levels were however, much less when compared to those in literature.

PAH diagnostic ratios and principal component analysis (PCA) emphasized that both pyrogenic and petrogenic sources contributed to road dust PAHs, however the possibility of “non-local” sources cannot be ignored.

Ordinary kriging was found to be the best suited interpolation technique for mapping PAH concentrations in road dust. By utilizing Geographically Weighted Regression (GWR), unique models for predicting PAH concentrations along motorways were established.

Keywords: Polycyclic Aromatic Hydrocarbons; Road dust; Geographic Information Systems; Geographically Weighted Regression; Modelling