Particulate Polycyclic Aromatic Hydrocarbons and Aerosol Active Surface Area in Different Environments of Mexico City

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Polycyclic aromatic hydrocarbons (PAHs) are highly carcinogenic, semi-volatile compounds whose main source is combustion. Previous studies have found PAH concentrations in Mexico City to be among the highest measured anywhere in the world, but their spatial distribution in the megacity has not been characterized. The objectives of this research are to compare and contrast PAH and aerosol active surface area (AS) concentrations in fresh, mixed, and aged emissions within Mexico City. We will evaluate the spatial and temporal variations at a busy downtown location, suburban areas, and at a mountain top location at the edge of the city.

Measurements of PAH and AS concentrations were conducted using portable sensors (Eco Chem) based on photoelectric charging and diffusion charging respectively. They describe chemical and physical characteristics of the particulate matter and indicate possible sources and degree of aging of the particles. The analyzers were each located on the Aerodyne Mobile Lab (AML), at Instituto Mexicano del Petroleo (T0) and at Universidad Tecnologia de Tecamac (T1). Recording time intervals were 10 s for the sensors in the Aerodyne Mobile Lab and 1 minute for the sensors at T0 and T1.

The initial analysis of results indicates the concentrations and strength of the diurnal variations for PAH and AS are generally the highest at T0, followed by AML and then T1. This is expected since T0 is located near some of the denser road networks and highways. Furthermore, the diurnal patterns especially at T0 showed a marked increase in concentrations during the morning rush hour (6-9 a.m). The correlation between PAH and AS is fairly strong at T0, while it is less so at other locations.

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