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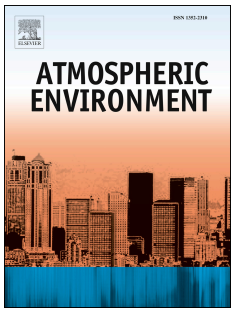

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Local and Remote Black Carbon Sources in the Metropolitan Area of Buenos Aires

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Abstract

Equivalent black carbon (EBC) mass concentrations in the fine inhalable fraction of airborne particles ($PM_{2.5}$) were determined using a 7-wavelength Aethalometer for 17 months, between November 2014 and March 2016, for a suburban location of the Metropolitan Area of Buenos Aires (MABA), Argentina. In addition to describing seasonal and diurnal black carbon (BC) cycles for the first time in this region, the relative contributions of fossil fuel and remote and local biomass burning were determined by distinguishing different carbonaceous components based on their effect on light attenuation for different wavelengths. Trajectory analyses and satellite-based fire products were used to illustrate the impact of long-range transport of particles emitted by non-local sources. EBC data showed a marked diurnal cycle, largely modulated by traffic variations and the height of the boundary layer, and a seasonal cycle with monthly median EBC concentrations (in $\mu g/m^3$) ranging from 1.5 (February) to 3.4 (June). Maximum values were found during winter due to the combination of prevailingly stable atmospheric conditions and the increase of fossil fuel emissions, derived primarily from traffic and biomass burning from the domestic use of wood for heating. The use of charcoal grills was also detected and concentrated during weekends. The average contribution of fossil fuel combustion sources to EBC concentrations was 96%, with the remaining 4% corresponding to local and regional biomass burning. During the entire study period, only two events were identified during which EBC concentrations attributed to regional biomass burning accounted for over 50% of total EBC; these events demonstrate the relevance of agricultural and forestry activities that take place far from the city

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