



PM levels in urban area of Bejaia

Fatima Benaissa (1,2), Cara Nichole Maesano (2,3), Rezak Alkama (4), Isabella Annesi-Maesano (2,3)

(1) Biological department, Boumerdes University, Boumerdes Algeria, (2) EPAR, UPMC Sorbonne Universités, UMR-S 1136, Institute Pierre Louis of Epidemiology and Public Health, Paris France, (3) EPAR (Epidemiology of Allergic And Respiratory Diseases, INSERM U 1136, Institute Pierre Louis of Epidemiology and Public Health, Paris, France, (4) Electrical Engineering Laboratory, Bejaia University, Bejaia, Algeria

Abstract

Air pollution is not routinely measured in Bejaia City, Algeria, an urban area of around 200,000 inhabitants. We present first time measurements of particulate matter (PM) mass concentrations for this city (PM₁₀, PM₇, PM₄, PM_{2.5} and PM₁) over the course of one week, from July 8 to July 14, 2015. This study covered eight urban sampling sites and 169 measurements were obtained to determine mass concentration levels.

Air pollution is not routinely measured in Bejaia City, Algeria, an urban area of around 200,000 inhabitants. We present first time measurements of particulate matter (PM) mass concentrations for this city (PM₁₀, PM₇, PM₄, PM_{2.5} and PM₁) over the course of one week, from July 8 to July 14, 2015. This study covered eight urban sampling sites and 169 measurements were obtained to determine mass concentration levels.

The average city-wide PM₁₀ and PM_{2.5} concentrations measured during this sampling were 87.8 ± 33.9 and $28.7 \pm 10.6 \mu\text{g}/\text{m}^3$ respectively. These results show that particulate matter levels are high and exceed Algerian ambient air quality standards (maximum $80 \mu\text{g}/\text{m}^3$, without specifying the particle size). Further, PM₁₀ and PM_{2.5} averages were well above the prescribed 24-hour average World Health Organization Air Quality Guidelines (WHO AQG) ($50 \mu\text{g}/\text{m}^3$ for PM₁₀ and $25 \mu\text{g}/\text{m}^3$ for PM_{2.5}). The PM₁, PM_{2.5}, PM₄ and PM₇ fractions accounted for 15%, 32 %, 56% and 78% respectively of the PM₁₀ measurements.

Our analysis reveals that PM concentration variations in the study region were influenced primarily by traffic. In fact, lower PM₁₀ concentrations (21.7 and $33.1 \mu\text{g}/\text{m}^3$) were recorded in residential sites while higher values (53.1 , and $45.2 \mu\text{g}/\text{m}^3$) were registered in city centers.

Keywords: Particulate matter, Urban area, vehicle fleet, Bejaia.