

Unravelling the Chemical Speciation and Sources of PM_{2.5}-Bound Polycyclic Aromatic Hydrocarbons (PAHs) in Nairobi, Kenya

Elizabeth Mbithe Mutua

University of Nairobi, Kenya

Author list (excluding presenting author)

Michael J. Gatari, August Andersson, Samuel M. Gaita, Leonard Kirago

Abstract

Air pollution is a major environmental human health risk in African cities, largely due to the rapidly growing urban population, unregulated traffic and industrial emissions, and inadequate regulations and pollution control policies. Currently, about a million premature deaths are linked to air pollution in Africa, and the related health burden is projected to increase. However, data on PM_{2.5} chemical characterization and source contribution, needed to address the air pollution challenges and inform policies, is currently limited and/ or inadequate for most African cities. In this view, year-round PM_{2.5} quartz filter samples were collected in Nairobi city and analyzed for mass concentration and PAHs (known for their carcinogenic and mutagenic properties). The average PM_{2.5} concentration was determined at $27 \pm 6 \mu\text{g m}^{-3}$, exceeding the World Health Organization 24-h health guideline. The PAHs concentration ranged between 5 - 20 ng m⁻³ and were dominated by the heavy molecular weight PAHs (>4 rings). Molecular diagnostic ratios further revealed that the PAHs predominantly originate from combustion sources, such as traffic emissions. Overall, this study signal to a severe health concern, and provide information that can be exploited for policy formulation and air pollution mitigation strategies in Nairobi, as well as other African cities.

Early Career Scientist

YES, I am an early career scientist.

IGAC Activities

CCMi: Chemistry Climate Model Initiative

IGAC Regional Working Groups

ANGA: African Group on Atmospheric Sciences