Policy Brief
04 September, 2023

Title: Fine particulate air pollution estimation in Ouagadougou using satellite aerosol optical depth and meteorological parameters

Written by Joe Adabouk Amooli, Université Joseph Ki-Zerbo

Key messages

- Air pollution causes approximately 7 million premature deaths globally and 780,000 premature deaths in Africa each year according to the World Health Organization (WHO).
- African cities lack monitoring devices for determining the levels of air pollution
- This work developed four (4) models for estimating fine particles in the city of Ouagadougou.

Introduction/Context

The main sources of fine particles in our cities are the exhausts of cars, trucks, buses, and off-road vehicles as well as other processes that involve the burning of fuels like wood, heating oil, or coal, and natural sources like dust storms from the Sahara Desert and forest fires.

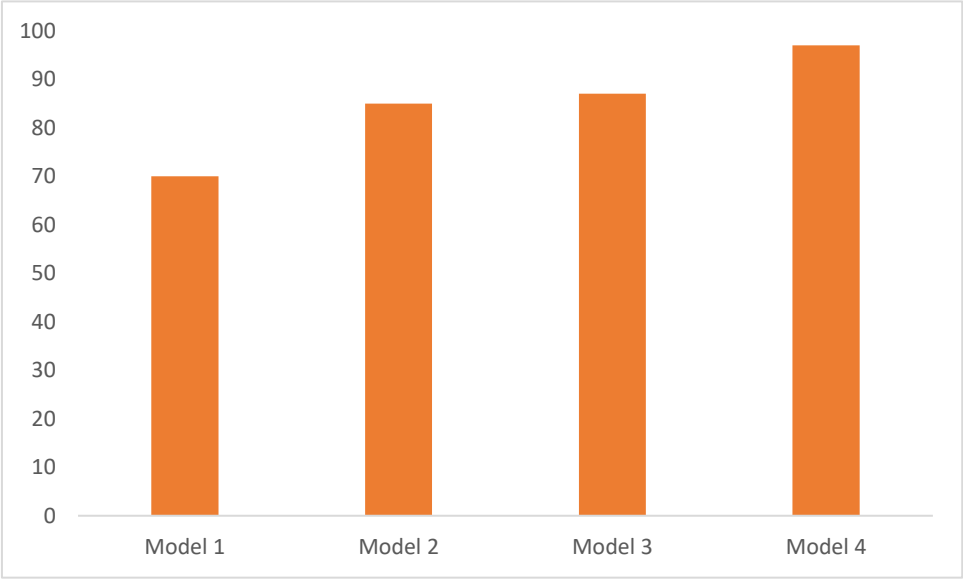
Fine particles tend to worsen conditions such as asthma, and other forms of respiratory diseases. Since the sources of these particles are a result of our daily activities it is urgent to measure their levels so we can plan outdoor activities safely and reduce their impact on our health.

This work used satellite and weather information to develop four (4) models to help estimate Ouagadougou's fine particles as a way of contributing to solving air pollution problems in African cities. The photo proves the sources of fine particles in the city of Ouagadougou and how residents breathe them without wearing air filters/nose marks.

Photo caption, © Raphael KAFANDO

Study results, conclusions, and recommendations

The four (4) models were able to estimate accurately 70-97% of fine particles present in the city of Ouagadougou as shown in the chart. The models also revealed that the fine particles in Ouagadougou exceed the recommended World Health Organization 24-hour limits by 2-22 times depending on the season. The ability of the models to mimic the real fine particles present in the city and provide information on fine particles even in areas within the city without measurements made the models good for decision-making.



Bar chart

Recommendation 1: Industries should implement cleaner production methods and install emission control systems

Installation of electrostatic precipitators, scrubbers, and bag filters to capture pollutants would minimize emissions by industries and would help minimize emissions risks.

Recommendation 2: Public transportation should be prioritized and the use of electric vehicles should be encouraged

Investing in a well-connected and efficient public transportation system would help reduce the number of private vehicles on the road, leading to lower emissions.

Recommendation 3: Launching public awareness campaigns to educate residents about the health risks associated with high levels of fine particles is recommended.

Raising awareness about the sources of air pollution and the importance of individual actions in reducing emissions can lead to behavioral changes and a collective effort to improve air quality.

Acknowledgments

-I would like to thank the Université Joseph Ki-Zerbo for offering me a serene environment to study.

-I would also like to thank the West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL) and the German Ministry of Higher Education and Research (BMBF) for offering financial support throughout my studies and throughout this project.

References/more information

1. WHO. *Air Pollution*. WHO. Available online at: http://www.who.int/airpollution/en/ (accessed November 2022).

2. Samantha F. et al., 2021. Air pollution and development in Africa: impacts on health, the economy, and human capital. DOI:https://doi.org/10.1016/S2542-5196(21)00201-1
3. Nana, B., Sanogo, O., Savadogo, P., Daho, T., Bouda, M., & Koulidiati, J. (2012). Air Quality Study in Urban Centers: Case Study of Ouagadougou, Burkina Faso. *FUTY Journal of the Environment*, *7*(1). https://doi.org/10.4314/FJE.V7I1.1

contact details: Phone Number: +233547524714

email: amooli.j@edu.wascal.org