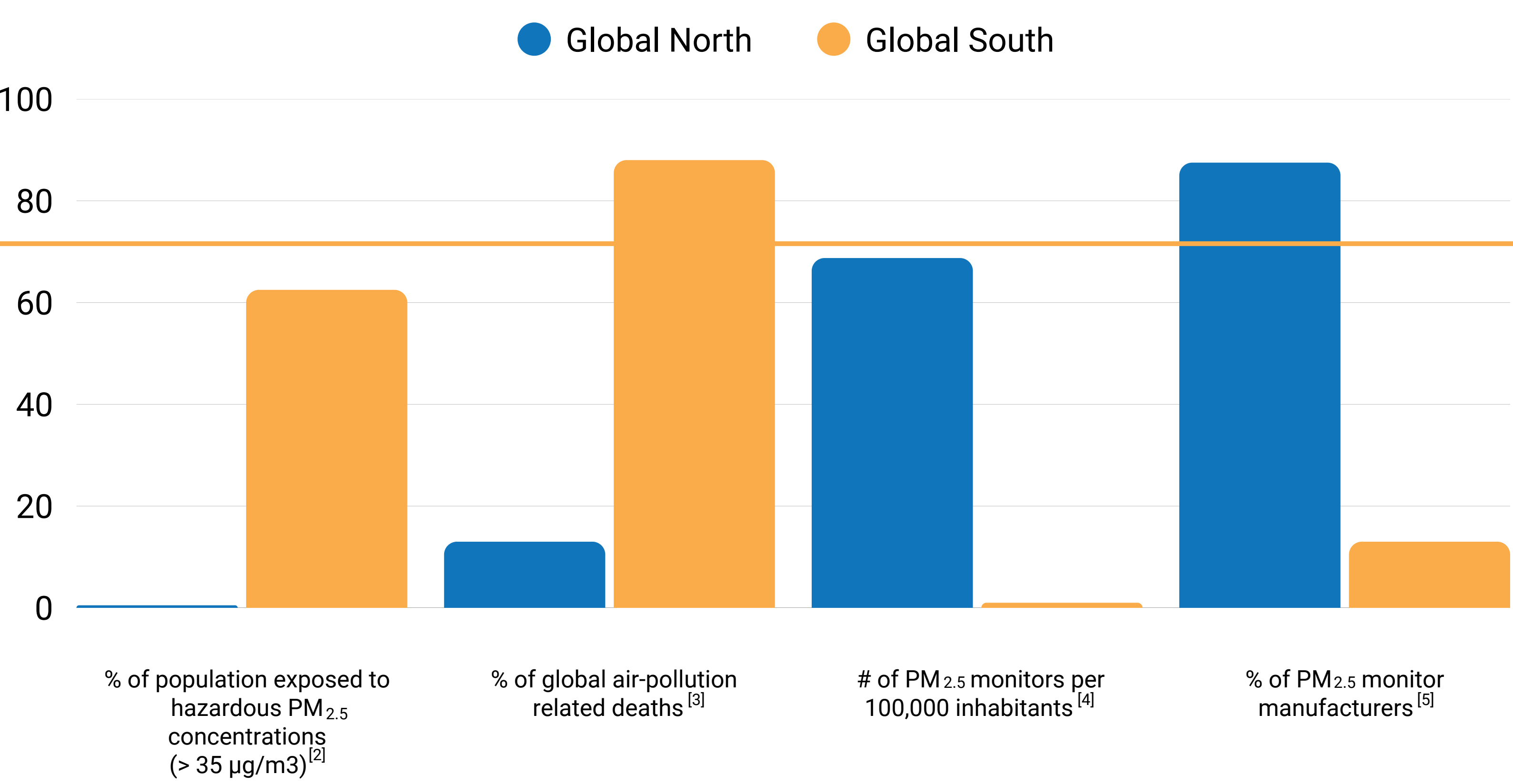


Open-Source Air Quality Monitoring: A Catalyst for Capacity Building and Action in Africa

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Global South: Most polluted, but least monitored



“More frequent, locally-generated ground monitoring data is often a starting point for public engagement in a community – and is required for policy enforcement in most instances.

University of Chicago, Air Quality Life Index, Annual Update, 2022^[1]



Scan me to learn more about the colocation project

Performance Evaluation



Collaborators in the Global South



[1] M. Greenstone, C. Hasenkopf, K. Lee, Air Quality Life Index, Annual Update, 2022.
[2] J. Rentschler, N. Leonova, Global air pollution exposure and poverty, *Nat Commun.* 2023;14(1):4432. doi: 10.1038/s41467-023-39797-4.
[3] S. Gulia, I. Khanna, K. Shukla, M. Khare, Ambient air pollutant monitoring and analysis protocol for low and middle income countries: An element of comprehensive urban air quality management framework, *Atm. Envir.* 2020, 222: 117120. doi: 10.1016/j.atmosenv.2019.117120.
[4] Estimated from R. V. Martin, M. Brauer, A. van Donkelaar, G. Shaddick, U. Narain, S. Dey, No one knows which city has the highest concentration of fine particulate matter, *Atm. Envir. X* 2019, 3, 100040, doi: 10.1016/j.aea.2019.100040.
[5] All PM_{2.5} monitor manufacturers that have been evaluated by Air-SPEC, Airparif and/or Afri-SET were taken into account.



Open-Source Advantage

Affordability

Open hardware allows both the design and production of affordable and accurate air quality monitors.

AirGradient Open Air Max with AlphaSense NO₂, O₃ sensor modules cost around ¼ of proprietary monitors.

If desired, self-assembling the monitor is a cost-effective choice, with the detailed instructions provided. To ensure longevity of the monitors, individual components can easily be replaced.

Accuracy

- Collaboration with leading air quality scientists, including AFRI-SET
- PM_{2.5} sensor won AirParif Microsensor Challenge 2023
- Comprehensive performance evaluation and development of calibration and correction algorithms via international co-location project

Awareness

- Open source map/platform to support local air quality organisations
- Used to engage school students in air quality related projects
- Perfectly suited to teach technical and research skills

Local Adaptations

Thanks to its open hardware and software approach, the monitor can be freely adapted to the individual project. Examples include:

- Time resolution: Adapt data volume to the research question
- Data transmission: WiFi or mobile data
- Storage: Download from AirGradient server or receive data at your own systems
- Easily add additional sensor modules, e.g. for CO, SO₂, etc.
- Co-branding: Print your organizational logo onto the monitor

Open Hardware, Open Data, Open Source

- Public sharing of monitor designs and software
- Collaboration with OpenAQ
- No patents / trade secrets
- Creative Commons license CC BY-SA 4.0
- Design can be openly shared, adapted and redistributed

