First measurements of PM2.5 and NO2 in Mombasa, Kenya

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Accelerating Research through International Network-to-Network Collaborations (AccelNet)
Air Quality Activities in Africa
Mombasa, Kenya

- 3.5 million people in the metropolitan area
- 2\textsuperscript{nd} largest city in Kenya
- Major port city – most or all imports/exports to/from East Africa come through here
- Pollution sources (informal assessment): tuk tuks, cars, buses, trucks, cement factory, cargo ships, open burning
Data collection plan

- Deploy a reference PM2.5 monitor and a network of low cost sensors (Clarity Node-S)

1. Shell Petrol Station (near port)
2. UoN-Mombasa
3. JSKUAT-Mombasa
4. Nyali Mall
5. Bamburi Cement Factory

Deployed in July 2021
Replaced in March 2022 (new sensors)
Without a current reference in Mombasa, this correction factor developed from the closest reference monitor to Mombasa is applied to the clarity nodes.
Corrected PM2.5 Data from July - December

- Average across all 5 sites ~17 µg m$^{-3}$
- Higher in the dryer seasons
- Peaks around 6am and 6pm
Corrected PM2.5 in March, April, and May: impact of rainy season
NO2 data: co-location in Nairobi with a Serinus 40 NOx analyzer

Figure from Ezekiel Waiguru
Uncorrected NO2 data in Mombasa (take with a huge grain of salt!)
Summary

- Preliminary analysis of mostly PM2.5 (briefly NOx) in Mombasa, Kenya
  - 5 Clarity nodes in diverse environments throughout the city
  - BAM-1022 is soon to be operational at UoN-Mombasa

- Correction factor applied to PM2.5 data improves sensor bias from ~9 to less than 4 µg m\(^{-3}\)

- "Annual" mean PM2.5 in Mombasa is around ~17 µg m\(^{-3}\)
  - However, we have yet to sample the two driest months of the year, which may lead to a few µg m\(^{-3}\) higher for the true annual average

- Current WHO annual mean PM2.5 guideline is 5 µg m\(^{-3}\)