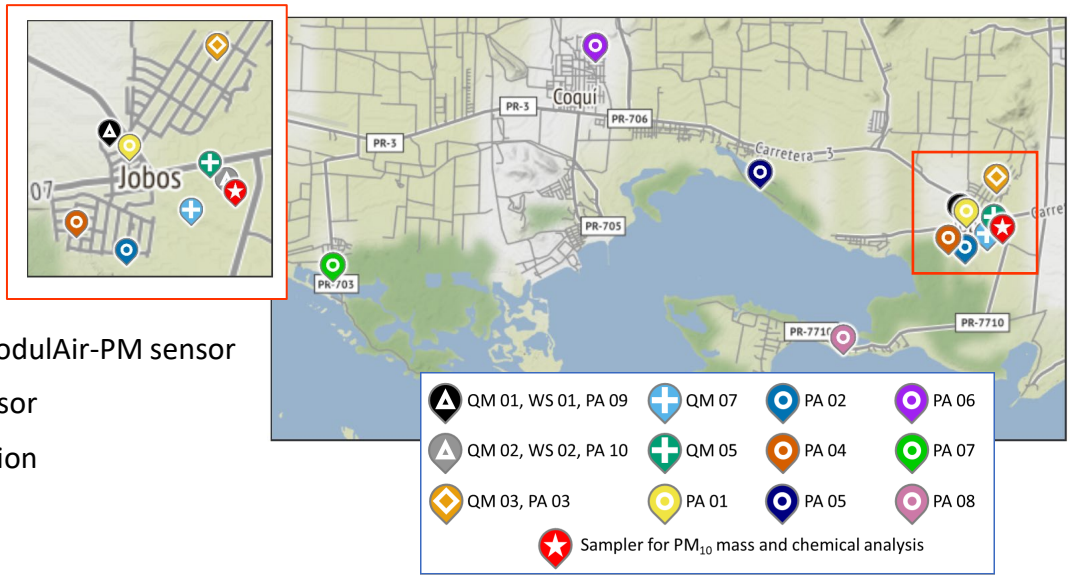
Particulate Matter Research Study in the Guayama and Salinas area of Puerto Rico: Research Project Updates for November, 2023

What is this study about and what does this summary include?

- Community members shared concerns with EPA about particulate matter (PM) in their community and whether the regulatory air monitoring site represents the community's exposure.
- With community member input and technical support from the Puerto Rico Department of Natural and Environmental Resources (DNER), EPA scientists installed 15 air sensors measuring $PM_{2.5}$ and PM_{10} and sited a sampler to collect air filters for laboratory analysis of PM_{10} mass and chemical components. The combination of sensors, sample analysis, and weather data will provide information on PM occurrence in the area. For information about PM_{10} and $PM_{2.5}$, see: https://www.epa.gov/pm-pollution/particulate-matter-pm-basics#PM
- After the field study concludes in the winter and laboratory analysis of samples is complete, a final summary will be developed by the study team. This monthly newsletter includes data available at the time of the summary. For the data shown here, initial quality checks have been conducted but the data are not final and further quality checks may occur.

Field Study Monitoring Sites

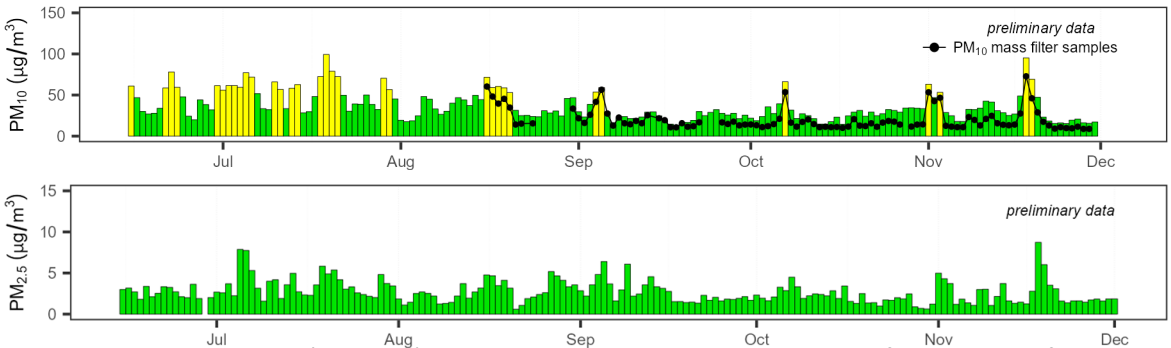


QM = QuantAQ ModulAir-PM sensor

PA = PurpleAir sensor

WS = weather station

$PM_{2.5}$ and PM_{10} Daily Averages Across Sites – Full Study Timeline:



Air Quality Index (AQI) Categories

- Good
- Moderate
- Unhealthy for sensitive groups
- Unhealthy
- Very unhealthy
- Hazardous

Note: The daily averages (barplots) include all data available at the time of the analysis from PA sensors for $PM_{2.5}$ and QM sensors for PM_{10}. The PM_{10} filter sample data (black markers) include all filters weighed in the lab thus far.

For questions about this research project, please reach out to EPA Region 2 contacts: Gavin Lau (lau.gavin@epa.gov) and Sarah Pender (pender.sarah@epa.gov)

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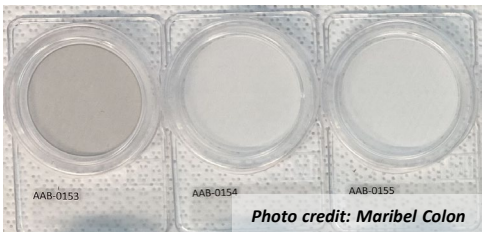
Field Study Updates:

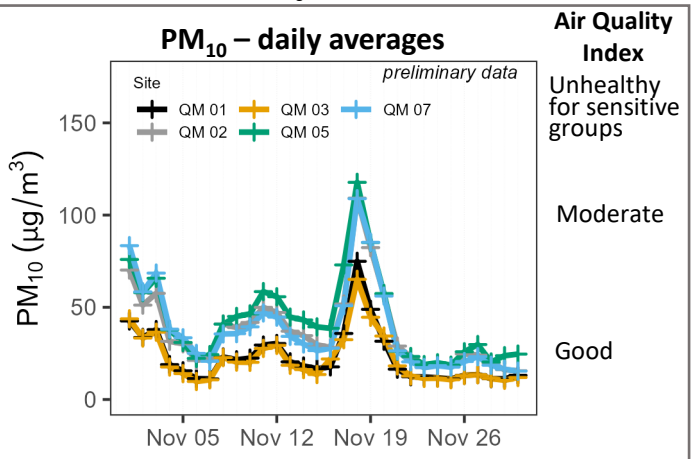
- In November, sensor and filter data collection continued.
- The replacement QM sensors continued to perform well.
- Multiple PA sensors (PA 02, PA 06, and PA 08) have experienced some form of hardware failure, while others have not been able to connect and report data online (PA 03, PA 06, and PA 07), but should have data saved locally.
- Over the past 106 days, 87 valid filters have been collected with the assistance of Puerto Rico DNER. As filters are collected, they are sent to EPA to measure the amount of deposited PM_{10} mass and then chemical composition.

Filters collected during the study

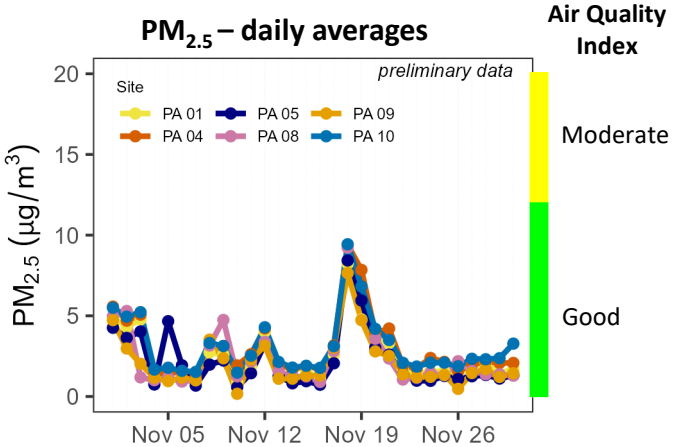


The small circles are sample filters contained in a plastic holder. Each filter is collected over one day and is used to measure the PM mass and will be analyzed for its chemical composition. The darker color of the filter on the far left is due to the larger amount of PM that was deposited on that filter.

Summary of data from online sites for November, 2023



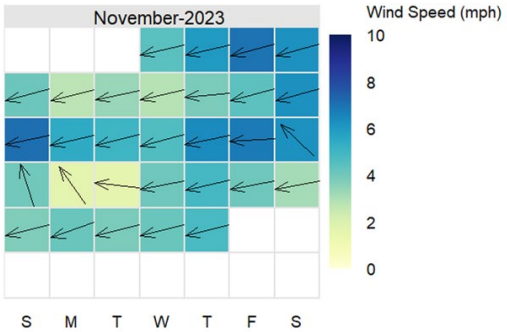
Interpreting the data: Trends were similar across the community and some sites had up to five days of **Moderate** air quality due to elevated PM_{10}. The highest concentrations were seen November 17th through 20th when both PM_{10} and $PM_{2.5}$ increased, and winds shifted to come from the south and east.



Interpreting the data: $PM_{2.5}$ air quality was **Good** at all sites across the community in November.

For more information about the Air Quality Index: Daily average plots of $PM_{2.5}$ and PM_{10} show the Air Quality Index (AQI) on the righthand side of the graphs above. Lower AQI values indicate cleaner air quality, while higher values correspond to poorer air quality. More information on the AQI is available at https://www.airnow.gov/aqi/aqi-basics/.

Daily average wind speed (color) and wind direction (arrow)



Interpreting the data: Many days experienced light breezy winds from the east.