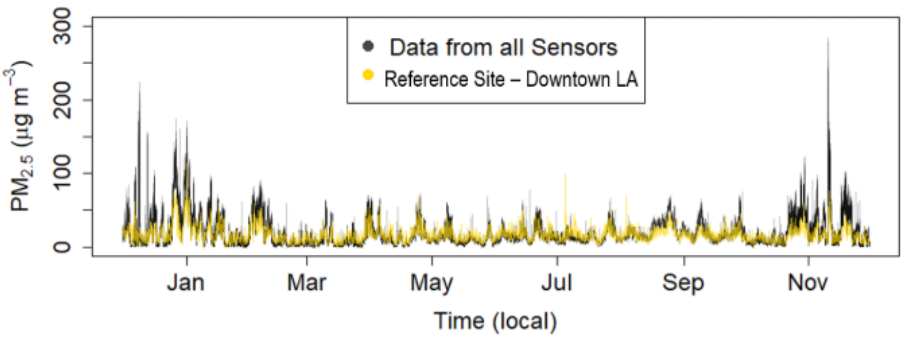
What can we learn from these PurpleAir sensors about outdoor air quality?

A QUICK LOOK AT THE UNIVERSITY VILLAGE APARTMENTS PURPLEAIR SENSORS

This analysis uses all available data from outdoor sensors collected from December 2017 - December 2018.
Note, the results presented here as well as data interpretations are preliminary.

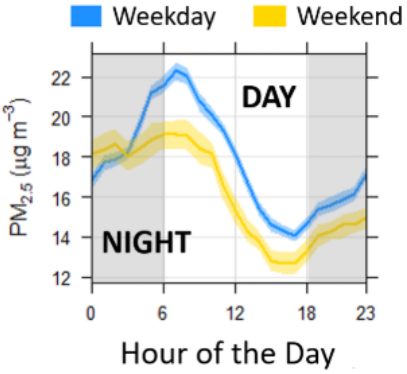
A YEAR OF DATA

- *Similar $PM_{2.5}$ levels across all sensors & reference data*
- *Darker = overlapping sensors*
- *Lighter = single sensor*



DAILY $PM_{2.5}$ TRENDS

Weekday peak is likely due to morning rush hour



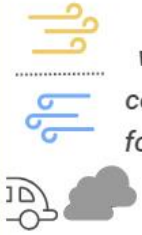
In general, pollution accumulates at night and in the early morning due to a stable atmosphere

Then, atmospheric mixing during the day results in the lowest pollution levels in the late afternoon

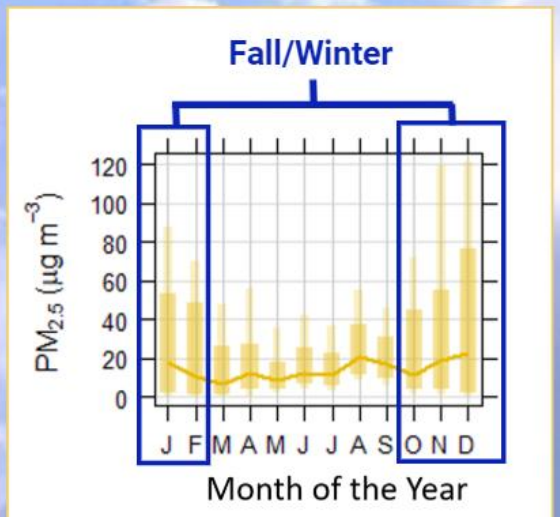
ELEVATED $PM_{2.5}$ IN THE FALL/WINTER

- *Lower wind speeds*
- *Cold-weather inversions*

= *LESS DILUTION*



*Inversions: stable conditions, caused by a layer of warm air over a cold one, can last for days, **trapping emissions***



The sensor data reflects expected trends, and if sensors can show us when air quality is behaving as we might expect, can they also highlight anomalies and provide new information at sites?

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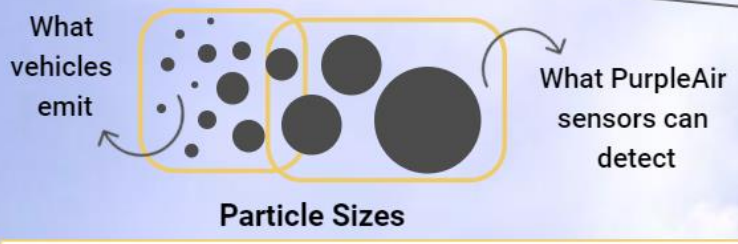
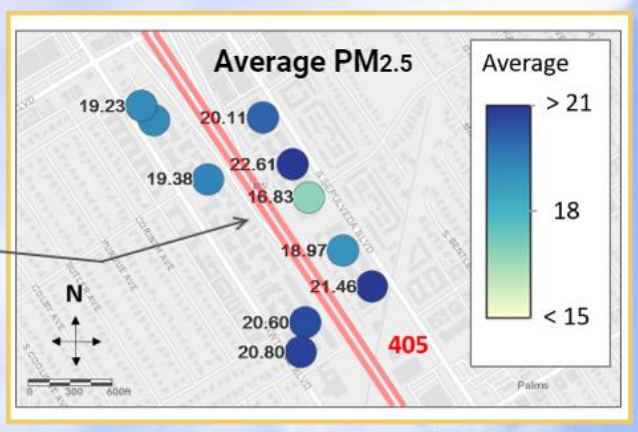
SPATIAL DIFFERENCES

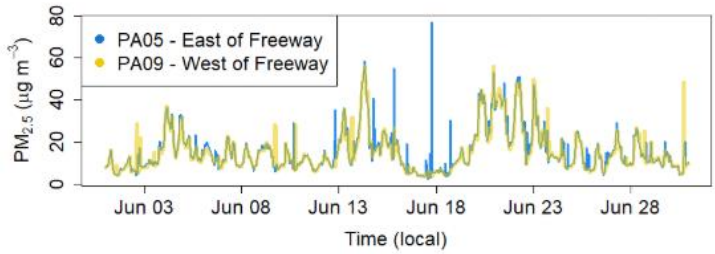
- *No clear differences in averages due to freeway (possibly due to sensor limitations - BELOW)*
- *Lower average PM at sites sheltered by walls and vegetation vs. roof tops (e.g., childcare facility)*





Units: µg/m^3

When there are differences between sites, what's driving them?



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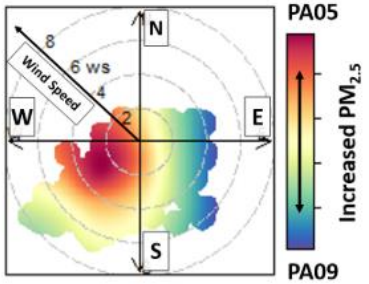
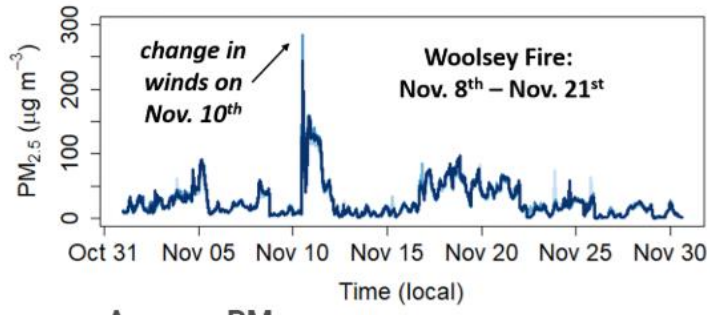


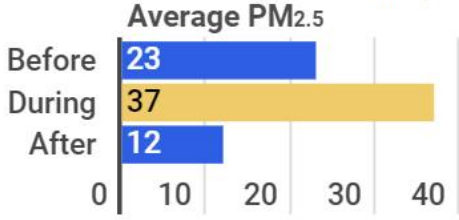
- *Polar plots tell us where emissions are likely coming from by adding wind speed & direction data*
- *Here, the spikes on the east are coming from the west, and vice versa*
- *Possible sources: traffic (emissions and/or road dust), cooking, outdoor grilling, or landscaping*

UNIQUE EMISSION EVENTS

- *Enhanced PM2.5 was observed when the fire was active*

While it is important to keep in mind the limitations of the PurpleAir sensors and their nature as a low cost tool, they can provide indicative information about local air quality and air quality trends.





For all sensors, through the month of November, before, during, and after the Woolsey fire
Units: µg m-3