

**MAZAMA SCIENCE**

SEE YOUR DATA



**mazamascience.com**

**MAZAMA SCIENCE**  
SEE YOUR DATA



**USFS**



**AIR FIRE**




Mazama Science creates data processing pipelines, custom plots and web sites for the USFS AirFire Group.


- PWFSLSmoke R package (open source)
- Efficient data model
- Data ingest and QC
- Data analysis
- Data visualization
- Historical data archive
- On-demand files, plots and reports
- High-traffic, interactive websites

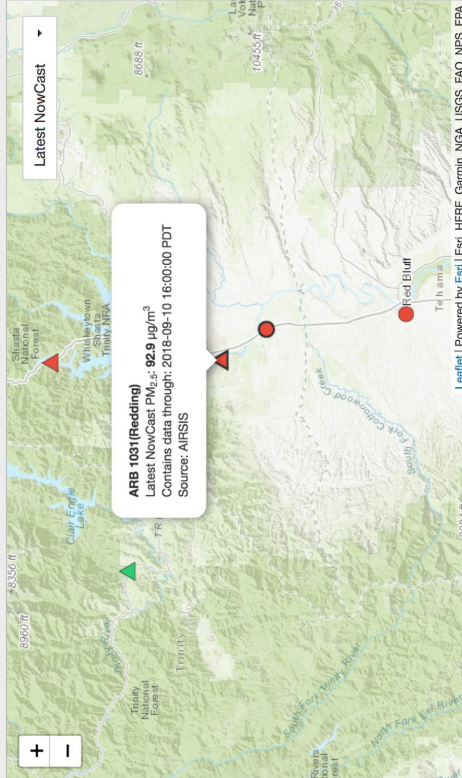
# The popular Monitoring v4 site is used operationally.

 Monitoring-v4.0

[Help](#)

 Map is up-to-date.

 Disclaimer: Data are preliminary and provided for informational purposes only. See original sources for final values. Not for official use; use at own risk.



Leaflet | Powered by Esri | HERE, HERE, NGA, USGS, FAO, NPS, EPA

**Monitor Type**

- Permanent monitors
- Temporary monitors

**Latency**

- Over 12 hour delay
- 6-12 hour delay
- 3-5 hour delay
- 1-2 hour delay
- on time
- no data


**AQI**

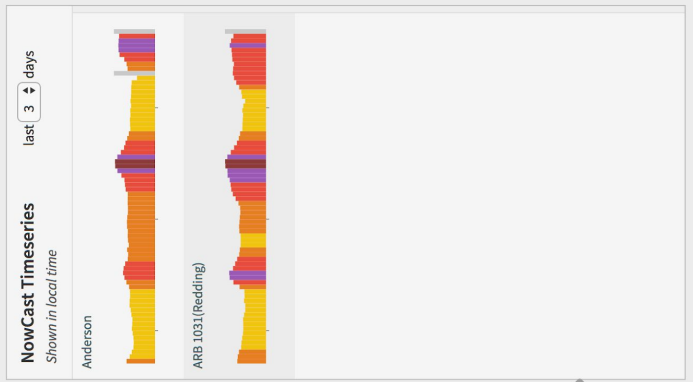
- Hazardous
- Very Unhealthy
- Unhealthy
- Unhealthy for Sensitive Groups
- Moderate
- Good
- no data

**NowCast**

- Hazardous
- Very Unhealthy
- Unhealthy
- Unhealthy for Sensitive Groups
- Moderate
- Good
- no data

AirNow: 09/10 23:45 UTC   AIRSIS: 09/10 23:46 UTC   WRCC: 09/10 23:49 UTC

 Last Updated



**Selected Monitors:** 2 monitors from 1 timezones.

[Data Report](#) [CSV File](#) [AQI-NowCast](#)

**Anderson**

Monitor ID: 060890007\_01

Source: AirNow

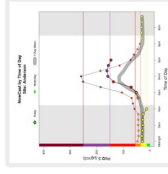
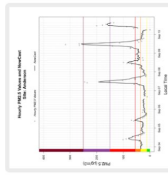
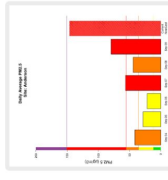
Latest NowCast PM<sub>2.5</sub>: 146.4 µg/m<sup>3</sup>

Contains data through: 2018-09-10 23:00:00 UTC

Timezone: America/Los\_Angeles

QA/QC: by AirNow

[Show in Simple Interface](#)



**ARB 1031 (Redding)**

Monitor ID: lon\_122.380\_lat\_40.550\_arb2.1031

Source: AIRSIS

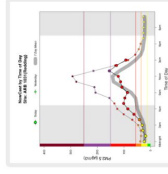
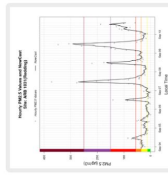
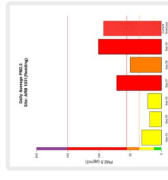
Latest NowCast PM<sub>2.5</sub>: 92.9 µg/m<sup>3</sup>

Contains data through: 2018-09-10 23:00:00 UTC

Timezone: America/Los\_Angeles

QA/QC: [Report](#)

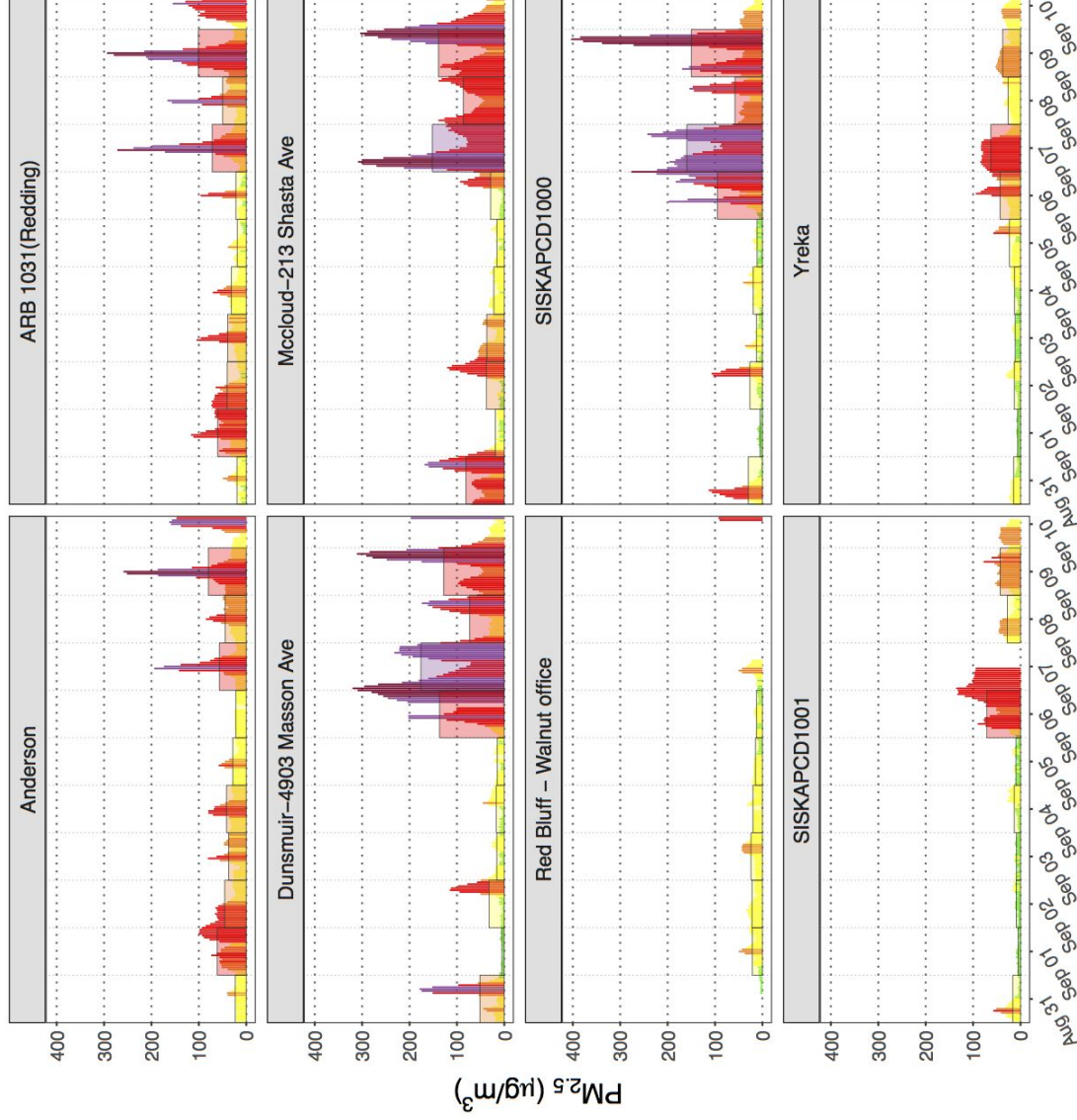
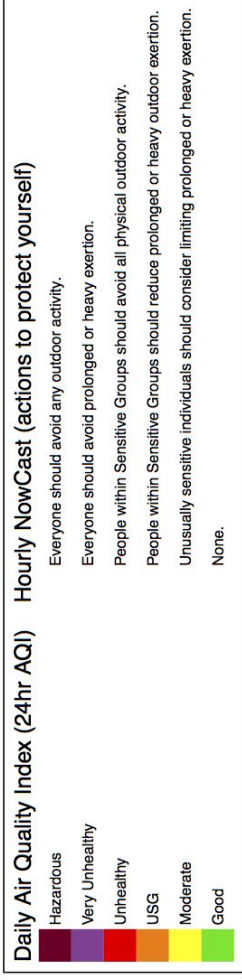
[Show in Simple Interface](#)



# tools.airfire.org/monitoring

# A single click will produce publication-ready graphics.

## Daily (AQI) and Hourly (NowCast) PM<sub>2.5</sub> Levels



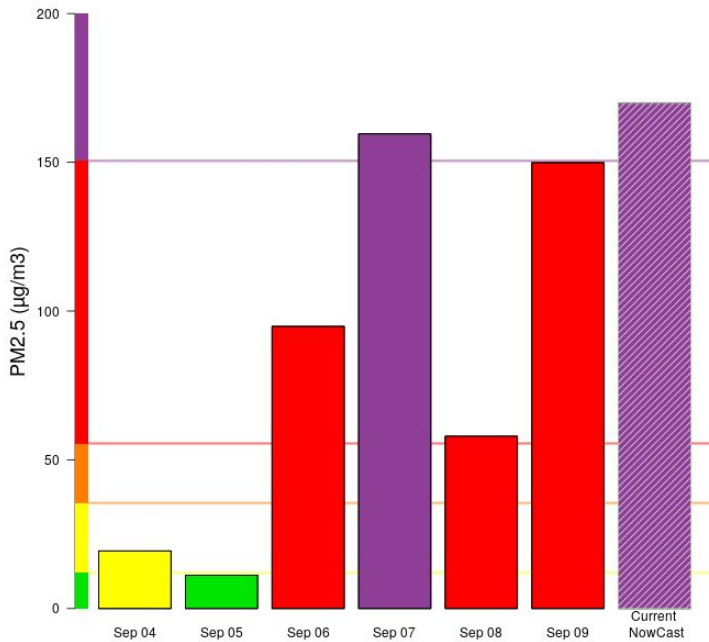
Date, midnight to midnight (2018)

Learn more about AQI at: [airnow.gov/index.cfm?action=aqibasics.aqi](http://airnow.gov/index.cfm?action=aqibasics.aqi)

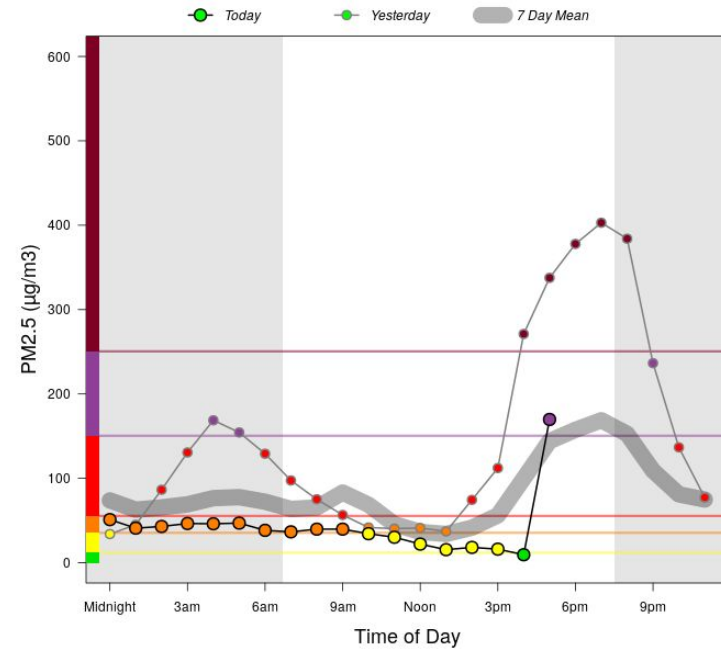
# AQI plots for Mt Shasta (Delta & Hirz Fires)



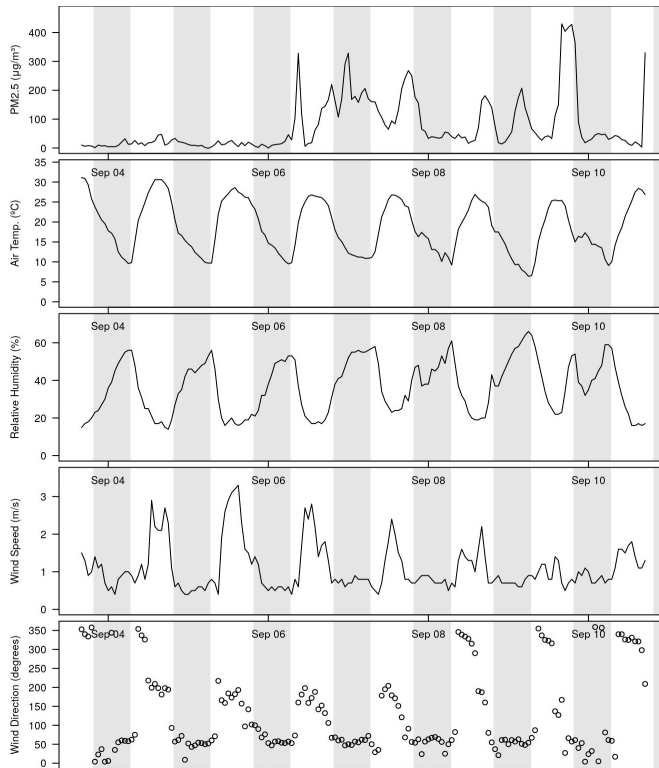
Daily Average PM2.5  
Site: SISKAPCD1000



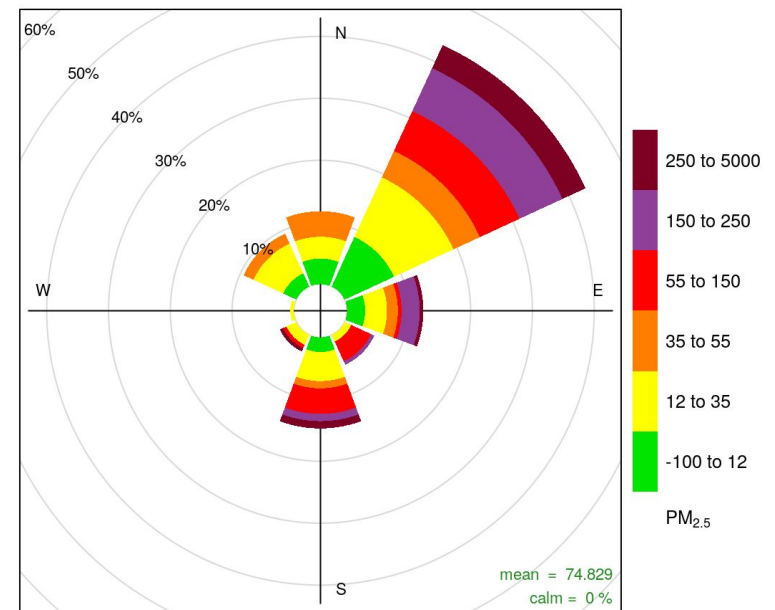
NowCast by Time of Day  
Site: SISKAPCD1000



# Weather plots for Mt Shasta (Delta & Hirz Fires)



## “Pollution Rose”



Frequency of counts by wind direction (%)



Mazama Science is building an R package to compare PurpleAir data with federal regulatory monitors.

- Synoptic data access
- Time series data access
- Metadata enhancement
- Outlier detection and removal
- Data interrogation
- Colocated federal monitors
- Linear modeling
- Mapping

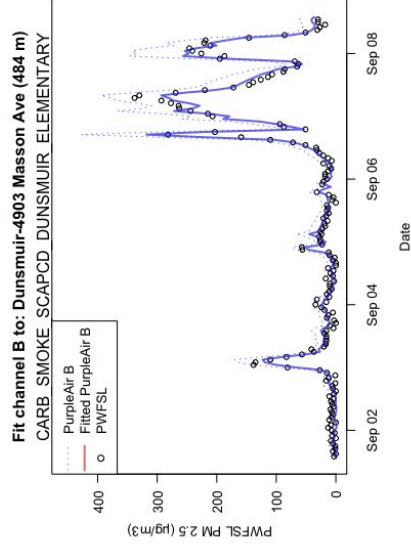
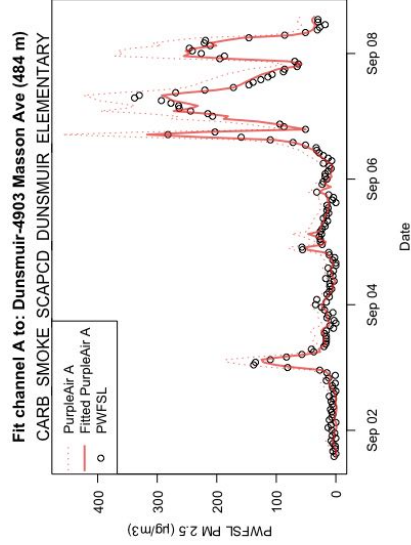
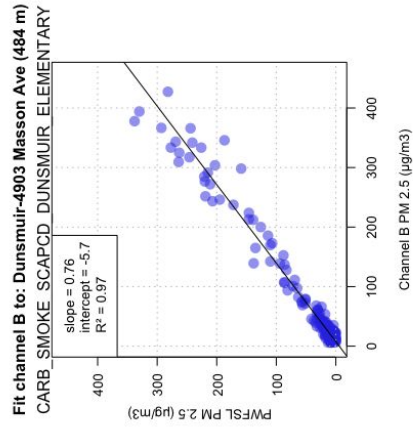
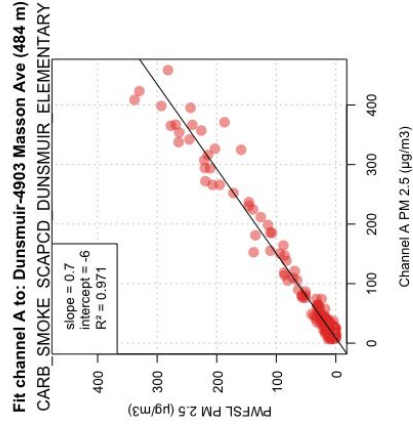
# Just a few lines of code is needed to fit PA data to federal regulatory data.

```
# Download and enhance Purple Air Synoptic ('pas') data
pas <- pas_load()

# Download and enhance Purple Air Timeseries ('pat') data
Dunsmuir <- pat_load(pas, 'CARB_SMOKE_SCAPCD_DUNSMUIR_ELEMENTARY')

# Download PWFSL data
pwfsl <- pwfsl_load()

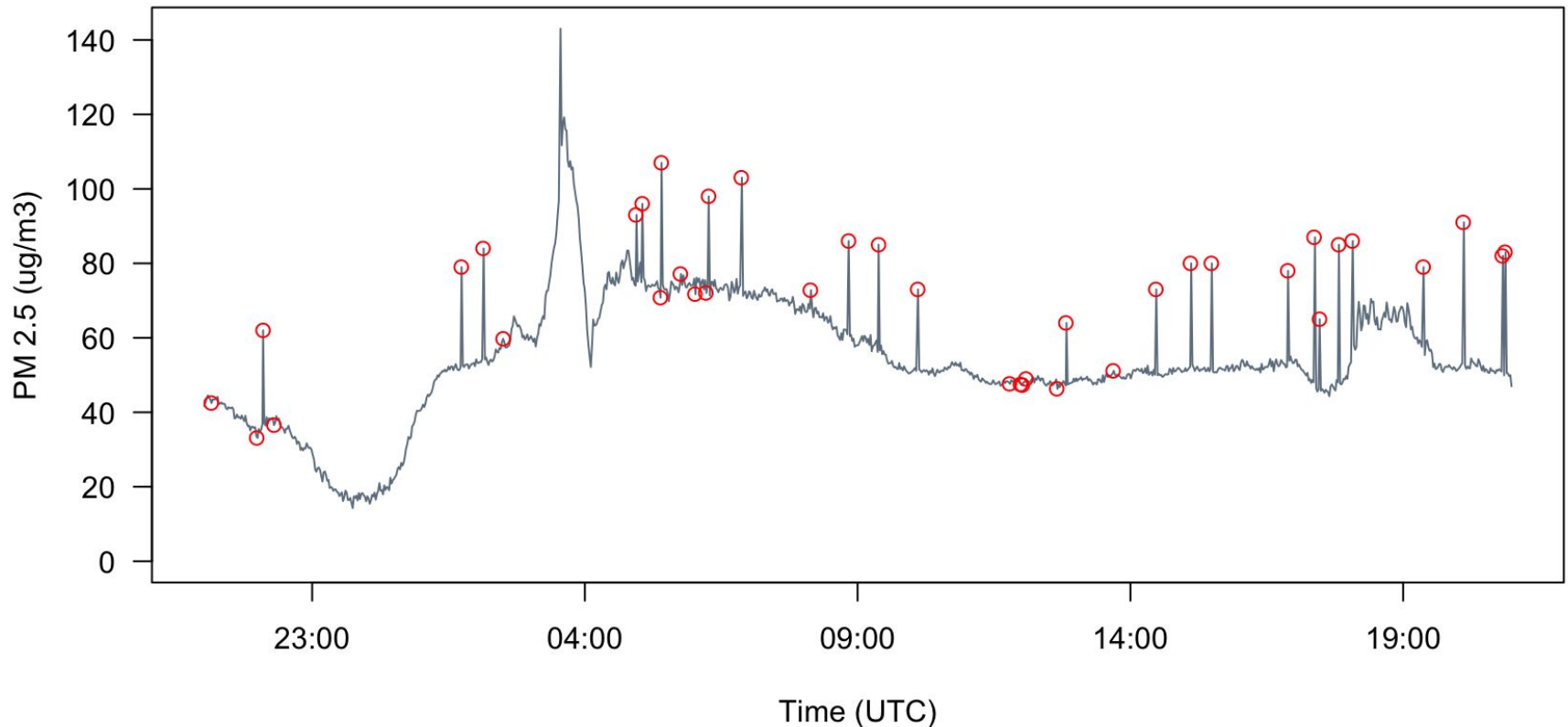
# Perform linear fit analysis against the closest PWFSL monitor
pat_externalFit(Dunsmuir, pwfsl)
```





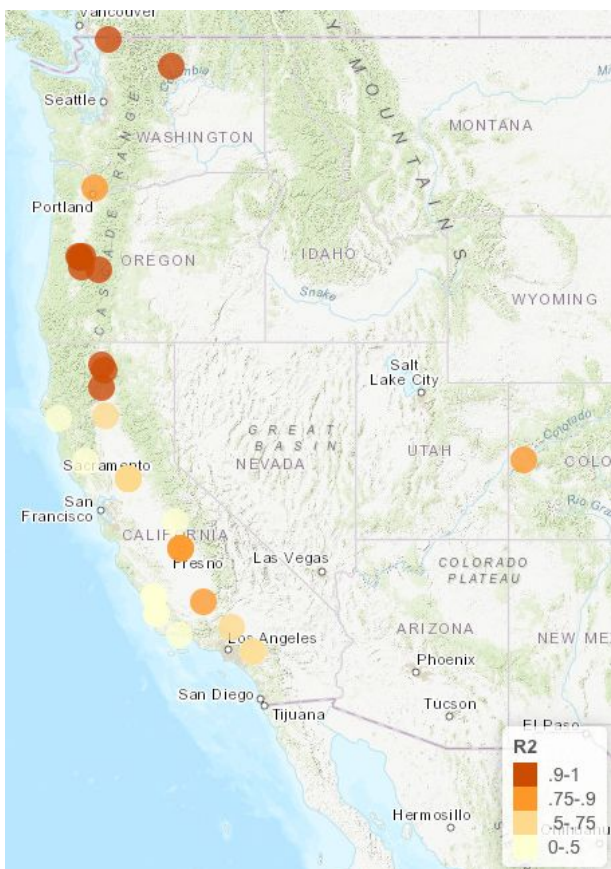
# A custom function detects outliers using *Median Average Deviation*.

PurpleAir Outliers for Ashland, OR

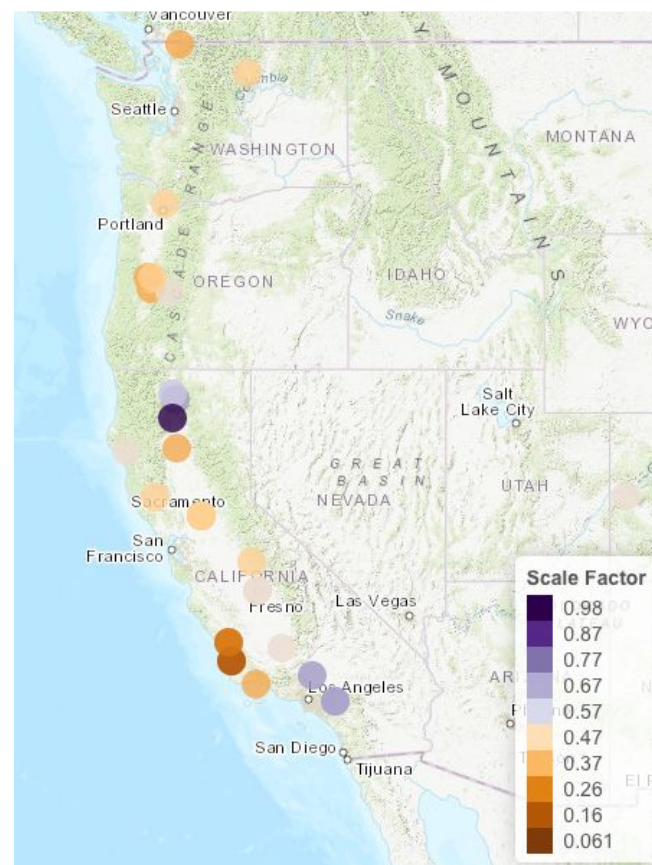


# Can linear models be used to scale PA sensors to co-located federal monitors?

How good is the fit?



What is the scale factor?



# A compact data model lets us interrogate and plot large volumes of data.

All Eugene Purple Air Monitors (full resolution)

204,660 points

