



# Determining Regulatory Significance – Statistical Methods

EPA/MJOs Exceptional Events Wildfire and Prescribed Fire Smoke  
Workshop

February 27-29, 2024

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Air Quality Assessment  
Planning, Rule Development, and Implementation  
South Coast Air Quality Management District

# Outline

- What is Regulatory Significance?
- How to determine Regulatory Significance?
- Case study
- Messaging exceptional events that are regulatory significant vs. non regulatory significant



# Regulatory Significance

- An Exceptional Event is considered regulatory significant if it will affect the following types of actions:
  - Designate or redesignate an area for a particular NAAQS
  - Classify or reclassify an area to attainment/nonattainment
  - Assignment of nonattainment classification category
  - Attainment date extensions based on clean data
  - SIP inadequacy in an area violating the NAAQS
  - Other actions on a case-by-case basis



Initial Notification Tool Version 1

Species:  PM2.5  PM10

Start Year: 2018 End Year: 2020

Buttons: Save Inputs, Load Inputs, Run, Export Table

Use Provisional PM2.5 Using Provisional PM10

Exclusion Dates (Dates Should Be Entered As MM/DD/YYYY)

Station	Exclusion Start	Exclusion End
ANAH	04-Jul-2018	04-Jul-2018
ANAH	05-Jul-2018	05-Jul-2018
AZUS	04-Jul-2018	04-Jul-2018
PICO	04-Jul-2018	04-Jul-2018
ONNR	05-Jul-2018	05-Jul-2018
ANAH	04-Jul-2019	04-Jul-2019

Buttons: Omit Filter Data, Clear Table, Export Table, Import Table

Add exceptional events

By year: 2023 Add

By DV period: 2018-2020 Add

By Event: 2023 Independen... Add

Column 1

Use Nearby PM2.5 FEM stations to simulate FRM stations without data

Data Source to Use (FRM or FRM & FEM)

Station	FRM Only	FRM & FEM	FRM FEM & 88502 F
AZUS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CELA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
RESE	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CMPT	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PICO	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PASA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
LBCH	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SLBH	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
W710	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ANAH	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
MSVJ	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PCHG	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
MORO	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
INDI	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PLSP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
RIVR	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
MLVB	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ONNR	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FONT	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Buttons: All FRM, All FRM & FEM

Select NAAQS-comparable FEM by DV period

DV period: 2020-2022 select

Stns	24 hr DV Bef	24 hr DV After	Ann DV Bef	Ann DV Aft
AZUS	35	25	11.2100	10.3200
CELA	37	30	12.4900	11.9900
RESE	NaN	NaN	10.2500	9.8700
CMPT	35	32	12.9500	12.5100
PICO	37	28	12.8000	12.0900
PASA	31	28	10.4500	10.0800
LBCH	33	26	11.0600	10.6100
SLBH	32	28	11.0300	10.7100
W710	35	30	12.6900	12.3000
ANAH	33	27	11.0200	10.6200
MSVJ	23	23	8.3800	8.2100
PCHG	NaN	NaN	NaN	NaN
MORO	22	22	8.0400	8.0400
INDI	17	17	8.0400	8.0400
PLSP	15	15	6.1600	6.1600
RIVR	34	30	12.4300	12.1600
MLVB	36	35	13.8400	13.5700

Buttons: Save Results

# Calculating Design Values With and Without Exceptional Events

- In 2021, developed interactive tool in-house using MATLAB App Designer
- Ability to calculate design values after removing subset of exceptional events
- Incredibly challenging to calculate PM2.5 DVs correctly

**SAMPLE DATA FOR DEMONSTRATION: DO NOT CITE OR QUOTE**

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PASA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
LBCH	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SLBH	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
W710	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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ONNR	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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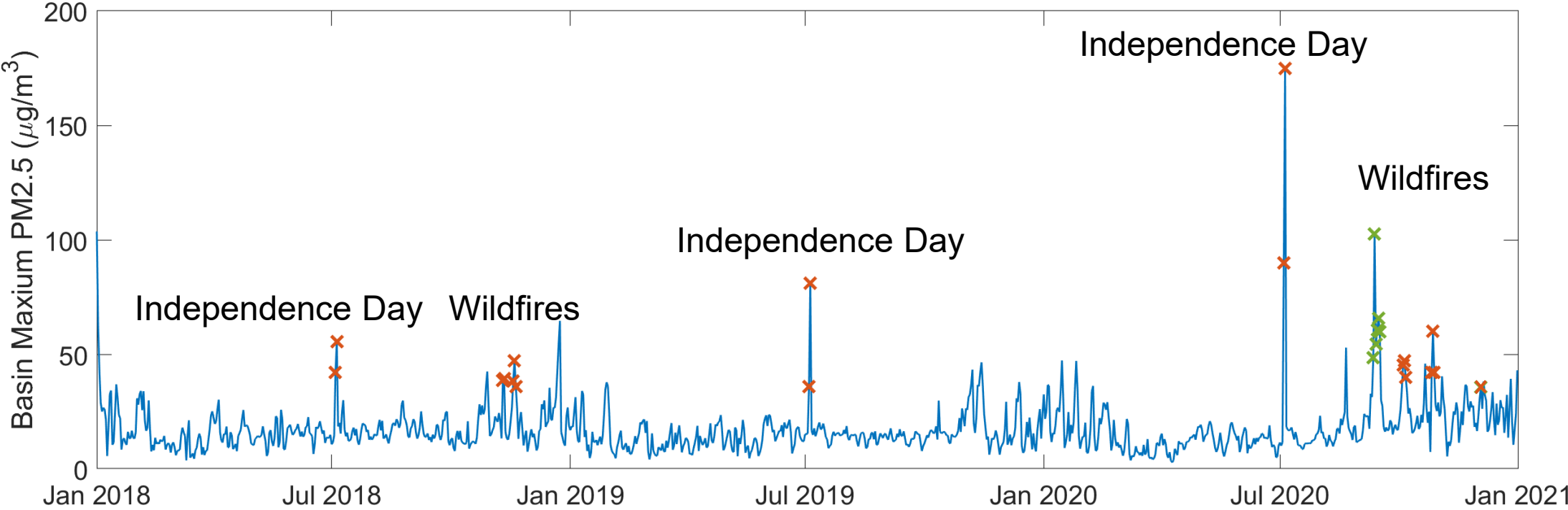
Buttons: Save Results

# Calculating Design Values With and Without Exceptional Events

- Automatically fetches AQS data and supplements with preliminary data from South Coast AQMD lab
- PM2.5 and PM10 calculation
- Calculate DVs with and without FEM waivers

**SAMPLE DATA FOR DEMONSTRATION: DO NOT CITE OR QUOTE**

# Case Study: Potential Exceptional Events Affecting 2018-2020 PM2.5 Design Values in the South Coast Air Basin



# Considerations When Selecting Set of Regulatory Significant Exceptional Events to Demonstrate

- Likelihood of concurrence
- Amount of analysis/tier of demonstration required
- Type(s) of exceptional event(s)
  - Important to consider experience of staff in selected type(s) and whether previous events of this type have already been written
  - One type vs. multiple



Windblown  
Dust



Prescribed  
Fire



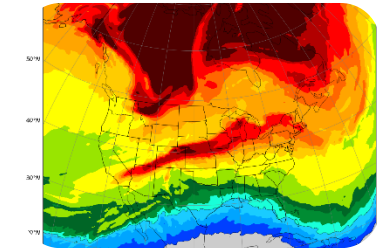
Wildfire  
Smoke



Cultural  
Events



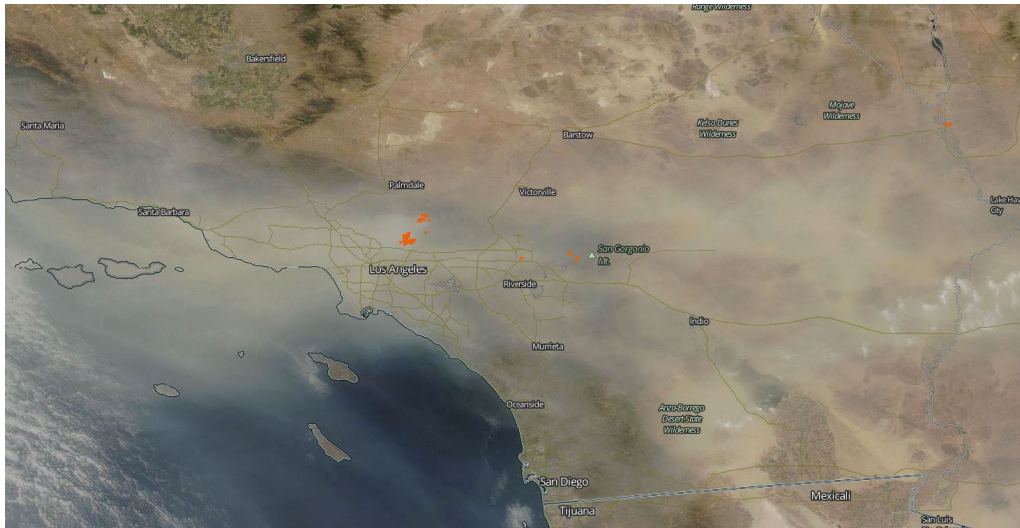
Volcanic  
Eruption



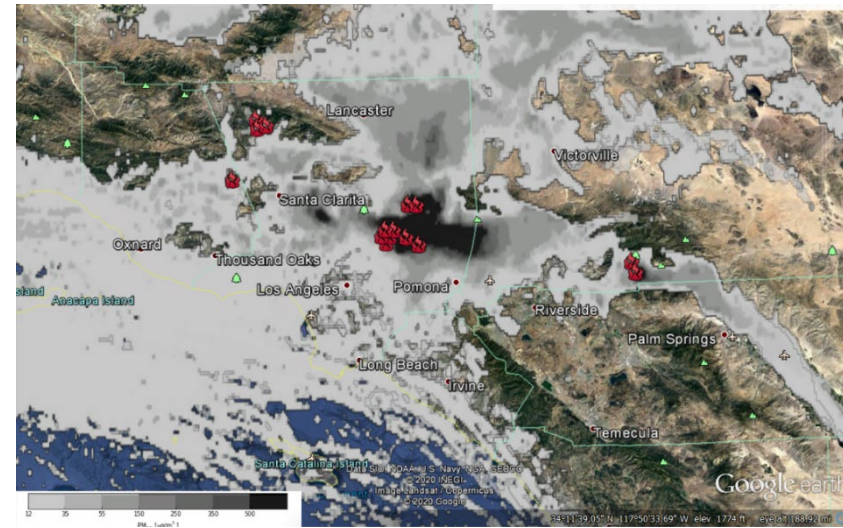
Stratospheric  
Intrusion

# Bobcat and El Dorado Fires

- Highest PM<sub>2.5</sub> levels from Sept. 11 to Sept. 16, 2020
- Fire location: Bobcat Fire was burning in the north of Azusa. El Dorado Fire was burning near Yucaipa.
- Affected stations: CA-610 Near Road, CA-710 Near Road, Anaheim, Azusa, Central LA, Compton, Fontana, North and South Long Beach, Mira Loma, Mission Viejo, Palm Springs, Pasadena, Pico Rivera, Reseda



Smoke in SoCal on Sept. 14

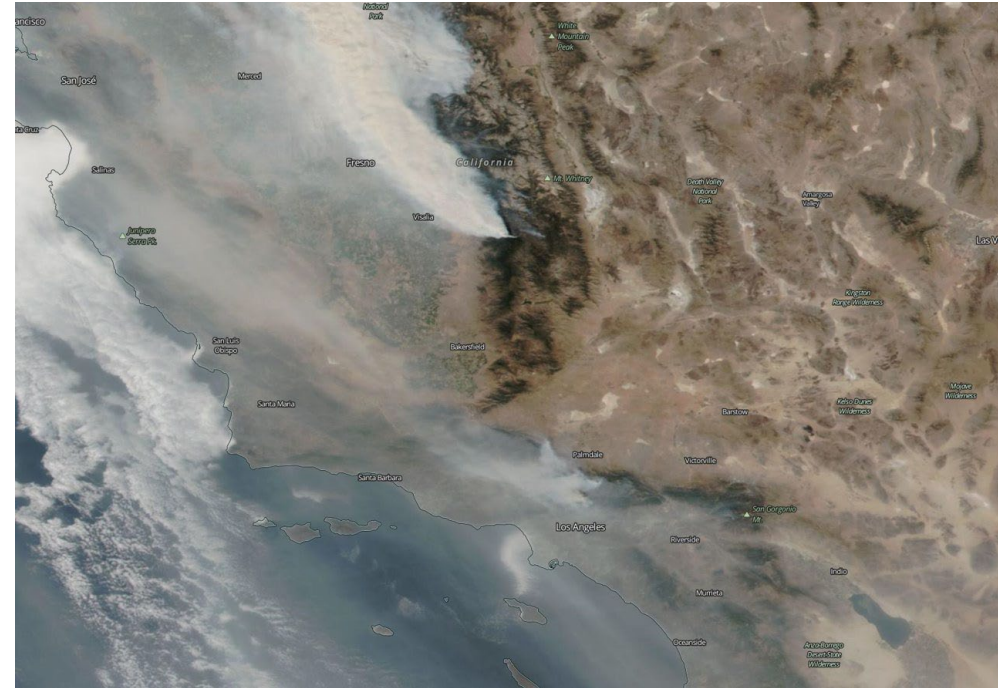


Daily average PM<sub>2.5</sub> concentrations simulated by the BlueSky Daily Run on Sept. 14



# Why Demonstrate the Bobcat and El Dorado Fires?

- Large and consequential events that clearly meet the exceptional event criteria
- Since events were concurrent and affected the same areas, reasonable to combine into a single demonstration
- Removing PM2.5 data affected by these events results in attainment of the 24-hour PM2.5 standard in the South Coast Air Basin
  - Possible to remove data affected from another set of events, but would require multiple demonstrations with concurrence less certain



# Removing the Data Impacted by the Bobcat and El Dorado Fires Leads to Attaining 2018-2020 Design Values

Stations	2018-2020 24-hr PM2.5 Design Values		
	No Exceptional Events Removed	Regulatory Significant Exceptional Events Removed	All Suspected Exceptional Events Removed
Azusa	35	35	26
Los Angeles-North Main Street	37	32	31
Reseda	29	29	26
Compton	35	35	33
Pico Rivera	37	34	31
Pasadena	31	31	29
Long Beach (North)	33	33	27
Long Beach (South)	32	32	28
Long Beach-Route 710 Near Road	35	35	31
Anaheim	33	33	28
Mission Viejo	23	23	23
Rubidoux	34	34	30
Mira Loma (Van Buren)	36	35	35
Ontario-Route 60 Near Road	36	34	33
Fontana	35	35	30
Big Bear	22	22	22
San Bernardino	28	28	27

# Messaging Regulatory Significant vs. Non-Regulatory Significant Exceptional Events to the Public

- Important to emphasize that exceptional events still impact public health and exposure reduction is main tool for reducing impacts (forecasts, advisories, alerts, media outreach, etc.)
- Concept of regulatory significance is due to limited air agency resources to develop demonstrations and limited EPA resources to review them
- However, removing data that meets EE criteria is useful for determining trends in controllable sources of air quality
- Often present statistics after removing data that would “likely meet exclusion criteria established by U.S. EPA”

# Conclusions

- Calculating design values with and without exceptional events is challenging and often must be done before data is finalized and in AQS. Ability to use preliminary FRM data in new EPA tools would be useful.
- For years with multiple sets of regulatory significant exceptional events, important to strategize ideal set of events to demonstrate
- Communication of air quality statistics that are affected by exceptional events is challenging and may depend on use case

# South Coast AQMD Air Quality Assessment Group



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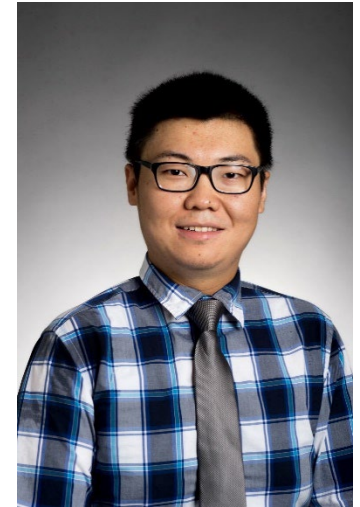
Air Quality Specialist  
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Air Quality Specialist  
Qijing (Emily) Bian,  
PhD



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## Thank You!

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South Coast  
Air Quality Management District