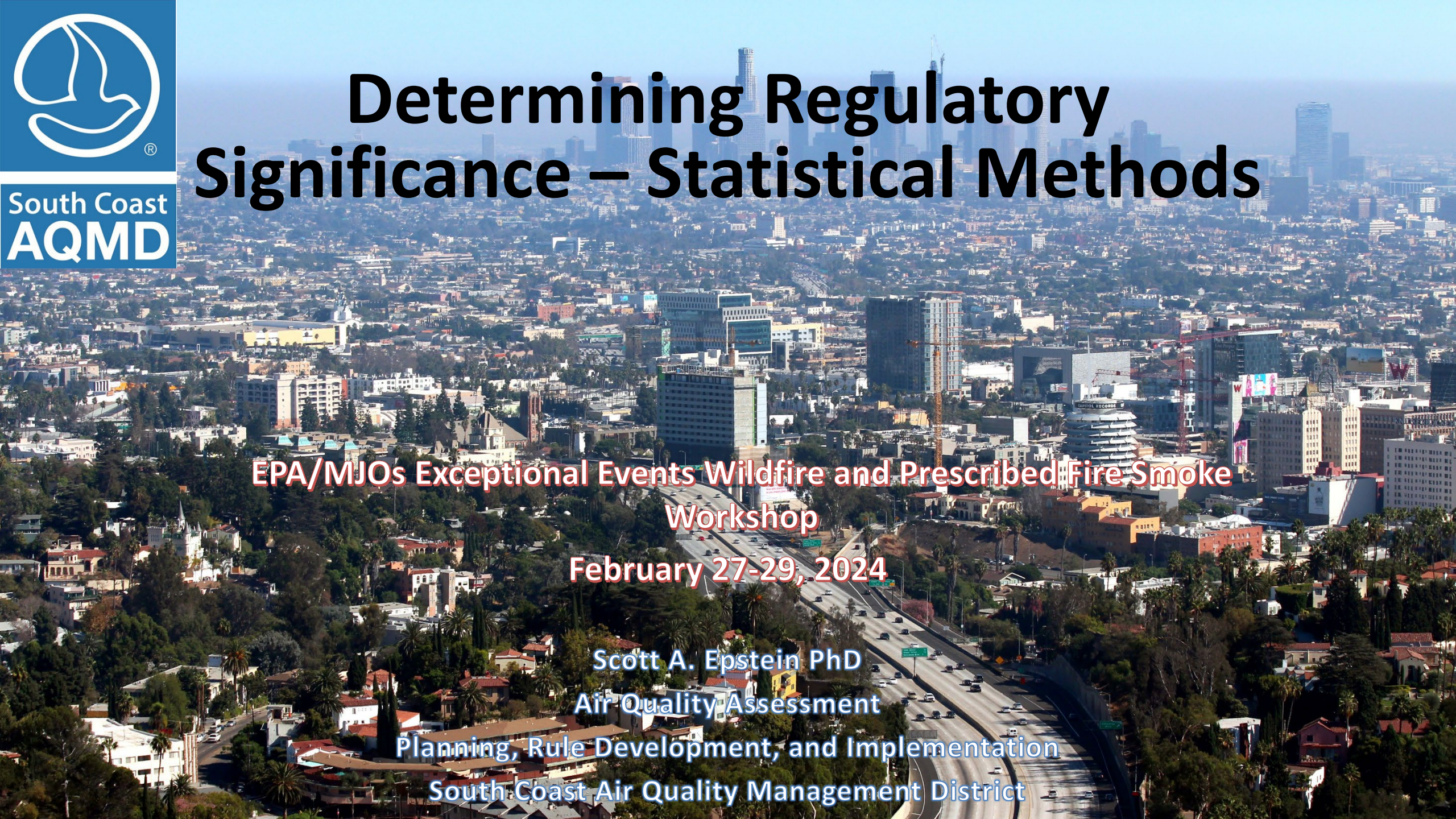
Determining Regulatory Significance – Statistical Methods



EPA/MJOs Exceptional Events Wildfire and Prescribed Fire Smoke Workshop

February 27-29, 2024

Scott A. Epstein PhD

Air Quality Assessment

Planning, Rule Development, and Implementation

South Coast Air Quality Management District

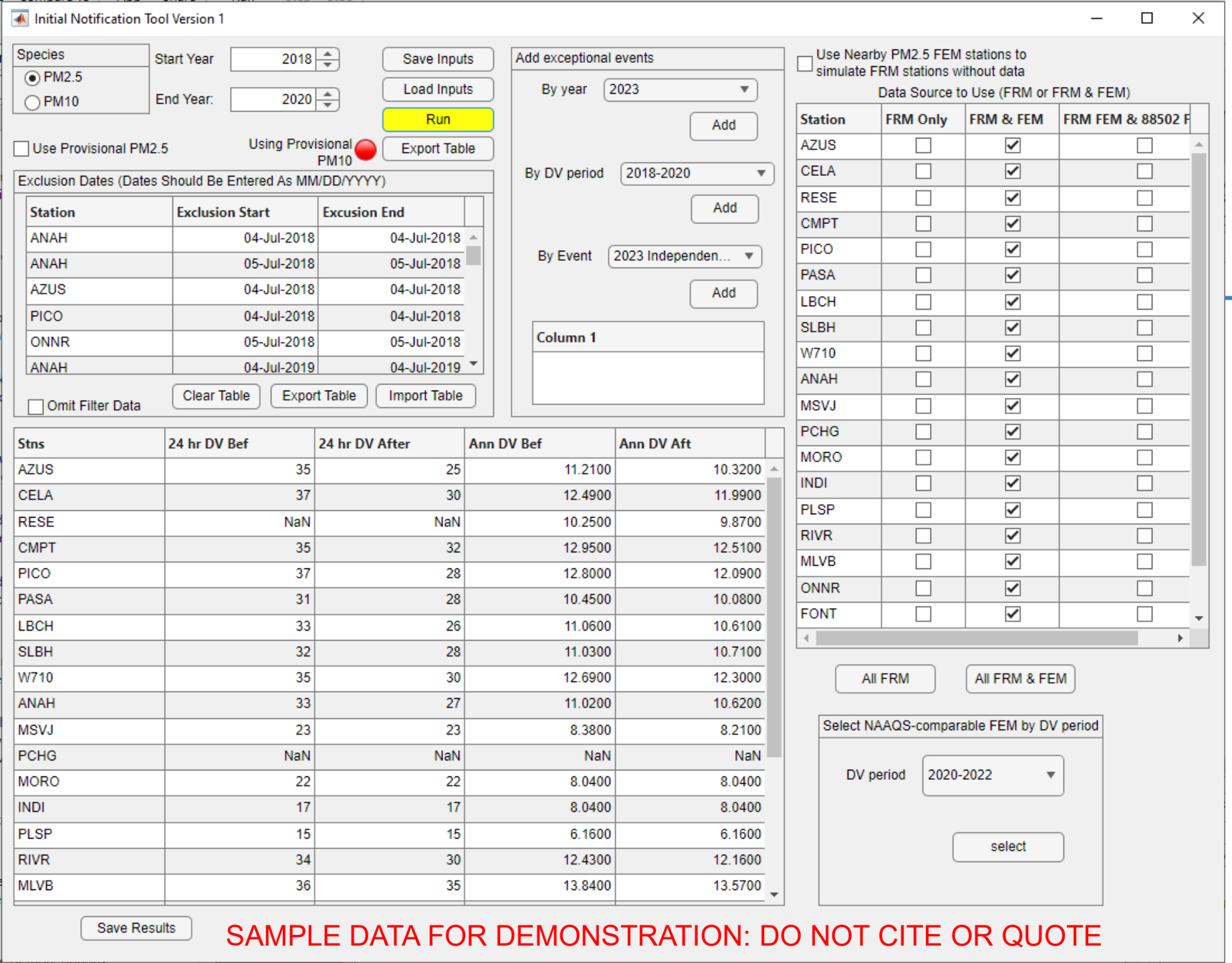
Outline

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

Regulatory Significance

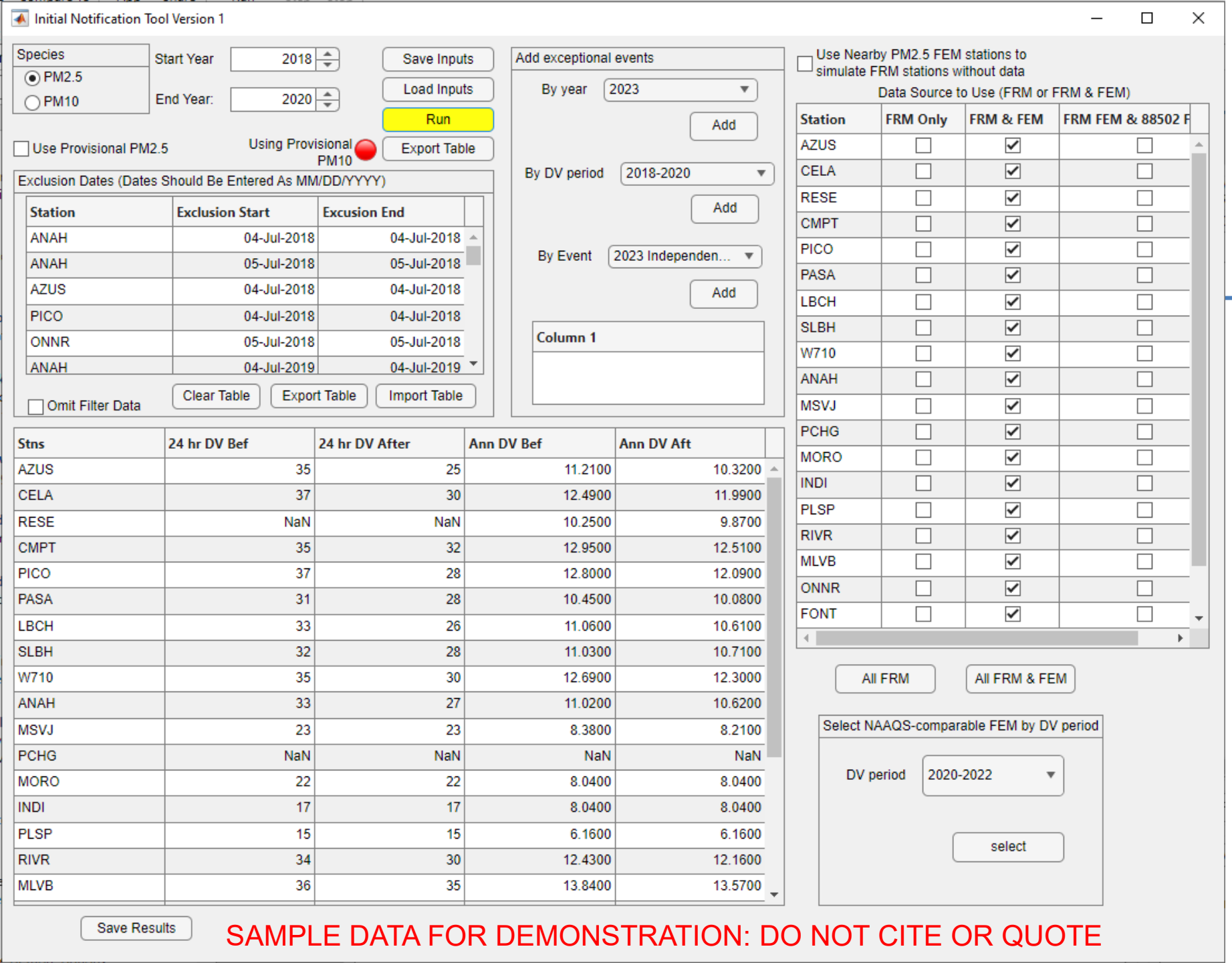
- An Exceptional Event is considered regulatory significant if it will affect the following types of actions:
  - Designate or redesignate an area for a particular NAAQS
  - Classify or reclassify an area to attainment/nonattainment
  - Assignment of nonattainment classification category
  - Attainment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

Source: 2016 Revisions to the Exceptional Events Rule: Update to Frequently Asked Questions



Calculating Design Values With and Without Exceptional Events

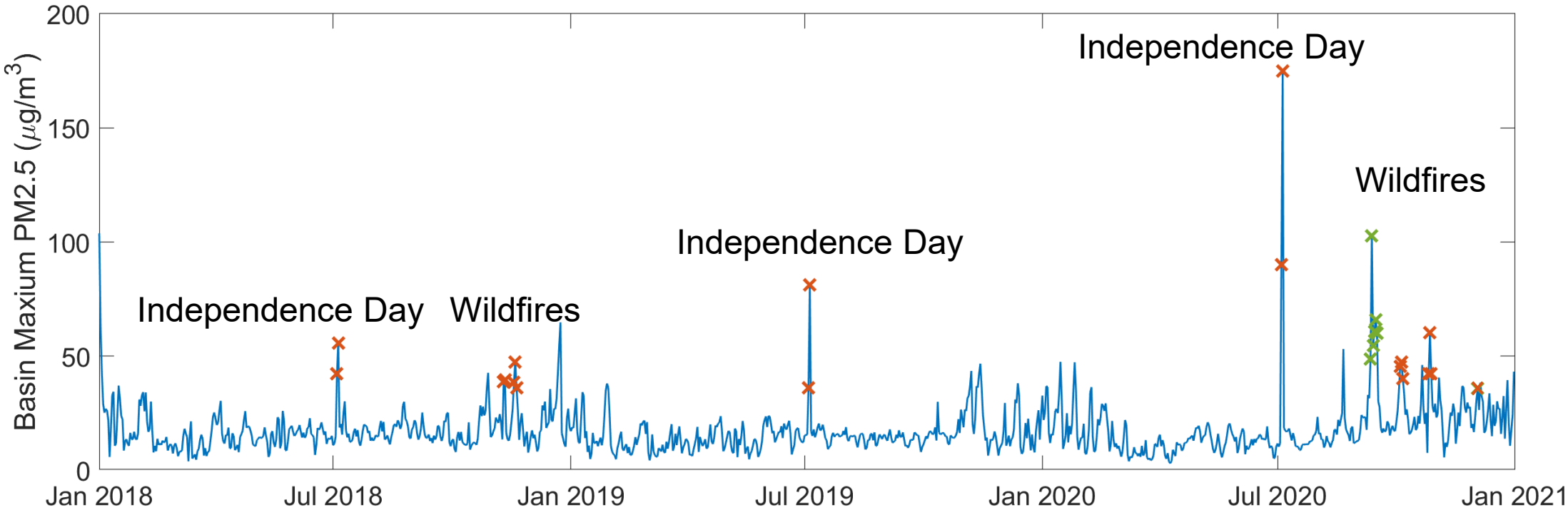
- In 2021, developed interactive tool in-house using MATLAB App Designer
- Ability to calculate design values after removing subset of exceptional events
- Incredibly challenging to calculate PM2.5 DVs correctly



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

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



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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

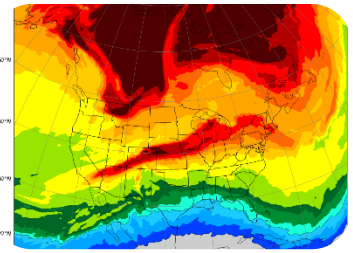
Windblown Dust

Prescribed Fire

Wildfire Smoke

Cultural Events

Volcanic Eruption

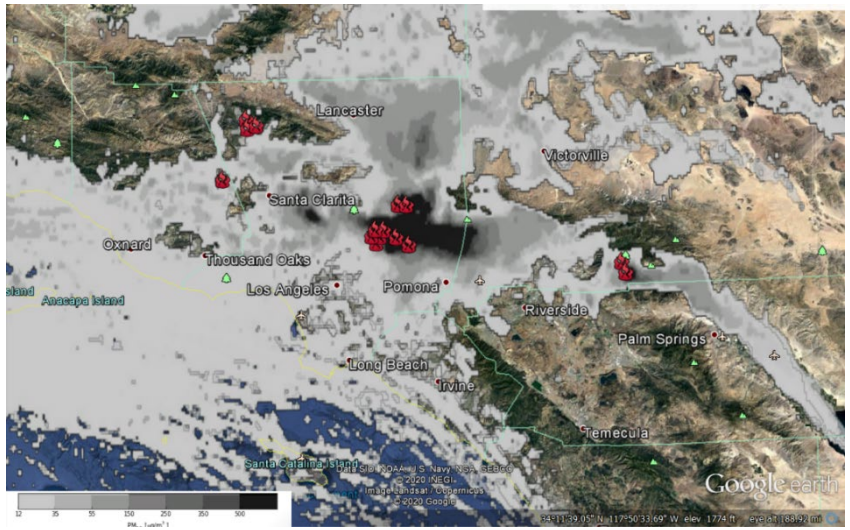


Stratospheric Intrusion

Bobcat and El Dorado Fires

- Highest $PM_{2.5}$ 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 PM2.5 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

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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

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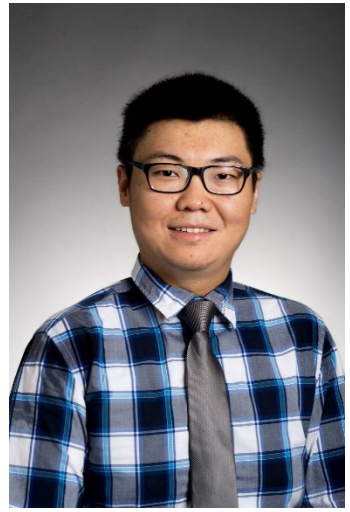

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Thank You!

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