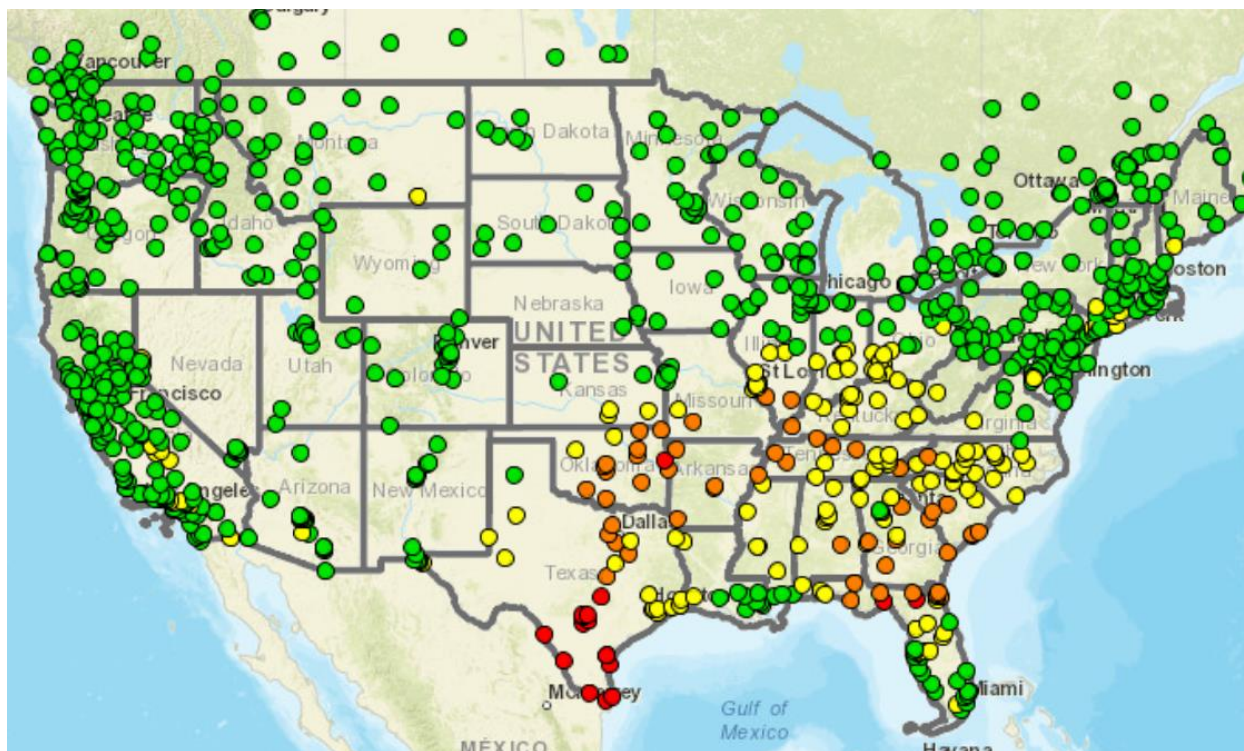
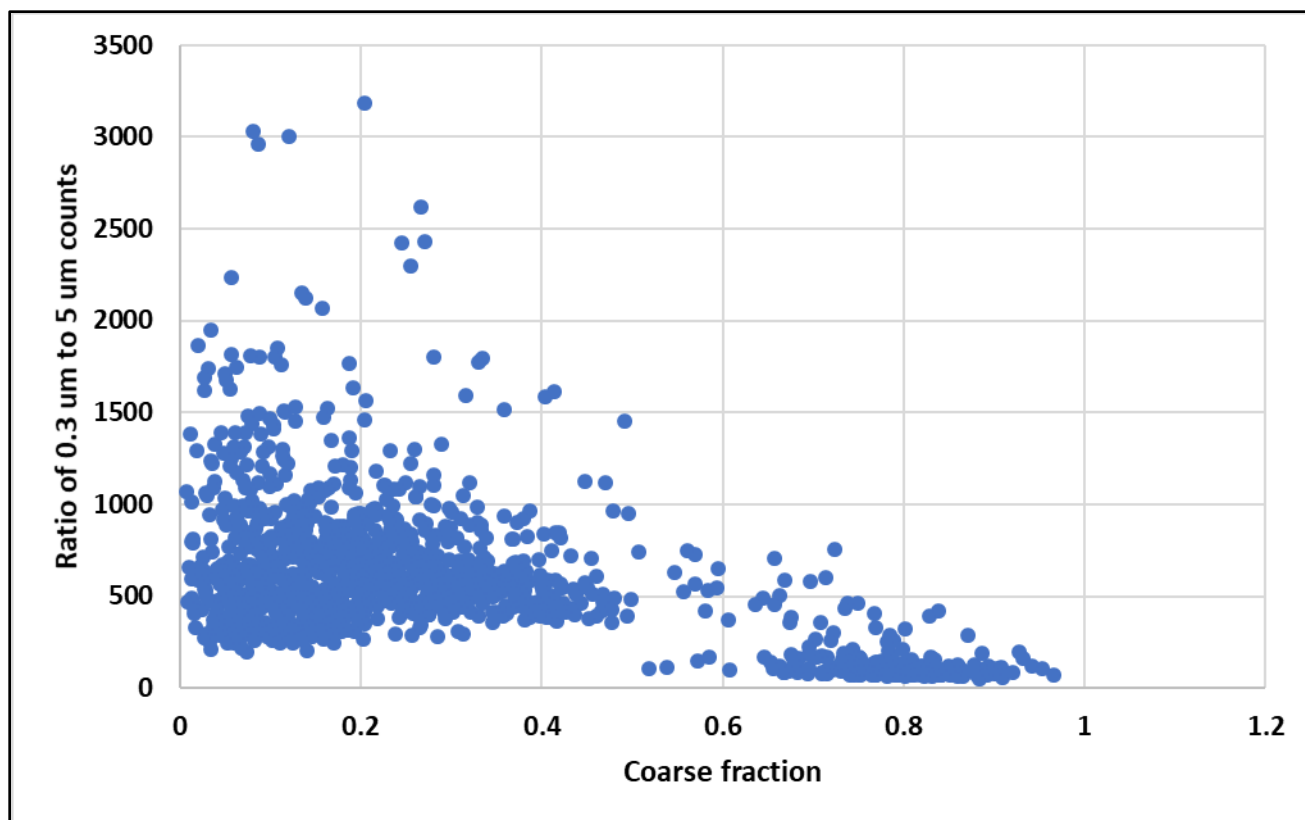


**Supplemental information for:**

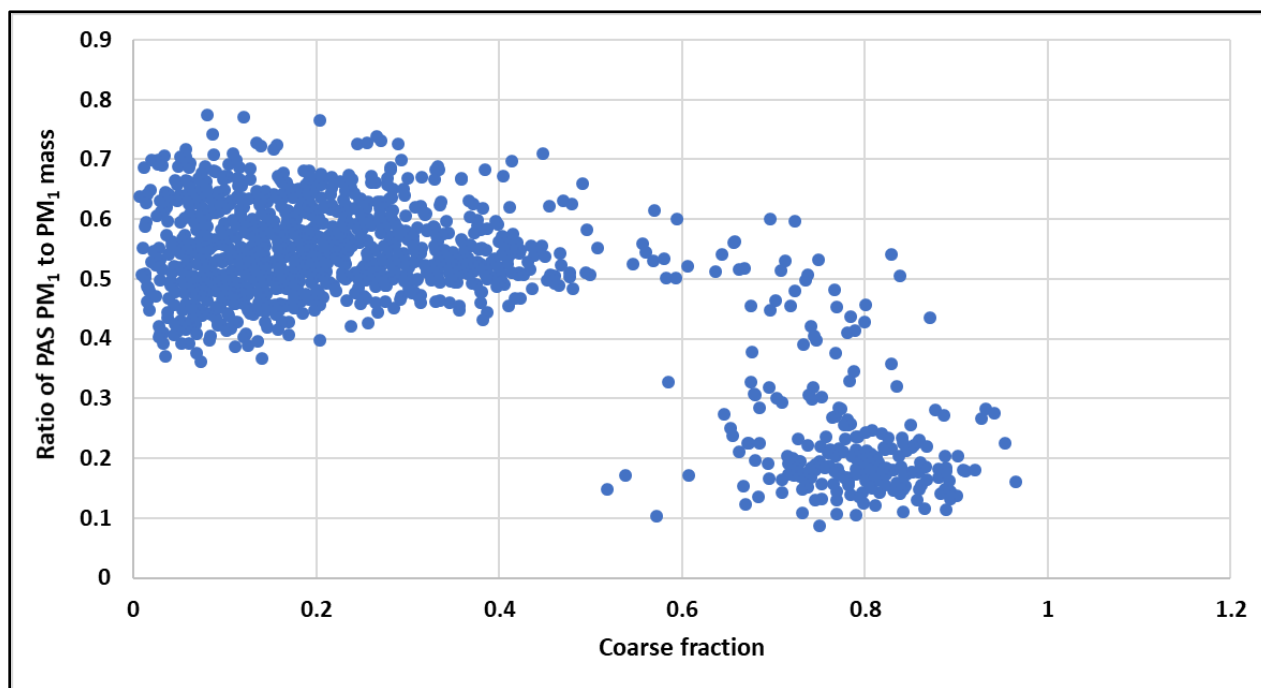
**An evaluation of the U.S. EPA's correction equation for Purple Air Sensor data in smoke, dust and wintertime urban pollution events**



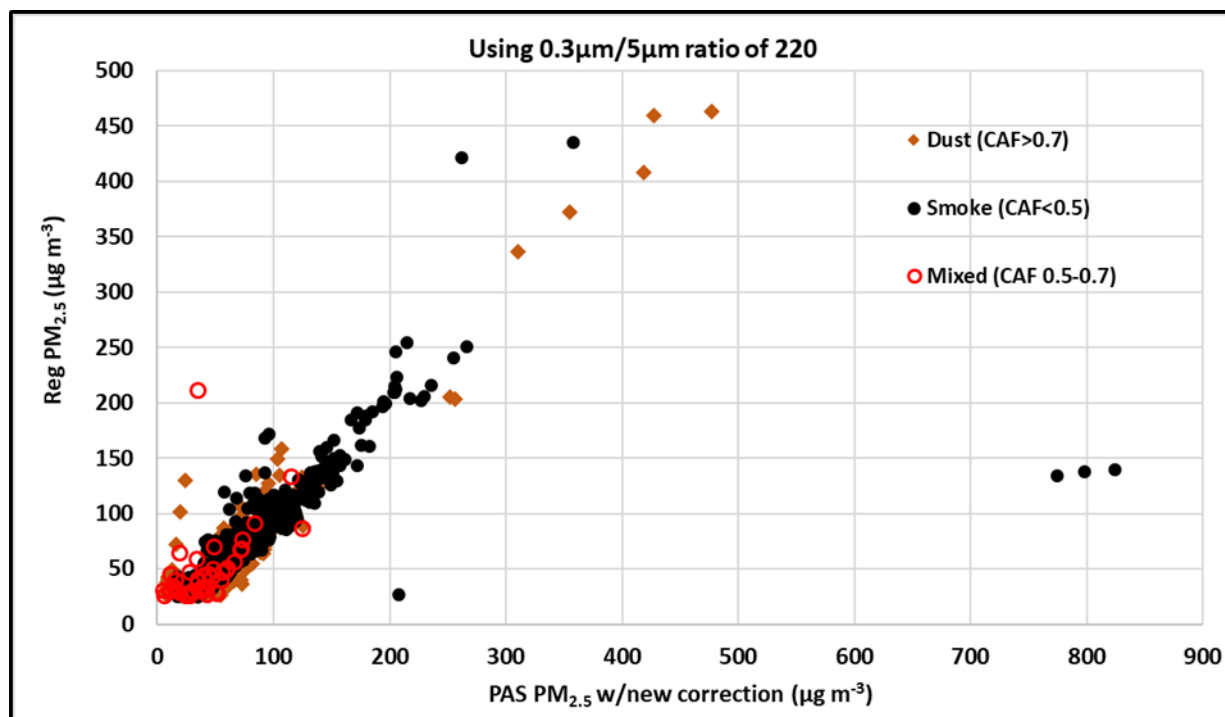
**Figure S1. Daily mean PM<sub>2.5</sub> values for June 27, 2020 at U.S. monitoring sites.** The PM<sub>2.5</sub> values use the EPA AQI color scale; green (0 to  $12.1 \mu\text{g m}^{-3}$ ); yellow ( $12.2$  to  $35.5 \mu\text{g m}^{-3}$ ); orange ( $35.5$  to  $55.5 \mu\text{g m}^{-3}$ ); red ( $55.5$  to  $150 \mu\text{g m}^{-3}$ ). Figure is from the Airnowtech website ([airnowtech.org](http://airnowtech.org)).



**Figure S2. Ratio of 0.3 to 5 um counts measured by the PAS vs coarse fraction from the Keeler regulatory data. A statistical comparison is shown in Table 4 in the main manuscript.**



**Figure S3. Ratio of PAS PM<sub>1</sub> to PM<sub>10</sub> mass vs coarse fraction from the Keeler regulatory data. A statistical comparison is shown in Table 4 in the main manuscript.**



**Figure S4. Regulatory PM<sub>2.5</sub> versus PAS with new correction at Keeler, CA for hours with regulatory PM<sub>2.5</sub> >25 µg m<sup>-3</sup>. The data are separated by the CAF, as measured by the regulatory data. The correction is applied to all data with PAS measured 0.3 µm/5µm counts <220.**

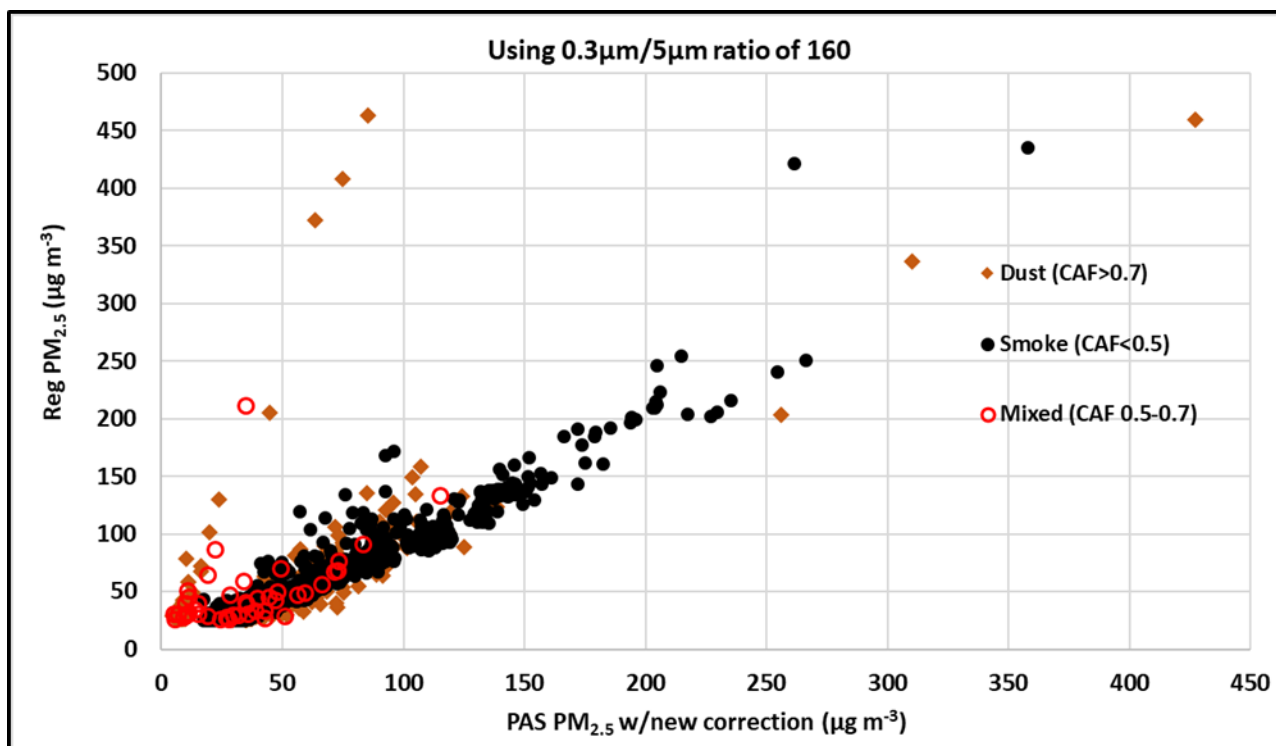


Figure S5. Regulatory PM<sub>2.5</sub> versus PAS with new correction at Keeler, CA for hours with regulatory PM<sub>2.5</sub> >25 µg m<sup>-3</sup>. The data are separated by the CAF, as measured by the regulatory data. The correction is applied to all data with PAS measured 0.3 µm/5µm counts <160.

**Table S1. Details on each of the 50 pollution events used in Part I of this analysis. Ordinary linear regression (OLR) and reduced major axis regression (RMA) slopes refer to the slopes given in equation 2 (Regulatory data = Slope \* PAS data (w/standard correction) + Intercept)**

Case #	Aerosol type	PA site name	PA site Lat	PA site Long	AQS site ID	Dist. between sites (km)	Start time (UTC)	End time (UTC)	OLR slope	RMA slope
1	Urban	North Berkeley	37.88	-122.27	60010012, 060010013	3.0	1/4/18 12:00	1/5/18 12:00	0.92	1.20
2	Urban	Berkeley Park and Coventry, Kensington, CA, USA	37.90	-122.29	60010012, 060010013	4.7	2/8/18 12:00	2/10/18 12:00	1.07	1.22
3	Urban	El Cerrito - Rust - Ohlone Greenway	37.91	-122.30	60010012, 060010013	5.2	2/8/18 12:00	2/10/18 12:00	0.94	1.07
4	Urban	North Berkeley	37.88	-122.27	60010012, 060010013	3.0	2/8/18 12:00	2/10/18 12:00	0.99	1.07
5	Urban	Alamo-Erselia Trail	37.86	-122.02	60130002	8.1	1/2/18 12:00	1/5/18 12:00	0.79	0.99
6	Urban	Concord	37.97	-122.02	60130002	3.8	1/2/18 12:00	1/5/18 12:00	0.98	1.17
7	Urban	Alamo-Erselia Trail	37.86	-122.02	60130002	8.1	12/13/17 12:00	12/16/17 12:00	0.95	1.05
8	Urban	AQMD_NASA_16 (outside)	33.76	-118.15	60374008	11.8	1/2/18 0:00	1/3/18 12:00	1.15	1.34
9	Urban	BikeSGV - Alhambra	34.07	-118.14	60371103	7.8	12/30/17 12:00	1/3/18 12:00	0.95	1.09
10	Urban	003 FK Parking Lot	34.11	-117.63	60711004	1.1	1/25/20 0:00	1/28/20 23:00	1.16	1.24
11	Urban	BikeSGV - Alhambra	34.07	-118.14	60371103	7.8	2/1/18 0:00	2/5/18 10:00	0.94	1.10
12	Urban	AQMD_NASA_16 (outside)	33.76	-118.15	60374004	4.2	12/24/17 16:00	12/25/17 23:00	1.04	1.95
13	Urban	AQMD_NASA_16 (outside)	33.76	-118.15	60374004	4.2	12/30/17 8:00	1/2/18 8:00	1.27	1.35
14	Urban	90.9fm KRCL 2	40.77	-111.95	490353010	2.1	12/31/17 12:00	1/1/18 23:00	1.05	1.15
15	Urban	KSL Mike Hale Acura Murray	40.65	-111.89	490353010	15.5	12/31/17 12:00	1/1/18 23:00	0.93	1.07
16	Urban	90.9fm KRCL 2	40.77	-111.95	490353010	2.1	1/3/18 12:00	1/7/18 23:00	0.85	0.95
17	Smoke	Enatai	47.59	-122.20	530330031	3.9	8/8/17 0:00	8/18/17 23:00	0.85	0.86
18	Smoke	Seattle	47.62	-122.34	530330080	6.0	8/9/18 0:00	8/27/18 23:00	0.96	0.99
19	Smoke	Enatai	47.59	-122.20	530330031	3.9	8/9/18 0:00	8/27/18 23:00	0.81	0.82
20	Smoke	LRAPA-Emerald Park	44.08	-123.14	410390059	1.9	8/9/18 0:00	8/30/18 23:00	0.70	0.70
21	Smoke	LRAPA-Bethel	44.07	-123.14	410390059	0.0	8/9/18 0:00	8/30/18 23:00	0.75	0.74

Case #	Aerosol type	PA site name	PA site Lat	PA site Long	AQS site ID	Dist. between sites (km)	Start time (UTC)	End time (UTC)	OLR slope	RMA slope
22	Smoke	Miller	45.52	-122.76	410512011	12.7	8/13/18 0:00	8/24/18 23:00	1.02	1.10
23	Smoke	PSU_GBRL_Home	45.50	-122.65	410512011	7.0	8/13/18 0:00	8/24/18 23:00	1.05	1.10
24	Smoke	PSU STAR Lab Lost Park	45.54	-122.79	410512011	14.9	8/13/18 0:00	8/23/18 23:00	0.98	1.08
25	Smoke	PSU STAR Lab Rose City Park	45.54	-122.60	410512011	0.7	8/13/18 0:00	8/24/18 23:00	1.00	1.01
26	Smoke	Bonny Slope	45.54	-122.79	410670111	7.9	8/13/18 0:00	8/23/18 22:00	0.92	0.96
27	Smoke	Woods Park	45.46	-122.72	410670111	7.9	8/13/18 0:00	8/23/18 23:00	0.95	0.98
28	Smoke	MesaVista	43.60	-116.21	160010010	11.3	8/17/18 0:00	8/24/18 23:00	0.93	1.06
29	Smoke	352 Saint Augustine Drive	39.73	-121.78	60070008	6.4	7/27/18 0:00	8/12/18 7:00	0.82	0.90
30	Smoke	CARB_SMOKE_B CAQMD_NORD	39.78	-121.96	60070008	10.1	7/27/18 0:00	8/3/18 23:00	0.60	0.71
31	Smoke	Phoenix	42.28	-122.81	410292129	8.6	7/23/19 0:00	8/2/19 23:00	0.84	0.90
32	Smoke	Fairbanks Ballaine & Lynx	64.90	-147.83	20900034	7.9	7/10/19 0:00	7/15/19 23:00	1.13	1.22
33	Smoke	CTC Building	64.84	-147.73	20900034	0.5	7/10/19 0:00	7/15/19 23:00	1.22	1.33
34	Smoke	Inclination Dr.	64.92	-147.88	20900034	11.2	7/10/19 0:00	7/15/19 23:00	1.07	1.17
35	Smoke	Kellum	64.84	-147.74	20900034	1.0	7/10/19 0:00	7/15/19 23:00	1.24	1.36
36	Smoke	Line Dr.	64.88	-147.91	20900034	9.7	7/10/19 0:00	7/15/19 23:00	1.15	1.30
37	Smoke	Haines St.	64.84	-147.68	20900040	0.7	7/7/19 0:00	7/11/19 0:57	1.07	1.10
38	Smoke	LRAPA-Emerald Park	44.08	-123.14	410390059	1.9	9/6/20 0:00	9/18/20 22:00	1.30	1.26
39	Smoke	LRAPA-Bethel	44.07	-123.14	410390059	0.0	9/6/20 0:00	9/18/20 22:00	1.08	1.24
40	Smoke	PSU STAR Lab Rose City Park	45.54	-122.60	410512011	0.7	9/9/20 0:00	9/18/20 23:00	1.14	1.13
41	Smoke	Wildwood	45.01	-123.04	410470041	7.6	9/6/20 8:00	9/19/20 23:00	1.29	2.67
42	Smoke	Willamette University - Sparks Center	44.93	-123.03	410470041	1.6	9/6/20 8:00	9/19/20 23:00	1.05	1.18
43	Smoke	Hopfer Road	48.42	-119.52	530470013	2.6	8/1/21 0:00	8/3/21 23:00	1.00	1.06
44	Smoke	Colville High School-	48.55	-117.88	530650005	2.0	7/31/21 0:00	8/1/21 23:00	0.81	0.86



Case #	Aerosol type	PA site name	PA site Lat	PA site Long	AQS site ID	Dist. between sites (km)	Start time (UTC)	End time (UTC)	OLR slope	RMA slope
45	Dust	Creative Montessori School	33.48	-86.79	10730023	8.3	6/26/20 0:00	6/27/20 23:00	6.76	8.36
46	Dust	Ruffner Mountain	33.56	-86.71	10730023	10.0	6/26/20 1:00	6/27/20 23:00	7.03	8.34
47	Dust	Hudson Hill	32.09	-81.12	130511002	0.8	6/26/20 12:00	6/28/20 12:00	4.55	4.71
48	Dust	TracMyAir2	35.88	-78.87	370630099	1.0	6/28/20 0:00	6/29/20 12:00	5.67	6.07
49	Dust	Gina Ward	32.61	-83.60	131530001	0.5	6/25/20 12:00	6/27/20 23:00	4.69	6.12
50	Dust	MLK+Peeples	35.04	-85.30	132950002	6.9	6/26/20 12:00	6/27/20 18:00	4.55	5.84

**Table S2. Details on the data from Keeler CA used in Part II of this analysis.**

Case #	Aerosol type	PA site name	PA site Lat	PA site Long	AQS site ID	Dist. between sites (km)	Start time (UTC)	End time (UTC)
1	Dust	CARB_S_GPUAPC D_Keeler	36.48	-117.87	060271003	<1	2/12/2019 17:00	5/29/2022 21:00