

# Development and Field Validation of a Community-Engaged Particulate Matter Air Quality Monitoring Network in Imperial, CA

*Graeme N. Carvlin<sup>1\*</sup>, Humberto Lugo<sup>3</sup>, Luis Olmedo<sup>3</sup>, Ester Bejarano<sup>3</sup>, Alexa Wilkie<sup>4</sup>, Dan Meltzer<sup>4</sup>, Michelle Wong<sup>4</sup>,  
Galatea King<sup>4</sup>, Amanda Northcross<sup>5</sup>, Michael Jerrett<sup>6</sup>, Paul B. English<sup>4</sup>, Donald Hammond<sup>2</sup>, Edmund Seto<sup>1</sup>*

1. Department of Environmental & Occupational Health Sciences, University of Washington, Seattle, WA, U.S.A.
2. Monitoring and Laboratory Division, California Air Resources Board, Sacramento, CA, U.S.A.
3. Comite Civico del Valle, Brawley, CA, U.S.A.
4. California Environmental Health Tracking Program, Richmond, CA, U.S.A.
5. George Washington University, Washington, DC, U.S.A.
6. Department of Environmental Health Sciences, University of California, Los Angeles, CA, U.S.A.

The Supporting Information contains 7 pages, 2 tables and 9 figures.

\*Corresponding author. Phone: (206) 221-8491; email: gcarvlin@uw.edu

## List of Tables

**Table S1.** R<sup>2</sup> for different size bins of the Dylos and BAM and filter data

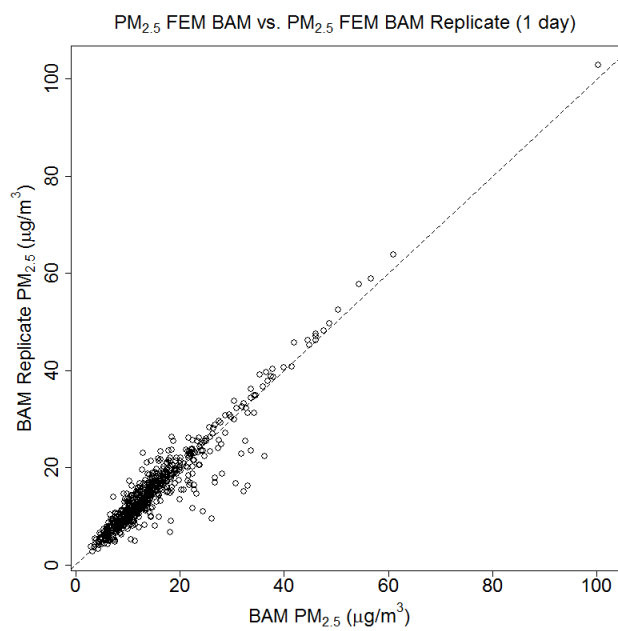
	PM <sub>2.5</sub>			PM <sub>10</sub>		
	FEM BAM (hourly)	FEM BAM (daily)	FRM Filter	FEM BAM (hourly)	FEM BAM (daily)	FRM Filter
Bin 1 (>0.5 μm)	0.78	0.84	0.79	0.31	0.41	0.23
Bin 2 (>1.0 μm)	0.71	0.73	0.67	0.57	0.72	0.57
Bin 3 (>2.5 μm)	0.56	0.58	0.42	0.77	0.87	0.78
Bin 4 (>10 μm)	0.09	0.06	0.04	0.73	0.71	0.43
Bin 1 – Bin 2	0.68	0.81	0.74	0.20	0.30	0.13
Bin 1 – Bin 3	0.74	0.83	0.76	0.23	0.34	0.17
Bin 1 – Bin 4	0.78	0.84	0.79	0.31	0.41	0.23
Bin 2 – Bin 3	0.73	0.76	0.71	0.34	0.51	0.38
Bin 2 – Bin 4	0.71	0.73	0.68	0.57	0.72	0.57
Bin 3 – Bin 4	0.56	0.59	0.42	0.77	0.86	0.78
n <sup>a</sup>	3907	160	300	4008	168	32
<sup>a</sup> Total number of overlapping observations for the Dylos and the BAM/Filter						

**Table S2.** Data Loss During the Study Period and After Implementing Lessons Learned

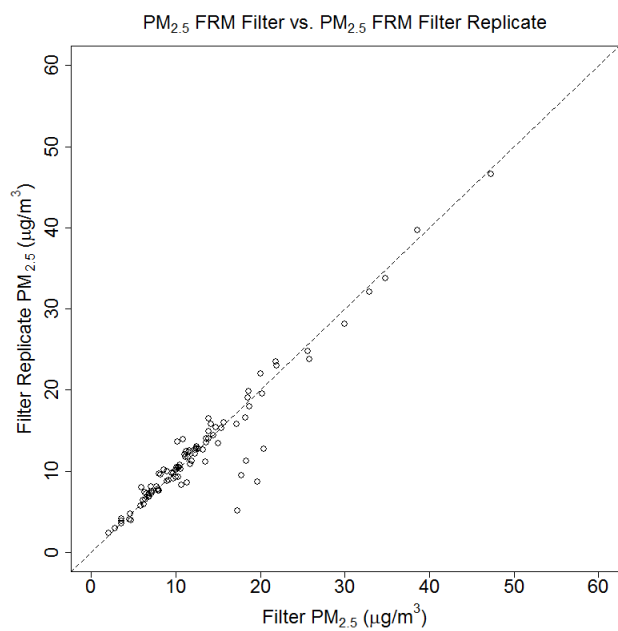
Site	Location	Network Type <sup>a</sup>	Network Data Loss (%)	Dylos Data Loss (%)	Total Data Loss (%)
Seeley <sup>b</sup>	Central	E, C	<1, 0	<1, <1	<1, <1
Kennedy <sup>b</sup>	Central	C, C	<1, 0	82, 0	83, 0
Westmorland <sup>b</sup>	North	W, C	49, 30	24, 19	73, 49
Meadows <sup>b</sup>	Central	E, E	<1, 0	37, <1	37, <1
Calipatria <sup>b</sup>	North	C, C	46, 22	<1, 0	46, 22
Calexico <sup>b</sup> Alvarez	South	W, W	24, 36	<1, 0	24, 36
<b>Total (average)</b>			19, 15	24, 3	44, 18
Calexico-Ethel <sup>c</sup>	South	C, C	9, <1	<1, 0	9, <1
<sup>a</sup> E = Ethernet; C = Cellular; W = Wi-Fi; <sup>b</sup> Study period (3/2/16 to 7/19/16), follow up period (1/1/17 to 3/1/17); <sup>c</sup> From 6/18/15 to 7/12/16 (~13 months), follow up period (1/1/17 to 3/1/17).					

## List of Figures

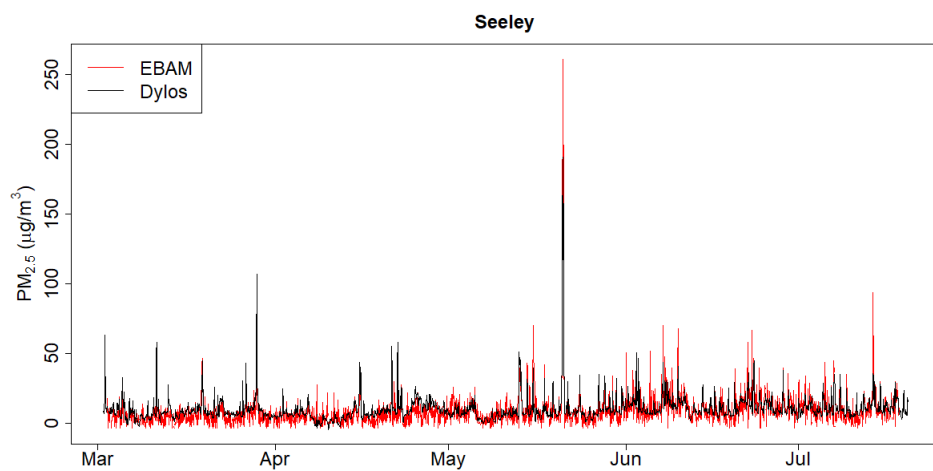
**Figure S1.** Scatterplot of PM<sub>2.5</sub> BAM vs. PM<sub>2.5</sub> BAM replicate at Calxico-Ethel



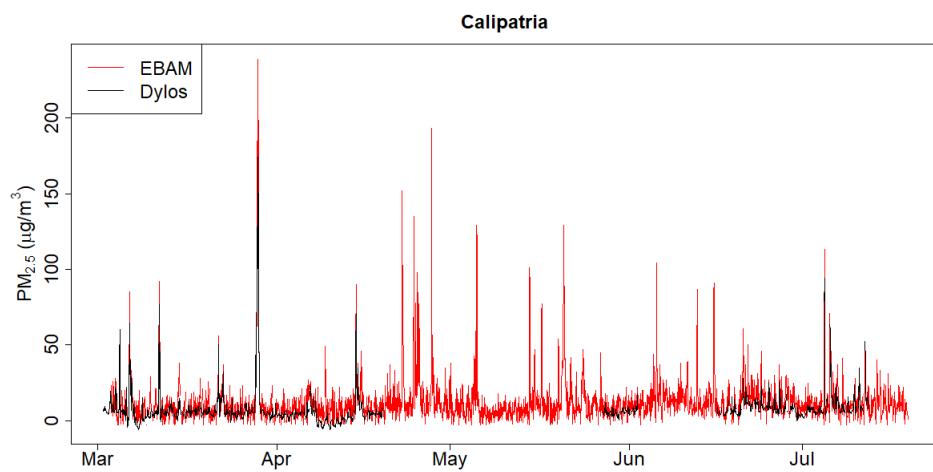
**Figure S2.** Scatterplot of PM<sub>2.5</sub> Filter vs. PM<sub>2.5</sub> Filter replicate at Calxico-Ethel



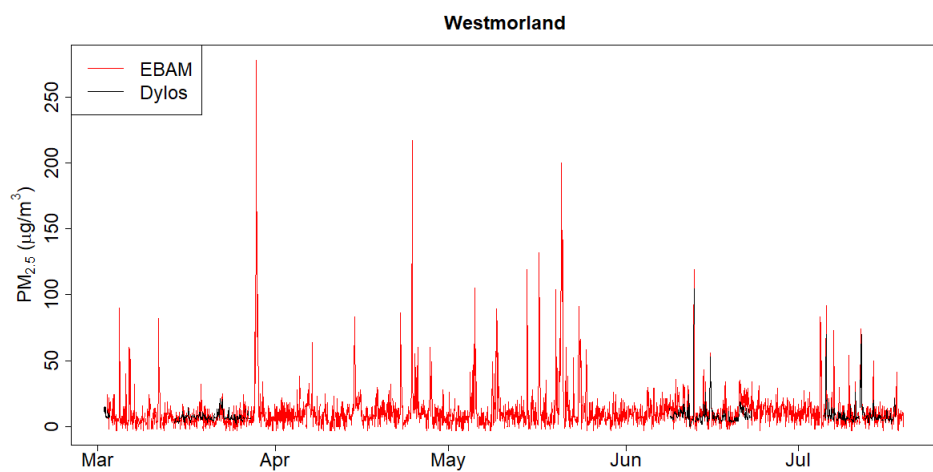
**Figure S3. Seeley Time-series**



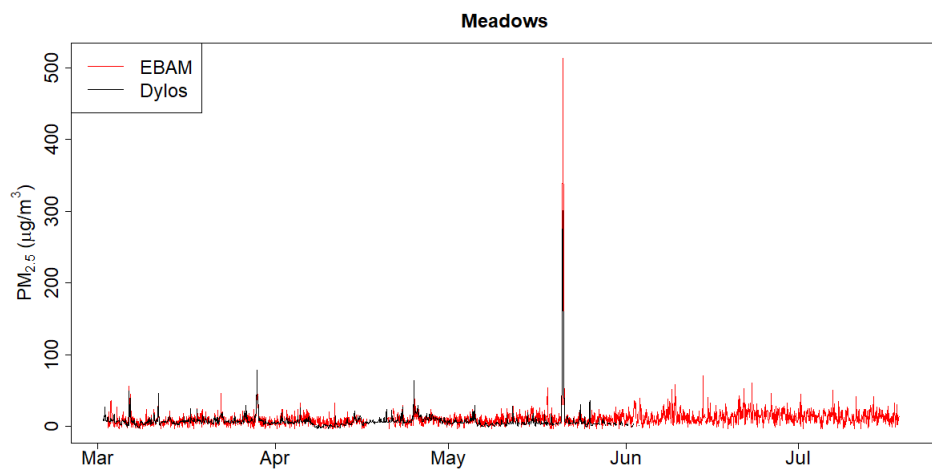
**Figure S4. Calipatria Time-series**



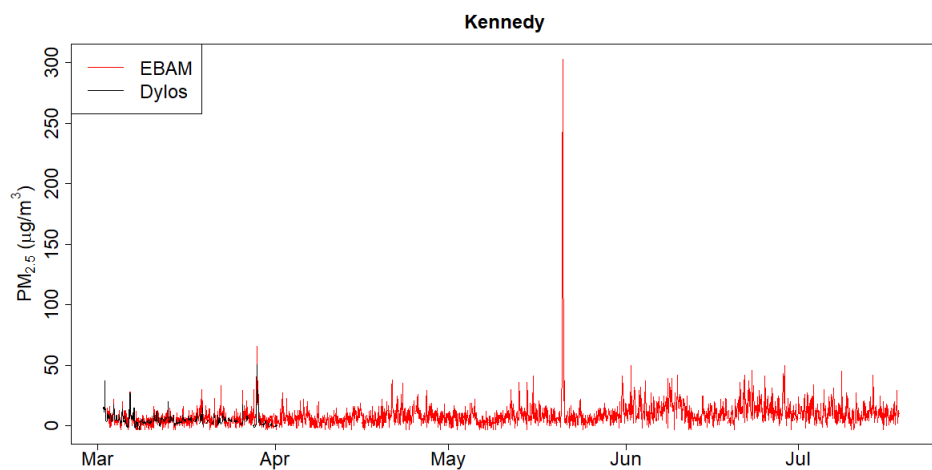
**Figure S5. Westmorland Time-series**



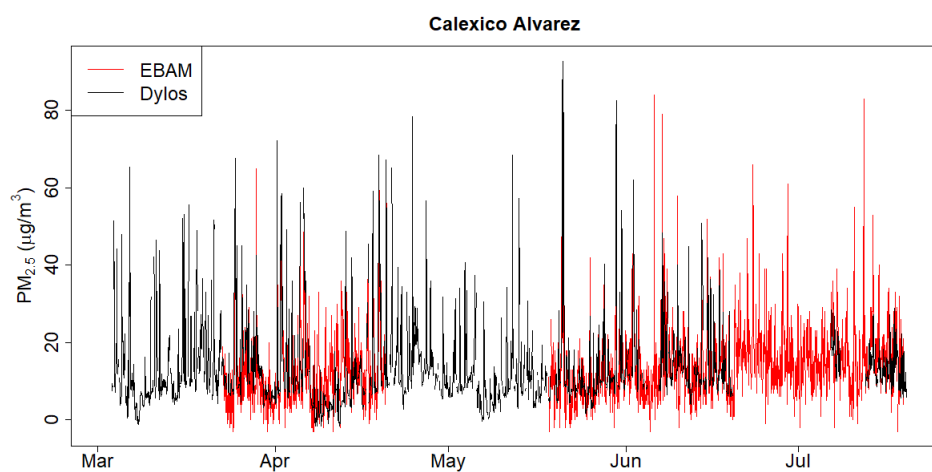
**Figure S6. Meadows Time-series**



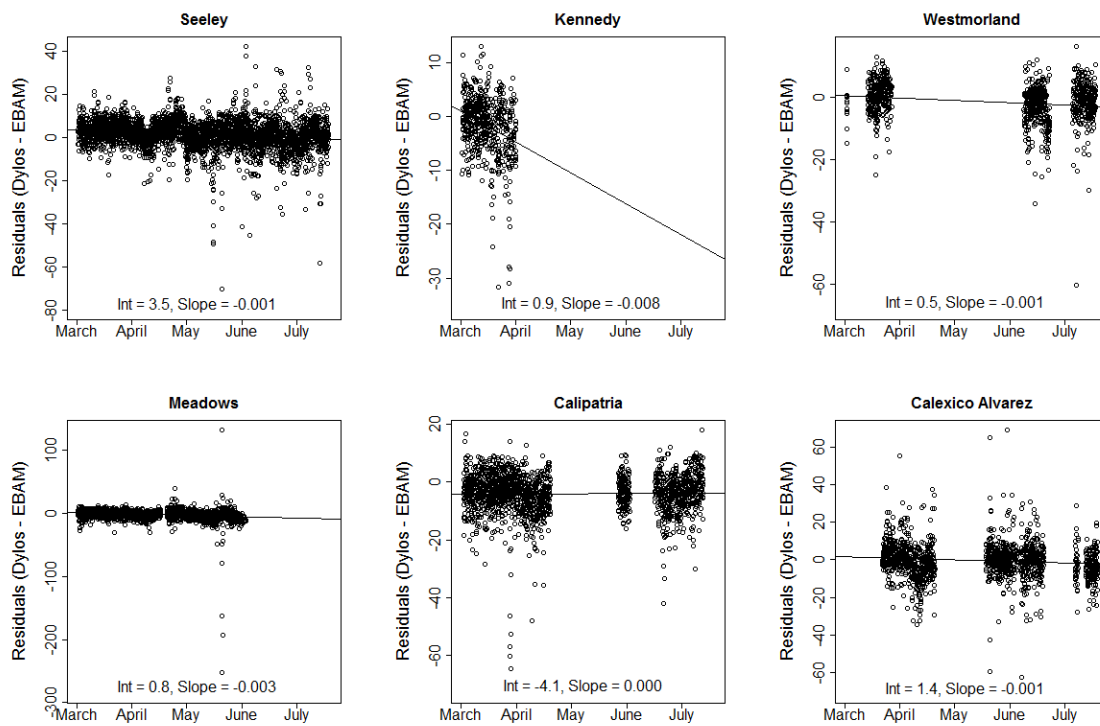
**Figure S7. Kennedy Time-series**



**Figure S8. Calxico Alvarez Time-series**



**Figure S9.** Difference between Dylos conversion and EBAM



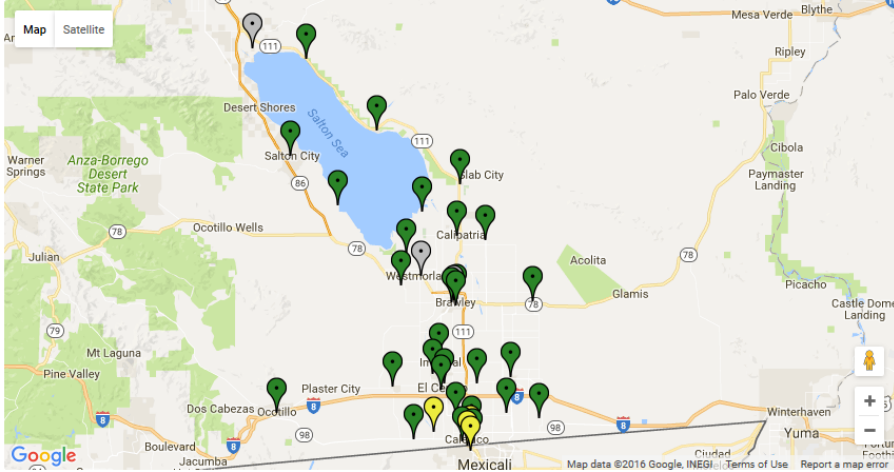
**Figure S10.** The Display of the Community Air Monitoring Network on the IVAN website

**IVAN IMPERIAL** MENU

## Map of Monitors

Select a monitor location on the map for more information about current air quality at that location. Learn what the Community Air-Quality Level (CAL) colors mean. Gray monitors are [offline](#).

Monday, November 14, 2016 at 11:17 AM



**About CALs**

Community Air-Quality Levels (CALs) are used to describe air quality in terms of how harmful the level of particulate matter (PM) pollution in the air is to human health. The CALs are derived using similar [methods](#) as EPA's Air Quality

[Map](#) [About CALs](#) [Disclaimer](#) [More info](#) [Government air data](#) [Report an air problem](#)