

**Northern California Winter Time PM_{2.5} and Meteorology
2006-07**

Statistical Analysis Summary Report

Draft Report

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July 9, 2007

PM_{2.5} Exceedances:

Stations:

Table 1. PM_{2.5} and Meteorology Stations

PM _{2.5}	Meteorology
Concord	Concord
Davis	Davis
Elk Grove	Elk Grove
Fremont	
Livermore	Livermore
Modesto-14th	Modesto-14th
Napa	Napa
Oakland	
Point Reyes	Point Reyes
Redwood City	
Sacramento-TSt	Sacramento-TSt
San Francisco	San Francisco
San Jose	
Santa Rosa	Santa Rosa
SJ-Tully	
Stockton-Hazelton	Stockton-Hazelton
Tracy	Tracy
Vacaville	Vacaville
Vallejo	Vallejo
Woodland	Woodland

PM data have been collected from 20 stations over Bay Area (BAAQMD), Sacramento Valley (SACV), and San Joaquin Valley (SJV) air districts during 2006-07 PM_{2.5} sessions. There are 12 BAAQMD, 5 SACV, and 3 SJV stations as listed in Table 1.

Table 2. PM_{2.5} Stations and Exceedance days

Exceedances (days)		Year		Month		Grand Total
Region	Site	2006		2007		
		Nov	Dec	Jan	Feb	
BAAQMD	Concord	1	5	4	2	12
	Fremont	0	2	1	1	4
	Livermore	0	6	5	1	12
	Napa	0	0	5	1	6
	Oakland	2	5	5	3	15
	Point Reyes	0	1	0	0	1
	Redwood City	0	2	3	2	7
	San Francisco	0	3	3	3	9
	San Jose	0	7	4	3	14
	Santa Rosa	0	1	0	0	1

	SJ-Tully	0	8	3	3	14
	Vallejo	0	7	6	0	13
BAAQMD Total		3	47	39	19	108
SACV	Davis	0	2	1	1	4
	Elk Grove	0	4	10	4	18
	Sacramento-TSt	1	7	14	5	27
	Vacaville	0	3	0	1	4
	Woodland	0	0	2	0	2
SACV Total		1	16	27	11	55
SJV	Modesto-14th	2	17	18	8	45
	Stockton-Hazelton	0	12	11	5	28
	Tracy	0	2	4	4	10
SJV Total		2	31	33	17	83
Grand Total		6	94	99	47	246

Total 246 exceedance days occurred over all sites during this period, Figure1 showed that:

- Modesto-14th station of SJV exceeded more than 50% of days: 17 days in December 2006, and 18 days in January 2007,
- BAAQMD stations totaled 108 of 246 days during this 4 months period,
- Most exceedances occurred during December and January.

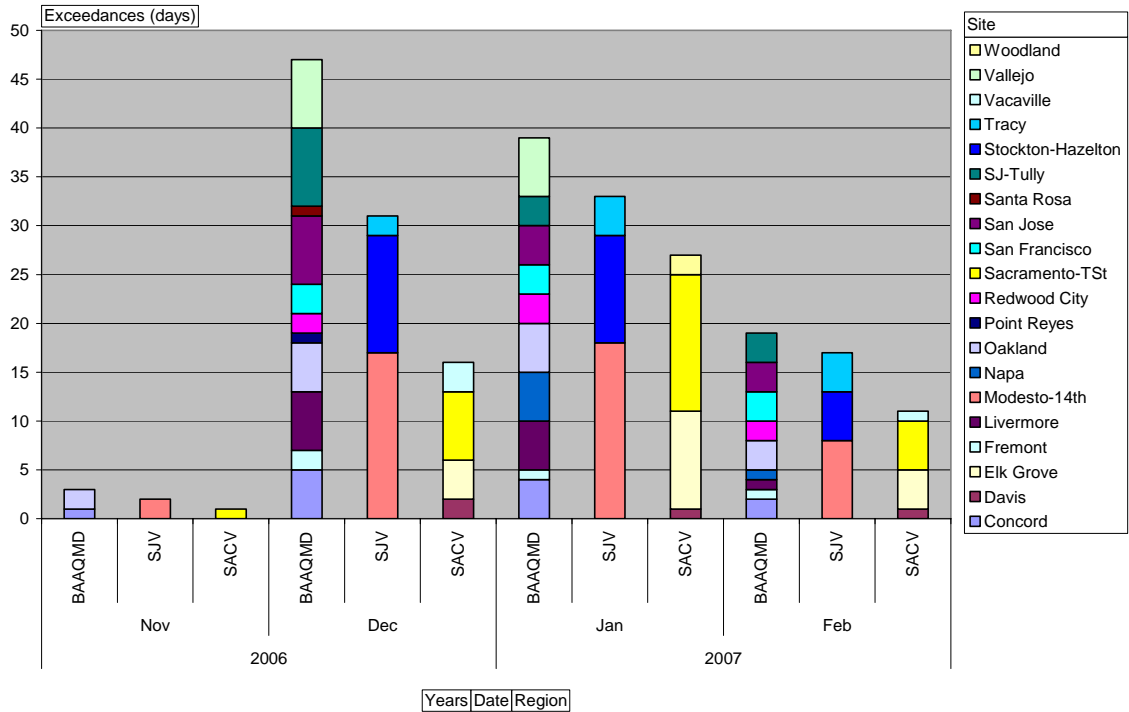


Figure 1. Number of days PM_{2.5} Exceedance by region

Each station readings were statistically summarized in Table 2 and sorted by maximum values, where:

- Redwood City topped the daily reading as high as 75.3 ug/m³, 4-month averaged high values found in Modesto-14th, Stockton-Hazelton, Sacramento-TSt, Elk Grove, and Napa stations, while lowest is located at Point Reyes.

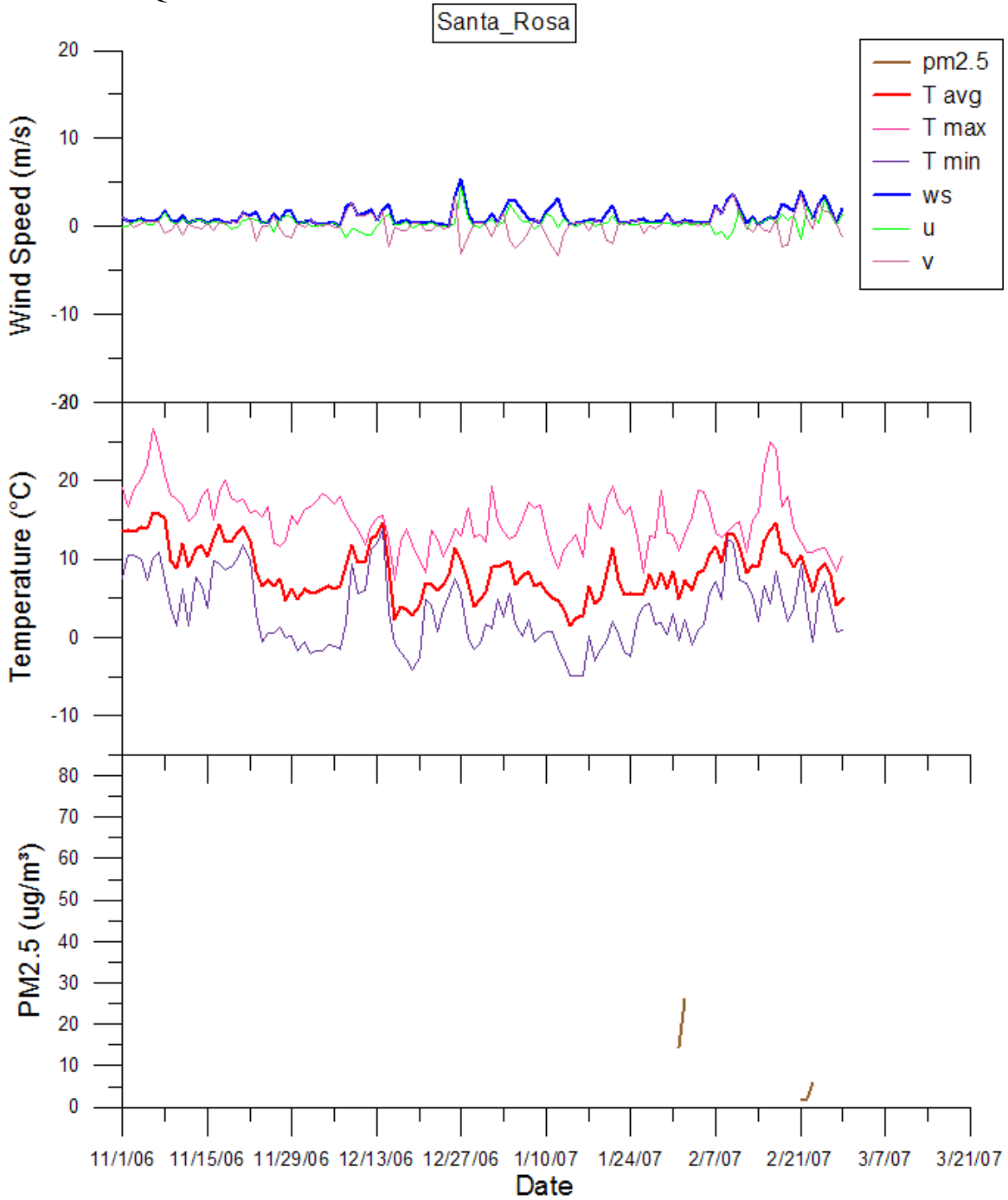
Table 3. Measured PM_{2.5} readings by station

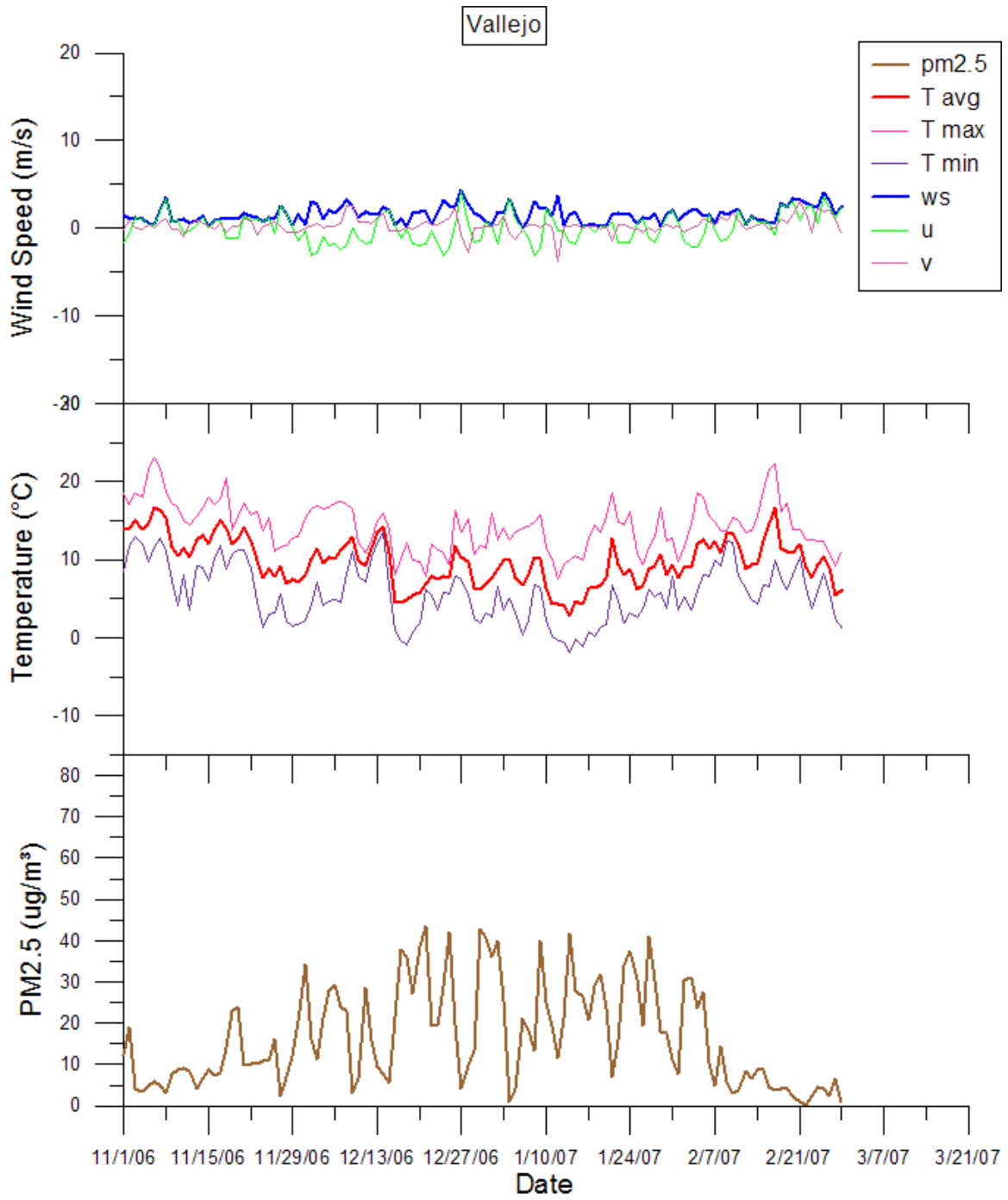
Stations	PM _{2.5} (ug/m ³)			
	Maximum	Average	Standard Deviation	Variance
Redwood City	75.3	13.94	11.52	132.66
Modesto-14 th	75.17	29.72	19.93	397.28
Stockton-Hazelton	66.83	23.54	16.29	265.38
Oakland	65.5	18.83	13.17	173.39
San Jose	64.4	17.19	13.21	174.45
Sacramento-TSt	63.53	21.28	14.34	205.61
SJ-Tully	62.5	16.21	12.75	162.67
Davis	62.17	13.10	10.55	111.31
Concord	62.1	15.76	13.37	178.76
Tracy	60.25	16.40	11.93	142.44
Santa Rosa	59	15.79	12.39	153.56
Elk Grove	55.37	21.32	11.62	135.02
Livermore	55	14.97	12.42	154.34
San Francisco	54.3	13.75	11.12	123.64
Fremont	51.3	14.15	12.35	152.41
Woodland	48.35	14.73	9.62	92.47
Vacaville	45.35	11.68	10.11	102.29
Vallejo	43.49	16.52	12.08	145.91
Napa	43.2	20.17	11.56	133.66
Point Reyes	35.04	8.42	5.98	35.75

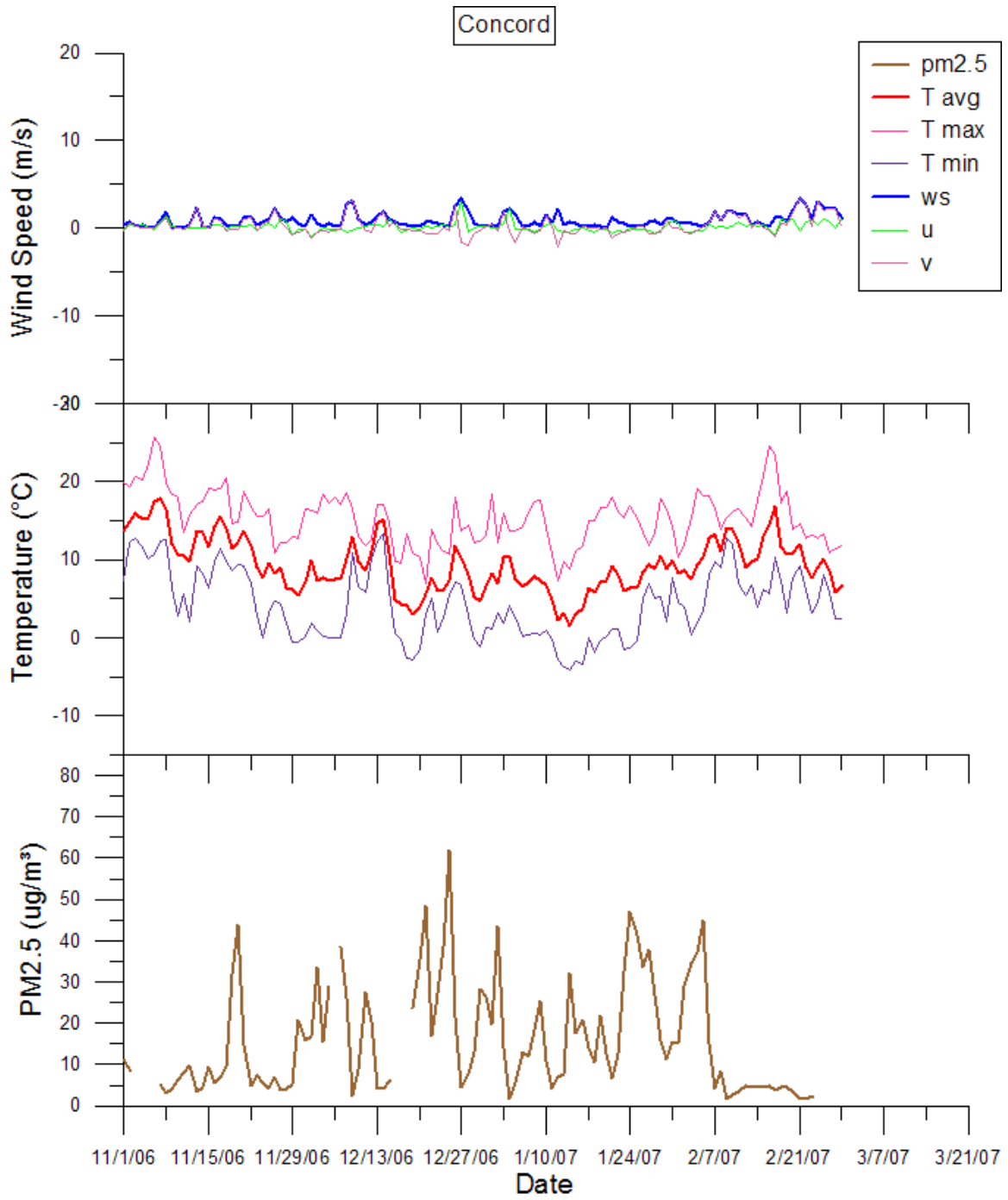
PM_{2.5} and meteorology:

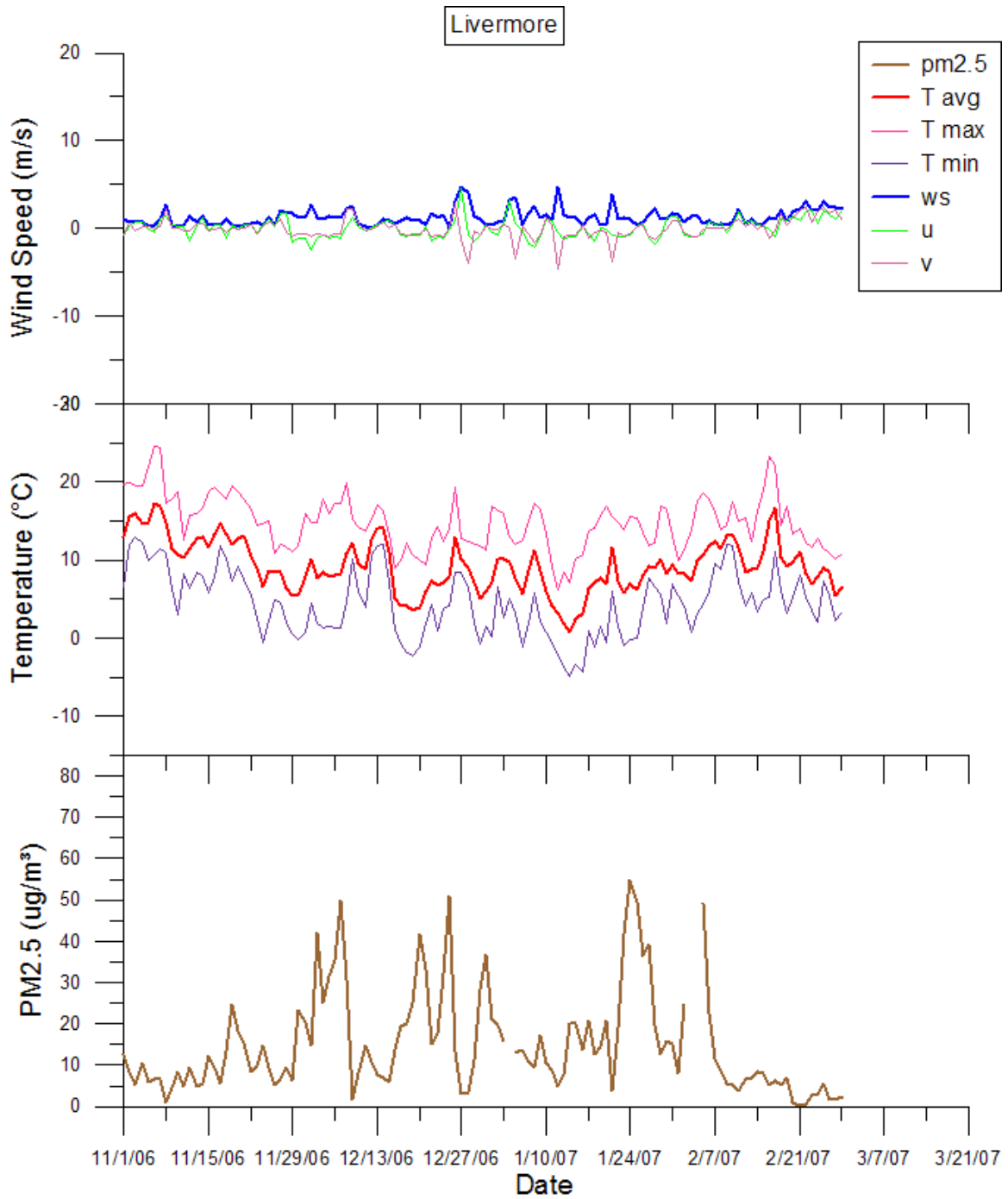
PM_{2.5} concentration and meteorology during winter time

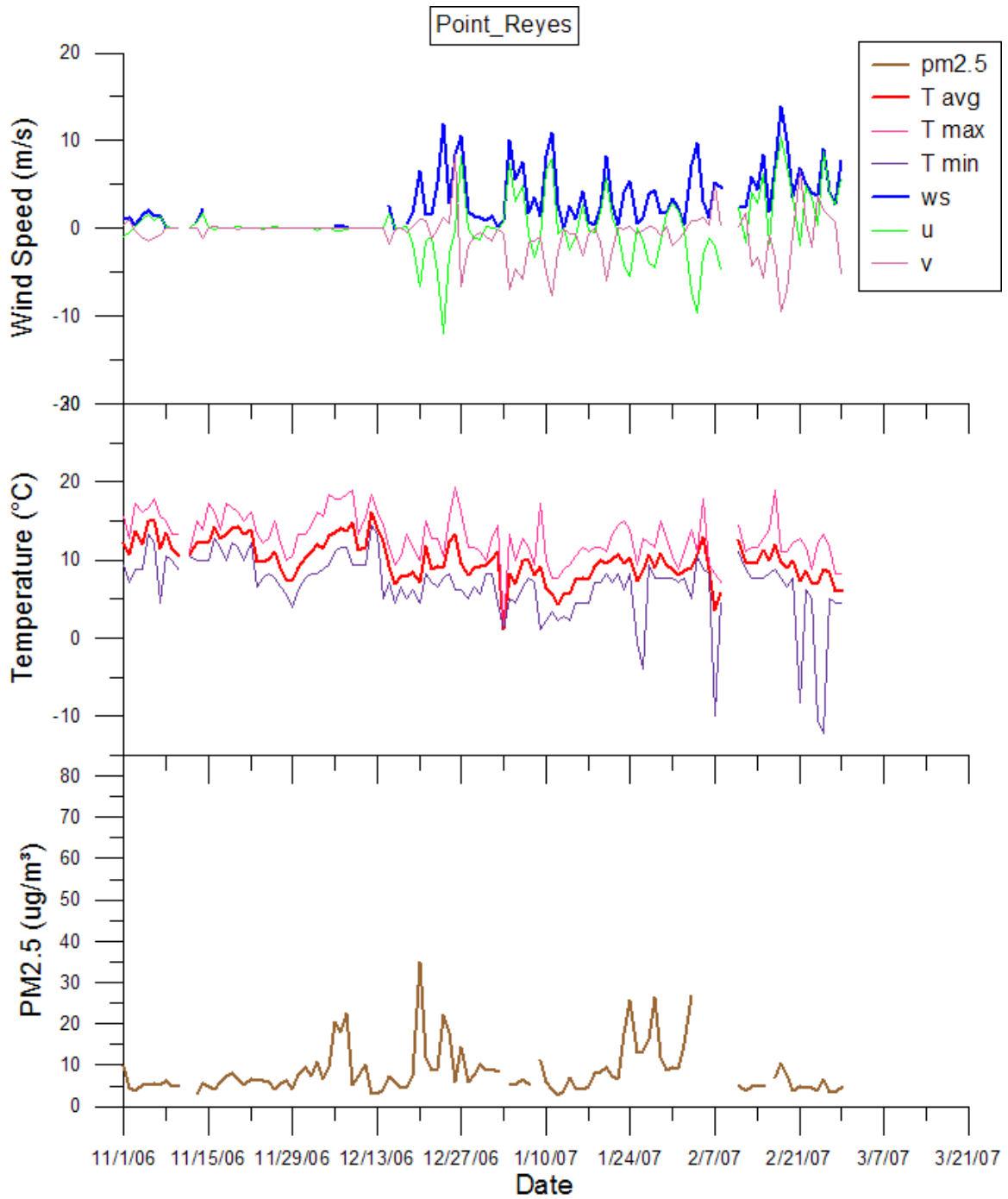
- BAAQMD stations:

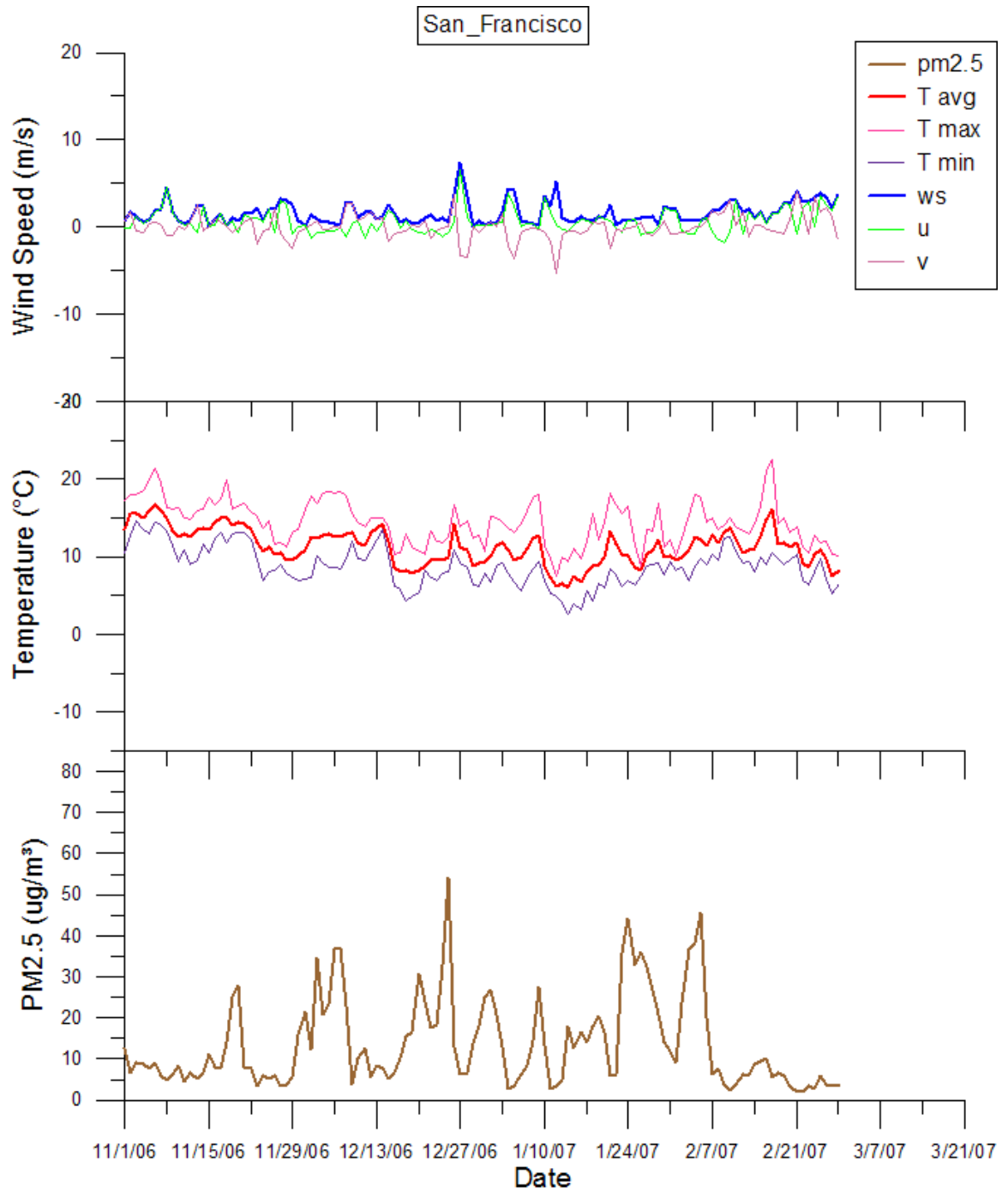




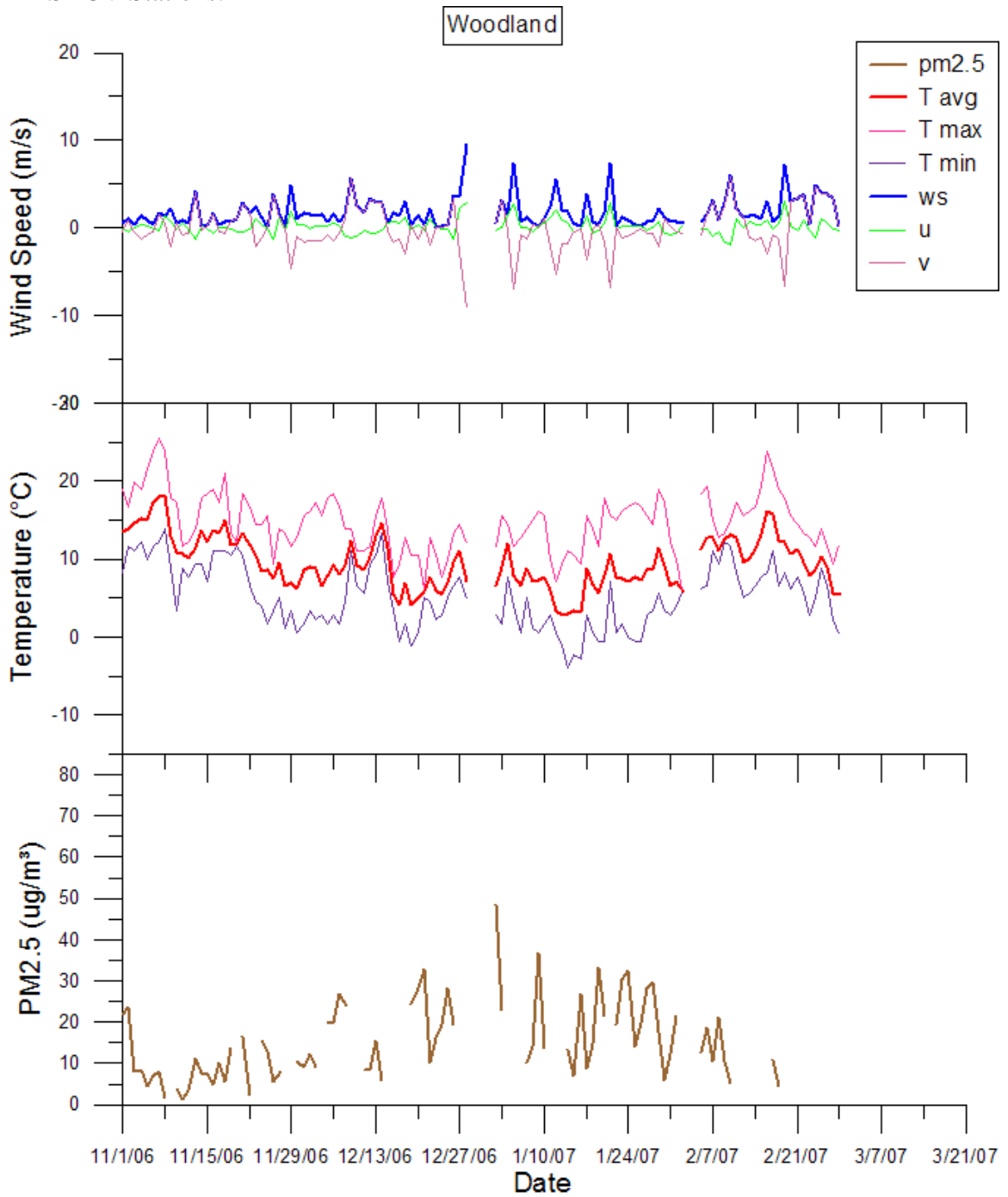


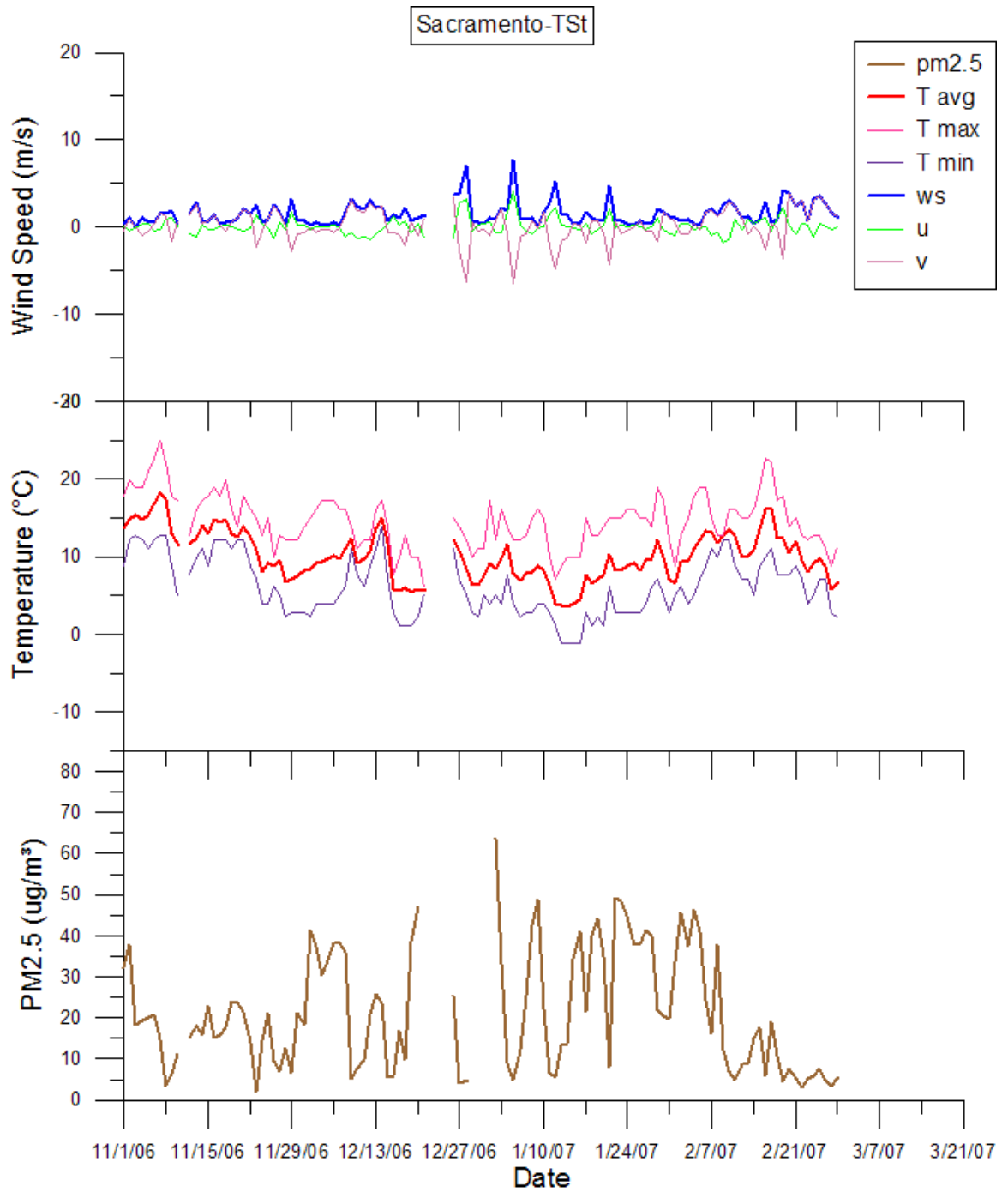


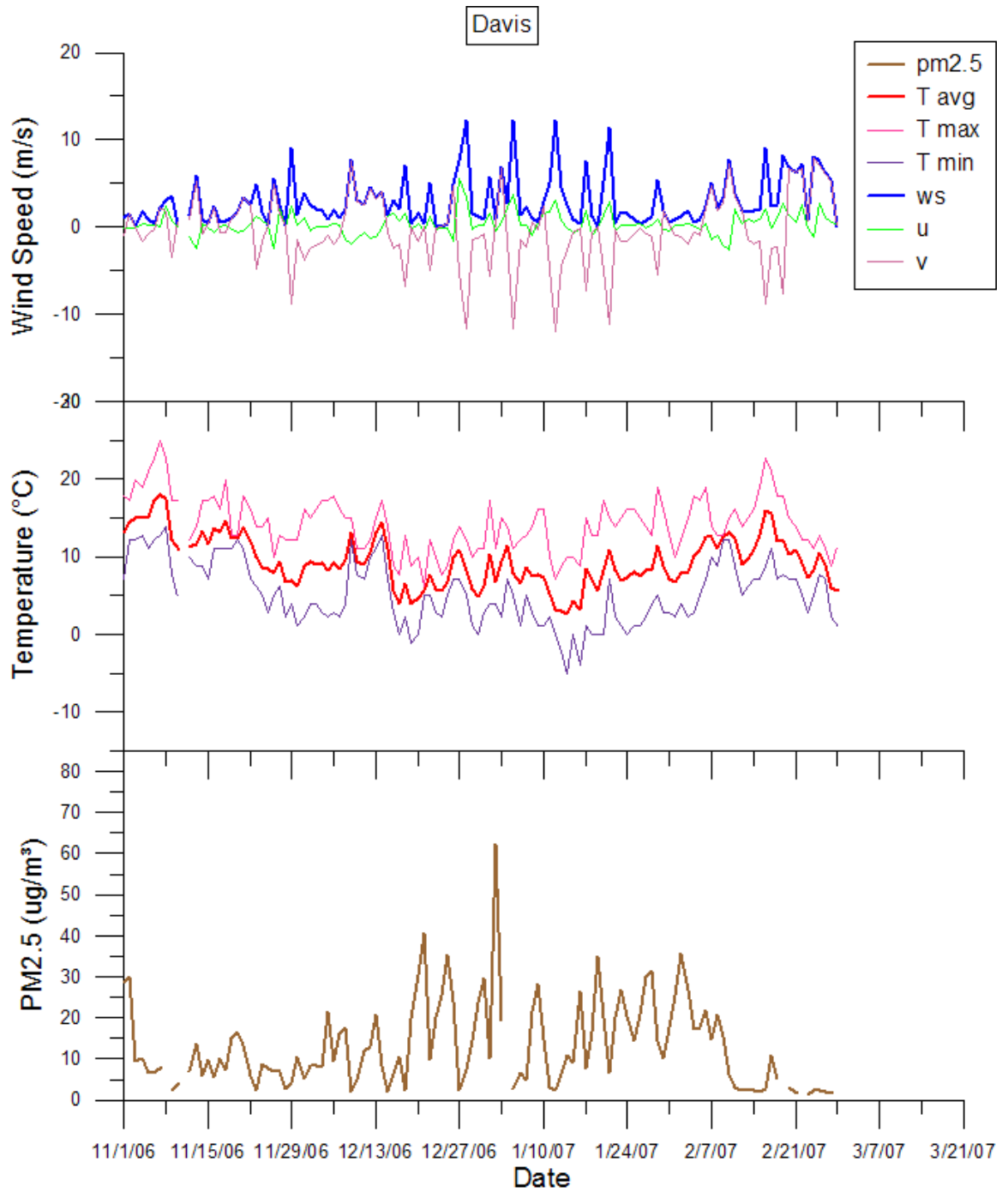


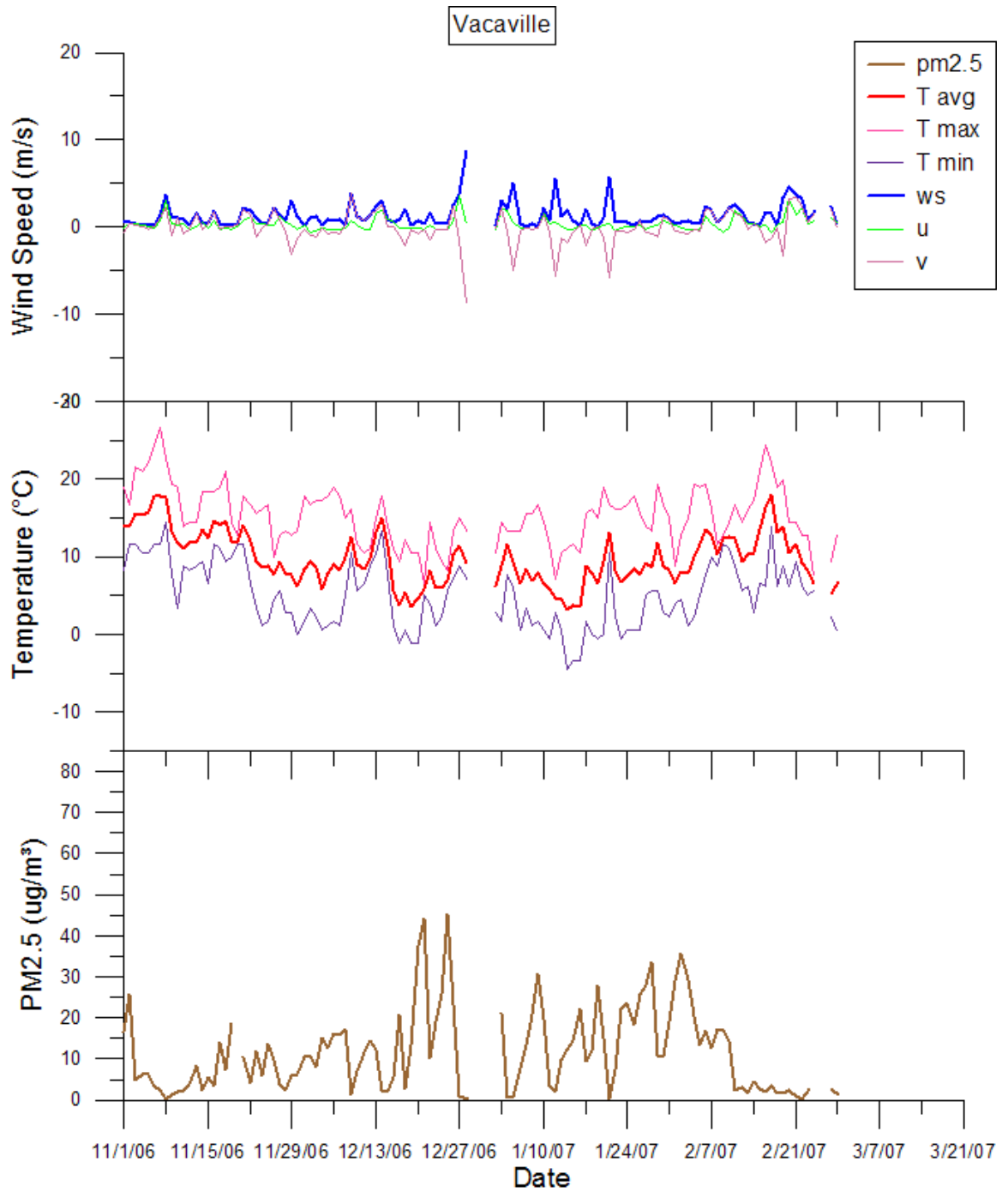


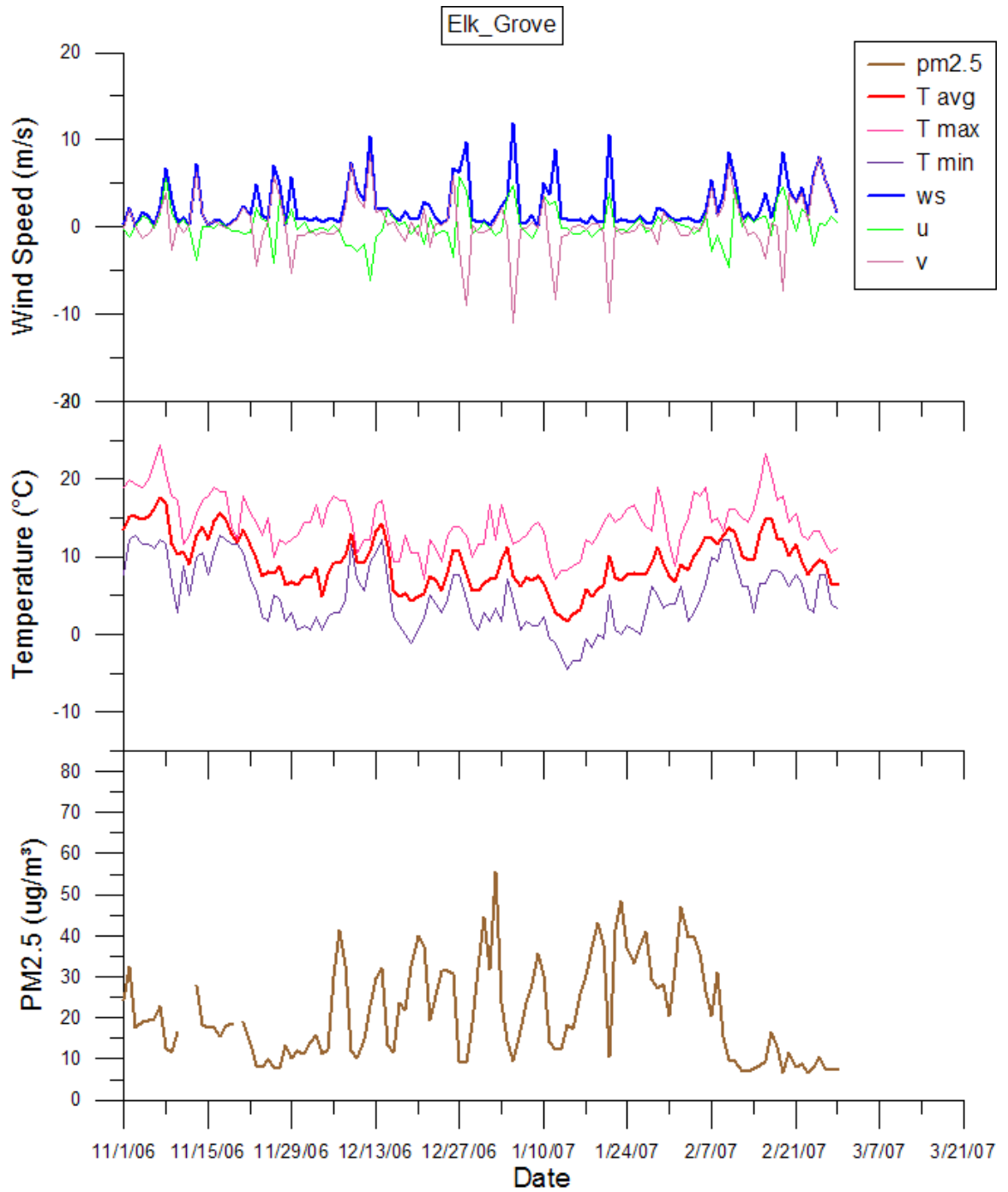
▪ SACV Stations:



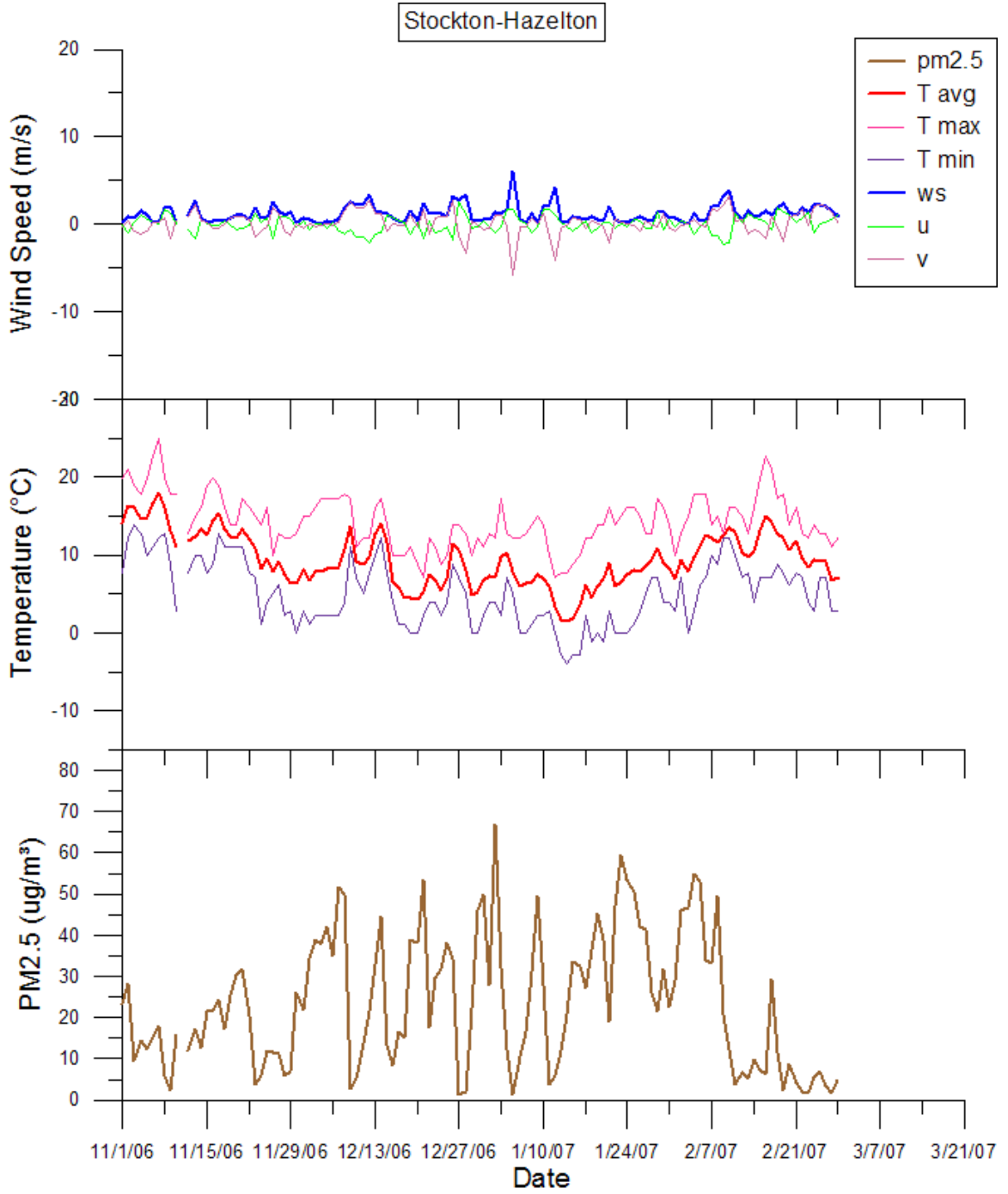


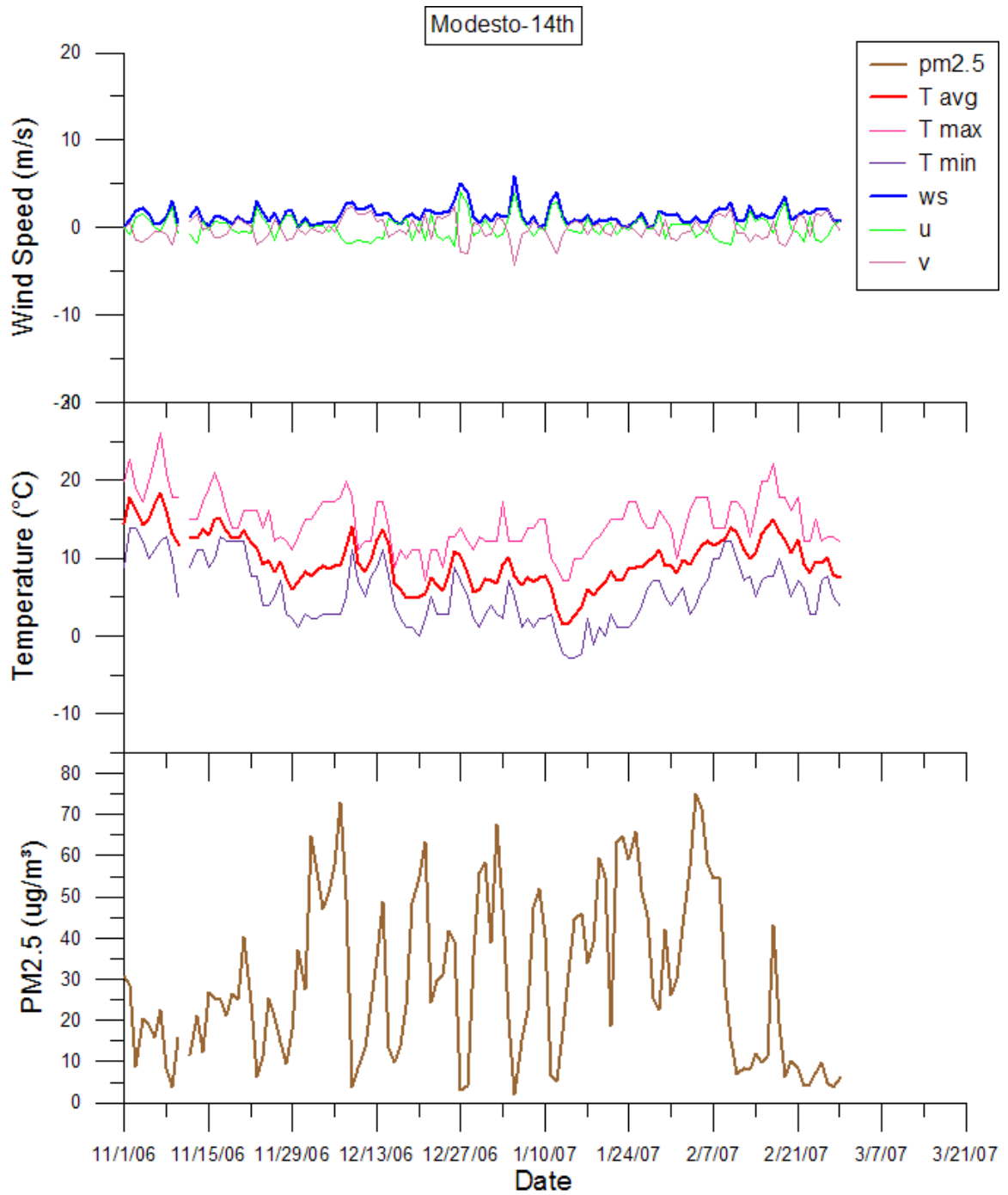


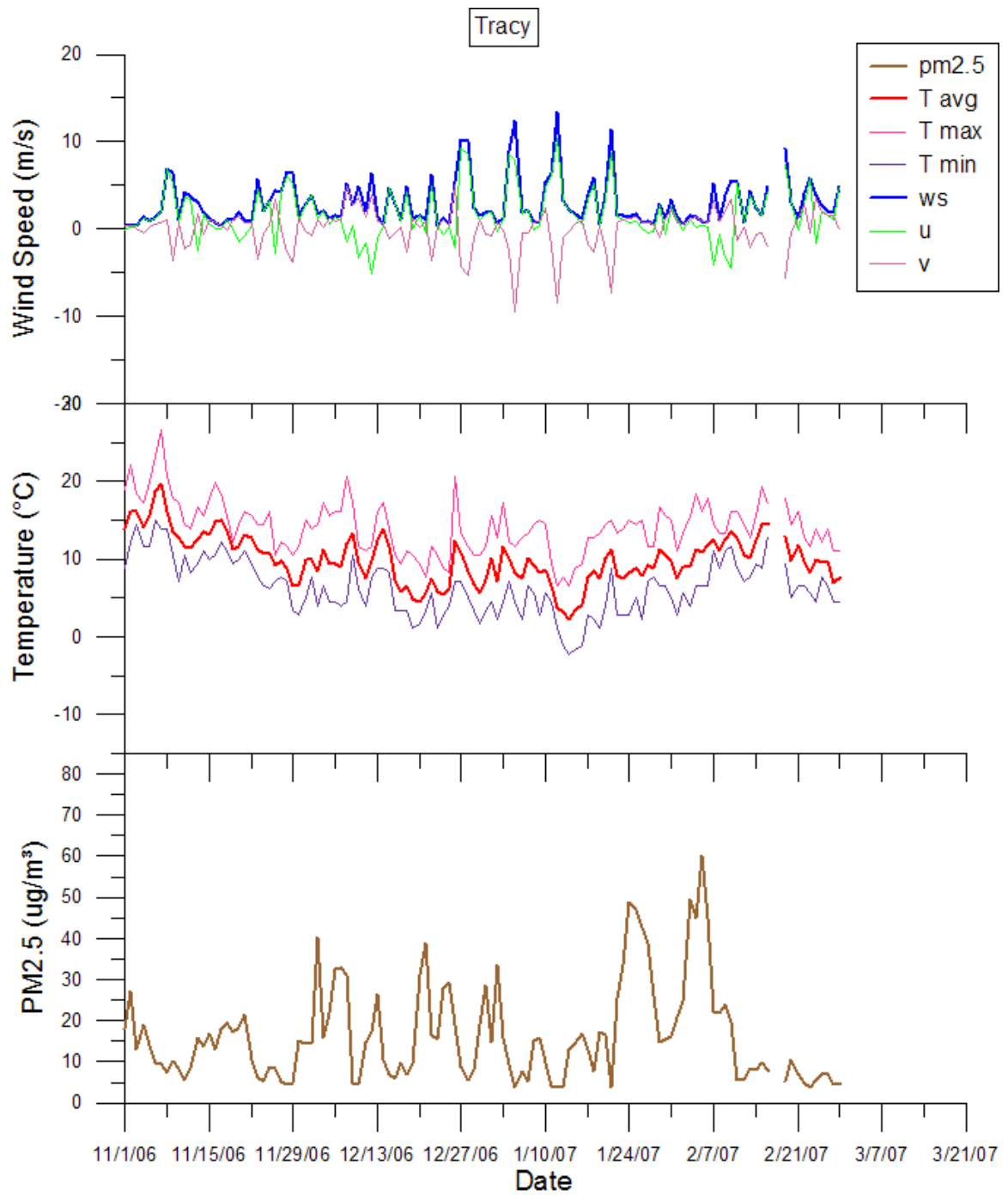




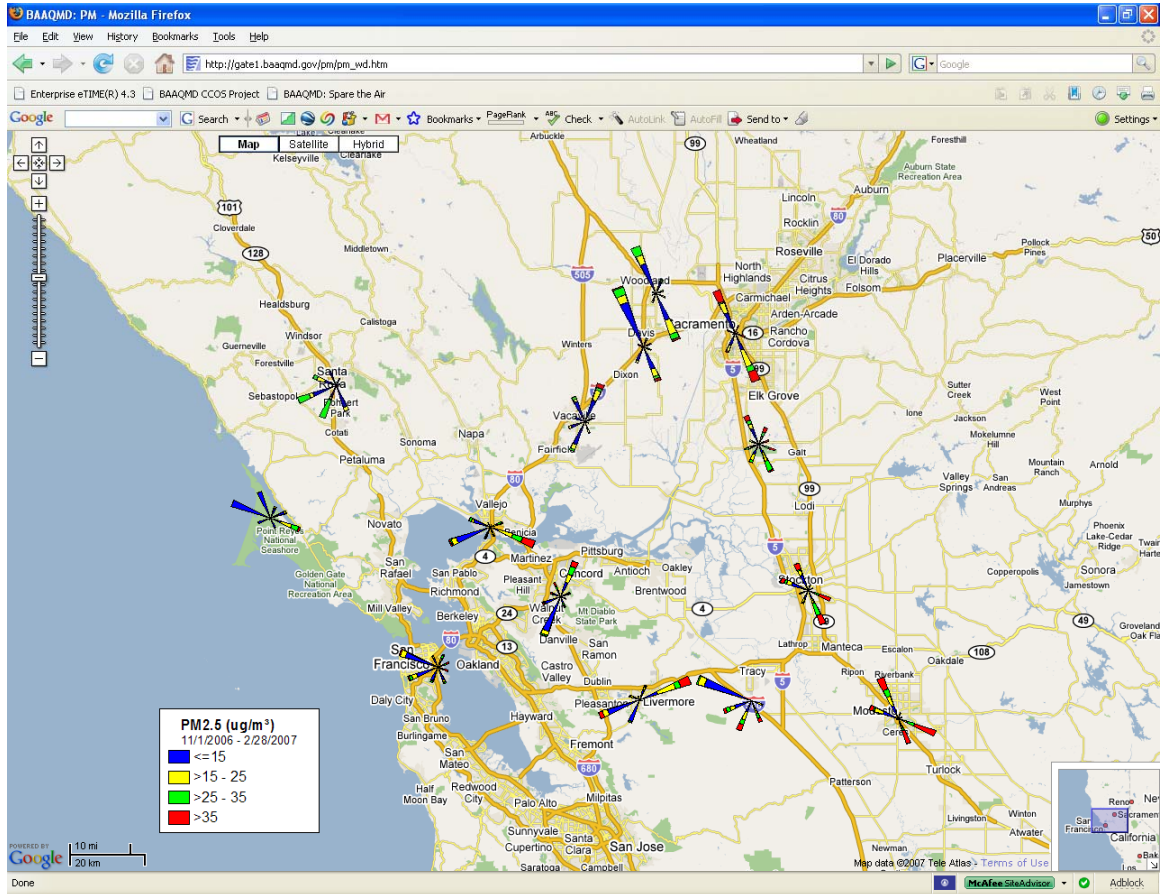
▪ SJV Stations:





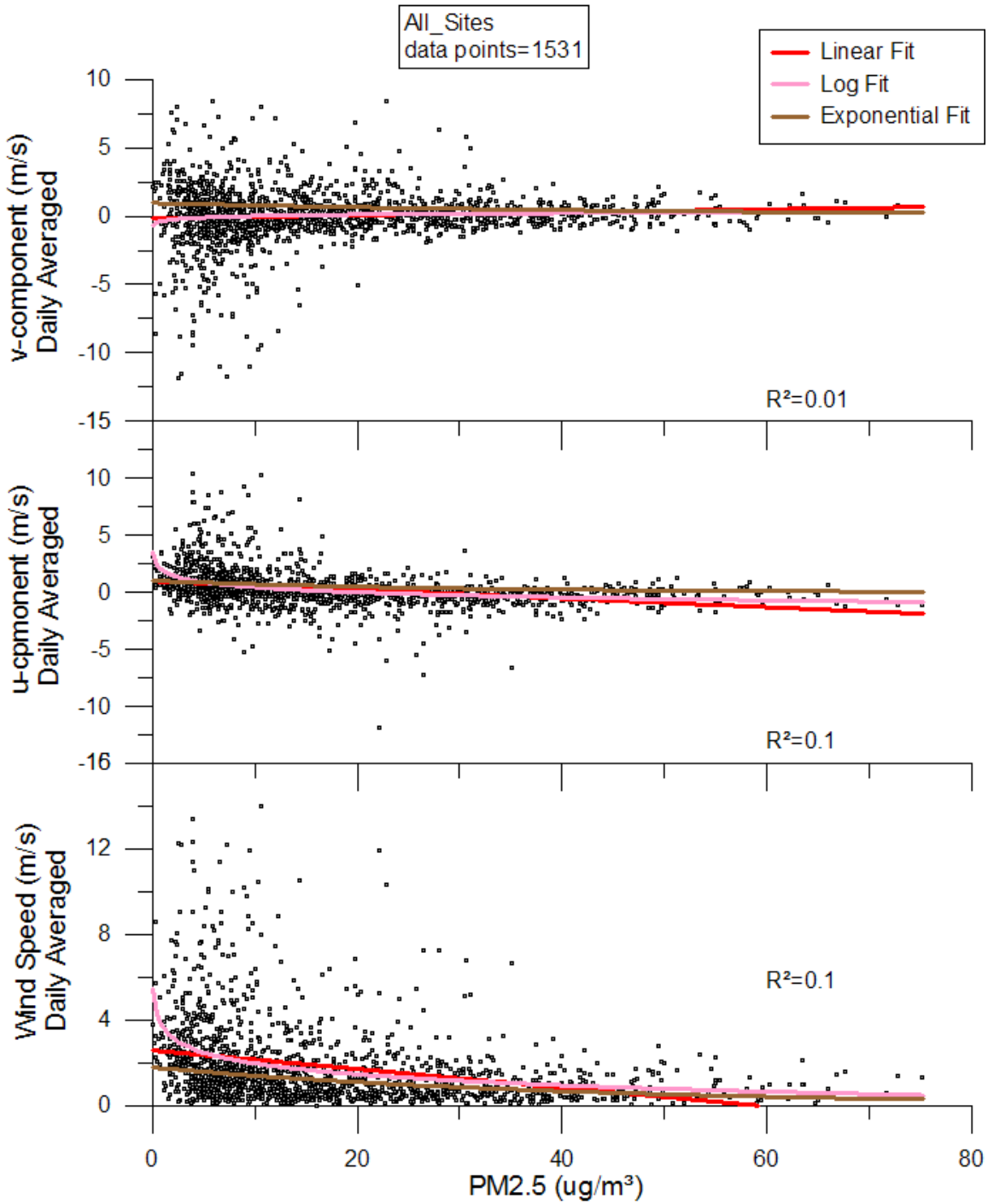


PM_{2.5} concentration and wind directions

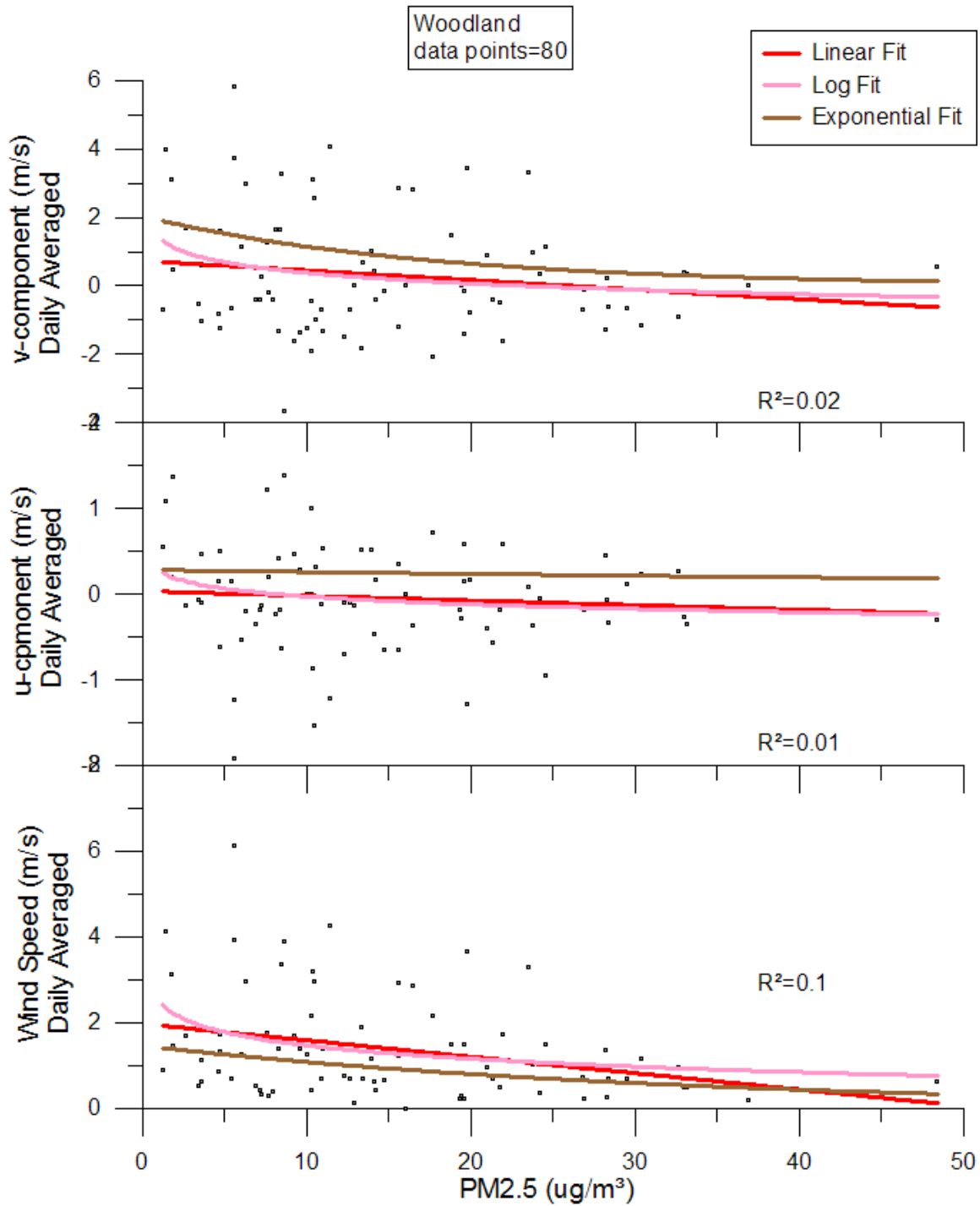


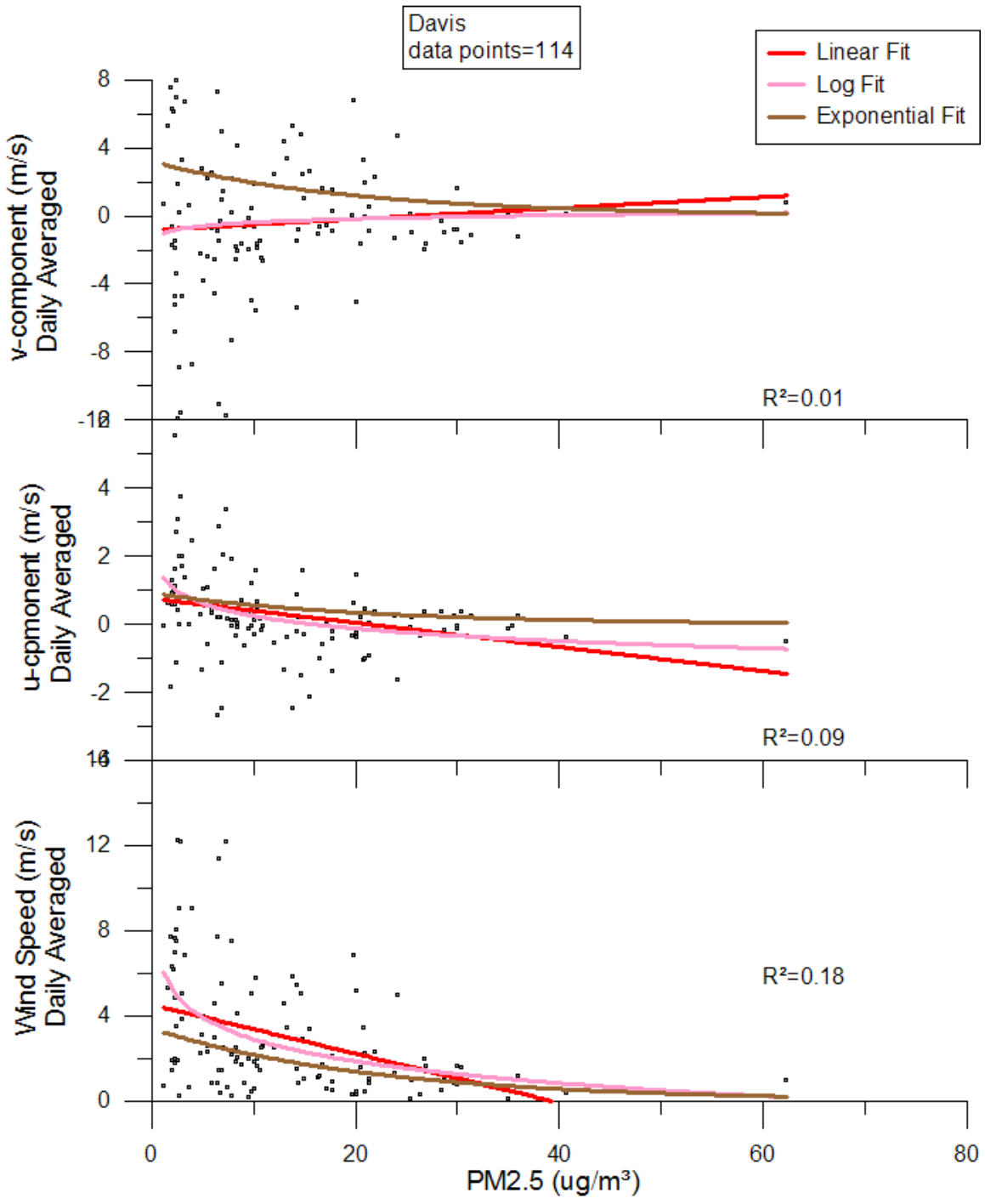
PM_{2.5} concentration and wind speed:

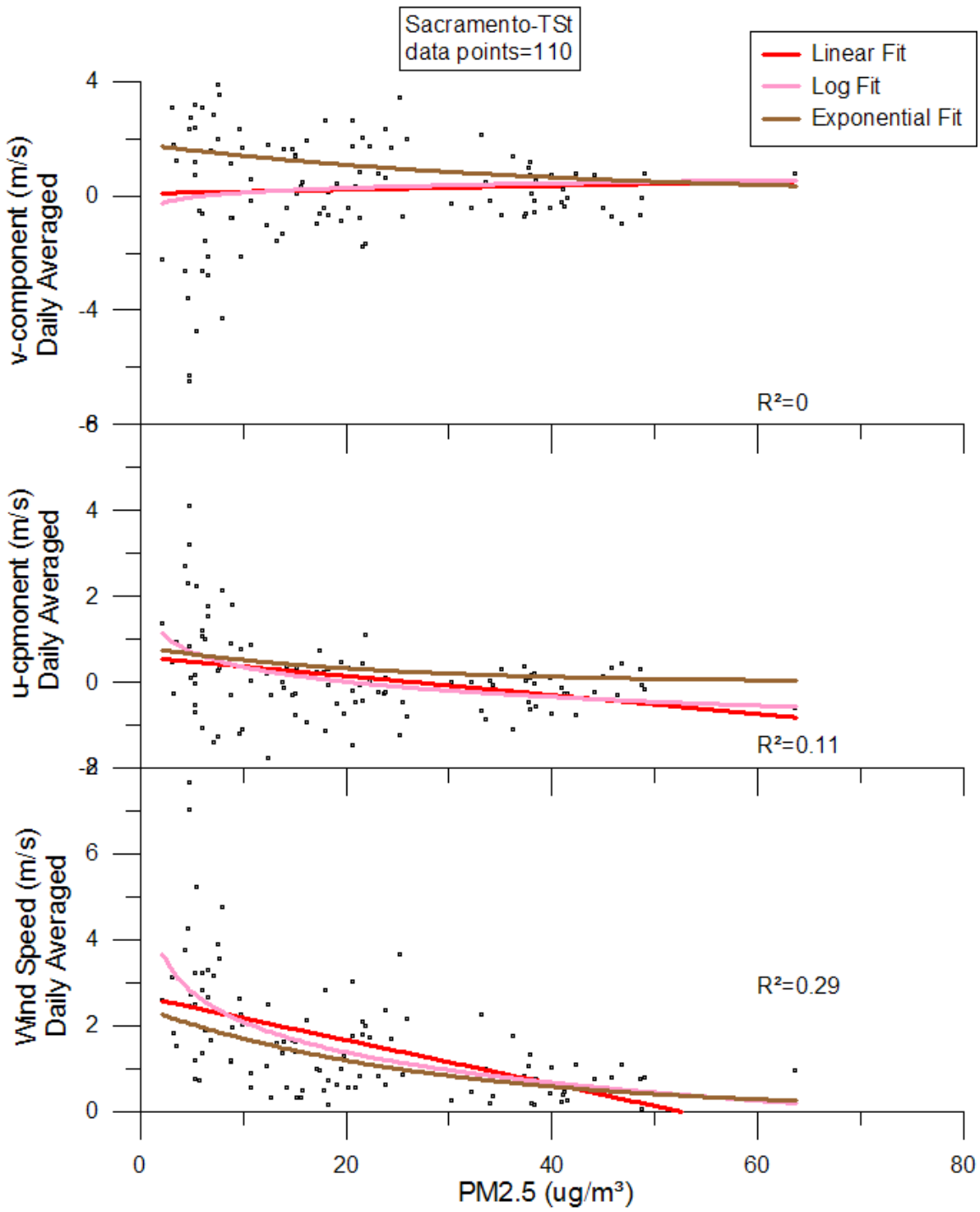
No significant correlation has been found between PM_{2.5} and wind speed for all and each individual station during this winter season.

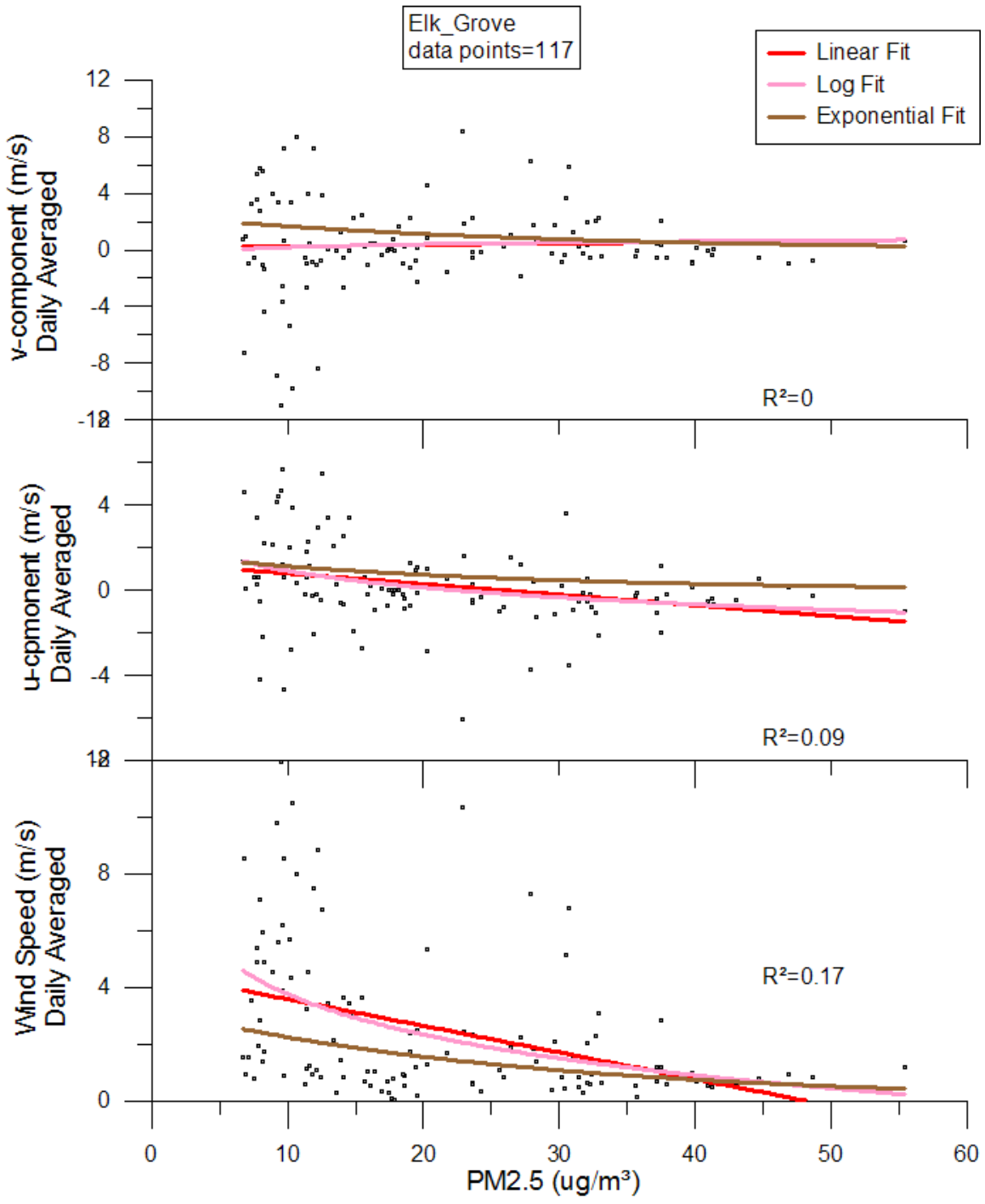


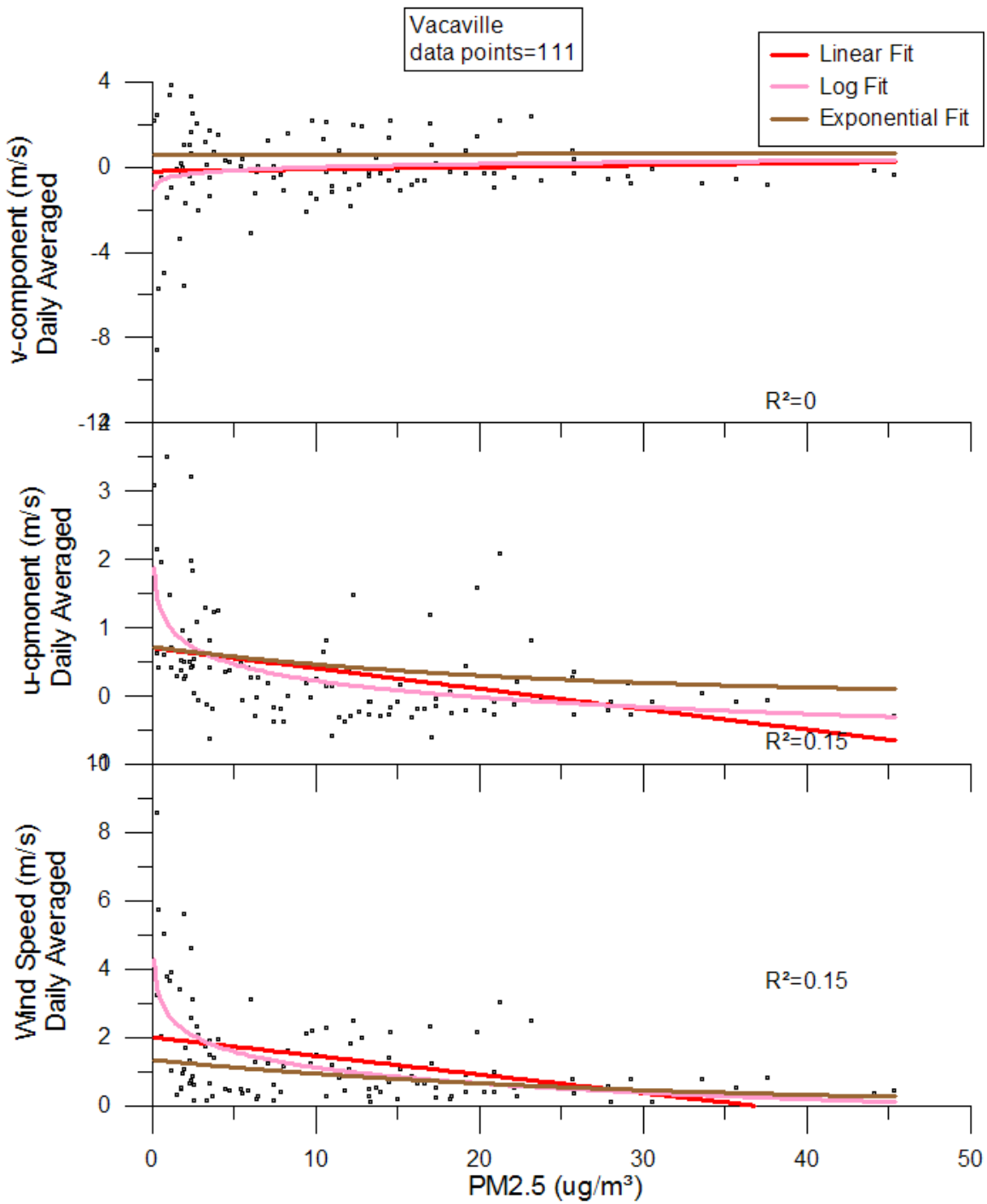
SACV stations:



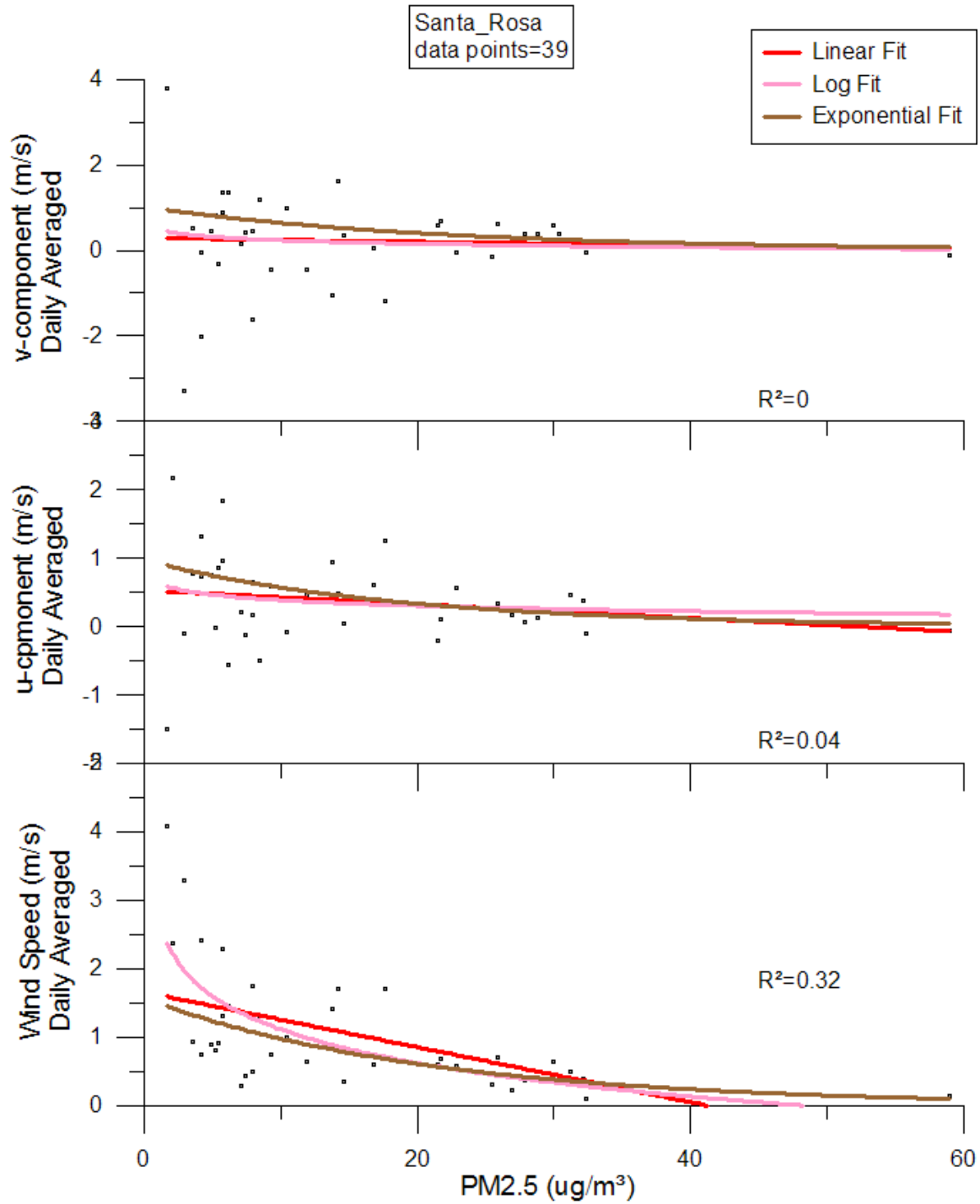


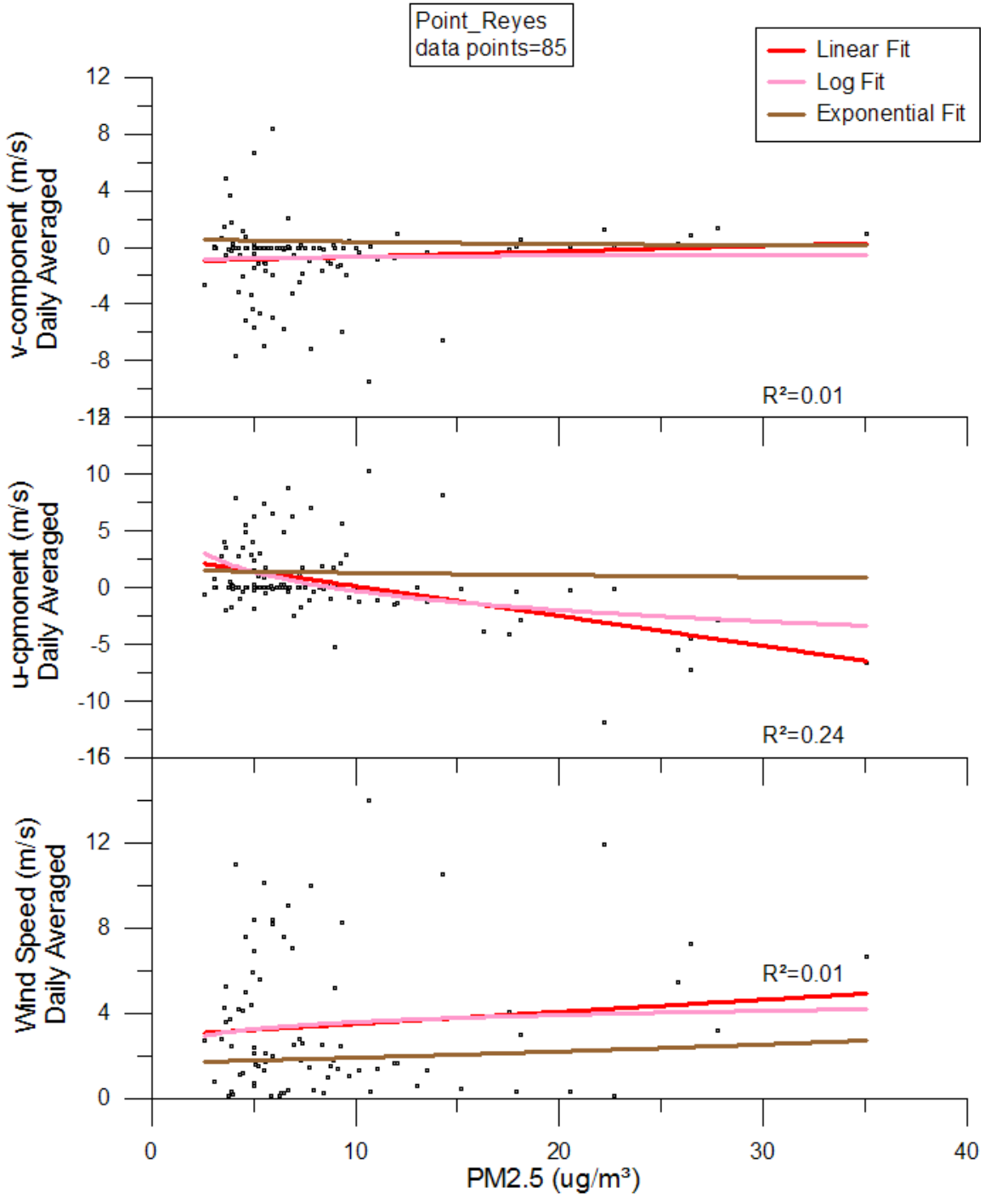


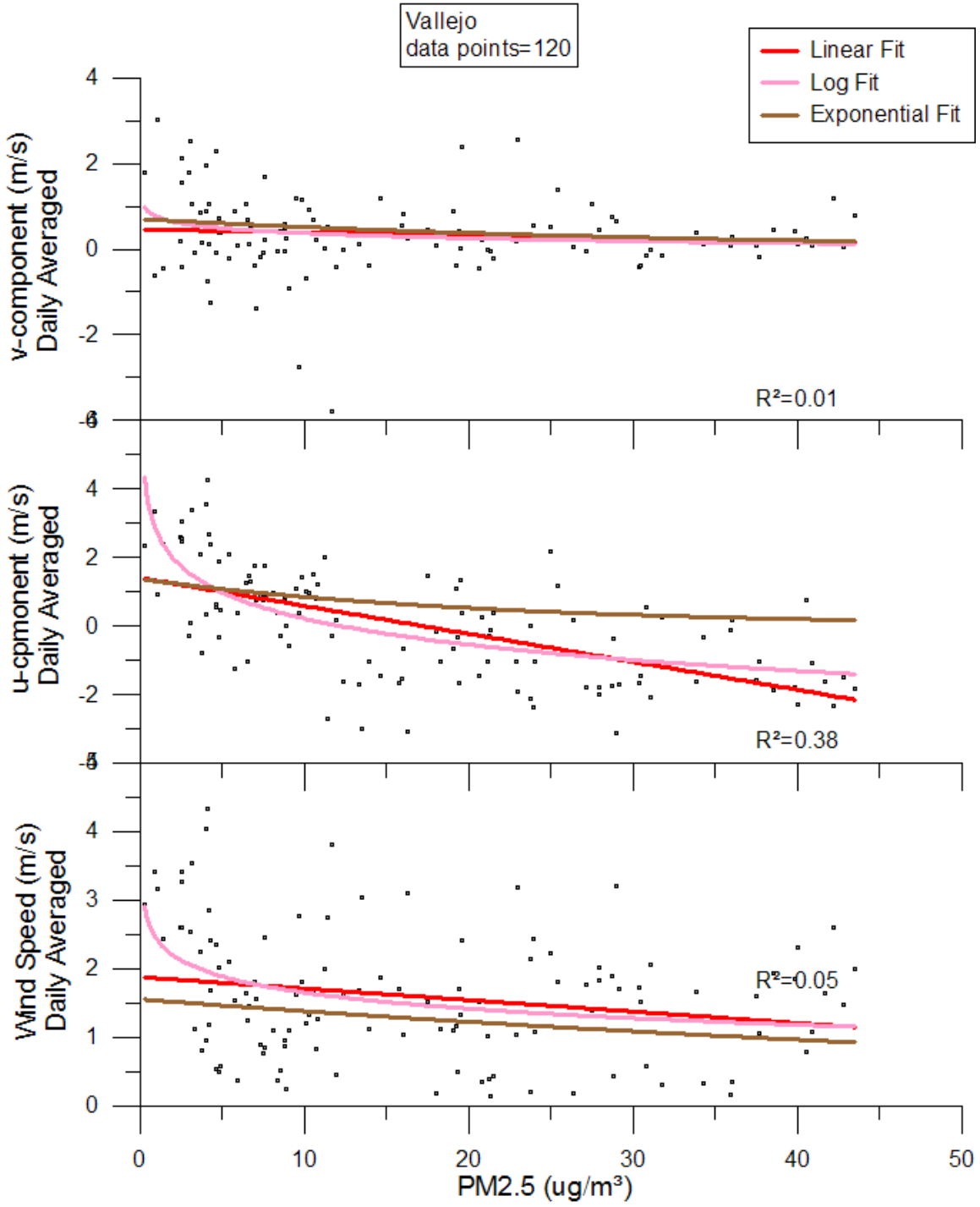


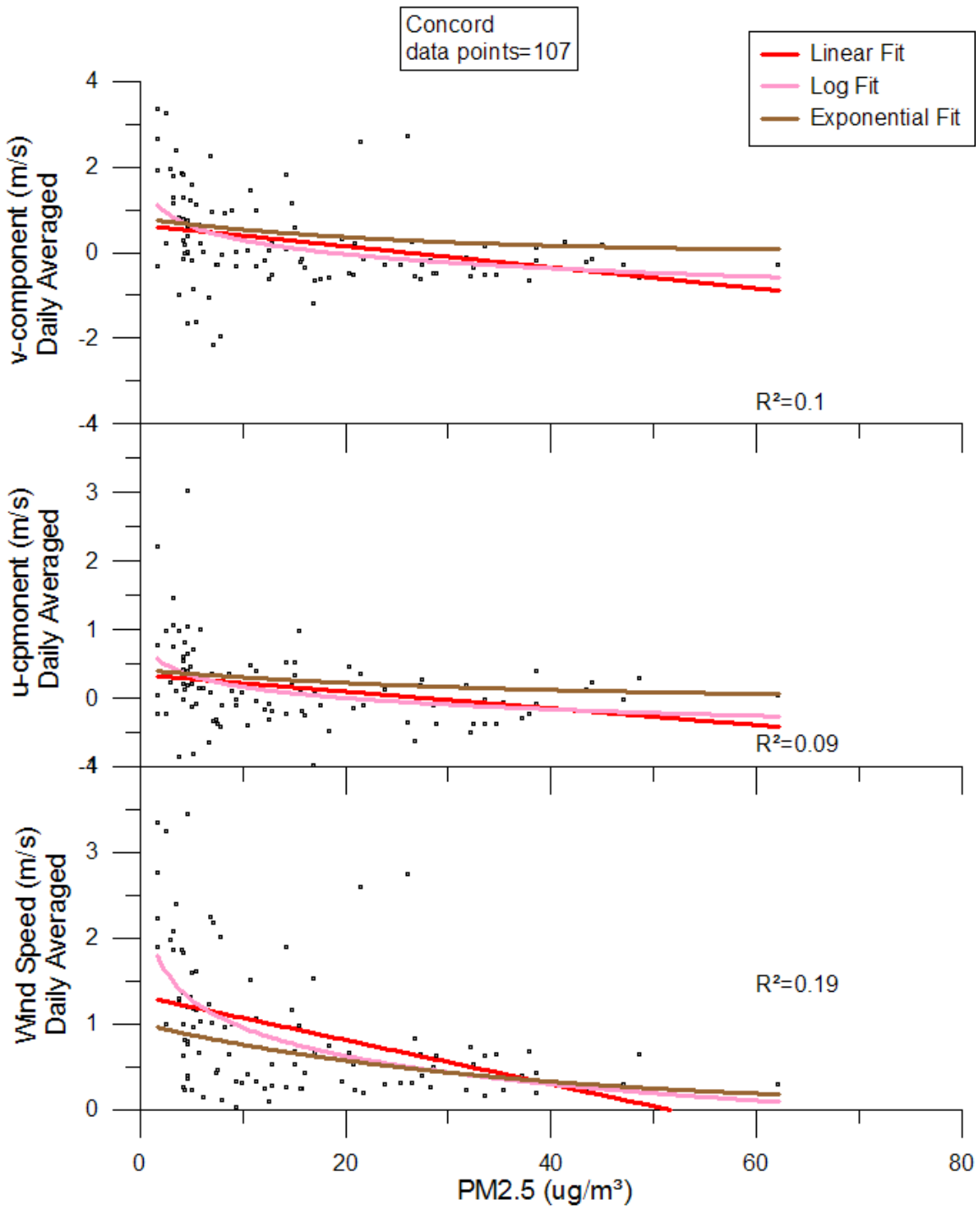


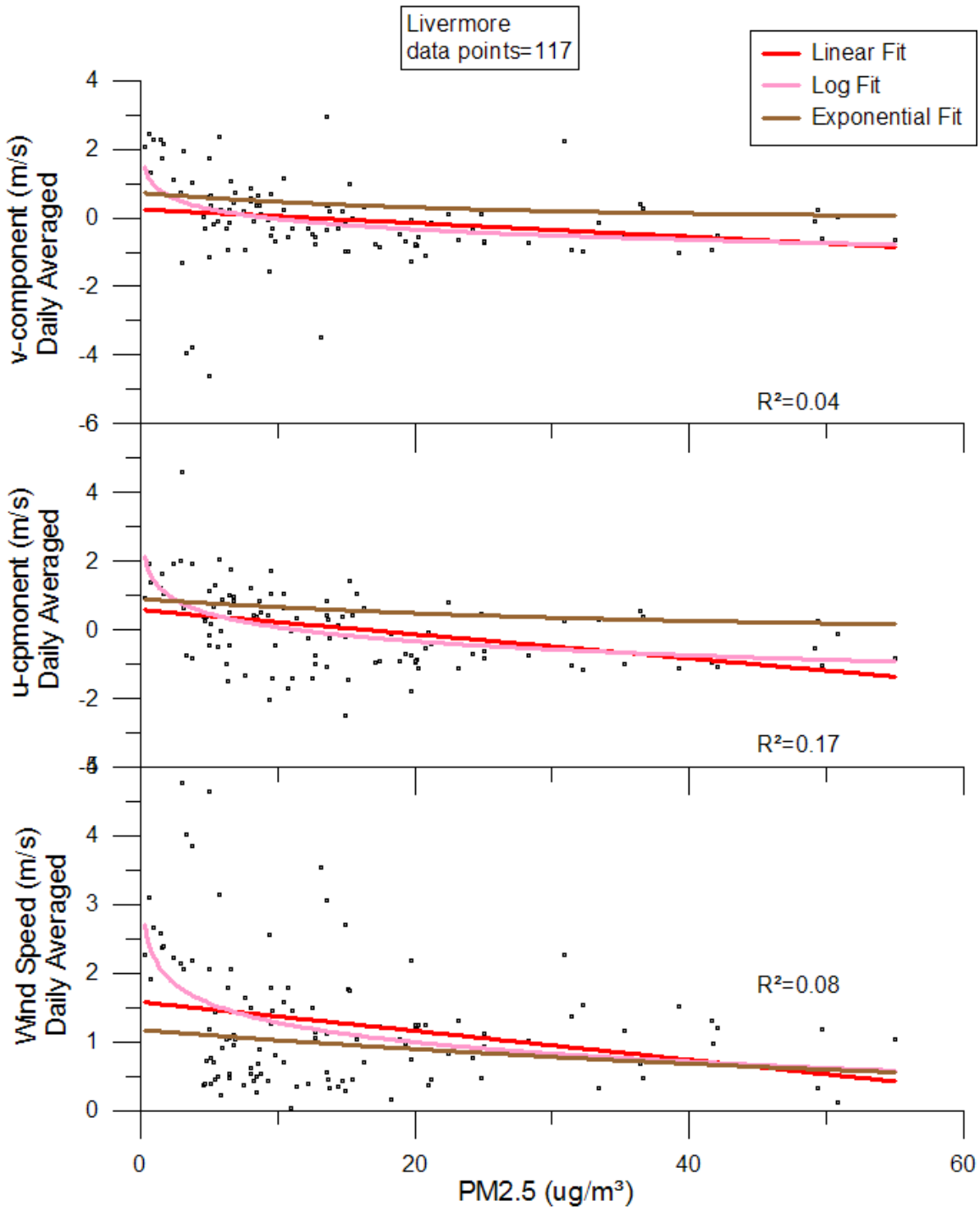
BAAQMD stations:

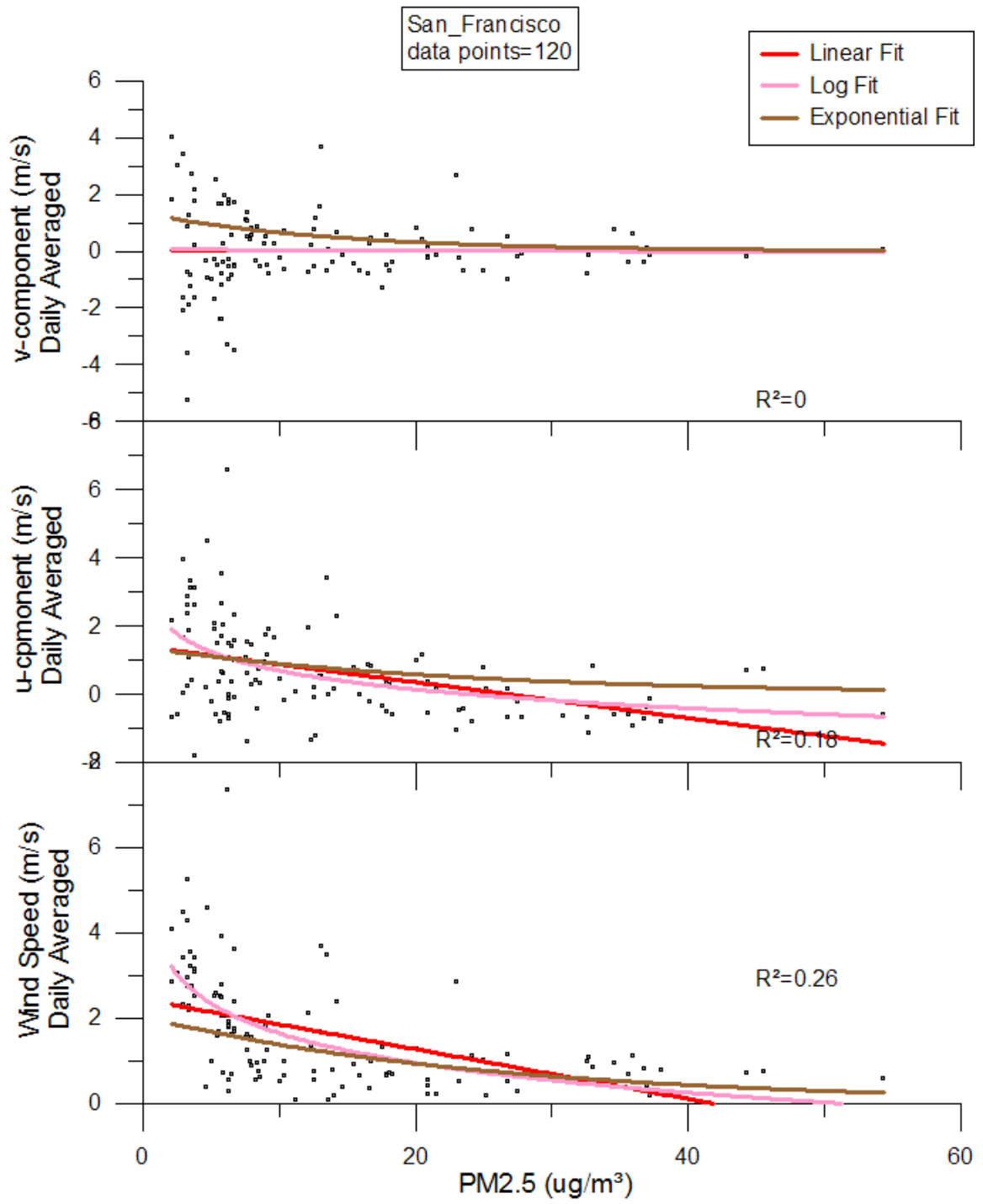




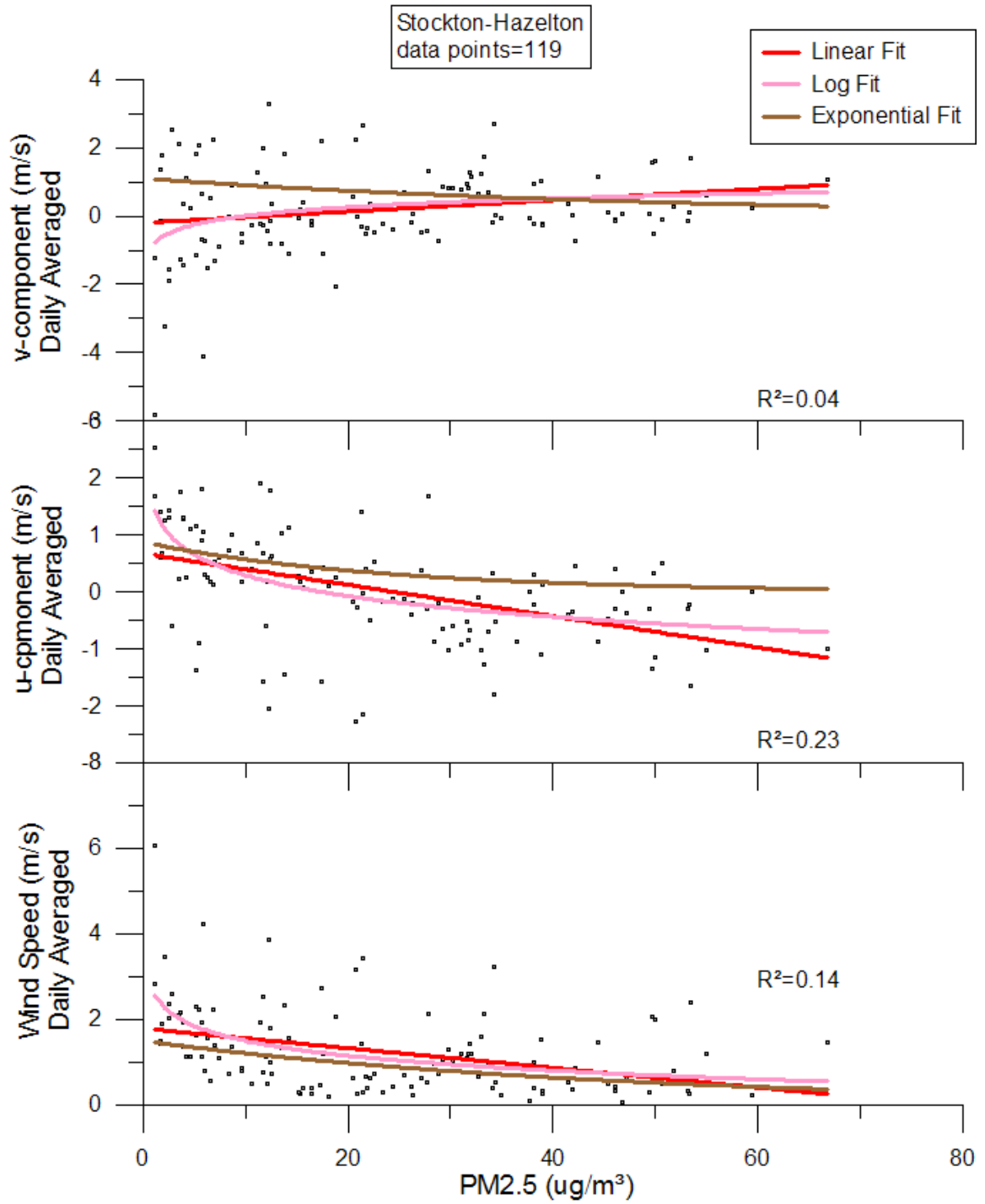


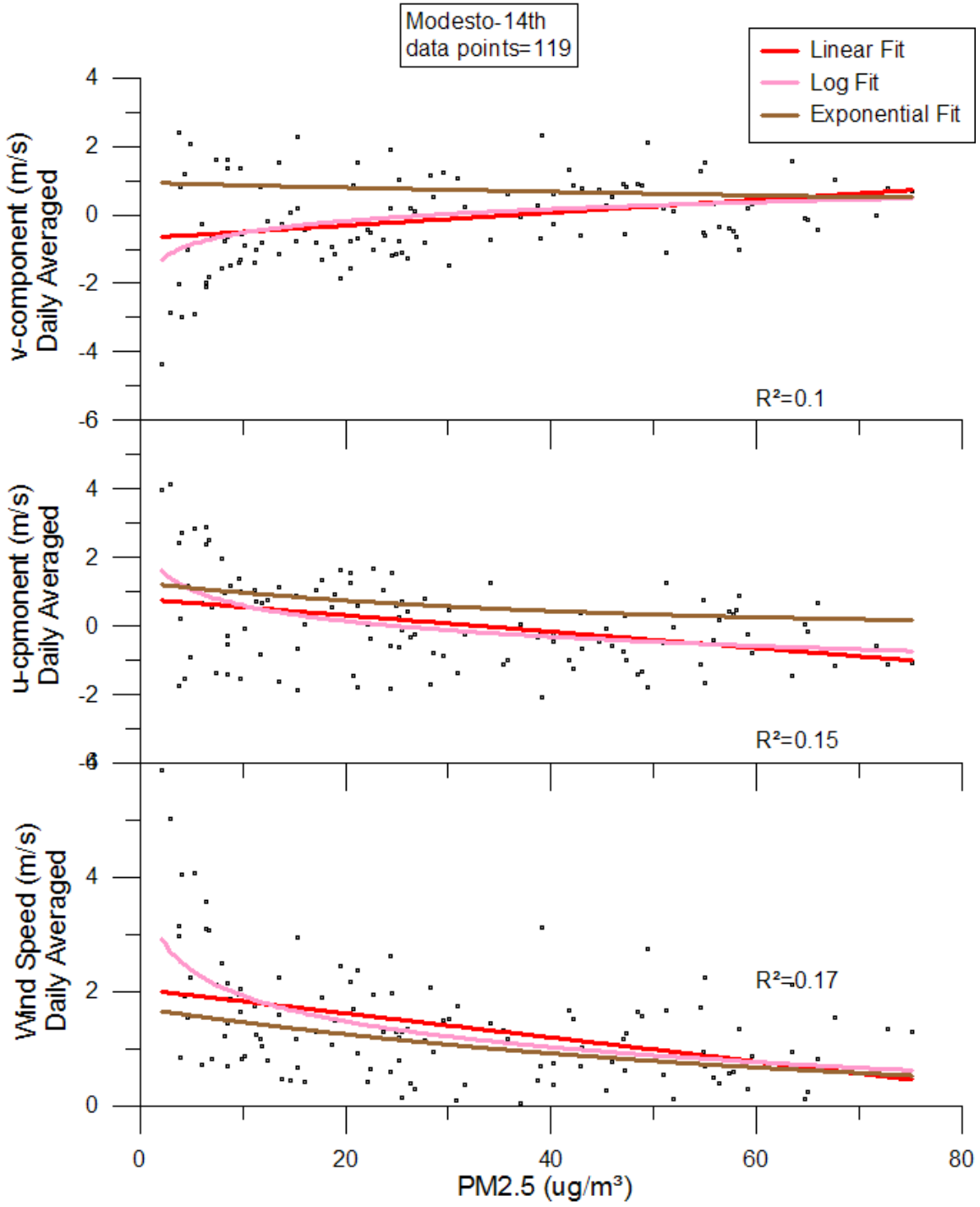


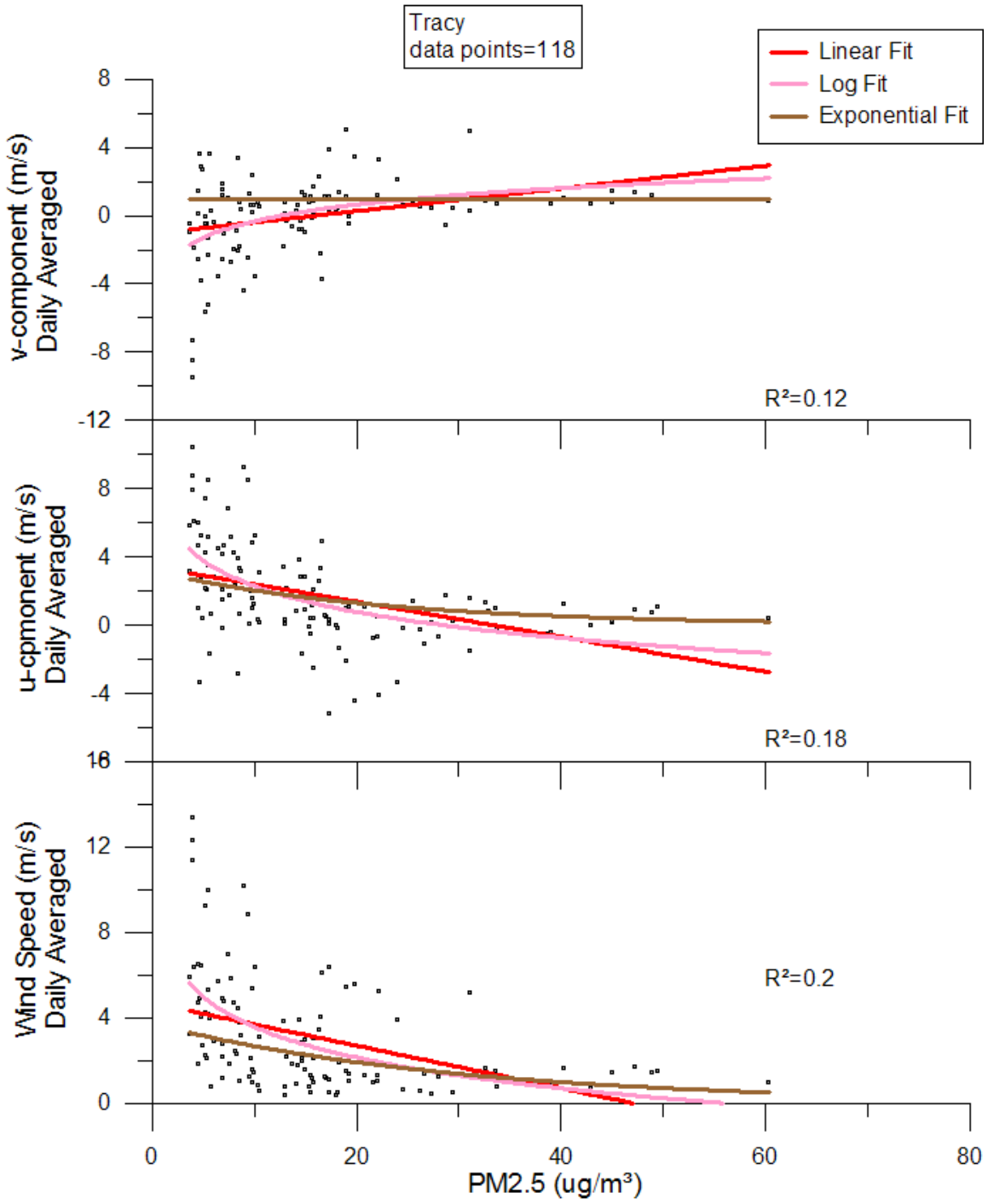




SJV stations:







Reference:

Fairley, David, 2007: Bay Area PM2.5 Concentrations and relation to meteorology,
(DRAFT 2)