Field Evaluation
PurpleAir PA-II-FLEX

South Coast AQMD

AQ-SPEC
Air Quality Sensor Performance Evaluation Center

Background

- From 03/17/2022 to 05/24/2022, three **PurpleAir PA-II-FLEX (hereinafter PA-II-FLEX)** sensors were deployed at the South Coast AQMD stationary ambient monitoring site in Rubidoux and were run side-by-side with Federal Equivalent Method (FEM) instruments measuring the same pollutants

PA-II-FLEX (*3 units tested*):

- Particle sensor: optical; non-FEM (dual Plantower PMS6003)
- Each unit reports: $PM_{1.0}$, $PM_{2.5}$ and PM_{10} (µg/m^3)
- Also measures: internal temperature (°F) and internal relative humidity (%)
- Unit cost: $299
- Time resolution: 1-min
- Units IDs: Unit #1 (7fd9, 7fd9-b); Unit #2 (7f6d, 7f6d-b); Unit #3 (2bf1, 2bf1-b)

Note: each unit has two PM sensors and reports two PM values (Channel A and Channel B. Sensors are named Unit ID and Unit ID-b for Channel A and Channel B values, respectively.)

South Coast AQMD Reference Instruments:

- GRIMM EDM 180 (*hereinafter FEM GRIMM for $PM_{2.5}$, GRIMM otherwise*):
  - Optical particle counter (FEM $PM_{2.5}$)
  - Measures $PM_{1.0}$, $PM_{2.5}$, and PM_{10} (µg/m^3)
  - Cost: ~$25,000 and up
  - Time resolution: 1-min
- Teledyne API T640 (*hereinafter FEM T640 for $PM_{2.5}$, T640 otherwise*):
  - Optical particle counter (FEM $PM_{2.5}$)
  - Measures $PM_{1.0}$, $PM_{2.5}$ and PM_{10} (µg/m^3)
  - Unit cost: ~$21,000
  - Time resolution: 1-min
- Met Station (T, RH, P, WS, WD)
  - Unit cost: ~$5,000
  - Time resolution: 1-min

FEM GRIMM

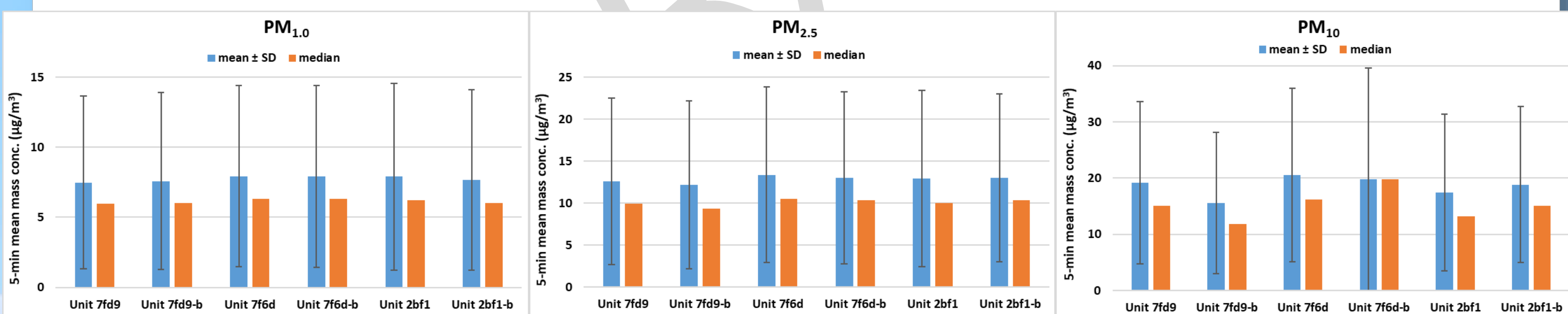
FEM T640

Data validation & recovery

- Basic QA/QC procedures were used to validate the collected data (i.e. obvious outliers, negative values and invalid data-points were eliminated from the data-set)
- Data recovery from all units was ~94% for all PM measurements

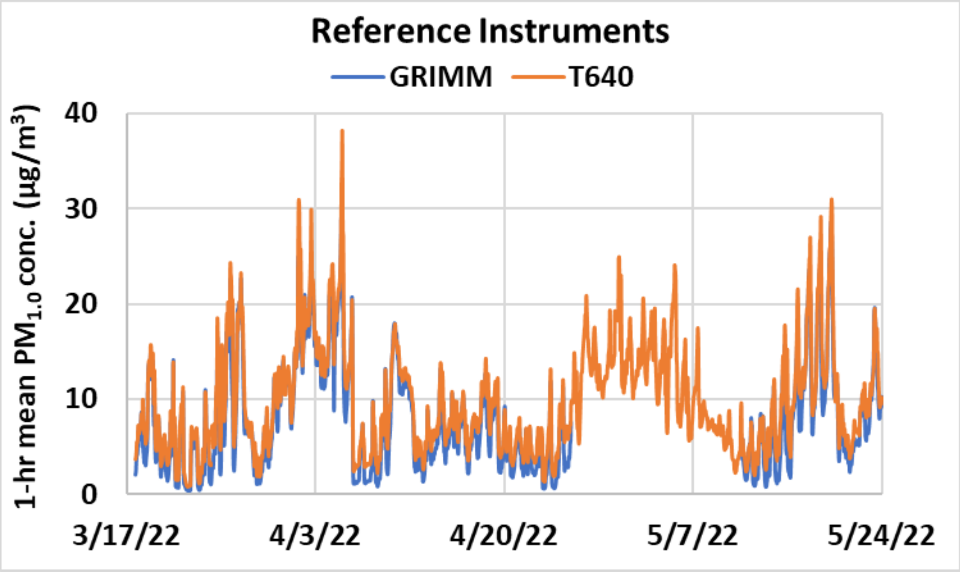
PA-II-FLEX; intra-model variability

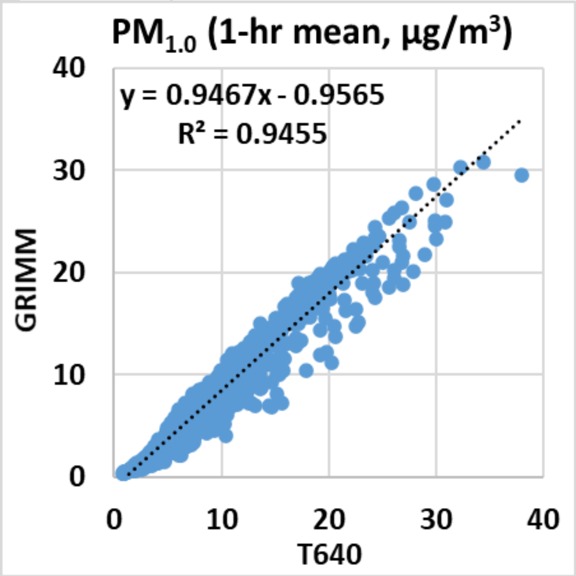
- Absolute intra-model variability was ~0.18, ~0.38 and ~1.64 μg/m^3 for $PM_{1.0}$, $PM_{2.5}$ and PM_{10}, respectively (calculated as the standard deviation of the three sensor means)
- Relative intra-model variability was ~2.3%, ~3.0% and ~8.9% for $PM_{1.0}$, $PM_{2.5}$ and PM_{10}, respectively (calculated as the absolute intra-model variability relative to the mean of the three sensor means)



Reference Instruments: $PM_{1.0}$ GRIMM and T640

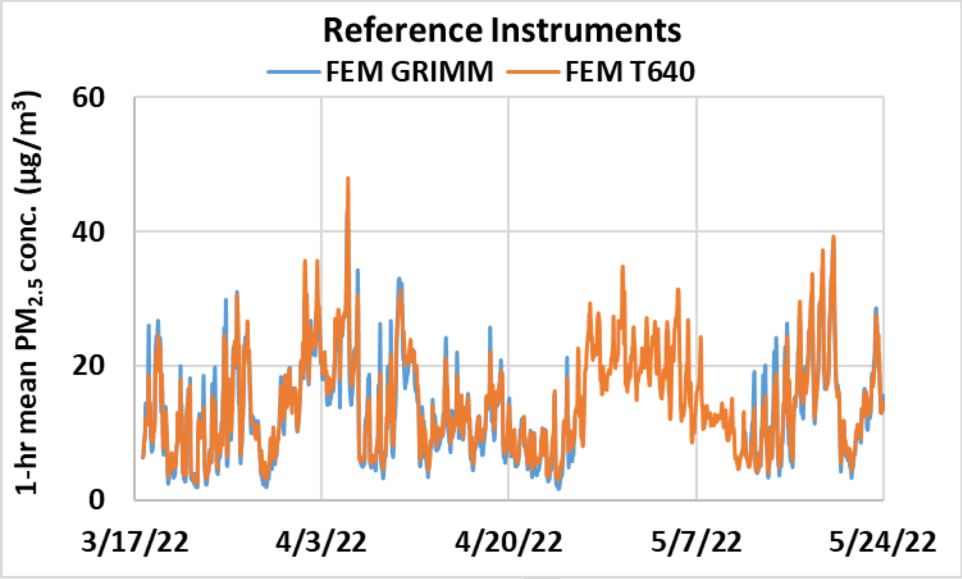
- Data recovery for $PM_{1.0}$ from GRIMM and T640 was ~98% and ~93%, respectively.
- Very strong correlations between the reference instruments for $PM_{1.0}$ measurements (R^2 ~0.95) were observed.

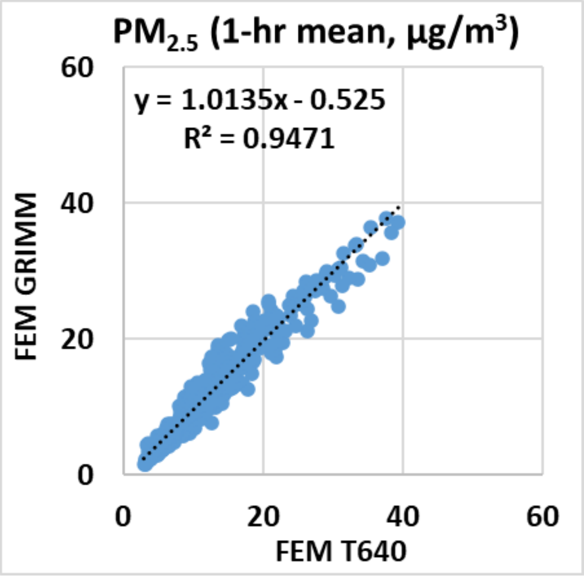




Reference Instruments: $PM_{2.5}$ FEM GRIMM and FEM T640

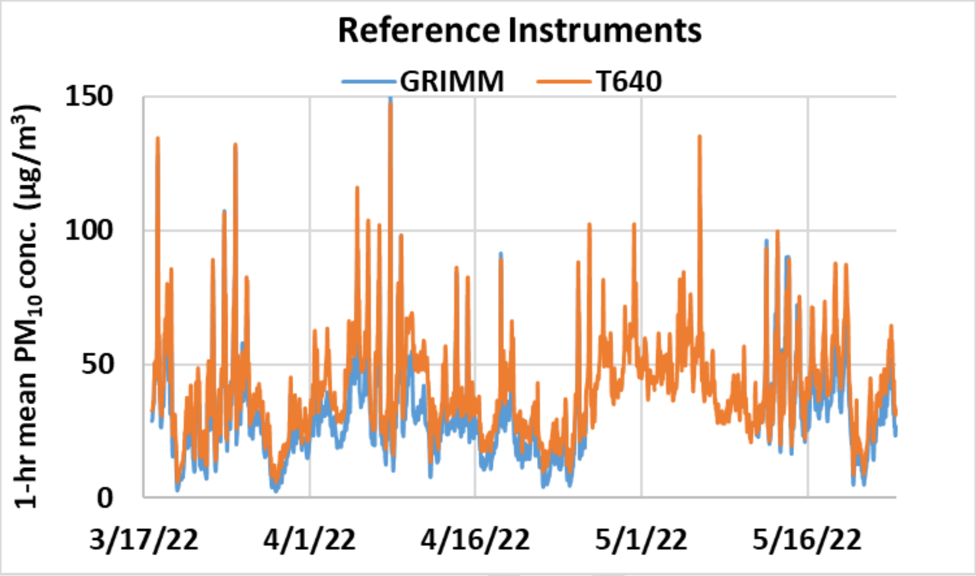
- Data recovery for $PM_{2.5}$ from FEM GRIMM and FEM T640 was ~ 98% and ~ 93%, respectively.
- Very strong correlations between the reference instruments for $PM_{2.5}$ measurements (R^2 ~0.95) were observed.

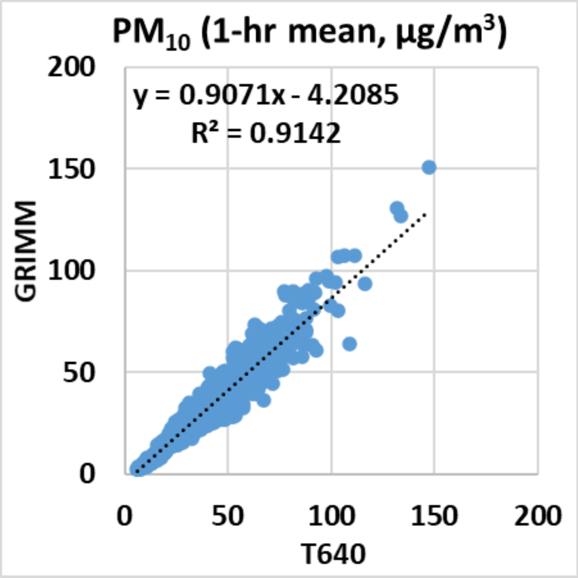




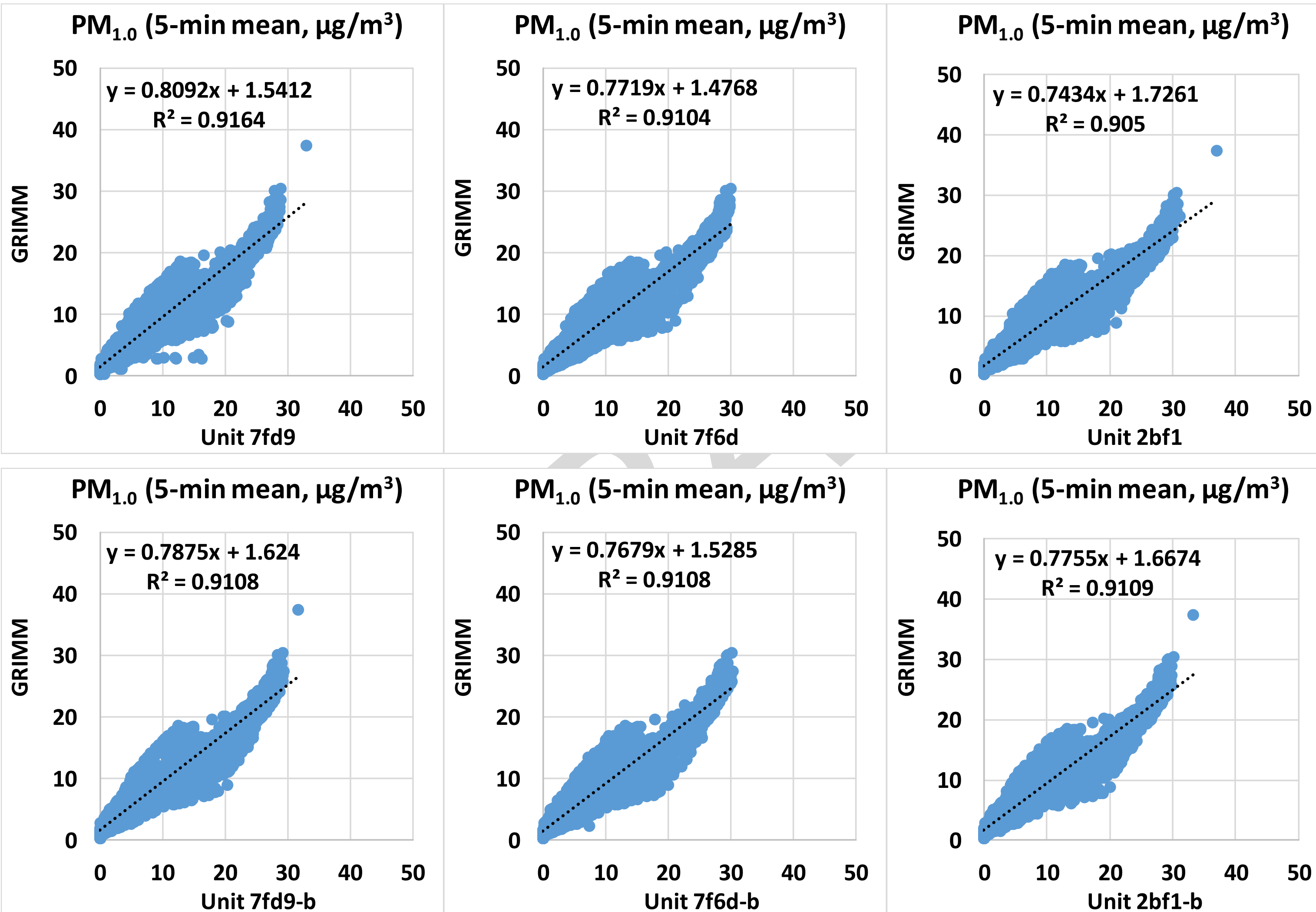
Reference Instruments: PM_{10} GRIMM and T640

- Data recovery for PM_{10} from GRIMM and T640 was ~ 98% and ~ 93%, respectively.
- Very strong correlations between the reference instruments for PM_{10} measurements (R^2 ~0.91) were observed.



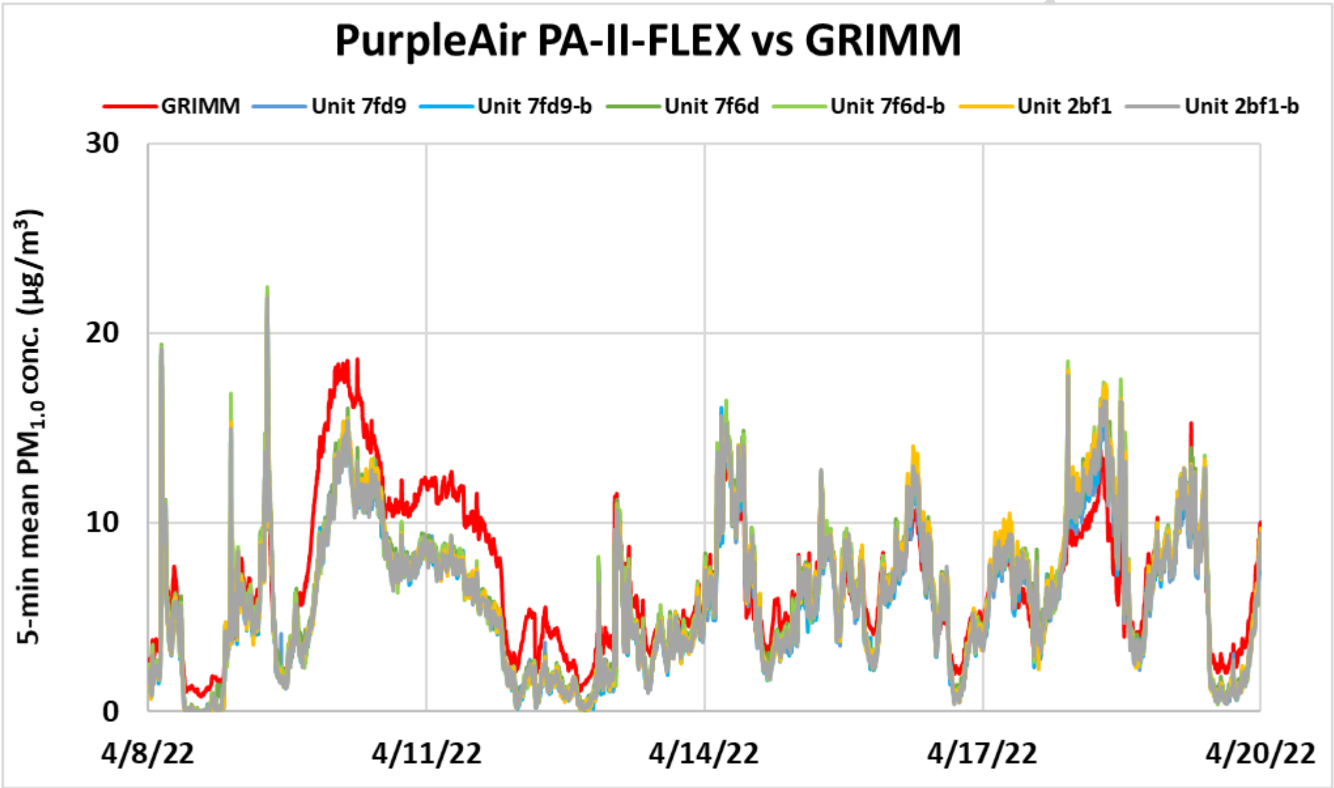


PA-II-FLEX vs GRIMM ($PM_{1.0}$; 5-min mean)



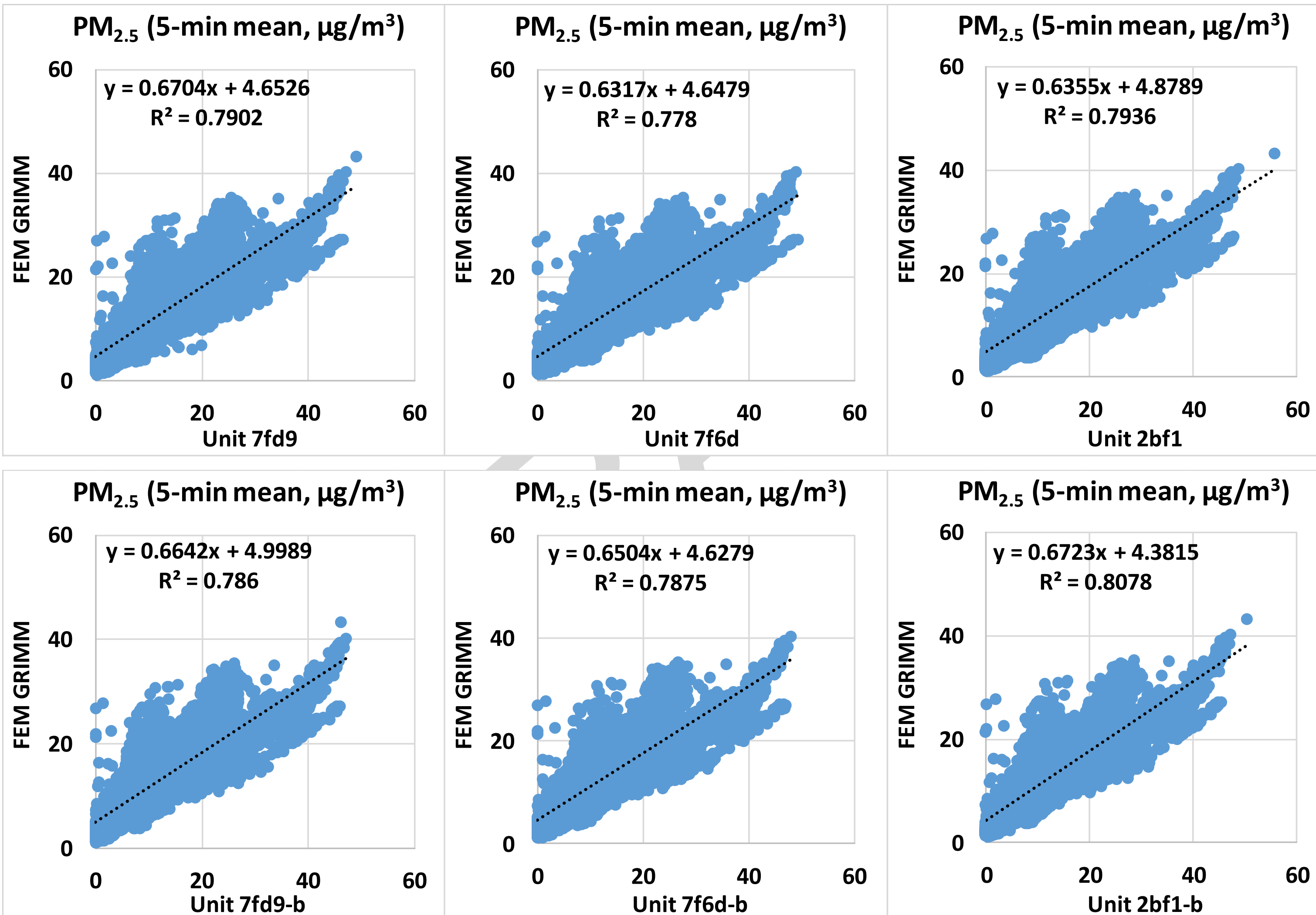
- The PA-II-FLEX sensors showed very strong correlations with the corresponding GRIMM data ($0.90 < R^2 < 0.92$)

PA-II-FLEX vs GRIMM ($PM_{1.0}$; 5-min mean)



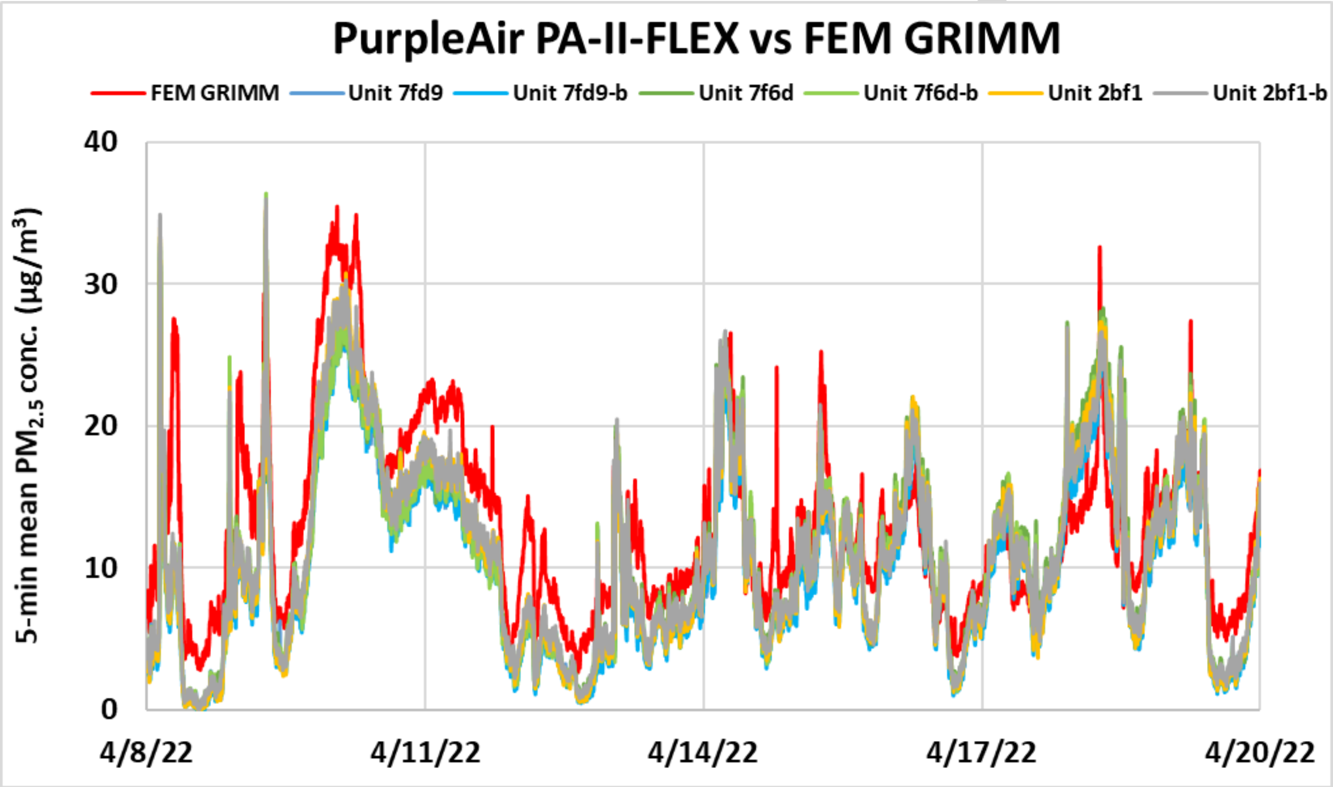
- Overall, the PA-II-FLEX sensors underestimated the $PM_{1.0}$ mass concentrations as measured by GRIMM
- The PA-II-FLEX sensors seemed to track the $PM_{1.0}$ diurnal variations as recorded by GRIMM

PA-II-FLEX vs FEM GRIMM ($PM_{2.5}$; 5-min mean)



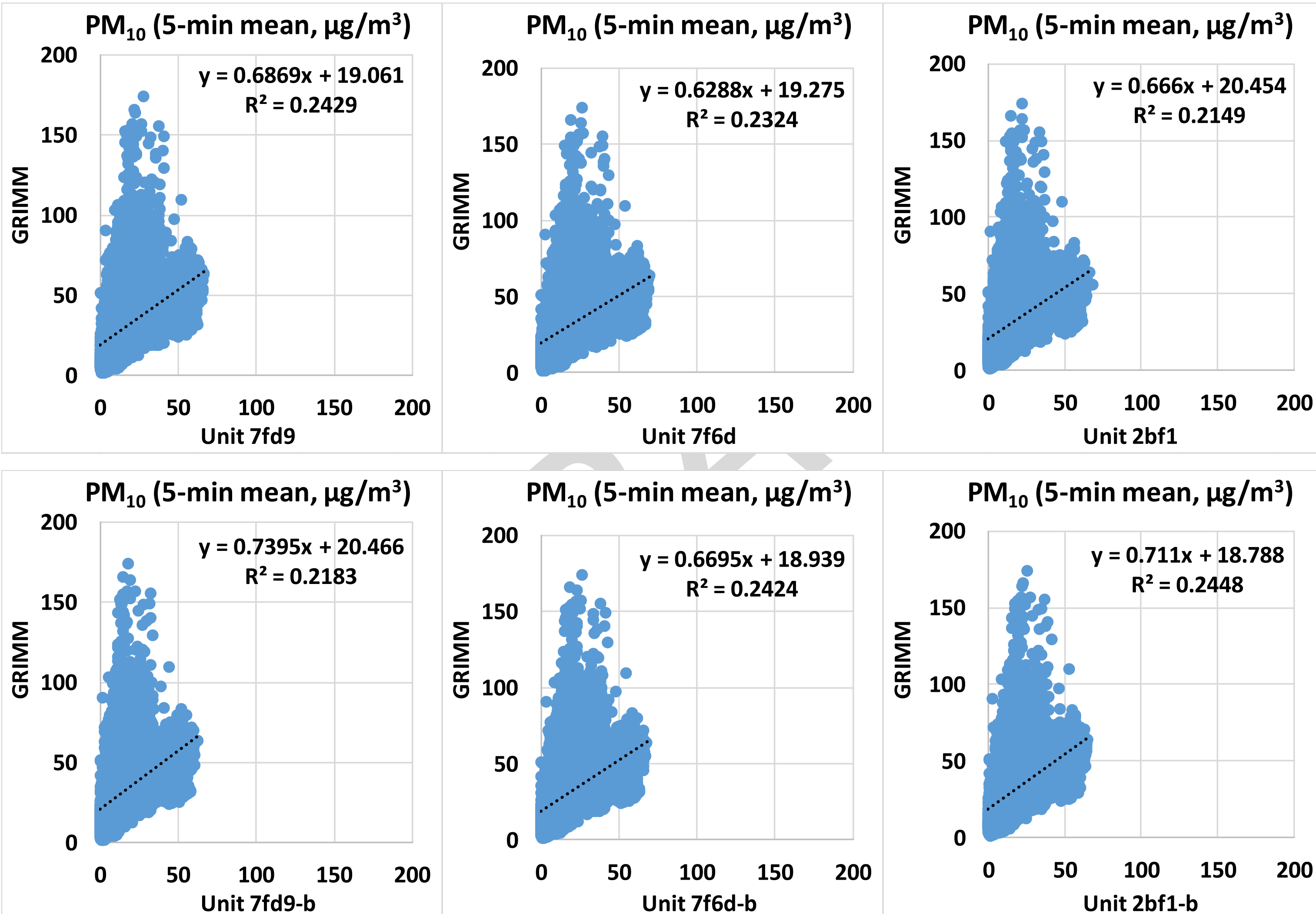
- The PA-II-FLEX sensors showed strong correlations with the corresponding FEM GRIMM data ($0.77 < R^2 < 0.81$)

PA-II-FLEX vs FEM GRIMM ($PM_{2.5}$; 5-min mean)



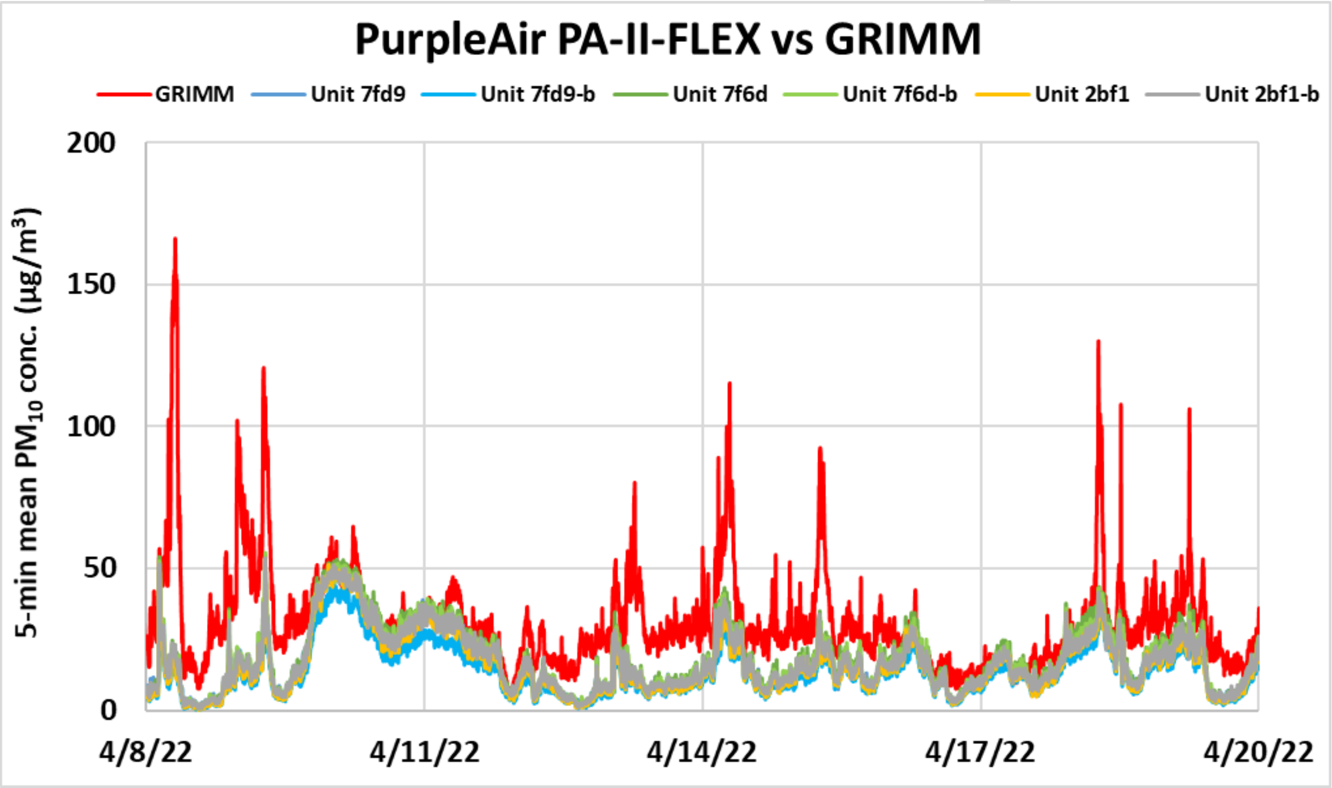
- Overall, the PA-II-FLEX sensors underestimated the $PM_{2.5}$ mass concentrations as measured by FEM GRIMM
- The PA-II-FLEX sensors seemed to track the $PM_{2.5}$ diurnal variations as recorded by FEM GRIMM

PA-II-FLEX vs GRIMM (PM_{10}; 5-min mean)



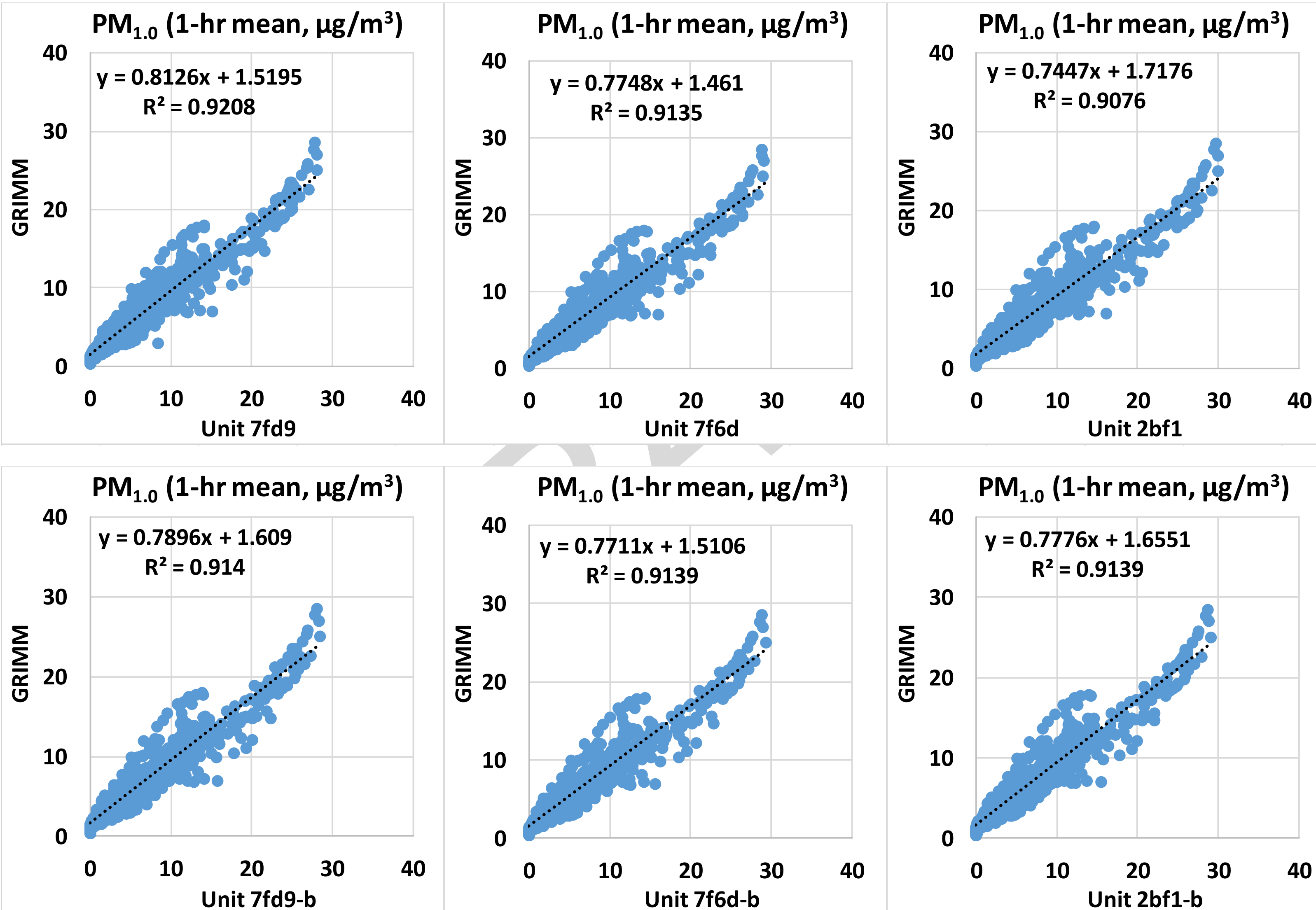
- The PA-II-FLEX sensors showed very weak correlations with the corresponding GRIMM data ($0.21 < R^2 < 0.25$)

PA-II-FLEX vs GRIMM (PM_{10}; 5-min mean)



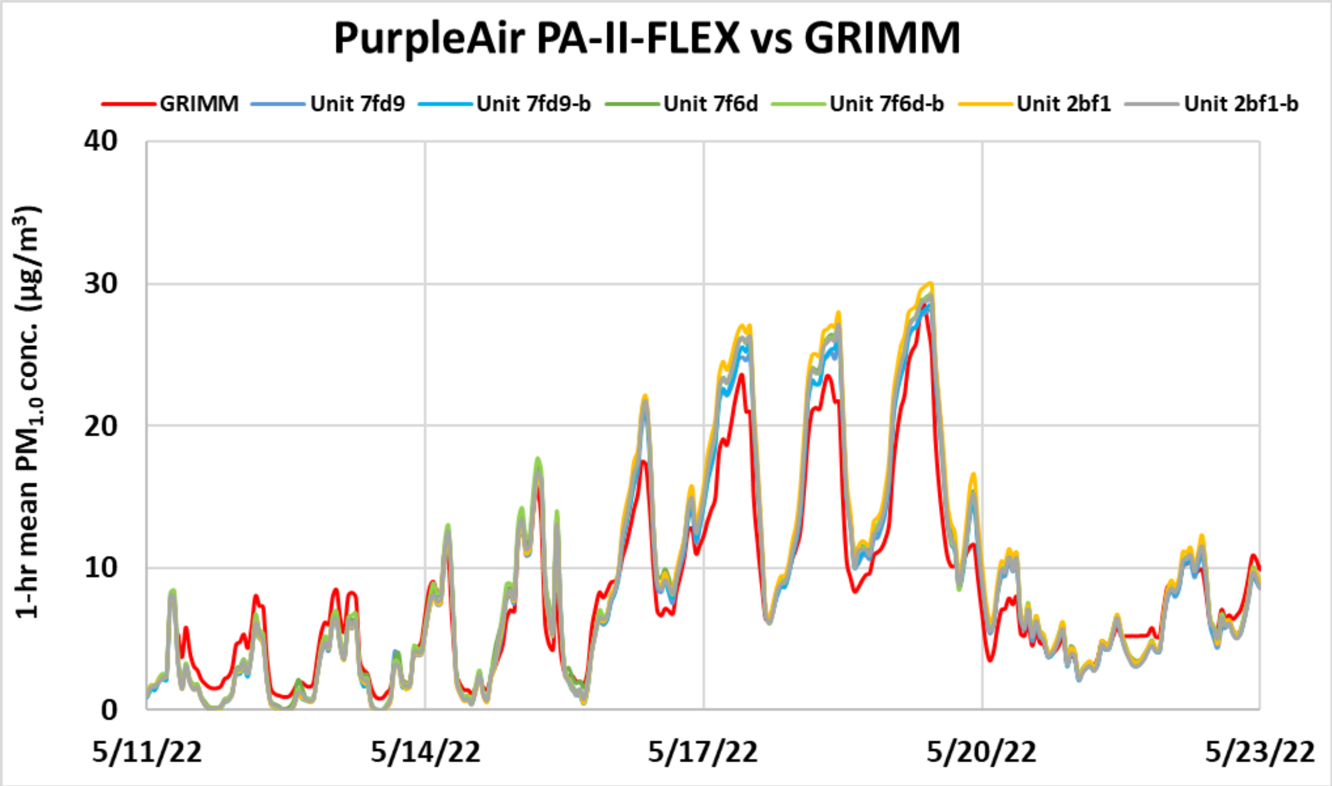
- Overall, the PA-II-FLEX sensors underestimated the PM_{10} mass concentrations as measured by GRIMM
- The PA-II-FLEX sensors sometimes seemed to track the PM_{10} diurnal variations as recorded by GRIMM

PA-II-FLEX vs GRIMM ($PM_{1.0}$; 1-hr mean)



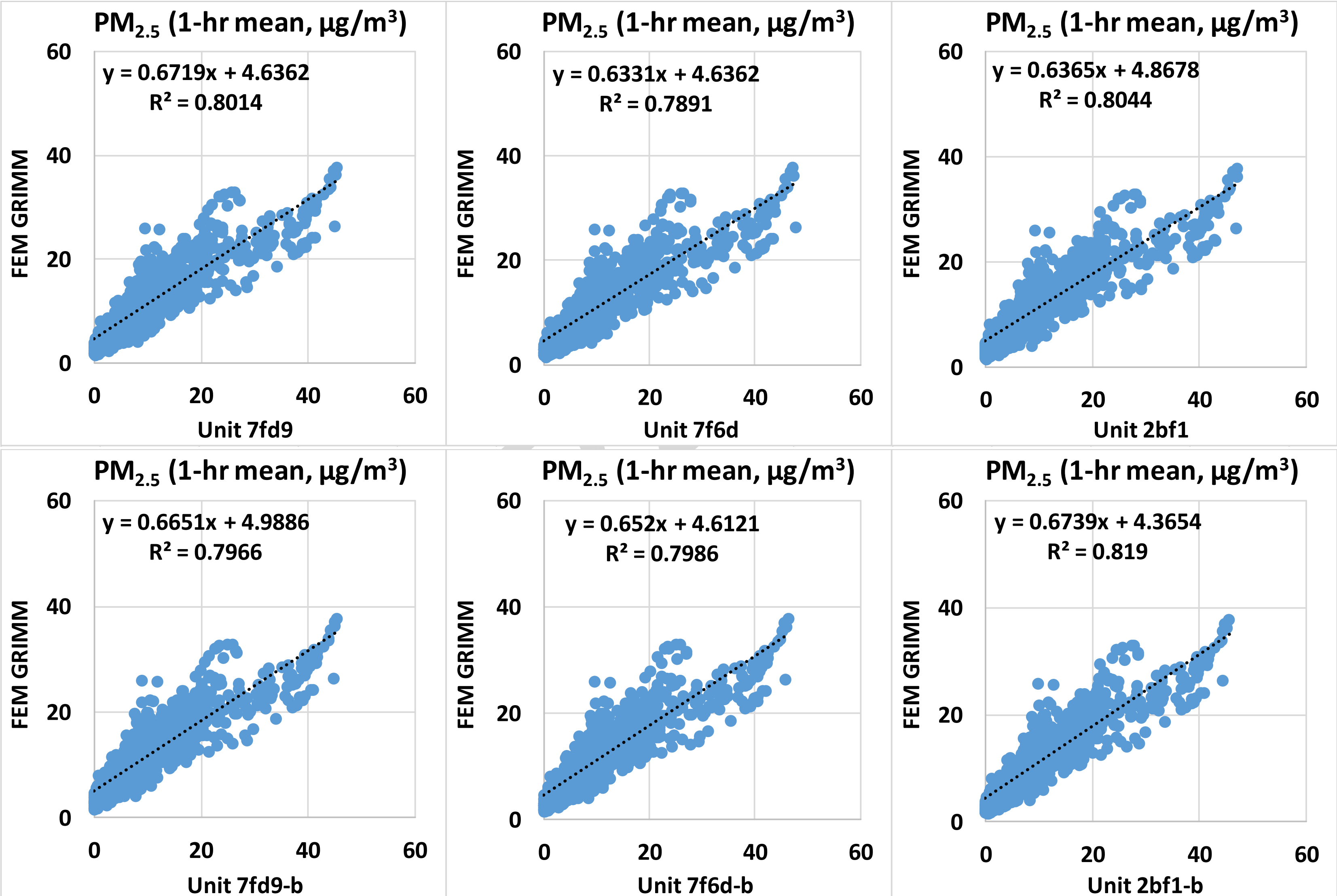
- The PA-II-FLEX sensors showed very strong correlations with the corresponding GRIMM data ($0.90 < R^2 < 0.93$)

PA-II-FLEX vs GRIMM ($PM_{1.0}$; 1-hr mean)



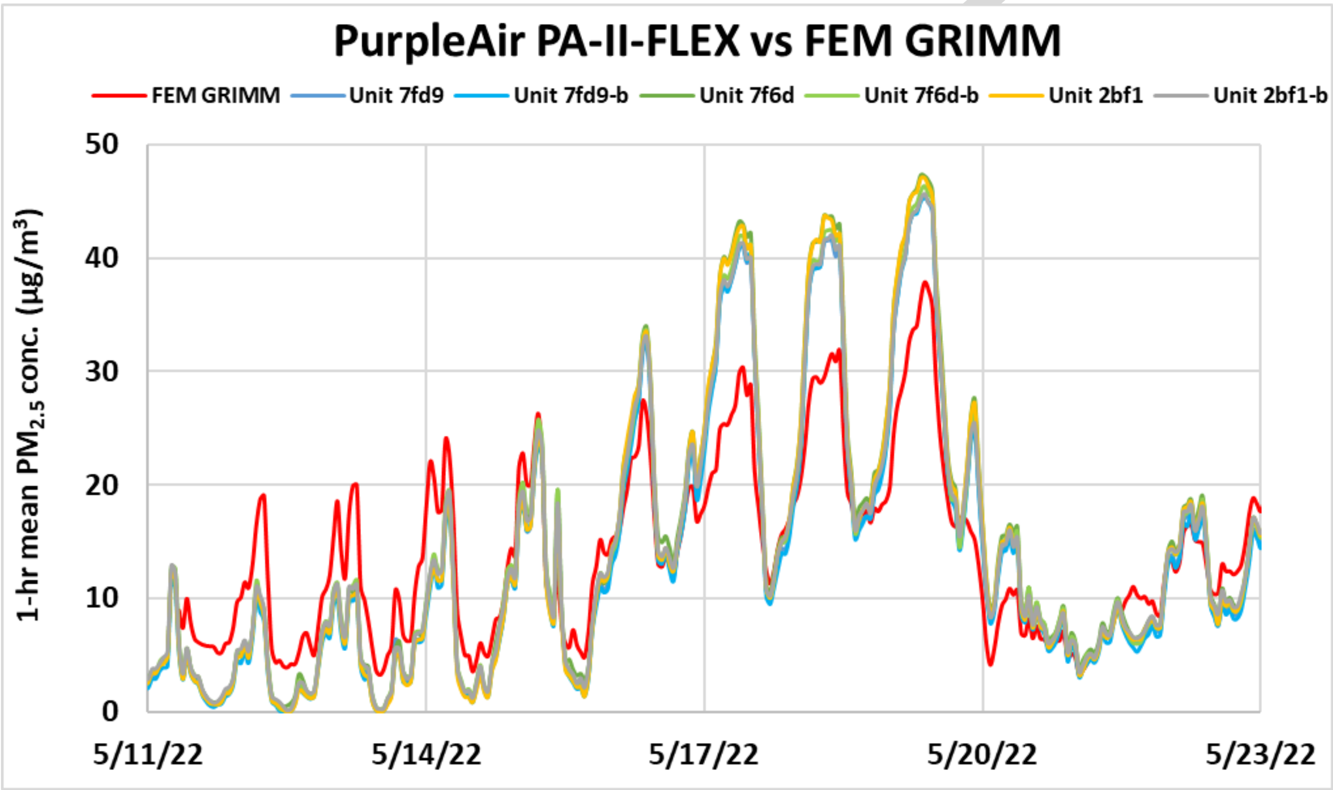
- Overall, the PA-II-FLEX sensors underestimated the $PM_{1.0}$ mass concentrations as measured by GRIMM
- The PA-II-FLEX sensors seemed to track the $PM_{1.0}$ diurnal variations as recorded by GRIMM

PA-II-FLEX vs FEM GRIMM ($PM_{2.5}$; 1-hr mean)



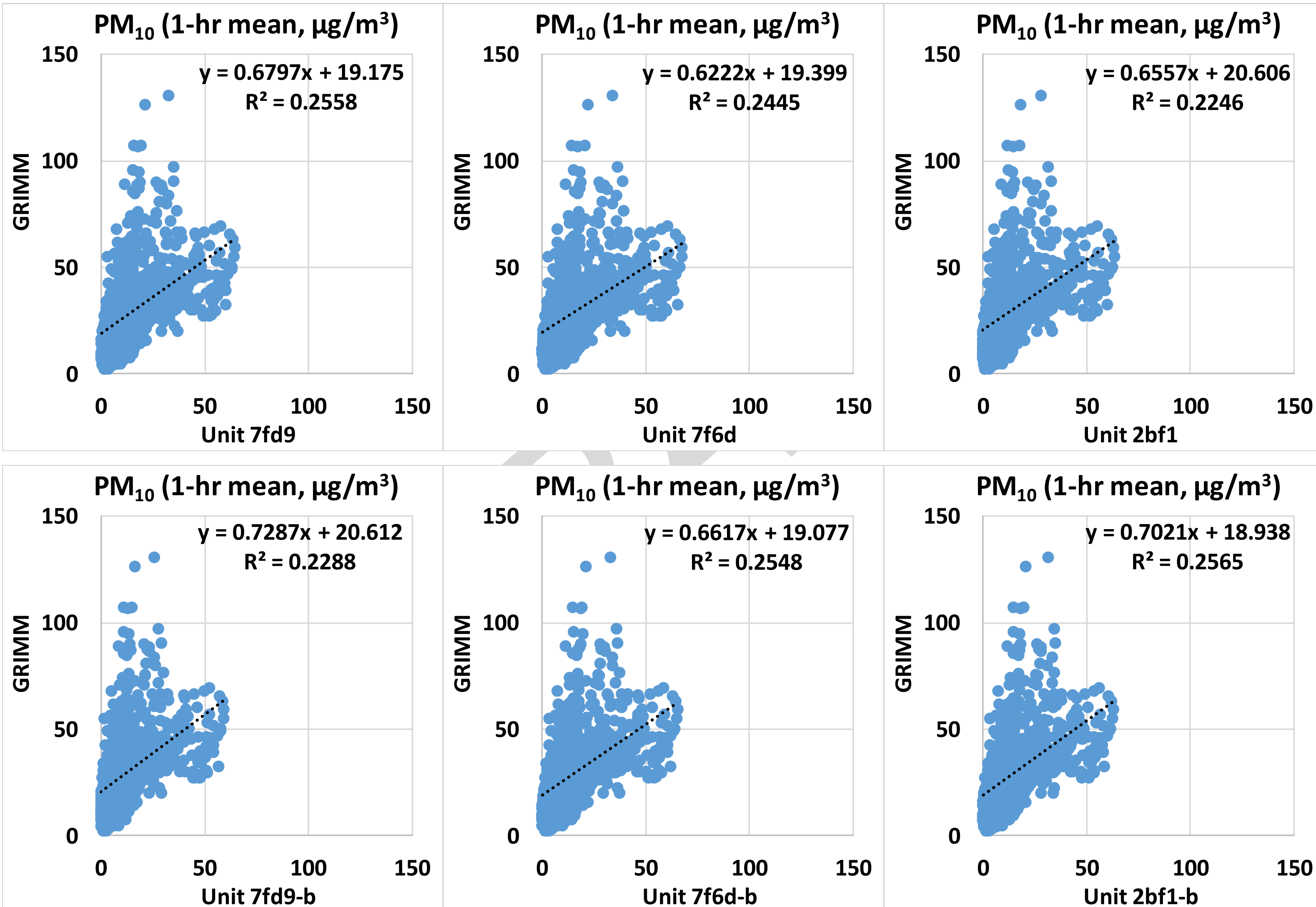
- The PA-II-FLEX sensors showed strong correlations with the corresponding FEM GRIMM data ($0.78 < R^2 < 0.82$)

PA-II-FLEX vs FEM GRIMM ($PM_{2.5}$; 1-hr mean)



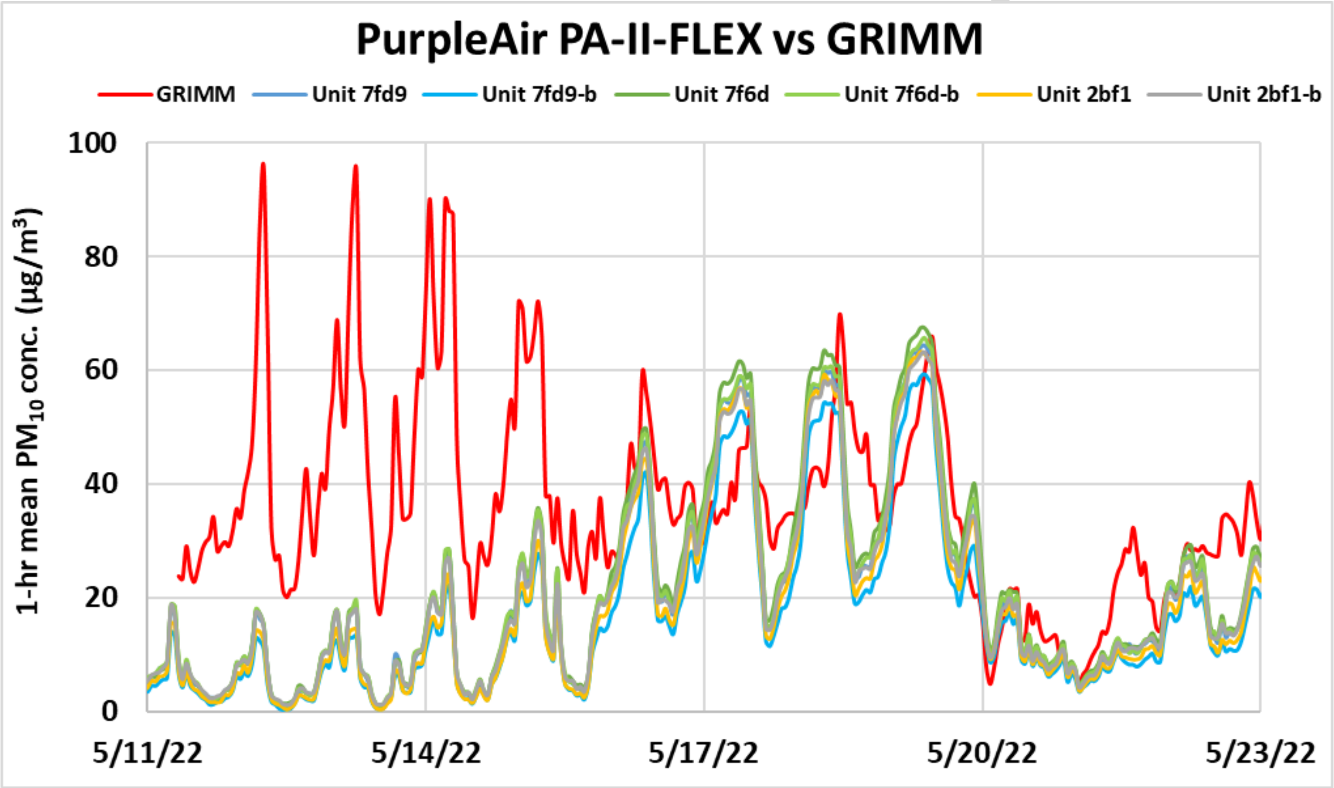
- Overall, the PA-II-FLEX sensors underestimated the $PM_{2.5}$ mass concentrations as measured by FEM GRIMM
- The PA-II-FLEX sensors seemed to track the $PM_{2.5}$ diurnal variations as recorded by FEM GRIMM

PA-II-FLEX vs GRIMM (PM_{10}; 1-hr mean)



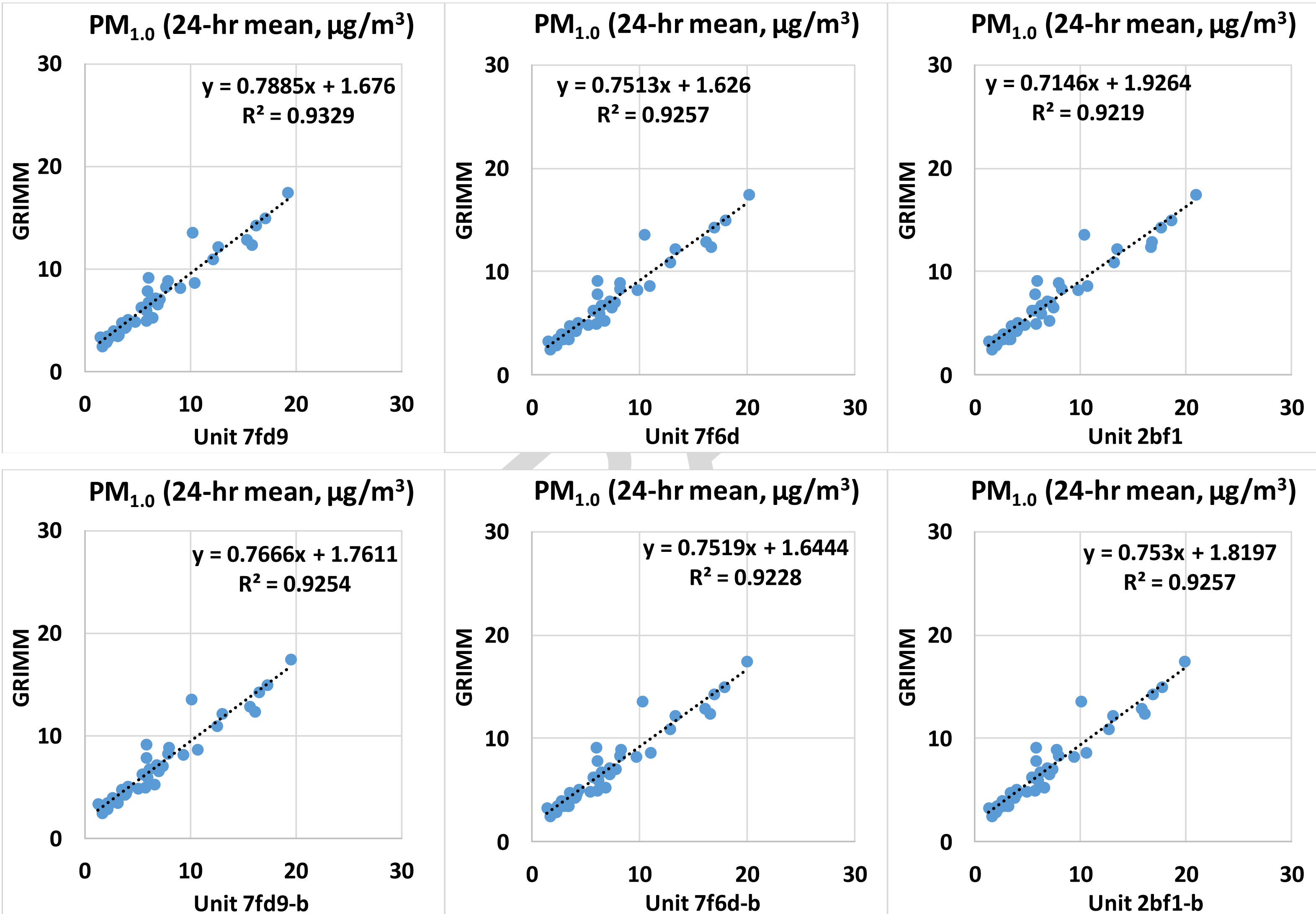
- The PA-II-FLEX sensors showed very weak correlations with the corresponding GRIMM data ($0.22 < R^2 < 0.26$)

PA-II-FLEX vs GRIMM (PM_{10}; 1-hr mean)



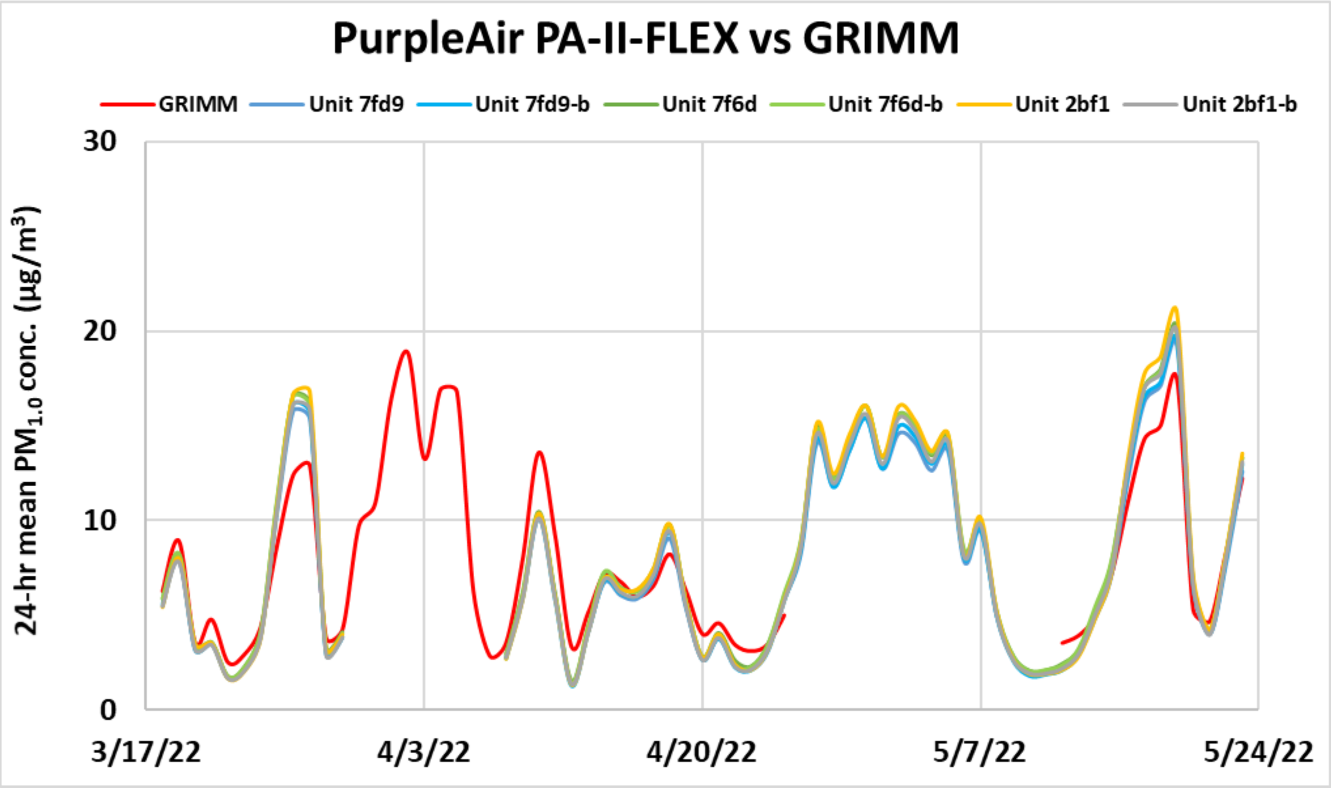
- Overall, the PA-II-FLEX sensors underestimated the PM_{10} mass concentrations as measured by GRIMM
- The PA-II-FLEX sensors sometimes seemed to track the PM_{10} diurnal variations as recorded by GRIMM

PA-II-FLEX vs GRIMM ($PM_{1.0}$; 24-hr mean)



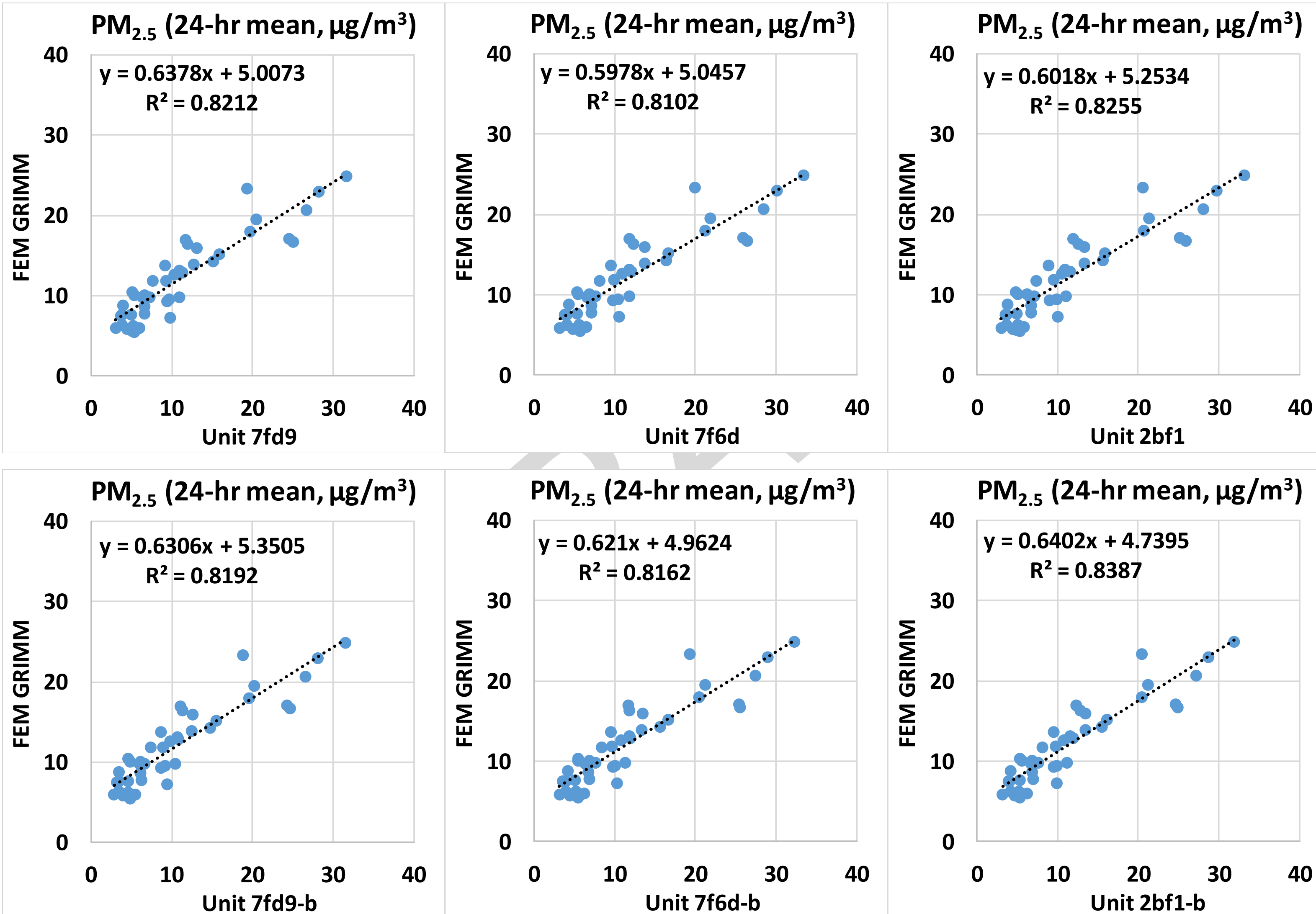
- The PA-II-FLEX sensors showed very strong correlations with the corresponding GRIMM data ($0.92 < R^2 < 0.94$)

PA-II-FLEX vs GRIMM ($PM_{1.0}$; 24-hr mean)



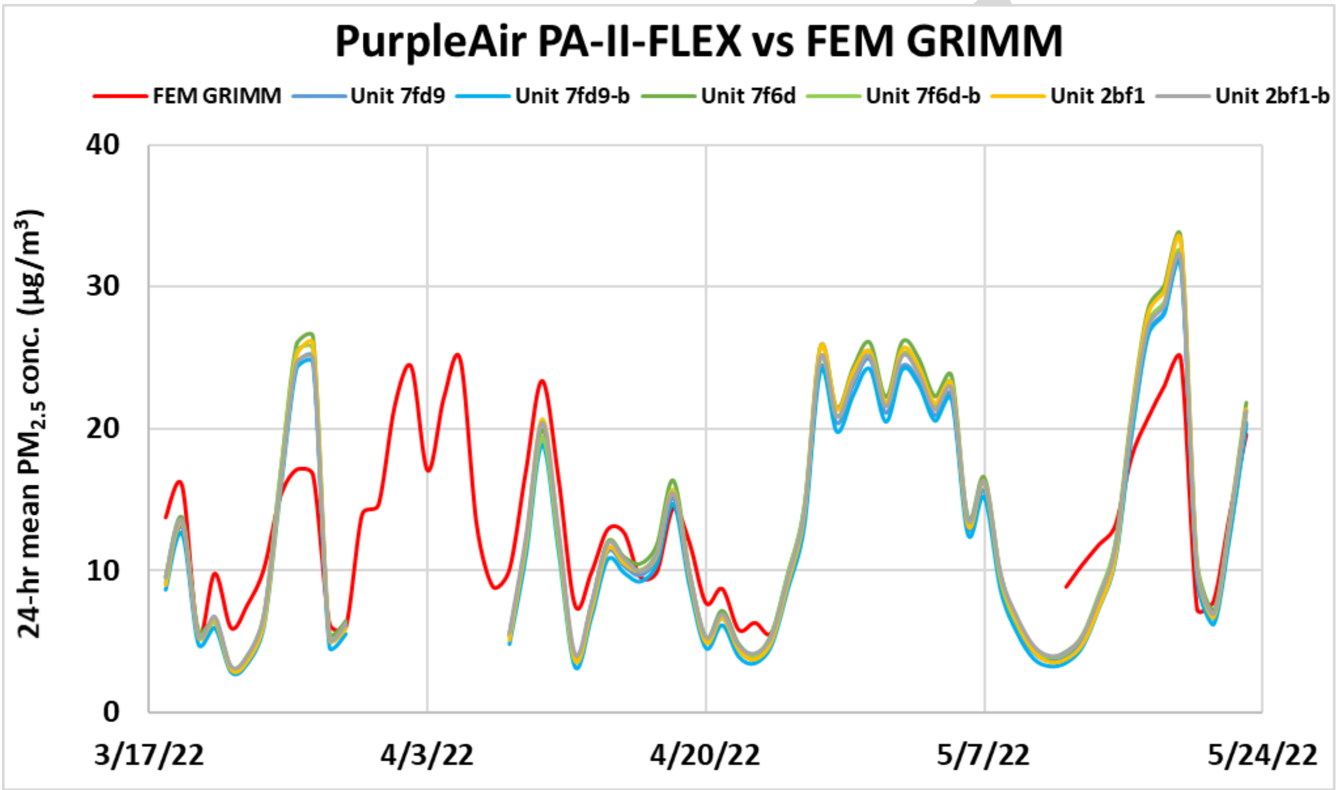
- Overall, the PA-II-FLEX sensors underestimated the $PM_{1.0}$ mass concentrations as measured by GRIMM
- The PA-II-FLEX sensors seemed to track the $PM_{1.0}$ daily variations as recorded by GRIMM

PA-II-FLEX vs FEM GRIMM ($PM_{2.5}$; 24-hr mean)



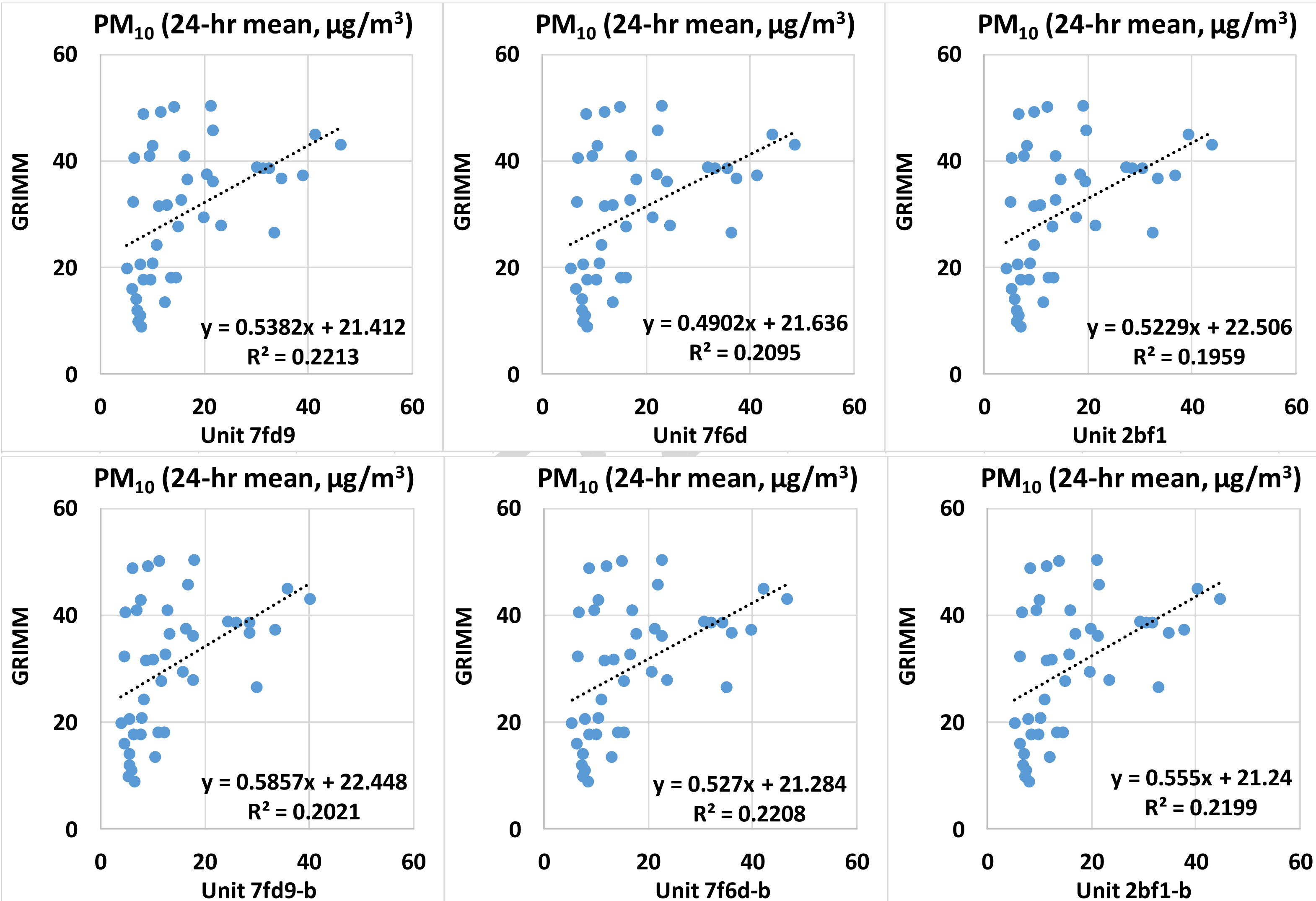
- The PA-II-FLEX sensors showed strong correlations with the corresponding FEM GRIMM data ($0.81 < R^2 < 0.84$)

PA-II-FLEX vs FEM GRIMM ($PM_{2.5}$; 24-hr mean)



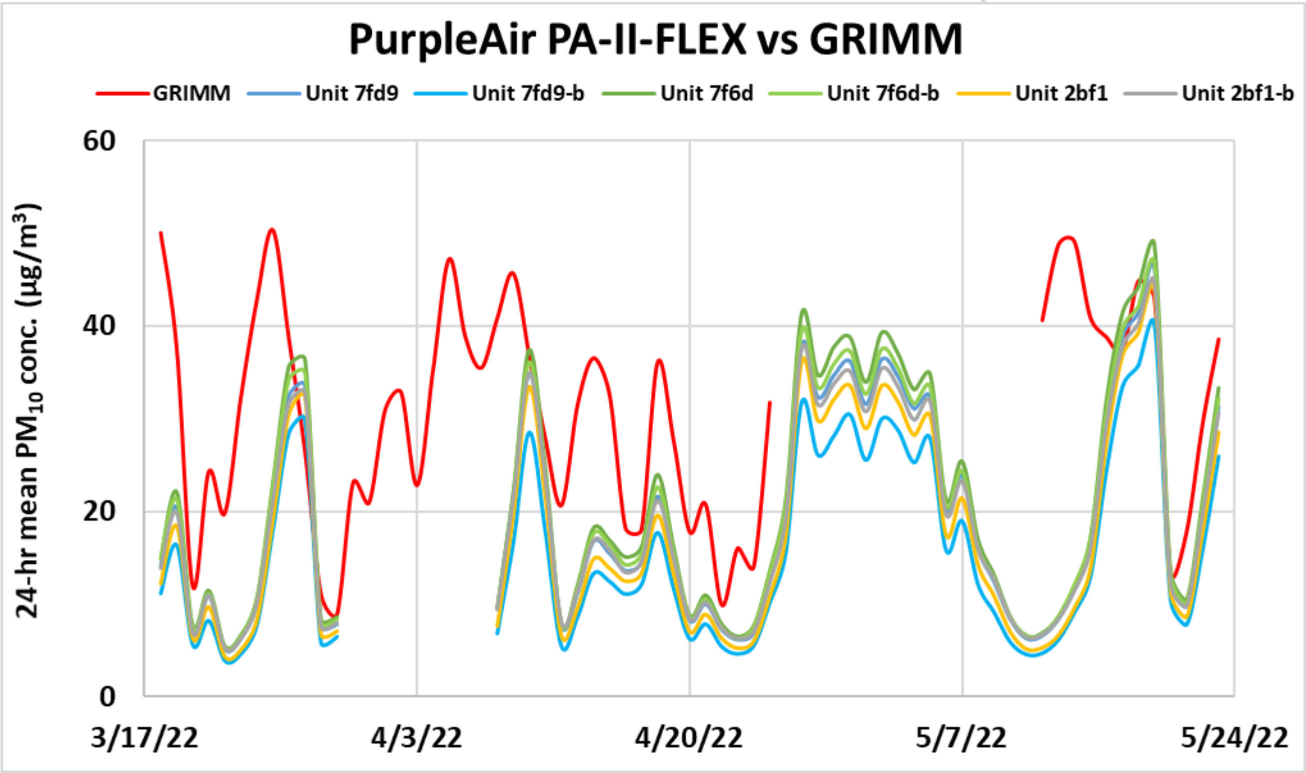
- Overall, the PA-II-FLEX sensors underestimated the $PM_{2.5}$ mass concentrations as measured by FEM GRIMM
- The PA-II-FLEX sensors seemed to track the $PM_{2.5}$ daily variations as recorded by FEM GRIMM

PA-II-FLEX vs GRIMM (PM_{10}; 24-hr mean)



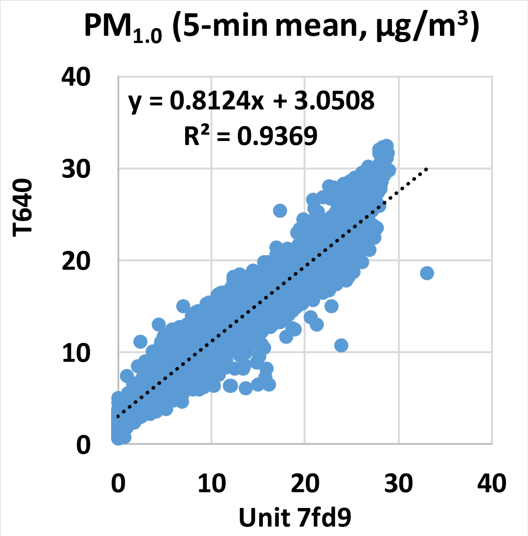
- The PA-II-FLEX sensors showed very weak correlations with the corresponding GRIMM data ($0.19 < R^2 < 0.23$)

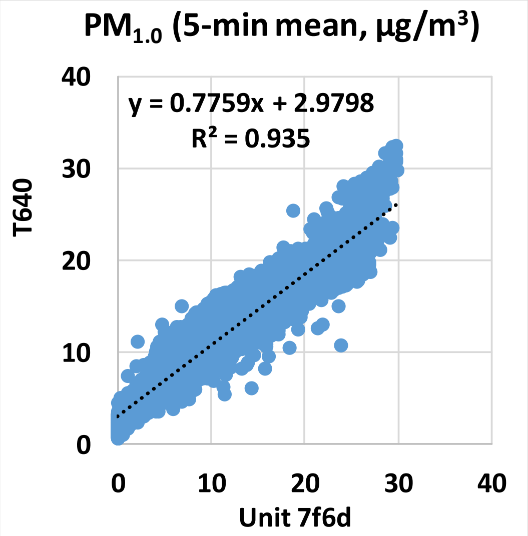
PA-II-FLEX vs GRIMM (PM_{10}; 24-hr mean)

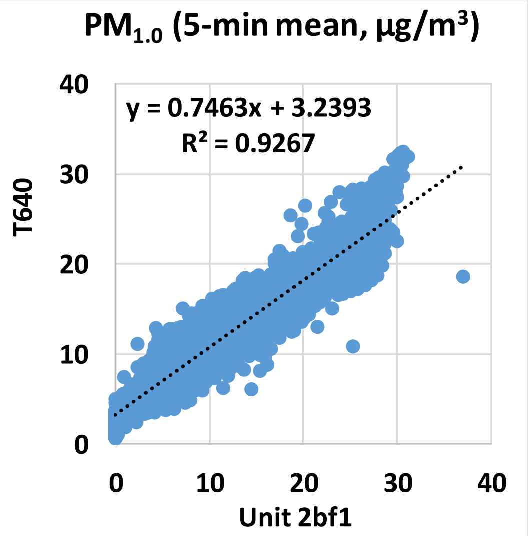


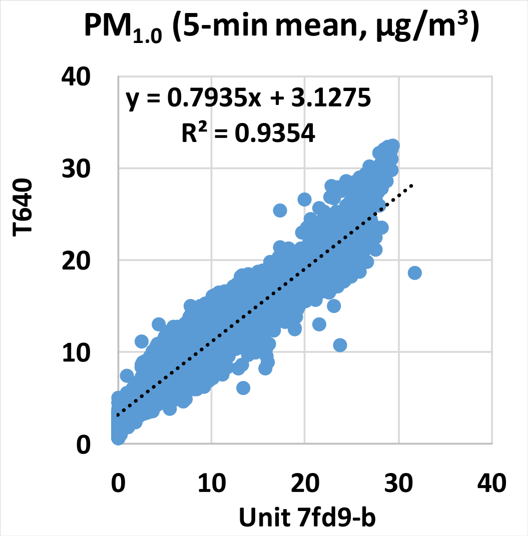
- Overall, the PA-II-FLEX sensors underestimated the PM_{10} mass concentrations as measured by GRIMM
- The PA-II-FLEX sensors sometimes seemed to track the PM_{10} daily variations as recorded by GRIMM

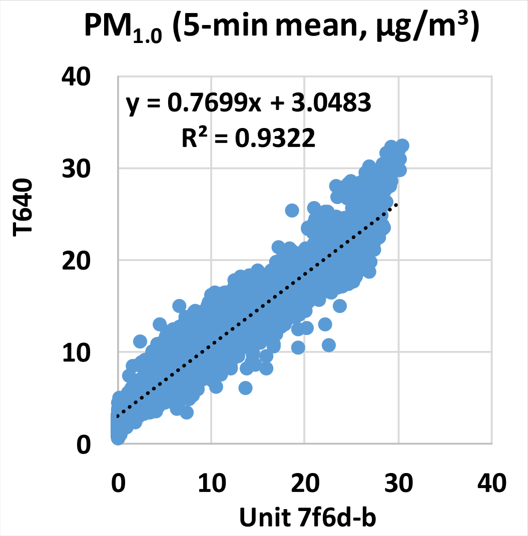
PA-II-FLEX vs T640 ($PM_{1.0}$; 5-min mean)

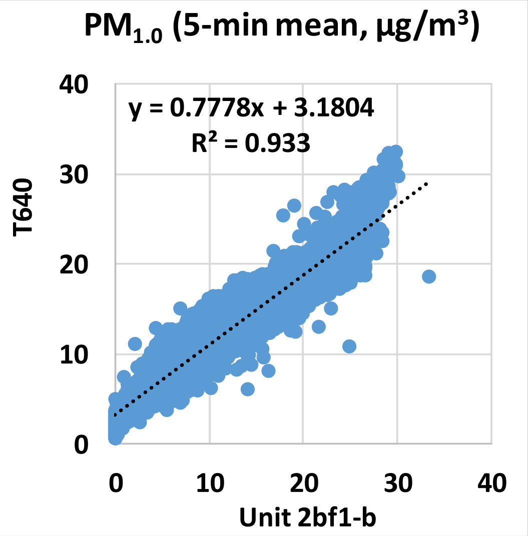






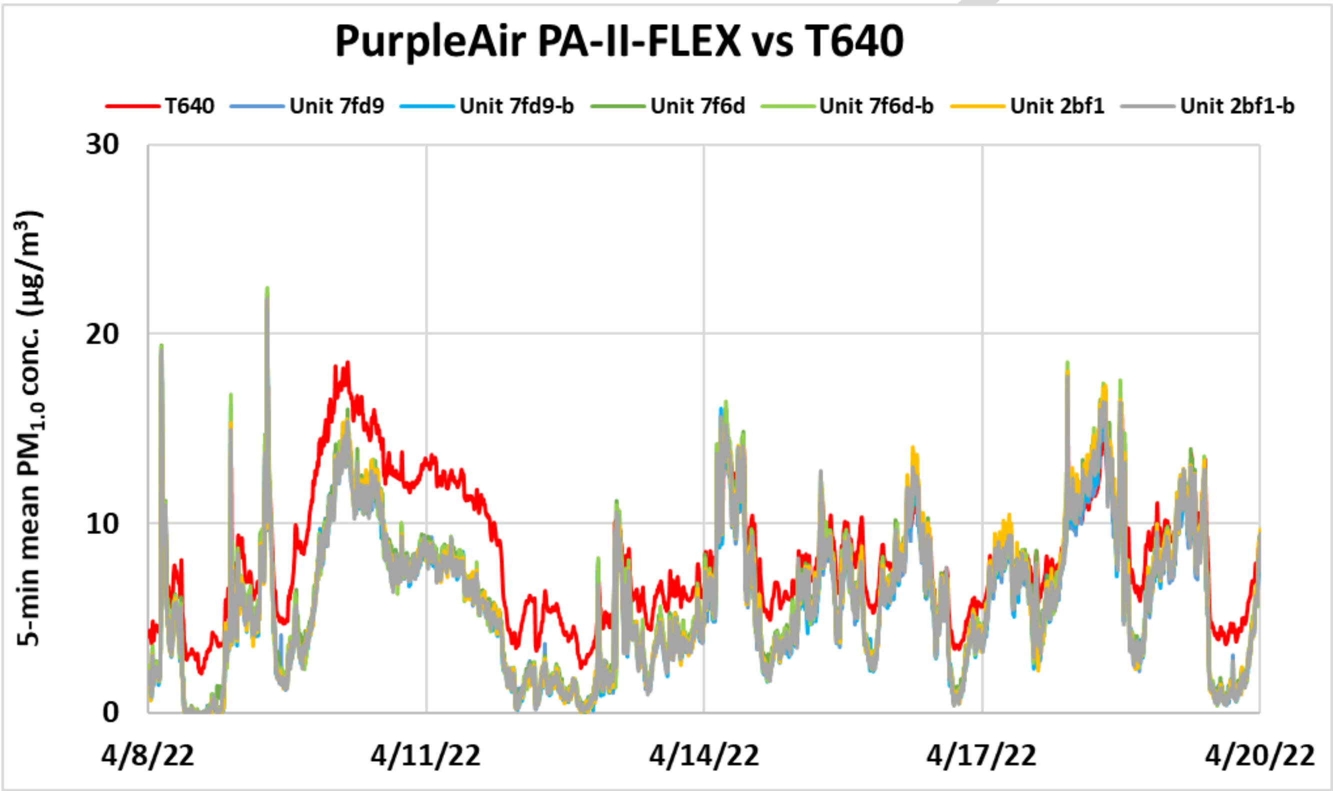






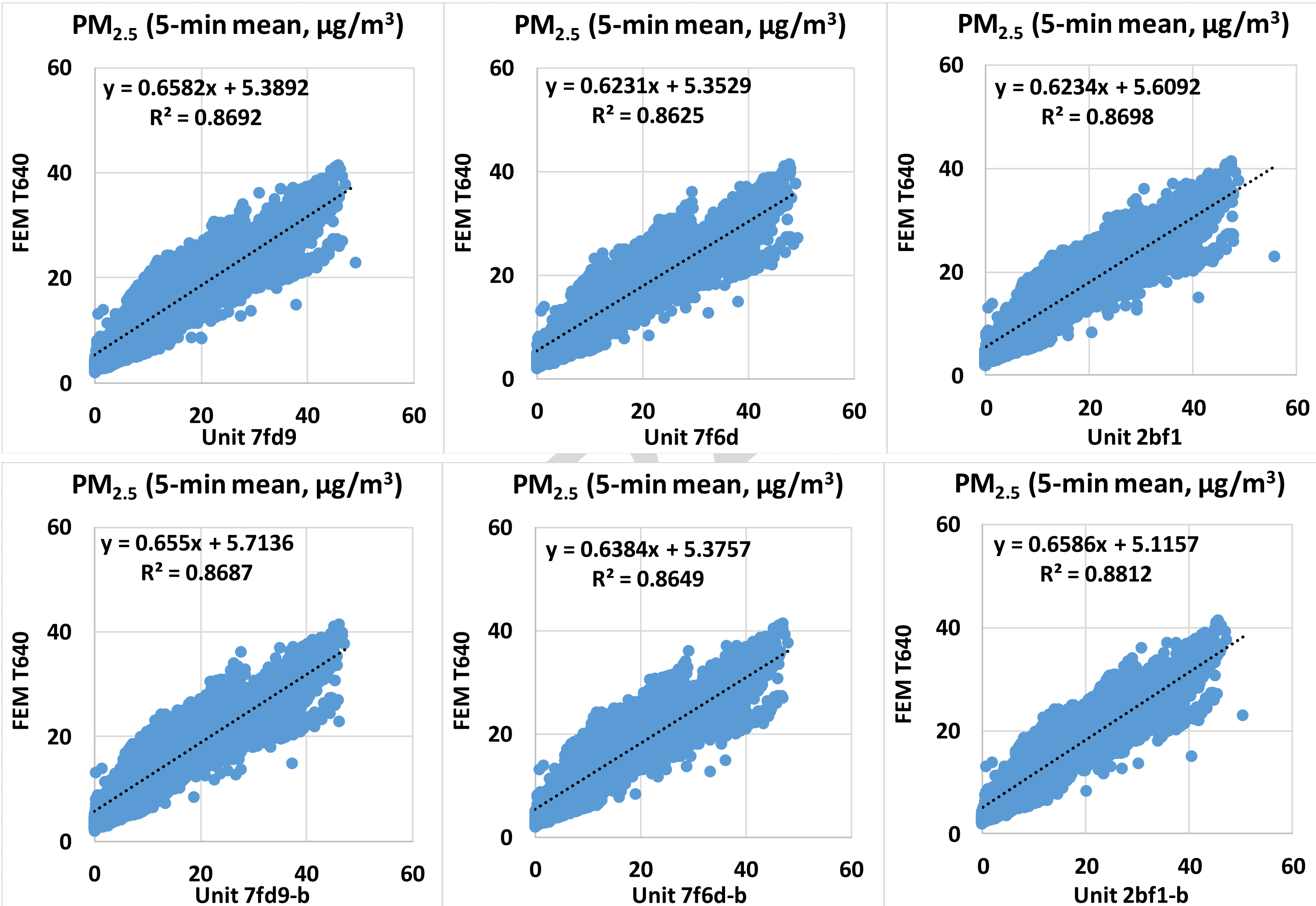
- The PA-II-FLEX sensors showed very strong correlations with the corresponding T640 data ($0.92 < R^2 < 0.94$)

PA-II-FLEX vs T640 ($PM_{1.0}$; 5-min mean)



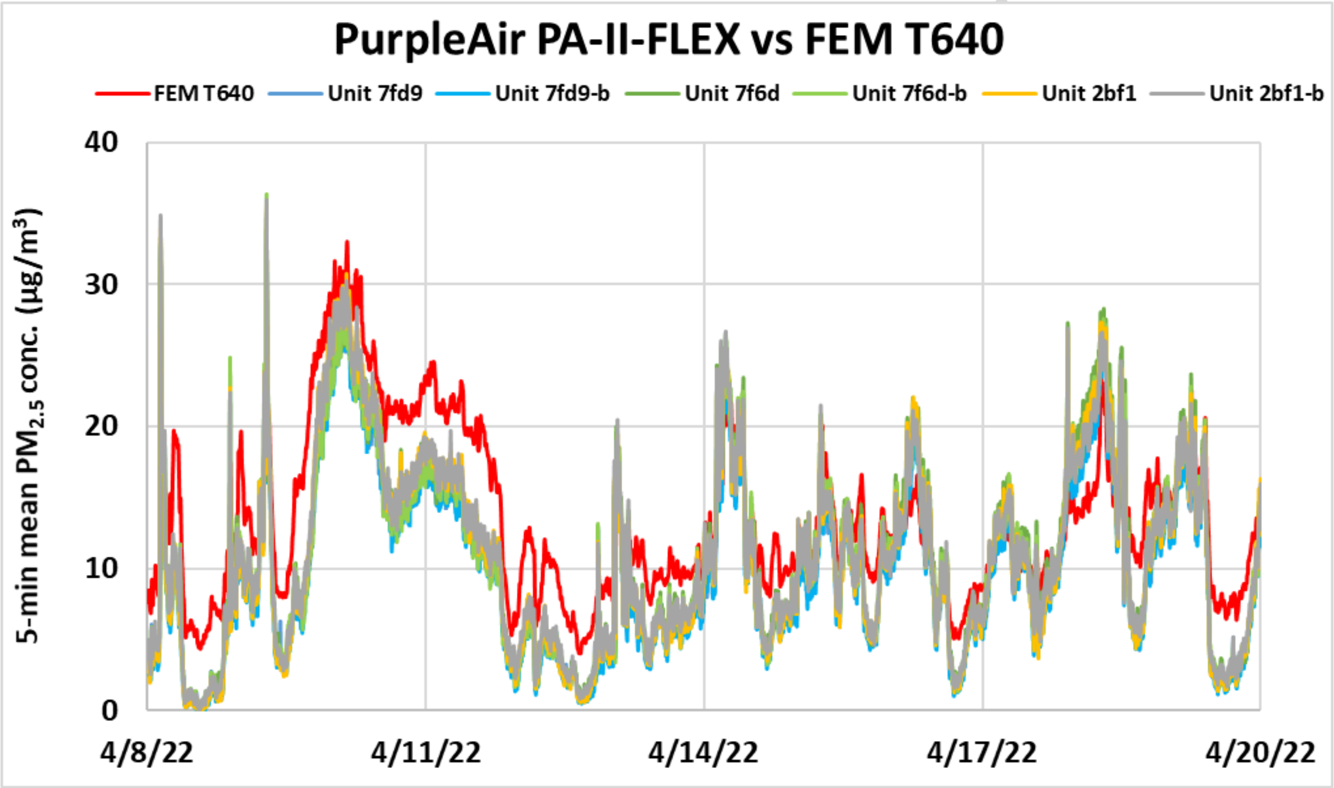
- Overall, the PA-II-FLEX sensors underestimated the $PM_{1.0}$ mass concentrations as measured by T640
- The PA-II-FLEX sensors seemed to track the $PM_{1.0}$ diurnal variations as recorded by T640

PA-II-FLEX vs FEM T640 ($PM_{2.5}$; 5-min mean)



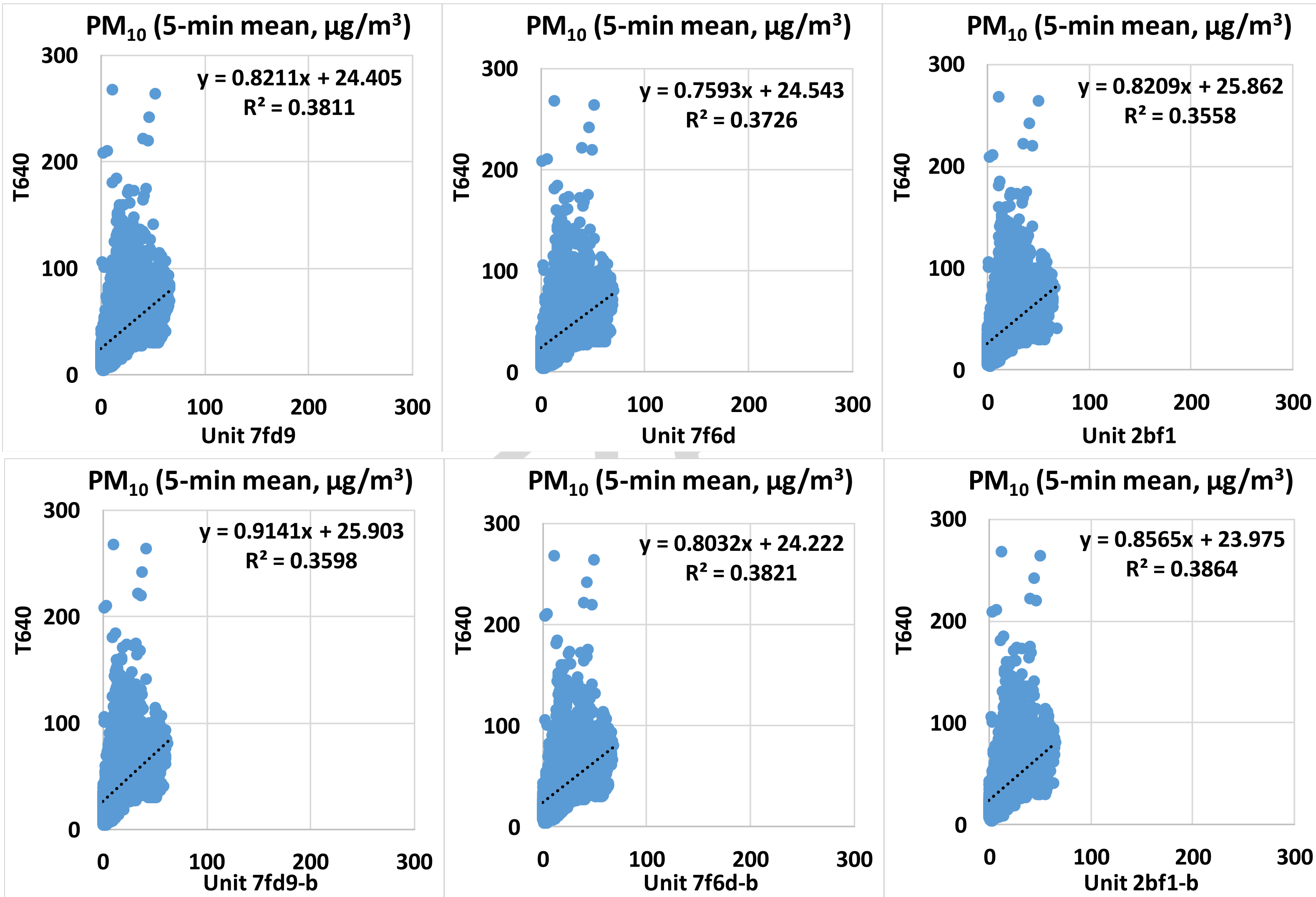
- The PA-II-FLEX sensors showed strong correlations with the corresponding FEM T640 data ($0.86 < R^2 < 0.89$)

PA-II-FLEX vs FEM T640 ($PM_{2.5}$; 5-min mean)



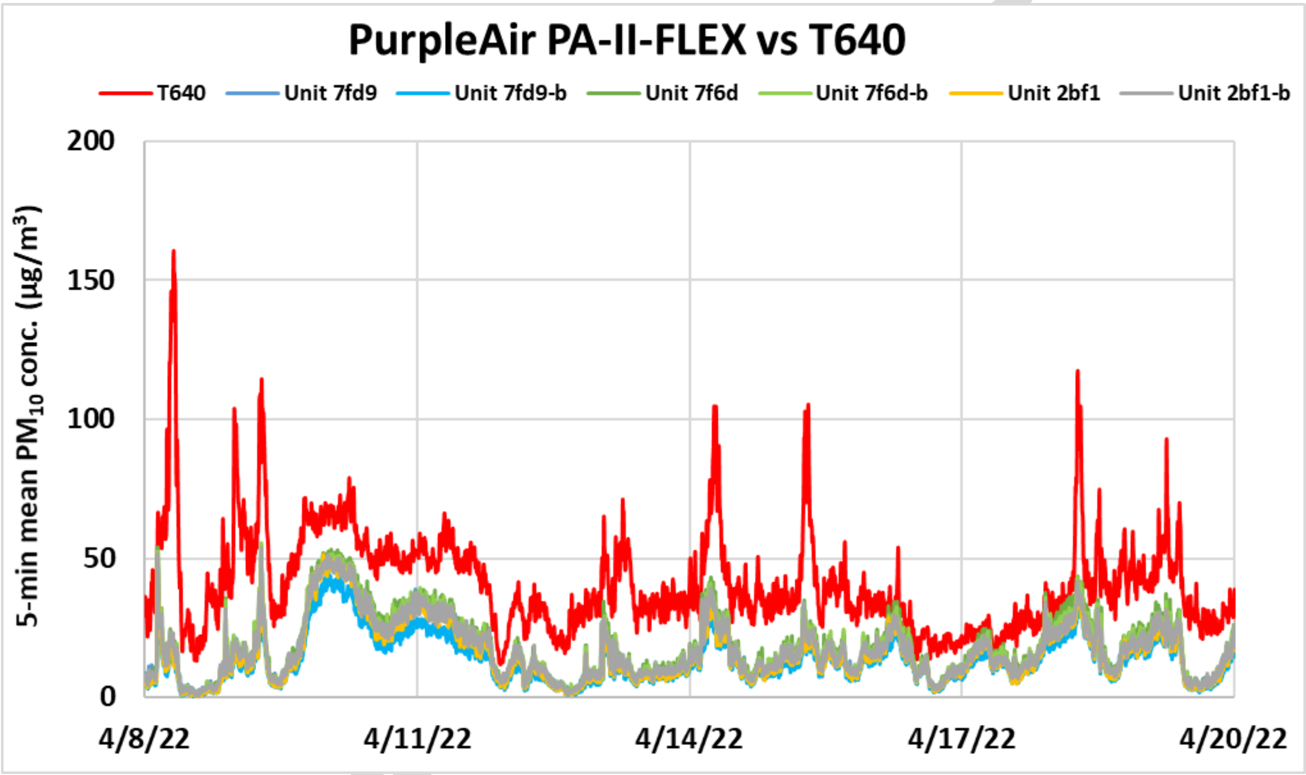
- Overall, the PA-II-FLEX sensors underestimated the $PM_{2.5}$ mass concentrations as measured by FEM T640
- The PA-II-FLEX sensors seemed to track the $PM_{2.5}$ diurnal variations as recorded by FEM T640

PA-II-FLEX vs T640 (PM_{10}; 5-min mean)



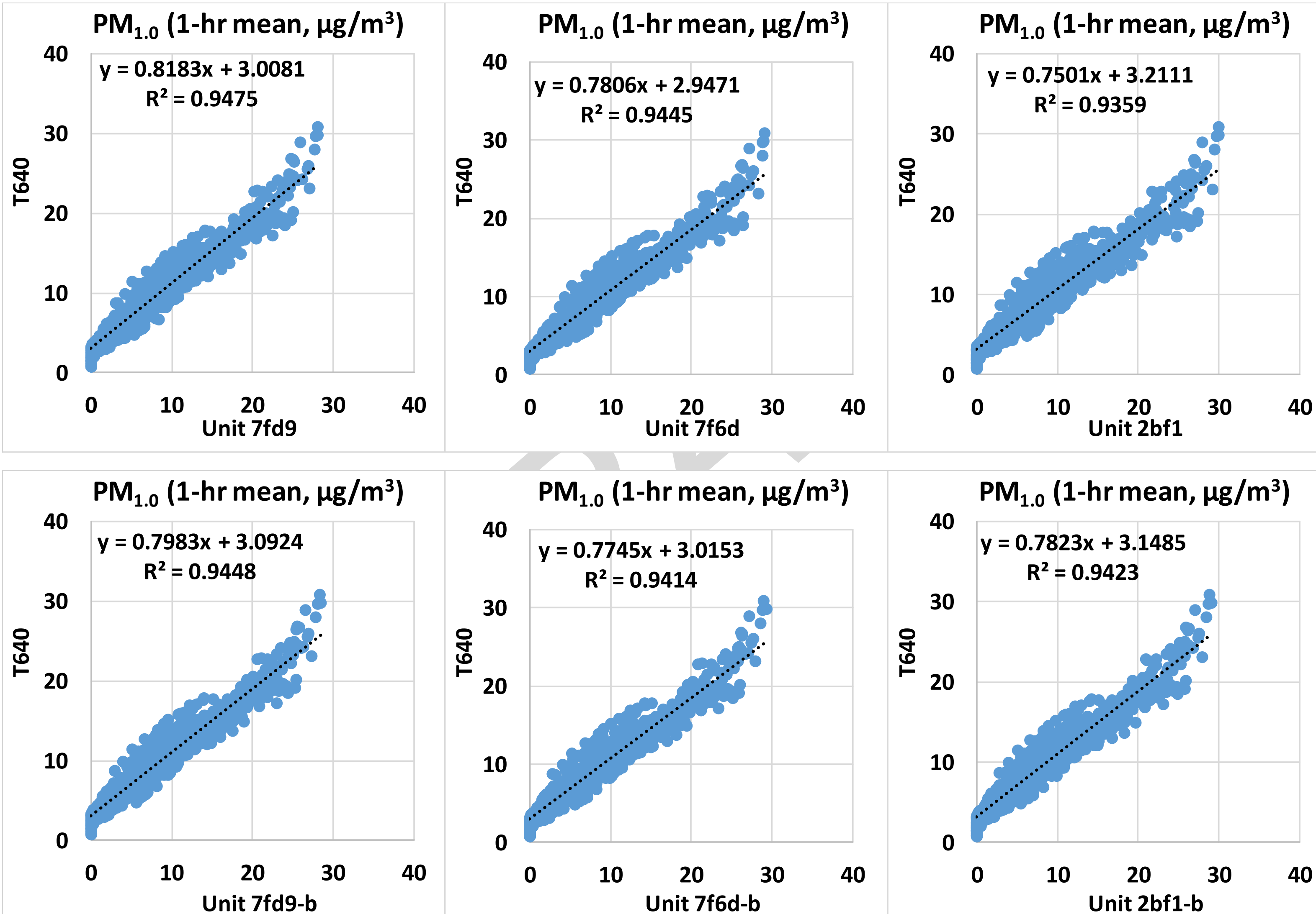
- PA-II-FLEX sensors showed weak correlations with the corresponding T640 data ($0.35 < R^2 < 0.39$)

PA-II-FLEX vs T640 (PM_{10}; 5-min mean)



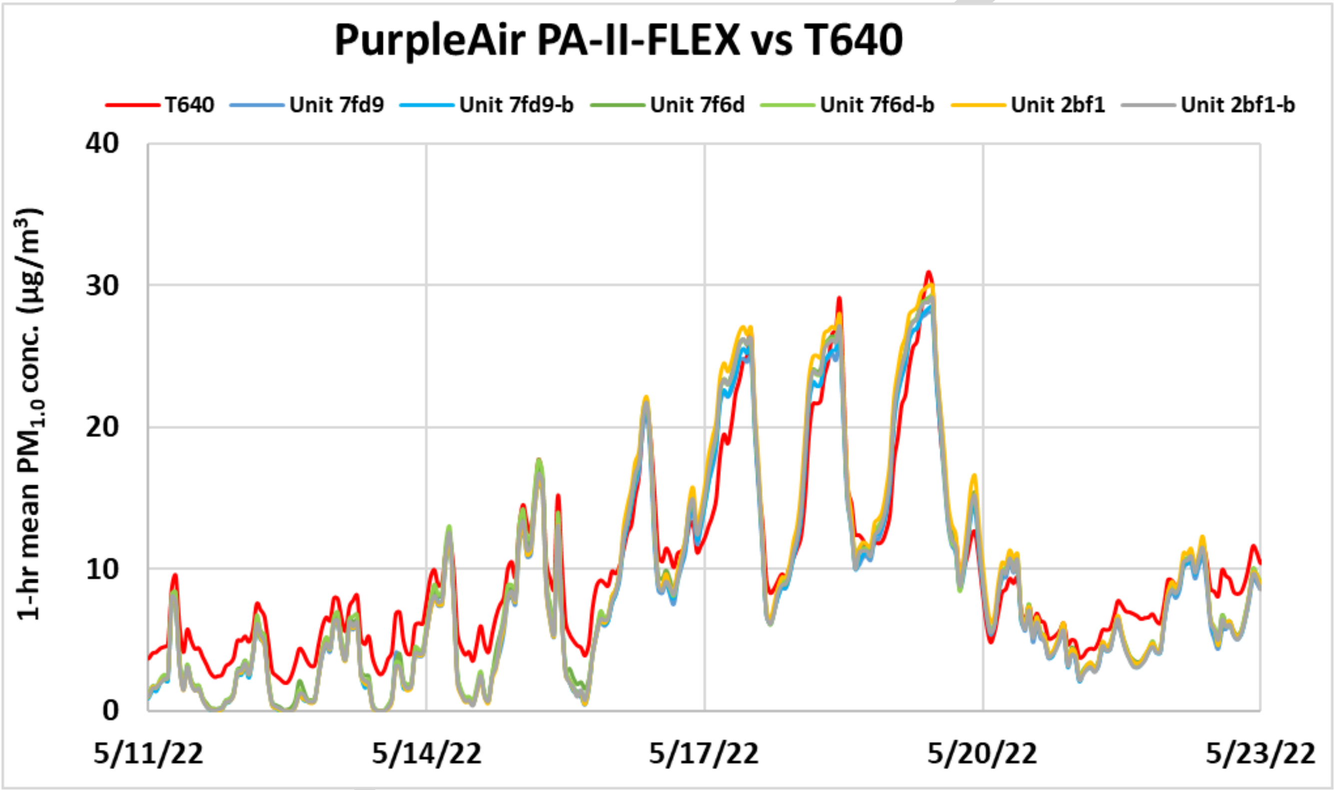
- Overall, the PA-II-FLEX sensors underestimated the PM_{10} mass concentrations as measured by T640
- The PA-II-FLEX sensors sometimes seemed to track the PM_{10} diurnal variations as recorded by T640

PA-II-FLEX vs T640 ($PM_{1.0}$; 1-hr mean)



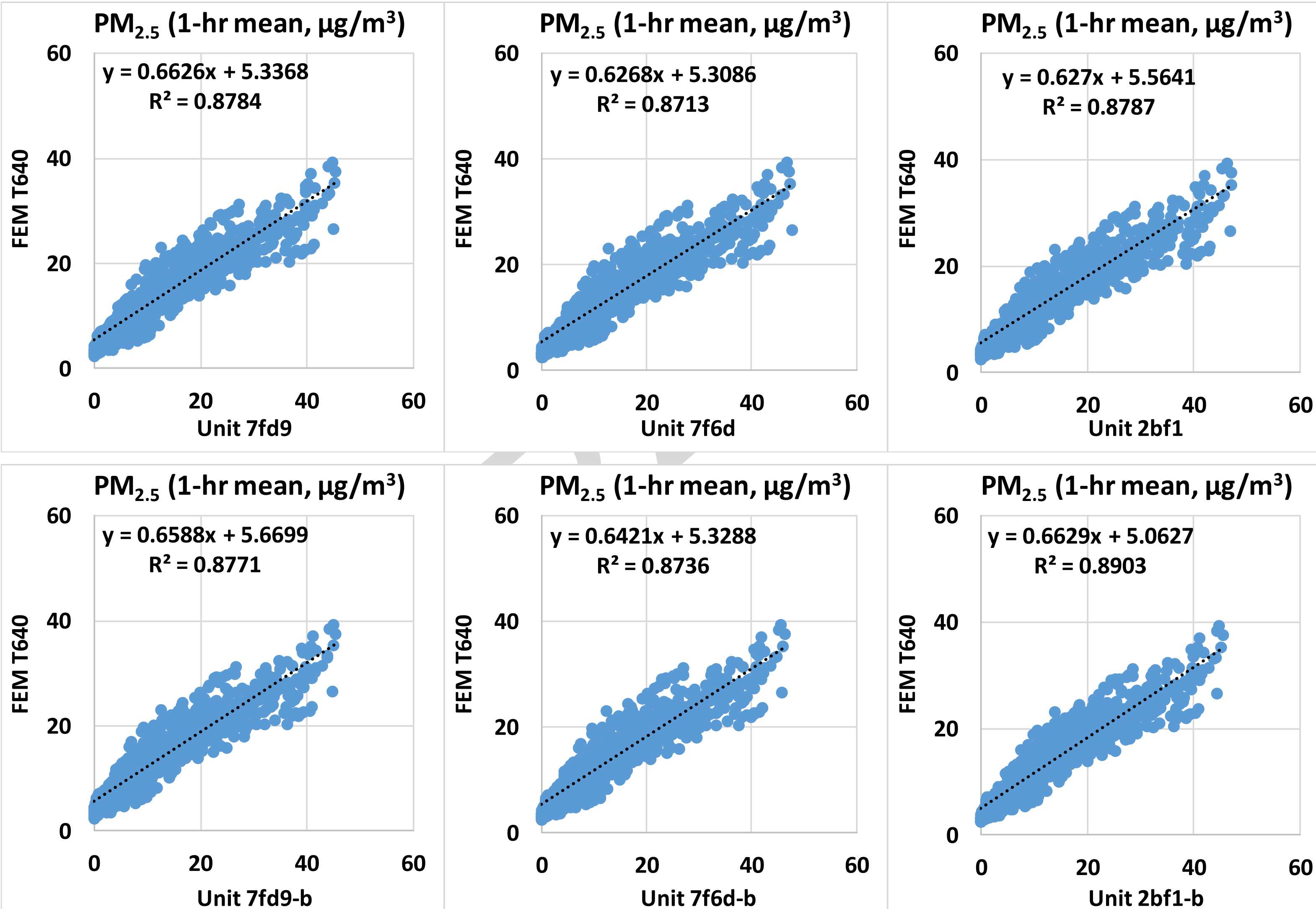
- The PA-II-FLEX sensors showed very strong correlations with the corresponding T640 data ($0.93 < R^2 < 0.95$)

PA-II-FLEX vs T640 ($PM_{1.0}$; 1-hr mean)



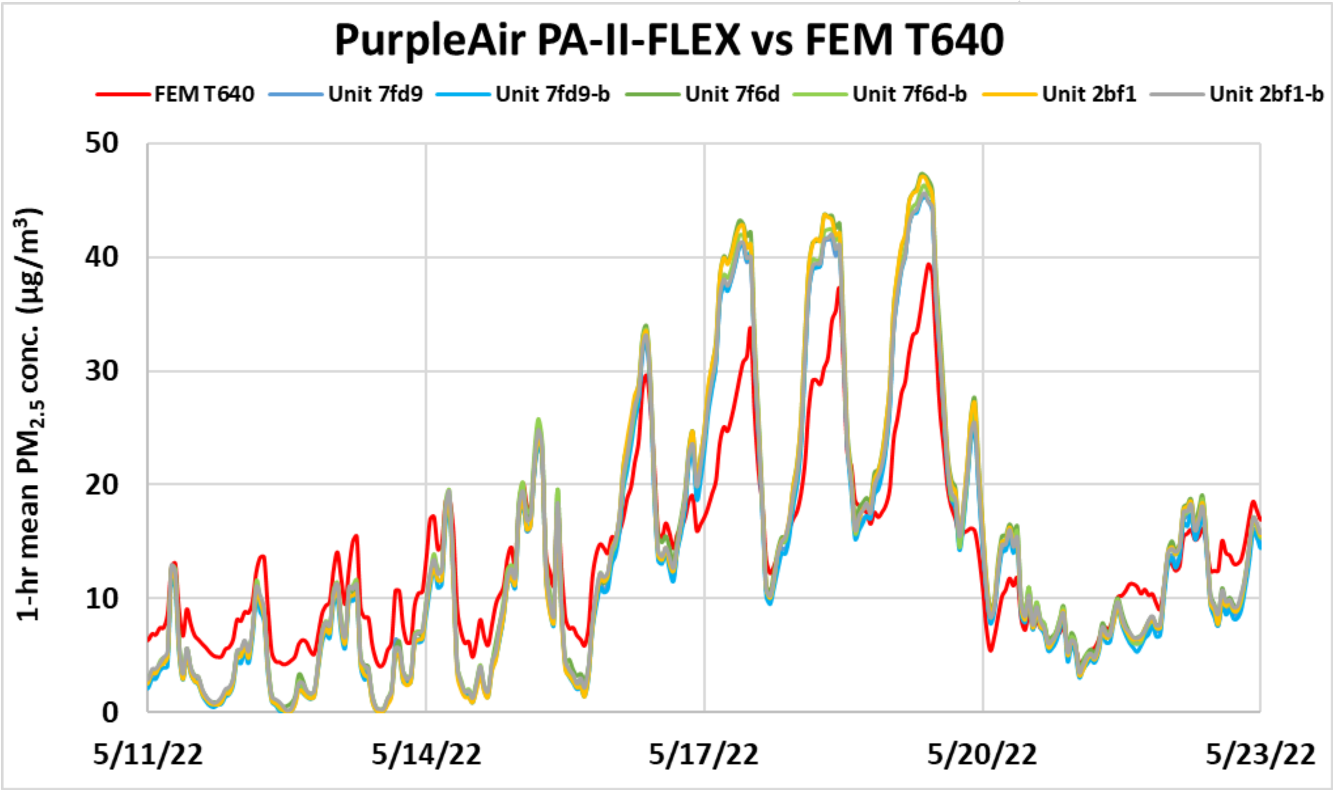
- Overall, the PA-II-FLEX sensors underestimated the $PM_{1.0}$ mass concentrations as measured by T640
- The PA-II-FLEX sensors seemed to track the $PM_{1.0}$ diurnal variations as recorded by T640

PA-II-FLEX vs FEM T640 ($PM_{2.5}$; 1-hr mean)



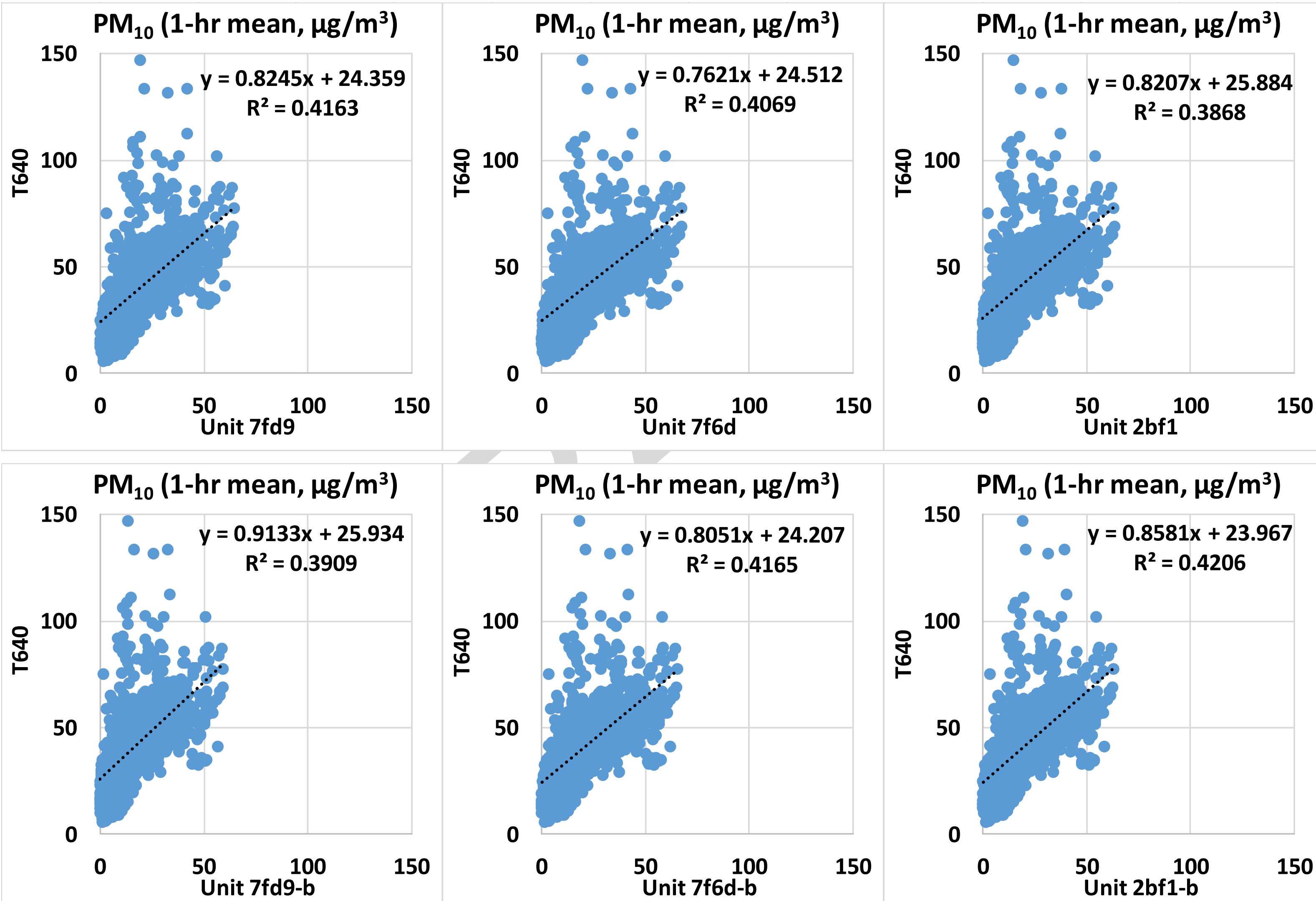
- The PA-II-FLEX sensors showed strong correlations with the corresponding FEM T640 data ($0.87 < R^2 < 0.90$)

PA-II-FLEX vs FEM T640 ($PM_{2.5}$; 1-hr mean)



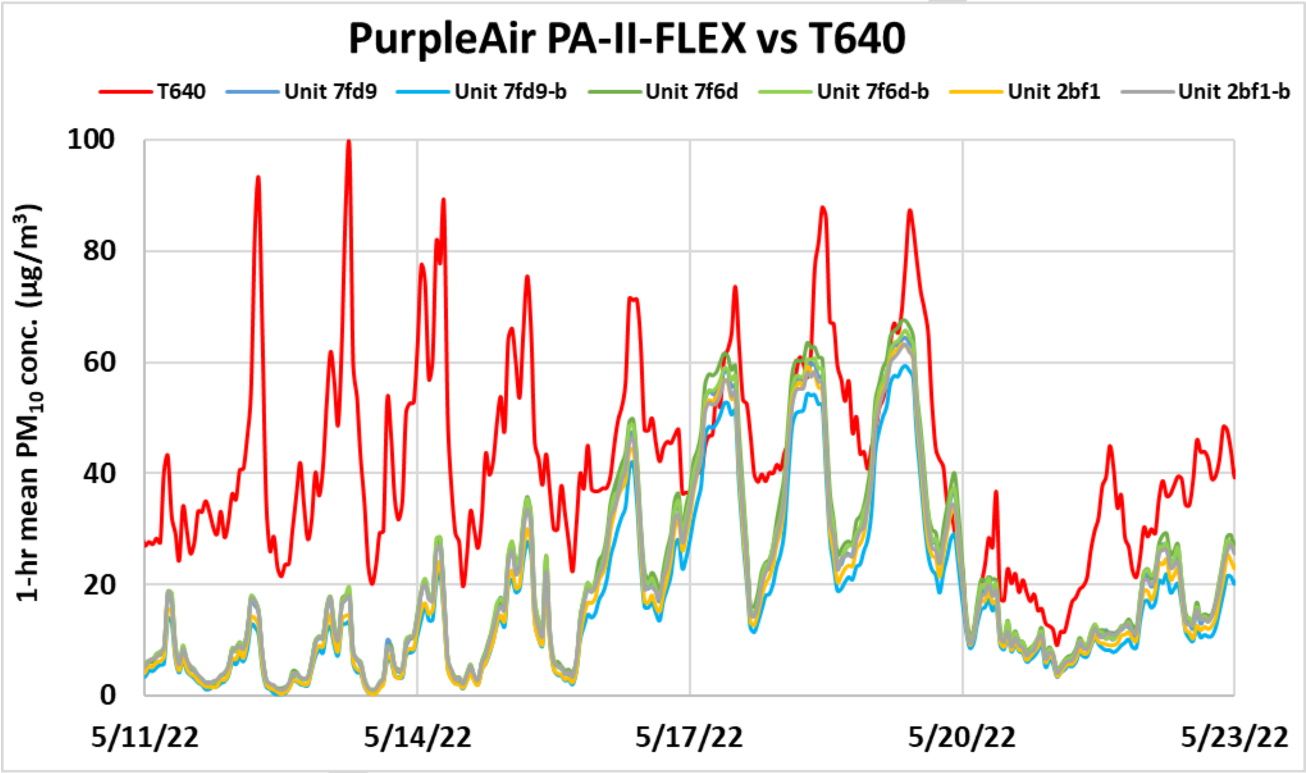
- Overall, the PA-II-FLEX sensors underestimated the $PM_{2.5}$ mass concentrations as measured by FEM T640
- The PA-II-FLEX sensors seemed to track the $PM_{2.5}$ diurnal variations as recorded by FEM T640

PA-II-FLEX vs T640 (PM_{10}; 1-hr mean)



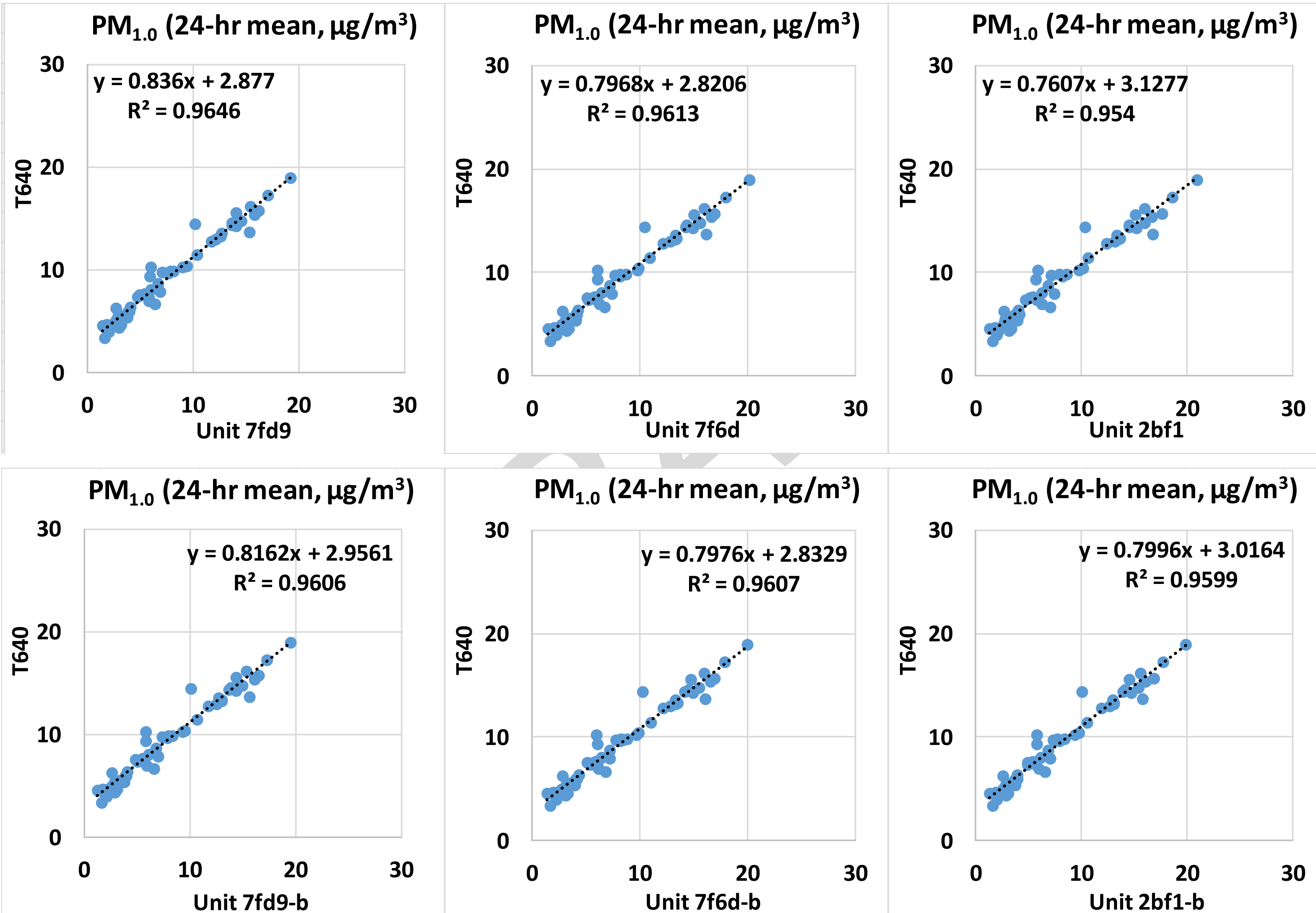
- The PA-II-FLEX sensors showed weak correlations with the corresponding T640 data ($0.38 < R^2 < 0.43$)

PA-II-FLEX vs T640 (PM_{10}; 1-hr mean)



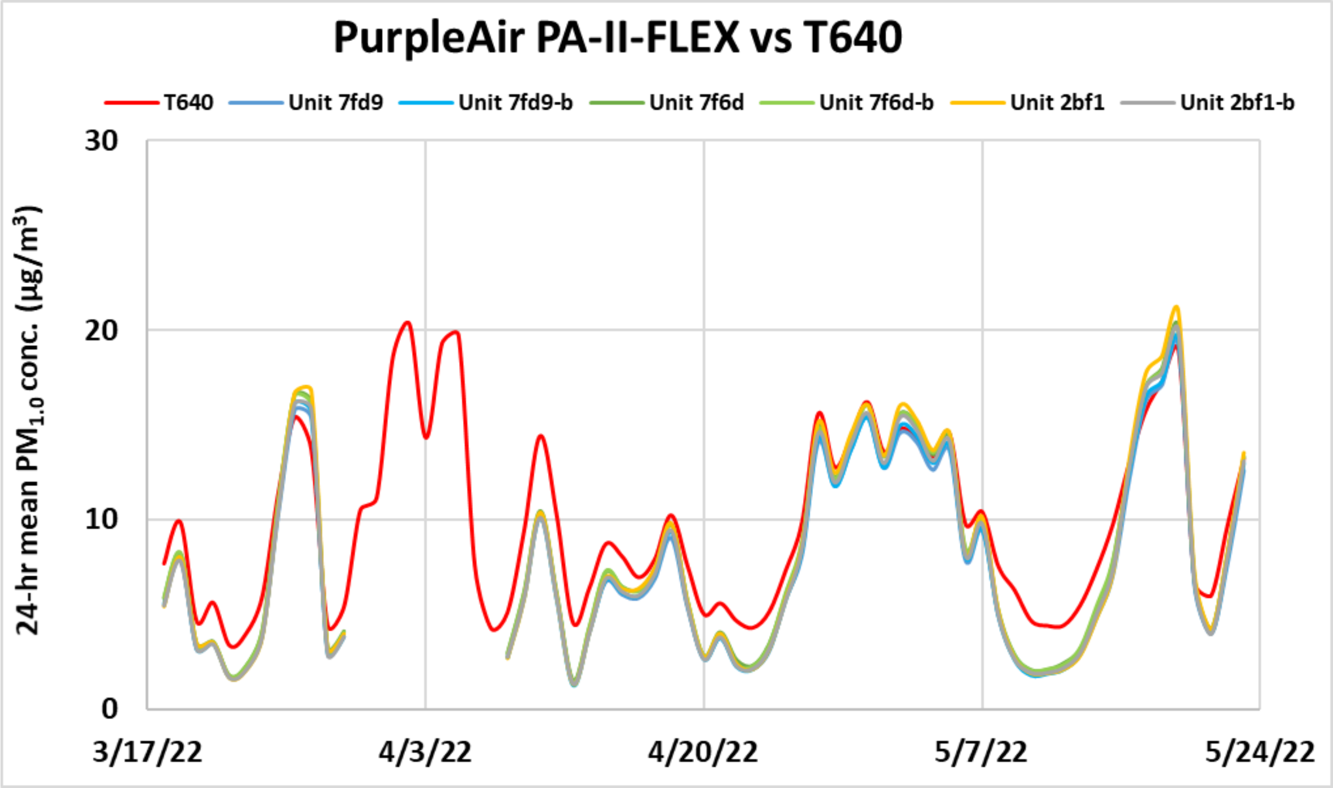
- Overall, the PA-II-FLEX sensors underestimated the PM_{10} mass concentrations as measured by T640
- The PA-II-FLEX sensors sometimes seemed to track the PM_{10} diurnal variations as recorded by T640

PA-II-FLEX vs T640 ($PM_{1.0}$; 24-hr mean)



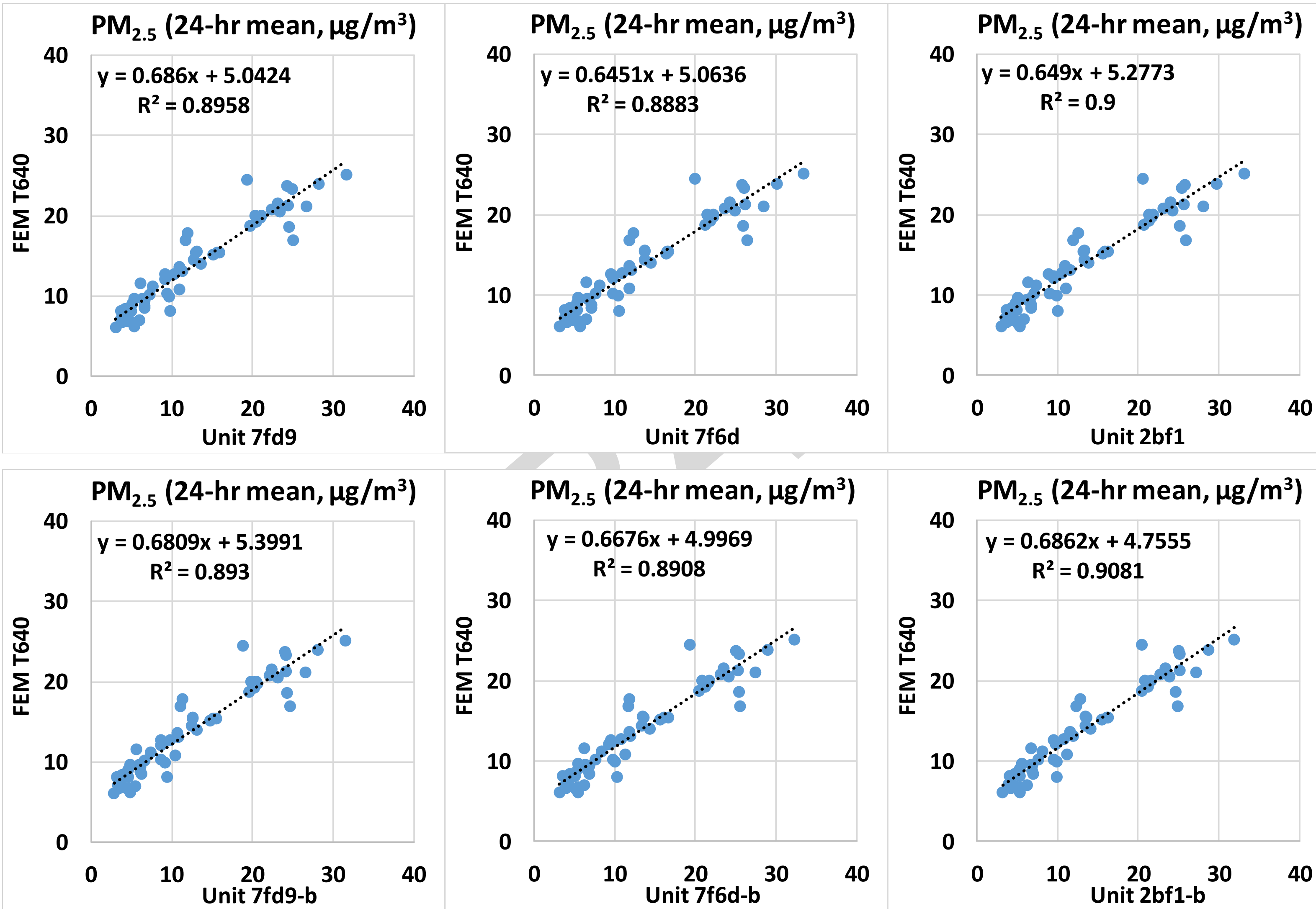
- The PA-II-FLEX sensors showed very strong correlations with the corresponding T640 data ($0.95 < R^2 < 0.97$)

PA-II-FLEX vs T640 ($PM_{1.0}$; 24-hr mean)



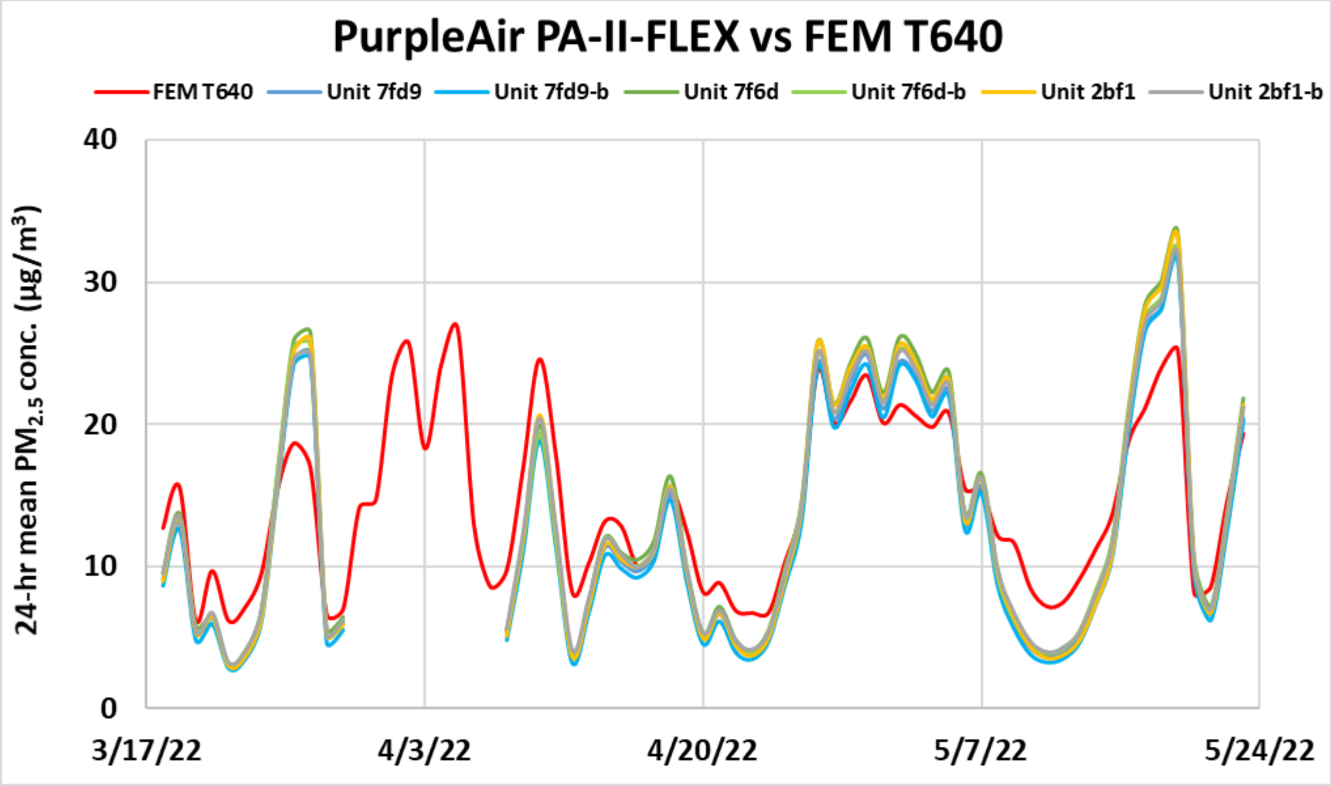
- Overall, the PA-II-FLEX sensors underestimated the $PM_{1.0}$ mass concentrations as measured by T640
- The PA-II-FLEX sensors seemed to track the $PM_{1.0}$ daily variations as recorded by T640

PA-II-FLEX vs FEM T640 ($PM_{2.5}$; 24-hr mean)



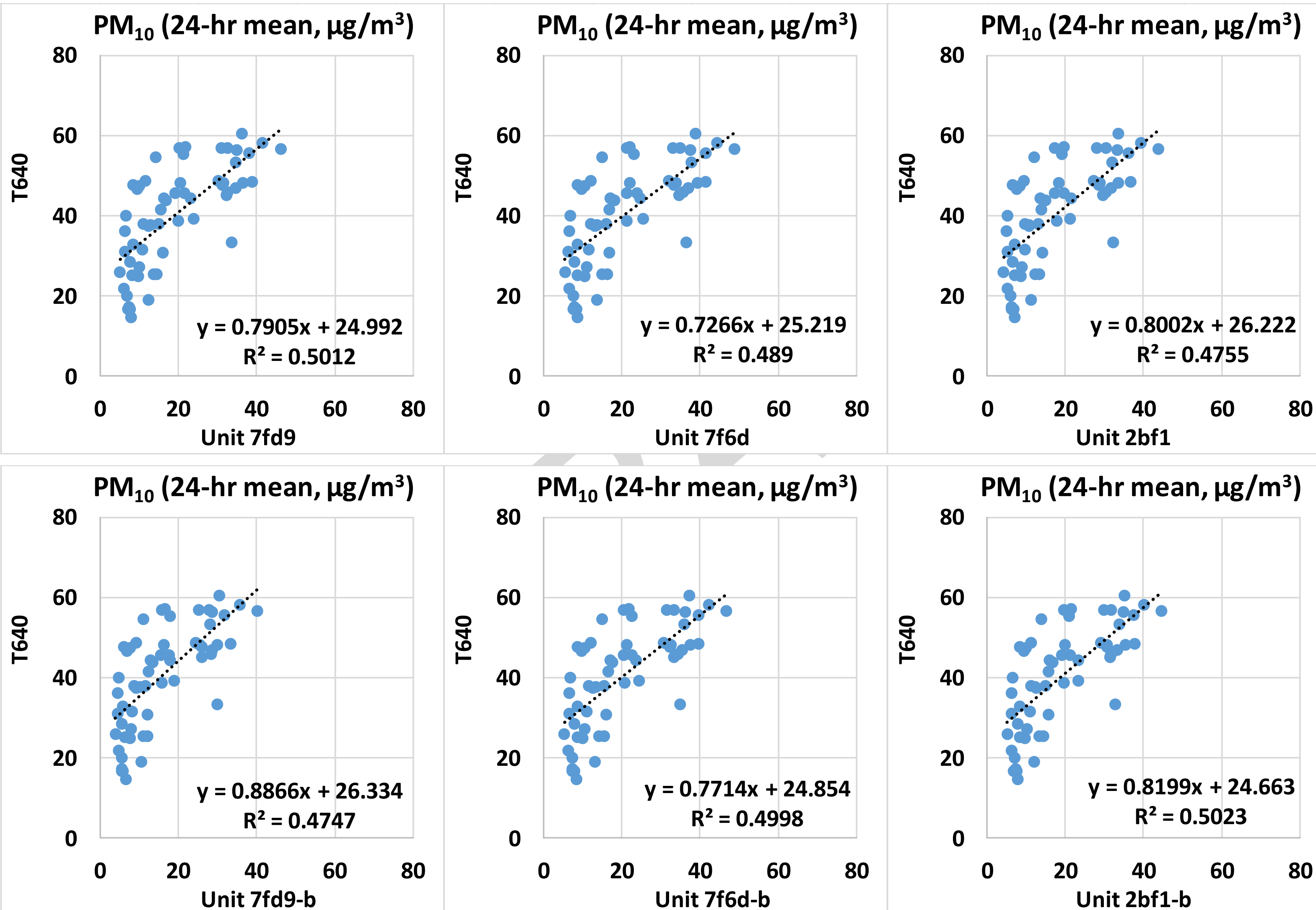
- The PA-II-FLEX sensors showed strong to very strong correlations with the corresponding FEM T640 data ($0.88 < R^2 < 0.91$)

PA-II-FLEX vs FEM T640 ($PM_{2.5}$; 24-hr mean)



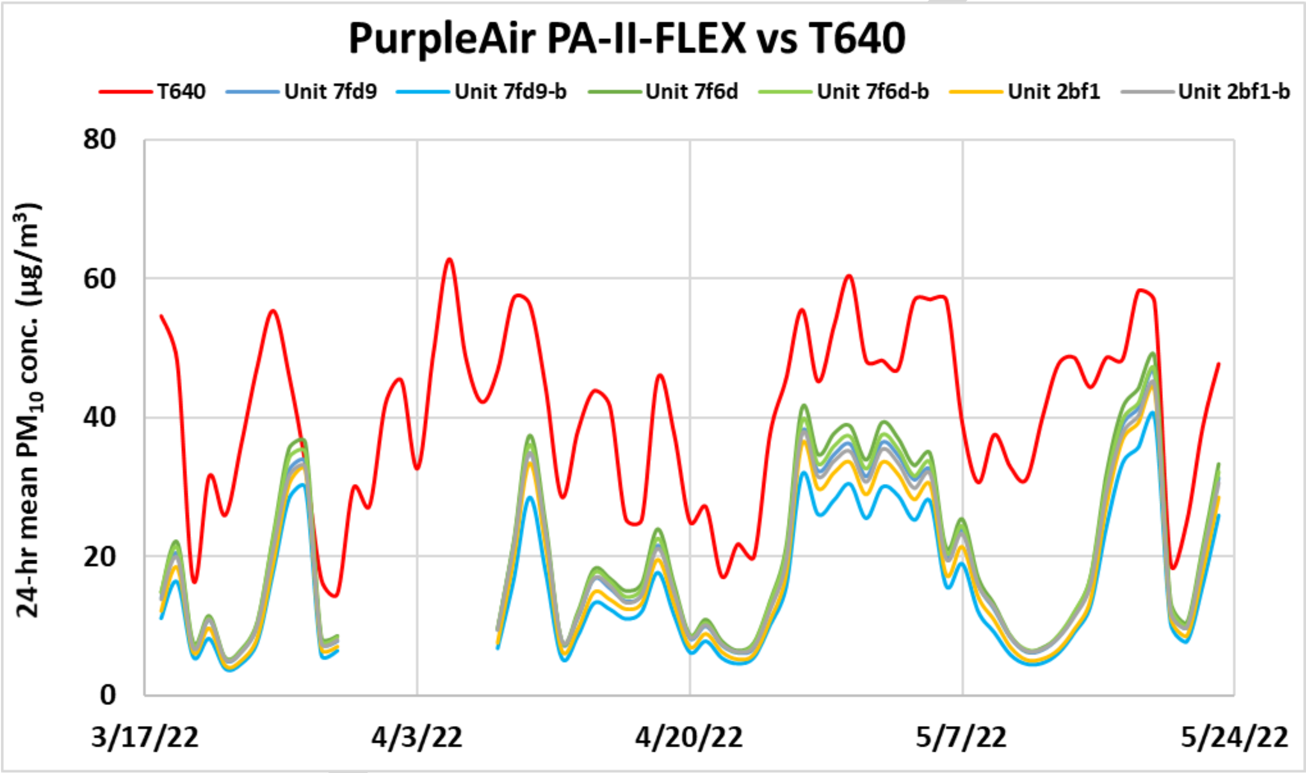
- Overall, the PA-II-FLEX sensors underestimated the $PM_{2.5}$ mass concentrations as measured by FEM T640
- The PA-II-FLEX sensors seemed to track the $PM_{2.5}$ daily variations as recorded by FEM T640

PA-II-FLEX vs T640 (PM_{10}; 24-hr mean)



- The PA-II-FLEX sensors showed weak to moderate correlations with the corresponding T640 data ($0.47 < R^2 < 0.51$)

PA-II-FLEX vs T640 (PM_{10}; 24-hr mean)



- Overall, the PA-II-FLEX sensors underestimated the PM_{10} mass concentrations as measured by T640
- The PA-II-FLEX sensors sometimes seemed to track the PM_{10} daily variations as recorded by T640

Summary: Channel A

	Average of 3 Sensors, $PM_{1.0}$		PA-II-FLEX vs GRIMM & T640, $PM_{1.0}$						GRIMM & T640 ($PM_{1.0}$, $\mu g/m^3$)		
	Average ($\mu g/m^3$)	SD ($\mu g/m^3$)	R^2	Slope	Intercept	MBE[1] ($\mu g/m^3$)	MAE[2] ($\mu g/m^3$)	RMSE[3] ($\mu g/m^3$)	Ref. Average	Ref. SD	Range during the field evaluation
5-min	7.8	6.4	0.91 to 0.94	0.74 to 0.81	1.5 to 3.2	-1.7 to 0.1	1.4 to 2.2	1.9 to 2.5	7.8 to 9.8	5.7	0.3 to 38.4
1-hr	7.8	6.4	0.91 to 0.95	0.74 to 0.82	1.5 to 3.2	-1.7 to 0.1	1.4 to 2.1	1.8 to 2.4	7.8 to 9.8	5.7	0.4 to 37.9
24-hr	7.8	5.1	0.92 to 0.96	0.71 to 0.84	1.6 to 3.1	-1.6 to 0.1	1.1 to 1.7	1.4 to 2.0	7.9 to 9.8	4.6 to 4.7	2.5 to 20.3
	Average of 3 Sensors, $PM_{2.5}$		PA-II-FLEX vs FEM GRIMM & FEM T640, $PM_{2.5}$						FEM GRIMM & FEM T640 ($PM_{2.5}$, $\mu g/m^3$)		
	Average ($\mu g/m^3$)	SD ($\mu g/m^3$)	R^2	Slope	Intercept	MBE[1] ($\mu g/m^3$)	MAE[2] ($\mu g/m^3$)	RMSE[3] ($\mu g/m^3$)	Ref. Average	Ref. SD	Range during the field evaluation
5-min	13.0	10.3	0.78 to 0.87	0.62 to 0.67	4.6 to 5.6	-1.1 to -0.3	3.5 to 3.8	4.4 to 5.0	13.0 to 14.4	7.4 to 7.5	1.2 to 48.9
1-hr	13.0	10.2	0.79 to 0.88	0.63 to 0.67	4.6 to 5.6	-1.1 to -0.3	3.5 to 3.7	4.2 to 4.9	13.0 to 14.4	7.3 to 7.4	1.5 to 47.9
24-hr	13.1	8.1	0.81 to 0.90	0.60 to 0.69	5.0 to 5.3	-1.1 to -0.3	2.7 to 3.1	3.2 to 3.9	13.1 to 14.4	5.7 to 6.0	5.5 to 26.7
	Average of 3 Sensors, PM_{10}		PA-II-FLEX vs GRIMM & T640, PM_{10}						GRIMM & T640 (PM_{10}, $\mu g/m^3$)		
	Average ($\mu g/m^3$)	SD ($\mu g/m^3$)	R^2	Slope	Intercept	MBE[1] ($\mu g/m^3$)	MAE[2] ($\mu g/m^3$)	RMSE[3] ($\mu g/m^3$)	Ref. Average	Ref. SD	Range during the field evaluation
5-min	19.0	14.6	0.21 to 0.38	0.63 to 0.82	19.1 to 25.9	-22.8 to -12.7	15.3 to 23.1	21.8 to 27.6	30.7 to 40.5	18.5 to 19.1	1.7 to 268.7
1-hr	19.0	14.4	0.22 to 0.42	0.62 to 0.82	19.2 to 25.9	-22.8 to -12.8	15.1 to 23.1	21.0 to 27.0	30.7 to 40.5	17.6 to 18.1	2.3 to 150.8
24-hr	19.2	11.5	0.20 to 0.50	0.49 to 0.80	21.4 to 26.2	-22.7 to -12.5	13.4 to 22.7	17.6 to 24.6	30.7 to 40.5	11.7 to 12.4	8.9 to 62.8

[1] Mean Bias Error (MBE): the difference between the sensors and the reference instruments. MBE indicates the tendency of the sensors to underestimate (negative MBE values) or overestimate (positive MBE values).

[2] Mean Absolute Error (MAE): the absolute difference between the sensors and the reference instruments. The larger MAE values, the higher measurement errors as compared to the reference instruments.

[3] Root Mean Square Error (RMSE): another metric to calculate measurement errors.

Summary: Channel B

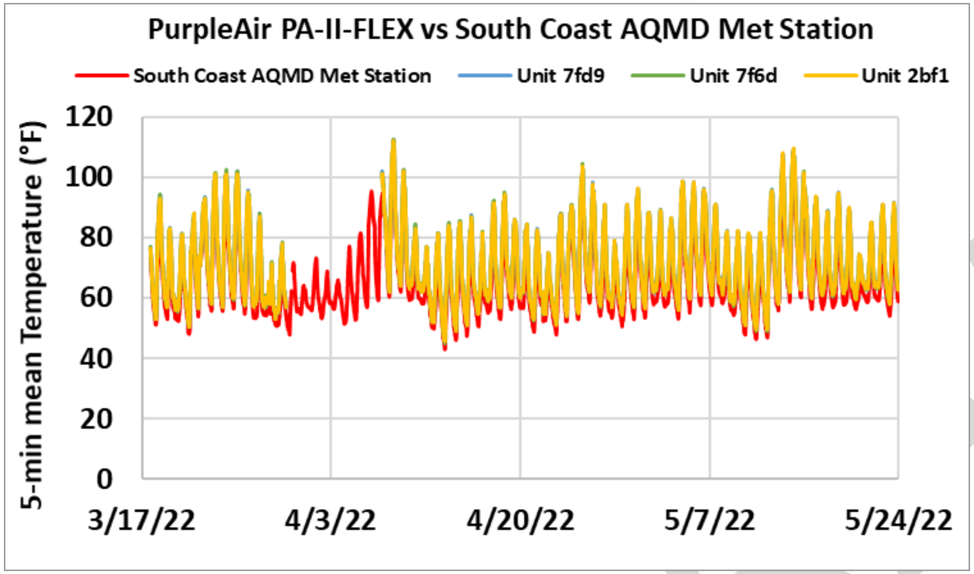
	Average of 3 Sensors, $PM_{1.0}$		PA-II-FLEX vs GRIMM & T640, $PM_{1.0}$						GRIMM & T640 ($PM_{1.0}$, μg/m^3)		
	Average (μg/m^3)	SD (μg/m^3)	R^2	Slope	Intercept	MBE[1] (μg/m^3)	MAE[2] (μg/m^3)	RMSE[3] (μg/m^3)	Ref. Average	Ref. SD	Range during the field evaluation
5-min	7.7	6.4	0.91 to 0.94	0.77 to 0.79	1.5 to 3.2	-1.6 to 0.1	1.5 to 2.1	2.0 to 2.5	7.8 to 9.8	5.7	0.3 to 38.4
1-hr	7.7	6.3	0.91 to 0.94	0.77 to 0.80	1.5 to 3.1	-1.6 to 0.1	1.5 to 2.1	1.9 to 2.4	7.8 to 9.8	5.7	0.4 to 37.9
24-hr	7.8	5.0	0.92 to 0.96	0.75 to 0.82	1.6 to 3.0	-1.6 to 0.1	1.2 to 1.7	1.5 to 2.0	7.9 to 9.8	4.6 to 4.7	2.5 to 20.3
	Average of 3 Sensors, $PM_{2.5}$		PA-II-FLEX vs FEM GRIMM & FEM T640, $PM_{2.5}$						FEM GRIMM & FEM T640 ($PM_{2.5}$, μg/m^3)		
	Average (μg/m^3)	SD (μg/m^3)	R^2	Slope	Intercept	MBE[1] (μg/m^3)	MAE[2] (μg/m^3)	RMSE[3] (μg/m^3)	Ref. Average	Ref. SD	Range during the field evaluation
5-min	12.7	10.1	0.79 to 0.88	0.64 to 0.67	4.4 to 5.7	-1.5 to -0.7	3.4 to 3.8	4.2 to 4.8	13.0 to 14.4	7.4 to 7.5	1.2 to 48.9
1-hr	12.7	9.9	0.80 to 0.89	0.64 to 0.67	4.4 to 5.7	-1.5 to -0.7	3.3 to 3.7	4.1 to 4.7	13.0 to 14.4	7.3 to 7.4	1.5 to 47.9
24-hr	12.9	7.9	0.82 to 0.91	0.62 to 0.69	4.7 to 5.4	-1.5 to -0.6	2.6 to 3.2	3.4 to 3.8	13.1 to 14.4	5.7 to 6.0	5.5 to 26.7
	Average of 3 Sensors, PM_{10}		PA-II-FLEX vs GRIMM & T640, PM_{10}						GRIMM & T640 (PM_{10}, μg/m^3)		
	Average (μg/m^3)	SD (μg/m^3)	R^2	Slope	Intercept	MBE[1] (μg/m^3)	MAE[2] (μg/m^3)	RMSE[3] (μg/m^3)	Ref. Average	Ref. SD	Range during the field evaluation
5-min	18.1	13.8	0.22 to 0.39	0.67 to 0.91	18.8 to 25.9	-24.6 to -13.3	15.4 to 24.8	21.8 to 29.0	30.7 to 40.5	18.5 to 19.1	1.7 to 268.7
1-hr	18.1	13.6	0.23 to 0.42	0.66 to 0.91	18.9 to 25.9	-24.6 to -13.3	15.2 to 24.8	21.1 to 28.4	30.7 to 40.5	17.6 to 18.1	2.3 to 150.8
24-hr	18.2	10.8	0.20 to 0.50	0.53 to 0.89	21.2 to 26.3	-24.6 to -13.0	13.7 to 24.6	17.7 to 26.2	30.7 to 40.5	11.7 to 12.4	8.9 to 62.8

[1] Mean Bias Error (MBE): the difference between the sensors and the reference instruments. MBE indicates the tendency of the sensors to underestimate (negative MBE values) or overestimate (positive MBE values).

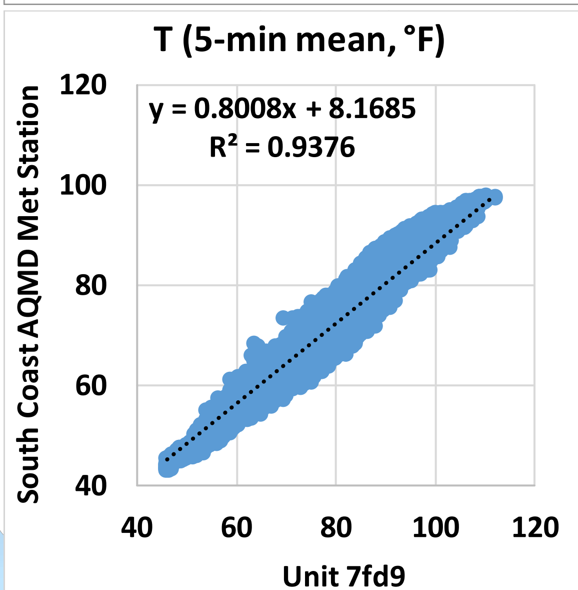
[2] Mean Absolute Error (MAE): the absolute difference between the sensors and the reference instruments. The larger MAE values, the higher measurement errors as compared to the reference instruments.

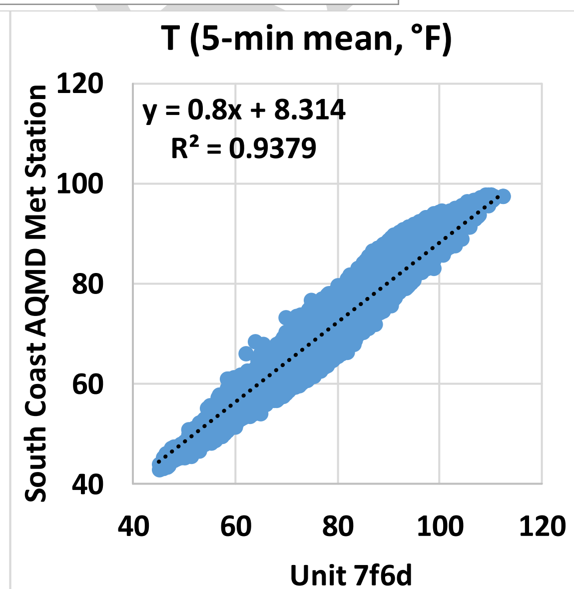
[3] Root Mean Square Error (RMSE): another metric to calculate measurement errors.

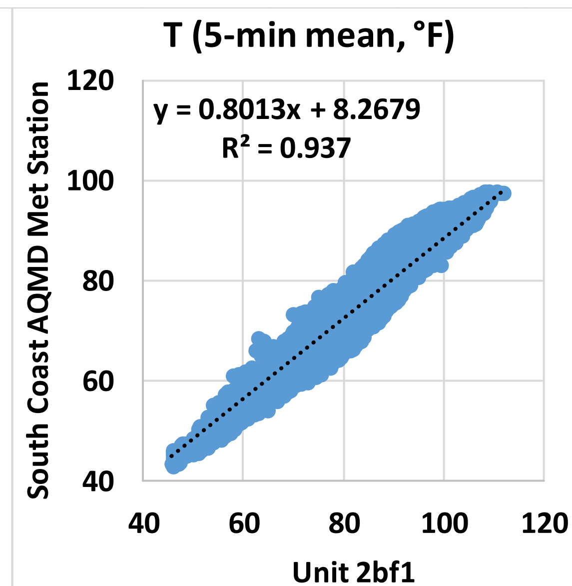
PurpleAir PA-II-FLEX vs South Coast AQMD Met Station (Temp; 5-min mean)



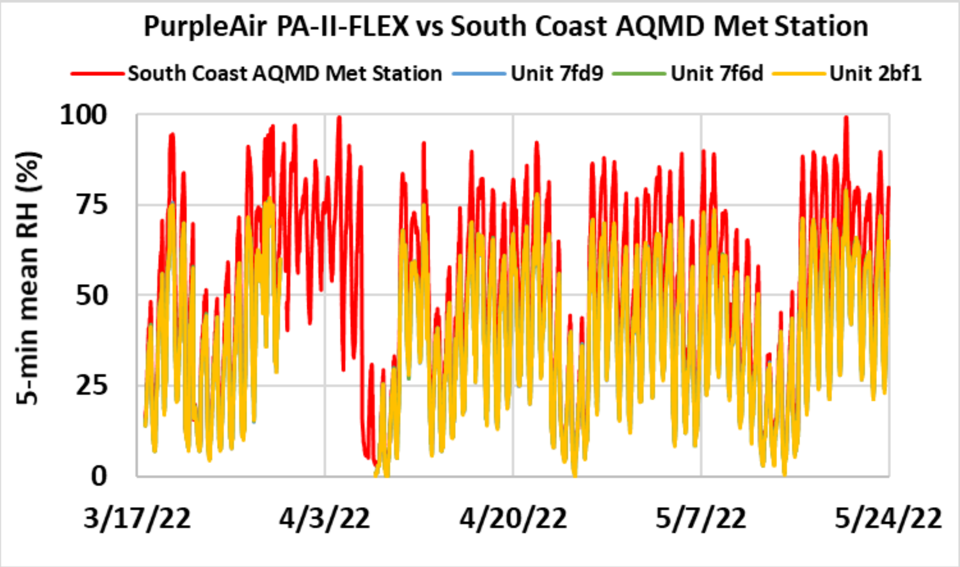
- The PA-II-FLEX sensors showed very strong correlations with the corresponding South Coast AQMD Met Station data (R^2 ~0.94)
- Overall, the PA-II-FLEX sensors overestimated the temperature measurement as recorded by South Coast AQMD Met Station
- The PA-II-FLEX sensors seemed to track the diurnal temperature variations as recorded by South Coast AQMD Met Station



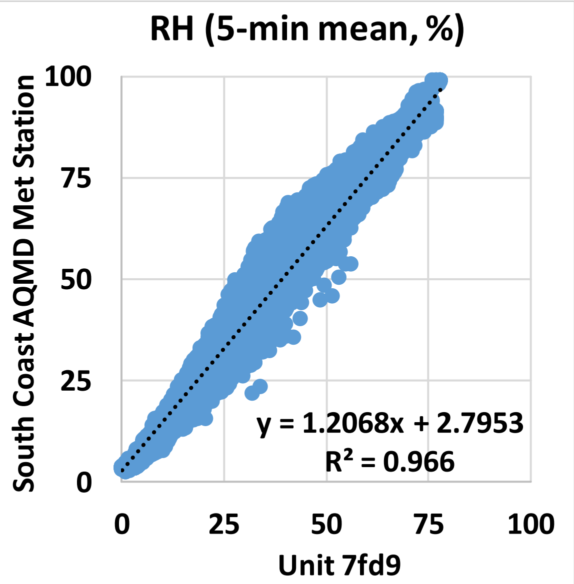


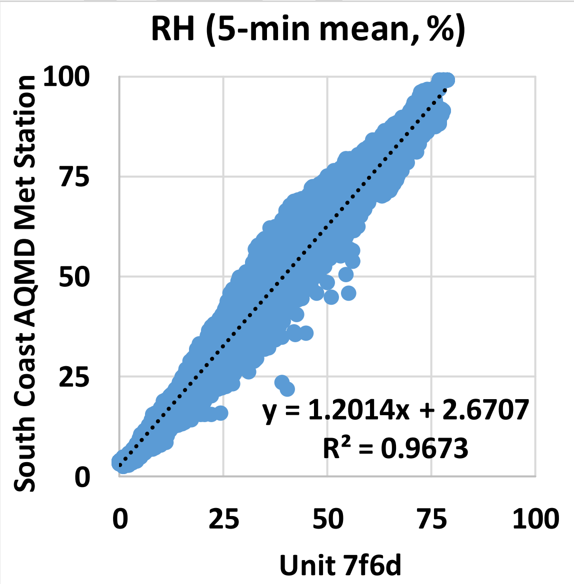


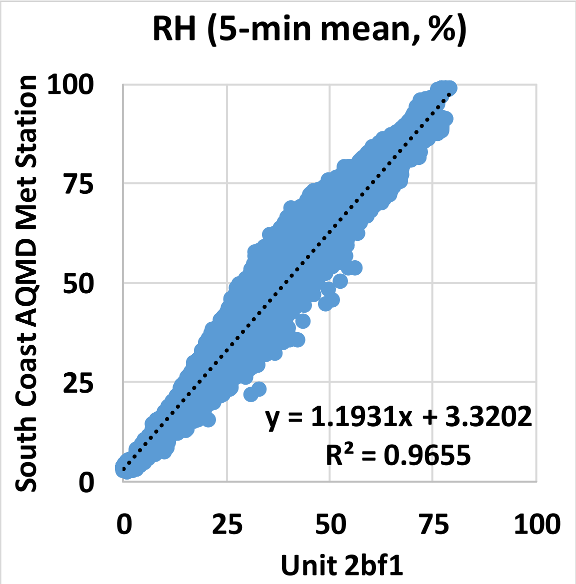
PurpleAir PA-II-FLEX vs South Coast AQMD Met Station (RH; 5-min mean)



- The PA-II-FLEX sensors showed very strong correlations with the corresponding South Coast AQMD Met Station data (R^2 ~0.97)
- Overall, the PA-II-FLEX sensors underestimated the RH measurement as recorded by South Coast AQMD Met Station
- The PA-II-FLEX sensors seemed to track the diurnal RH variations as recorded by South Coast AQMD Met Station







Discussion

- The three **PA-II-FLEX** sensors' data recovery from all units was ~94% for all PM measurements
- The absolute intra-model variability for $PM_{1.0}$, $PM_{2.5}$ and PM_{10} was ~0.18, ~0.38 and ~1.64 µg/m^3, respectively
- Reference instruments: Very strong correlations between GRIMM and T640 for $PM_{1.0}$, $PM_{2.5}$, and PM_{10} (R^2 ~0.95, R^2 ~0.95, and R^2 ~0.91, respectively, 1-hr mean)
- $PM_{1.0}$ mass concentrations measured by PA-II-FLEX sensors showed very strong correlations with the corresponding GRIMM and T640 data ($0.90 < R^2 < 0.95$, 1-hr mean). The sensors underestimated $PM_{1.0}$ mass concentrations as measured by GRIMM and T640
- $PM_{2.5}$ mass concentrations measured by PA-II-FLEX sensors showed strong correlations with the corresponding FEM GRIMM and FEM T640 data ($0.78 < R^2 < 0.90$, 1-hr mean). The sensors underestimated $PM_{2.5}$ mass concentrations as measured by FEM GRIMM and FEM T640
- PM_{10} mass concentrations measured by PA-II-FLEX sensors showed very weak to weak correlations with the corresponding GRIMM and T640 ($0.22 < R^2 < 0.43$; 1-hr mean). The sensors underestimated PM_{10} mass concentrations as measured by GRIMM and T640
- No sensor calibration was performed by South Coast AQMD staff for this evaluation
- Laboratory chamber testing is necessary to fully evaluate the performance of these sensors under known aerosol concentrations and controlled temperature and relative humidity conditions
- All results are still preliminary