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Supplement of

Long-term evaluation of air sensor technology under ambient conditions in Denver, Colorado

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1 **SUPPLEMENTAL MATERIAL**

2 Table S1 Aeroqual SM-50 Calibration Audit Results

<i>Unit</i>	<i>Pre-Denver Slope</i>	<i>Pre-Denver Intercept</i>	<i>Pre-Denver r²</i>	<i>Post-Denver Slope</i>	<i>Post-Denver Intercept, ppb</i>	<i>Post-Denver r²</i>
Aeroqual 1	1.2	1.1	0.9996	0.53	0.25	0.9913
Aeroqual 2	1.2	1.3	0.9998	0.63	-1.00	0.9987
Aeroqual 3	1.2	3.8	0.9997	0.57	2.78	0.993

3

4 Table S2 TSI Air Assure Calibration Audit Results

<i>Unit</i>	<i>Pre-Denver Zero (µg/m³)</i>	<i>Post-Denver Zero (µg/m³)</i>
Air Assure 1	5	4.46
Air Assure 2	3	2.54
Air Assure 3	1	0.64

5

6 Table S3 AirCasting Airbeam Calibration Audit Results

<i>Unit</i>	<i>Pre-Denver Zero¹</i>	<i>Post-Denver Zero (hppcf)</i>
Airbeam 1	NA	0
Airbeam 2	NA	0
Airbeam 3	NA	0

¹Pre-Denver Audits were not performed for Airbeam units

7

8 Table S4 Cairpol CairClip Calibration O₃ Audit Results

<i>Unit</i>	<i>Pre-Denver Slope¹</i>	<i>Pre-Denver Intercept¹</i>	<i>Pre-Denver r²</i>	<i>Post-Denver Slope</i>	<i>Post-Denver Intercept, ppb</i>	<i>Post-Denver r²</i>
CairClip 1	NA	NA	NA	1.22	-0.47	0.9984
CairClip 2	NA	NA	NA	1.03	5.59	0.9994
CairClip 3	NA	NA	NA	1.29	-20.8	0.9991

¹Pre-Denver Audits were not performed for CairClip units

9

10 Table S5 Cairpol CairClip Calibration NO₂ Audit Results

<i>Unit</i>	<i>Pre-Denver Slope¹</i>	<i>Pre-Denver Intercept¹</i>	<i>Pre-Denver r²</i>	<i>Post-Denver Slope</i>	<i>Post-Denver Intercept, ppb</i>	<i>Post-Denver r²</i>
CairClip 1	NA	NA	NA	0.93	0	0.9993
CairClip 2	NA	NA	NA	0.88	0	0.9941
CairClip 3	NA	NA	NA	1.01	0	0.9988

¹Pre-Denver Audits were not performed for CairClip units

11

12 Table S6 Dylos DC-1100/DC-1100 Pro Calibration Audit Results

<i>Unit</i>	<i>Pre-Denver Zero (particle count)</i>	<i>Post-Denver Zero (particle count)</i>
Dylos 1	0	0
Dylos 2	0	0
Dylos 3	0	0

13

14 Table S7 Alphasense OPC-N2 Calibration Audit Results

<i>Unit</i>	<i>Pre-Denver Zero ($\mu\text{g}/\text{m}^3$)</i>	<i>Post-Denver Zero ($\mu\text{g}/\text{m}^3$)</i>
OPC 1	0	0
OPC 2	0	0
OPC 3	0	0

15

16 Table S8 Shinyei PMS-SYS-1 Calibration Audit Results

<i>Unit</i>	<i>Pre-Denver Zero ($\mu\text{g}/\text{m}^3$)</i>	<i>Post-Denver Zero ($\mu\text{g}/\text{m}^3$)</i>
Shinyei 1	0	0
Shinyei 2	0	0
Shinyei 3	0	0

17

18 Table S9 AirViz Speck Calibration Audit Results

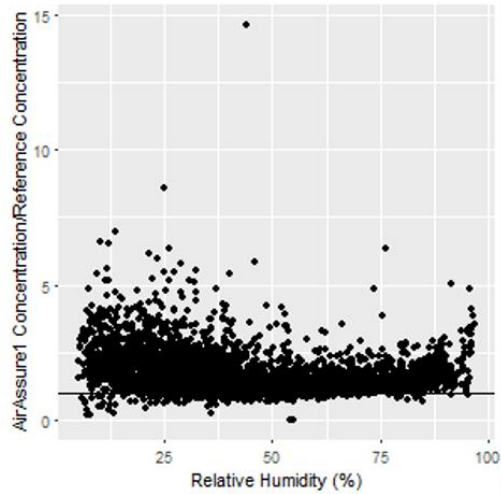
<i>Unit</i>	<i>Pre-Denver Zero ($\mu\text{g}/\text{m}^3$)</i>	<i>Post-Denver Zero ($\mu\text{g}/\text{m}^3$)</i>
Speck 1	0	0
Speck 2	0	10
Speck 3	0	4

19

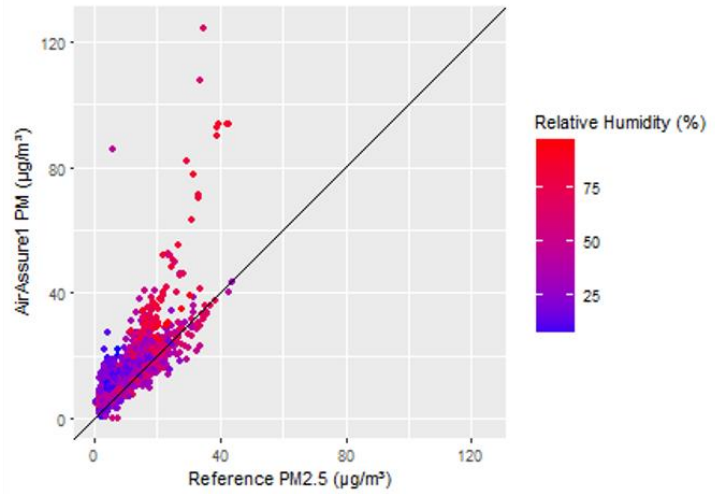
Table S10 Correlation Results for CAIRSENSE sensors at different time intervals

Sensor	Pollutant	5-minute	1-hour	12-hour	24-hour
Aeroqual SM-50	O ₃ , ppb	0.93	0.93	0.91	0.86
		0.92	0.92	0.98	0.83
		0.96	0.96	0.97	0.95
TSI Air Assure	PM, µg/m ³	0.78	0.8	0.55	0.39
		0.77	0.78	0.52	0.37
		0.80	0.81	0.54	.39
AirCasting AirBeam	Particle Count, hundreds of particles per cubic foot (hppcf)	0.81	0.82	0.82	0.79
		0.83	0.84	0.83	0.82
		0.81	0.82	0.80	0.79
Cairpol Cairclip	O ₃ , ppb	NA ¹	NA ¹	NA ¹	NA ¹
		-0.42	-0.06	-0.12	0.65
		0.40	0.46	0.47	-0.42
Cairpol Cairclip	NO ₂ , ppb	NA ¹	NA ¹	NA ¹	NA ¹
		0.82	0.873	0.61	0.50
		0.83	0.84	0.79	0.77
Dylos DC1100/DC1100 Pro	"Small" Particle Count, hppcf	0.85	0.86	0.86	0.86
		0.77	0.78	0.77	0.75
		0.72	0.73	0.72	0.70
Dylos DC1100/DC1100 Pro	"Large" Particle Count, hppcf	0.38	0.40	0.57	0.69
		0.34	0.33	0.34	0.40
		0.28	0.27	0.27	0.32
Alphasense OPC-N2	PM _{2.5} , µg/m ³	0.41	0.45	0.51	0.51
		0.32	0.34	0.34	0.36
		0.11	0.11	0.07	0.00
Alphasense OPC-N2	PM ₁₀ , µg/m ³	0.40	0.47	0.69	0.74
		0.63	0.68	0.70	0.70
		0.20	0.20	0.15	0.16
Shinyei PMS- SYS-1	PM _{2.5} , µg/m ³	0.71	0.71	0.69	0.64
		0.70	0.72	0.71	0.70
		0.01	0.01*	0.05	0.10
AirViz Speck	PM _{2.5} , µg/m ³	0.24	0.24	0.21	0.26
		0.40	0.40	0.38	0.40
		0.36	0.35	0.31	0.31
TZOA PM Research Sensor	Particle Count, hppcf	NA ¹	NA ¹	NA ¹	NA ¹
		0.50	0.66	0.64	0.57
		0.68	0.72	0.71	0.67

20 ¹Correlations were not performed



(a)

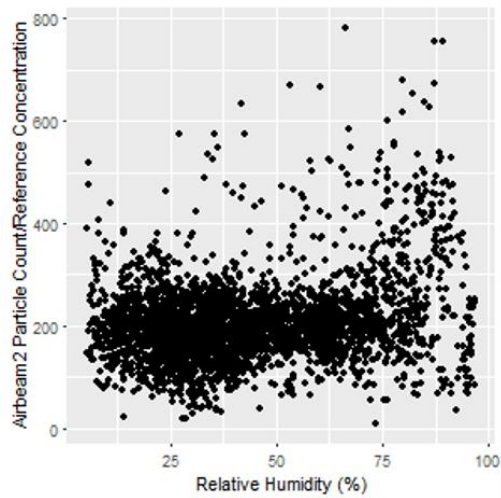


(b)

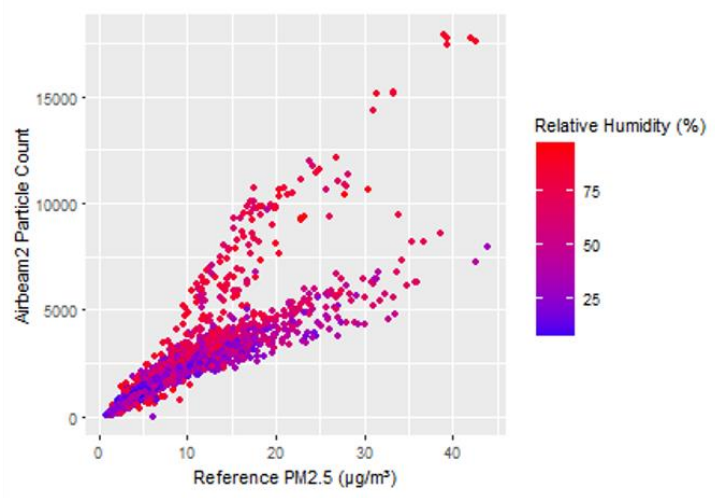
21

22 Figure S1 AirAssure1 PM_{2.5} to reference concentration ratio and Relative Humidity (a) and Hourly
 23 Average FRM PM_{2.5} concentration and AirAssure1 PM concentration stratified by Relative Humidity (b)

24



(a)

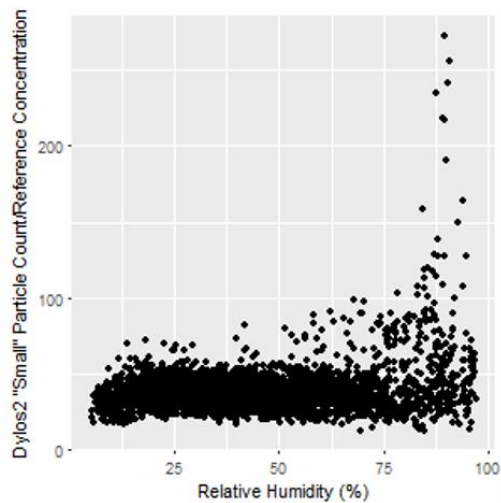


(b)

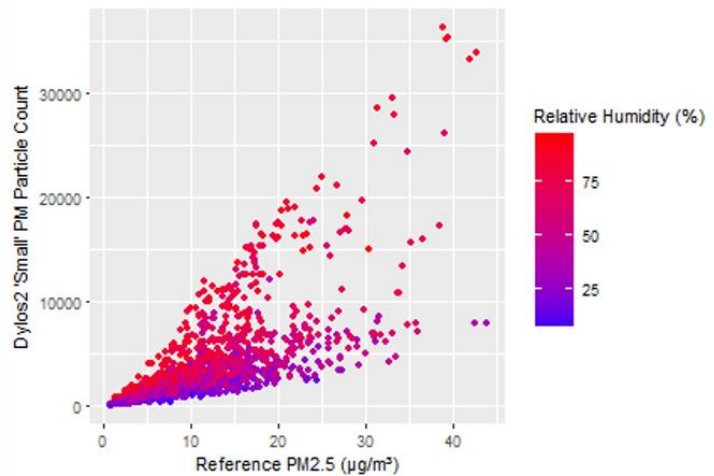
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26 Figure S2 Airbeam2 Particle Count to reference concentration ratio and Relative Humidity (a) and Hourly
 27 Average FRM PM_{2.5} concentration and Airbeam2 Particle Count stratified by Relative Humidity (b)

28



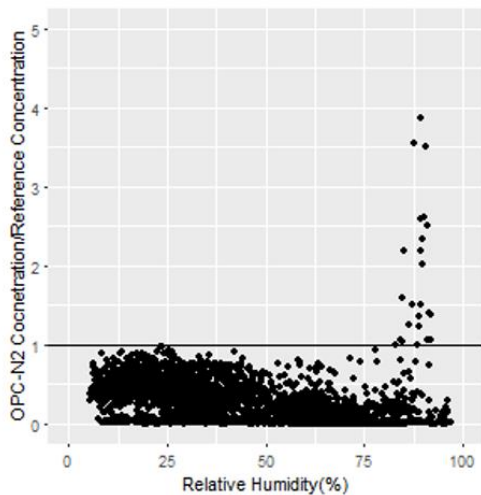
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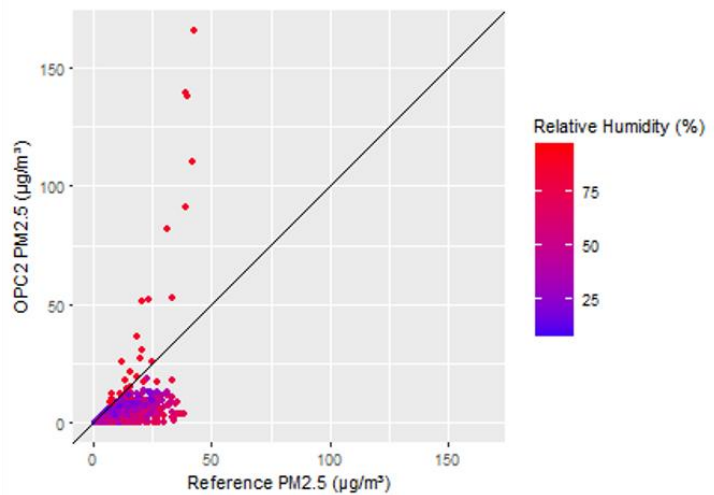
(b)

29
 30 Figure S3 Dylos2 "Small" Particle Count to reference concentration ratio and Relative Humidity (a) and
 31 Hourly Average FRM PM_{2.5} concentration and Dylos2 "Small" Particle Count stratified by Relative
 32 Humidity (b)

33



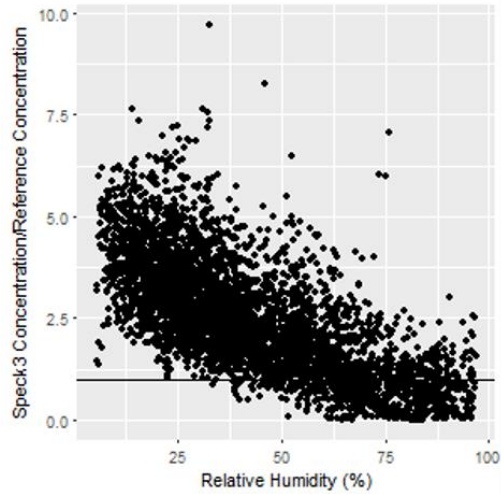
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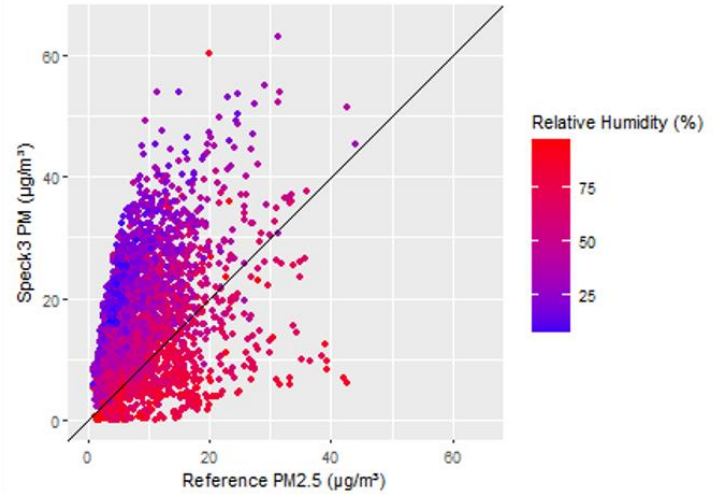
(b)

34
 35 Figure S4 OPC2 PM_{2.5} to reference concentration ratio and Relative Humidity (a) and Hourly Average
 36 FRM PM_{2.5} concentration and OPC2 PM concentration stratified by Relative Humidity (b)

37



(a)



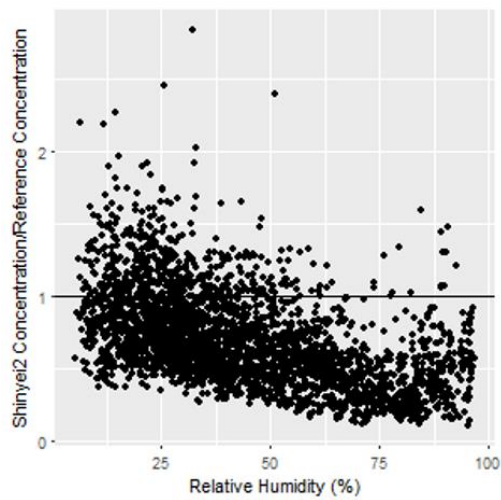
(b)

38

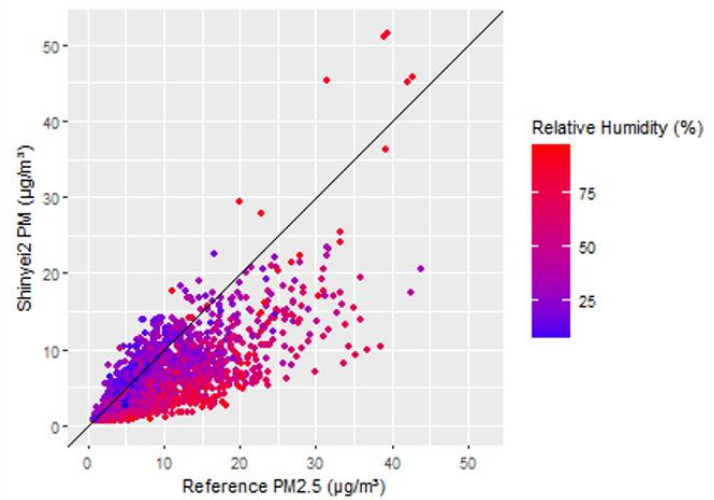
39 Figure S5 Speck3 PM_{2.5} to reference concentration ratio and Relative Humidity (a) and Hourly Average

40 FRM PM_{2.5} concentration and Speck3 PM concentration stratified by Relative Humidity (b)

41



(a)



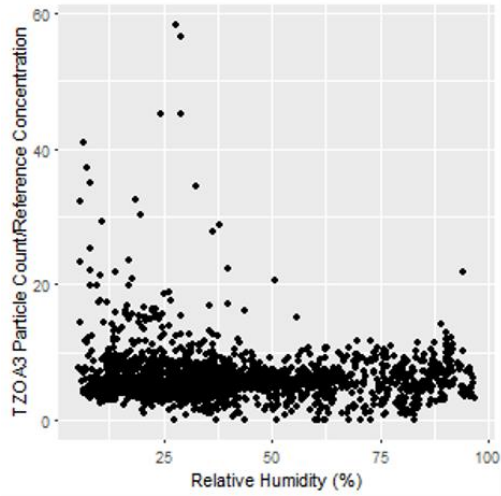
(b)

42

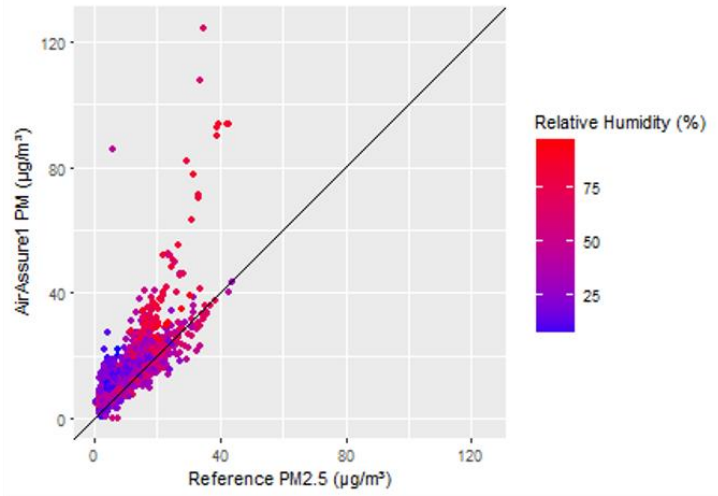
43 Figure S6 Shinyei2 PM_{2.5} to reference concentration ratio and Relative Humidity (a) and Hourly Average

44 FRM PM_{2.5} concentration and Shinyei2 PM concentration stratified by Relative Humidity (b)

45



(a)



(b)

46

47 Figure S7 TZO A3 Particle Count to reference concentration ratio and Relative Humidity (a) and Hourly

48 Average FRM PM_{2.5} concentration and TZO A3 Particle Count stratified by Relative Humidity (b)

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