



Supplement of

The Aerosol Research Observation Station (AEROS)

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Supplement Material

Supplement Table

Table S1: Statistics for laboratory intercomparison of aerosol instrumentation using ATD particles based on linear regression

Variable	Instrument used		AVE \pm SD		N	Based on linear regression							Based on ODR	
						R ²	RMSE	MAE	Slope	Inter	PCC	<i>P</i> values	Slope	Inter
Total Count	OPS	Grimm 11-D	441 \pm 210	505 \pm 243	31	0.97	43	29	1.1	3.6	0.984	1.0	1.2	-6.2
PM ₁₀	Grimm 11-D	DustTrak	9401 \pm 20065	6050 \pm 12866	33	1	721	378	0.6	32	0.998	0.9	18.6	-2926
PM ₄	Grimm 11-D	DustTrak	5092 \pm 7983	2161 \pm 5758	33	0.95	1214	7098	0.7	-1427	0.977	0.9	0.7	-1484
PM _{2.5}	Grimm 11-D	DustTrak	1904 \pm 2325	1458 \pm 5194	33	0.85	2005	11888	2.1	-2455	0.920	1.0	2.4	-3044
PM ₁	Grimm 11-D	DustTrak	219 \pm 296	1162 \pm 5123	33	0.86	1894	1152	16	-2352	0.927	1.0	0.6	25.8

AVE \pm SD - Average \pm standard deviation, N - Number of parallel measurements (min), RMSE - Root-mean-square error, MAE - Mean absolute error, Inter- Intercepts, PCC- a value of Pearson correlation coefficient, *P* values based on one-way ANOVA and ODR-orthogonal distance regression. Total Count in cm⁻³ and PM values in $\mu\text{g m}^{-3}$.

Table S2: Statistics of an intercomparison of AEROS instrumentation hourly measurements during March-May 2019

Variable	Instrument used		N	AVE \pm SD		Median		Mode		Standard Error		10th percentile values		90th percentile values		PCC	ODR Slope	ODR Inter
Total Count	OPS	Grimm 11-D	892	22.7 \pm 24.5	21.9 \pm 23.8	14.4	13.8	NA	NA	0.8	0.8	5.1	4.7	51.4	50.0	0.989	1.0	0.2
PM ₁₀	OPS	Grimm 11-D	867	11.5 \pm 14.9	20.3 \pm 23.8	7.8	14.9	NA	5.7	0.5	0.8	3.4	7.0	19.6	34.3	0.975	0.6	-1.1
PM ₁₀	OPS	DustTrak	348	26.7 \pm 84.9	21.2 \pm 53.2	9.7	10.7	NA	6.7	4.6	2.9	4.3	6.0	26.6	23.0	0.889	0.6	5.3
PM ₁₀	Grimm 11-D	DustTrak	671	26.3 \pm 29.3	17.1 \pm 17.1	18.6	12.0	4.1	5.0	1.1	0.7	6.3	4.1	45.4	33.9	0.786	0.5	3.6
PM ₄	Grimm 11-D	DustTrak	671	17.1 \pm 15.9	14.3 \pm 14.8	13.3	9.2	7.5	2.0	0.6	0.6	4.9	3.3	29.6	29.8	0.853	0.9	-1.4
PM _{2.5}	Grimm 11-D	DustTrak	671	11.2 \pm 9.3	13.6 \pm 14.1	8.3	8.7	4.9	5.0	0.4	0.5	3.4	3.0	21.9	28.5	0.927	1.6	-4.0
PM ₁	Grimm 11-D	DustTrak	671	7.7 \pm 6.9	13.0 \pm 13.4	4.8	8.3	1.5	2.0	0.3	0.5	1.7	3.0	17.1	27.4	0.863	2.1	-3.4

N - Number of parallel measurements (min), AVE \pm SD - Average \pm standard deviation, PCC- a value of Pearson correlation coefficient. Total Count in cm⁻³ and PM values in $\mu\text{g m}^{-3}$. Slop and Inter (Intercepts) based on orthogonal distance regression (ODR).

Supplement Figure

Figure S1: A schematic design of the inlet to the instruments in AEROS

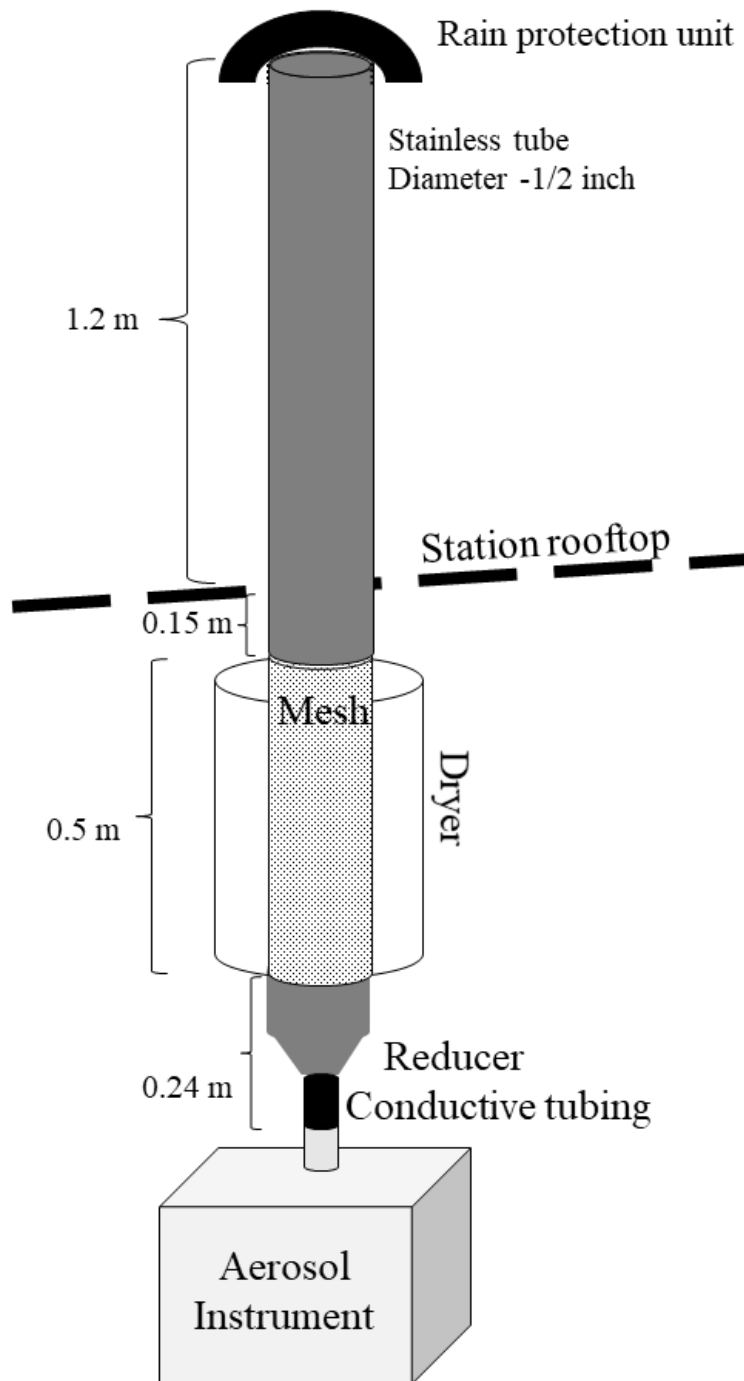


Figure S2: Comparison between OPS and Grimm 11-D using diverse sizes of PSL particles (0.25, 0.5, and 0.95 μm). Size distribution for each PSL tested for OPS (red) and Grimm 11-D (blue). Lines represent the average concentration over an average of 16 measurements and error bars represent standard deviation values of size bin and concentration measured.

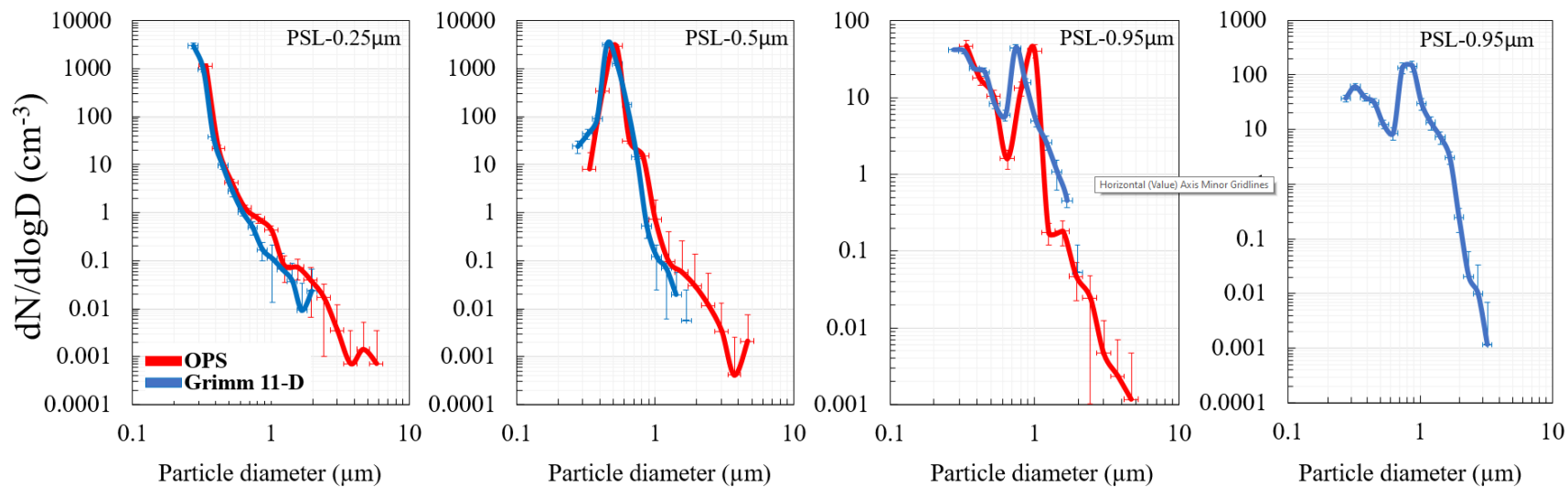


Figure S3: Comparison of total number concentration between OPS and Grimm 11-D during March-May 2019. Numbers of parallel measurements (hour) of total number concentration for both instruments per measurements period (A). Average and SD values (error bard) for the difference in number concentration between OPS and Grimm 11-D for each period, dash line highlights 0, no difference (B). Comparison between OPS and Grimm 11-D for total particle number concentration per period (different color), Dashed gray lines represent a 1:1 line.

