Distinct ultrafine particle profiles associated with aircraft and roadway traffic

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Tables

Table S1. Summary of each mobile monitoring transect

Transects	Range
N5	West Seattle (high-level) Bridge, S. Spokane St., S. Walden St., S. Horton St
N4	SW Holden St., 1st Ave S. Bridge, S. Michigan St., S. Graham St.
N3	SW/ S. 116th St., S. Boeing Access Rd., S. Bangor St., S. Hazel St.
N2	136th St., S. 135th St., S. 137th St.
N1	SW/ S. 146th St., S. 144th St.
S1	SW/ S. 200th St., S. 199th St.
S2	S. 216th St., 37th Pl S.
S3	S. 240th St.
S4	S. 272nd St., S. 277th St.
S5	SW/ S. 320th St., S. 321st St., S. 319th St.
S6	SW 330th St., S. 336th St., Peasley Canyon Rd S.

Table S2. Summary of instruments used in the MOV-UP Study

Parameter (units)	Instrument	Manufacturer	Accuracy
≥10nm Particle Count (#/cm^3)	CPC 3007	TSI	N/A
≥20nm Particle Count (#/cm^3)	P-Trak 8525	TSI	N/A
≥36nm Particle Count (#/cm^3)	P-Trak 8525 with 36 nm diffusion screen	TSI	N/A
10-420nm Nanoparticle Size Distributions (#/cm^3)	NanoScan 3910	TSI	N/A
BC (ng/m^3)	AE51	AethLabs	±100 ng BC/m^3
CO_2 (ppm)	Li-850	LI-COR	<1.5%
Location and Speed	GPS Receiver DG-500	GlobalSat	Position: <2.5m Velocity: 0.1m/s

Table S3. Summary of co-location calibration results for PNC and BC monitors.

Instrument	Intercept*	Slope	R^2
P-Trak 1#	539	0.93	0.990
P-Trak 2#	197	0.97	0.992
P-Trak 3#	-941	1.28	0.992
P-Trak 4#	213	0.95	0.999
P-Trak 5#	127	0.90	0.974
P-Trak screened 1#	386	0.87	0.966
P-Trak screened 2#	372	1.04	0.955
P-Trak screened 3#	194	1.05	0.948
P-Trak screened 4#	673	0.89	0.987
CPC 1#	1208	1.20	0.993
CPC 2#	-647	0.85	0.996
AE51 1#	16	0.98	0.791
AE51 2#	143	0.89	0.932
AE51 3#	37	1.00	0.964

* Intercept units: #/ cm^3 for PNC monitors, and ng/m^3 for BC monitors.

Table S4. Summary of drive days across the four seasons of the MOV-UP study

Season	Sampling days	Second car proportion	Start hour	End hour	Temp	RH	South Flow Operation
Spring	14 days	71%	11:00	16:30	65F	50%	52%
Summer	16 days	81%	11:00	17:00	73F	47%	75%
Fall	12 days	83%	11:00	17:00	54F	78%	91%
Winter	21 days	62%	11:30	17:00	51F	62%	59%

Table S5. Summary measures from the mobile monitoring campaign by monitoring location and transect.

Pollutants	Transect	Mean	Interquartile Range (IQR)	Standard Deviation (SD)	Minutes of Data
Black Carbon: ng/m^3	I-5	5030	3916	4319	2155
	N1	953	733	1013	3935
	N2	909	618	1133	3184
	N3	1280	972	1779	3073
	N4	1720	1421	2504	1911
	N5	1590	1320	13867	1576
	S1	1544	1023	5149	1140
	S2	1243	985	1264	1454
	S3	1290	1068	1908	571
	S4	2832	2396	13326	608
	S5	1566	1984	1545	916
	S6	3457	868	1008	123
	SR 99	2043	1992	2089	431
CO_2: ppm	I-5	513	55	56	1640
	N1	450	40	128	3306
	N2	434	32	88	2616

	N3	456	51	110	2495
	N4	474	54	135	1508
	N5	472	63	115	1269
	S1	454	32	161	1011
	S2	476	40	190	1217
	S3	462	26	170	528
	S4	485	38	162	559
	S5	468	36	77	783
	S6	443	24	19	123
	SR 99	480	66	155	349
Total UFP (10-1000 nm): #/cm^3	I-5	59896	41833	37704	2121
	N1	20160	18022	16555	3853
	N2	18318	15581	15260	3161
	N3	20124	16747	18975	3184
	N4	23186	16487	20715	1917
	N5	19868	14132	19123	1606
	S1	16340	12139	21452	1139
	S2	19150	15202	16831	1430
	S3	13433	8056	14088	567
	S4	18723	13787	19496	606
	S5	14500	10819	11427	903
	S6	9713	5589	4402	123
	SR 99	26117	19768	21077	407

Figures

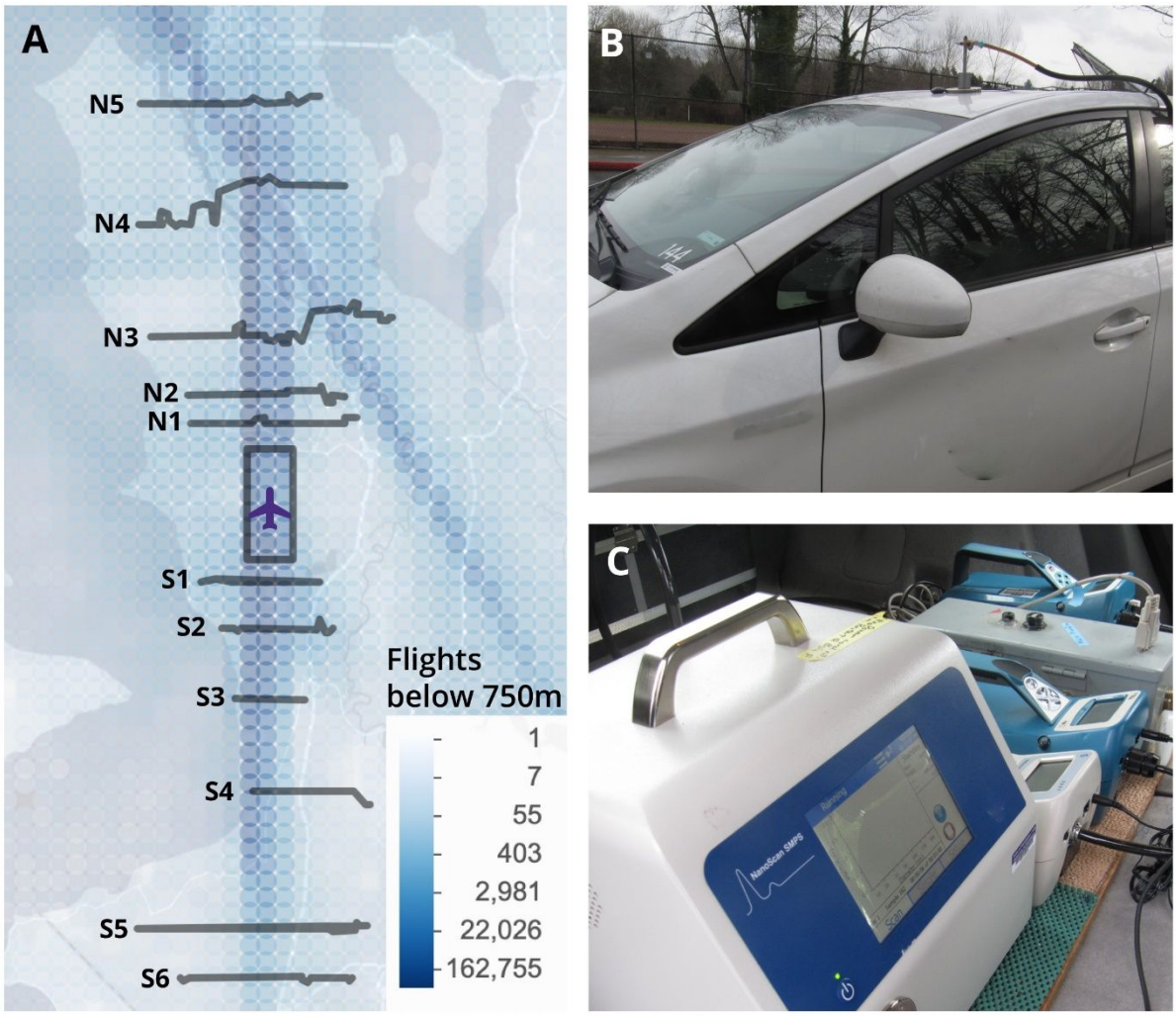


Figure S3. Mobile ObserVations of Ultrafine Particles (MOV-UP) Study Setup. A. Displayed on the map are the location of the 5 transects North of the airport, labeled N1-N5, and the 6 transects South of the airport, labeled S1-S6. In blue, the density of flights at an altitude of 750m or less is overlaid on the street map. B. Mobile platform with rooftop air inlet. C. Sampling manifold and monitoring instruments.

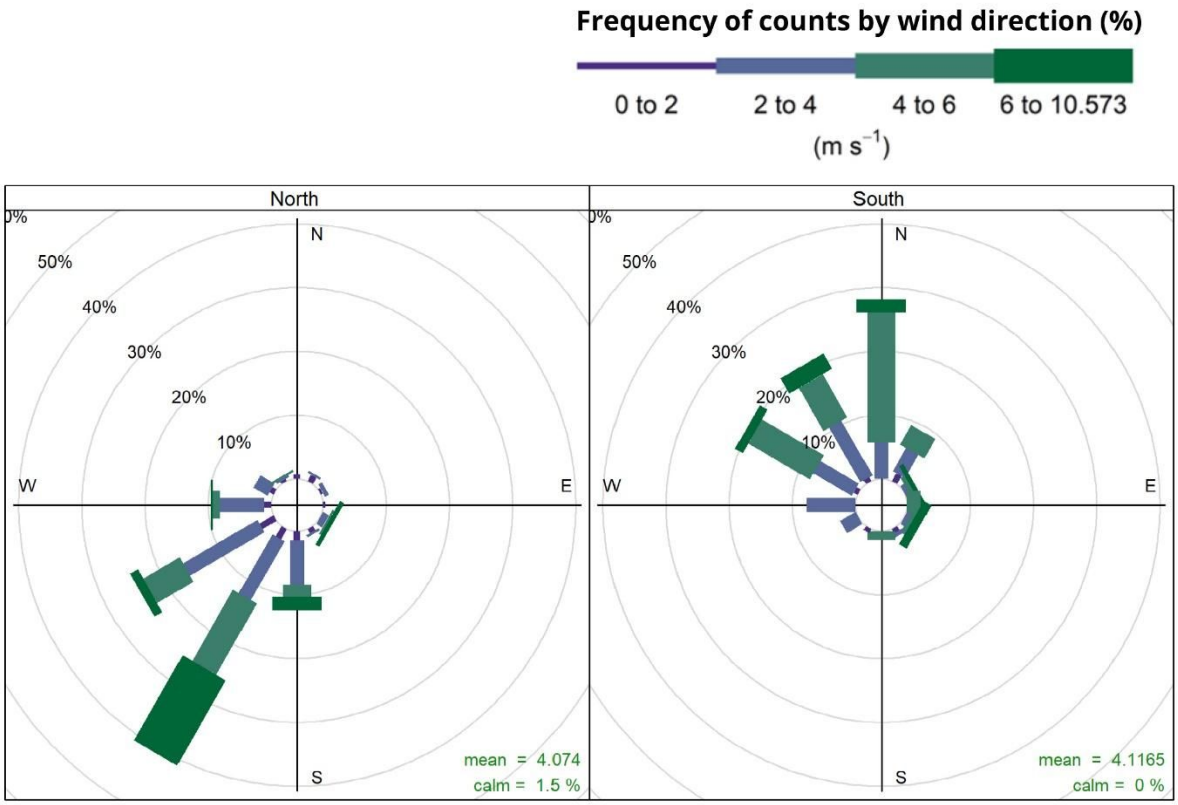
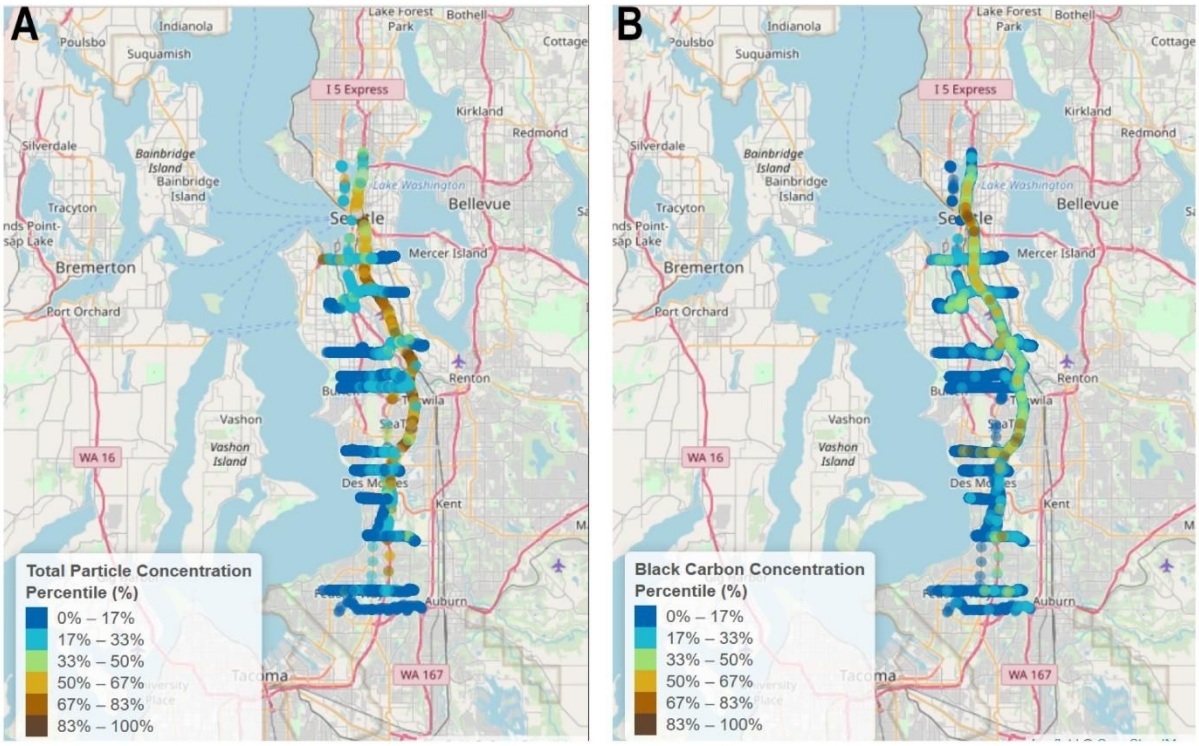


Figure S4. Wind Rose Plots. Represents the wind speed and direction over the course of all mobile monitoring sampling campaigns, separated by the landing direction of the aircraft. The north and south labels on the plot refer to the direction from which aircraft were landing with respect to the airport.



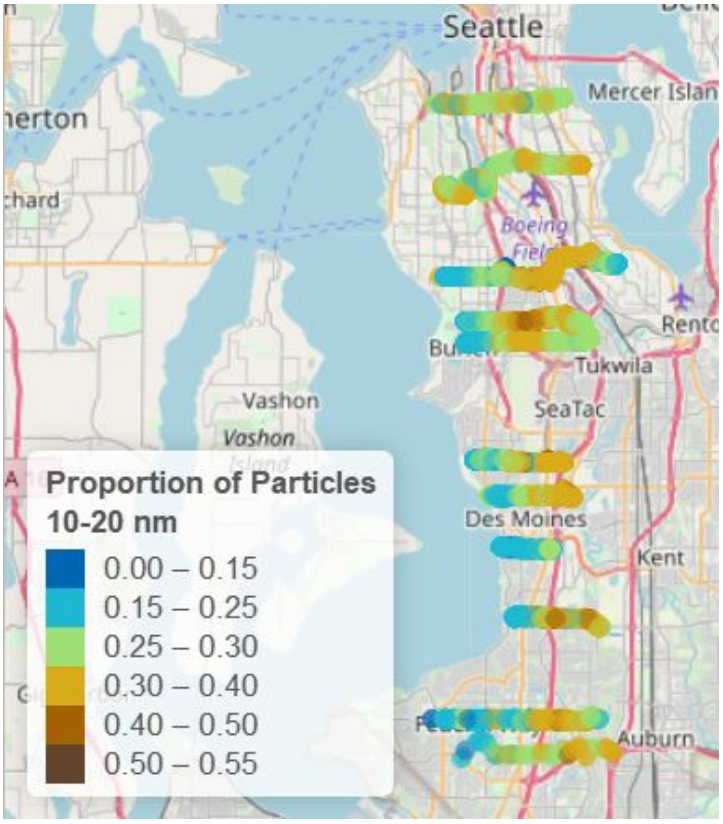


Figure S5. Spatial distribution of traffic-related pollutant concentration percentiles: A. Total particle (> 10 nm) number; B. Black carbon mass. C. Proportion of particles between 10-20 nm over the transect drives.

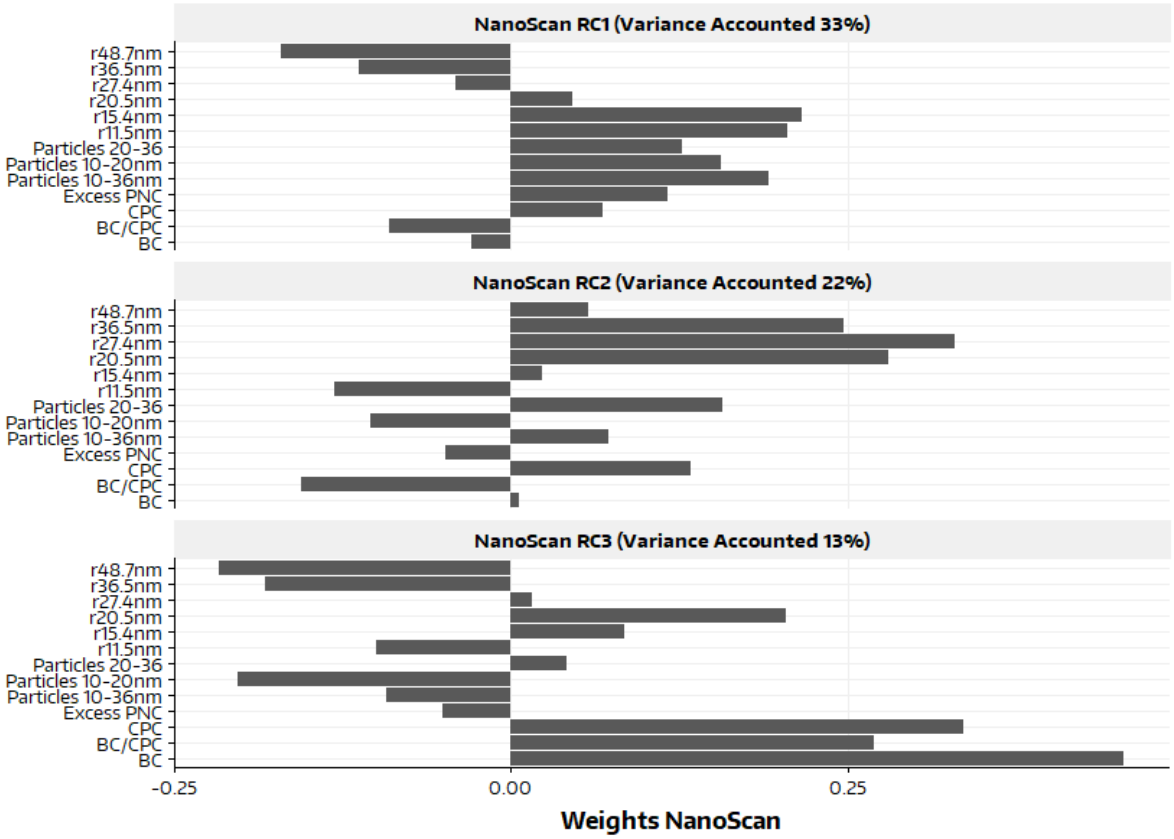


Figure S6. Principal Component factor loadings for each feature of the secondary PCA analysis.

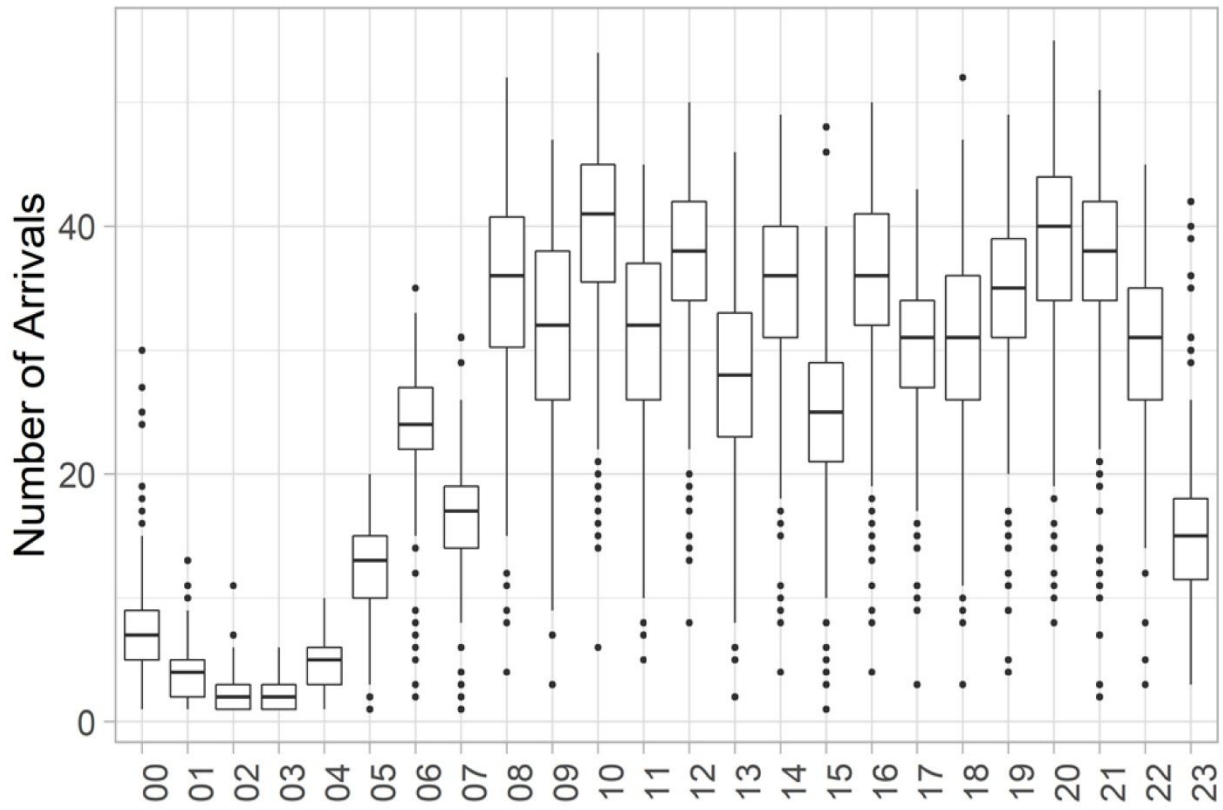


Figure S5. Diurnal patterns in SEA-TAC arrivals over 2018.