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Supplement of

Comparative measurements of ambient atmospheric concentrations of ice nucleating particles using multiple immersion freezing methods and a continuous flow diffusion chamber

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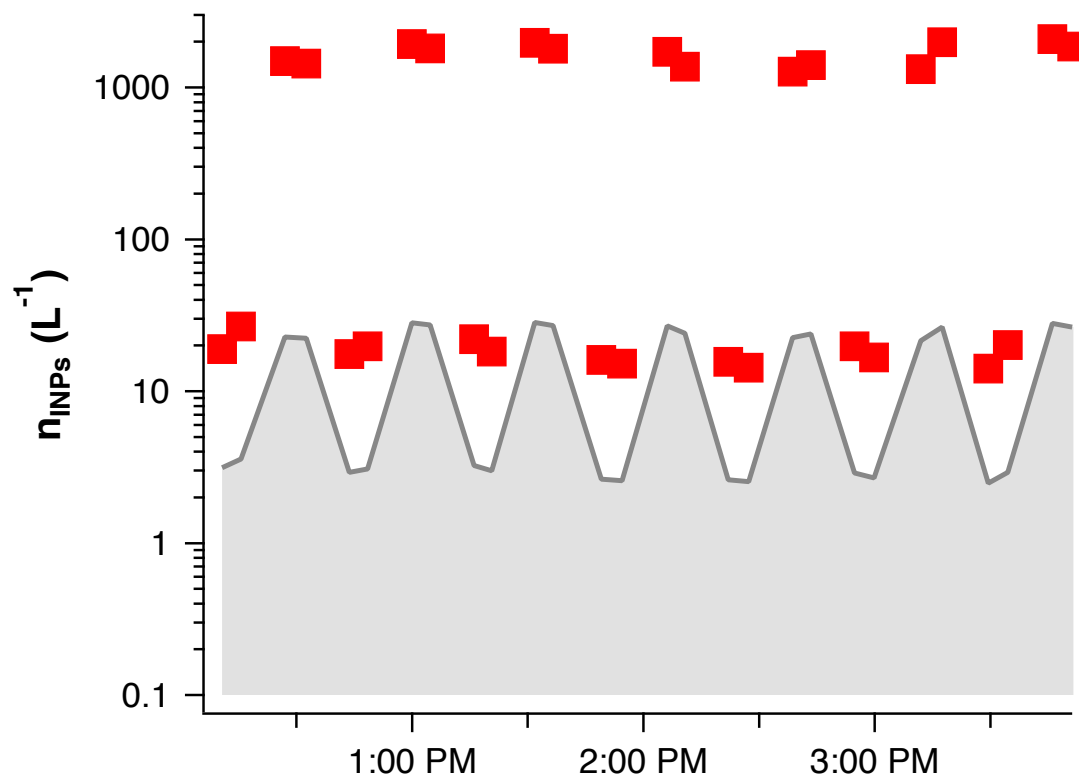


Figure S1. Aerosol Concentrator calibration check at -30°C at CSU on May 19, 2016. This is a typical experimental sampling period at one temperature. In this figure, the lower data points are INP number concentrations without using the aerosol concentrator. Alternating periods of high INP number concentrations are during use of the aerosol concentrator. Inspection of the ratio between the INP number concentrations per volume of air during periods on versus off the concentrator reveal the CF factor, which is ~ 90 in this case. The shaded lower region is the limit of significance for INP concentrations, as described in Section 2.1 of the manuscript.

Table S1. Data for Figures 3 and 4. INP concentrations and confidence limits (CL+; CL-) are in units L⁻¹, and Temp is in °C. Concentrator (Y: On; N: Off; B: both on and off for integrated period). IS pore-size and CS pore-size or BioSampler (Bio) use are indicated.

Date	Site	Temp	CFDC	CFDC_CL-	CFDC_CL+	Concentrator	IS_0.2um	IS_CL-	IS_CL+	IS_3um	IS_CL-	IS_CL+
29-Sep-10	NoCO Ag	-19.9	1.40	0.30	0.20	N	5.40	2.50	4.50			
4-Oct-10	NoCO Ag	-20.0	13.20	0.20	0.20	N	20.00	10.00	18.80			
8-Oct-10	NoCO Ag	-20.1	1.10	0.40	0.40	N	5.30	2.50	3.75			
3-Nov-10	NoCO Ag	-20.0	5.90	1.00	1.00	N	53.00	22.00	31.00			
6-Sep-13	CSU ATChem	-18.2	0.34	0.11	0.11	Y	2.20	1.20	2.00	1.90	0.92	1.80
12-Sep-13	CSU ATChem	-16.0	0.23	0.09	0.09	Y	0.29	0.16	0.32	0.52	0.25	0.41
12-Nov-13	CSU ATChem	-30.5	98.00	13.00	12.00	N						
13-Nov-13	CSU ATChem	-21.8	12.50	2.50	3.00	N	81.00	26.00	32.00	42.00	17.70	22.00
14-Nov-13	CSU ATChem	-26.8	21.50	4.50	4.50	N	105.00	41.00	53.00			
18-May-16	CSU ATChem	-20.0	0.25	0.02	0.02	Y	0.55	0.27	0.46			
19-May-16	CSU ATChem	-30.0	20.00	0.20	0.20	Y						
11-May-16	CRC (all STP)	-21.0	0.82	0.81	2.56	N	0.29	0.12	0.18			
11-May-16	CRC (all STP)	-25.0	1.25	1.4	1.24	N	8.50	3.20	3.77			
12-May-16	CRC (all STP)	-16.0	0.12	1.80	0.11	N	0.02	0.01	0.02			
12-May-16	CRC (all STP)	-21.0	0.51	1.40	0.51	N	0.38	0.19	0.31			
12-May-16	CRC (all STP)	-24.5	1.30	0.88	0.88	N	3.40	1.50	3.00			
12-May-16	CRC (all STP)	-28.5	5.20	1.30	1.30	N						
26-Jan-15	BBY	-17.5	0.84	0.74	0.74	B	0.07	0.04	0.12			
26-Jan-15	BBY	-21.0	0.99	0.81	0.81	Y	0.12	0.07	0.14			
26-Jan-15	BBY	-23.0	0.25	0.24	0.50	Y	0.45	0.20	0.27			
26-Jan-15	BBY	-24.0	1.64	0.90	0.90	Y	0.78	0.33	0.40			
26-Jan-15	BBY	-25.0	1.02	0.50	0.50	Y	4.20	2.17	3.70			
2-Feb-15	BBY	-20.0	0.17	0.16	0.21	Y	0.05	0.03	0.02			
2-Feb-15	BBY	-21.0	0.21	0.20	0.65	N	0.06	0.02	0.03			
2-Feb-15	BBY	-22.0	0.46	0.44	0.55	Y	0.09	0.04	0.05			
2-Feb-15	BBY	-24.0	0.59	0.58	0.76	B	1.10	0.46	0.65			
2-Feb-15	BBY	-25.0	1.19	0.54	0.54	B	2.74	1.07	1.29			
30-Apr-14	SGP	-21.2	0.84	0.82	0.82	B	0.40	0.21	0.35			
30-Apr-14	SGP	-27.2	10.59	4.75	4.75	B	47.64	19.80	21.60			
4-May-14	SGP	-21.6	2.75	2.40	2.40	B	1.19	0.87	2.92			
4-May-14	SGP	-24.9	21.05	8.96	8.96	B	27.89	11.61	13.66			
4-May-14	SGP	-15.0	0.28	0.13	0.13	Y	0.08	0.03	0.03			
5-May-14	SGP	-19.9	2.98	2.11	2.11	B	0.44	0.22	0.36			
5-May-14	SGP	-22.4	4.85	2.99	2.99	B	3.03	2.02	5.43			
5-May-14	SGP	-24.4	13.55	6.36	6.36	N	40.74	16.75	20.16			
5-May-14	SGP	-26.1	27.80	11.65	11.65	B	79.55	39.21	42.74			
5-Jun-14	SGP	-19.7	0.08	0.07	0.27	B	0.30	0.17	0.33			
7-Jun-14	SGP	-17.1	0.19	0.18	1.12	B	0.22	0.13	0.27			
7-Jun-14	SGP	-21.3	0.32	0.17	0.17	Y	0.43	0.21	0.35			
7-Jun-14	SGP	-25.1	0.61	0.27	0.27	Y	4.05	2.03	2.23			
8-Jun-14	SGP	-15.0	0.08	0.07	0.11	Y	0.18	0.11	0.26			
8-Jun-14	SGP	-21.8	0.89	0.88	1.15	Y	1.30	0.50	0.65			
30-Apr-14	SGP	-17.2	0.29	0.19	0.19	Y	0.14	0.08	0.18			
14-Oct-14	Kansas-harvest	-18.7	1.63	0.66	0.66	Y	1.10	0.49	0.75			
14-Oct-14	Kansas-harvest	-24.3	6.43	2.58	2.58	Y	69.00	26.40	31.90			
14-Oct-14	Kansas-harvest	-29.2	12.06	5.12	5.12	Y						
15-Oct-14	Kansas-harvest	-17.2	3.00	1.84	1.84	Y	0.57	0.31	0.63			
15-Oct-14	Kansas-harvest	-22.6	1.74	0.91	0.91	Y	21.00	10.10	16.50			
15-Oct-14	Kansas-harvest	-27.1	7.29	2.93	2.93	Y						
10/15/2014-10/16/2014	Kansas	-18.2	0.26	0.12	0.12	Y	1.20	0.62	1.13			
10/15/2014-10/16/2014	Kansas	-21.6	0.29	0.14	0.14	Y	4.70	1.99	2.49			
10/15/2014-10/16/2014	Kansas	-25.0	2.12	1.94	1.94	Y	77.03	30.88	39.60			
14-Oct-14	Kansas	-17.7	0.49	0.48	1.00	Y	0.19	0.11	0.23			
14-Oct-14	Kansas	-20.9	0.97	0.97	0.98	Y	2.10	1.32	3.14			
14-Oct-14	Kansas	-24.8	4.54	3.59	3.59	Y	55.00	25.90	27.70			
14-Oct-14	Kansas	-30.7	7.84	4.35	4.35	Y						
17-Aug-11	MEFO	-25.0	3.92	1.22	1.22	Y						
17-Aug-11	MEFO	-25.0	4.26	2.48	2.48	Y						
18-Aug-11	MEFO	-20.3	0.43	0.30	0.30	Y						

Table S1. (continued)

Date	Site	Temp	IS-Biosamp	IS_CL-	IS_CL+CS_0.2um	CS_CL-	CS_CL+CS_3um	CS_CL-	CS_CL+		
29-Sep-10	NoCO Ag	-19.9									
4-Oct-10	NoCO Ag	-20.0									
8-Oct-10	NoCO Ag	-20.1									
3-Nov-10	NoCO Ag	-20.0									
6-Sep-13	CSU ATChem	-18.2	0.80	0.35	0.55	2.02	1.25	3.26	1.20	0.88	2.86
12-Sep-13	CSU ATChem	-16.0	0.26	0.17	0.46						
12-Nov-13	CSU ATChem	-30.5				624.06	443.30	1250.50	752.79	548.80	1348.50
13-Nov-13	CSU ATChem	-21.8	40.00	19.00	21.00	42.90	27.30	75.30	42.40	29.70	98.90
14-Nov-13	CSU ATChem	-26.8	105.00	40.50	52.30						
18-May-16	CSU ATChem	-20.0									
19-May-16	CSU ATChem	-30.0									
11-May-16	CRC (all STP)	-21.0									
11-May-16	CRC (all STP)	-25.0									
12-May-16	CRC (all STP)	-16.0									
12-May-16	CRC (all STP)	-21.0									
12-May-16	CRC (all STP)	-24.5									
12-May-16	CRC (all STP)	-28.5									
26-Jan-15	BBY	-17.5									
26-Jan-15	BBY	-21.0									
26-Jan-15	BBY	-23.0									
26-Jan-15	BBY	-24.0									
26-Jan-15	BBY	-25.0									
2-Feb-15	BBY	-20.0									
2-Feb-15	BBY	-21.0									
2-Feb-15	BBY	-22.0									
2-Feb-15	BBY	-24.0									
2-Feb-15	BBY	-25.0									
30-Apr-14	SGP	-21.2									
30-Apr-14	SGP	-27.2									
4-May-14	SGP	-21.6									
4-May-14	SGP	-24.9									
4-May-14	SGP	-15.0									
5-May-14	SGP	-19.9									
5-May-14	SGP	-22.4									
5-May-14	SGP	-24.4									
5-May-14	SGP	-26.1									
5-Jun-14	SGP	-19.7									
7-Jun-14	SGP	-17.1									
7-Jun-14	SGP	-21.3									
7-Jun-14	SGP	-25.1									
8-Jun-14	SGP	-15.0									
8-Jun-14	SGP	-21.8									
30-Apr-14	SGP	-17.2									
14-Oct-14	Kansas-harvest	-18.7									
14-Oct-14	Kansas-harvest	-24.3									
14-Oct-14	Kansas-harvest	-29.2									
15-Oct-14	Kansas-harvest	-17.2									
15-Oct-14	Kansas-harvest	-22.6									
15-Oct-14	Kansas-harvest	-27.1									
10/15/2014-10/16/2014	Kansas	-18.2									
10/15/2014-10/16/2014	Kansas	-21.6									
10/15/2014-10/16/2014	Kansas	-25.0									
14-Oct-14	Kansas	-17.7									
14-Oct-14	Kansas	-20.9									
14-Oct-14	Kansas	-24.8									
14-Oct-14	Kansas	-30.7									
17-Aug-11	MEFO	-25.0									
17-Aug-11	MEFO	-25.0									
18-Aug-11	MEFO	-20.3									

Table S1. (continued)

Date	Site	Temp	CS_Biosamp	CS_CL-	CS_CL+	DFT_all	DFT_CLDFT_size	DFT_CL	CRAFT	CRAFT_CL-	CRAFT_CL+
29-Sep-10	NoCO Ag	-19.9									
4-Oct-10	NoCO Ag	-20.0									
8-Oct-10	NoCO Ag	-20.1									
3-Nov-10	NoCO Ag	-20.0									
6-Sep-13	CSU ATChem	-18.2	1.98	1.12	2.60						
12-Sep-13	CSU ATChem	-16.0									
12-Nov-13	CSU ATChem	-30.5	1281.00	884.00	2389.00						
13-Nov-13	CSU ATChem	-21.8	69.60	45.80	134.30	4.59	3.49	4.12	3.47		
14-Nov-13	CSU ATChem	-26.8	238.00	168.70	579.00	28.10	11.10	25.20	11.10		
18-May-16	CSU ATChem	-20.0							0.46	0.34	1.17
19-May-16	CSU ATChem	-30.0							188.2	59.4	68
11-May-16	CRC (all STP)	-21.0							0.5	0.34	1.17
11-May-16	CRC (all STP)	-25.0							7	4.7	13
12-May-16	CRC (all STP)	-16.0							0.03	0.013	0.021
12-May-16	CRC (all STP)	-21.0							0.7	0.5	1.3
12-May-16	CRC (all STP)	-24.5							4.7	1.8	2.7
12-May-16	CRC (all STP)	-28.5							54	20	29
26-Jan-15	BBY	-17.5	0.24	0.12	0.24						
26-Jan-15	BBY	-21.0	0.72	0.46	1.28						
26-Jan-15	BBY	-23.0	2.22	1.35	3.45						
26-Jan-15	BBY	-24.0	5.76	3.66	10.06						
26-Jan-15	BBY	-25.0	14.56	8.92	23.02						
2-Feb-15	BBY	-20.0	0.14	0.09	0.36						
2-Feb-15	BBY	-21.0	0.53	0.3	0.72						
2-Feb-15	BBY	-22.0	0.99	0.58	1.42						
2-Feb-15	BBY	-24.0	2.39	1.57	4.57						
2-Feb-15	BBY	-25.0	7.66	4.96	14.04						
30-Apr-14	SGP	-21.2									
30-Apr-14	SGP	-27.2									
4-May-14	SGP	-21.6									
4-May-14	SGP	-24.9									
4-May-14	SGP	-15.0									
5-May-14	SGP	-19.9									
5-May-14	SGP	-22.4									
5-May-14	SGP	-24.4									
5-May-14	SGP	-26.1									
5-Jun-14	SGP	-19.7									
7-Jun-14	SGP	-17.1									
7-Jun-14	SGP	-21.3									
7-Jun-14	SGP	-25.1									
8-Jun-14	SGP	-15.0									
8-Jun-14	SGP	-21.8									
30-Apr-14	SGP	-17.2									
14-Oct-14	Kansas-harvest	-18.7				0.70	0.50	0.50	0.30		
14-Oct-14	Kansas-harvest	-24.3				8.90	2.90	4.10	1.40		
14-Oct-14	Kansas-harvest	-29.2				68.50	23.50	32.30	11.00		
15-Oct-14	Kansas-harvest	-17.2				1.40	1.00	0.25	0.24		
15-Oct-14	Kansas-harvest	-22.6				2.10	1.40	0.34	0.32		
15-Oct-14	Kansas-harvest	-27.1				23.30	6.60	10.70	2.90		
10/15/2014-10/16/2014	Kansas	-18.2				0.26	0.24				
10/15/2014-10/16/2014	Kansas	-21.6				1.40	0.80	0.35	0.20		
10/15/2014-10/16/2014	Kansas	-25.0				5.40	2.00	2.40	0.80		
14-Oct-14	Kansas	-17.7				0.90	0.50	0.80	0.50		
14-Oct-14	Kansas	-20.9				1.30	0.80	1.10	0.70		
14-Oct-14	Kansas	-24.8				4.50	1.90	2.40	0.90		
14-Oct-14	Kansas	-30.7				60.80	28.10	16.00	4.50		
17-Aug-11	MEFO	-25.0						8.60	5.35		
17-Aug-11	MEFO	-25.0						0.8	0.40		
18-Aug-11	MEFO	-20.3						0.1	0.04		

Table S2. Data for Figure 5. Instrument name column data and positive (+) and negative (-) confidence intervals are INP concentrations in L⁻¹, and T is in °C. “Bio” indicates use of the BioSampler, while all other samples used 0.2 μm pore size filters for collections.

Location	Date	T	CS	CS+	CS-	IS	IS+	IS-	LOG(CS/IS)
BBY	1/26/15	-17.5	0.240	0.240	0.120	0.070	0.118	0.044	0.535
		-21.0	0.720	1.280	0.460	0.116	0.141	0.068	0.794
		-23.0	2.220	3.450	1.350	0.450	0.270	0.197	0.693
		-24.0	5.760	10.060	3.660	0.780	0.403	0.329	0.868
		-25.0	14.560	23.020	8.920	4.200	3.702	2.171	0.540
BBY	2/2/15	-20.0	0.140	0.360	0.090	0.050	0.021	0.031	0.448
		-21.0	0.530	0.720	0.300	0.060	0.034	0.025	0.945
		-22.0	0.990	1.420	0.580	0.093	0.045	0.035	1.028
		-24.0	2.390	4.570	1.570	1.098	0.654	0.457	0.338
		-25.0	7.660	14.040	4.960	2.736	1.290	1.074	0.447
Kansas	14-Oct-14	T MOUDI-DFT	DFT+	DFT-	IS	IS+	IS-	LOG(DFT/IS)	
		-15.0	0.210	0.200	0.200	0.078	0.191	0.057	0.428
		-16.0	0.210	0.200	0.200	0.078	0.191	0.057	0.428
		-17.0	0.550	0.460	0.460	0.078	0.191	0.057	0.846
		-18.0	0.900	0.500	0.500	0.210	0.257	0.123	0.631
		-19.0	1.040	0.500	0.500	0.624	0.418	0.284	0.222
		-20.0	1.110	0.640	0.640	1.613	0.823	0.690	-0.162
		-20.5	1.190	0.700	0.700	2.237	1.153	1.019	-0.274
		-20.0	1.100	0.640	0.640	1.772	3.220	1.179	-0.207
		-20.5	1.190	0.700	0.700	2.404	3.527	1.486	-0.305
		-21.0	1.750	0.890	0.890	2.404	3.527	1.486	-0.138
		-21.5	1.840	0.920	0.920	3.738	4.103	2.062	-0.308
		-22.0	2.260	1.100	1.100	4.608	4.533	2.430	-0.309
		-22.5	2.690	1.230	1.230	7.012	5.417	3.313	-0.416
		-23.0	3.300	1.380	1.380	13.069	7.461	5.358	-0.598
-23.5	4.450	1.930	1.930	20.369	9.943	7.839	-0.661		
-24.0	4.590	1.940	1.940	36.865	16.591	14.488	-0.905		
-24.5	6.560	2.850	2.850	61.823	31.151	29.048	-0.974		
Kansas	10/1514-10/16/14	T MOUDI-DFT	DFT+	DFT-	IS	IS+	IS-	LOG(DFT/IS)	
		-8.0	0.070	0.067	0.067	0.059	0.056	0.031	0.074
		-9.0	0.100	0.100	0.100	0.104	0.074	0.049	0.000
		-10.0	0.100	0.100	0.100	0.132	0.084	0.059	-0.114
		-11.0	0.150	0.140	0.140	0.186	0.105	0.080	-0.103
		-12.0	0.150	0.150	0.150	0.186	0.105	0.080	-0.094
		-13.0	0.170	0.150	0.150	0.235	0.125	0.099	-0.141
		-14.0	0.170	0.150	0.150	0.266	0.138	0.113	-0.195
		-15.0	0.170	0.150	0.150	0.353	0.179	0.154	-0.317
		-16.0	0.200	0.180	0.180	0.422	0.217	0.192	-0.324
		-17.0	0.250	0.220	0.220	0.539	0.293	0.268	-0.334
		-18.0	0.270	0.250	0.250	1.170	1.126	0.622	-0.637
		-19.0	0.620	0.420	0.420	1.376	1.207	0.704	-0.346
		-20.0	0.760	0.460	0.460	1.829	1.381	0.877	-0.381
		-21.0	1.160	0.660	0.660	3.728	2.096	1.592	-0.507
-22.0	1.570	0.800	0.800	10.640	5.867	5.343	-0.831		
-23.0	2.260	1.100	1.100	23.274	19.293	11.364	-1.013		
-24.0	3.140	1.200	1.200	53.948	29.684	21.755	-1.235		
-25.0	5.610	2.100	2.100	77.026	39.603	30.877	-1.138		
-26.0	7.570	2.600	2.600	179.101	87.033	78.307	-1.376		
Kansas harvest soy	14-Oct-14	T MOUDI-DFT	DFT+	DFT-	IS	IS+	IS-	LOG(DFT/IS)	
		-16.0	0.230	0.230	0.230	0.265	0.117	0.103	-0.061
		-17.0	0.520	0.300	0.300	0.301	0.135	0.121	0.237
		-18.0	0.720	0.400	0.400	0.732	0.659	0.370	-0.007
		-19.0	0.720	0.550	0.550	1.196	0.822	0.533	-0.220
		-20.0	0.820	0.630	0.630	2.960	1.411	1.122	-0.558
		-21.0	1.040	0.670	0.670	6.797	9.973	4.202	-0.815
		-22.0	2.180	1.010	1.010	8.648	10.799	5.028	-0.598
		-23.0	4.140	1.560	1.560	35.281	20.186	14.416	-0.931
		-24.0	8.430	2.880	2.880	76.000	34.812	28.865	-0.955
-25.0	12.850	3.820	3.820	180.000	223.096	104.167	-1.146		
-26.0	25.000	7.150	7.150	220.000	239.811	120.883	-0.944		

Table S2. (continued)

Kansas harvest sorghum	15-Oct-14	T	MOUDI-DFT	DFT+	DFT-	IS	IS+	IS-	LOG(DFT/IS)		
				-9.0	0.350	0.340	0.340	0.104	0.059	0.042	0.528
				-10.0	1.140	0.854	0.854	0.174	0.083	0.066	0.816
				-11.0	1.140	0.854	0.854	0.228	0.103	0.086	0.700
				-12.0	1.140	0.854	0.854	0.415	0.192	0.175	0.439
				-13.0	1.260	0.908	0.908	0.415	0.192	0.175	0.482
				-14.0	1.260	0.908	0.908	0.519	0.259	0.242	0.385
				-13.0	1.260	0.908	0.908	0.295	0.536	0.196	0.631
				-14.0	1.260	0.908	0.908	0.400	0.587	0.247	0.498
				-15.0	1.260	0.908	0.908	0.509	0.635	0.296	0.394
				-16.0	1.260	0.908	0.908	0.509	0.635	0.296	0.394
				-17.0	1.260	0.908	0.908	0.622	0.683	0.343	0.307
				-18.0	1.580	1.136	1.136	0.989	0.822	0.482	0.203
				-19.0	1.580	1.136	1.136	2.698	1.392	1.053	-0.232
				-20.0	1.910	1.358	1.358	3.483	1.660	1.320	-0.261
				-21.0	2.020	1.402	1.402	5.900	10.714	3.923	-0.466
				-22.0	2.160	1.447	1.447	10.000	12.707	5.917	-0.666
				-23.0	2.490	1.503	1.503	57.000	29.303	22.305	-1.360
				-24.0	4.030	1.689	1.689	86.000	211.495	62.475	-1.329
		-25.0	8.790	2.870	2.870	180.000	259.082	110.061	-1.311		
		-26.0	14.550	4.683	4.683	330.000	323.840	174.819	-1.356		
CRC	11-May-16	T	CRAFT	CRAFT+	CRAFT-	IS	IS+	IS-	LOG(CRAFT/IS)		
				-13.0	0.005	0.012	0.003	0.002	0.009	0.002	0.333
				-14.0	0.007	0.013	0.005	0.002	0.009	0.002	0.514
				-15.0	0.015	0.016	0.008	0.009	0.013	0.006	0.197
				-16.0	0.023	0.019	0.011	0.009	0.013	0.006	0.389
				-17.0	0.041	0.025	0.016	0.020	0.018	0.010	0.297
				-18.0	0.099	0.041	0.033	0.035	0.023	0.016	0.454
				-19.0	0.188	0.068	0.059	0.070	0.037	0.030	0.429
				-20.0	0.432	0.192	0.184	0.167	0.139	0.081	0.413
				-21.0	0.463	1.175	0.337	0.291	0.181	0.124	0.202
				-22.0	1.195	1.529	0.691	0.858	1.072	0.499	0.144
				-23.0	2.822	2.111	1.273	3.195	1.547	0.974	-0.054
				-24.0	6.213	3.087	2.249	4.954	2.484	1.911	0.098
		-25.0	11.118	4.422	3.584	8.454	3.769	3.197	0.119		
		-26.0	20.121	7.230	6.392	13.677	6.481	5.872	0.168		
CRC	12-May-16	T	CRAFT	CRAFT+	CRAFT-	IS	IS+	IS-	LOG(CRAFT/IS)		
				-13.0	0.002	0.010	0.002	0.002	0.007	0.001	0.126
				-14.0	0.007	0.013	0.005	0.007	0.011	0.005	-0.022
				-15.0	0.023	0.019	0.011	0.009	0.012	0.006	0.387
				-16.0	0.028	0.021	0.013	0.022	0.016	0.010	0.113
				-17.0	0.041	0.025	0.016	0.032	0.020	0.014	0.110
				-18.0	0.066	0.032	0.024	0.063	0.033	0.027	0.019
				-19.0	0.094	0.040	0.031	0.128	0.070	0.064	-0.135
				-20.0	0.188	0.068	0.059	0.189	0.230	0.110	-0.001
				-21.0	0.702	1.304	0.466	0.380	0.308	0.188	0.267
				-22.0	1.451	1.633	0.795	0.888	0.499	0.379	0.213
				-23.0	2.254	1.925	1.087	1.422	0.738	0.615	0.200
				-24.0	3.738	2.392	1.554	1.628	0.853	0.725	0.361
		-25.0	6.216	3.089	2.251	5.309	5.128	2.818	0.069		
		-26.0	10.524	4.258	3.420	9.371	6.669	4.358	0.050		
		-27.0	20.132	7.234	6.396	25.182	14.644	11.668	-0.097		

Table S2. (continued)

CSU	18-May-16	T	CRAFT	CRAFT+	CRAFT-	IS	IS+	IS-	LOG(CRAFT/IS)		
		-8.0	0.002	0.010	0.002	0.025	0.022	0.013	-1.160		
		-9.0	0.007	0.013	0.005	0.098	0.051	0.042	-1.261		
		-10.0	0.012	0.015	0.007	0.156	0.080	0.071	-1.229		
		-11.0	0.017	0.017	0.009	0.156	0.080	0.071	-1.073		
		-12.0	0.034	0.023	0.015	0.168	0.298	0.112	-0.804		
		-13.0	0.047	0.027	0.018	0.168	0.298	0.112	-0.663		
		-14.0	0.058	0.030	0.021	0.229	0.329	0.142	-0.708		
		-15.0	0.079	0.036	0.027	0.229	0.329	0.142	-0.574		
		-16.0	0.118	0.046	0.038	0.361	0.387	0.201	-0.601		
		-17.0	0.156	0.057	0.049	0.352	0.399	0.201	-0.466		
		-18.0	0.278	0.103	0.095	0.428	0.431	0.233	-0.301		
		-19.0	0.229	1.027	0.189	0.509	0.464	0.266	-0.461		
		-20.0	0.463	1.175	0.337	0.509	0.464	0.266	-0.155		
		-21.0	0.702	1.304	0.466	0.509	0.483	0.272	0.025		
		-22.0	1.196	1.530	0.691	0.812	0.604	0.393	0.054		
		-23.0	3.120	2.205	1.367	1.379	0.831	0.620	0.241		
		-24.0	6.620	3.199	2.360	3.575	2.168	1.916	0.154		
		-25.0	11.124	4.425	3.586	7.224	8.657	4.245	0.074		
		-26.0	16.595	6.047	5.209	15.970	13.469	8.353	-0.097		
		-27.0	43.230	19.237	18.398	27.586	19.757	14.032	0.081		
		CSU	19-May-16	T	CRAFT	CRAFT+	CRAFT-	IS	IS+	IS-	LOG(CRAFT/IS)
				-11.0	0.020	0.018	0.010	0.005	0.012	0.004	0.598
				-12.0	0.031	0.022	0.014	0.005	0.012	0.004	0.796
				-13.0	0.058	0.030	0.021	0.010	0.015	0.007	0.745
				-14.0	0.124	0.048	0.040	0.031	0.023	0.015	0.604
				-15.0	0.188	0.068	0.059	0.045	0.029	0.020	0.623
-16.0	0.229			1.027	0.189	0.080	0.042	0.034	0.459		
-17.0	0.463			1.175	0.337	0.099	0.052	0.043	0.669		
-18.0	0.946			1.421	0.582	0.139	0.073	0.064	0.833		
-19.0	0.946			1.421	0.582	0.256	0.335	0.154	0.567		
-20.0	1.980			1.830	0.992	0.256	0.335	0.154	0.888		
-21.0	2.824			2.112	1.274	0.312	0.376	0.183	0.956		
-22.0	3.425			2.298	1.460	0.551	0.477	0.284	0.794		
-23.0	6.216			3.089	2.251	1.648	0.926	0.733	0.577		
-24.0	8.895	3.813	2.975	2.474	1.464	1.234	0.556				
-25.0	11.956	15.297	6.913	8.335	7.987	4.439	0.157				
-26.0	25.355	20.192	11.808	9.895	9.339	5.303	0.409				
CSU	6-Sep-13	T	CS	CS+	CS-	IS	IS+	IS-	LOG(CS/IS)		
		-15	0.584	0.584	0.292	0.567	0.331	0.245	-0.013		
		-16	0.806	1.122	0.469	0.621	0.351	0.266	-0.113		
		-17	1.163	1.876	0.718	1.545	1.732	0.874	0.123		
		-18	2.017	3.257	1.246	2.236	2.014	1.156	0.045		
		-19	2.697	4.820	1.729	3.411	2.462	1.604	0.102		
		-21	11.097	17.508	6.792	8.567	4.478	3.620	-0.112		
		-22	21.839	44.909	14.693	15.670	17.416	8.835	-0.144		
		-23	33.488	76.010	23.246	26.778	21.857	13.276	-0.097		
CSU	12-Nov-13	T	CS-Bio	CS+	CS-	IS-Bio	IS+	IS-	LOG(CS/IS)		
		-12.0	0.954	0.954	0.477	0.364	0.163	0.146	0.418		
		-13.0	1.258	1.833	0.746	0.514	0.754	0.318	0.389		
		-14.0	1.693	2.318	0.978	0.653	0.816	0.380	0.413		
		-15.0	2.712	3.340	1.497	0.653	0.816	0.380	0.618		
		-16.0	3.781	7.196	2.479	2.299	1.405	0.969	0.216		
		-17.0	7.550	11.301	4.526	3.277	1.726	1.290	0.362		
		-18.0	12.922	19.174	7.720	4.631	2.187	1.751	0.446		
		-19.0	20.698	29.290	12.128	4.631	2.187	1.751	0.650		
		-20.0	24.259	33.646	14.096	10.126	4.632	4.196	0.379		
		-21.0	39.027	64.816	24.360	19.965	21.915	11.014	0.291		
		-22.0	75.870	115.796	45.837	27.063	24.670	13.769	0.448		
-23.0	138.679	189.600	80.095	51.655	33.204	22.303	0.429				
-24.0	181.408	208.552	97.018	195.255	86.523	75.622	-0.032				

Table S2. (continued)

CSU	12-Nov-13	T	MOUDI-DFT	DFT+	DFT-	IS-Bio	IS+	IS-	LOG(DFT/IS)
		-10.0	0.118	0.116	0.116	0.179	0.085	0.068	-0.180
		-11.0	0.200	0.198	0.198	0.320	0.142	0.124	-0.203
		-12.0	0.508	0.423	0.423	0.364	0.163	0.146	0.145
		-13.0	0.710	0.622	0.622	0.514	0.754	0.318	0.141
		-14.0	0.891	0.801	0.801	0.653	0.816	0.380	0.134
		-15.0	1.314	1.193	1.193	0.653	0.816	0.380	0.303
		-16.0	1.987	1.836	1.836	2.299	1.405	0.969	-0.063
		-17.0	2.838	2.579	2.579	3.277	1.726	1.290	-0.062
		-18.0	4.643	4.381	4.381	4.631	2.187	1.751	0.001
CSU	13-Nov-13	T	CS-Bio	CS+	CS-	IS-Bio	IS+	IS-	LOG(CS/IS)
		-12.0	0.499	0.682	0.288	0.163	0.075	0.069	0.486
		-13.0	1.010	1.873	0.656	0.330	0.255	0.156	0.486
		-14.0	2.686	4.921	1.737	0.459	0.299	0.200	0.767
		-15.0	6.192	9.914	3.811	1.763	2.587	1.090	0.546
		-16.0	10.297	14.612	6.040	1.953	2.674	1.177	0.722
		-17.0	16.744	23.844	9.837	5.625	4.066	2.569	0.474
		-18.0	27.020	49.350	17.460	9.487	5.346	3.849	0.455
		-19.0	40.174	73.178	25.936	11.494	6.006	4.509	0.543
		-20.0	55.401	116.584	37.555	23.015	10.228	8.731	0.382
		-21.0	69.563	134.262	45.822	35.055	16.064	14.567	0.298
		-22.0	108.495	225.122	73.212	26.920	29.928	14.679	0.605
		-23.0	301.880	301.880	150.940	28.820	30.662	15.413	1.020
-24.0	276.865	497.157	177.831	66.560	43.141	27.892	0.619		
-25.0	335.586	420.524	186.642	119.916	58.201	42.951	0.447		
CSU	14-Nov-13	T	CS-Bio	CS+	CS-	IS-Bio	IS+	IS-	LOG(CS/IS)
		-18.0	4.175	5.715	2.412	1.490	2.092	0.906	0.447
		-19.0	5.571	9.910	3.566	2.771	2.618	1.433	0.303
		-21.0	12.507	13.803	6.562	8.134	4.437	3.252	0.187
		-22.0	21.512	55.815	15.528	9.997	5.055	3.869	0.333
		-23.0	33.414	64.636	22.027	17.330	7.734	6.548	0.285
		-24.0	64.863	97.105	38.887	26.450	12.001	10.815	0.390
		-25.0	138.913	289.675	93.889	53.411	35.189	23.335	0.415
-26.0	237.974	579.013	168.656	102.554	51.415	39.561	0.366		
-27.0	347.864	1135.096	266.264	167.467	75.003	63.149	0.317		
CSU	14-Nov-13	T	MOUDI-DFT	DFT+	DFT-	IS-Bio	IS+	IS-	LOG(DFT/IS)
		-18.0	0.470	0.269	0.269	1.490	2.092	0.906	-0.501
		-19.0	0.770	0.400	0.400	2.771	2.618	1.433	-0.556
		-20.0	1.300	0.577	0.577	5.233	3.483	2.297	-0.605
		-21.0	2.167	0.786	0.786	8.134	4.437	3.252	-0.574
		-22.0	3.961	1.354	1.354	9.997	5.055	3.869	-0.402
		-23.0	6.533	2.124	2.124	17.330	7.734	6.548	-0.424
		-24.0	11.187	3.750	3.750	26.450	12.001	10.815	-0.374
		-25.0	19.657	7.929	7.929	53.411	35.189	23.335	-0.434
		-26.0	23.834	10.783	10.783	102.554	51.415	39.561	-0.634
-27.0	28.450	11.128	11.128	167.467	75.003	63.149	-0.770		

Table S3. Correction factors, $f_{nu,1mm}$ and $f_{nu,0.25-0.10mm}$, applied to MOUDI-DFT samples collected at CSU. $\mu = N_u(T)/N_o$, where $N_u(T)$ is the number of unfrozen droplets at temperature T in the freezing experiment and N_o is the total number of droplets in the freezing experiment.

MOUDI Stage	$f_{nu,0.25mm-0.1mm}$	$f_{nu,1mm}$, with uncertainty (+/-)
2	$0.1225\exp(-11\mu) + 1.065\exp(-0.06412\mu)$	0.74, + 0.2, -0.13
3	$0.04718\exp(-14.15\mu)+1.023\exp(-0.02347\mu)$	0.72, +0.8, -0.8 0.65, +0.03, -0.07
4	$0.04252\exp(-13.06\mu) + 1.024\exp(-0.02386\mu)$	1.18, +0.10, -0.15
5	$0.03023\exp(-14.97\mu) + 1.015\exp(-0.01515\mu)$	0.97, +0.03, -0.10
6	$0.5799\exp(-10.57\mu) + 1.148\exp(-0.1408\mu)$	0.75, +0.19, -0.02
7	$0.1151\exp(-10.66\mu) + 1.072\exp(-0.07029\mu)$	0.84, +0.07, -0.11
8	$1.03\exp(-12.79\mu) + 1.268\exp(-0.2422\mu)$	1.01, +0.03, -0.12

Table S4. Correction factors, $f_{nu,1mm}$ and $f_{nu,0.25-0.10mm}$, applied to samples collected in Kansas. $\mu = N_u(T)/N_o$, where $N_u(T)$ is the number of unfrozen droplets at temperature T in the freezing experiment and N_o is the total number of droplets in the freezing experiment.

MOUDI Stage	$f_{nu,0.25mm-0.1mm}$	$f_{nu,1mm}$ with uncertainty (+/-)
2	$0.6505\exp(-7.33\mu) + 1.234\exp(-0.2126\mu)$	3.18, +0.38, -1.03
3	$0.04718\exp(-14.15\mu)+1.023\exp(-0.02347\mu)$	0.72, +0.8, -0.8 0.65, +0.03, -0.07
4	$0.04252\exp(-13.06\mu) + 1.024\exp(-0.02386\mu)$	1.18, +0.10, -0.15
5	$0.03023\exp(-14.97\mu) + 1.015\exp(-0.01515\mu)$	0.97, +0.03, -0.10
6	$0.5799\exp(-10.57\mu) + 1.148\exp(-0.1408\mu)$	0.75, +0.19, -0.02
7	$0.1151\exp(-10.66\mu) + 1.072\exp(-0.07029\mu)$	0.84, +0.07, -0.11
8	$1.03\exp(-12.79\mu) + 1.268\exp(-0.2422\mu)$	1.01, +0.03, -0.12

Table S5a: Correction factors, $f_{nu,1mm}$ applied to sample M27 (August 17, 2011) collected at the Manitou Experimental Forest Observatory. Only stages overlapping with the CFDC size range were analyzed in this case.

MOUDI Stage	Slide Offset	$f_{nu,1mm}$ lower limit	$f_{nu,1mm}$ upper limit
4	0.5 mm	11.0	29.922
5	0.5 mm	27.304	51.821
6	0.5 mm	5.29	6.273
8	0 mm	1.421	1.829

Table S5b: Correction factors, $f_{nu,1mm}$ applied to sample M28 (August 18, 2011) collected at the Manitou Experimental Forest Observatory. Only stages overlapping with the CFDC size range were analyzed in this case.

MOUDI Stage	Slide Offset	$f_{nu,1mm}$ lower limit	$f_{nu,1mm}$ upper limit
4	1.5 mm	1.217	1.724
5	2 mm	0.73	0.843
6	1.5 mm	1.045	1.167
8	2 mm	0.893	1.077