Supplemental Information

S1. Precipitation and Particulate Matter Properties

S1.1 Precipitation Categorization

In this study, we have segregated our precipitation samples into four different categories, such as (1) snow, (2) hails/thunderstorm, (3) long-lasted rain, and (4) weak rain, based on our disdrometer observation of precipitation. For this categorization, we have considered both our visual observation and the disdrometer-assigned National Weather Service (NWS) code. Initially, the precipitation samples had been assigned one of the four categories based on our visual observation. Next, we used each NWS code and its occurrence in each precipitation sample to finalize the precipitation category. For example, a precipitation sample was categorized into snow only when we identified a snow type NWS code (Snow: S-, S, S+ and/or Snow Grains: SG). Likewise, a precipitation sample was categorized into hail/thunderstorm when the cumulative sum of NWS codes for hail was counted more than five times (i.e., A + SP ≥ 5; where A and SP are the codes for soft hail and hail, respectively). This limit of five was chosen arbitrarily. If there existed no snow and/or hail type NWS codes, we defined the category as we observed, thus falling in either long-lasted or weak rain category. Overall, we acquired 6 snow, 18 hail/thunderstorm, 13 long-lasted rain, and 5 weak rain samples for the sampling period of June 2018 – July 2019.

Table S1 gives the detailed information about the collected precipitation samples. The ID# column goes from 1-42. The column of 'Sample#' is the precipitation sample number in the chronological order. The missing precipitation sample numbers are the ones which collected a negligible amount of precipitation (typically < 1 ml). This amount is too small to carry out the West Texas Cryogenic Refrigerator Applied to Freezing Test (WT-CRAFT) ice-nucleating particle (INP) measurements. The amount of precipitation collected (in ml) is presented in **Table S1**. This table also includes the meteorological season in which each precipitation was observed and collected.

S1.2 Disdrometer and IoT Measurements

We have measured the ambient meteorological properties, particulate matter (PM) concentrations and precipitation properties including the intensity and number of precipitation particles using OTT Parsivel^2 Laser disdrometer and Internet of Things (IoT) PM sensors. The average temperature (T), relative humidity, PM concentrations, and intensity measured during each precipitation event are shown in **Table**

S2. The overall average values calculated for the entire sampling period (i.e., June 2018 – July 2019) for *T* and relative humidity are 17.7 ± 15 °C and 46.5 ± 12.3 %, respectively. The maximum and minimum intensities observed during each precipitation sampling are also shown in **Table S2**. The cumulative number of detected particles is the total number of precipitation particles measured by a disdrometer in each precipitation sample. **Table S3** shows the average, maximum and minimum intensity (mm hr^{-1}), number of detected particles, and mode and maximum hydrometeor size in diameter (mm) for each precipitation category.

Table S1. Summary of the Precipitation Categories and sampling periods.

ID#	Sample#	Start Date (Local Time)	End Date (Local Time)	Season	Volume Collected (ml)	NWS Code*	Precipitation Type
1	PCPT_NSB_1	6/12/2018 0:30	6/13/2018 9:30		13	C, R-, SP, R, R+, A	Hail/Thunderstorm
2	PCPT_NSB_2	6/13/2018 10:42	6/17/2018 13:50		15	C, R, R-, R+, A, SP, RL-	Hail/Thunderstorm
3	PCPT_NSB_5	6/30/2018 12:35	7/3/2018 9:35		3	C, R-, R, R+, A, RL-, L-	Long-Lasted Rain
4	PCPT_NSB_6	7/3/2018 9:40	7/6/2018 19:40		3	C, R-, R, A, R+, RL-	Long-Lasted Rain
5	PCPT_NSB_7	7/13/2018 16:40	7/14/2018 8:05		5.1	C, R, R+, A, R-, RL-, SP	Hail/Thunderstorm
6	PCPT_NSB_8	7/14/2018 8:10	7/16/2018 13:20	**Summer**	20	C, R, R-, R+, A, RL-	Hail/Thunderstorm
7	PCPT_NSB_9	7/16/2018 13:30	7/17/2018 18:25		3.5	C, R-, R, R+, A, SP, RL-	Long-Lasted Rain
8	PCPT_NSB_10	7/25/2018 0:30	7/26/2018 10:50		5	C, R-, R, R+, RL-	Long-Lasted Rain
9	PCPT_NSB_11	7/26/2018 11:00	7/30/2018 5:09		1	C, R-, R, R+, RL-	Weak Rain
10	PCPT_NSB_15	8/14/2018 8:20	8/16/2018 18:40		5	C, R-, R, R+, A, SP	Hail/Thunderstorm
11	PCPT_NSB_16	8/16/2018 18:50	8/17/2018 8:20		10	C, R-, R, R+, A, RL-	Hail/Thunderstorm
12	PCPT_NSB_17	8/17/2018 8:30	8/20/2018 8:00		15	C, R-, R, R+, RL+, RL-, L-, A	Long-Lasted Rain
13	PCPT_NSB_19	9/2/2018 12:00	9/5/2018 12:00		1	C, R-, RL-, R	Weak Rain
14	PCPT_NSB_20	9/10/2018 8:10	9/21/2018 12:30		4	C, R-, R, SP, RL-	Long-Lasted Rain
15	PCPT_NSB_23	10/5/2018 0:30	10/6/2018 10:00	**Fall**	8	C, SP, A, R+, R, R-, RL-, L-	Hail/Thunderstorm
16	PCPT_NSB_24	10/6/2018 10:10	10/14/2018 10:30		34	C, R-, R, R+, RL-, L-, A, SP, L+	Hail/Thunderstorm
17	PCPT_NSB_25	10/14/2018 10:35	10/21/2018 13:30		8	C, RL-, S-, S, SP, L-, R, R+, RL+	Snow Sample
18	PCPT_NSB_26	10/21/2018 13:35	10/28/2018 16:45		2.5	C, R-, RL-, R, R+, SP, L-	Long-Lasted Rain
19	PCPT_NSB_27	11/5/2018 8:00	11/21/2018 13:55		7	C, RL-, R-, L-, SP, S-, S+, S	Snow Sample
20	PCPT_NSB_29	12/14/2018 15:26	12/26/2018 12:40		3.5	C, RL-, L-, R-, R, R+, SP	Long-Lasted Rain
21	PCPT_NSB_30	12/26/2018 12:50	12/27/2018 21:50		3.5	C, R-, RL-, L-, SP, RLS-, S-, S, S+	Snow Sample
22	PCPT_NSB_31	12/27/2018 10:00	12/28/2018 13:45	**Winter**	1.5	C, SP, S-, RL-, S, S+, R-	Snow Sample
23	PCPT_NSB_32	12/28/2018 13:55	12/29/2018 14:08		1	C, S-, SP, L-	Snow Sample
24	PCPT_NSB_43	2/21/2019 18:30	2/23/2019 10:45		2.5	C, R-, R, RL-, R+, A, RLS-, L-	Snow Sample
25	PCPT_NSB_46	3/11/2019 18:00	3/12/2019 9:45		1.5	C, RL-, R-, L-, R, R+	Weak Rain
26	PCPT_NSB_47	3/12/2019 9:50	3/12/2019 18:15		5	C, R-, RL-, R, R+, A, L-	Weak Rain
27	PCPT_NSB_48	3/12/2019 18:20	3/13/2019 10:00		12.2	C, L-, RL-, R-, R, R+, SP	Hail/Thunderstorm
28	PCPT_NSB_49	3/19/2019 18:38	3/20/2019 8:50		5	C, R-, RL-, R, A, R+	Long-Lasted Rain
29	PCPT_NSB_51	4/17/2019 12:40	4/18/2019 10:10		7.4	C, R-, R, SP, R+, RL-	Hail/Thunderstorm
30	PCPT_NSB_52	4/22/2019 17:25	4/23/2019 10:10	**Spring**	7.3	C, R-, RL-, R, L-, R+	Long-Lasted Rain
31	PCPT_NSB_54	4/28/2019 10:30	4/30/2019 18:45		2.1	C, RL-, R-, L-, R, SP, A, R+	Long-Lasted Rain
32	PCPT_NSB_55	4/30/2019 18:50	5/3/2019 14:35		1.8	C, L-, RL-, R-, R, R+	Weak Rain
33	PCPT_NSB_56	5/3/2019 14:40	5/20/2019 8:40		6.2	C, L-, R-, R, R+, RL-, SP, A, RLS-	Hail/Thunderstorm
34	PCPT_NSB_57	5/23/2019 9:00	5/26/2019 14:30		3.4	C, R, R-, RL-, A, SP, R+, RL+, L-	Hail/Thunderstorm
35	PCPT_NSB_58	5/26/2019 14:20	5/27/2019 11:35		7.4	C, R-, R, RL-, R+, A, SP, L-	Hail/Thunderstorm
36	PCPT_NSB_59	5/27/2019 11:40	6/1/2019 12:30		7.5	C, R-, R, A, R+, RL-, L-	Long-Lasted Rain
37	PCPT_NSB_60	6/1/2019 12:35	6/2/2019 12:20		17.5	C, R-, RL-, R, R+, A, SP, L-	Hail/Thunderstorm
38	PCPT_NSB_61	6/2/2019 12:25	6/4/2019 11:50		3	C, R-, RL-, R, R+	Long-Lasted Rain
39	PCPT_NSB_62	6/4/2019 12:00	6/8/2019 11:40	**Summer**	3	C, R-, RL-, R, R+, SP, L-	Hail/Thunderstorm
40	PCPT_NSB_63	6/8/2019 11:50	6/14/2019 11:50		7.2	C, RL-, L-, R-, SP, R, R+, A	Hail/Thunderstorm
41	PCPT_NSB_65	6/16/2019 12:15	6/19/2019 12:45		5	C, R-, SP, RL-, R, L-, R+, A	Hail/Thunderstorm
42	PCPT_NSB_66	7/5/2019 19:40	7/6/2019 15:30		25	C, R-, R, R+, SP, A, RL-	Hail/Thunderstorm

*The NWS Code column in the above table shows the assigned precipitation code to each event. The codes are defined as C: no rain; RL, RL+, RL-, L, L+, L-: drizzle; R, R+, R-: rain; A, SP: hail and/or soft hail; and S, S+, S-, RLS: snow and/or snow with rain.

Table S2. Summary of the precipitation properties and meteorological parameters during the sampling.

ID#	Sample#	Precipitation Type	Average *T* (°C) ± standard dev.	Average RH (%) ± standard dev.	Cumulative No. of detected particles	Average Intensity (mm hr^{-1}) ± standard error	Maximum Intensity (mm hr^{-1})	Minimum Intensity (mm hr^{-1})
17	PCPT_NSB_25		8.55 ± 8.62	51.94 ± 11.49	2.49E+05	1.00 ± 0.04	21.47	0.01
19	PCPT_NSB_27		4.26 ± 10.33	41.00 ± 3.38	6.58E+05	2.96 ± 0.10	26.68	0.01
21	PCPT_NSB_30	**Snow**	2.53 ± 5.92	54.56 ± 10.30	1.68E+05	1.16 ± 0.06	14.21	0.02
22	PCPT_NSB_31		-3.09 ± 4.83	47.35 ± 5.03	7.25E+04	1.03 ± 0.06	7.42	0.14
23	PCPT_NSB_32		-6.50 ± 6.70	53.83 ± 6.24	1.07E+04	0.33 ± 0.01	1.12	0.01
24	PCPT_NSB_43		2.40 ± 5.23	56.00 ± 8.78	4.16E+04	1.12 ± 0.11	22.58	0.05
1	PCPT_NSB_1		29.76 ± 12.94	46.70 ± 11.90	2.76E+04	11.08 ± 0.94	67.33	0.05
2	PCPT_NSB_2		29.61 ± 8.79	46.92 ± 12.37	8.48E+04	5.97 ± 0.57	83.89	0.03
5	PCPT_NSB_7		21.57 ± 3.87	58.81 ± 9.28	1.53E+04	3.95 ± 0.49	40.27	0.03
6	PCPT_NSB_8		32.41 ± 11.19	—	7.7E+04	8.60 ± 0.66	105.53	0.04
10	PCPT_NSB_15		31.90 ± 11.60	53.34 ± 12.37	3.33E+04	3.69 ± 0.37	85.30	0.04
11	PCPT_NSB_16		25.47 ± 6.30	52.69 ± 5.75	4.75E+04	5.52 ± 0.65	90.45	0.03
15	PCPT_NSB_23		21.76 ± 10.88	58.87 ± 10.50	2.9E+04	11.63 ± 1.51	80.67	0.02
16	PCPT_NSB_24		11.72 ± 6.31	66.17 ± 7.63	3.49E+05	2.88 ± 0.17	110.49	0.01
27	PCPT_NSB_48	**Hail/Thunderstorm**	7.00 ± 2.91	66.16 ± 9.43	7.63E+04	2.67 ± 0.12	19.90	0.01
29	PCPT_NSB_51		12.12 ± 9.11	57.10 ± 10.60	3.83E+04	2.23 ± 0.08	9.64	0.04
33	PCPT_NSB_56		20.03 ± 11.31	51.37 ± 13.12	1.96E+05	2.47 ± 0.12	83.20	0.01
34	PCPT_NSB_57		21.62 ± 8.19	63.98 ± 8.39	1.37E+04	3.33 ± 0.54	65.64	0.02
35	PCPT_NSB_58		21.51 ± 7.01	68.47 ± 8.03	3.29E+04	6.56 ± 0.98	103.17	0.02
37	PCPT_NSB_60		23.57 ± 11.35	57.97 ± 11.33	8.88E+04	5.69 ± 0.34	56.77	0.01
39	PCPT_NSB_62		25.48 ± 10.80	56.46 ± 10.06	3.52E+04	1.33 ± 0.10	25.75	0.02
40	PCPT_NSB_63		24.20 ± 10.62	47.64 ± 11.15	2.43E+04	6.93 ± 1.50	129.25	0.01
41	PCPT_NSB_65		27.02 ± 10.82	52.40 ± 11.07	2.05E+04	3.34 ± 0.40	60.46	0.01
42	PCPT_NSB_66		22.50 ± 6.03	58.59 ± 8.88	9.48E+04	7.00 ± 0.34	88.18	0.04
3	PCPT_NSB_5		30.67 ± 9.62	46.25 ± 10.57	1.16E+04	3.72 ± 0.54	34.77	0.04
4	PCPT_NSB_6		33.69 ± 9.60	42.19 ± 9.94	1.35E+04	10.51 ± 1.20	40.76	0.07
7	PCPT_NSB_9		34.89 ± 12.21	30.76 ± 0.74	1.67E+04	5.77 ± 0.64	34.37	0.04
8	PCPT_NSB_10		30.23 ± 10.32	44.30 ± 11.62	5.23E+04	3.06 ± 0.14	13.06	0.04
12	PCPT_NSB_17		28.71 ± 10.98	52.15 ± 9.98	7.14E+04	7.85 ± 0.66	74.67	0.03
14	PCPT_NSB_20		26.51 ± 9.01	54.43 ± 10.91	2.77E+04	0.96 ± 0.06	6.85	0.02
18	PCPT_NSB_26	**Long-Lasted Rain**	14.81 ± 10.75	51.91 ± 11.22	2.04E+05	0.89 ± 0.03	12.64	0.02
20	PCPT_NSB_29		5.94 ± 8.97	41.51 ± 11.64	2.07E+04	1.74 ± 0.21	28.48	0.01
28	PCPT_NSB_49		4.42 ± 2.28	57.95 ± 5.32	7.69E+04	1.13 ± 0.05	12.65	0.02
30	PCPT_NSB_52		9.57 ± 1.66	65.47 ± 4.02	1.26E+05	1.17 ± 0.05	9.23	0.01
31	PCPT_NSB_54		18.32 ± 10.31	52.92 ± 11.46	2.42E+04	1.19 ± 0.32	86.29	0.01
36	PCPT_NSB_59		24.66 ± 11.30	48.02 ± 14.00	6.3E+04	3.35 ± 0.28	69.13	0.02
38	PCPT_NSB_61		26.91 ± 8.74	57.18 ± 9.31	2.02E+04	2.83 ± 0.21	19.25	0.03
9	PCPT_NSB_11		31.21 ± 10.43	48.01 ± 10.87	1.27E+04	2.12 ± 0.21	9.09	0.03
13	PCPT_NSB_19		27.99 ± 9.41	51.91 ± 11.35	1.04E+04	1.05 ± 0.07	4.01	0.03
25	PCPT_NSB_46	**Weak Rain**	3.54 ± 0.77	68.65 ± 1.14	1.15E+04	2.17 ± 0.45	31.44	0.03
26	PCPT_NSB_47		8.86 ± 2.91	70.68 ± 2.29	3.9E+04	2.05 ± 0.37	83.67	0.01
32	PCPT_NSB_55		16.14 ± 10.16	61.02 ± 12.75	1.71E+04	0.21 ± 0.06	15.60	0.01

Table S3. Summary of the precipitation Intensity and Particles Size.

Precipitation Type	Precipitation Properties							
	Average Intensity (mm hr^{-1}) ± standard error	Maximum Intensity (mm hr^{-1})	Minimum Intensity (mm hr^{-1})	Average No. of detected precipitation particles ± standard error	Maximum No. of detected precipitation particles	Minimum No. of detected precipitation particles	Hydrometeor Mode diameter (mm)	Maximum diameter of hydrometeor (mm)
Snow *(n=6)	1.27E+00 ± 3.61E-01	26.68	0.01	2E+05 ± 2E+02	6.58E+05	1.07E+04	0.44	17
Hail/Thunderstorm (n=18)	5.27E+00 ± 7.01E-01	129.25	0.01	7.13E+04 ± 1.93E+04	3.49E+05	1.37E+04	0.44	17
Long-Lasted Rain (n=13)	3.4E+00 ± 8.26E-01	86.29	0.01	5.6E+04 ± 1.54E+04	2.04E+05	1.16E+04	0.44	17
Weak Rain (n=5)	1.52E+00 ± 3.86E-01	83.67	0.01	1.81E+04 ± 5.35E+03	3.9E+04	1.04E+04	0.31	5.5

* n is the number of samples in each precipitation category.

S2. Cooling Rate Dependency and Time Trial Test

S2.1. Cooling Rate Dependency Test

For this study, we have cooled the 3 µL volume droplets from all our precipitation samples in the WT-CRAFT system at a cooling rate of 1 °C min^{-1}. However, we observe a rapid cooling rate of 2-3 °C min^{-1} in the invigorating convective systems like hurricanes and thunderstorms depending on the vertical updrafts in that weather system. This variation in the cooling rate was mimicked at laboratory conditions by conducting our immersion freezing tests at different cooling rates. To understand the effect of different cooling rates on INP measurements, we have selected a hail/thunderstorm sample (ID# 16), which was observed during the landfall of Hurricane Michael in 2018. **Figure S1** shows the frozen fraction curves and n_{INP} values for this chosen sample at three different cooling rates (i.e., at 1, 2, and 3°C min^{-1}). Throughout this test, the T discrepancy was within the system's uncertainty (i.e., ±0.5°C).

A slight decrease in freezing activity (within a factor of 2-3) was observed with an increase in cooling rate as shown in **Fig. S1**. This negligible variation in the freezing behavior highlights that the sensitivity of freezing to ΔT (°C) is much higher compared to Δt (min), supporting previous simulation studies (Ervens and Feingold, 2013). This result also supports our assumption for this study, that freezing activity is independent of time following the singular freezing theory (Niedermeier et al., 2011).

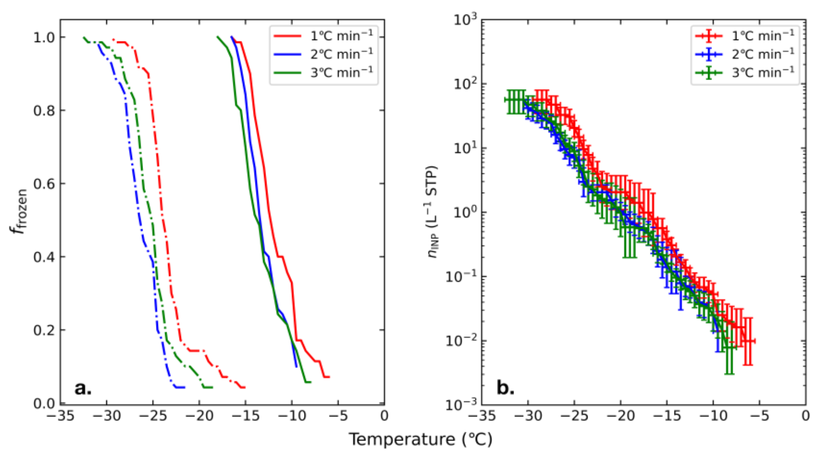


Figure S1. The cooling rate dependency tests for a hail/thunderstorm sample (ID# 16) showing (a) frozen fraction curves, the dash-dot curves are for a serial dilution fold of 100 and (b) n_{INP} curves. The X-axis error bars represent constant uncertainty of ±0.5 °C in temperature. The Y-axis error bars show the 95% confidence interval for n_{INP} shown only for one test here.

S2.2. Time Trial Test

There was a time gap between our sample collection day and the day of droplet freezing assay measurements. The effect of this delay in measurements on immersion freezing propensity was examined by systematically carrying out time trail tests on a hail/thunderstorm sample (ID# 16). Initially the samples were stored at 4 °C in the refrigerator from the day of sample collection until we conducted droplet freezing assay measurements. Multiple immersion freezing experiments were carried out for the same sample every two weeks since the first droplet freezing assay measurement. Overall, three-time trial tests were conducted on hail/thunderstorm sample (ID# 16) over a period of one month.

We observed a slight decrease in the freezing efficiency with time (**Fig. S2**), but not more than a factor of 3-4. Therefore, these results showed that our immersion freezing measurements were not affected by the delay in droplet freezing assay experiments, agreeing with the previous studies, such as Murray et al. (2012).

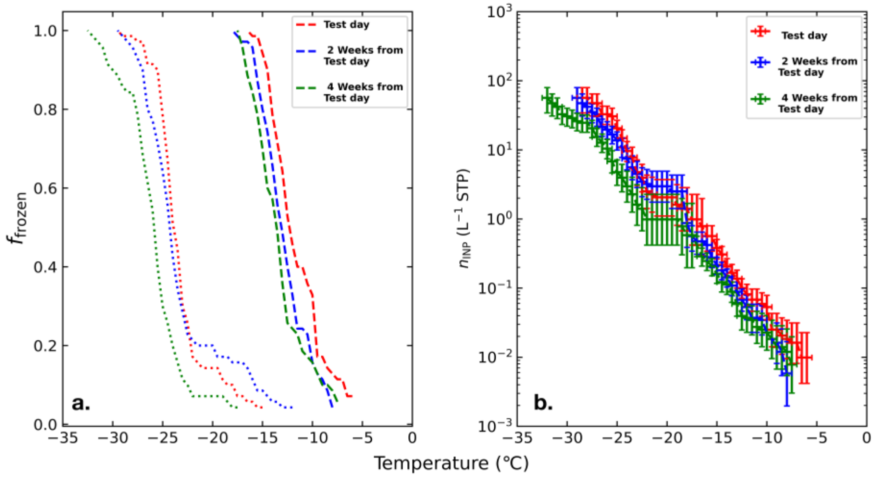


Figure S2. The time trial tests for a hail/thunderstorm sample (ID# 16) showing (a) frozen fraction curves, the dotted curves are for a serial dilution fold of 100 and (b) n_{INP} curves. The X-axis error bars represent constant uncertainty of ±0.5 °C in temperature. The Y-axis error bars show the 95% confidence interval for n_{INP} shown only for one test here.

S4. INP Variation with Precipitation Category

Table S4. Summary of precipitation category-wise average and maximum n_{INP}.

	n_{INP} (L^{-1} STP) values								
Precipitation Type	$(n_{INP})_{max}$ at -5°C	$(n_{INP})_{max}$ at -10°C	$(n_{INP})_{max}$ at -15°C	$(n_{INP})_{max}$ at -20°C	$(n_{INP})_{max}$ at -25°C	Average n_{INP} ± standard error at -10°C	Average n_{INP} ± standard error at -15°C	Average n_{INP} ± standard error at -20°C	Average n_{INP} ± standard error at -25°C
Snow *(n=6)	3.46E-02	1.62E+00	2.98E+00	1.62E+01	6.50E+01	4.38E-01 ± 2.98E-01	7.84E-01 ± 4.47E-01	5.74E+00 ± 2.46E+00	2.90E+01 ± 1.00E+01
Hail/Thunderstorm (n=18)	1.13E-01	9.88E-01	2.51E+00	1.61E+01	1.13E+03	1.43E-01 ± 5.76E-02	5.46E-01 ± 1.71E-01	4.17E+00 ± 1.19E+00	1.18E+02 ± 6.42E+01
Long-Lasted Rain (n=13)	5.84E-03	2.89E-01	1.4E+00	5.84E+00	1.32E+02	9.51E-02 ± 2.67E-02	3.15E-01 ± 1.07E-01	2.25E+00 ± 5.59E-01	4.72E+01 ± 1.21E+01
Weak Rain (n=5)	5.84E-02	6.50E-01	1.00E+00	4.74E+00	2.05E+02	1.97E-01 ± 1.52E-01	3.10E-01 ± 1.81E-01	1.34E+00 ± 8.57E-01	4.60E+01 ± 3.99E+01

* n is the number of samples in each precipitation category.

S4. Wet Deposition

This section explains potential implications of aerosol particle scavenging in our precipitation data. First, we assessed the hourly averaged PM values right before vs. after 28 precipitation events, which had relevant PM data. Our measurements of PM_1, $PM_{2.5}$, and PM_{10} are summarized in **Table 1** of the main manuscript. As seen in the table, we confirm the trend of PM reduction for all three PM categories after precipitation in part due to scavenging.

Second, using the PM data measured before precipitation (typically an hour prior or the most adjacent data to each precipitation event) in **Table 1**, we estimated the "first order" impact of wet deposition – i.e., estimating the amount of scavenged aerosol particle mass, M_{sv} (μg m^{-3}), during each precipitation event. In the first step of this estimation, we converted our PM data into three size-segregated bins with different median diameters (MDs), including PM_1-PM_0 (MD = 0.5 μm), $PM_{2.5}$-PM_1 (MD = 1.75 μm), and PM_{10}-$PM_{2.5}$ (MD = 6.25 μm). This conversion was implemented to incorporate with the fact that aerosol particle scavenging efficiencies vary for different aerosol particle sizes. The resulting size-segregated data were used as the ground level aerosol particle mass, M_{gl} (μg m^{-3}), in this analysis. Subsequently, we estimated the mass concentration of aerosol particles below cloud, M_{bc} (μg m^{-3}), by the pressure scaling method (Eqns. 11-30 of Ch. 11 in Pruppacher and Klett, 2010), assuming a well-mixed boundary layer around West Texas, which is part of Southern Great Plains (SGP) (Delle Monache et al., 2004; Schmid and Niyogi, 2012; Zhu et al., 2001). It is important to note that Delle Monache et al. (2004) found that aerosol measurements made at the surface are representative of those within the atmospheric boundary layer at SGP. Since Dong et al. (2008) previously showed a typical cloud base height in the range of 0.5 – 3.0 km above ground level (AGL) for the SGP region, we estimated M_{bc} at 0.5 km ($M_{bc,0.5km}$) and 3.0 km ($M_{bc,3.0km}$) to cover a reasonable range of M_{bc}. On average, the relative difference between $M_{bc,0.5km}$ and $M_{bc,3.0km}$) is ≈14%, which is smaller than our PM sensor error (±27%). Further, a lapse rate of -7.1 °C km^{-1}, which is representative for the SGP region according to Dong et al. (2008), was used as part of our M_{bc} calculation, assuming this number holds true for the entire SGP region including West Texas region. We also estimated the column-integrated mean mass concentration, M_{cm} (μg m^{-3}), of the surface - 3.0 km AGL. We examined precipitation scavenging of particles using both M_{bc} and M_{cm} as an original aerosol particle mass parameter, M_0, to estimate M_{sv}. The summary of our size-segregated M_0 is provided in **Table S5**.

Third, we computed the scavenging coefficient (Λ, s^{-1}) for each precipitation event as a function of aerosol particle size (*d,* μm), for which we used our PM MDs, and precipitation intensity (*R,* mm/h). In particular, to obtain our Λ values, we used the parameterization method described in Wang et al. (2014). Briefly, the scavenging rate, Λ, is governed by Eqn. 4 of Wang et al. (2014);

$$log_{10}\big(\Lambda(d,R)\big) = log_{10}\big(A(d)\big) + B(d)(log_{10}R), \quad \text{[Eqn. S1]}$$

where A is the hydrometeor-specific effective cross section area coefficient (s-1), B is the coefficient governing the regression slope between R and Λ, in which both A and B are as a function of d. We note that our parameterization was performed for snow and non-snow precipitation (i.e., rain) separately. In short, Eqns. 6 and 8 in Wang et al. (2014) were applied to derive the A values of rain and snow, respectively. Likewise, the regression slope coefficient, B, was derived using Eqns. 7 and 9 in Wang et al. (2014) for rain and snow individually. The resulting Λ values and all coefficients are summarized in **Table S6**. It is noteworthy that Wang et al. (2014) reports up to ±50% uncertainty in their parameterization, especially for snow and aerosol particle size between 1 and 4 µm in diameter.

Fourth, following the Seinfeld and Pandis textbook chapter (1996, Ch. 20.3: precipitation scavenging of particles), we estimated M_{sv} (assuming a constant Λ over precipitation) as follows,

$$M_{sv} = M_0 - M_t = M_0 - M_0 e^{-\Lambda t}, \quad \text{[Eqn. S2]}$$

in which, M_t is the amount of aerosol particle mass per unit volume of air after t seconds of precipitation. Thus, the amount of aerosol particle mass concentration removed by scavenging is estimated as $M_0 - M_t$. The summary of size-resolved and summed M_{sv} is provided in **Table S7**. We note that the estimated scavenging efficiencies of snow are relatively high compared to those of rain as expected (IDs #19 and #21 in **Table S6** – almost all scavenged). However, the M_{sv} values of these IDs are not substantially higher compared to those of other rain samples in part due to low M_0 (**Table S5**). As we found in M_0, the relative difference between $M_{bc\_0.5km}$ and $M_{bc\_0.5km}$ is on average < 15%.

Finally, we assessed the impact of M_{sv} on INP by estimating the INP concentration of scavenged aerosol particles as a function of T, $n_{INP,sv}(T)$, using the modified version of equation presented in Hiranuma et al. (2020);

$$n_{INP,sv}(T)(L^{-1}) = n_{s,geo}(T)(m^{-2}) \times Geometric\ SSA\left(\frac{m^2}{g}\right) \times M_{sv}\left(\frac{g}{L}\right), \quad \text{[Eqn. S3]}$$

where $n_{geo}(T)$ is ice nucleation active surface site density derived using the $n_{s,geo}(T)$ parameterization given in Hiranuma et al. (2020; Eqn. Field_Min), geometric SSA value is approximately 0.4 m^2g^{-1} as described in Hiranuma et al. (2020), M_{sv} is based on our M_{gl}, $M_{bc\_0.5km}$, $M_{bc\_3.0km}$, and M_{cm}. Though other $n_{geo}(T)$ parameterizations may also be applicable, using this particular parameterization might be fair for the following three reasons; (1) this parameterization is derived from PM_{10} mass concentration data in somewhat similar manner, (2) organic dominant agricultural dust is a predominant local PM_{10} source in West Texas throughout the year (411.6 ± 3.0 µg m^{-3} Hiranuma et al., 2020) and, thus, may largely contribute to M_{sv}, (3) we observed that the INP propensity measured during our recent field campaign, called the TxTEST campaign held in West Texas in 2019, exhibits very similar features to what is seen in the Field_Min parameterization (not shown but the data are available upon request, Hiranuma et al., in prep.).

Table S8 shows the average $n_{INP,sv}(T)$ at four different Ts based on scavenged mass ($M_{sv,M0}$) simulated with four different M_0 values, including PM_{10} measured at ground level, gl, estimated PM_{10} for below cloud at 0.5 km AGL, bc_0.5km, as well as 3.0 km AGL, bc_3.0km, and column-integrated mean PM_{10}, cm. We also show the average INP concentrations of our precipitation samples, $n_{INP,pcpt}(T)$ [L^{-1}], for comparison. It should be noted that the total uncertainty of our $n_{INP,pcpt}(T)$ derived from errors in our PM measurement, scavenging coefficient calculation, and immersion freezing method is estimated to be ±61.5%. **Figure S3** shows the estimated $n_{INP,SV}$ for individual samples at four different Ts based on $M_{sv,cm}$ in comparison to individual $n_{INP,pcpt}(T)$ time series. As seen in these table and figure, our estimated $n_{INP,sv}(T)$ values are constantly more than an order magnitude lower at the least as compared to $n_{INP,pcpt}(T)$. This trend is true across all ranges of examined Ts regardless of the choice of $M_{sv,M0}$. The overall deviation between $n_{INP,sv}$ ($M_{bc\_0.5km}$) and $n_{INP,sv}$ ($M_{bc\_3.0km}$) is 14.6% for -25 °C ≤ T ≤ -10 °C. Due to many assumptions we made for this analysis, our results of $n_{INP,sv}(T)$ being much lower than $n_{INP,pcpt}(T)$ may not be conclusive and indeed requires further detailed study. Nevertheless, our estimates suggest the presence of $n_{INP,sv}(T)$ in our precipitation samples, but may be negligible for this study.

Table S5. Summary of our size-segregated M_0.

		M_0 [μg m^{-3}]											
		M_{gl}			$M_{bc\_0.5km}$			$M_{bc\_3.0km}$			M_{cm}		
ID#	**Sample#**	PM1-PM0	PM2.5-PM1	PM10-PM2.5	PM1-PM0	PM2.5-PM1	PM10-PM2.5	PM1-PM0	PM2.5-PM1	PM10-PM2.5	PM1-PM0	PM2.5-PM1	PM10-PM2.5
1	PCPT_NSB_1	1.97	2.12	2.10	1.91	2.06	2.04	1.64	1.77	1.75	1.81	1.94	1.92
2	PCPT_NSB_2	0.01	1.80	0.30	0.01	1.75	0.29	0.01	1.50	0.25	0.01	1.65	0.28
3	PCPT_NSB_5	4.67	1.07	5.06	4.53	1.04	4.91	3.89	0.89	4.22	4.28	0.98	4.64
4	PCPT_NSB_6	3.76	2.20	2.91	3.65	2.14	2.83	3.14	1.84	2.43	3.45	2.02	2.67
5	PCPT_NSB_7	0	0.56	0.17	0	0.54	0.16	0	0.46	0.14	0	0.51	0.15
8	PCPT_NSB_10	7.48	2.42	4.88	7.26	2.35	4.74	6.24	2.01	4.07	6.86	2.21	4.47
9	PCPT_NSB_11	5.76	2.41	4.61	5.59	2.34	4.47	4.81	2.01	3.84	5.28	2.21	4.22
10	PCPT_NSB_15	14.29	1.79	14.72	13.88	1.74	14.29	11.93	1.49	12.28	13.11	1.64	13.50
11	PCPT_NSB_16	4.91	0.51	5.11	4.77	0.49	4.96	4.08	0.42	4.25	4.50	0.47	4.68
12	PCPT_NSB_17	4.55	1.86	4.22	4.42	1.81	4.10	3.79	1.55	3.51	4.17	1.71	3.87
13	PCPT_NSB_19	0.05	1.23	5.02	0.05	1.20	4.87	0.04	1.03	4.18	0.04	1.13	4.60
14	PCPT_NSB_20	1.78	2.53	1.58	1.73	2.46	1.53	1.48	2.11	1.31	1.63	2.32	1.45
15	PCPT_NSB_23	3.87	1.87	3.81	3.75	1.82	3.70	3.21	1.55	3.16	3.54	1.71	3.49
16	PCPT_NSB_24	1.59	3.39	0.80	1.54	3.29	0.78	1.31	2.79	0.66	1.45	3.09	0.73
18	PCPT_NSB_26	0.66	2.17	0.36	0.64	2.11	0.35	0.54	1.79	0.30	0.60	1.98	0.33
19	PCPT_NSB_27	0	0.01	0.07	0	0.01	0.07	0	0.01	0.06	0	0.01	0.06
21	PCPT_NSB_30	0.76	1.87	0.55	0.74	1.81	0.54	0.62	1.53	0.45	0.69	1.70	0.50
25	PCPT_NSB_46	1.46	3.06	0.92	1.41	2.97	0.89	1.20	2.51	0.76	1.33	2.79	0.84
27	PCPT_NSB_48	0	0.43	0	0	0.41	0	0	0.35	0	0	0.39	0
34	PCPT_NSB_57	29.65	0	29.30	28.76	0	28.42	24.58	0	24.29	27.12	0	26.79
35	PCPT_NSB_58	12.45	0.80	11.15	12.08	0.77	10.81	10.32	0.66	9.24	11.39	0.73	10.19
36	PCPT_NSB_59	10.52	1.00	9.68	10.20	0.97	9.39	8.74	0.83	8.04	9.63	0.92	8.86
37	PCPT_NSB_60	9.74	0.92	8.09	9.45	0.89	7.85	8.09	0.76	6.72	8.91	0.84	7.40
38	PCPT_NSB_61	4.40	1.52	4.16	4.27	1.47	4.04	3.66	1.26	3.46	4.03	1.39	3.81
39	PCPT_NSB_62	0.04	1.52	0.25	0.04	1.47	0.24	0.03	1.26	0.21	0.04	1.39	0.23
40	PCPT_NSB_63	2.22	2.13	2.19	2.15	2.07	2.12	1.84	1.77	1.81	2.03	1.95	2.00
41	PCPT_NSB_65	1.69	2.30	1.31	1.64	2.23	1.27	1.41	1.91	1.09	1.55	2.11	1.20
42	PCPT_NSB_66	1.75	1.13	2.89	1.70	1.10	2.80	1.45	0.94	2.40	1.60	1.03	2.64

Table S6. Summary of scavenging efficiencies, Λ, and other coefficients for estimating Λ.

ID#	Sample#	Precipitation type	R [mm hr^{-1}]	$A(d)$ [s^{-1}]			$B(d)$			$\Lambda(d,R)$ [s^{-1}]		
				MD = 0.5 µm	MD = 1.75 µm	MD = 6.25 µm	MD = 0.5 µm	MD = 1.75 µm	MD = 6.25 µm	MD = 0.5 µm	MD = 1.75 µm	MD = 6.25 µm
1	PCPT_NSB_1	Hail/Thunderstorm	11.08	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	2.26E-06	5.26E-06	2.26E-03
2	PCPT_NSB_2	Hail/Thunderstorm	5.97	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	1.46E-06	3.35E-06	1.34E-03
3	PCPT_NSB_5	Long-Lasted Rain	3.72	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	1.04E-06	2.37E-06	8.95E-04
4	PCPT_NSB_6	Long-Lasted Rain	10.51	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	2.18E-06	5.06E-06	2.16E-03
5	PCPT_NSB_7	Hail/Thunderstorm	3.95	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	1.08E-06	2.48E-06	9.42E-04
8	PCPT_NSB_10	Long-Lasted Rain	3.06	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	9.04E-07	2.06E-06	7.59E-04
9	PCPT_NSB_11	Weak Rain	2.12	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	6.95E-07	1.57E-06	5.55E-04
10	PCPT_NSB_15	Hail/Thunderstorm	3.69	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	1.03E-06	2.36E-06	8.89E-04
11	PCPT_NSB_16	Hail/Thunderstorm	5.52	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	1.38E-06	3.16E-06	1.25E-03
12	PCPT_NSB_17	Long-Lasted Rain	7.85	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	1.77E-06	4.09E-06	1.69E-03
13	PCPT_NSB_19	Weak Rain	1.05	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	4.21E-07	9.42E-07	3.06E-04
14	PCPT_NSB_20	Long-Lasted Rain	0.96	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	3.95E-07	8.82E-07	2.84E-04
15	PCPT_NSB_23	Hail/Thunderstorm	11.63	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	2.34E-06	5.45E-06	2.35E-03
16	PCPT_NSB_24	Hail/Thunderstorm	2.88	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	8.64E-07	1.96E-06	7.20E-04
18	PCPT_NSB_26	Long-Lasted Rain	0.89	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	3.73E-07	8.31E-07	2.65E-04
19	PCPT_NSB_27	Snow Sample	2.96	1.32E-05	9.32E-05	1.93E-03	5.60E-01	5.63E-01	7.08E-01	2.43E-05	1.72E-04	4.17E-03
21	PCPT_NSB_30	Snow Sample	1.16	1.32E-05	9.32E-05	1.93E-03	5.60E-01	5.63E-01	7.08E-01	1.43E-05	1.01E-04	2.15E-03
25	PCPT_NSB_46	Weak Rain	2.17	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	7.06E-07	1.60E-06	5.66E-04
27	PCPT_NSB_48	Hail/Thunderstorm	2.67	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	8.19E-07	1.86E-06	6.75E-04
34	PCPT_NSB_57	Hail/Thunderstorm	3.33	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	9.60E-07	2.19E-06	8.15E-04
35	PCPT_NSB_58	Hail/Thunderstorm	6.56	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	1.56E-06	3.59E-06	1.45E-03
36	PCPT_NSB_59	Long-Lasted Rain	3.35	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	9.64E-07	2.20E-06	8.19E-04
37	PCPT_NSB_60	Hail/Thunderstorm	5.69	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	1.41E-06	3.23E-06	1.28E-03
38	PCPT_NSB_61	Long-Lasted Rain	2.83	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	8.54E-07	1.94E-06	7.10E-04
39	PCPT_NSB_62	Hail/Thunderstorm	1.33	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	4.99E-07	1.12E-06	3.75E-04
40	PCPT_NSB_63	Hail/Thunderstorm	6.93	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	1.62E-06	3.73E-06	1.52E-03
41	PCPT_NSB_65	Hail/Thunderstorm	3.34	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	9.62E-07	2.19E-06	8.17E-04
42	PCPT_NSB_66	Hail/Thunderstorm	7.00	4.06E-07	9.08E-07	2.93E-04	7.14E-01	7.30E-01	8.49E-01	1.63E-06	3.76E-06	1.53E-03

Table S7. Summary of our size-segregated and total merged M_{sv}.

ID #	Sample #	M_{sv} [µg m^{-3}]															
		M_{gl}				$M_{bc\_0.5km}$				$M_{bc\_3.0km}$				M_{cm}			
		PM1-PM0	PM2.5-PM1	PM10-PM2.5	Total	PM1-PM0	PM2.5-PM1	PM10-PM2.5	Total	PM1-PM0	PM2.5-PM1	PM10-PM2.5	Total	PM1-PM0	PM2.5-PM1	PM10-PM2.5	Total
1	PCPT_NSB_1	0.46	0.99	2.10	3.55	0.45	0.96	2.04	3.44	0.39	0.82	1.75	2.96	0.43	0.90	1.92	3.25
2	PCPT_NSB_2	0.00_4	1.26	0.30	1.56	0.00_4	1.22	0.29	1.51	0.00_3	1.05	0.25	1.30	0.00_4	1.15	0.28	1.43
3	PCPT_NSB_5	1.06	0.47	5.06	6.59	1.03	0.46	4.91	6.40	0.88	0.40	4.22	5.50	0.97	0.44	4.64	6.04
4	PCPT_NSB_6	1.78	1.71	2.91	6.40	1.73	1.66	2.83	6.22	1.49	1.43	2.43	5.35	1.63	1.57	2.67	5.87
5	PCPT_NSB_7	0	0.07	0.17	0.24	0	0.07	0.16	0.23	0	0.06	0.14	0.20	0	0.07	0.15	0.22
8	PCPT_NSB_10	0.79	0.54	4.88	6.21	0.77	0.53	4.74	6.03	0.66	0.45	4.07	5.18	0.72	0.50	4.47	5.69
9	PCPT_NSB_11	1.16	0.96	4.61	6.73	1.13	0.93	4.47	6.53	0.97	0.80	3.84	5.61	1.07	0.88	4.22	6.17
10	PCPT_NSB_15	2.79	0.70	14.72	18.20	2.71	0.68	14.29	17.68	2.32	0.58	12.28	15.19	2.56	0.64	13.50	16.69
11	PCPT_NSB_16	0.32	0.07	5.11	5.50	0.31	0.07	4.96	5.34	0.26	0.06	4.25	4.57	0.29	0.07	4.68	5.04
12	PCPT_NSB_17	1.66	1.21	4.22	7.10	1.62	1.18	4.10	6.89	1.39	1.01	3.51	5.91	1.53	1.11	3.87	6.50
13	PCPT_NSB_19	0.01	0.27	5.02	5.29	0.00	0.26	4.87	5.14	0.00	0.22	4.18	4.40	0.00	0.24	4.60	4.85
14	PCPT_NSB_20	0.56	1.45	1.58	3.60	0.55	1.41	1.53	3.49	0.47	1.21	1.31	2.99	0.52	1.33	1.45	3.29
15	PCPT_NSB_23	0.95	0.90	3.81	5.66	0.92	0.88	3.70	5.50	0.79	0.75	3.16	4.70	0.87	0.83	3.49	5.18
16	PCPT_NSB_24	0.72	2.52	0.80	4.04	0.69	2.44	0.78	3.92	0.59	2.08	0.66	3.33	0.65	2.30	0.73	3.68
18	PCPT_NSB_26	0.13	0.87	0.36	1.37	0.13	0.84	0.35	1.33	0.11	0.72	0.30	1.13	0.12	0.79	0.33	1.25
19	PCPT_NSB_27	0	0.01	0.07	0.08	0	0.01	0.07	0.08	0	0.01	0.06	0.07	0	0.01	0.06	0.07
21	PCPT_NSB_30	0.62	1.87	0.55	3.04	0.60	1.81	0.54	2.94	0.51	1.53	0.45	2.49	0.57	1.70	0.50	2.76
25	PCPT_NSB_46	0.06	0.27	0.92	1.25	0.06	0.26	0.89	1.21	0.05	0.22	0.76	1.02	0.05	0.24	0.84	1.13
27	PCPT_NSB_48	0	0.04	0	0.04	0	0.04	0	0.04	0	0.03	0	0.03	0	0.04	0	0.04
34	PCPT_NSB_57	6.97	0	29.30	36.26	6.76	0	28.42	35.18	5.77	0	24.29	30.07	6.37	0	26.79	33.16
35	PCPT_NSB_58	1.40	0.19	11.15	12.73	1.36	0.19	10.81	12.35	1.16	0.16	9.24	10.56	1.28	0.17	10.19	11.64
36	PCPT_NSB_59	3.60	0.62	9.68	13.89	3.49	0.60	9.39	13.48	2.99	0.51	8.04	11.54	3.30	0.56	8.86	12.72
37	PCPT_NSB_60	1.10	0.22	8.09	9.41	1.07	0.22	7.85	9.14	0.92	0.18	6.72	7.82	1.01	0.20	7.40	8.62
38	PCPT_NSB_61	0.60	0.43	4.16	5.18	0.58	0.42	4.04	5.03	0.50	0.36	3.46	4.31	0.55	0.39	3.81	4.75
39	PCPT_NSB_62	0.01	0.49	0.25	0.74	0.01	0.47	0.24	0.72	0.01	0.40	0.21	0.62	0.01	0.44	0.23	0.68
40	PCPT_NSB_63	1.26	1.82	2.19	5.27	1.22	1.77	2.12	5.11	1.05	1.51	1.81	4.37	1.15	1.67	2.00	4.82
41	PCPT_NSB_65	0.38	1.00	1.31	2.69	0.37	0.97	1.27	2.61	0.31	0.83	1.09	2.24	0.34	0.92	1.20	2.46
42	PCPT_NSB_66	0.19	0.27	2.89	3.35	0.19	0.26	2.80	3.25	0.16	0.22	2.40	2.78	0.18	0.24	2.64	3.06

Table S8. Summary of cumulative $n_{INP,sv}(T)$ compared to cumulative $n_{INP,pcpt}(T)$ at four different Ts.

T	Average $n_{INP,sv}(T)$ [L^{-1}]				Average nINP,pcpt(T) ± Std. Error [L-1]
	$M_{sv,gl}$	$M_{sv,bc\_0.5km}$	$M_{sv,bc\_3.0km}$	$M_{sv,cm}$	
-10 °C	1.05 x 10^{-3}	1.02 x 10^{-3}	0.87 x 10^{-3}	0.96 x 10^{-3}	0.17 ± 0.05
-15 °C	3.93 x 10^{-3}	3.81 x 10^{-3}	3.26 x 10^{-3}	3.60 x 10^{-3}	0.48 ± 0.10
-20 °C	7.05 x 10^{-2}	6.84 x 10^{-2}	5.86 x 10^{-2}	6.45 x 10^{-2}	3.46 ± 0.66
-25 °C	2.06	2.00	1.71	1.89	74.74 ± 28.28

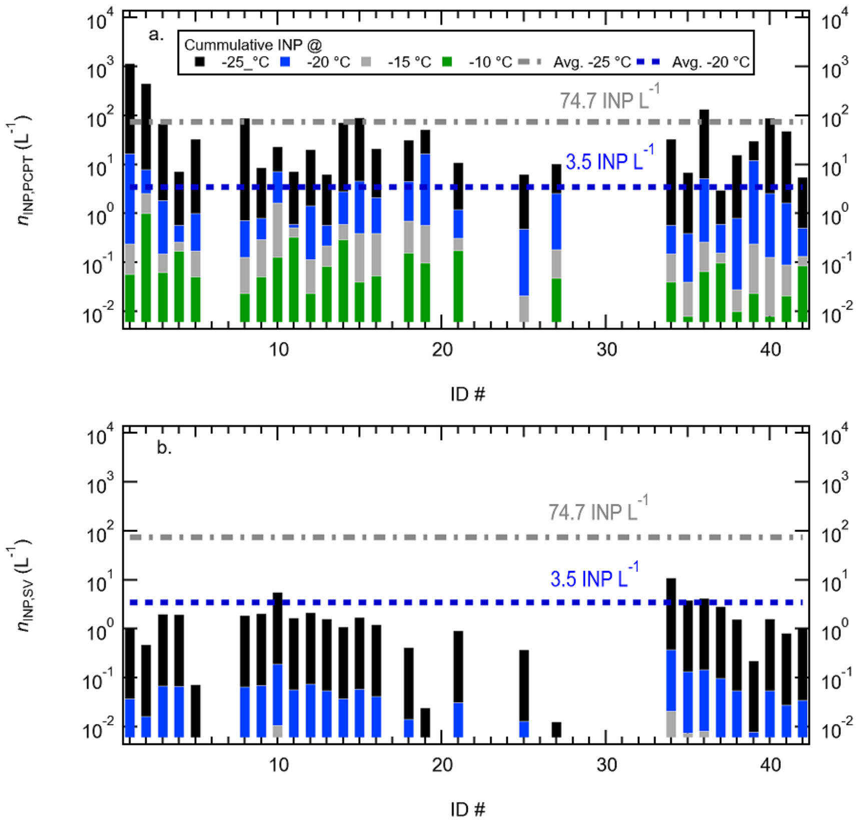
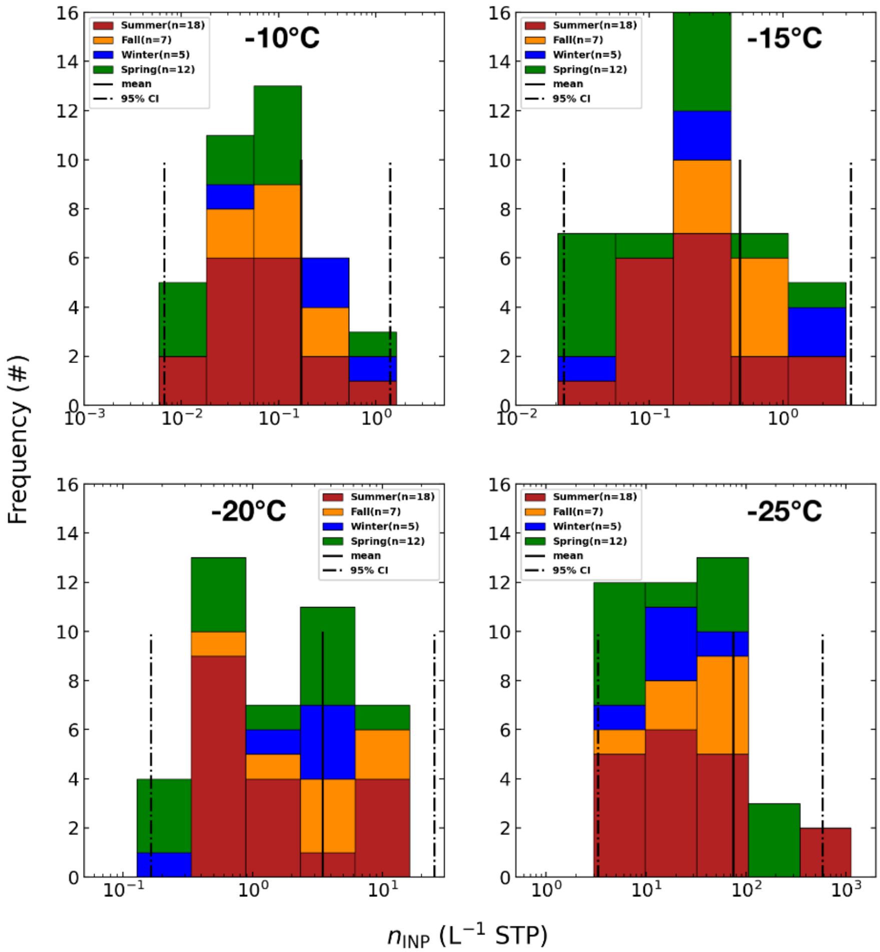


Figure S3. (a) Time series of cumulative n_{INP} (L^{-1} air) in each precipitation sample (ID# shown on the x-axis) at different temperatures. (b) Estimated $n_{\mathrm{INP,SV}}$ for a total of 28 samples analyzed based on $M_{sv,cm}$. All data above our n_{INP} detection limit of > 0.006 L^{-1} are shown. The average n_{INP} values at -25 °C (74.7 L^{-1}) and -20 °C (3.5 L^{-1}) in all precipitation samples are shown to guide the reader's eye.

S5. $n_{INP}(T)$ distribution histogram

We analyzed the $n_{INP}(T)$ distribution histogram, categorized based on the season, precipitation type, and precipitation intensity, at -10, -15, -20, and -25 °C. The results are presented in **Figs. S4-6**. Briefly, we first binned our n_{INP} values at each temperature (i.e., -10, -15, -20, and -25 °C) into five equally sized bins by dividing the n_{INP} range (i.e., max - min) at that temperature by the number six. Subsequently, we visualized the frequency distribution of n_{INP} across different bins on a log scale based on the meteorological season in the U.S. (**Fig. S4**), precipitation type (**Fig. S5**), and maximum precipitation intensity (**Fig. S6**). From these results combined with other findings within this study, we found the followings:

- While no clear seasonal variations of n_{INP} values were apparent in part due to the limited number of samples, the analysis of yearlong ground level precipitation observation as well as INPs in the precipitation samples showed that the highest n_{INP} at -25 °C of 1,130 INP L^{-1} coincided with a hail-involved severe thunderstorm event in the summer,
- The lowest cumulative INP at the same temperature, 3.0 INP L^{-1}, was also found in one of our hail/thunderstorm samples collected during the summer, but the second lowest (3.0 INP L^{-1}) was found from a snow sample collected in the winter, and
- Cumulative n_{INP} in our precipitation samples below -20 °C could be high in the samples collected while observing > 10 mm hr^{-1} precipitation with notably large hydrometeor sizes (i.e., the size in ID# 1 = Sample# 1 > ID #37 = Sample# 60; see **Fig. 2b**).



255 **Figure S4.** The $n_{INP}(T)$ distribution histogram over different *T*s. The histogram frequency is color-categorized for different meteorological seasons (see **Table S1**). The vertical dashed lines and solid line represent 95% confidence intervals and mean $n_{INP}(T)$ value, respectively.

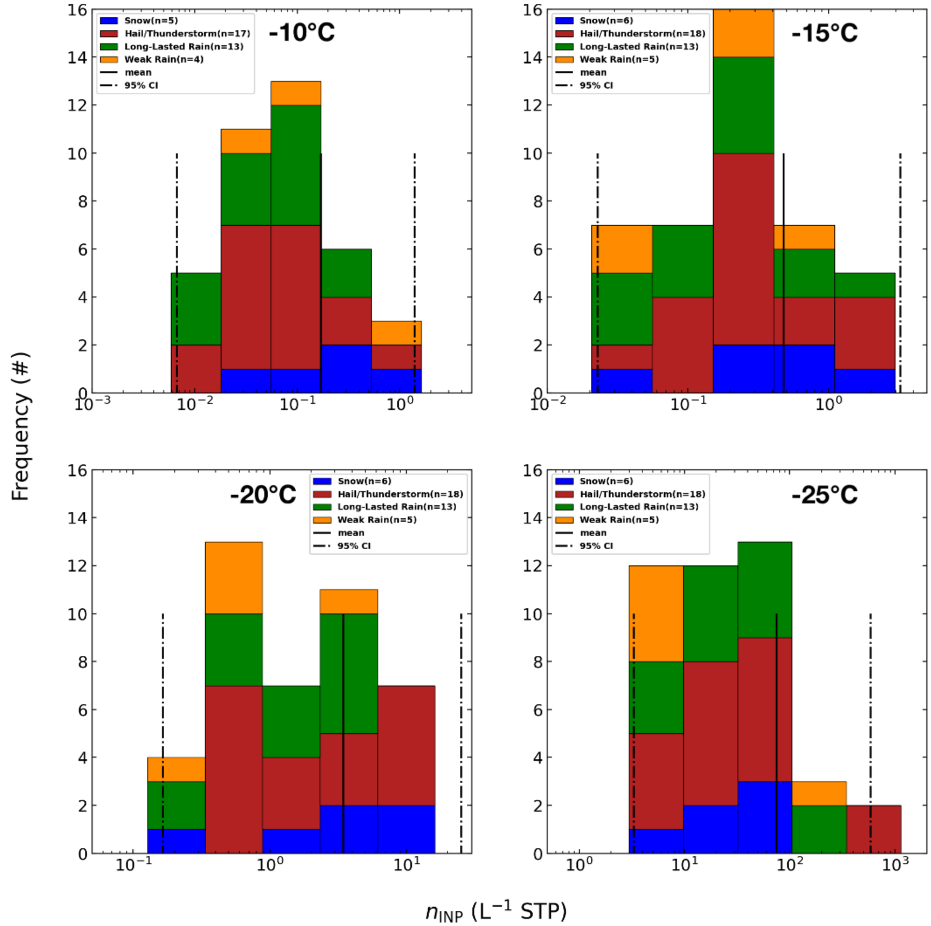


Figure S5. The $n_{\text{INP}}(T)$ distribution over different Ts. The histogram frequency is color-categorized for different types of precipitation, including snow, hail/thunderstorm rain, long-lasted ran, and weak rain, observed at the ground level (see **Table S2**).

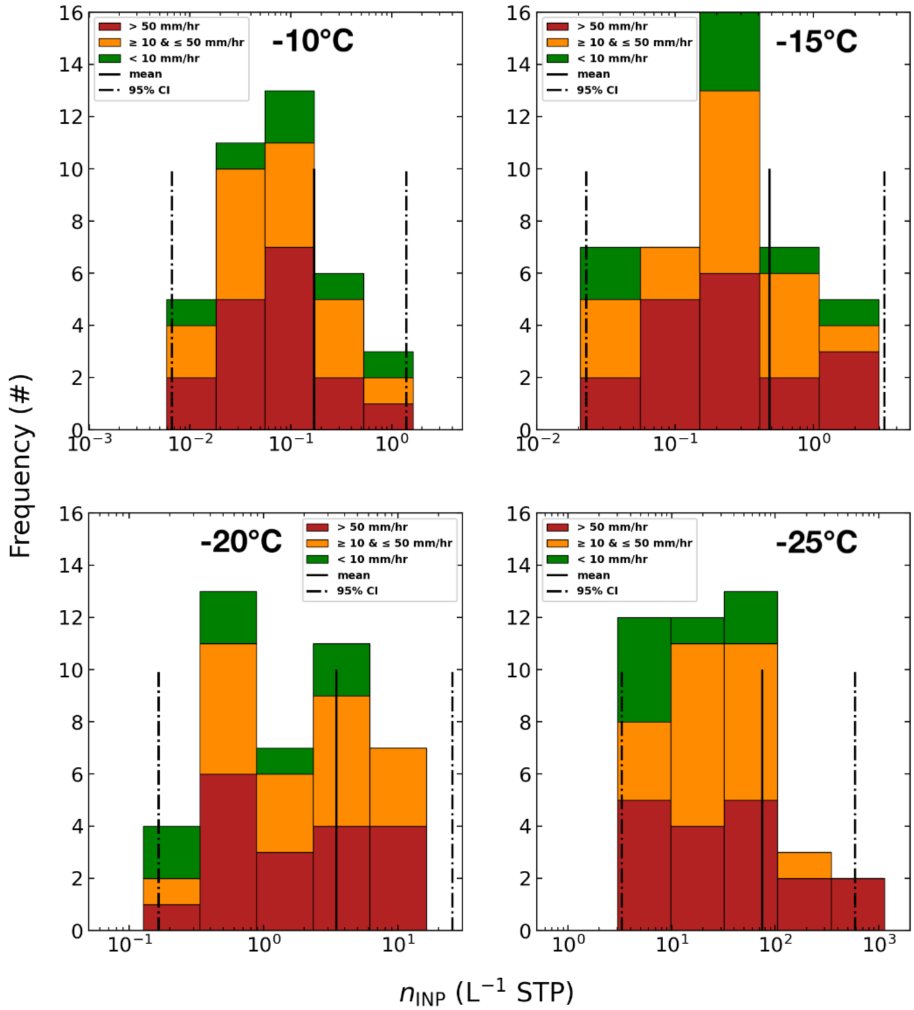


Figure S6. The $n_{INP}(T)$ distribution histogram color-categorized based on three maximum precipitation intensity categories, < 10 mm hr^{-1}, 10-50 mm hr^{-1}, and > 50 mm hr^{-1} (see **Table S2**).

Table S9. Abundance of major bacterial orders in precipitation samples. Numbers indicate percentage of the OTUs/ASVs for each order in the total bacterial microbiome. 'Bkgr' represents the 24-hour dry deposition blank sample (Sample# 34). Our cattle feedyard samples were collected locally on March 28, 2019 (1), July 22, 2018 (2), July 23, 2018 (3), and July 24, 2018 (4) – see Hiranuma et al. (2020). PCPT 1-4 corresponds to our Sample# 1, 2, 50, and 7, respectively.

Sample Type Taxonomy	PCPT 1	PCPT 2	PCPT 3	PCPT 4	Feedyard 2	Feedyard 1	Feedyard 3	Feedyard 4	24-hour dry-deposition blank
Bacteria; Unclassified	2.6%	0.0%	0.0%	0.0%	0.5%	0.0%	1.3%	0.0%	2.8%
Bacteria; Unclassified	0.0%	0.0%	0.8%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Acidobacteria; Solibacteres; Solibacterales; Bryobacteraceae	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%	0.0%	0.0%
Bacteria; Actinobacteria; Actinobacteria; Actinomycetales	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	0.0%	0.0%	0.0%
Bacteria; Actinobacteria; Actinobacteria; Actinomycetales; Actinosynnemataceae	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	13.4%
Bacteria; Actinobacteria; Actinobacteria; Actinomycetales; Geodermatophilaceae; Blastococcus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.4%
Bacteria; Actinobacteria; Actinobacteria; Actinomycetales; Microbacteriaceae; Labedella	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%
Bacteria; Actinobacteria; Actinobacteria; Actinomycetales; Microbacteriaceae; Leifsonia	0.2%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	4.1%
Bacteria; Actinobacteria; Actinobacteria; Actinomycetales; Micrococcaceae; Arthrobacter	0.0%	0.0%	0.0%	1.6%	0.0%	3.0%	0.0%	0.0%	0.0%
Bacteria; Actinobacteria; Actinobacteria; Actinomycetales; Nocardiaceae	0.0%	0.0%	0.0%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Actinobacteria; Actinobacteria; Actinomycetales; Nocardiaceae; Rhodococcus	0.0%	0.0%	0.0%	0.0%	2.1%	1.4%	0.0%	0.0%	0.0%
Bacteria; Actinobacteria; Actinobacteria; Actinomycetales; Nocardioidaceae; Marmoricola	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.0%
Bacteria; Actinobacteria; Actinobacteria; Actinomycetales; Nocardioidaceae; Nocardioides	0.0%	0.0%	0.0%	1.1%	3.5%	0.0%	0.1%	0.0%	0.0%
Bacteria; Actinobacteria; Thermoleophilia; Solirubrobacterales; Patulibacteraceae	0.0%	1.5%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Actinobacteria; Thermoleophilia; Solirubrobacterales; Patulibacteraceae; Patulibacter	0.6%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Armatimonadetes	0.0%	0.0%	0.0%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Armatimonadetes; Armatimonadia; Armatimonadales; Armatimonadaceae	0.0%	6.5%	0.0%	3.9%	0.0%	0.0%	0.0%	6.0%	0.0%
Bacteria; Armatimonadetes; Armatimonadia; Armatimonadales; Armatimonadaceae	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Armatimonadetes; Fimbriimonadia; Fimbriimonadales; Fimbriimonadaceae; Fimbriimonas	0.0%	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Bacteroidetes	0.0%	0.0%	0.0%	3.2%	1.0%	0.0%	13.7%	0.0%	0.0%
Bacteria; Bacteroidetes; Bacteroidia; Bacteroidales	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	9.5%	0.0%
Bacteria; Bacteroidetes; Cytophagia; Cytophagales	0.0%	0.8%	0.0%	5.6%	0.0%	0.0%	0.0%	4.0%	0.0%
Bacteria; Bacteroidetes; Cytophagia; Cytophagales; Cyclobacteriaceae	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%
Bacteria; Bacteroidetes; Cytophagia; Cytophagales; Cytophagaceae; Hymenobacter	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Bacteroidetes; Cytophagia; Cytophagales; Cytophagaceae; Rhodocytophaga	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.2%
Bacteria; Bacteroidetes; Cytophagia; Cytophagales; Cytophagaceae; Rudanella	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Bacteroidetes; Cytophagia; Cytophagales; Cytophagaceae; Spirosoma	2.3%	6.8%	0.0%	3.8%	0.0%	0.0%	0.0%	0.0%	5.6%
Bacteria; Bacteroidetes; Cytophagia; Cytophagales; Cytophagaceae; Sporocytophaga	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%
Bacteria; Bacteroidetes; Cytophagia; Cytophagales; Flammeovirgaceae	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%	0.0%
Bacteria; Bacteroidetes; Cytophagia; Cytophagales; Flammeovirgaceae; Marinoscillum	8.7%	3.2%	17.3%	8.5%	8.4%	3.0%	6.2%	5.5%	0.0%
Bacteria; Bacteroidetes; Flavobacteriia; Flavobacteriales; Flavobacteriaceae	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	5.5%	0.0%	0.0%
Bacteria; Bacteroidetes; Flavobacteriia; Flavobacteriales; Flavobacteriaceae; Flavobacterium	0.0%	0.0%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Bacteroidetes; Flavobacteriia; Flavobacteriales; Flavobacteriaceae; Persicivirga	0.0%	0.0%	0.0%	0.0%	6.8%	0.0%	2.1%	0.0%	0.0%
Bacteria; Bacteroidetes; Flavobacteriia; Flavobacteriales; Weeksellaceae	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%	0.0%	0.0%	0.0%
Bacteria; Bacteroidetes; Flavobacteriia; Flavobacteriales; Weeksellaceae; Elizabethkingia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.1%	0.0%	0.0%
Bacteria; Bacteroidetes; Sphingobacteriia; Sphingobacteriales; Sphingobacteriaceae; Mucilaginibacter	0.0%	0.0%	5.8%	0.0%	0.0%	0.0%	3.6%	0.0%	0.0%
Bacteria; Bacteroidetes; Sphingobacteriia; Sphingobacteriales; Sphingobacteriaceae; Pedobacter	3.2%	0.0%	1.8%	5.3%	1.0%	0.0%	6.6%	0.0%	0.0%
Bacteria; Bacteroidetes; Saprospirae; Saprospirales; Chitinophagaceae	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%	1.1%	9.7%	1.1%
Bacteria; Bacteroidetes; Saprospirae; Saprospirales; Chitinophagaceae; Ferruginibacter	0.0%	0.0%	0.0%	0.0%	5.3%	0.0%	0.0%	0.0%	0.0%

Table S9. Abundance of major bacterial orders in precipitation samples. Numbers indicate percentage of the OTUs/ASVs for each order in the total bacterial microbiome – continued.

Sample Type / Taxonomy	PCPT 1	PCPT 2	PCPT 3	PCPT 4	Feedyard 2	Feedyard 1	Feedyard 3	Feedyard 4	24-hour dry-deposition blank
Bacteria; Bacteroidetes; Saprospirae; Saprospirales; Chitinophagaceae; Filimonas	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	0.0%	0.0%
Bacteria; Bacteroidetes; Saprospirae; Saprospirales; Chitinophagaceae; Parasegitibacter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%	0.0%	0.0%
Bacteria; Bacteroidetes; Saprospirae; Saprospirales; Chitinophagaceae; Trachelomonas	3.9%	0.0%	0.0%	9.5%	0.0%	0.0%	0.0%	0.0%	8.2%
Bacteria; Chlorobi	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Cyanobacteria	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
Bacteria; FBP	0.0%	0.0%	0.0%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Firmicutes; Bacilli; Bacillales	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	0.0%	0.0%
Bacteria; Firmicutes; Bacilli; Bacillales; Bacillaceae	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	1.1%	0.0%	0.0%
Bacteria; Firmicutes; Bacilli; Bacillales; Bacillaceae; Bacillus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.8%	0.0%	0.0%
Bacteria; Firmicutes; Bacilli; Bacillales; Planococcaceae	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%	0.0%	0.0%
Bacteria; Firmicutes; Bacilli; Lactobacillales; Aerococcaceae; Lacticigenium	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%
Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae; Clostridium	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	0.7%	0.0%	0.0%
Bacteria; Gemmatimonadetes; Gemm-3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%
Bacteria; Gemmatimonadetes; Gemmatimonadetes; Gemmatimonadales	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%
Bacteria; Gemmatimonadetes; Gemmatimonadetes; Gemmatimonadales; Ellin5301	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Gemmatimonadetes; Gemmatimonadetes; Gemmatimonadales; Gemmatimonadaceae; Gemmatimonas	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Bacteria; Planctomycetes; Phycisphaerae	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Planctomycetes; Planctomycetia; Gemmatales; Isosphaeraceae	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Planctomycetes; Planctomycetia; Gemmatales; Isosphaeraceae; Nostocoida	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%
Bacteria; Proteobacteria	8.3%	8.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%	3.1%	17.7%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Caulobacterales; Caulobacteraceae	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.6%
Bacteria; Proteobacteria; Alphaproteobacteria; Caulobacterales; Caulobacteraceae; Arthrospira	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Caulobacterales; Caulobacteraceae; Brevundimonas	6.2%	15.0%	0.0%	0.0%	1.2%	0.0%	4.5%	19.7%	2.8%
Bacteria; Proteobacteria; Alphaproteobacteria; Caulobacterales; Caulobacteraceae; Caulobacter	2.5%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Rhizobiales	2.8%	0.0%	0.0%	5.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Rhizobiales; Aurantimonadaceae; Aurantimonas	0.0%	0.8%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Rhizobiales; Beijerinckiaceae	0.0%	0.0%	0.0%	3.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Rhizobiales; Bradyrhizobiaceae	1.8%	2.4%	0.0%	3.5%	0.0%	0.0%	0.0%	0.0%	0.3%
Bacteria; Proteobacteria; Alphaproteobacteria; Rhizobiales; Phyllobacteriaceae	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Rhizobiales; Rhizobiaceae; Rhizobium	3.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Rhizobiales; Xanthobacteraceae	0.0%	1.6%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Rhizobiales; Xanthobacteraceae; Ancylobacter	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Rhodobacterales; Rhodobacteraceae	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Rhodospirillales; Acetobacteraceae	1.8%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%
Bacteria; Proteobacteria; Alphaproteobacteria; Rhodospirillales; Acetobacteraceae; Roseomonas	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.1%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Sphingomonadales	3.5%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table S9. Abundance of major bacterial orders in precipitation samples. Numbers indicate percentage of the OTUs/ASVs for each order in the total bacterial microbiome – continued.

Sample Type	PCPT 1	PCPT 2	PCPT 3	PCPT 4	Feedyard 2	Feedyard 1	Feedyard 3	Feedyard 4	24-hour dry-deposition blank
Taxonomy									
Bacteria; Proteobacteria; Alphaproteobacteria; Sphingomonadales; Erythrobacteraceae	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%
Bacteria; Proteobacteria; Alphaproteobacteria; Sphingomonadales; Erythrobacteraceae; Porphyrobacter	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Sphingomonadales; Sphingomonadaceae	0.0%	4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.5%
Bacteria; Proteobacteria; Alphaproteobacteria; Sphingomonadales; Sphingomonadaceae; Novosphingobium	4.2%	0.0%	5.1%	0.0%	0.0%	0.0%	0.5%	8.3%	0.0%
Bacteria; Proteobacteria; Alphaproteobacteria; Sphingomonadales; Sphingomonadaceae; Sphingomonas	0.7%	14.1%	7.4%	0.7%	0.0%	1.4%	0.0%	0.0%	2.1%
Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales; Comamonadaceae	8.8%	0.0%	5.9%	4.3%	0.0%	0.0%	0.3%	0.0%	5.9%
Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales; Comamonadaceae; Acidovorax	0.0%	0.0%	3.9%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%
Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales; Comamonadaceae; Pseudorhodoferax	0.0%	3.7%	0.0%	0.0%	7.4%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales; Oxalobacteraceae	4.1%	6.1%	19.4%	0.0%	6.7%	14.6%	0.0%	5.2%	0.0%
Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales; Oxalobacteraceae; Herminiimonas	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	0.0%	0.0%
Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales; Oxalobacteraceae; Massilia	13.9%	10.6%	8.4%	11.3%	53.9%	65.4%	6.5%	10.6%	0.9%
Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales; Oxalobacteraceae; Naxibacter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%
Bacteria; Proteobacteria; Deltaproteobacteria; Myxococcales	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Deltaproteobacteria; Myxococcales; OM27	5.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Deltaproteobacteria; Myxococcales; Polyangiaceae	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
Bacteria; Proteobacteria; Gammaproteobacteria; Alteromonadales; Alteromonadaceae; Gilvimarinus	0.0%	0.0%	11.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Gammaproteobacteria; Alteromonadales; OM60; Haliea	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%
Bacteria; Proteobacteria; Gammaproteobacteria; Enterobacteriales; Enterobacteriaceae; Pseudomonas	0.0%	0.0%	6.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Gammaproteobacteria; Legionellales	1.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bacteria; Proteobacteria; Gammaproteobacteria; Pseudomonadales; Moraxellaceae; Acinetobacter	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	0.4%	0.0%	0.0%
Bacteria; Proteobacteria; Gammaproteobacteria; Pseudomonadales; Pseudomonadaceae; Pseudomonas	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%
Bacteria; Proteobacteria; Gammaproteobacteria; Xanthomonadales; Xanthomonadaceae; Achromobacter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
Bacteria; Proteobacteria; Gammaproteobacteria; Xanthomonadales; Xanthomonadaceae; Lysobacter	0.0%	1.8%	0.0%	0.6%	0.0%	0.0%	0.0%	3.8%	0.0%
Bacteria; Thermi; Deinococci; Deinococcales; Deinococcaceae; Deinococcus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%
Bacteria; Verrucomicrobia; Opitutae; Opitutales; Opitutaceae; Opitutus	0.0%	0.0%	0.0%	0.9%	0.0%	0.0%	3.7%	0.0%	0.0%
Bacteria; Verrucomicrobia; Pedosphaerae; Pedosphaerales; Pedosphaeraceae	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	0.0%	0.0%
Bacteria; Verrucomicrobia; Spartobacteria; Chthoniobacterales; Chthoniobacteraceae	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%	0.0%	0.0%
Bacteria; Verrucomicrobia; Spartobacteria; Chthoniobacterales; Chthoniobacteraceae; Chthoniobacter	1.7%	0.0%	0.0%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%

Data Availability

Original data created for the study are or will be available in a persistent repository (pangaea.de) upon publication.

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