

Table S1 Sampling information of Erenhot.

Sample name	Start Time (UTC+8)	End Time (UTC+8)	Air condition	Time (min)	Volume (L)
ER3_30D	2016/3/30 8:40	2016/3/30 18:05	Dust	565	169.5
ER3_30N	2016/3/30 18:15	2016/3/31 8:15	Dust	840	252
ER3_31D1	2016/3/31 8:25	2016/3/31 13:25	Dust	300	90
ER3_31D2	2016/3/31 13:30	2016/3/31 15:30	Dust	120	36
ER3_31D3	2016/3/31 15:35	2016/3/31 17:30	Dust	115	34.5
ER3_31D4	2016/3/31 17:35	2016/3/31 19:37	Dust	122	36.6
ER3_31N	2016/3/31 21:45	2016/4/1 8:25	Dust	640	192
ER4_1	2016/4/1 8:40	2016/4/2 8:15	Non-dust	1415	424.5
ER4_2D	2016/4/2 8:23	2016/4/2 18:00	Non-dust	577	173.1
ER4_2N	2016/4/2 18:07	2016/4/3 8:14	Non-dust	847	254.1
ER4_3D	2016/4/3 8:20	2016/4/3 18:05	Non-dust	585	175.5
ER4_3N	2016/4/3 18:30	2016/4/4 17:40	Non-dust	1390	417
ER4_4N	2016/4/4 17:45	2016/4/5 8:17	Non-dust	872	261.6
ER4_5D	2016/4/5 8:20	2016/4/5 18:05	Non-dust	585	175.5
ER4_6D1	2016/4/6 8:15	2016/4/6 10:35	Dust	140	42
ER4_6D2	2016/4/6 10:45	2016/4/6 13:35	Dust	170	51
ER4_6D3	2016/4/6 13:45	2016/4/6 18:15	Dust	270	81
ER4_6N	2016/4/6 18:20	2016/4/7 8:25	Non-dust	845	253.5
ER4_7	2016/4/7 8:28	2016/4/8 8:15	Non-dust	1427	428.1
ER4_8	2016/4/8 8:20	2016/4/9 8:15	Non-dust	1435	430.5
ER4_9	2016/4/9 8:20	2016/4/10 8:15	Non-dust	1435	430.5
ER4_10D	2016/4/10 8:20	2016/4/10 18:40	Dust	620	186
ER4_10N	2016/4/10 18:45	2016/4/11 8:10	Non-dust	805	241.5
ER4_11D	2016/4/11 8:15	2016/4/11 18:10	Non-dust	595	178.5
ER4_11N	2016/4/11 18:15	2016/4/12 8:10	Non-dust	835	250.5
ER4_12D	2016/4/12 15:20	2016/4/12 17:20	Dust	120	36
ER4_13	2016/4/13 8:15	2016/4/14 8:10	Dust	1435	430.5
ER4_15D1	2016/4/15 8:03	2016/4/15 12:10	Dust	247	74.1
ER4_15D2	2016/4/15 12:15	2016/4/15 15:00	Dust	165	49.5
ER4_15D3	2016/4/15 15:10	2016/4/15 18:07	Dust	177	53.1
ER4_15N1	2016/4/15 18:12	2016/4/15 21:00	Dust	168	50.4
ER4_15N2	2016/4/15 21:05	2016/4/16 8:15	Non-dust	670	201
ER4_16	2016/4/16 8:20	2016/4/17 8:03	Non-dust	1423	426.9
ER4_18D	2016/4/18 8:00	2016/4/18 18:00	Non-dust	600	180
ER4_18N	2016/4/18 19:00	2016/4/19 8:50	Non-dust	830	249
ER4_19D	2016/4/19 8:55	2016/4/19 18:05	Non-dust	550	165
ER4_19N	2016/4/19 18:10	2016/4/20 8:00	Non-dust	830	249

ER4_20D	2016/4/20 8:05	2016/4/20 18:05	Dust	600	180
ER4_20N	2016/4/20 18:10	2016/4/21 12:00	Dust	1070	321
ER4_21D1	2016/4/21 12:10	2016/4/21 15:20	Dust	190	57
ER4_21D2	2016/4/21 16:00	2016/4/21 19:00	Dust	180	54
ER4_21N	2016/4/21 19:10	2016/4/22 9:00	Dust	830	249
ER4_22D	2016/4/22 9:05	2016/4/22 19:00	Non-dust	595	178.5
ER4_25N	2016/4/25 18:16	2016/4/26 7:35	Non-dust	799	239.7
ER4_26D	2016/4/26 8:05	2016/4/26 18:10	Non-dust	605	181.5
ER4_26N	2016/4/26 19:24	2016/4/27 7:12	Non-dust	708	212.4
ER4_30D1	2016/4/30 8:25	2016/4/30 12:01	Non-dust	216	64.8
ER4_30D2	2016/4/30 12:50	2016/4/30 15:54	Dust	184	55.2
ER4_30D3	2016/4/30 17:00	2016/4/30 20:11	Non-dust	191	57.3

Table S2 Sampling information of Zhangbei.

Sample name	Start Time (UTC+8)	End Time (UTC+8)	Air condition	Time (min)	Volume (L)
ZB3_29D	2016/3/29 6:58	2016/3/29 18:00	Non-dust	662	198.6
ZB3_29N	2016/3/29 18:36	2016/3/30 7:00	Non-dust	744	223.2
ZB3_30D	2016/3/30 7:27	2016/3/30 18:13	Non-dust	646	193.8
ZB3_30N	2016/3/30 19:00	2016/3/31 6:38	Non-dust	698	209.4
ZB3_31D	2016/3/31 7:15	2016/3/31 18:30	Non-dust	675	202.5
ZB3_31N	2016/3/31 18:40	2016/3/31 21:28	Dust	168	50.4
ZB4_1D	2016/4/1 7:02	2016/4/1 18:31	Non-dust	689	206.7
ZB4_1N	2016/4/1 18:38	2016/4/2 6:36	Non-dust	718	215.4
ZB4_2D	2016/4/2 6:45	2016/4/2 18:15	Non-dust	690	207
ZB4_2N	2016/4/2 18:21	2016/4/3 6:40	Non-dust	739	221.7
ZB4_3D	2016/4/3 6:49	2016/4/3 18:12	Non-dust	683	204.9
ZB4_3N	2016/4/3 18:26	2016/4/4 6:34	Non-dust	728	218.4
ZB4_4D	2016/4/4 6:41	2016/4/4 18:22	Non-dust	701	210.3
ZB4_4N	2016/4/4 18:28	2016/4/5 6:42	Non-dust	734	220.2
ZB4_5D	2016/4/5 6:50	2016/4/5 18:22	Non-dust	692	207.6
ZB4_5N	2016/4/5 18:31	2016/4/6 6:40	Non-dust	729	218.7
ZB4_6D	2016/4/6 6:50	2016/4/6 15:33	Dust	523	156.9
ZB4_6N	2016/4/6 15:41	2016/4/7 6:51	Dust	910	273
ZB4_7D	2016/4/7 6:57	2016/4/7 18:30	Non-dust	693	207.9
ZB4_7N	2016/4/7 18:36	2016/4/8 6:44	Non-dust	728	218.4
ZB4_8D	2016/4/8 6:50	2016/4/8 18:43	Non-dust	713	213.9
ZB4_9N	2016/4/9 18:24	2016/4/10 6:43	Non-dust	739	221.7
ZB4_10D	2016/4/10 6:50	2016/4/10 18:05	Non-dust	675	202.5
ZB4_10N	2016/4/10 18:11	2016/4/11 6:31	Non-dust	740	222

ZB4_11D	2016/4/11 6:40	2016/4/11 18:08	Non-dust	688	206.4
ZB4_12D	2016/4/12 8:34	2016/4/12 18:30	Non-dust	596	178.8
ZB4_12N	2016/4/12 18:40	2016/4/13 6:50	Non-dust	730	219
ZB4_13D	2016/4/13 6:58	2016/4/13 18:16	Non-dust	678	203.4
ZB4_13N	2016/4/13 18:26	2016/4/14 6:40	Non-dust	734	220.2
ZB4_14D	2016/4/14 6:51	2016/4/14 18:15	Non-dust	684	205.2
ZB4_14N	2016/4/14 18:24	2016/4/15 6:45	Non-dust	741	222.3
ZB4_15D	2016/4/15 6:53	2016/4/15 15:07	Non-dust	494	148.2
ZB4_16D	2016/4/16 7:07	2016/4/16 18:20	Non-dust	673	201.9
ZB4_16N	2016/4/16 18:28	2016/4/17 6:42	Non-dust	734	220.2
ZB4_17D	2016/4/17 6:52	2016/4/17 18:06	Non-dust	674	202.2
ZB4_17N	2016/4/17 18:17	2016/4/18 6:56	Non-dust	759	227.7
ZB4_18D	2016/4/18 7:05	2016/4/18 18:12	Non-dust	667	200.1
ZB4_18N	2016/4/18 18:20	2016/4/19 6:41	Non-dust	741	222.3
ZB4_19D	2016/4/19 6:52	2016/4/19 17:36	Non-dust	644	193.2
ZB4_19N	2016/4/19 18:29	2016/4/20 7:00	Non-dust	751	225.3
ZB4_20D	2016/4/20 7:10	2016/4/20 18:15	Non-dust	665	199.5
ZB4_20N	2016/4/20 18:25	2016/4/21 6:50	Non-dust	745	223.5
ZB4_21D	2016/4/21 7:00	2016/4/21 18:19	Dust	679	203.7
ZB4_21N	2016/4/21 18:47	2016/4/22 6:53	Non-dust	726	217.8
ZB4_22D	2016/4/22 7:50	2016/4/22 18:02	Non-dust	612	183.6
ZB4_22N	2016/4/22 19:03	2016/4/23 6:47	Non-dust	704	211.2

Table S3 Sampling information of R-DzToUb

Sample name	Sampling time (UTC+8)	Air condition	Time (min)	Volume (L)	Location
Dz5_5R100	2016/5/5 9:25 – 10:25	Dust	60	30	0km to 100km from Daranzadgad
Dz5_5R200	2016/5/5 10:56 – 11:56	Dust	60	30	100km to 200km from Daranzadgad
Dz5_5R300	2016/5/5 12:21 – 13:21	Dust	60	30	200km to 300km from Daranzadgad
Dz5_5R500	2016/5/5 15:43 – 16:43	Non-dust	60	30	300km to 400km from Daranzadgad
Dz5_5R600	2016/5/5 17:05 – 18:05	Non-dust	60	30	500km to 600km from Daranzadgad

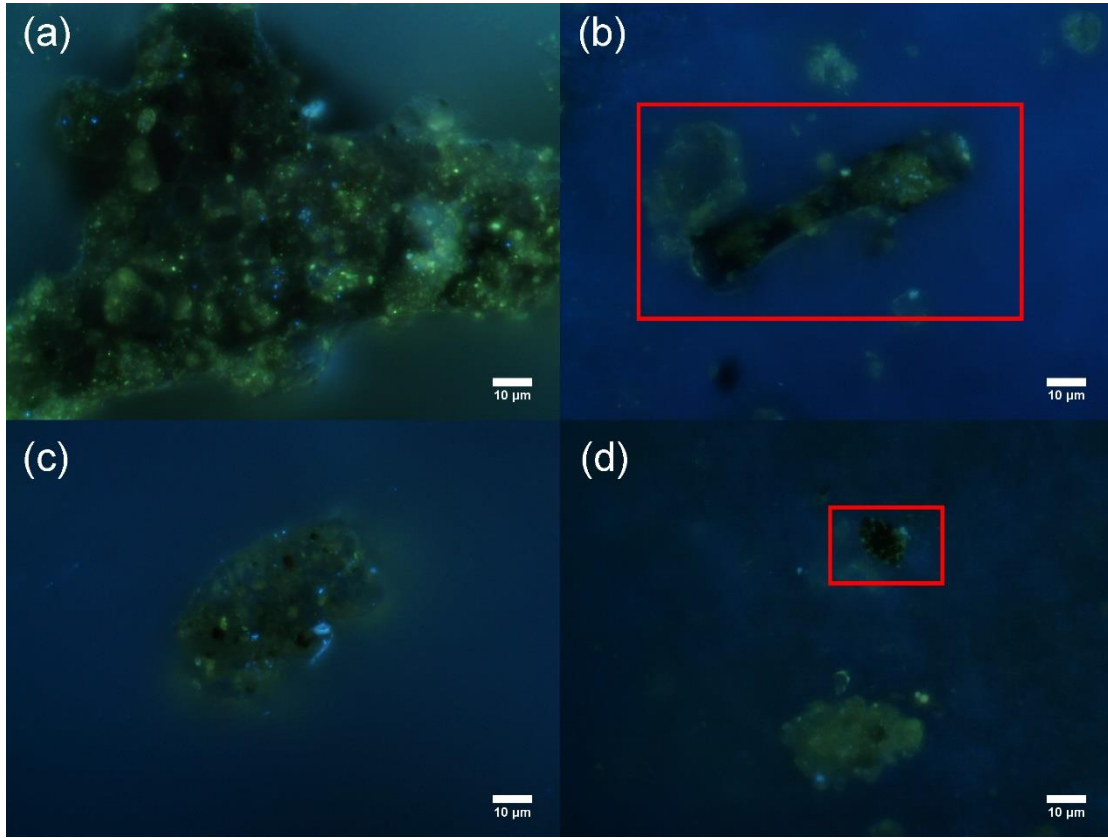


Fig. S4 Epifluorescence micrograph of mixed-type aerosols, (a) from the sample ER4 15D2, (b) and (d) from the sample ER4 11N, (c) from the sample ER4 15N1.

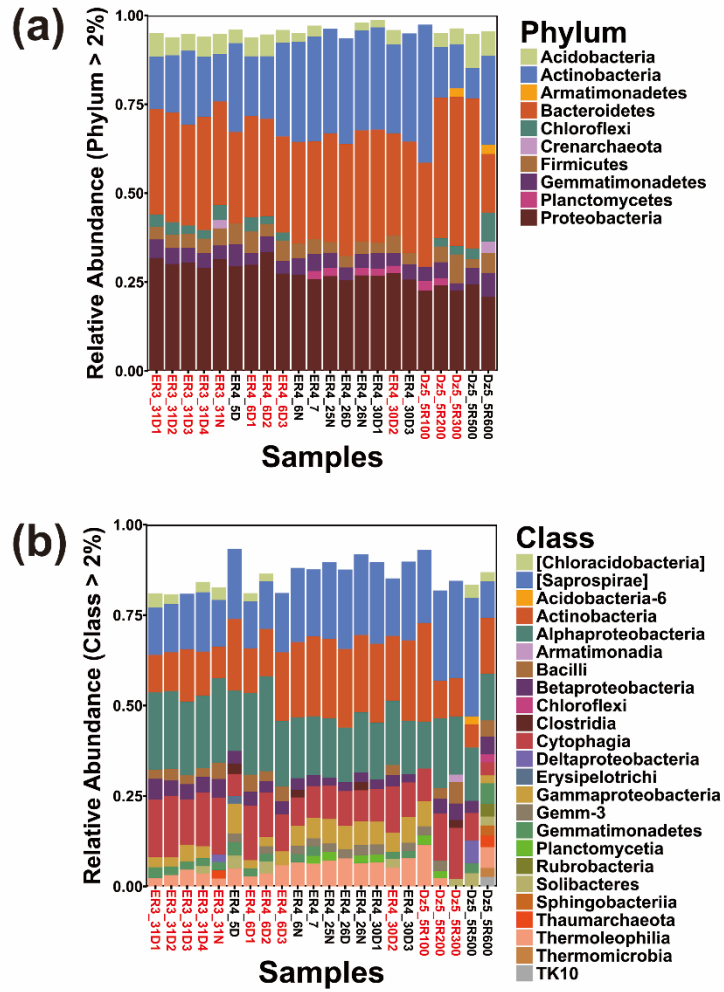


Fig. **S4-S5** Variations of the bacterial community composition at (a) the phylum level and (b) the class level in the dust (red font) and non-dust samples (black font).

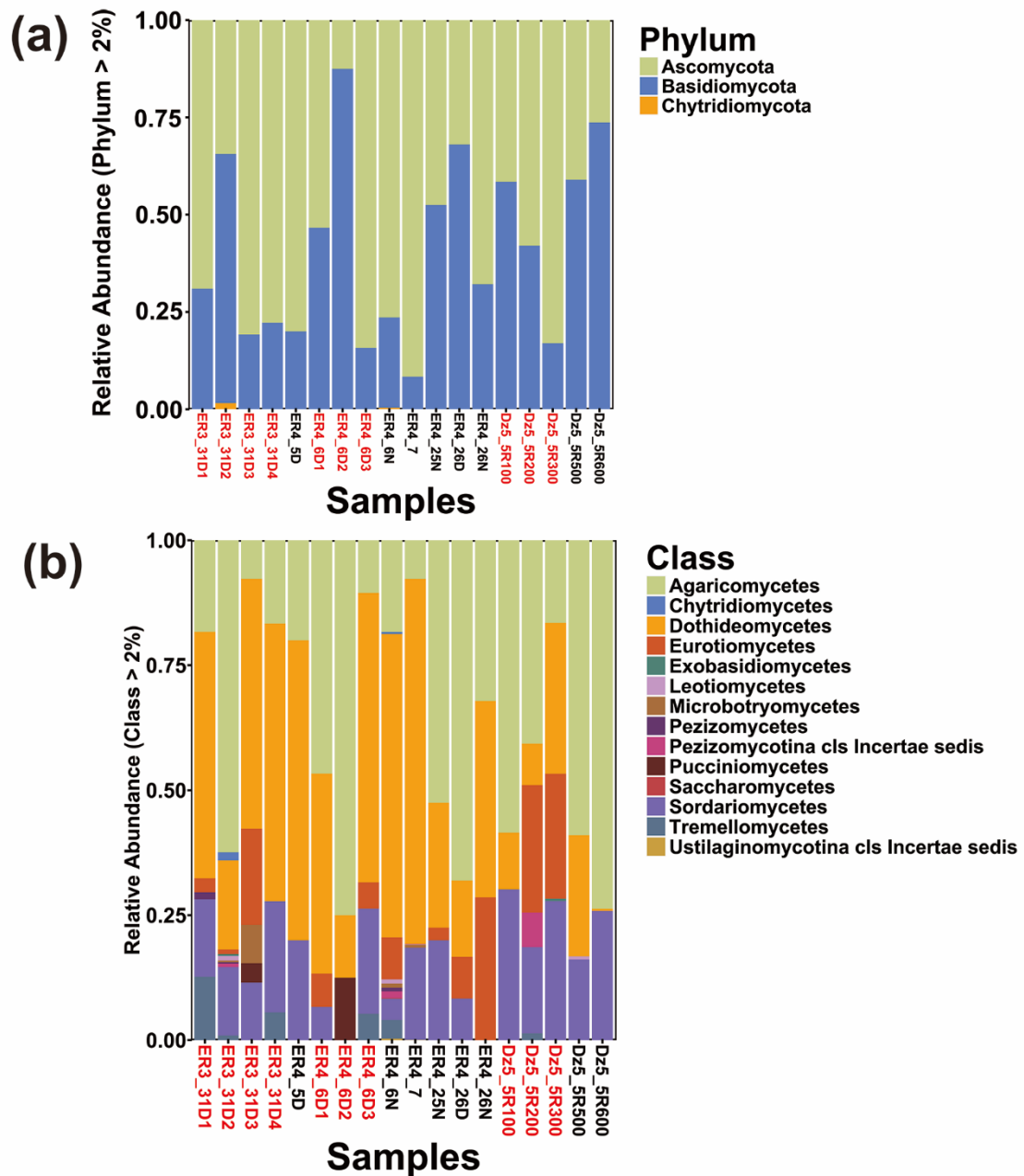


Fig. S5-S6 Variations of the fungal community composition at (a) the phylum level and (b) the class level in the dust (red font) and non-dust samples (black font).