



Supplement of

Characterization of the particle size distribution, mineralogy, and Fe mode of occurrence of dust-emitting sediments from the Mojave Desert, California, USA

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Supplementary

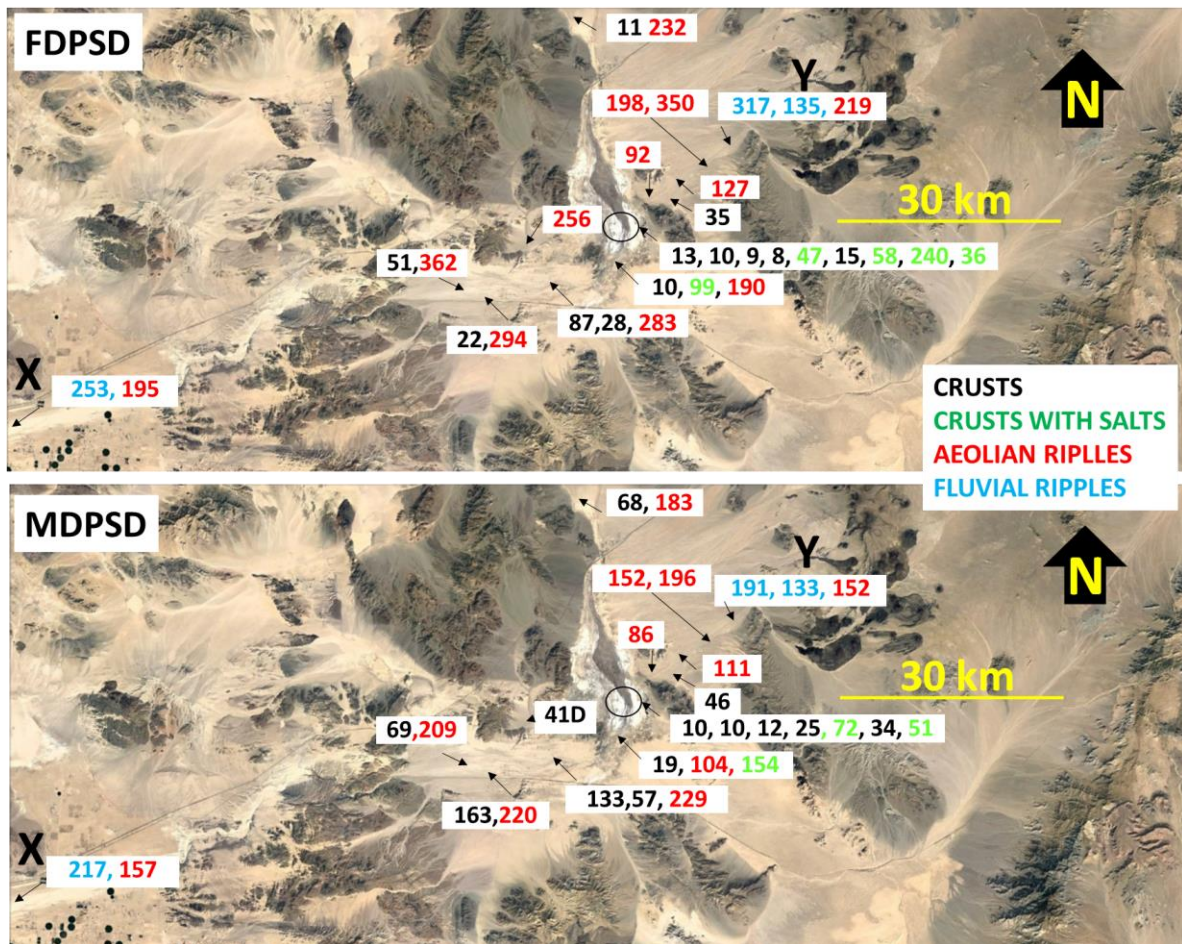


Figure S1: Soda Lake basin scale map with median particle diameter analysed with fully dispersed methodology (upper panel) and minimally dispersed methodology (lower panel) of different type of samples. Basemap: Imagery data from © Google Earth Pro v: 7.3.6.9345.

Table S1. Mean particle diameter from the samples of the Mojave Desert. N° indicates the number of the sample, Lat. is the latitude, Long. is the longitude. Type is the type of the sample being C: Crust and R: Ripple. Basin indicates the basin name where sample was obtained from. MDPSD is the minimally dispersed particle size distribution and FDPD is the Fully dispersed particle size distribution.

N°	Lat.	Long.	Type	Basin	mean diameter MDPSD (μm)	mean diameter FDPD (μm)
1	35.04	-116.24	C	Soda	69	51
2	35.04	-116.24	R	Soda	209	362
3	35.05	-116.19	C	Soda	163	22
4	35.04	-116.19	R	Soda	220	294
5	35.04	-116.19	C	Soda	133	87
6	35.04	-116.12	R	Soda	229	283
7	35.04	-116.12	C	Soda	57	28
8	35.04	-116.10	C	Soda	19	9.8
9	35.04	-116.10	C	Soda	104	99
10	35.04	-116.10	R	Soda	154	190
11	35.72	-115.58	C	Mesquite	64	91
12	35.72	-115.58	R	Mesquite	88	107
14	35.72	-115.61	C	Mesquite	313	46
15	35.72	-115.61	R	Mesquite	453	28
16	35.71	-115.61	C	Mesquite	138	16
17	35.71	-115.61	C	Mesquite	76	28
18	35.71	-115.61	C	Mesquite	35	14
19	35.70	-115.60	C	Mesquite	33	35
20	35.75	-115.61	C	Mesquite	180	11
21	35.54	-115.41	C	Ivanpah	30	12
22	35.34	-116.09	C	Soda	68	11
23	35.34	-116.09	R	Soda	183	232
24	35.21	-115.92	R	Soda	191	317

25	35.21	-115.92	R	Soda	133	135
26	35.20	-115.93	R	Soda	152	219
27	35.17	-115.98	R	Soda	152	198
28	35.17	-115.99	R	Soda	196	351
29	35.16	-116.03	R	Soda	111	127
30	35.16	-116.03	C	Soda	46	35
31	35.16	-116.03	C	Soda	86	92
32	35.16	-116.03	C	Soda	10	13
33	35.16	-116.04	C	Soda	10	10
34	35.16	-116.04	C	Soda	12	9.2
35	35.16	-116.04	C	Soda	25	8.4
36	35.16	-116.04	C	Soda	72	47
37	35.15	-116.06	C	Soda	34	15
38	35.14	-116.08	C	Soda	51	58
39	35.13	-116.10	C	Soda	Not An.	240
40	35.13	-116.10	C	Soda	Not An.	136
41	35.12	-116.11	R	Soda	211	256
42	35.13	-116.28	C	Cronese	24	9.4
43	35.13	-116.28	C	Cronese	42	9.5
44	35.13	-116.28	C	Cronese	67	8.2
45	35.12	-116.28	C	Cronese	82	6.6
46	35.11	-116.27	C	Cronese	49	20
47	35.11	-116.27	R	Cronese	165	147
48	35.14	-116.32	C	Cronese	123	13
49	35.14	-116.32	C	Cronese	71	5.5
50	35.14	-116.31	R	Cronese	220	77
51	35.14	-116.29	C	Cronese	279	325
52	35.14	-116.29	C	Cronese	167	4.9
53	35.07	-116.73	C	Coyote	79	8.4
54	35.07	-116.73	R	Coyote	153	156

55	34.91	-116.68	R	Soda	217	253
56	34.91	-116.68	R	Soda	157	195

Table S2. Summarised results of the % of mass from each dry sieved size fraction.

Fractions (% of total mass)	Sample	5	7	10	11	14	17	19	21	22	26
	Type	Crust	Crust	A. Ripple	Crust	Crust	Crust	Crust	Crust	Crust	A. Ripple
	250-500 μm	22	24	22	15	53	29	20	29	29	31
	80-250 μm	50	38	73	50	36	44	45	62	35	63
	63-80 μm	8,5	12	3,1	10	2,8	7,8	5,7	0,4	6,0	3,7
	40-63 μm	9,7	15	0,97	13	4,6	11	19	0,9	14,7	1,8
	20-40 μm	4,8	6,7	<0,1	8,2	2,3	5,5	6,2	2,8	8,1	0,89
<20 μm	4,8	3,7	<0,1	3,8	1,4	2,5	3,7	5,2	7,6	0,11	
Fractions (% of total mass)	Sample	32	35	38	42	46	48	50	52	53	55
	Type	Crust	Crust	Crust	Crust	Crust	Crust	A. Ripple	Crust	Crust	A. Ripple
	250-500 μm	21	21	12	34	15	44	36	44	35	35
	80-250 μm	73	67	66	54	68	49	60	47	56	64
	63-80 μm	0,32	2,8	4,4	0,42	2,5	1,1	0,58	1,9	2,1	1,0
	40-63 μm	1,7	5,8	9,9	2,9	7,7	4,9	1,5	3,9	4,8	0,47
	20-40 μm	2,6	3,2	5,8	4,2	3,1	0,26	1,0	1,6	2,1	<0,1
<20 μm	1,6	0,84	1,8	5,2	3,2	0,56	1,0	0,69	0,80	<0,1	

53	11.4	29.1	8.2	5.0	9.7	13.5	5.6	<0.1	8.5	7.2	<0.1	1.2	<0.1	<0.1	<0.1	<0.1	0.5
54	27.9	44.1	8.1	1.2	4.2	5.8	3.5	<0.1	2.3	2.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6
55	41.1	38.5	10.1	<0.1	3.0	2.5	4.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7
56	35.3	44.1	8.3	<0.1	0.8	4.5	6.5	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.2

Table S4. Summarised mineralogy of the dry sieved size fractions of 20 selected samples. The mineralogy results show weight %.

Nº	Fractions	Quartz	Feldspars	Carbonates	Clays	Amphibole	Zeolites	Na-Salts	Gypsum	Fe-Oxides
5	250-500 µm	37	46	2.0	13	1.9	<0.1	<0.1	<0.1	0.48
	80-250 µm	25	53	3.3	13	5.4	<0.1	<0.1	<0.1	1.2
	63-80 µm	19	54	2.4	14	8.5	<0.1	<0.1	<0.1	1.8
	40-63 µm	21	42	2.3	21	12	<0.1	<0.1	<0.1	1.7
	20-40 µm	16	45	4.1	26	8.0	<0.1	<0.1	<0.1	0.63
	<20 µm	19	34	7.2	35	3.4	<0.1	<0.1	<0.1	1.4
7	250-500 µm	15	35	4.6	34	2.9	4.9	<0.1	<0.1	3.7
	80-250 µm	20	32	3.0	33	4.8	4.8	<0.1	<0.1	2.3
	63-80 µm	16	29	3.8	38	6.8	4.8	<0.1	<0.1	2.0
	40-63 µm	14	34	4.1	36	4.7	4.8	<0.1	<0.1	2.2
	20-40 µm	11	38	4.2	39	3.0	3.1	<0.1	<0.1	2.0
	<20 µm	15	33	4.2	34	7.4	4.8	<0.1	<0.1	2.2
10	250-500 µm	59	35	0.36	4.1	0.41	<0.1	<0.1	<0.1	0.48
	80-250 µm	43	48	0.36	4.5	3.8	<0.1	<0.1	<0.1	0.18
	63-80 µm	24	54	1.3	10	9.9	<0.1	<0.1	<0.1	0.96
	40-63 µm	31	43	1.8	6.3	16	<0.1	<0.1	<0.1	2.8
11	250-500 µm	21	27	3.9	19	7.0	1	18	2.0	1.1
	80-250 µm	28	33	6.1	18	6.8	2	4.8	1.1	0.64
	63-80 µm	25	37	6.0	17	9.6	2	1.3	0.98	0.96
	40-63 µm	29	26	3.4	26	9.0	2	2.0	1.2	1.2
	20-40 µm	16	28	3.6	36	7.9	2	5.1	1.2	1.2
	<20 µm	7.1	21	5.0	51	3.8	2	6.8	0.72	1.9
14	250-500 µm	5.3	17	4.7	19	4.6	<0.1	8.5	37	4.0
	80-250 µm	2.3	29	5.7	16	5.0	<0.1	8.7	31	1.5
	63-80 µm	21	29	1.4	22	8.3	<0.1	8.3	9.7	0.24
	40-63 µm	17	35	4.3	18	6.6	<0.1	10	7.6	1.8
	20-40 µm	9.1	22	5.1	40	5.2	<0.1	13	4.7	1.2
17	250-500 µm	12	26	2.3	9	3.9	0.94	39	6.6	1.1
	80-250 µm	15	25	4.1	9	5.3	1	36	2.9	1.1
	63-80 µm	25	38	5.8	8	5.9	0.59	15	1.2	1.1
	40-63 µm	22	33	5.2	15	9.2	0.96	14	0.72	0.96
	20-40 µm	19	35	5.3	15	8.3	1.5	12	0.95	2.4
	<20 µm	14	37	7.8	25	5.9	1.4	6	0.59	1.7
19	250-500 µm	22	36	16	20	5.5	<0.1	<0.1	<0.1	1.3
	80-250 µm	33	32	11	16	6.9	<0.1	<0.1	<0.1	0.91
	63-80 µm	32	33	11	14	8.4	<0.1	<0.1	<0.1	1.4
	40-63 µm	29	35	6.9	20	6.8	<0.1	<0.1	<0.1	2.1
	20-40 µm	24	33	14	20	6.4	<0.1	<0.1	<0.1	2.9
	<20 µm	21	29	18	24	5.3	<0.1	<0.1	<0.1	2.8
21	250-500 µm	18	40	5.0	31	3.7	<0.1	<0.1	<0.1	2.4
	80-250 µm	24	36	3.9	29	3.6	<0.1	<0.1	<0.1	3.5
	63-80 µm	24	28	5.6	36	4.8	<0.1	<0.1	<0.1	1.9
	40-63 µm	20	37	6.9	26	7.3	<0.1	<0.1	<0.1	3.1
	20-40 µm	18	34	7.1	34	3.8	<0.1	<0.1	<0.1	3.1
	<20 µm	21	32	3.2	39	1.8	<0.1	<0.1	<0.1	3.2
22	250-500 µm	23	34	5.4	32	4.7	<0.1	<0.1	<0.1	1.8
	80-250 µm	20	44	4.3	22	7.7	<0.1	<0.1	<0.1	2.0
	63-80 µm	21	35	6.3	30	4.1	<0.1	<0.1	<0.1	4.0
	40-63 µm	20	34	6.4	31	4.0	<0.1	<0.1	<0.1	4.1
	20-40 µm	21	33	4.1	33	6.8	<0.1	<0.1	<0.1	2.4
	<20 µm	17	39	2.8	33	5.7	<0.1	<0.1	<0.1	2.5
26	250-500 µm	53	41	<0.1	5.2	0.71	<0.1	<0.1	<0.1	0.47
	80-250 µm	43	48	<0.1	5.8	2.6	<0.1	<0.1	<0.1	0.54
	63-80 µm	29	52	<0.1	8.2	11	<0.1	<0.1	<0.1	0.47
	40-63 µm	24	48	<0.1	14	11	<0.1	1	<0.1	1.6
32	250-500 µm	6.2	56	7.4	25	4.1	<0.1	<0.1	<0.1	1.9
	80-250 µm	17	50	5.5	21	5.2	<0.1	<0.1	<0.1	2.1
	63-80 µm	15	35	5.5	37	6.0	<0.1	<0.1	<0.1	1.1
	40-63 µm	9.0	58	6.5	18	7.2	<0.1	<0.1	<0.1	1.4
	20-40 µm	3.4	56	8.2	26	3.2	<0.1	<0.1	<0.1	2.9
	<20 µm	11	41	11	33	2.0	<0.1	<0.1	<0.1	1.6
35	250-500 µm	16	41	4.4	21	4.9	1.2	9.3	0.95	1.2
	80-250 µm	16	51	3.1	17	5.6	1.2	3.5	0.72	1.5

	63-80 μm	15	52	2.6	15	9.1	1.1	2.4	1.2	1.4
	40-63 μm	13	51	1.6	17	12	1.1	2.3	1.1	1.6
	20-40 μm	2.5	46	6.5	31	6.2	0.36	5.6	0.60	1.8
	<20 μm	6.8	37	8.2	36	3.1	2.5	3.9	0.48	1.4
38	250-500 μm	17	42	2.4	9.3	5.8	1.2	22	<0.1	0.67
	80-250 μm	19	54	1.9	9.0	8.4	0.84	5.9	<0.1	0.96
	63-80 μm	24	58	0.83	5.9	7.1	0.83	3.6	<0.1	0.36
	40-63 μm	23	47	2.8	8.5	10	1.3	5.8	<0.1	0.84
	20-40 μm	17	44	3.5	12	10	0.82	12	<0.1	1.1
	<20 μm	16	37	4.4	16	7.6	2.0	15	<0.1	1.4
42	250-500 μm	6.1	46	6.7	34	3.9	2.4	<0.1	<0.1	1.6
	80-250 μm	4.1	48	7.0	31	3.9	3.4	<0.1	<0.1	2.3
	63-80 μm	5.5	55	4.7	28	2.9	2.0	<0.1	<0.1	1.4
	40-63 μm	12	49	4.8	27	2.6	2.4	<0.1	<0.1	2.6
	20-40 μm	11	52	6.1	24	3.2	3.1	<0.1	<0.1	1.7
	<20 μm	16	44	6.2	26	3.6	2.9	<0.1	<0.1	1.4
46	250-500 μm	13	51	4.5	23	3.4	2.0	<0.1	<0.1	2.2
	80-250 μm	18	51	2.0	20	5.6	2.3	<0.1	<0.1	2.0
	63-80 μm	20	55	1.7	12	8.2	1.3	<0.1	<0.1	1.3
	40-63 μm	14	47	2.3	25	5.9	3.2	<0.1	<0.1	2.5
	20-40 μm	14	45	3.7	27	4.7	3.2	<0.1	<0.1	1.5
	<20 μm	17	47	5.6	22	4.4	2.6	<0.1	<0.1	1.9
48	250-500 μm	23	53	3.3	8.3	2.6	0.83	7.7	<0.1	1.3
	80-250 μm	18	52	1.9	13	4.8	0.74	9.5	<0.1	0.24
	63-80 μm	2.6	60	1.4	20	6.4	1.3	6.4	<0.1	1.5
	40-63 μm	6.5	42	5.8	21	8.0	3.1	11	<0.1	2.1
	20-40 μm	12	37	6.8	25	4.0	2.2	12	<0.1	1.4
	<20 μm	3.4	42	9.1	29	3.8	1.5	10	<0.1	0.95
50	250-500 μm	37	50	1.6	7.3	2.1	0.91	<0.1	<0.1	0.83
	80-250 μm	24	58	1.9	8.3	6.2	0.95	<0.1	<0.1	1.2
	63-80 μm	17	50	4.5	14	9.3	3.9	<0.1	<0.1	2.1
	40-63 μm	15	47	3.8	19	12	2.5	<0.1	<0.1	0.69
	20-40 μm	18	32	7.7	28	6.5	4.8	<0.1	<0.1	3.3
	<20 μm	13	39	11	28	3.2	4.2	<0.1	<0.1	1.4
52	250-500 μm	12	48	4.1	29	3.1	2.5	<0.1	<0.1	1.2
	80-250 μm	9.9	48	5.7	28	4.5	1.4	<0.1	<0.1	1.9
	63-80 μm	3.6	48	4.4	32	8.5	2.1	<0.1	<0.1	1.4
	40-63 μm	11	43	5.6	29	8.1	1.6	<0.1	<0.1	1.9
	20-40 μm	5.5	43	7.9	39	1.3	1.3	<0.1	<0.1	1.9
	<20 μm	13	42	7.4	31	1.7	2.0	<0.1	<0.1	3.4
53	250-500 μm	13	49	6.6	18	5.5	5.7	1.3	<0.1	0.60
	80-250 μm	18	43	4.7	16	10	6.0	1.1	<0.1	1.9
	63-80 μm	11	45	5.8	22	8.1	6.5	0.72	<0.1	1.1
	40-63 μm	9.3	47	5.1	24	8.5	5.6	0.45	<0.1	1.0
	20-40 μm	10	35	10	27	7.6	7.8	1.2	<0.1	1.3
	<20 μm	9.8	34	13	28	4.8	8.6	0.95	<0.1	1.3
55	250-500 μm	51	46	<0.1	2.6	0.46	<0.1	<0.1	<0.1	0.40
	80-250 μm	42	50	<0.1	5.5	1.9	<0.1	<0.1	<0.1	0.16
	63-80 μm	30	54	<0.1	3.7	12	<0.1	<0.1	<0.1	0.59
	40-63 μm	28	53	<0.1	5.1	13	<0.1	<0.1	<0.1	0.83

Table S5. Summarised results of the Fe mode of occurrence from Mojave Desert samples. N° is the sample number, FeT is the total Fe content in weight %, FeA is the exchangeable Fe and nano Fe oxides in weight %, FeD is the Fe in hematite and goethite in weight %, FeM is the Fe in magnetite in weight %, FeS is the Fe in Fe bearing minerals in weight %. The FeA %, FeD %, FeM %, FeS % are the percentage of Fe that is in that mode of occurrence according to the total Fe amount.

N°	FeT	FeA	FeD	FeM	FeS	FeA %	FeD %	FeM %	FeS %
1	3.64	0.06	0.473	0.038	3.069	1.6	13	1.0	84
2	1.38	0.02	0.207	0.016	1.137	1.4	15	1.2	82
3	3.09	0.06	0.467	0.028	2.535	1.9	15	0.92	82
4	1.36	0.02	0.181	0.015	1.144	1.5	13	1.1	84
5	2.54	0.04	0.347	0.022	2.131	1.6	14	0.87	84
6	1.19	0.02	0.146	0.021	1.003	1.7	12	1.8	84
7	5.24	0.21	0.839	0.096	4.095	4.0	16	1.8	78
8	3.4	0.05	0.492	0.066	2.792	1.5	14	1.9	82
9	2.08	0.05	0.27	0.036	1.724	2.4	13	1.7	83
10	1.38	0.017	0.165	0.02	1.178	1.2	12	1.4	85
11	2.02	0.019	0.323	0.086	1.592	0.94	16	4.3	79
12	1.77	0.025	0.331	0.079	1.335	1.4	19	4.5	75
14	0.77	0.026	0.163	0.025	0.556	3.4	21	3.2	72
15	0.28	0.016	0.057	0.012	0.195	5.7	20	4.3	70
16	1.06	0.029	0.257	0.051	0.723	2.7	24	4.8	68
17	1.4	0.021	0.281	0.035	1.063	1.5	20	2.5	76
18	2	0.031	0.434	0.098	1.437	1.6	22	4.9	72
19	2.18	0.021	0.481	0.042	1.636	0.96	22	1.9	75
20	1.72	0.022	0.313	0.071	1.314	1.3	18	4.1	76
21	4.85	0.068	1.429	0.04	3.313	1.4	29	0.82	68
22	4.37	0.054	0.693	0.081	3.542	1.2	16	1.9	81
23	2.45	0.019	0.324	0.112	1.995	0.78	13	4.6	81

24	1.48	0.021	0.144	0.096	1.219	1.4	9.7	6.5	82
25	2.22	0.021	0.228	0.014	1.957	0.95	10	0.63	88
26	1.37	0.01	0.134	0.046	1.18	0.73	9.8	3.4	86
27	2.04	0.012	0.182	0.013	1.833	0.59	8.9	0.64	90
28	1.12	0.011	0.107	0.024	0.978	0.98	9.6	2.1	87
29	1.52	0.015	0.161	0.029	1.315	0.99	11	1.9	87
30	3.07	0.036	0.418	0.041	2.575	1.2	14	1.3	84
31	2.5	0.024	0.315	0.03	2.131	0.96	13	1.2	85
32	3.79	0.03	0.577	0.057	3.126	0.79	15	1.5	82
33	4.01	0.034	0.572	0.031	3.373	0.85	14	0.77	84
34	3.72	0.029	0.561	0.064	3.066	0.78	15	1.7	82
35	3.78	0.043	0.565	0.035	3.137	1.14	15	0.93	83
36	2.73	0.026	0.374	0.057	2.273	0.95	14	2.1	83
37	4.15	0.083	0.588	0.059	3.42	2.0	14	1.4	82
38	2.34	0.041	0.306	0.029	1.964	1.8	13	1.2	84
39	0.56	0.005	0.037	0.014	0.504	0.89	6.6	2.5	90
40	0.52	0.004	0.044	0.007	0.465	0.77	8.5	1.3	89
41	0.8	0.005	0.067	0.031	0.697	0.62	8.4	3.9	87
42	3.63	0.108	0.891	0.098	2.533	3.0	25	2.7	70
43	4.69	0.102	0.811	0.095	3.682	2.2	17	2.0	79
44	5.15	0.113	0.945	0.099	3.993	2.2	18	1.9	78
45	5.26	0.125	0.961	0.1	4.074	2.4	18	1.9	77
46	4.26	0.106	0.643	0.044	3.467	2.5	15	1.0	81
47	3.41	0.055	0.243	0.026	3.086	1.6	7.1	0.76	90
48	2.81	0.049	0.43	0.076	2.255	1.7	15	2.7	80

49	3.55	0.064	0.614	0.052	2.82	1.8	17	1.5	79
50	2.09	0.028	0.327	0.042	1.693	1.3	16	2.0	81
51	1.25	0.014	0.253	0.061	0.922	1.1	20	4.9	74
52	2.09	0.099	1.05	0.102	0.839	4.7	50	4.9	40
53	3.52	0.065	0.501	0.085	2.869	1.8	14	2.4	82
54	1.25	0.043	0.319	0.037	0.851	3.4	26	3.0	68
55	3.52	0.017	0.12	0.006	3.377	0.48	3.4	0.17	96
56	5.29	0.021	0.164	0.024	5.081	0.40	3.1	0.45	96