Supplementary

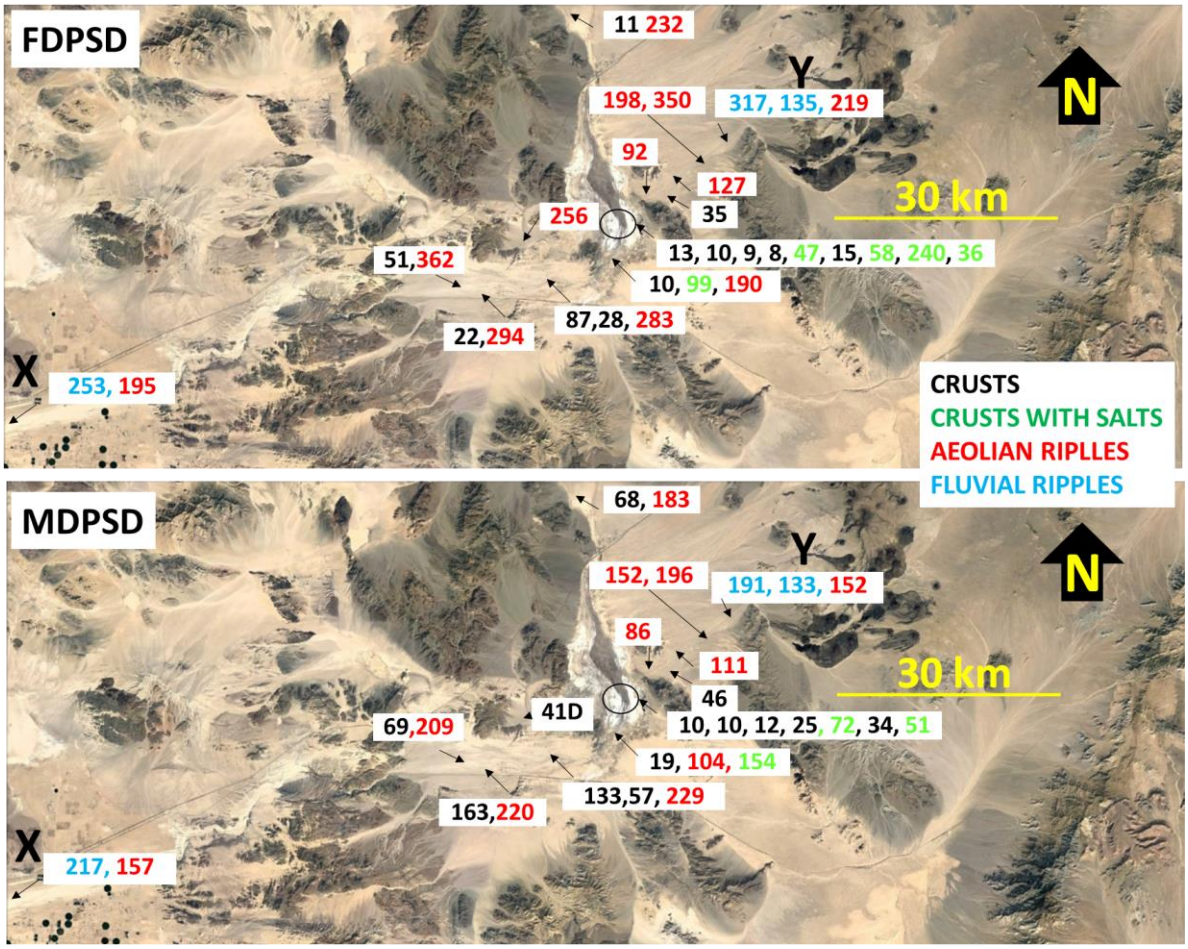

Figure S1: Soda Lake basin scale map with median particle diameter analysed with fully dispersed methodology (upper panel) and minimally dispersed methodology (lower panel) of different type of samples. Basemap: Imagery data from © Google Earth Pro v: 7.3.6.9345.

Table S1. Mean particle diameter from the samples of the Mojave Desert. Nº 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 FDPSD is the Fully dispersed particle size distribution.

Nº	Lat.	Long.	Type	Basin	mean diameter MDPSD (µm)	mean diameter FDPSD (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 mineralogy of the samples in the Mojave Desert. Qtz: Quartz, Ab: Albite/Anorthite, Mc: Microcline, Mnt/Clc/Vrm: Montmorillonite/clinochlore/vermiculite, Ill: Illite, Amp: Amphibole, Lmt: Laumontite, Anl: Analcime, Cal: Calcite, Dol: Dolomite, Hal: Halite, The: Thenardite, Tro: Trona, Bur: Burkeite, Gp: Gypsum, Mgh: Maghemite, Nº of sample indicates the sample number and can be correlated to other results with same nº of sample.

Nº	Qtz	Ab	Mc	Kln	Mnt/ Clc/ Vrm	Ill	Amp	Lmt	Anl	Cal	Dol	Hal	The	Tro	Bur	Gp	Mgh
1	25.6	30.1	8.6	3.7	4.4	18.0	2.5	<0.1	<0.1	5.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.6
2	37.8	38.3	12.0	1.0	1.7	4.6	2.9	<0.1	<0.1	1.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6
3	30.5	24.9	11.1	3.5	4.7	15.5	4.7	<0.1	<0.1	4.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7
4	39.1	34.6	11.2	1.1	2.7	5.6	3.9	<0.1	<0.1	1.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.8
5	31.9	33.6	8.9	2.0	6.0	11.2	4.5	<0.1	<0.1	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.1
6	38.2	38.2	9.6	0.8	2.8	4.6	5.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6
7	17.5	21.1	8.5	8.0	7.6	22.2	4.7	3.3	<0.1	4.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.2
8	17.6	28.7	9.8	4.6	10.0	15.3	4.1	1.6	<0.1	7.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7
9	29.4	34.6	8.7	1.2	3.8	5.8	6.9	<0.1	<0.1	2.3	<0.1	6.6	<0.1	<0.1	<0.1	<0.1	0.8
10	35.5	40.1	10.7	0.5	4.2	3.4	4.6	<0.1	<0.1	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.5
11	17.2	23.0	6.9	2.9	7.6	13.9	4.0	<0.1	<0.1	<0.1	6.9	14.4	<0.1	<0.1	<0.1	2.3	0.9
12	20.1	21.4	8.8	2.5	0.1	11.9	3.8	<0.1	<0.1	0.8	8.8	16.4	<0.1	<0.1	<0.1	5.0	0.4
14	5.0	<0.1	<0.1	1.3	<0.1	5.0	1.3	<0.1	<0.1	<0.1	<0.1	7.5	<0.1	<0.1	<0.1	79.9	<0.1
15	<0.1	<0.1	<0.1	3.6	<0.1	2.4	1.8	<0.1	<0.1	<0.1	<0.1	2.4	<0.1	<0.1	<0.1	89.9	<0.1

16	7.4	22.1	3.7	1.2	0.7	8.6	2.5	<0.1	<0.1	<0.1	12.3	30.6	<0.1	<0.1	<0.1	11.0	<0.1
17	16.1	15.5	3.6	3.0	1.3	5.9	4.2	<0.1	<0.1	<0.1	17.8	29.7	<0.1	<0.1	<0.1	3.0	<0.1
18	16.3	25.6	9.3	4.1	1.4	17.5	4.7	<0.1	<0.1	1.5	10.6	<0.1	<0.1	<0.1	<0.1	7.0	2.0
19	21.4	21.9	6.9	4.6	1.6	11.5	5.5	<0.1	<0.1	16.2	9.5	<0.1	<0.1	<0.1	<0.1	<0.1	0.9
20	12.1	24.3	8.7	2.3	2.3	14.5	4.0	<0.1	<0.1	6.4	24.3	<0.1	<0.1	<0.1	<0.1	<0.1	1.2
21	15.1	29.7	5.8	7.0	6.4	24.4	3.5	<0.1	<0.1	5.2	1.6	<0.1	<0.1	<0.1	<0.1	<0.1	1.2
22	20.3	31.5	9.6	6.6	5.6	15.5	4.2	<0.1	<0.1	4.8	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	1.2
23	38.1	36.9	9.2	1.2	1.0	5.8	6.9	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2
24	31.1	46.8	13.1	0.9	0.5	4.1	2.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4
25	33.8	42.0	8.2	2.1	2.5	5.4	5.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.0
26	30.6	50.1	10.6	0.6	1.4	2.6	3.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6
27	35.7	46.4	9.2	1.2	0.5	3.5	3.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4
28	43.8	35.5	10.7	0.6	3.2	4.1	1.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2
29	30.9	44.7	9.7	0.8	2.7	4.6	4.9	<0.1	<0.1	0.9	<0.1	0.6	<0.1	<0.1	<0.1	<0.1	0.1
30	22.2	36.8	10.6	4.9	4.4	13.0	4.5	<0.1	<0.1	1.5	<0.1	1.4	<0.1	<0.1	<0.1	<0.1	0.8
31	26.2	44.3	8.9	2.2	1.8	5.8	5.8	<0.1	<0.1	2.6	<0.1	1.7	<0.1	<0.1	<0.1	<0.1	0.6
32	15.1	29.5	9.3	5.8	6.5	19.2	4.7	<0.1	<0.1	7.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.3
33	16.2	33.2	11.7	4.9	3.8	19.2	4.1	<0.1	<0.1	4.7	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	1.2
34	12.3	30.0	6.9	4.6	5.6	19.9	3.7	<0.1	2.3	5.8	<0.1	6.3	<0.1	<0.1	<0.1	1.4	1.2
35	12.1	25.8	8.4	3.3	12.8	16.9	3.7	<0.1	1.8	5.5	<0.1	7.3	<0.1	<0.1	<0.1	1.2	1.4
36	14.3	43.4	9.5	3.0	0.4	10.7	6.8	<0.1	<0.1	0.8	<0.1	8.3	<0.1	<0.1	<0.1	2.4	0.5
37	15.6	33.7	8.2	4.3	6.9	14.7	5.5	2.6	<0.1	0.7	<0.1	7.4	<0.1	<0.1	<0.1	<0.1	0.5
38	9.1	46.2	7.9	1.8	4.4	7.9	7.9	<0.1	1.5	2.4	<0.1	7.3	3.6	<0.1	<0.1	<0.1	0.0
39	10.6	27.0	5.9	<0.1	5.8	2.4	1.8	<0.1	<0.1	<0.1	<0.1	43.5	2.9	<0.1	<0.1	<0.1	0.2
40	5.7	26.4	7.5	<0.1	1.6	<0.1	2.3	<0.1	<0.1	<0.1	<0.1	35.6	<0.1	16.1	4.6	<0.1	0.1
41	34.8	42.9	11.6	0.5	3.5	3.6	2.5	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	0.3
42	11.8	30.7	7.7	7.1	7.0	20.1	3.5	4.4	<0.1	6.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.2
43	10.7	29.6	6.4	6.4	6.2	20.9	3.5	4.1	<0.1	5.3	<0.1	5.8	<0.1	<0.1	<0.1	<0.1	1.2

44	9.4	27.0	8.2	7.6	10.3	22.3	3.9	3.5	<0.1	6.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.2
45	7.3	27.2	8.6	6.5	11.3	24.8	3.0	3.1	<0.1	7.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.2
46	14.1	33.0	11.8	5.9	7.4	13.0	5.9	3.5	<0.1	4.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.2
47	25.8	42.8	10.6	1.9	2.7	5.9	6.9	<0.1	<0.1	2.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.1
48	18.1	36.2	9.1	2.1	5.4	12.1	4.1	<0.1	1.1	3.8	<0.1	5.4	1.6	<0.1	<0.1	<0.1	0.9
49	12.9	32.9	8.7	4.7	5.3	17.6	3.8	<0.1	1.4	4.7	<0.1	4.9	2.4	<0.1	<0.1	<0.1	0.8
50	30.9	41.0	9.7	1.2	3.9	7.2	2.7	<0.1	0.5	2.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4
51	38.6	43.9	9.5	<0.1	0.2	4.8	2.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6
52	7.7	25.2	10.2	7.0	13.1	27.0	0.4	<0.1	<0.1	8.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.2
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 S3. Summarised results of the Fe mode of occurrence from Mojave Desert samples. Nº 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.

Nº	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