

Table S1 Morphometric parameters and locations of the 272 cones measured in this study

ID	Lon (E)	Lat (N)	Wcr (m)	Wco (m)	Hco (m)
1	109.6789	23.7525	296.1	648.7	31.0
2	109.6378	23.6753	87.1	306.9	25.0
3	109.6445	23.6806	101.6	306.9	30.0
4	109.6499	23.4730	145.6	276.0	17.8
5	109.6594	23.4710	166.6	309.3	10.5
6	109.7001	23.4222	155.0	348.8	25.5
7	109.6838	23.4221	109.0	191.7	17.3
8	109.7983	23.4045	201.4	425.6	39.5
9	110.2160	23.8239	197.1	430.2	37.5
10	110.3522	23.7919	211.0	505.3	43.7
11	110.3513	23.7396	189.0	457.3	24.1
12	110.3907	23.6801	225.2	545.9	29.0
13	110.4279	23.6324	114.5	326.8	30.5
14	110.4304	23.6271	165.1	297.9	29.2
15	110.4459	23.7928	248.0	471.4	15.7
16	110.4066	23.7789	243.4	412.6	25.0
17	110.4168	23.7816	134.6	387.5	47.7
18	110.4300	23.7789	301.2	504.9	35.0
19	110.4257	23.7728	160.0	326.3	35.0
20	110.4363	23.7654	268.8	497.6	37.7
21	110.4506	23.7740	352.6	574.1	31.8
22	110.4468	23.8075	313.3	576.0	35.0
23	110.5587	23.7985	150.8	408.2	31.5
24	110.6028	23.8063	176.2	471.6	41.0
25	110.5893	23.7273	221.6	463.8	30.0
26	110.4823	23.6327	259.5	525.7	30.8
27	110.4725	23.6078	348.6	675.8	23.5
28	110.5848	23.6650	187.1	497.4	32.3
29	110.6626	23.6391	180.2	456.1	50.3
30	110.6160	23.6068	157.5	314.7	36.6
31	110.6586	23.6564	176.2	550.1	73.5
32	110.5064	23.3712	218.9	434.2	18.5
33	110.5119	23.3793	286.1	513.0	27.0
34	110.5157	23.3861	249.1	479.9	24.0
35	110.6009	23.3850	384.2	616.4	21.3
36	110.6430	23.4335	687.9	1206.6	33.3
37	110.6786	23.5070	362.0	699.4	26.4
38	110.7307	23.5184	94.7	193.1	19.9
39	110.7320	23.7299	113.6	206.6	16.4
40	110.7421	23.7780	195.2	385.3	36.8
41	110.7468	23.7807	288.9	596.9	42.0
42	110.8159	23.8206	227.9	487.2	37.3

43	110.8299	23.8284	255.5	449.6	28.5
44	110.8383	23.8213	93.9	266.2	31.0
45	110.8367	23.8093	201.5	336.0	31.3
46	110.8466	23.8076	160.9	309.6	26.4
47	110.8471	23.8278	92.9	283.6	32.0
48	110.8450	23.8360	134.7	326.6	48.0
49	110.7694	23.8267	317.6	669.4	38.0
50	110.9854	23.7866	129.1	243.4	21.0
51	110.9574	23.7307	247.0	484.7	38.5
52	110.9897	23.7263	252.6	457.7	27.0
53	110.9656	23.7388	222.2	457.1	34.0
54	110.9790	23.7311	497.2	707.7	32.0
55	110.9701	23.6708	180.2	336.5	18.8
56	110.9849	23.6666	300.1	538.8	38.5
57	110.8141	23.5828	241.3	541.8	35.3
58	110.8220	23.5494	241.5	515.1	26.5
59	110.8475	23.5591	164.3	422.3	21.6
60	110.7440	23.4332	289.8	544.7	24.0
61	110.8188	23.4577	231.4	347.2	17.5
62	110.8173	23.4883	130.9	256.4	20.3
63	110.8342	23.3613	350.3	683.5	35.5
64	110.9344	23.4920	218.5	405.9	28.0
65	110.9373	23.4415	214.2	427.5	27.5
66	110.9419	23.4386	350.2	482.7	22.0
67	110.9598	23.5576	262.5	496.2	21.3
68	110.9827	23.5678	269.4	516.8	22.7
69	110.9780	23.5215	201.9	345.1	17.0
70	110.9374	23.5330	320.0	511.3	18.0
71	110.8631	23.8369	503.7	709.2	25.3
72	109.7221	24.2649	238.1	487.3	37.5
73	109.7208	24.2482	159.2	412.5	47.0
74	109.6649	24.2097	75.1	215.9	26.0
75	109.7294	24.2835	301.7	507.7	30.0
76	109.7527	24.2821	381.0	578.9	41.0
77	109.8326	24.3055	173.9	389.0	37.3
78	109.8887	24.3102	149.8	348.1	31.0
79	109.8555	24.1754	319.6	554.6	43.7
80	109.8723	23.9592	199.9	390.7	36.5
81	109.7253	24.2378	140.6	285.6	27.7
82	109.9360	24.1305	238.1	391.8	27.3
83	109.9566	24.1063	239.1	447.9	31.5
84	110.0978	24.0668	79.3	191.7	17.4
85	110.2884	24.4121	210.0	429.9	23.7
86	110.3156	24.4252	265.7	415.4	26.7

87	110.3006	24.3022	199.1	351.3	21.8
88	110.2258	23.9955	177.2	304.1	28.0
89	110.3256	24.1342	184.2	420.1	34.3
90	110.3315	24.2723	202.0	414.2	29.0
91	110.3397	24.2584	169.1	356.3	32.8
92	110.3242	24.2677	122.6	227.6	32.0
93	110.2927	23.8654	221.0	450.4	34.8
94	110.5903	24.3475	336.8	732.6	48.5
95	110.6471	24.1692	352.2	725.3	43.8
96	110.7078	24.0872	246.9	593.7	62.3
97	110.6976	24.0365	305.8	578.2	48.0
98	110.7073	24.0356	251.7	496.7	38.0
99	110.6494	23.9890	350.2	642.8	44.8
100	110.7065	23.9801	189.5	340.8	17.3
101	110.6924	23.9795	152.6	314.5	23.3
102	110.7024	23.9091	292.2	621.2	37.8
103	110.7023	23.8726	130.9	327.9	23.0
104	110.4906	23.9205	259.4	433.0	18.0
105	110.4965	23.8940	205.7	332.9	20.3
106	110.5444	23.8967	299.5	607.7	39.8
107	110.5654	23.8474	355.5	707.8	31.3
108	110.9062	24.4606	216.2	495.4	47.0
109	110.9175	24.4491	142.0	438.0	42.8
110	110.9354	24.4321	296.7	698.8	63.8
111	110.8795	24.3817	285.2	653.8	50.0
112	110.9555	24.1968	157.2	301.2	17.0
113	110.9557	24.0777	240.2	614.1	42.8
114	110.7934	23.8505	292.0	561.3	22.5
115	110.9787	23.9697	235.0	393.3	19.8
116	109.6882	24.9369	182.0	390.4	36.8
117	109.7184	24.8624	261.9	582.1	63.3
118	109.6840	24.8212	444.9	598.9	38.3
119	109.6968	24.8214	240.1	386.1	40.0
120	109.6752	24.7989	216.6	406.9	25.3
121	109.6837	24.8019	207.0	368.6	36.7
122	109.6891	24.8041	167.6	330.3	33.5
123	109.7009	24.8163	276.2	437.7	14.5
124	109.7076	24.8161	285.6	538.0	37.0
125	109.7103	24.8078	146.8	329.1	31.3
126	109.7202	24.8233	105.1	269.3	31.0
127	109.7034	24.7852	93.9	235.0	24.1
128	109.6948	24.7623	217.9	518.2	56.8
129	109.6639	24.7334	161.6	445.5	56.0
130	109.7390	24.7699	215.0	426.2	24.0

131	109.7552	24.7653	92.1	234.4	19.8
132	109.7394	24.7418	219.8	344.3	30.0
133	109.7493	24.7478	136.1	281.2	28.5
134	109.7598	24.7462	126.0	285.3	28.8
135	109.8070	24.7180	221.0	619.3	32.5
136	109.7914	24.6750	156.2	357.6	45.8
137	109.7543	24.6208	230.6	449.0	17.1
138	109.7183	24.6247	259.7	508.0	25.6
139	109.8300	24.6201	223.3	485.1	22.0
140	110.9172	23.4490	242.3	419.6	21.7
141	109.8272	24.7175	182.4	385.6	22.0
142	109.7583	24.7040	123.6	285.9	18.8
143	109.7324	24.7131	149.6	327.4	30.5
144	109.8460	24.7070	272.7	680.4	28.0
145	109.7493	24.6929	150.0	306.1	19.8
146	109.7503	24.6977	103.6	233.1	17.5
147	109.6861	24.6464	127.2	207.0	20.0
148	109.6951	24.6513	115.9	245.6	41.7
149	109.6910	24.6303	159.8	298.2	30.7
150	109.7153	24.6518	154.6	274.9	25.0
151	109.7150	24.6470	227.5	413.2	33.7
152	109.7043	24.6623	121.6	246.4	21.3
153	109.7032	24.6497	135.6	265.2	38.0
154	109.6985	24.6339	195.8	334.7	37.0
155	109.6732	24.6397	141.9	276.7	17.5
156	109.6526	24.6347	92.2	272.8	20.0
157	109.7572	24.7407	156.9	357.4	39.5
158	109.7777	24.7138	144.5	309.7	25.3
159	109.7776	24.7179	139.9	277.7	24.0
160	109.7842	24.7288	128.6	295.7	27.0
161	109.7615	24.7263	239.9	462.1	32.7
162	109.8014	24.7366	196.8	599.9	65.0
163	109.7866	24.7515	414.7	663.3	26.7
164	109.7420	24.7596	404.7	608.3	23.0
165	109.7716	24.7376	326.4	474.2	28.5
166	109.7759	24.7285	122.2	322.9	29.0
167	109.7370	24.7496	143.8	422.4	45.0
168	109.7678	24.7590	220.0	538.2	44.0
169	109.6663	24.6428	311.0	456.3	35.0
170	109.7765	24.7529	113.0	267.4	17.0
171	109.9726	24.7969	345.8	828.9	81.0
172	109.9647	24.7530	323.6	638.2	39.0
173	109.9472	24.7469	219.3	488.4	31.0
174	109.9243	24.7397	219.3	520.0	36.8

175	109.9211	24.6953	216.6	465.6	30.3
176	110.1159	24.5657	355.9	643.2	36.8
177	109.9212	24.6538	310.6	693.3	43.9
178	110.1361	24.6575	144.6	375.4	32.8
179	110.1162	24.6576	103.2	228.3	16.0
180	110.1667	24.7368	279.7	480.2	30.0
181	110.1656	24.7203	172.7	356.1	34.5
182	110.1545	24.6972	338.6	508.6	28.5
183	110.1416	24.6952	276.6	493.9	16.0
184	110.1576	24.7111	98.4	282.0	23.0
185	110.0852	24.6826	303.8	488.1	22.5
186	110.0917	24.6644	277.8	611.4	38.0
187	110.1021	24.6708	323.3	539.1	27.0
188	110.1121	24.6650	279.0	489.0	30.0
189	110.1340	24.6763	422.8	678.4	28.0
190	110.1247	24.6672	321.0	521.3	35.0
191	110.1186	24.6683	300.4	598.7	42.0
192	110.1142	24.7011	124.7	247.0	21.3
193	110.1992	24.5551	183.6	491.8	31.0
194	110.2400	24.5742	209.1	437.8	29.5
195	110.3671	24.5688	212.4	372.0	22.8
196	110.3892	24.5524	142.4	440.0	28.0
197	110.6173	24.9403	346.9	915.5	60.0
198	110.6761	24.8511	78.8	242.6	25.0
199	110.9935	24.9487	181.1	378.6	29.0
200	110.8558	24.6174	309.6	692.6	59.8
201	110.9384	24.8138	141.5	308.3	24.0
202	109.8924	25.6518	385.3	843.0	56.3
203	109.7393	25.5626	252.3	543.9	60.0
204	110.8508	24.7180	431.9	950.9	75.5
205	109.8563	25.1586	410.5	925.9	64.8
206	109.6720	25.2057	152.1	375.6	37.5
207	109.6848	25.3138	348.8	880.6	79.5
208	109.6918	25.3316	148.3	426.2	44.3
209	109.7740	25.3948	340.6	788.7	66.3
210	109.7272	25.4049	325.0	731.0	66.8
211	109.7821	25.3694	464.3	848.1	66.8
212	109.7481	25.5491	217.7	539.5	37.3
213	109.6715	24.9361	227.2	406.1	35.3
214	109.7313	24.8549	72.8	252.5	25.1
215	109.9091	25.5590	58.0	205.4	19.5
216	109.9488	25.2886	312.4	803.1	56.3
217	109.9726	25.2944	287.0	706.5	70.5
218	109.9787	25.2905	102.7	282.5	34.5

219	110.0450	25.2993	368.1	869.2	63.5
220	110.1132	25.3111	531.9	1031.1	76.3
221	110.2342	25.2442	488.8	787.4	53.0
222	110.2798	25.2534	98.7	276.2	28.3
223	110.2945	25.2137	109.0	266.0	20.0
224	110.3010	25.1832	440.6	808.0	45.8
225	110.3239	25.1722	377.6	604.2	40.3
226	110.3514	25.1607	125.9	324.6	32.5
227	110.3535	25.1656	118.8	382.0	33.3
228	110.4332	25.1588	220.2	381.0	27.1
229	110.4305	25.1555	227.9	407.5	25.0
230	110.4407	25.0831	356.0	769.4	71.5
231	110.3131	25.1173	315.0	467.9	19.5
232	110.5588	25.2667	255.4	659.2	56.3
233	110.5723	25.2816	202.0	373.6	29.7
234	110.4598	25.1876	208.4	372.2	25.4
235	110.5076	25.1731	258.1	496.5	66.7
236	110.5409	25.1628	364.4	556.7	31.0
237	110.5376	25.1387	311.8	758.5	87.5
238	110.4639	25.0753	240.2	583.9	65.3
239	110.6840	25.2742	406.2	788.0	54.8
240	110.6776	25.2223	452.8	842.6	44.6
241	110.8059	25.3201	440.1	812.2	52.8
242	110.9003	25.3581	538.7	1092.5	90.8
243	110.9616	25.3208	335.8	626.6	30.8
244	109.8905	24.7660	208.2	407.8	19.3
245	110.8267	24.0952	172.9	513.6	45.3
246	110.9614	23.8448	327.6	513.9	34.3
247	110.8706	23.8429	286.1	578.5	41.0
248	110.8785	23.8968	318.5	570.3	30.5
249	110.8074	23.9841	137.3	331.7	33.0
250	110.8049	23.9786	119.5	254.4	21.5
251	110.8090	23.9725	124.3	268.4	24.4
252	110.7827	23.9954	304.0	540.6	40.7
253	110.7844	23.9891	395.5	684.1	47.5
254	110.8019	23.9896	170.6	389.2	31.5
255	110.7883	23.9830	81.6	198.6	14.0
256	110.7751	23.9861	261.6	424.7	25.3
257	110.8108	23.9673	198.9	311.7	11.7
258	110.8476	23.8617	418.8	669.4	22.3
259	110.2310	23.3587	142.5	307.5	38.0
260	110.2508	23.3220	178.8	386.9	40.0
261	110.2641	23.3317	510.7	831.0	32.0
262	110.4158	23.5440	95.7	231.9	34.0

263	110.4178	23.5245	215.8	437.2	41.7
264	110.4235	23.4799	329.1	564.9	19.5
265	109.6531	24.0554	190.2	337.1	22.3
266	109.8643	24.3130	215.6	455.8	40.7
267	110.3485	24.2346	102.6	213.7	21.0
268	110.3440	24.2381	166.6	295.9	37.5
269	110.3367	24.2256	127.1	274.9	23.5
270	110.3548	24.2341	69.9	178.9	15.7
271	110.3445	24.2429	176.0	296.0	38.5
272	110.3387	24.2305	468.7	676.7	33.0

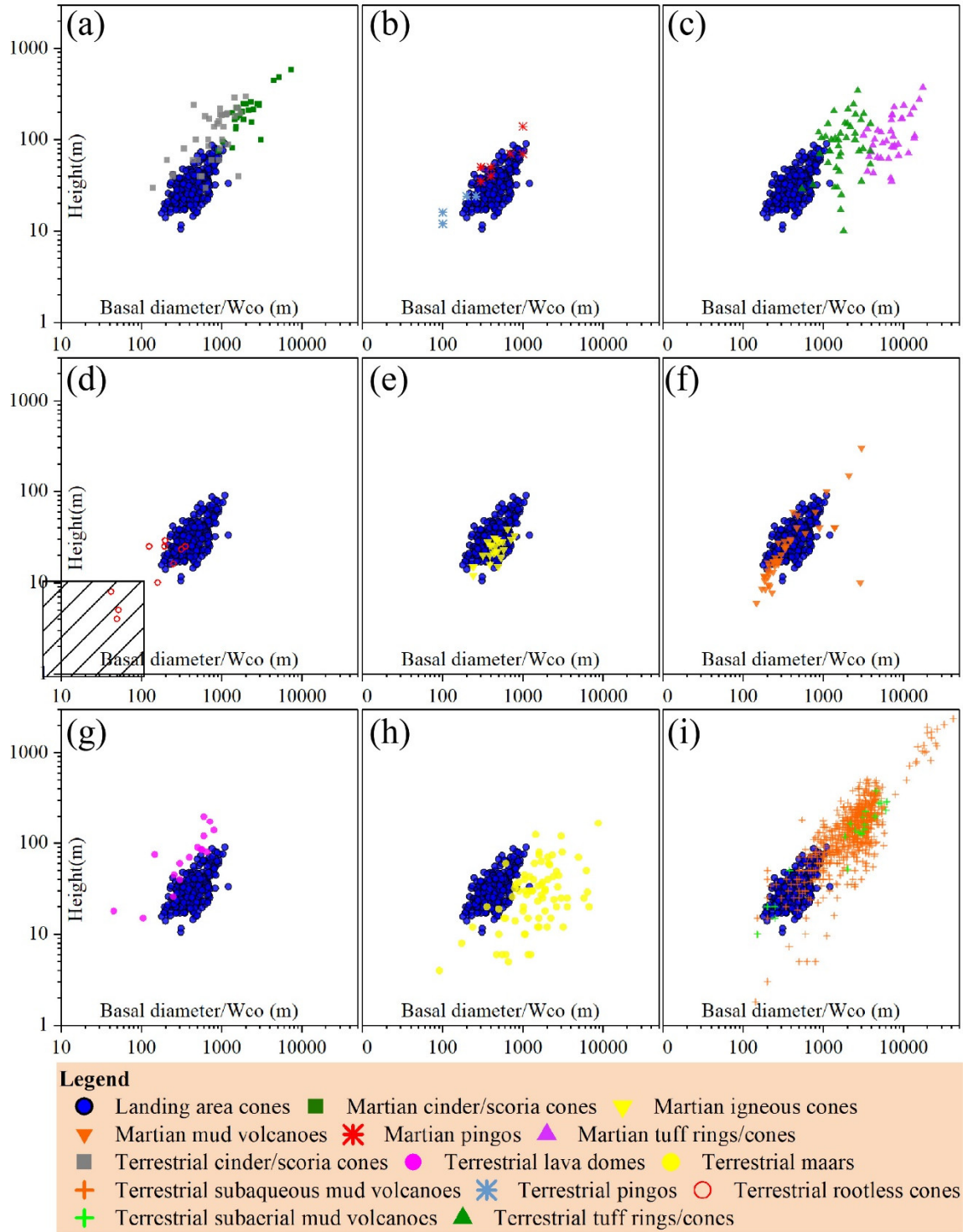


Figure S1. Separate panels of Figure 5. (a) Landing area cones versus cinder/scoria cones on Earth and Mars. (b) Landing area cones versus pingos on Earth and Mars. (c) Landing area cones versus tuff rings/cones on Earth and Mars. (d) Landing area cones versus rootless cones on Earth and Mars, the bottom left rectangle with filled diagonals represents Martian rootless cones. (e) Landing area cones versus Martian igneous cones. (f) Landing area cones versus Martian mud volcanoes. (g) Landing area cones versus terrestrial lava domes. (h) Landing area cones versus terrestrial maars. (i) Landing area cones versus subaqueous/subaerial mud volcanoes on Earth.

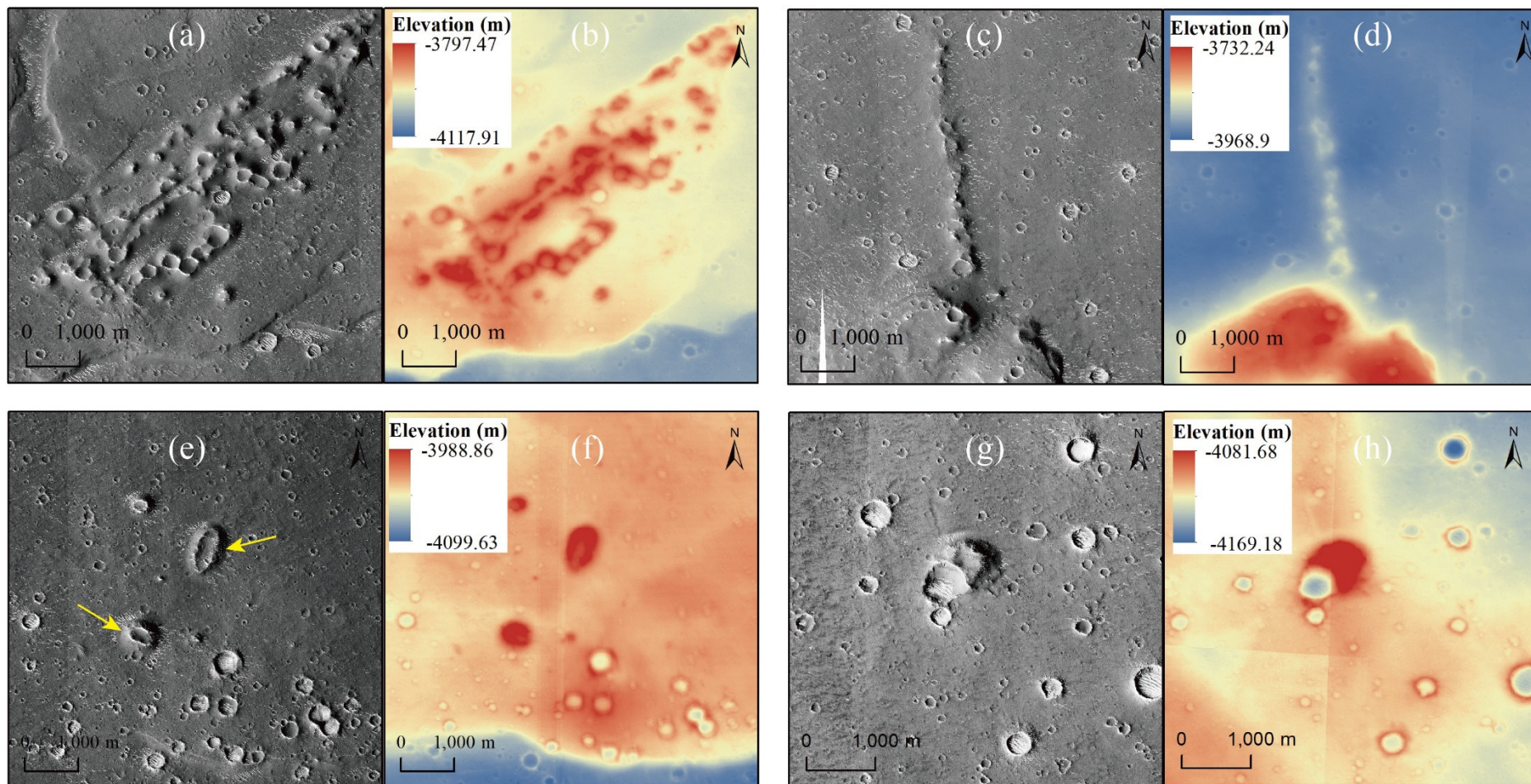


Figure S2. The images of the landing area cones with various morphology from HiRIC DOM and DEM. (a) a cone cluster, (c) a cone chain, (e) elongated cones (denoted by yellow arrows), (g) a cone destroyed by a crater. Their topographies are shown in (b), (d), (f) and (h), respectively.