

CATALOGUE OF 230 CERTAIN, PROBABLE, POSSIBLE, AND DOUBTFUL IMPACT STRUCTURES

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INTRODUCTION

Up to 1928 only one meteorite crater was known, the Barringer Crater. In that year, two of the three impact structures of Odessa were found. The first cluster of craters, Henbury, was discovered in 1930. Thereby, the number of known craters rose from seven to 20. In 1938 the first meteorite crater was recognized by aerial observation, the crater Aouelloul. Still, in 1955 only about 55 sites were under consideration. From 1955 the search for terrestrial impact structures was intensified on all continents.

Ten years later several catalogues were published (1-4). These catalogues contain many structures which were not formed by impact. These, as well as later lists (5-9), have since become outdated. A large number of possible new craters have since been suggested including several in countries not previously listed: Switzerland, Poland, Turkey, Japan, and Brazil. In the USSR, the hitherto existing catalogues at the most list only 14 sites. At present 92 sites are known in that country. Also in all these catalogues the possible crater chains in North-West Africa and near Quillagua in Chile are not mentioned. The present catalogue tries to fill these voids in our knowledge. It contains 230 sites of single craters and crater clusters. New clusters of craters are now being discovered at a greater rate. It can be asserted that 80 out of 100 individual meteorite craters belong to crater clusters although only 25% of crater sites occur as clusters. Altogether in this catalogue, a total of almost 900 individual craters have been listed. Not a single meteorite crater has been reported for the People's Republic of China. Unfortunately, Pulsnitz Observatory does not have a collaborator in China.

In order to make the present catalogue more synoptic, the sites are not arranged alphabetically as in previous catalogues, but are grouped by continents and within the continents by longitude, from west to east. Two hundred five out of the 230 sites are located in the northern hemisphere and 25 in the southern. This smaller number is caused by smaller land area and lower level of research activity.

In a cluster, only the location, diameter and the depth of the largest crater are recorded. If data in the literature differ, the latest were chosen. Neighbouring craters or crater clusters are considered as two sites only when 10 km between them lacks craters. An exception to this rule occurs in the case of the great craters suggested to exist in Central Kazakhstan (USSR) whose dimensions are still doubtful.

A classification of certain, probable, possible, and doubtful formations by meteorite impact is given in column five, following the criteria of Dence (7):

- A = sites with meteorites present (certain impact structures)
- B = sites with shock metamorphism (probable impact structures)
- C = sites with other acceptable indications of meteoritic origin (possible impact structures)
- D = sites with uncertain indications of meteoritic origin (doubtful impact structures)

Many of the features listed in Category D are based upon flimsy data and may eventually be shown not to be meteoritic. The time required to determine meteoritic identity is long. A striking example was the protracted discussion on the Nördlinger Ries in West Germany before 1965.

In the next to the last column is found the year in which impact origin was assigned to a crater. The sites listed in the catalogue have been plotted on six maps, each 30 × 42 cm (Europe, Asia, Africa, North America, South America, and Australia). Copies of these maps are available for collaborators from Pulsnitz Observatory. In spite of local difficulties both catalogue and maps will be continually updated. Please send updated information on listed craters and newly-discovered craters to the following address:

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REFERENCES

Published Catalogues (chronologically)

1. **O'Connell, E.**, 1965. A catalogue of meteorite craters and related features with a guide in the literature. Rand Corp., Santa Monica, California. (116 sites)
2. **Monod, T.**, 1965. Contribution à l'établissement d'une liste d'accidents circulaires d'origine météoritique, cryptoexplosive, etc. Ifan - Dakar. (95 sites)
3. **Hey, M.H.**, 1966. *Catalogue of Meteorites*, 538-562. London. (139 sites)
4. **Freeberg, J.H.**, 1966. Terrestrial impact structures — a bibliography. *U.S. Geol. Surv. Bull.* 1220. Washington. Supplement 1965 - 68. *U.S. Geol. Surv. Bull.* 1320. Washington, 1969. (127 sites)
5. **Short, N.M. and T.E. Bunch**, 1968. A worldwide inventory of features characteristic of rocks associated with presumed meteorite impact structures. In French, B.M. and Short, N.M. (Editors): Shock metamorphism of natural materials. Mono Book Corp., Baltimore, Maryland. (52 sites)

No.	Name	Location	Number of craters	Classification	Latitude	Longitude	Notes	Diameter, meters	Depth, meters	Age, m.y.	Date of Verification	References
Europe												
1	St. Magnus Bay	Great Britain, Shetland Islands	1	C	60°25' N	01°34' W	sea	11,000	97		1971	7-9, 47
2	Rochechouart, Chassenon	France	1	B	45°50' N	00°56' E	central uplift, shatter cones, glass, melt rocks	15,000		165	1967	4, 6-9
3	St. Imier	Switzerland	1	D	47°10' N	07°00' E	hole, shatter cones ?	400			1976	25
4	Lake of Constance	Switzerland	1	D	47°35' N	09°25' E	shatter cones ?	20,000 ?		origin with No. 6 ?	1973	8, 24
5	Steinheim Basin	West Germany	1	B	48°42' N	10°04' E	central uplift, shatter cones	3,500	100	14, 8	1933	1-9, 12, 14, 15, 26, 36, 49
6	Nördlinger Ries	West Germany	1	B	48°53' N	10°37' E	shatter cones, coesite, stishovite, glass, suevit, source of moldavites in CSSR ?	23,000	200	14, 8	1904	1-9, 12, 14, 26, 49
7	Kofels	Austria, Oitztal	1	B	47°13' N	10°58' E	glass, pumice stone	5,000		0, 008	1936	1-9
8	Pfahldorf, Mandelgrund and Sornhull	West Germany, Frankenalb	3	D	48°57' N	11°22' E	elevated rims, shatter cones ?, alomonite	2,500		origin with No. 6 ?	1969	12, 26, 36, 37, 39, 43
9	Mendorf	West Germany, Frankenalb	1	D	48°53' N	11°36' E	elevated rim, alomonite	2,500		origin with No. 6 ?	1971	12, 36, 37, 39
10	Willenhofen, Parsberg	West Germany, Frankenalb	several	D	49°08' N	11°42' E	alomonite	2,000		origin with No. 6 ?	1971	36-39
11	Hemauer Pulk	West Germany, Frankenalb	14	D	49°03' N	11°47' E	alomonite	2,000		origin with No. 6 ?	1971	12, 36-39
12	Wipfelsfurt	West Germany	1	D	48°54' N	11°51' E	in bed of Danube, shatter cones ?, alomonite	850	100	origin with No. 6 ?	1971	11, 12, 36, 37, 39
13	Sausthal	West Germany, Frankenalb	2	D	48°58' N	11°51' E	elevated rim, alomonite	1,000		origin with No. 6 ?	1964	12, 36-39
14	Saal	West Germany	1	D	48°53' N	11°57' E	alomonite	1,000 ?		origin with No. 6 ?	1974	12, 39, 40
15	Mien	Sweden	1	B	56°25' N	14°55' E	lake, coesite, glass, melt rocks	6,000		50	1963	3-9
16	Siljan	Sweden	several	B	61°05' N	15°00' E	lakes, shatter cones	45,000	165	500	1963	3, 4, 6-9

No.	Name	Location	Number of craters	Classification	Latitude	Longitude	Notes	Diameter, meters	Depth, meters	Age, m.y.	Date of Verification	References	
17	Humeln	Sweden	1	C	57°22' N	16°15' E	lake	1,200	60	600	1965	3, 4, 7-9	
18	Dellen	Sweden	1	B	61°50' N	16°45' E	lake, glass, melt rocks	12,000		Paleozoic-Mesozoic	1963	3, 4, 7-9	
19	Morasko, Poznań	Poland	8	B	52°29' N	16°54' E	NiFe (found 1914)	100	13			3 (page 317), 4, 9, 28, 55	
20	Tvären Bay	Sweden	1	C	58°46' N	17°25' E	lake	2,300			1963	3, 4, 7, 9	
21	Kaalijärv, Ösel	USSR, Estonia	7	A	58°24' N	22°40' E	NiFe, shatter cones, glass	110	16	Pleistocene-Recent	1927	1-9, 21, 29, 52, 54	
22	Lappajärvi	Finland	1	B	63°10' N	23°40' E	lake, melt rocks	10,000		Paleozoic-Mesozoic	1968	4-9	
23	Kobrin	USSR, Brest	1	C	52°12' N	24°12' E	lake	250	20		1957	54	
24	Kalushskaja	USSR, Ukrainsk	1	C	49°00' N	24°22' E	astrobleme, discovered by drill hole					18	
25	Riga	USSR, Latviska	1	C	57°00' N	24°30' E	deepness	300				1953	54
26	Aukshtadvaris	USSR, Litowska	1	C	54°30' N	24°30' E	deepness	185	65			1966	54
27	Iumetsa	USSR, Estonia	3	B	57°58' N	27°23' E		80	12			1938	3, 4, 7-9, 54
28	Minsk	USSR	1	C	53°50' N	27°40' E	astrobleme, shocked crystals, discovered by drill hole					1976	57
29	Berditschew	USSR, Ukrainsk	several	C	50°00' N	28°30' E	lake	30				1958	54
30	Idriza	USSR, Pskow	1	C	56°18' N	28°48' E	lake					1952	54
31	Jänisjärvi	USSR, Karelia	1	B	61°58' N	30°55' E	melt rocks	10,000				1970	6-9
32	Ostaschkow	USSR, Kalinin	1	C	57°12' N	33°12' E	lake	75				1966	54
33	Twerdowo	USSR, Smolensk	1	C	53°12' N	34°42' E	depression	100				1962	54
34	Otnos	USSR, Orlow	4	C	53°00' N	35°00' E	lakes	50				1964	54
35	Gzatskaya	USSR	1	C	55°30' N	35°00' E	astrobleme						60
36	Karatschew	USSR, Orlow	1	C	53°12' N	35°06' E	lake						54
37	Boriskowo	USSR, Moscow	several	C	56°00' N	36°30' E	depression	10				1967	54
38	Lianosowo	USSR, Moscow	1	C	55°54' N	37°36' E	depression	50				1961	54
39	Dolgoje	USSR, Tula	6	C	54°00' N	37°54' E	deepness	30				1962	54
40	Winogradowo	USSR, Moscow	5	C	55°30' N	38°00' E	depression	150				1960	54
41	Kasarik	USSR, Lugansk	1	C	49°54' N	38°18' E	depression	700	20			1968	54
42	Swjatoje Osero	USSR, Moscow	1	C	55°48' N	38°30' E	lake	100	8			1969	54
43	Rogoshino	USSR, Lipezk	1	C	52°30' N	39°30' E	depression	16	4			1957	54
44	Rjasan	USSR, Rjasan	1	C	54°00' N	40°00' E	depression	20	7			1960	54
45	Nowki	USSR, Wladimir	8	C	56°24' N	41°06' E	depression	40	8			1960	54
46	Rotschegda	USSR, Archangel'sk	1	C	62°30' N	43°30' E	depression	10				1953	54
47	Putschesh-Katun	USSR, Gorki	1	B	57°06' N	43°35' E	depression	80,000	500			1965	4, 7-9, 54
48	Swetlojar	USSR, Gorki	1	C	56°42' N	45°06' E	lake	450	30			1969	54
49	Archangel'skoje	USSR, Gorki	1	C	57°48' N	46°18' E	lake	90				1962	54

50	Jernur	USSR, Mari	1	C	56°48' N	47°36' E	crater	125		1947	54
51	Zepotshkino	USSR, Kirow	7	C	57°12' N	50°00' E	depression	80		1957	54
52	Alexejewskoje	USSR, Tatarisk	1	C	55°18' N	50°06' E	deppness	40	20	1964	54
53	Tobys	USSR, Komi	13	C	63°18' N	53°06' E	depression	50		1951	54
54	Padun	USSR, Kirow	1	C	60°00' N	53°30' E	lake	100	5	1964	54
55	Nowo Gurowka	USSR, Baschkirsk	2	C	54°06' N	56°06' E	depression	10	3	1969	54
56	Koshwa	USSR, Komi	1	C	65°00' N	56°30' E	lake	100		1961	54
Asia											
57	Al Umchaimin	Iraq	1	D	32°41' N	39°35' E	depression	3,200		1965	1-4, 7-9
58	Dogubayazid	Turkey	1	D	39°32' N	44°14' E	pretended 1920 fall of meteorite	35	30	0, 000056 ?	1927 9, 41
59	Baghdad	Iraq	2	D	33°20' N	44°25' E	oval depression	200	40		1965 1-4, 9
60	Basra	Iraq	1	C	30°20' N	47°40' E					1965 1, 3, 4, 9, 21
61	Wabar, Al Hadida	Saudi Arabia	2	A	21°30' N	50°28' E	NiFe, coesite, glass	100	13	Pleistocene-	1932 1-9, 14
62	North Kaspi Sea Territory	USSR, Kazakhstan	1	D	44°00' N	53°00' E	sea and depression	400,000 ?	1,000 ?	Recent	1975 46
63	Oman	Saudi Arabia	1	C	19°55' N	56°58' E	round	6,000			1973 59
64	Zhamanshin	USSR, Aktjubinsk	1	B	49°00' N	59°00' E	deppness, tektites	15,000			1969 7, 9, 19, 54
65	Tagil	USSR, Swerdlowsk	1	C	57°48' N	60°00' E	lake	250	50		1964 54
66	Kasaba	USSR, Tscheljabinsk	3	C	53°48' N	61°24' E	lake	1,000			1967 54
67	Beresowo	USSR, Tjumen	1	C	63°00' N	65°00' E	lake	250			1967 54
68	Dshaus	USSR, Tadshik	2	C	39°15' N	67°15' E	depressions	7 ?			1950 4, 54
69	Wostotschnoje	USSR, Koktschetaw	1	C	53°30' N	68°12' E	crater	200	35		1962 54
70	Yntaly	USSR, Kazakhstan	1	D	49°00' N	69°55' E	depression	20,000 ?			1975 46, 64
71	Tengis Lake Territory	USSR, Kazakhstan	1	D	52°00' N	70°00' E	depression	350,000 ?			1975 45, 46
72	Dsheskasgan	USSR, Kazakhstan	1	D	47°00' N	70°00' E	central uplift	90,000 ?			1975 46
73	Akschoky	USSR, Kazakhstan	1	C	47°42' N	72°23' E	depression	2,500 ?			1975 46, 64
74	Kaibsko, Tschujsk	USSR, Kazakhstan	1	D	46°00' N	72°30' E	central uplift	350,000 ?			1975 46
75	Balchasch	USSR, Kazakhstan	1	C	47°00' N	73°00' E	circle	2,000			1966 54
76	Taikuduksk	USSR, Kazakhstan	1	C	46°24' N	73°10' E	depression	500 ?			1975 46, 64
77	Karaganda	USSR, Karaganda	1	C	49°48' N	73°12' E	depression	80	8		1964 54
78	Surgut	USSR, Tjumen	1	C	61°12' N	73°36' E	depression	50	3		1961 54
79	West Akkudusk	USSR, Kazakhstan	1	C	47°01' N	73°41' E	glass	10,000 ?			1975 46, 64
80	Tasaral	USSR, Kazakhstan	1	C	46°29' N	73°42' E	glass ?	3,000 ?			1975 46, 64
81	Shuan-Tobe	USSR, Kazakhstan	1	C	47°08' N	73°51' E		10,000 ?			1975 46, 64
82	Murgab, Pamir	USSR, Tadshikistan	2	C	38°06' N	74°20' E	deppness	80	15		1951 2-4, 7, 9, 54
83	Borly	USSR, Kazakhstan	1	C	47°05' N	74°45' E	NiFe ?	150 ?			1975 46, 64
84	West Karkaralinsk	USSR, Kazakhstan	1	C	49°25' N	75°00' E	glass	300 ?			1975 46
85	North Kounradsk	USSR, Kazakhstan	1	C	47°09' N	75°14' E	magnetic anomaly	5,000 ?			1975 46, 64
86	Tokrau Territory	USSR, Kazakhstan	1	D	47°44' N	75°29' E	depression, glass	140,000 ?			1975 46, 64

No.	Name	Location	Number of craters	Classification	Latitude	Longitude	Notes	Diameter, meters	Depth, meters	Age, m.y.	Date of Verification	References
87	South Balchasch Lake Territory	USSR, Kazakhstan	1	D	46°00' N	75°30' E	magnetic anomaly	285,000 ?			1975	46, 64
88	Lonar	India	1	B	19°59' N	76°34' E	elevated rim around lake	1,830	150	0, 05		1-9
89	Konyas	USSR, Kazakhstan	5	C	48°33' N	76°36' E	depression	250 ?			1975	46, 64
90	Rangarh, Rajasthan	India	1	C	25°20' N	76°37' E		3,000	200		1971	9, 13
91	Barraba	USSR, Novosibirsk	several	C	54°30' N	77°30' E	lake				1969	54
92	East Balchasch Lake Territory	USSR, Kazakhstan	1	D	47°00' N	78°00' E	lake and depression, shocked crystals ?	315,000 ?			1975	46
93	Lepsinsk	USSR, Alma Ata	1	C	45°30' N	80°42' E	crater	550	120		1958	54
94	Tschik	USSR, Novosibirsk	1	C	55°00' N	82°30' E	lake	75	10		1953	54
95	Ogni	USSR, Altai	1	C	51°48' N	83°30' E	crater	140	25		1961	54
96	Wojewodskoje	USSR, Altai	several	C	53°48' N	85°36' E	depression	40	2		1958	54
97	Ust-Oserni	USSR, Krasnojarsk	1	C	58°54' N	87°42' E	crater	70	10		1969	54
98	Sym	USSR, Krasnojarsk	several	C	60°24' N	88°24' E	crater	80	6		1963	54
99	Ushur	USSR, Krasnojarsk	1	C	55°12' N	90°18' E	depression	400	40		1953	54
100	Udshej Bowl, Sayan	USSR, Krasnojarsk	2	C	53°45' N	93°10' E	crater				1962	3, 4, 9, 54
101	Tschinge Site, Chinga	USSR, Tuwin	1	C	51°12' N	94°18' E					1947	2-4, 9, 54
102	Ust Wichorewo	USSR, Irkutsk	1	C	56°42' N	101°24' E	depression	10	2		1968	54
103	Tunguska	USSR, Central Siberia	200 ?	(A)	60°55' N	101°57' E	depression craters (?) and devastations	32 ?	6 ?	fall	(1927)	2-4, 9, 21, 54
							(devastations about 150,000)			30.6, 1908		
104	Sanar	USSR, Irkutsk	1	C	60°24' N	106°12' E	deepness	50			1962	54
105	Mogol	USSR, Irkutsk	several	C	57°30' N	108°30' E	depression	40			1961	54
106	Popigai	USSR, Yakutian	1	B	71°30' N	111°00' E		100,000	500	30	1970	7-9, 31, 33
107	Witim	USSR, Mongolia	1	C	53°30' N	112°30' E	lake	200			1956	54
108	Patomski, Perevoz	USSR, Irkutsk	1	B	59°00' N	116°25' E	circle	86	8		1962	4, 7-9, 54
109	Tjuptjalir	USSR, Jakutsk	2	C	69°54' N	124°54' E	lake	300			1959	54
110	Gonamski	USSR, Jakutsk	1	C	56°18' N	126°48' E	deepness	25			1948	54
111	Hoshikubo	Japan, Okinawa	1	C	26°16' N	127°47' E		600			1941	63
112	Tiksi	USSR, Jakutsk	1	C	71°42' N	128°24' E	crater	10			1969	54
113	Amami	Japan, Kagoshima	2	C	28°25' N	129°38' E		2,400			1970	63
114	Amurski	USSR, Chabarowsk	1	C	48°00' N	132°42' E	lake	175			1947	54
115	Hoshinoko-zan	Japan, Hiroshima	1	C	35°44' N	133°14' E		10			1968	63
116	Sikhote Alin	USSR, Chabarowsk	122 (not all explosive craters)	A	46°10' N	134°39' E	greatest observed meteorite shower, collected 27 t NiFe	27	6	fall	1947	1-9, 54
										12.2, 1947		
117	Konder	USSR, Chabarowsk	1	D	57°30' N	134°50' E	hill	9,000			1950	7, 9, 54

118	Katjen	USSR, Chabarowsk	I	C	47°00' N 136°24' E	deepness	40	9	1967	54
119	Soboljewski	USSR, Primorje	I	C	46°18' N 137°54' E	crater	51	8	1947	54
120	Cheputschki, Arn Valley	USSR, Chabarowsk	6	C	52°54' N 138°06' E	50 km west of Cher-putschi "a chain of small craters"	30	20	1956	4, 54
121	Sporni	USSR, Chabarowsk	several	C	51°48' N 139°00' E	depressions			1961	54
122	Labyntyk	USSR, Jakutsk	I	C	62°30' N 143°00' E	depression	60,000		1969	7-9, 54
123	Srednjekan	USSR, Magadan	I	C	62°30' N 152°42' E	lake	50		1966	54
124	El'gytkhyn	USSR, Chukotsk	I	C	67°29' N 172°04' E	lake	12,000	200	1963	7-9, 54
Africa										
125	Gallouédec	Mauritania	I	D	21°00' N 15°40' W	aerial observation			1962	2, 3
126	Freetown	Sierra Leone	I	D	08°20' N 13°20' W	echo soundings			1963	4
127	Matam	Senegal	several	C	15°40' N 13°20' W	No. 127-136 crater chain ?, aerial observation			1965	2, 3, 12
128	Aouelloul, Adrar	Mauritania	I	B	20°15' N 12°41' W	No. 127-136 crater chain ?, shatter cones, NiFe, glass, aerial observation	250	0, 46	1938	1-9, 12, 21, 23, 42
129	Semsiyat	Mauritania	I	D	21°01' N 11°50' W	No. 127-136 crater chain ?	5,000	5 ?	1965	1-4, 9, 12, 42
130	Agheir, Hofrat	Mauritania	I	C	19°25' N 11°30' W	No. 127-136 crater chain ?, great depression			1951	2, 3, 12
131	Aghreydh Tenoumer	Mauritania	I	B	22°55' N 10°24' W	No. 127-136 crater chain ?	1,800	108	1954	1-4, 6, 8, 9, 12, 42
132	Temimichât, Challaman	Mauritania	I	C	24°15' N 09°39' W	No. 127-136 crater chain ?	500	35	1954	1-4, 6-9, 12, 42
133	Tindouf	Morocco	I	C	27°40' N 08°06' W	No. 127-136 crater chain ?	4,000		1965	2, 3, 12
134	Mejajouda	Mauritania	I	C	22°43' N 07°18' W	No. 127-136 crater chain ?, aerial observation	3,000		1965	2, 3, 12
135	El Mreiti	Mauritania	I	C	23°30' N 06°30' W	No. 127-136 crater chain ?, aerial observation	700		1955	2, 3, 7-9, 12, 42
136	Michlifen	Morocco	2	C	32°00' N 03°00' W	No. 127-136 crater chain ?	1,900	60	1963	2-4, 9
137	Nebiewale	Ghana	I	D	10°35' N 01°40' W	lake, shatter cones, coesite, glass, breccia, source of Ivory Coast tektites	2,400		1931	1-9
138	Bosumtwi, Ashanti	Ghana	I	B	06°32' N 01°23' W		10,500	345	1, 3	
139	Gourma	Mali	about 20	D	15°17' N 01°19' W		200	3	1965	2, 3
140	Erg Chech, Touat	Algeria	several	D	27°00' N 00°00' W		30	5		2, 3

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141	Four Teguentour	Algeria	1	D	25°30' N	02°20' E	60 km SSE of In Salah	4,000			1965	2, 3
142	Tademait	Algeria	1	D	27°30' N	04°00' E	175 km ENE of In Salah	4,000				2, 3
143	Talemzane	Algeria	1	C	33°18' N	04°06' E	shatter cones, coesite	1,900	70	1	1932	1-9, 21
144	Dzioua, Guerrara	Algeria	about 12	D	33°30' N	05°20' E		400			1965	2-4, 9
145	Amguid	Algeria	1	C	26°31' N	05°21' E	typical rim	2,360	133	Cenozoic	1964	1-5, 7-9
146	Roter Kamm	South West Africa	1	D	27°45' S	16°17' E		4,000			1967	3, 4, 6-9
147	Garet el Lefet	Libya, Fezzan	1	D	25°00' N	16°30' E		18,000	450		1941	2, 3
148	Tibesti	Chad	1	C	21°30' N	17°30' E	discovered by Gemini IV	2,000			1967	4, 10
149	Brukkaros	South West Africa	1	D	25°50' S	18°00' E	breccia ?	2,700			1941	59
150	Djebel Dalma	Libya, Southern Cyrenaika	1	C	25°20' N	24°20' E		640				9, 30
151	Kalkkop	South Africa	1	D	32°43' S	24°34' E	source of Libyan glass ?	800			1932	1-3
152	Libyan Desert Craters	Egypt	7	D	22°18' N	25°30' E	aerial observation				1943	2-4, 9
153	Malha	Sudan	1	D	15°07' N	26°15' E	central uplift, shatter cones, breccia	100,000		1 970 (oldest crater)	1947	1-9, 27
154	Vredefort	South Africa	1	B	27°00' S	27°30' E						
155	Pretoria Salt Pan	South Africa	1	C	25°30' S	28°00' E	typical rim	1,100	121	1	1931	1-9
North America												
156	Amak Island	USA, Alaska	1	D	53°54' N	163°09' W		64	15		1947	1-4, 9, 21
157	Steen River	Canada, Alberta	1	B	51°31' N	117°38' W	central uplift, glass	25,000		95	1968	4-9
158	Barringer, Canon Diablo, Arizona Crater	USA, Arizona	1	A	35°02' N	111°01' W	30 t NiFe, coesite, stishovite, glass	1,295	174	0, 04	1905	1-9, 21
159	Pilot	Canada, N.W.T.	1	B	60°17' N	111°01' W	lake, glass	6,700	68	Paleozoic-Mesozoic	1968	4-9
160	Eagle Butte	Canada, Alberta	1	C	49°42' N	110°30' W		10,000				7, 9
161	Upheaval, Christmas Canyon	USA, Utah	1	C	38°26' N	109°54' W		4,800				1-4, 7, 9
162	Carswell	Canada, Saskatchewan	1	B	58°27' N	109°30' W	lake, central uplift, shatter cones, shocked crystals	32,000	60	485	1956	1-9
163	Melville	Canada, N.W.T.	2	D	76°40' N	109°00' W					1951	1, 3, 4, 9
164	Keeley	Canada, Saskatchewan	1	D	54°54' N	108°08' W	lake	13,000				2-4, 9
165	Elbow	Canada, Saskatchewan	1	C	50°58' N	106°45' W		8,000			1960	2, 3, 7, 9
166	Deep Bay	Canada, Saskatchewan	1	B	56°24' N	102°59' W	central uplift, gravity anomaly, shocked crystals, 3 drill holes	13,600	1,314 ?	100	1957	1-9
167	Sierra Madera	USA, Texas	1	B	30°36' N	102°55' W	central uplift, crypt-explosion, shatter cones	13,000	2,400 ?	150	1937	1-9

168	Nicholson	Canada, N.W.T.	I	B	62°40' N 102°41' W	lake, central uplift, shatter cones, glass NiFe	12,500		Paleozoic-Mesozoic	1928	1-9, 21 7-9
169	Odessa	USA, Texas	3	A	31°48' N 102°30' W		168	6			
170	Hartney	Canada, Manitoba	I	C	49°24' N 100°40' W		6,000				
171	Haviland, Brenham	USA, Kansas	I	A	37°37' N 99°05' W	NiFe, fall of Brenham pallasite meteorite	15	3, 5		1933	1-4, 6-9
172	St. Martin	Canada, Manitoba	I	B	51°47' N 98°33' W	central uplift	24,000			1968	6, 7, 9
173	West Hawk Lake	Canada, Manitoba	I	B	49°46' N 95°11' W	lake, gravity anomaly, glass, breccia, shocked crystals, 1 drill hole	3,200	420		1960	1-9
174	Manson	USA, Iowa	I	B	42°35' N 94°31' W	central uplift, glass	32,000		Mesozoic-Cenozoic	1961	1-9
175	Decaturville	USA, Missouri	I	B	37°54' N 92°43' W	central uplift, crypto-explosion, shatter cones	6,000		500	1938	1-9
176	Crooked Creek	USA, Missouri	I	B	37°50' N 91°23' W	central uplift, crypto-explosion, shatter cones	5,000		320	1954	1-9, 15
177	Glasford	USA, Illinois	I	C	40°22' N 89°48' W	cryptoexplosion	5,000		Lower Paleozoic	1962	1-5, 7-9
178	Haughton	Canada, N.W.T.	I	B	75°22' N 89°40' W	shatter cones	30,000				7-9
179	Glover Bluff	USA, Wisconsin	I	C	43°55' N 89°35' W		430				1, 3, 4, 7-9
180	Kilmichael	USA, Mississippi	I	C	33°03' N 89°33' W		13,000			1962	1-4, 7-9
181	Des Plaines	USA, Illinois	I	C	42°02' N 87°56' W		10,000			1963	2-4, 7-9
182	Meen Lake	Canada, N.W.T.	I	C	64°58' N 87°41' W	lake	4,000				7-9
183	Wells Creek	USA, Tennessee	5	B	36°23' N 87°40' W	depression, crypto-explosion, shatter cones, the 5 craters "in a line"	14,000		200	1936	1-9, 15, 36
184	Kentland	USA, Indiana	I	B	40°45' N 87°24' W	central uplift, crypto-explosion, shatter cones, coesite	6,000		440	1938	1-9, 15
185	Slate Island, Lake Superior	Canada, Ontario	I	B	48°38' N 87°00' W						61
186	Howell	USA, Tennessee	I	C	35°15' N 86°35' W	cryptoexplosion	2,400		Lower Paleozoic	1939	1-9
187	Dycus Structure	USA, Tennessee	I	C	36°22' N 85°45' W	cryptoexplosion					1, 3, 4, 7, 8
188	Flynn Creek	USA, Tennessee	I	B	36°16' N 85°37' W	central uplift, crypto-explosion, shatter cones	3,600		300	1937	1-9, 36
189	Jephtha Knob	USA, Kentucky	I	C	38°06' N 85°06' W		3,200		350		1-9
190	Versailles	USA, Kentucky	I	C	38°02' N 84°45' W		1,500			1964	2-4, 7-9
191	Middlesboro	USA, Kentucky	I	B	36°37' N 83°44' W	central uplift, shatter cones	7,000		Paleozoic-Mesozoic	1963	2-9
192	Serpent Mound	USA, Ohio	I	B	39°02' N 83°25' W	central uplift, crypto-explosion, shatter cones, coesite	6,500		Mesozoic-Mesozoic	1936	1-9

No.	Name	Location	Number of craters	Classification	Latitude	Longitude	Notes	Diameter, meters	Depth, meters	Age, m.y.	Date of Verification	References
193	Sudbury	Canada, Ontario	1	B	46°20' N	81°10' W	depression, shatter cones, breccia, glass, nickel by volcanism	100,000		1,840	1962	2-9
194	Wanapitei	Canada, Ontario	1	B	46°44' N	80°44' W	coesite, shocked crystals	8,500		37	1971	6-9
195	Hudson Bay Arc, Nastapoka Arc	Canada, Quebec	1	D	57°40' N	80°02' W	sea	440,000	130	800	1953	2-4, 9, 20, 27
196	Skeleton	Canada, Ontario	1	C	45°16' N	79°27' W	lake	3,500		Paleozoic		6-9
197	Macamic	Canada, Quebec	1	D	48°52' N	79°01' W	lake	1,600			1956	1, 3, 4, 9
198	Brent Crater	Canada, Ontario	1	B	46°04' N	78°29' W	glass, breccia, shocked crystals, 10 drill holes	4,000	455	450	1956	1-9
199	Holleford	Canada, Ontario	1	B	44°47' N	76°30' W	gravity anomaly, coe-site, glass, breccia, 3 drill holes	2,340	318	550	1956	1-9
200	Lac Couture	Canada, Quebec	1	B	60°08' N	75°20' W	lake, shatter cones, glass, breccia, shocked crystals	15,000		150	1960	1, 3-9
201	Clearwater Lakes	Canada, Quebec	2	B	56°10' N	74°20' W	East and West Lake, gravity anomaly, shatter cones, glass, shocked crystals, 7 drill holes	32,000	45	285	1956	1-9
202	Ile Rouleau, Lake Mistassini	Canada, Quebec	1	B	50°41' N	73°53' W	astrobleme, shatter cones	1,000			1972	59
203	New Quebec, Ungava, Chubb Crater	Canada, Quebec	1	B	61°17' N	73°40' W	gravity anomaly, shocked crystals, aerial observation	3,200	400 ?	<10	1951	1-9, 14
204	Charlevoix, La Malbaie	Canada, Quebec	1	B	47°32' N	70°18' W	central uplift, glass	37,000		350	1967	4, 6-9
205	Manicouagan, Mushalagan	Canada, Quebec	1	B	51°28' N	68°37' W	central uplift, shatter cones, glass, breccia, shocked crystals	65,000	300	210	1960	1-9
206	Lac La Moirerie	Canada, Quebec	1	B	57°26' N	66°36' W	lakes	8,000		<600		8
207	Merewether, Hebron	Canada, Labrador	1	C	58°02' N	64°02' W	aerial observation	195	48		1957	1-4, 7-9, 14
208	Mistastin	Canada, Labrador	1	B	55°53' N	63°18' W	central uplift	28,000		40	1969	6, 7, 9
209	Mecatina	Canada, Quebec	1	D	50°50' N	59°22' W	in centre lake	3,200			1960	1-4, 9, 20 (frontispiece)
South America												
210	Cerro Soledad	Chile	1	C	21°50' S	69°50' W	No. 210-214 crater chain	300		No. 210-214 equal	1956	50

211	Quillagua – central craterfield	Chile	45	C	21°38' S	69°32' W	No. 210-214 crater chain	100	No. 210-214 equal	1956	50	
212	Quillagua – isolated crater	Chile	1	C	21°33' S	69°25' W	No. 210-214 crater chain	300	No. 210-214 equal	1956	50	
213	Quillagua – NNE craterfield	Chile	about 30 in 2 groups several	C	21°27' S	69°22' W	No. 210-214 crater chain	100	No. 210-214 equal	1956	50	
214	Quillagua – J. Kighley craterfield	Chile		C	21°15' S	69°08' W	No. 210-214 crater chain		No. 210-214 equal		50	
215	Monturaqui, Atacama	Chile	1	B	23°56' S	68°17' W	glass	480	31 Quaternary	1966	49, 51	
216	Campo del Cielo	Argentina	12	A	27°28' S	61°30' W	NiFe, glass	78	9 Pleistocene-Recent	1933	1-9, 21	
217	Araguainha Dome	Brazil, Mato Grosso	1	B	16°46' S	52°59' W	central uplift diameter 10,000	40,000		1973	16	
218	Serra da Cangalha	Brazil	1	C	08°05' S	46°52' W		12,000		1973	16	
Australia												
219	Dalgaranga	Western Australia	1	A	27°45' S	117°05' E	NiFe, fall of meso-siderite meteorite	23	5	0, 025	1923	1-9, 21
220	Wolf Creek	Western Australia	1	A	19°18' S	127°47' E	NiFe, typical rim	915	61 Pleistocene-Recent	1947	1-9, 21	
221	Mount Doreen	Northern Australia	4	D	22°05' S	131°30' E		610	15		1-4, 9, 48	
222	Gosses Bluff	Northern Australia	1	B	23°48' S	132°18' E	central uplift, shatter cones, glass	22,000	130	1966	4-9, 48	
223	Henbury	Northern Australia	15	A	24°34' S	133°10' E	NiFe, glass	198	18 Pleistocene-Recent	1930	1-9, 21	
224	Strangways	Northern Australia	1	B	15°12' S	133°35' E	central uplift	16,000	100	1971	6-9	
225	Liverpool	Northern Australia	1	B	12°24' S	134°03' E		1,600	100	1971	6-9	
226	Boxhole	Northern Australia	1	A	22°37' S	135°12' E	NiFe	175	16 Pleistocene-Recent	1937	1-9, 48	
227	Simpson Desert	Northern Australia	1	D	26°00' S	137°00' E					48	
228	Dirranbandi	Queensland	several	D	28°35' S	148°10' E				1967	4	
Arctica												
229	Hagens Fjord	Greenland	more than 50	D	81°45' N	28°15' W	aerial observation, because of remoteness few data			1954	2-4, 9	
Antarctica												
230	Ice Cap	Victoria Land	1	D	73°00' S	169°00' E	gravity anomaly	240,000		1959	60	

HISTORICAL APPENDIX

CATALOGUE OF 78 DISCREDITED IMPACT STRUCTURES

INTRODUCTION

This catalogue contains 78 structures which were reported to be meteoritic in the literature. In reality these structures are not formed by impact (Classification E = sites with indications of terrestrial origin = discredited impact structures). The sites again have been plotted on maps 30 X 42 cm. Copies of these maps are available from Pulsnitz Observatory.

No.	Name	Location	Number of craters	Classification	Latitude	Longitude	Notes	Diameter, meters	Depth, meters	Age, m.y.	Date of Verification	References
Europe												
1	La Sauvetat	France	1	E	44°52' N	01°31' E	depression	1,500				2, 3, 20, 62
2	Confolent	France	1	E	45°05' N	01°48' E	depression	1,500				2, 3, 20, 62
3	Paris Basin	France	1	E	48°56' N	02°30' E	depression	300,000				4, 9
4	Hérault, Faugères	France	6	E	45°32' N	03°08' E		300	50	0. 01 ?	1950	1-4, 9
5	Lac du Bouchet	France	1	E	44°56' N	03°47' E	lake	1,000			1965	2, 3
6	Urach Area	West Germany	?	E	48°30' N	09°24' E	300 volcanos				1962	14
7	Stopfenheim Kuppel	West Germany	1	E	49°04' N	10°53' E		8,000			1971	36, 43, 49
8	Lago di Bolsena	Italy	1	E	42°37' N	11°56' E	lake	13,000	305			35
9	Lago Trasimeno	Italy	1	E	43°08' N	12°07' E		15,000	257			35
10	Rötz-Tiefenbach	West Germany	many	E	49°23' N	12°35' E	depression 10 km long out of many craters, alemonite				1974	37-39
11	Cham-Stamsried	West Germany	many	E	49°14' N	12°37' E	depression 15 km long out of many craters				1974	37, 39
12	Horažďovice	Czechoslovakia	many	E	49°23' N	13°36' E	lakes district 15 km long out of many craters				1974	39

13	Blatná-Sedlice	Czechoslovakia	many	E	49°25' N 13°55' E	lakes district 20 km long out of many craters	origin with Nördlinger Ries ?	1974	39	
14	Strakonice-Písek	Czechoslovakia	many	E	49°17' N 14°03' E	lakes district 15 km long out of many craters	origin with Nördlinger Ries ?	1974	39	
15	Vodhany	Czechoslovakia	many	E	49°05' N 14°16' E	lakes district 30 km long out of many craters	origin with Nördlinger Ries ?	1974	39	
16	České Budějovice—Nový Hradý	Czechoslovakia	many	E	48°50' N 14°40' E	lakes district 30 km long out of many craters, alemonite	origin with Nördlinger Ries ?	1974	38, 39	
17	Třeboň—Lomnice—Veselí	Czechoslovakia	many	E	49°04' N 14°45' E	lakes district 30 km long out of many craters	origin with Nördlinger Ries ?	1974	39	
18	Jindřichuv Hradec	Czechoslovakia	many	E	49°07' N 15°07' E	lakes district 20 km long out of many craters	origin with Nördlinger Ries ?	1974	39	
19	Edelbach	Austria	many	E	48°40' N 15°26' E	depression out of many craters, alemonite	origin with Nördlinger Ries ?	1974	39	
20	Gföhl	Austria	many	E	48°30' N 15°30' E	depression out of many craters, alemonite	origin with Nördlinger Ries ?	1974	39	
21	Jasenice	Czechoslovakia	1	E	49°27' N 18°00' E	near Valašské Meziříčí, circular	origin with Nördlinger Ries ?	1970	53	
22	Radhošť	Czechoslovakia	1	E	49°28' N 18°15' E	semicircular	origin with Nördlinger Ries ?	1961	53	
23	Hungarian Plain	Hungary	1	E	47°00' N 21°00' E	depression	100 ?	1933	3, 9, 21	
24	Ilijinzy	USSR, Ukrainsk	1	E	49°08' N 29°12' E	4,000	100	1973	56	
25	Black Sea — Bosphorus	USSR, Turkey, Greece	many	E	43°00' N 35°00' E	sinking of territory by meteorite shower in 1680 B.C.	2,300	0, 003655	22	
26	Kasantip	USSR, Crimea	1	E	45°30' N 35°48' E	reef	4,500		1968	54
Asia										
27	Iriston	USSR, North Ossetia	1	E	42°54' N 43°54' E	depression	500		1966	54
28	Gwarkuh	Persia, Baluchistan	1	E	28°30' N 60°40' E		45		1933	2-4, 9
29	Sea of Japan	Japan	1	E	40°00' N 135°00' E	sea	800,000		1964	2, 3, 20

No.	Name	Location	Number of craters	Classification	Lat. ude	Longitude	Notes	Diameter, meters	Depth meters	Age, m.y.	Date of Verification	References
Africa												
30	Richât	Mauritania	several	E	21°09' N	11°24' W	member of crater chain No. 127-136?					2-5, 9, 12, 42
31	Quarkziz	Algeria	1	E	24°00' N	07°30' E						34
32	Butare Crater	Rwanda	1	E	02°36' S	29°44' E				1966		4
33	Victoria Njansa	East Africa	1	E	01°00' S	33°00' E	lake	250,000	1,180			44
34	Bishoftu Craters	Ethiopia	14	E	0°45' N	39°00' E	45 km SW Addis Ababa				1951	2, 3
35	Sokotra	South Yemen	1	E	12°36' N	53°40' E						4, 9
North America												
36	Ka-Imu-Hoku	USA, Hawaii	1	E	20°55' N	156°53' W					1924	3, 4, 9
37	Ubehebe	USA, California	2	E	36°59' N	117°32' W		150			1965 ¹	1, 3, 4
38	Panemint	USA, California	1	E	36°05' N	117°22' W		70	12		1961	3, 4, 9
39	Duckwater	USA, Nevada	1	E	38°07' N	115°07' W		68	5		1951	1, 3, 4
40	Elegante	Mexico, Sonora	1	E	31°40' N	112°55' W					1952	2, 9
41	Agnak Island	Canada, N.W.T.	4	E	67°30' N	108°50' W		800			1965	17
42	Cerro Colorado	USA, New Mexico	1	E	35°06' N	107°00' W	holes					1, 3, 4
43	Afton Craters	USA, New Mexico	3	E	32°05' N	106°50' W					1963	3, 4, 9
44	Crestone	USA, Colorado	1	E	38°52' N	105°39' W					1948	1-4, 9
45	New Mexico Crater, Mora County	USA, New Mexico	1	E	36°00' N	105°00' W	aerial observation	9	1			
Mora County												
46	Ellef Ringness Island	Canada, N.W.T.	4	E	78°30' N	102°30' W					1951	3, 4, 9
47	Wilbarger Dome	USA, Texas	1	E	33°50' N	99°15' W					1963	3, 4, 9
48	Tepehiti	Mexico, Puebla	1	E	19°13' N	97°26' W	circular structure	1,180	92		1974	32
49	Winkler	USA, Kansas	1	E	39°29' N	96°49' W	depression	760			1961	3, 4, 9
50	Gulf of Campeche	Mexico	1	E	21°00' N	94°00' W	sea	650,000	3,300		1964	2, 3, 20
51	Tiffin	USA, Iowa	1	E	41°48' N	91°41' W		30	2, 5		1937	1-4, 9
52	Limestone Mountain Disturbance	USA, Michigan	1	E	47°00' N	89°00' W	position inexact				1943	2
Disturbance												
53	Hicks Dorn	USA, Illinois	1	E	37°42' N	88°13' W					1954	2, 3
54	Mosquito Gulf	Costarica, Colombia	1	E	10°00' N	81°00' W	sea	300,000	2,000		1964	2, 3, 20
55	Parry Sound	Canada, Ontario	1	E	45°22' N	79°55' W					1965?	4, 9
56	Carolina Bays	USA, North and South Carolina	3	E	34°00' N	77°00' W	sea	100,000	200?		1933	2, 3, 9, 21

57	Franktown	Canada, Ontario	E	45°03' N	76°04' W	1,200	8	400	1977	61C
58	Lac Chatelein	Canada, Quebec	E	60°15' N	74°36' W	55?	5			
59	St. John Lake	Canada, Quebec	E	46°40' N	72°00' W					
60	Sault aux Cochons	Canada, Quebec	E	49°17' N	70°05' W	11,200			1960	2-4, 9
61	Ungava Bay	Canada, Quebec	E	60°00' N	67°20' W	240,000	100		1960	1-4, 9, 20
62	Menihék Lakes	Canada, Quebec	2	53°42' N	66°40' W	4,800			1960	1-4, 9
63	Merrivell	Canada, Quebec	1	58°00' N	65°00' W					4, 9
64	Michikamow	Canada, Labrador	1	54°34' N	64°27' W	5,600			1960	2, 9
65	Gulf of St. Lawrence	Canada	1	47°00' N	63°00' W	300,000	50		1960	2-4, 9, 20, 27
66	Bermuda	Atlantic	1	30°00' N	62°00' W	2,250,000	5,000			2, 20
South America										
67	Colluma	Bolivia	1	18°32' S	68°05' W				1966	4
68	Golfo San Jorge	Argentina	1	46°00' S	67°00' W	200,000	80		1964	2, 3, 20
69	Lesser Antilles	West Indies	1	14°30' N	66°30' W	600,000	5,000	400	1964	2, 3, 9, 20
70	Tierra del Fuego	Argentina – Falkland Islands	1	53°00' S	65°00' W	600,000	400		1964	2, 3, 20
71	Samborombon Bay	Argentina	1	36°00' S	57°00' W	100,000	16		1964	2, 3, 20
Australia										
72	Lake Hamilton depression	South Australia	1	34°00' S	135°20' E					1, 4
73	Eastern Arnhem Land	Northern Australia	1	13°10' S	135°40' E				1950	3
74	Eyre Peninsula	South Australia	several	34°30' S	136°00' E				1947	2-4, 9
75	Bass Strait	Tasmania	1	40°00' S	146°00' E	270,000	80		1967	4
76	Tasmania Crater	Tasmania	1	43°20' S	147°00' E	1,000		0, 70	1973	58
Antarctica										
77	Weddell Sea	south-east South America	1	67°00' S	40°00' W	1,000,000	5,000		1964	2, 3, 20
78	Wilkes Land	southwest Australia	1	71°00' S	140°00' E	240,000			1961	3, 4, 9

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