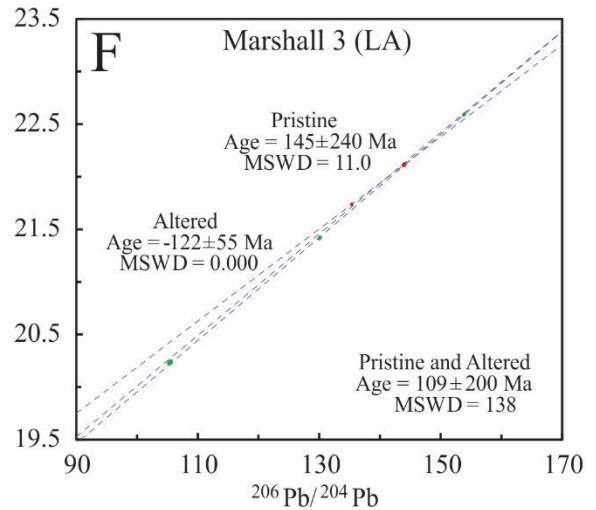
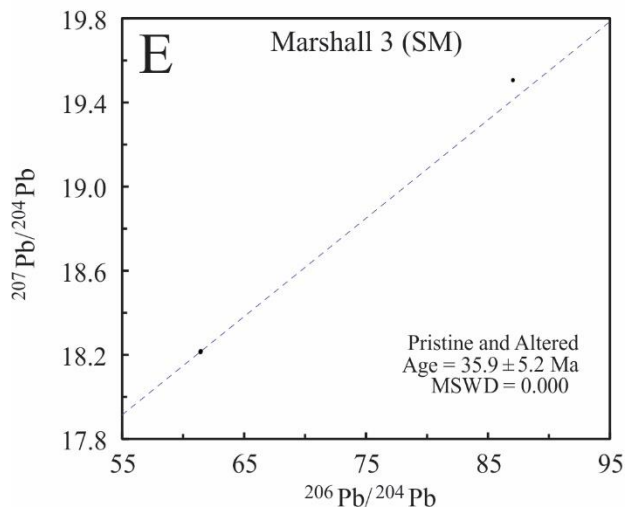
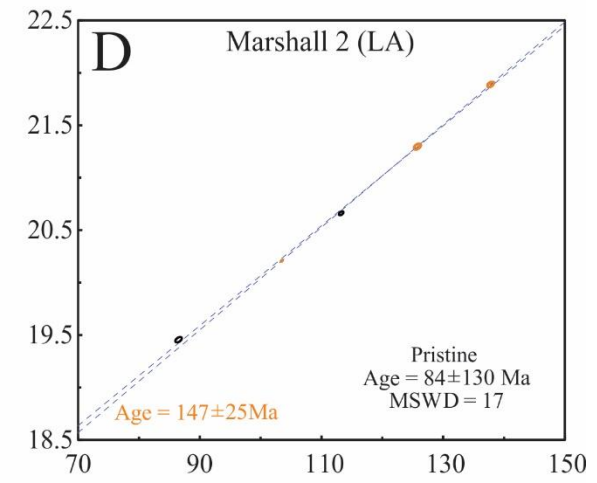
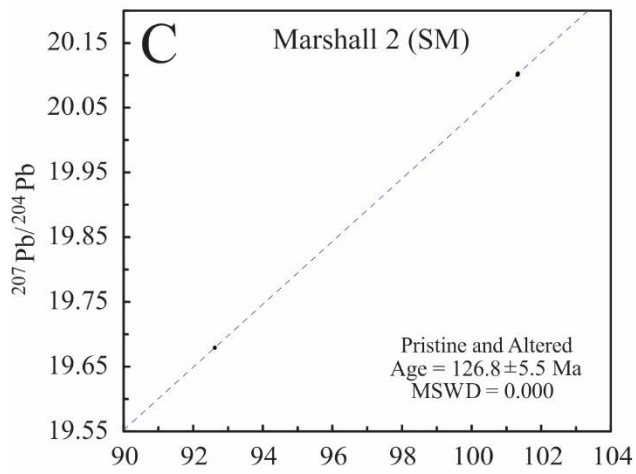
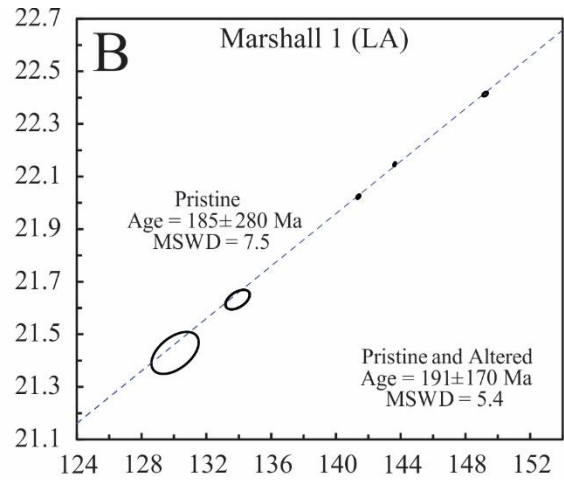
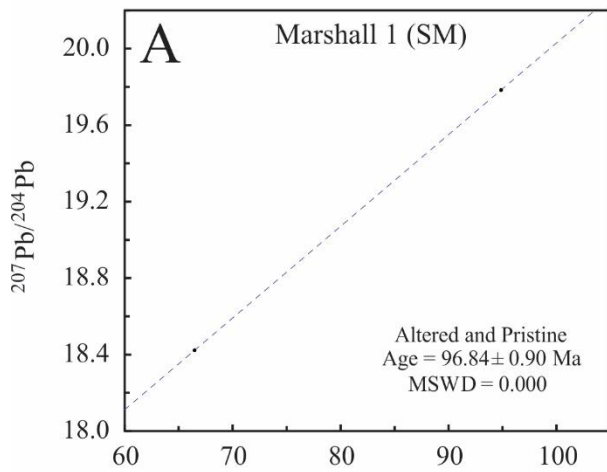
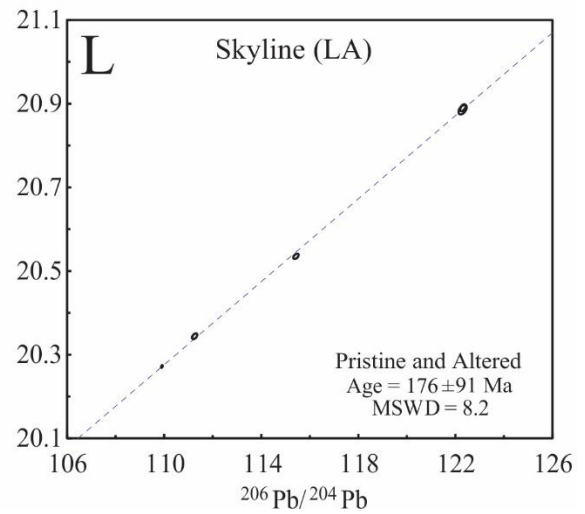
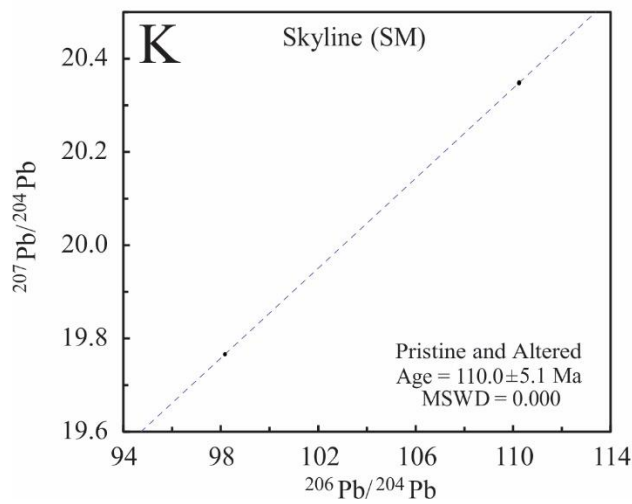
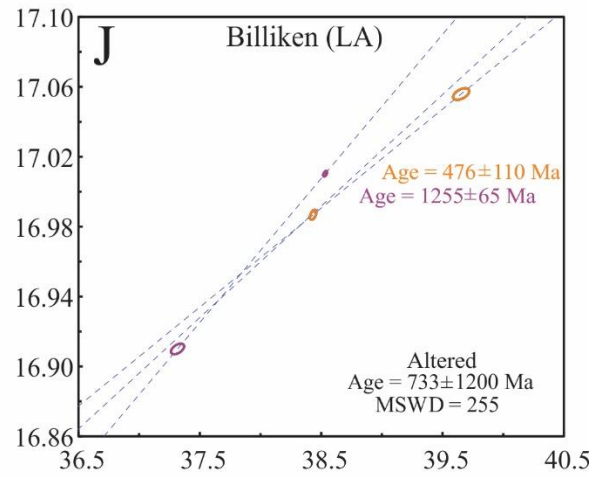
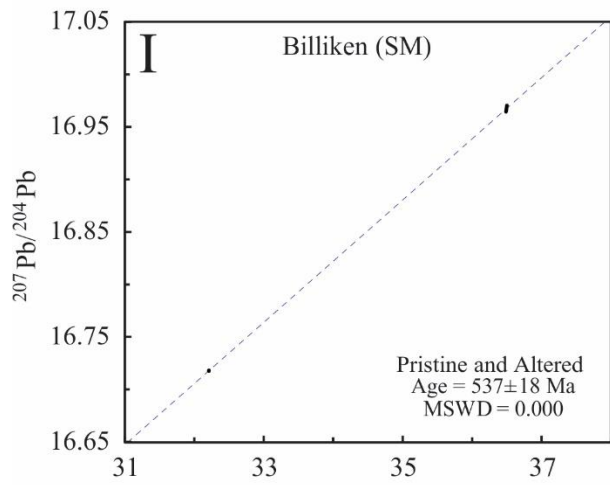
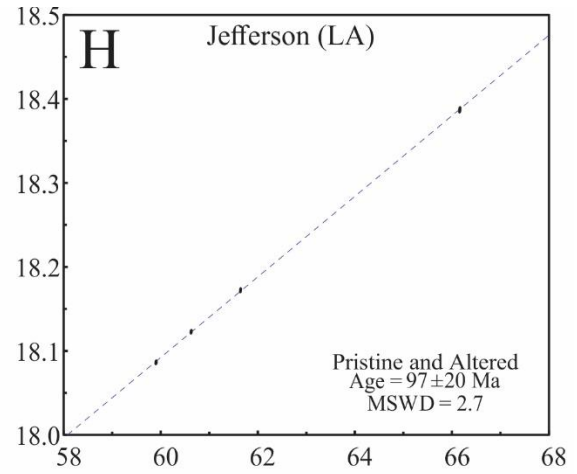
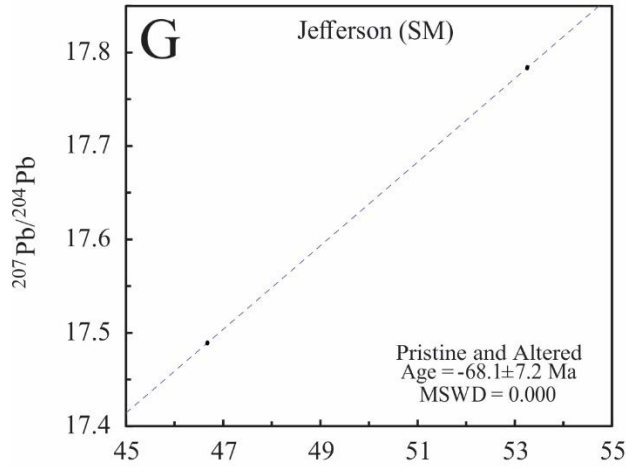


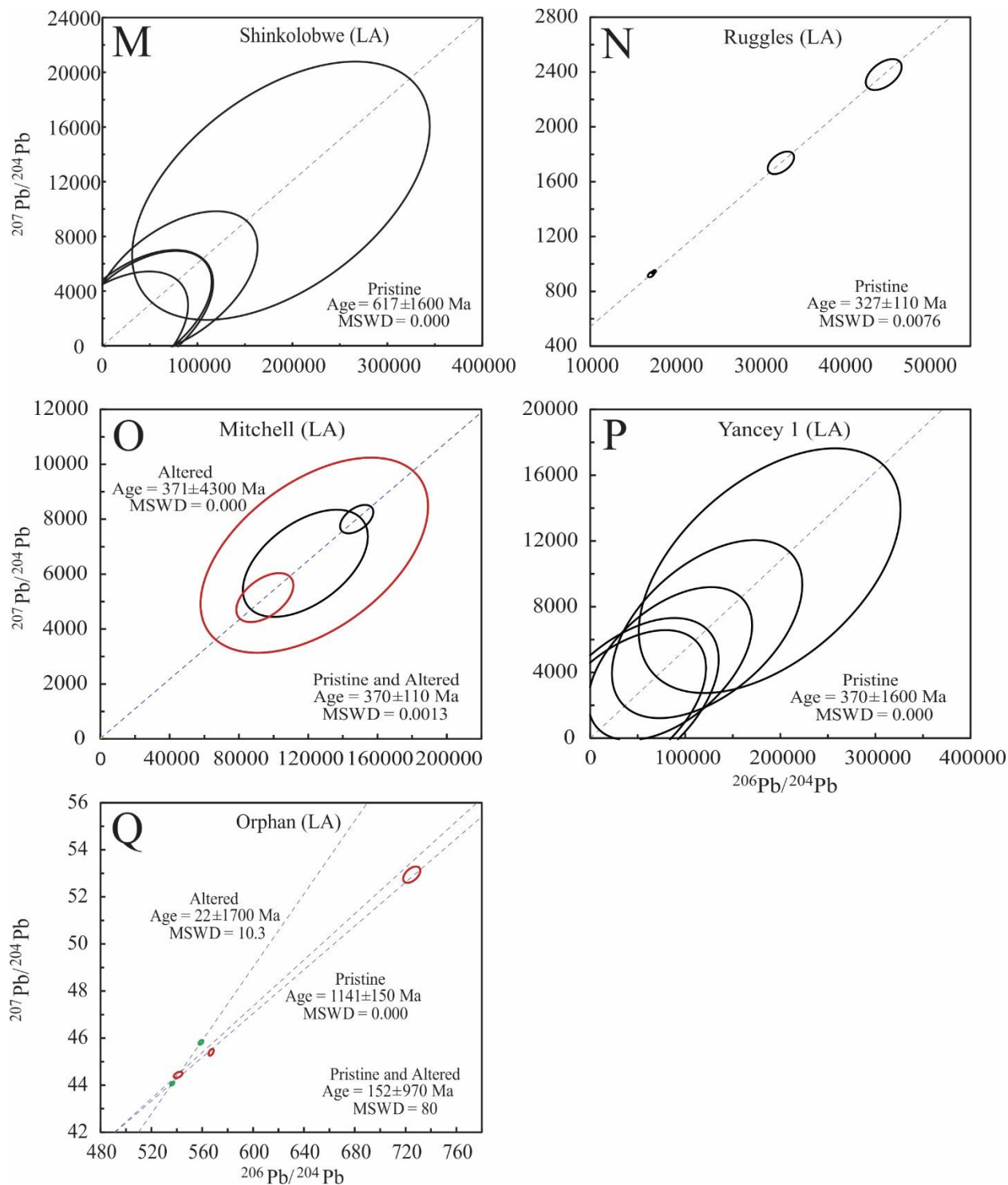
# The Role of Continental Crust in the Formation of Uraninite-Based Ore Deposits

S.R. Lewis, A. Simonetti, L. Corcoran, S.S. Simonetti, C. Dorais, and P.C. Burns

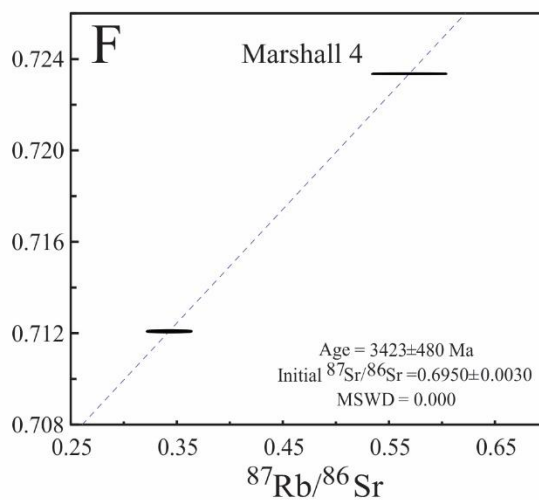
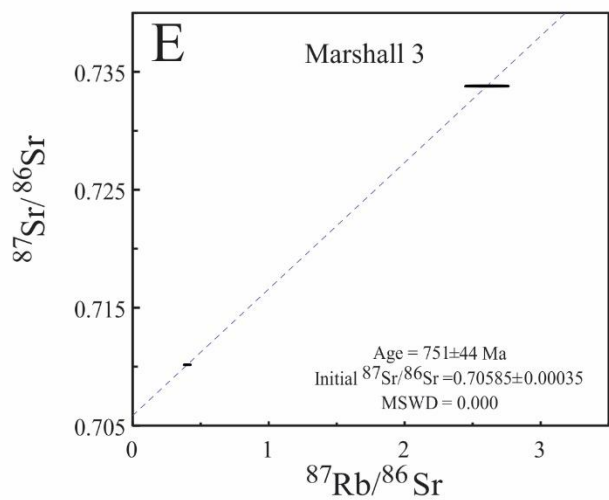
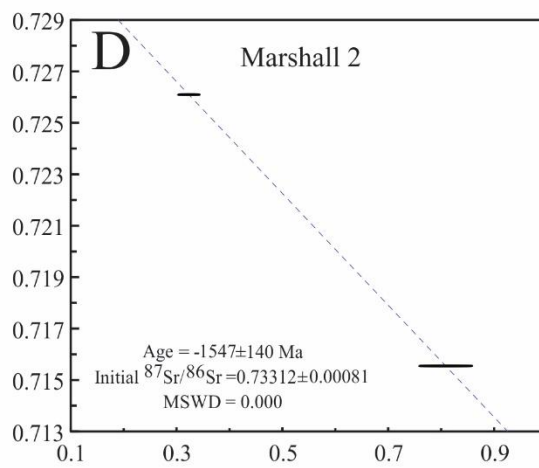
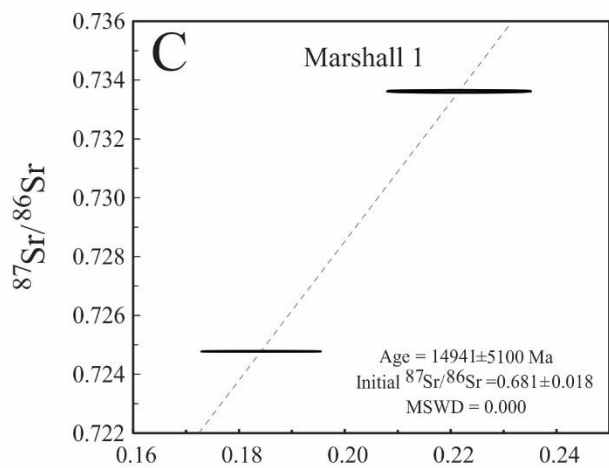
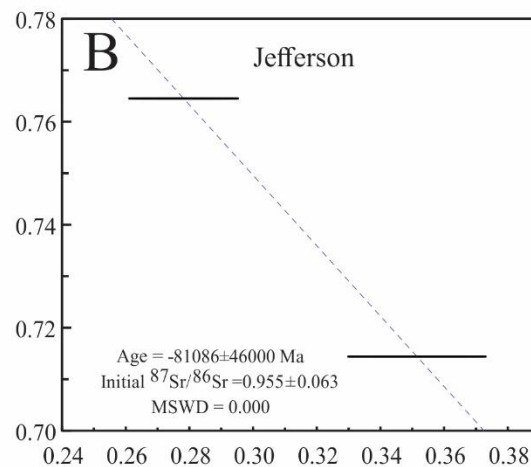
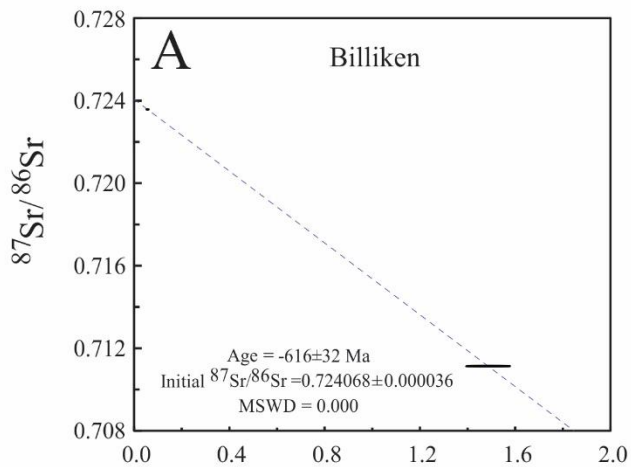
## Supplementary Materials

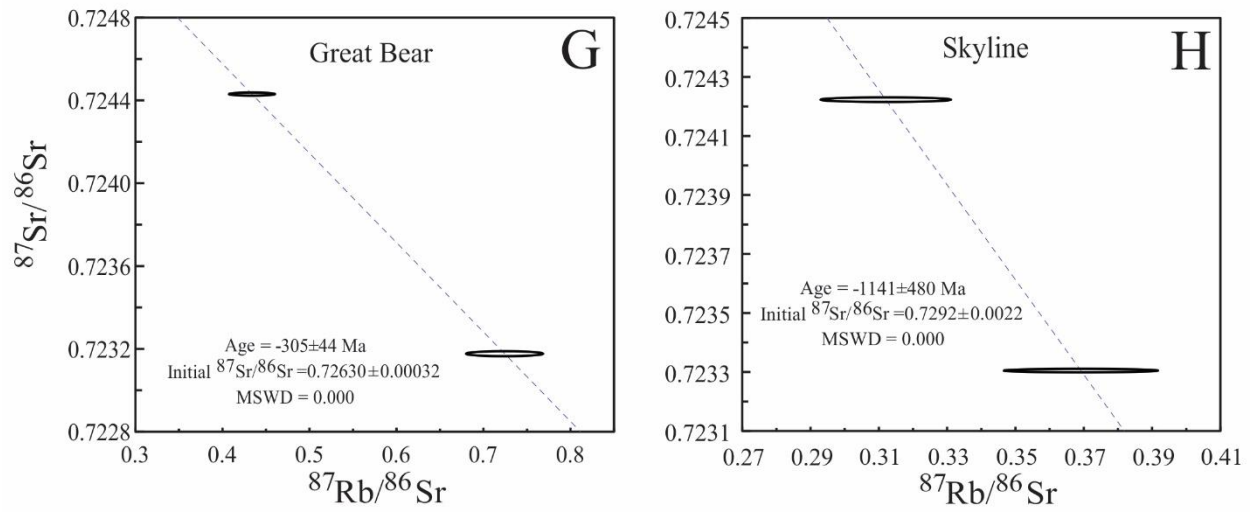




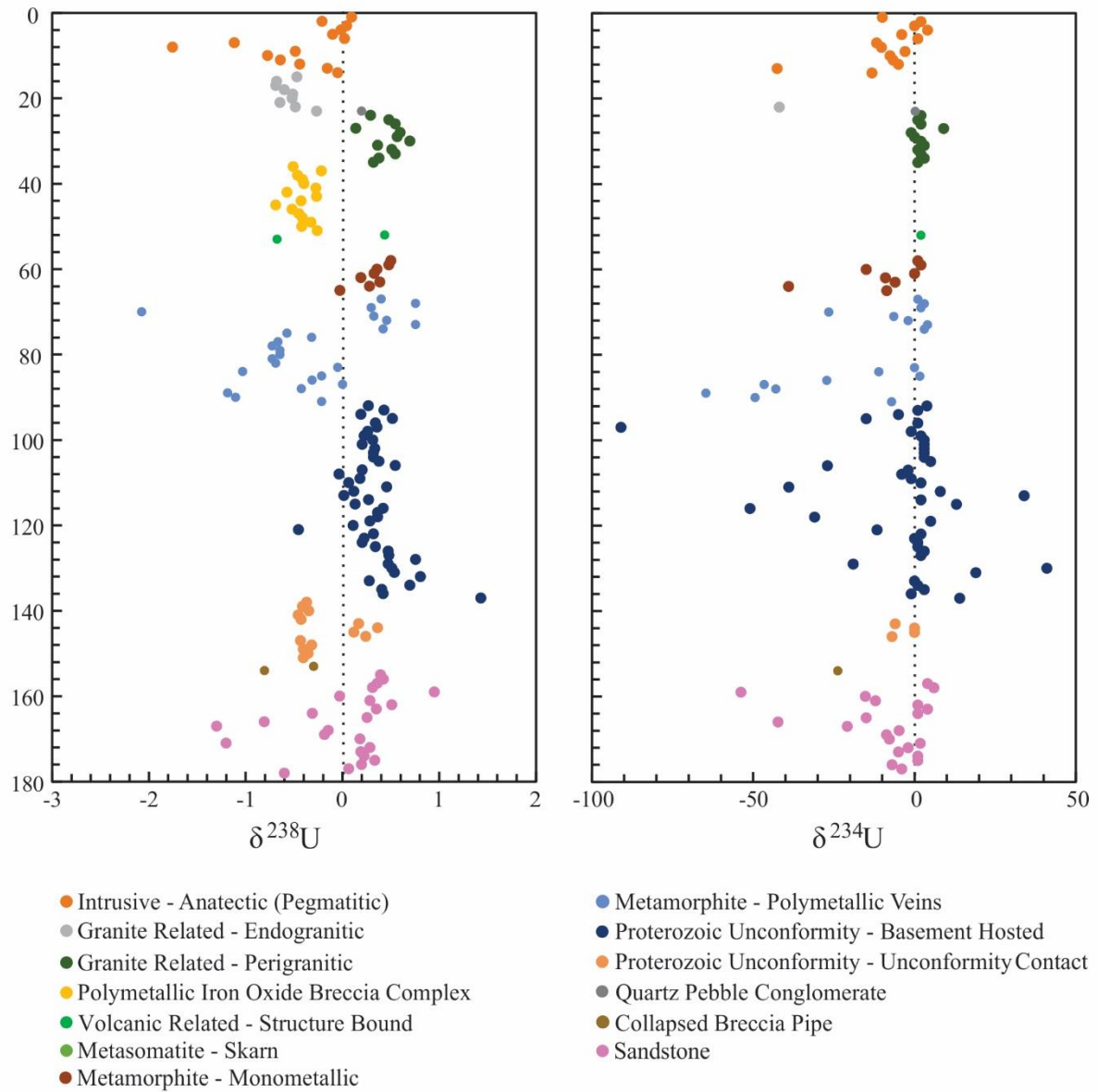


**Figure S1.** Secondary Pb-Pb isochrons determined using SM- and LA-MC-ICP-MS for uraninites from this study. (A–Q) All ellipsoids represent  $2\sigma$  error. Black=pristine and altered, Red=pristine, Green=altered, Orange and Purple=interpretive isochron.





**Figure S2.** Rb-Sr isochrons obtained by SM-MC-ICP-MS. (A–H) All ellipses are at the  $2\sigma$  level for uncertainty.



**Figure S3.**  $\delta^{238}\text{U}$  (left) and  $\delta^{234}\text{U}$  (right) values. See Table A1 for uraninite values and sources.

**Table S1.** Compiled list of uraninites from several previous studies.

	<b>Sample</b>	<b>Location</b>	<b>Sub type</b>	$^{238}\text{U}/^{235}\text{U}$	$\delta^{238}\text{U}$	$\delta^{234}\text{U}$	<b>Reference</b>
<b>Intrusive</b>							
1	M26947	Ingersoll Mine, Pennington Co.	Anatectic (pegmatitic)	137.86	0.09	-10.0	[9]
2	M19033	Wood Lode, Central City, CO	Anatectic (pegmatitic)	137.82	-0.21	2.0	[9]
3	M19032	German Mine, Gilpin Co., CO	Anatectic (pegmatitic)	137.86	0.04	0.0	[9]
4	M11336	Black Hawk, Gilpin Co, CO	Anatectic (pegmatitic)	137.85	-0.01	4.0	[9]
5	M21708	Penland, NC	Anatectic (pegmatitic)	137.84	-0.10	-4.0	[9]
6	M19255	Grafton Centre, NH	Anatectic (pegmatitic)	137.85	0.02	1.0	[9]
7	344	Ruggles Mine, NH (peg)	Anatectic (pegmatitic)	137.70	-1.12	-11.7	This study
8	334	Mitchell Co., NC (peg)	Anatectic (pegmatitic)	137.61	-1.76	-10.3	This study
9	333P	Yancy County, North Carolina	Anatectic (pegmatitic)	137.78	-0.49	-3.0	[59]
10	338B	Yancy County, North Carolina	Anatectic (pegmatitic)	137.74	-0.77	-7.6	[59]
11	340.1B	Bancroft, Ontario, Canada	Anatectic (pegmatitic)	137.76	-0.64	-6.6	[59]
12	340.1P	Bancroft, Ontario, Canada	Anatectic (pegmatitic)	137.79	-0.44	-5.0	[59]
13	348.1B	Saskatchewan, Canada	Anatectic (pegmatitic)	137.83	-0.16	-42.6	[59]
14	375P	Cardiff Township, Ontario, Canada	Anatectic (pegmatitic)	137.84	-0.05	-13.2	[59]
<b>Granite Related</b>							
15	$\Delta 33$	Evereest area, Southern Tibet	Endogranitic	137.78	-0.47		[61]
16	2-5	Urtuy massif, Eastern Transbaikalia, Russian Federation	Endogranitic	137.76	-0.68		[62]
17	2-5	Urtuy massif, Eastern Transbaikalia, Russian Federation	Endogranitic	137.75	-0.69		[62]
18	2-5	Urtuy massif, Eastern Transbaikalia, Russian Federation	Endogranitic	137.77	-0.60		[62]
19	2012	Khadatkanda, Transbaikalia, Russia	Endogranitic	137.78	-0.52		[62]
20	2012	Khadatkanda, Transbaikalia, Russia	Endogranitic	137.78	-0.52		[62]
21	2012	Khadatkanda, Transbaikalia, Russia	Endogranitic	137.76	-0.65		[62]
22	564P	Jachymov, Czech Republic	Endogranitic	137.78	-0.49	-41.9	[59]
23	Midnite Mine	Midnite Mine, USA	Endogranitic	137.80	-0.27		[25]
24	M9450	St. Stephan's, England	Perigranitic	137.89	0.29	2.0	[9]
25	M6939	St. Just Wheal Owles, England	Perigranitic	137.92	0.48	1.0	[9]
26	M16900	St. Just Wheal Owles, England	Perigranitic	137.92	0.54	2.0	[9]
27	M33227	St. Just Wheal Edward Mine, England	Perigranitic	137.87	0.14	9.0	[9]
28	M16899	St. Just, England	Perigranitic	137.93	0.59	-1.0	[9]
29	M13323	Cornwall, England	Perigranitic	137.93	0.57	0.0	[9]
30	M15328	Pribram, Czech Republic	Perigranitic	137.95	0.70	2.0	[9]
31	M19330	Jachymov, Czech Republic	Perigranitic	137.90	0.36	3.0	[9]
32	M14887	Jachymov, Czech Republic	Perigranitic	137.92	0.51	1.0	[9]
33	M9176B	Jachymov, Czech Republic	Perigranitic	137.92	0.54	2.0	[9]
34	M12106	Jachymov, Czech Republic	Perigranitic	137.90	0.38	3.0	[9]
35	M9176A	Jachymov, Czech Republic	Perigranitic	137.89	0.32	1.0	[9]
<b>Polymetallic Iron Oxide Breccia Complex</b>							
36	Mount Painter	Mount Painter		137.77	-0.51		[25]
37	OD1	Olympic Damn, Australia		137.82	-0.22		[20]
38	OD4	Olympic Damn, Australia		137.79	-0.46		[20]
39	OD6	Olympic Damn, Australia		137.79	-0.41		[20]
40	OD10	Olympic Damn, Australia		137.79	-0.40		[20]
41	OD11	Olympic Damn, Australia		137.81	-0.28		[20]
42	OD14	Olympic Damn, Australia		137.77	-0.57		[20]
43	OD15	Olympic Damn, Australia		137.81	-0.27		[20]

Table S1. Cont.

	Sample	Location	Sub type	$^{238}\text{U}/^{235}\text{U}$	$\delta^{238}\text{U}$	$\delta^{234}\text{U}$	Reference
44	OD16	Olympic Damn, Australia		137.79	-0.43		[20]
45	OD17	Olympic Damn, Australia		137.75	-0.69		[20]
46	OD29	Olympic Damn, Australia		137.78	-0.52		[20]
47	OD34	Olympic Damn, Australia		137.79	-0.45		[20]
48	OD36	Olympic Damn, Australia		137.79	-0.41		[20]
49	OD38	Olympic Damn, Australia		137.80	-0.33		[20]
50	OD39	Olympic Damn, Australia		137.79	-0.42		[20]
51	OD42	Olympic Damn, Australia		137.81	-0.26		[20]
<b>Volcanic Related</b>							
52	M32072	Bolivia	Structure Bound	137.91	0.44	2.0	[9]
53	White King Mine	White King Mine	Structure Bound	137.74	-0.68		[25]
<b>Metasomatite</b>							
54	33B	Cage District, Canadian Shield, Canada	Skarn	137.76	-0.63		[62]
55	33B	Cage District, Canadian Shield, Canada	Skarn	137.75	-0.69		[62]
56	07-1A	Cage District, Canadian Shield, Canada	Skarn	137.78	-0.48		[62]
57	07-1A	Cage District, Canadian Shield, Canada	Skarn	137.77	-0.61		[62]
<b>Metamorphite</b>							
58	M22307	Ace Mine, Beaverlodge area, Canada	Monometallic Vein	137.92	0.50	1.0	[9]
59	5788 Fay deposit	Fay deposit, Beaverlodge area, Canada	Monometallic Vein	137.92	0.48	2.0	[9]
60	6126 Nesbine Labine	Nesbine Labine, Beaverlodge area, Canada	Monometallic Vein	137.90	0.36	-15.0	[9]
61	6120 Ace deposit	Ace deposit, Beaverlodge area, Canada	Monometallic Vein	137.89	0.33	0.0	[9]
62	VR Fay mine	Fay mine, 24 level, Beaverlodge area, Canada	Monometallic Vein	137.88	0.19	-9.0	[9]
63	Eagle Ace Pitch 8208	Eagle Ace deposit, Beaverlodge area, Canada	Monometallic Vein	137.90	0.38	-6.0	[9]
64	522	Biliken Lode, Jefferson Co., CO (metasedimentary)	Monometallic Vein	137.89	0.28	-39.1	This study
65	637	Jefferson Co. CO (metasedimentary)	Monometallic Vein	137.85	-0.03	-8.6	This study
66	348.1P	Saskatchewan, Canada	Monometallic Vein	137.78	-0.51	-7.6	[59]
67	M19342	Great Bear, Canada	Polymetallic Vein	137.90	0.40	1.0	[9]
68	M20949	Great Bear, Canada	Polymetallic Vein	137.95	0.75	3.0	[9]
69	Bear Mine 5121F	Great Bear, Canada	Polymetallic Vein	137.89	0.30	2.0	[9]
70	626	Great Bear, Canada	Polymetallic Vein	137.56	-2.08	-26.6	This study
71	423P	Great Bear Lake, Canada	Polymetallic Vein	137.89	0.32	-6.5	[59]
72	M16456	Echo Bay, Canada	Polymetallic Vein	137.91	0.46	-2.0	[9]
73	M16988	Echo Bay, Canada	Polymetallic Vein	137.95	0.75	4.0	[9]
74	M21080	Eldorado Mine, Canada	Polymetallic Vein	137.91	0.42	3.0	[9]
75	Nk-1	Nkana deposit, Zambia	Polymetallic Vein	137.77	-0.57		[62]
76	Nk-2	Nkana deposit, Zambia	Polymetallic Vein	137.81	-0.32		[62]
77	2236	Shinkolobwe	Polymetallic Vein	137.76	-0.67		[62]
78	2236	Shinkolobwe	Polymetallic Vein	137.75	-0.73		[62]
79	2633	Shinkolobwe	Polymetallic Vein	137.76	-0.65		[62]
80	2633	Shinkolobwe	Polymetallic Vein	137.76	-0.65		[62]



Table S1. *Cont.*

	Sample	Location	Sub type	$^{238}\text{U}/^{235}\text{U}$	$\delta^{238}\text{U}$	$\delta^{234}\text{U}$	Reference
81	2633	Shinkolobwe	Polymetallic Vein	137.75	-0.73		[62]
82	2633	Shinkolobwe	Polymetallic Vein	137.75	-0.69		[62]
83	M13075	Shinkolobwe	Polymetallic Vein	137.84	-0.05	0.0	[9]
84	662P	Shinkolobwe, DR Congo	Polymetallic Vein	137.71	-1.03	-11.1	[59]
85	437	Shinkwobwe	Polymetallic Vein	137.82	-0.22	1.7	This study
86	809BP	Marshall Pass, CO	Polymetallic Vein (hydrothermal)	137.81	-0.31	-27.2	[59]
87	530	Marshall Pass, CO	Polymetallic Vein (hydrothermal)	137.85	0.00	-46.6	This study
88	531	Marshall Pass, CO	Polymetallic Vein (hydrothermal)	137.79	-0.43	-43.0	This study
89	623	Marshall Pass, CO	Polymetallic Vein (hydrothermal)	137.69	-1.19	-64.7	This study
90	624	Near Sargents, CO	Polymetallic Vein (hydrothermal)	137.70	-1.11	-49.5	This study
91	516P	Northern Territory, Australia	Polymetallic Vein	137.82	-0.22	-7.1	[59]
<b>Proterozoic Unconformity</b>							
92	604B	Northern Territory, Australia	Basement-Hosted	137.89	0.27	3.8	[59]
93	MRD101-72.6	King River, Australia	Basement-Hosted	137.91	0.43	1.0	[9]
94	NA4-40.5	Nabarlek, Australia	Basement-Hosted	137.88	0.19	-5.0	[9]
95	NA88-29.0	Nabarlek, Australia	Basement-Hosted	137.92	0.52	-15.0	[9]
96	NA1-40.5	Nabarlek, Australia	Basement-Hosted	137.90	0.34	1.0	[9]
97	NA-39-13.8	Nabarlek, Australia	Basement-Hosted	137.90	0.36	-91.0	[9]
98	JU-26-34	Jabiluka, Australia	Basement-Hosted	137.89	0.26	-1.0	[9]
99	0186V-475.0	Jabiluka, Australia	Basement-Hosted	137.88	0.22	2.0	[9]
100	99J7	Jabiluka, Australia	Basement-Hosted	137.89	0.31	3.0	[9]

Table S1. *Cont.*

	Sample	Location	Sub type	$^{238}\text{U}/^{235}\text{U}$	$\delta^{238}\text{U}$	$\delta^{234}\text{U}$	Reference
101	R129V-207.9	Jabiluka, Australia	Basement-Hosted	137.88	0.20	3.0	[9]
102	N147V-404.5	Jabiluka, Australia	Basement-Hosted	137.90	0.33	3.0	[9]
103	JU-38-41.3	Jabiluka, Australia	Basement-Hosted	137.89	0.32	3.0	[9]
104	JU-37-59	Jabiluka, Australia	Basement-Hosted	137.89	0.32	3.0	[9]
105	S3-115-916	Jabiluka, Australia	Basement-Hosted	137.90	0.38	5.0	[9]
106	V39-226.6m	Jabiluka, Australia	Basement-Hosted	137.92	0.54	-27.0	[9]
107	S186V-224.3	Jabiluka, Australia	Basement-Hosted	137.88	0.20	-2.0	[9]
108	QUNK-32.3m	Jabiluka, Australia	Basement-Hosted	137.84	-0.04	-4.0	[9]
109	QUNK-34.1m	Jabiluka, Australia	Basement-Hosted	137.87	0.18	-1.0	[9]
110	U135V-179.3	Jabiluka, Australia	Basement-Hosted	137.86	0.07	2.0	[9]
111	V39-235.6	Jabiluka, Australia	Basement-Hosted	137.91	0.46	-39.0	[9]
112	CX56-3-680.5	Millenium, Athabasca Basin	Basement-Hosted	137.87	0.12	8.0	[9]
113	CX56-3-712	Millenium, Athabasca Basin	Basement-Hosted	137.85	0.01	34.0	[9]
114	CX48-1-689	Millenium, Athabasca Basin	Basement-Hosted	137.89	0.27	2.0	[9]
115	CX48-1-695	Millenium, Athabasca Basin	Basement-Hosted	137.87	0.13	13.0	[9]
116	CX48-791	Millenium, Athabasca Basin	Basement-Hosted	137.91	0.42	-51.0	[9]
117	SW10-366.5	Southwest, Athabasca Basin	Basement-Hosted	137.90	0.36	-193.0	[9]
118	DF22-902	Dawn Lake, Athabasca Basin	Basement-Hosted	137.90	0.36	-31.0	[9]
120	7-191-71ft	Rabbit Lake, Athabasca Basin	Basement-Hosted	137.86	0.11	-203.0	[9]
121	511B	Rabbit Lake, Saskatchewan, Canada	Basement-Hosted	137.79	-0.46	-11.6	[59]
122	Sue-C-551-96.5	SUE, Athabasca Basin	Basement-Hosted	137.89	0.32	2.0	[9]
123	Sue-C-528-95.5	SUE, Athabasca Basin	Basement-Hosted	137.88	0.22	0.0	[9]
124	Sue-C-528-129.5	SUE, Athabasca Basin	Basement-Hosted	137.88	0.20	1.0	[9]
125	Sue-C-528130	SUE, Athabasca Basin	Basement-Hosted	137.90	0.34	1.0	[9]
126	Sue-E-417113.3	SUE-E, Athabasca Basin	Basement-Hosted	137.91	0.47	3.0	[9]
127	EPE63-076.6	Eagle Point Extension, Athabasca Basin	Basement-Hosted	137.92	0.48	2.0	[9]
128	EPE80-319.5	Eagle Point Extension, Athabasca Basin	Basement-Hosted	137.95	0.75	-217.0	[9]
129	EPE44-236	Eagle Point Extension, Athabasca Basin	Basement-Hosted	137.91	0.47	-19.0	[9]
130	EPE44-251	Eagle Point Extension, Athabasca Basin	Basement-Hosted	137.92	0.51	41.0	[9]
131	EPE44-317	Eagle Point Extension, Athabasca Basin	Basement-Hosted	137.92	0.54	19.0	[9]
132	EPE59-137.4	Eagle Point Extension, Athabasca Basin	Basement-Hosted	137.96	0.81	281.0	[9]
133	H-799-57	Eagle Point, Athabasca Basin	Basement-Hosted	137.89	0.28	0.0	[9]
134	EP-2	Eagle Point, Athabasca Basin	Basement-Hosted	137.95	0.70	1.0	[9]
135	EP222-215.5	Eagle Point, Athabasca Basin	Basement-Hosted	137.91	0.41	3.0	[9]
136	VR29-W2-806 U1	Centennial (massive), Athabasca Basin	Basement-Hosted	137.91	0.42	-1.0	[9]
137	VR29-W2-806 U2	Centennial (colloform), Athabasca Basin	Basement-Hosted	138.05	1.43	14.0	[9]
138	8658/8	Shea Creek, Athabasca, Canada	Unconformity-Contact	137.80	-0.37		[62]
139	8658/8	Shea Creek, Athabasca, Canada	Unconformity-Contact	137.79	-0.41		[62]
140	9081/9	Shea Creek, Athabasca, Canada	Unconformity-Contact	137.80	-0.35		[62]
141	9081/9	Shea Creek, Athabasca, Canada	Unconformity-Contact	137.79	-0.46		[62]

Table S1. Cont.

Sample	Location	Sub type	$^{238}\text{U}/^{235}\text{U}$	$\delta^{238}\text{U}$	$\delta^{234}\text{U}$	Reference	
142	9081/9	Shea Creek, Athabasca, Canada	Unconformity-Contact	137.79	-0.43	[62]	
143	McRiv387715	McArthur, Athabasca Basin	Unconformity-Contact	137.87	0.17	-6.0	[9]
144	McRiv353-50.2	McArthur, Athabasca Basin	Unconformity-Contact	137.90	0.36	0.0	[9]
145	McRiv236-515	McArthur, Athabasca Basin	Unconformity-Contact	137.87	0.12	0.0	[9]
146	McRiv208-533	McArthur, Athabasca Basin	Unconformity-Contact	137.88	0.24	-7.0	[9]
147	9079/22	McArthur, Athabasca, Canada	Unconformity-Contact	137.79	-0.44	[62]	
148	9079/22	McArthur, Athabasca, Canada	Unconformity-Contact	137.81	-0.32	[62]	
149	9079/22	McArthur, Athabasca, Canada	Unconformity-Contact	137.79	-0.41	[62]	
150	9079/22	McArthur, Athabasca, Canada	Unconformity-Contact	137.80	-0.36	[62]	
151	9079/22	McArthur, Athabasca, Canada	Unconformity-Contact	137.79	-0.41	[62]	
<b>Quartz Pebble Conglomerate</b>							
152	M9996	Lanark County, Canada		137.88	0.20	-4.0	[9]
<b>Collapsed Breccia Pipe</b>							
153	Faith Mountain	Faith Mountain		137.80	-0.30	[25]	
154	1304B	Orphan Lode, AZ		137.74	-0.81	-23.8	This study
<b>Sandstone</b>							
155	Jackpile Mine	Jackpile Mine	Tabular	137.89	0.39	[25]	
156	Mi Vida Mine	Mi Vida Mine	Tabular	137.90	0.42	[25]	
157	353B	Happy Jack, Utah	Tabular	137.90	0.36	4.0	[59]
158	353P	Happy Jack, Utah	Tabular	137.89	0.31	6.0	[59]
159	625	SE Utah, Monument Valley	Tabular	137.98	0.95	-53.8	This study
160	815B	Moonlight Mine	Rollfront	137.85	-0.03	-15.2	This study
161	1856-Continental	Wyoming, roll front	Rollfront	137.89	0.28	-12.1	[64]
162	M28469	Ike Mine, Utah		137.92	0.51	1.0	[9]
163	M21404	Saxung, Schmiedelberg, Germany		137.90	0.35	4.0	[9]
164	Finland 324-42.5	Finland		137.81	-0.31	1.0	[9]
165	Finland AE762.5-63	Finland		137.88	0.25	-15.0	[9]
166	1237B	Cane Spring Canyon, Utah		137.74	-0.81	-42.3	[59]
167	1237BP	Cane Spring Canyon, Utah		137.67	-1.30	-20.8	[59]
168	1262B	Adair Mine, Utah		137.83	-0.15	-4.8	[59]
169	1303B	Big Indian Wash, Utah		137.82	-0.19	-8.7	[59]
170	1303P	Big Indian Wash, Utah		137.87	0.18	-7.8	[59]
171	1232B	Big Indian Wash, Utah		137.68	-1.20	1.8	[59]
172	OTS 07-04-174.5	Camie River Prospect, Otish Basin, Canada	Mafic Dykes/ Sills in Proterozoic Sandstone	137.89	0.28	-2.0	[9]
173	76-Palette	Palette, S. Alligator River Valley, Australia	Mafic Dykes/ Sills in Proterozoic Sandstone	137.88	0.19	-5.0	[9]
174	MT-6-10-313.6	Matoush Lake prospoect, Otish Basin, Canada	Mafic Dykes/ Sills in Proterozoic Sandstone	137.88	0.22	1.0	[9]
175	MT-06-010-313.1 a	Matoush Lake prospoect, Otish Basin, Canada	Mafic Dykes/ Sills in Proterozoic Sandstone	137.90	0.33	1.0	[9]
176	MT-06-010-313.1 b	Matoush Lake prospoect, Otish Basin, Canada	Mafic Dykes/ Sills in Proterozoic Sandstone	137.88	0.20	-7.0	[9]
177	MT-06-010-314.1	Matoush Lake prospoect, Otish Basin, Canada	Mafic Dykes/ Sills in Proterozoic Sandstone	137.86	0.07	-4.0	[9]
<b>Unknown</b>							
	HU-1	Harwell Uraninite		137.77	-0.60	[50]	

<sup>1</sup> First column (1–177) corresponds to X-axis position for Figure S3.