



Mineral Resources Tasmania

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The significance of current and proposed SHRIMP dating

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As an initial part of the National Geoscience Mapping Accord (NGMA) project in Tasmania six different rocks have been analysed by SHRIMP in the first phase of this study. An attempt to date the Cooe Dolerite was foiled by a lack of zircon in the submitted sample. Some of the rocks yield crystallisation ages, whereas others provide information on basement ages.

A distinct range of crystallisation ages was observed. Tonalite within the Heazlewood Ultramafic Complex crystallised during the Cambrian, at 510 ± 6 Ma (all reported uncertainties are at 95% confidence levels). The slightly younger value of this age, compared with previously obtained conventional U-Pb zircon data, presumably reflects the presence of sparse xenocrystic grains, one of which (~ 1800 Ma) was identified in this study. Undeformed porphyry from the Timbs Group is considerably younger, having crystallised at 380 ± 6 Ma. It is presumed that currently undated deformed granitoids in the Timbs Group will be considerably older, being possibly of Cambrian age. Two-mica granite from King Island crystallised at 760 ± 12 Ma. This age is significantly older than K-Ar and Rb-Sr mineral ages, a consequence of partial isotopic resetting of those systems during Cambrian and/or Devonian times.

Most of the zircon from eclogite within the Franklin Metamorphics Complex crystallised at 502 ± 8 Ma, an age which is ascribed to the eclogite-grade metamorphism rather than original crystallisation, the precursor of this rock having been insufficiently enriched in SiO_2 (49.7%) to crystallise zircon.

The preceding data (together with those obtained by Caroline Perkins for the Mount Read Volcanics) demonstrate that a diverse range of geological activity, including ultramafic emplacement, high-grade metamorphism and widespread felsic magmatism, occurred during a very restricted time interval in the

Cambrian. The unrelated King Island Granite is considerably older.

A major contribution of the initial SHRIMP study has been the identification of Mesoproterozoic and older zircon in all of the studied rocks. This is presumed to indicate the presence of yet undiscovered (or non-outcropping) basement in northwestern Tasmania. The best examples of this inheritance are found in the King Island Granite, a deformed metasediment from the Bowry Formation, and a mafic porphyry thought to be a correlative of the Cooe Dolerite. A wide range of ages is indicated, from minor older components (at ~ 2900 Ma, ~ 2500 Ma and ~ 2000 Ma) through to a spectrum of ages between 1900 Ma and 1200 Ma in which significant events appear to be indicated at ~ 1900 Ma, 1800–1700 Ma, ~ 1600 Ma, ~ 1400 Ma and ~ 1200 Ma. The abundance of 1200 Ma detrital zircon in the Bowry Formation, and its absence in any of the other analysed samples, indicates either that the Bowry Formation is younger than the country rocks around the other dated samples, or that a nearby 1200 Ma source was not contributing detritus to the more distant sediments. In either case, deposition of the Bowry Formation sediments occurred no earlier than 1200 Ma.

Future SHRIMP study is designed to date the most significant events to have contributed to the geological evolution of northern Tasmania. Wherever possible, the isotopic data and resultant models will be used to constrain interpretations of the soon-to-be-acquired geophysical data. In particular, future SHRIMP dating could be particularly important in identifying different blocks in this geologically complex region. Such dating suggests that Mesoproterozoic and older rocks underlie at least part of northwestern Tasmania. The next phase of this study is, in part, designed to seek more evidence of, and to more quantitatively define, this Precambrian evolution.

[12 July 1994]

APPENDIX 1

Major and trace element analyses of samples collected for dating

Sample	93220001	93220002	93220003	93220004	93220006	93220007
SiO ₂	45.41	48.04	65.91	74.75	89.08	49.71
TiO ₂	2.67	2.76	0.33	0.06	0.29	0.59
Al ₂ O ₃	17.71	16.55	16.91	14.06	3.71	15.22
Fe ₂ O ₃ *	9.04	9.03	1.57	1.17	3.26	11.07
Fe ₂ O ₃	0.89	0.72	0.13	-1.19	2.16	2.66
FeO	7.33	7.48	1.30	2.12	0.99	7.57
MnO	0.14	0.13	0.03	0.01	0.02	0.16
MgO	8.17	5.07	2.68	0.21	0.99	9.10
CaO	5.56	3.74	3.24	0.04	0.05	11.55
Na ₂ O	3.63	6.89	6.65	2.76	1.72	2.06
K ₂ O	2.27	0.14	1.05	4.83	0.03	0.49
P ₂ O ₅	0.64	0.71	0.22	0.04	0.00	0.06
LOI	4.85	7.39	1.60	1.15	0.66	0.89
rest	0.76	0.41	0.11	0.65	0.09	0.40
Total	100.03	100.03	100.16	99.49	99.79	100.46

Trace elements (ppm)

Ag	2	2	1	-1	-1	2
As	3	2	0	3	1	1
B	0	0	0	0	0	0
Ba	1996	89	141	461	49	122
Be	3	3	3	5	3	1
Bi	-2	-2	-2	-2	-2	-2
Br	0	0	0	0	0	0
C	0	0	0	0	0	0
Ce	79	106	6	61	34	13
Cl	0	0	0	0	0	0
Co	0	0	0	0	0	0
Cr	151	91	14	1	22	477
Cs	12	3	-3	4	-3	-3
Cu	37	57	-1	1	8	9
F	0	0	0	0	0	0
Ga	16	16	9	15	6	17
Ge	2	1	1	3	2	3
Hf	7	8	-2	3	6	-2
La	40	55	4	30	12	11
Li	161	59	7	27	4	24
Mn	1401	1194	252	26	151	1426
Mo	3	4	-2	-2	2	3
Nb	75	92	3	25	5	3
Nd	37	43	2	22	13	5
Ni	57	28	65	-1	2	153
Pb	6	3	-2	64	2	9
Pr	9	8	-2	7	13	-2
Rb	71	5	23	197	-1	27
S	770	790	20	6920	90	70
Sb	0	0	0	0	0	0
Sc	32	32	19	4	6	41
Se	-1	-1	-1	-1	-1	-1

Sample	93220001	93220002	93220003	93220004	93220006	93220007
Sn	2	4	-2	5	-2	5
Sr	768	51	158	20	4	96
Ta	3	5	-2	3	-2	-2
Th	7	7	-2	16	4	-2
Tl	0	0	0	0	0	0
U	2	1	0	8	0	1
V	270	255	98	-2	49	291
W	0	0	0	0	0	0
Y	34	37	14	37	20	16
Zn	59	34	7	15	10	89
Zr	236	272	36	61	222	48

Samples collected by N. J. Turner. Analyses by AGSO.

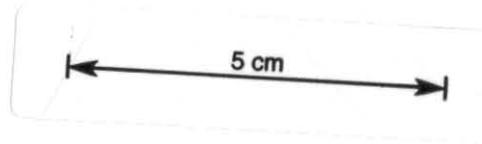
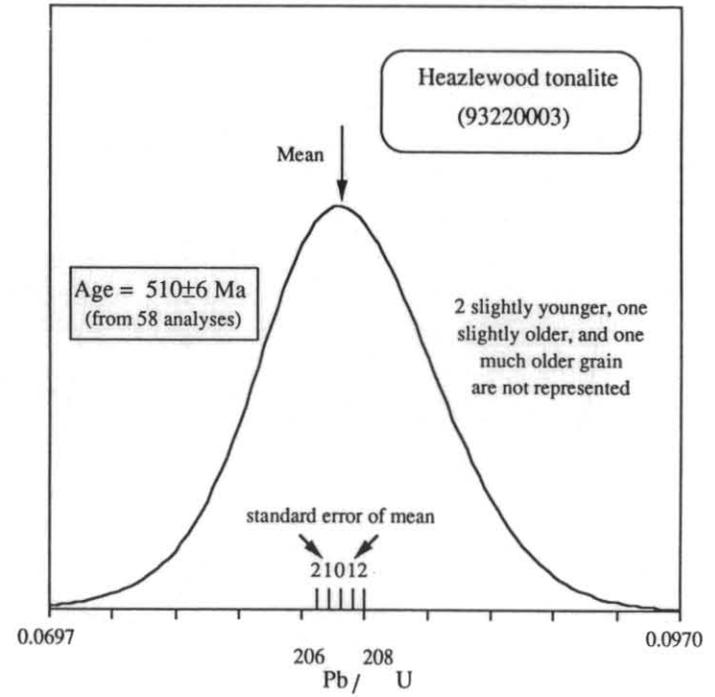
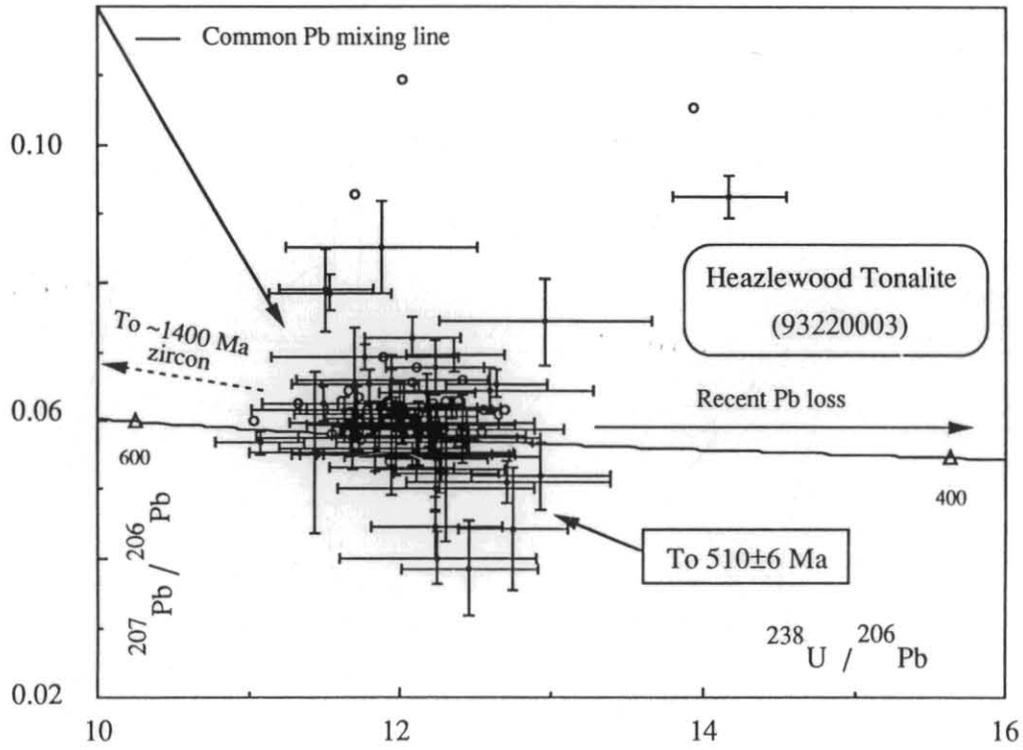
Samples:	93220001	Cooee Dolerite (no zircon)
	93220002	Cooee Dolerite correlative
	93220003	Heazlewood tonalite
	93220004	Timbs Group porphyry
	93220006	Bowry Formation
	93220007	Franklin Metamorphic Complex

Zircon analyses for U, Th and Pb and calculated ages

HEAZLEWOOD TONALITE (sample 93220003)

Analysis	U (ppm)	Th (ppm)	Th/U	206/204	f206 (%)	206/238	±	207/235	±	207/206	±	Age (Ma)	±
100.1	90	136	1.519	361	4.97	0.0813	0.0023	0.586	0.113	0.0523	0.0098	507	13
101.1	730	1078	1.477	9007	0	0.081	0.0021	0.692	0.027	0.0619	0.0016	500	13
102.1	213	460	2.157	1747	0	0.0818	0.0022	0.764	0.053	0.0677	0.0041	501	13
103.1	677	1676	2.477	272	1.64	0.0706	0.0019	0.901	0.04	0.0926	0.003	421	11
104.1	266	426	1.605	6845	0	0.0821	0.0021	0.723	0.039	0.0639	0.0028	505	13
105.1	182	516	2.831	1825	0	0.0869	0.0023	0.946	0.079	0.0789	0.006	524	13
106.1	114	161	1.413	1903	0.35	0.0843	0.0022	0.688	0.049	0.0592	0.0037	521	13
107.1	423	675	1.596	4164	0.14	0.0804	0.0021	0.636	0.031	0.0574	0.0022	499	12
108.1	621	1383	2.227	7576	0	0.0809	0.0021	0.776	0.037	0.0696	0.0025	494	12
109.1	606	662	1.092	4346	0	0.082	0.0021	0.686	0.025	0.0607	0.0014	506	13
110.1	579	1104	1.906	3418	0.38	0.0804	0.0021	0.66	0.032	0.0595	0.0023	498	12
111.1	683	1283	1.877	4027	0	0.0792	0.0021	0.714	0.031	0.0654	0.002	487	12
112.1	79	181	2.308	1853	1.35	0.0817	0.0023	0.614	0.089	0.0545	0.0076	508	13
113.1	471	848	1.802	8407	0	0.0847	0.0022	0.706	0.036	0.0605	0.0024	523	13
114.1	507	27916	55.033	4456	0.4	0.0904	0.0024	0.708	0.03	0.0568	0.0018	558	14
115.1	368	560	1.523	3119	0	0.082	0.0021	0.699	0.033	0.0618	0.0023	506	13
116.1	199	401	2.013	3591	0.32	0.0825	0.0022	0.668	0.051	0.0587	0.0041	510	13
117.1	338	526	1.555	7014	0	0.0849	0.0022	0.763	0.035	0.0652	0.0023	520	13
118.1	844	2261	2.68	22361	0	0.0828	0.0022	0.823	0.041	0.0722	0.0028	504	13
119.1	74	183	2.485	669	2.6	0.0785	0.0022	0.479	0.098	0.0443	0.0088	495	13
120.1	430	626	1.455	7884	0	0.0856	0.003	0.706	0.037	0.0598	0.002	528	18
121.1	140	408	2.909	2804	0.1	0.0838	0.003	0.711	0.098	0.0615	0.0079	516	17
122.1	207	222	1.075	7994	0.44	0.0856	0.003	0.651	0.038	0.0551	0.0023	531	18
123.1	413	151	0.366	14282	0.13	0.3018	0.0106	4.535	0.164	0.109	0.0006	1782	10
124.1	101	351	3.459	6306	0.87	0.0875	0.0033	0.669	0.146	0.0554	0.0116	542	18
125.1	76	194	2.542	1048	0	0.0855	0.0031	0.768	0.106	0.0652	0.0084	524	18
126.1	72	87	1.219	1270	0.43	0.0855	0.003	0.718	0.057	0.0609	0.0041	526	18
127.1	807	2129	2.638	3091	0	0.0867	0.003	0.939	0.049	0.0785	0.0027	523	18
128.1	309	588	1.901	3429	0.65	0.0816	0.0029	0.594	0.044	0.0528	0.0032	508	17
129.1	96	219	2.275	1428	2.7	0.0803	0.0029	0.426	0.08	0.0385	0.0069	509	17
130.1	833	2098	2.52	11582	0	0.0871	0.0031	0.749	0.042	0.0623	0.0024	535	18
131.1	224	508	2.27	2386	1.9	0.0817	0.0029	0.502	0.055	0.0445	0.0044	514	17
132.1	417	611	1.466	7395	0	0.0853	0.003	0.678	0.035	0.0577	0.0019	527	18
133.1	186	297	1.596	4275	0	0.0833	0.0029	0.718	0.046	0.0625	0.0031	513	17
134.1	67	69	1.023	255	7.04	0.0774	0.0027	0.555	0.058	0.052	0.0049	484	16
135.1	256	599	2.338	6470	0.71	0.0838	0.003	0.616	0.054	0.0534	0.004	521	18
118.2	670	1727	2.577	12872	0.25	0.0818	0.0043	0.642	0.043	0.057	0.0019	507	26
119.2	67	99	1.483	3545	0.8	0.0835	0.0044	0.636	0.054	0.0552	0.0033	518	26
136.1	189	432	2.29	6008	1.28	0.0787	0.0042	0.553	0.047	0.051	0.0031	492	25
127.2	366	680	1.861	1217	0.45	0.0838	0.0044	0.759	0.047	0.0657	0.0017	513	26
126.2	62	101	1.634	2478	2.74	0.0817	0.0043	0.451	0.052	0.04	0.0038	516	26
137.1	401	556	1.388	18678	0.04	0.0819	0.0043	0.643	0.038	0.057	0.0012	507	26

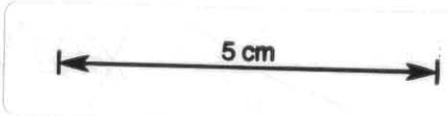
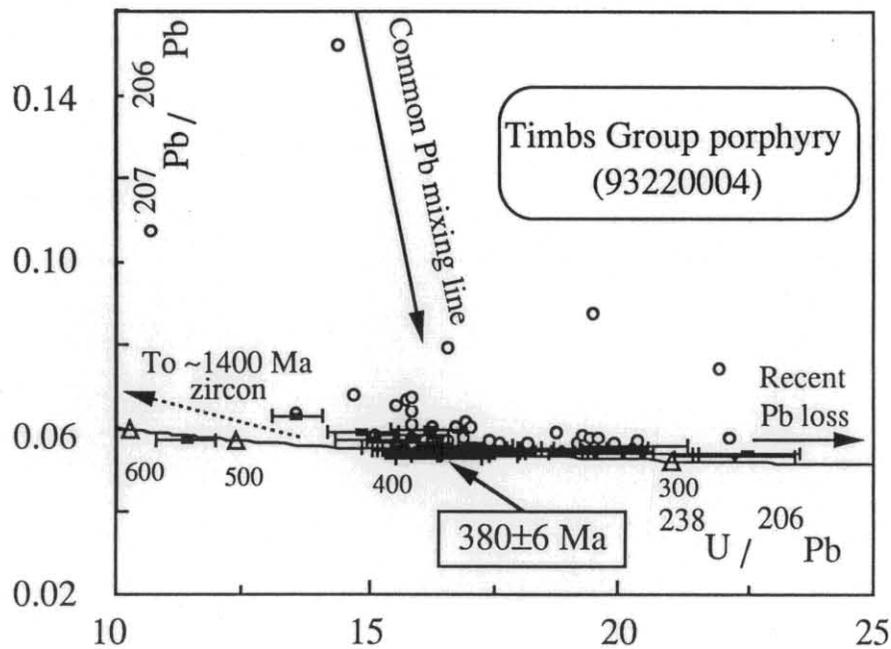
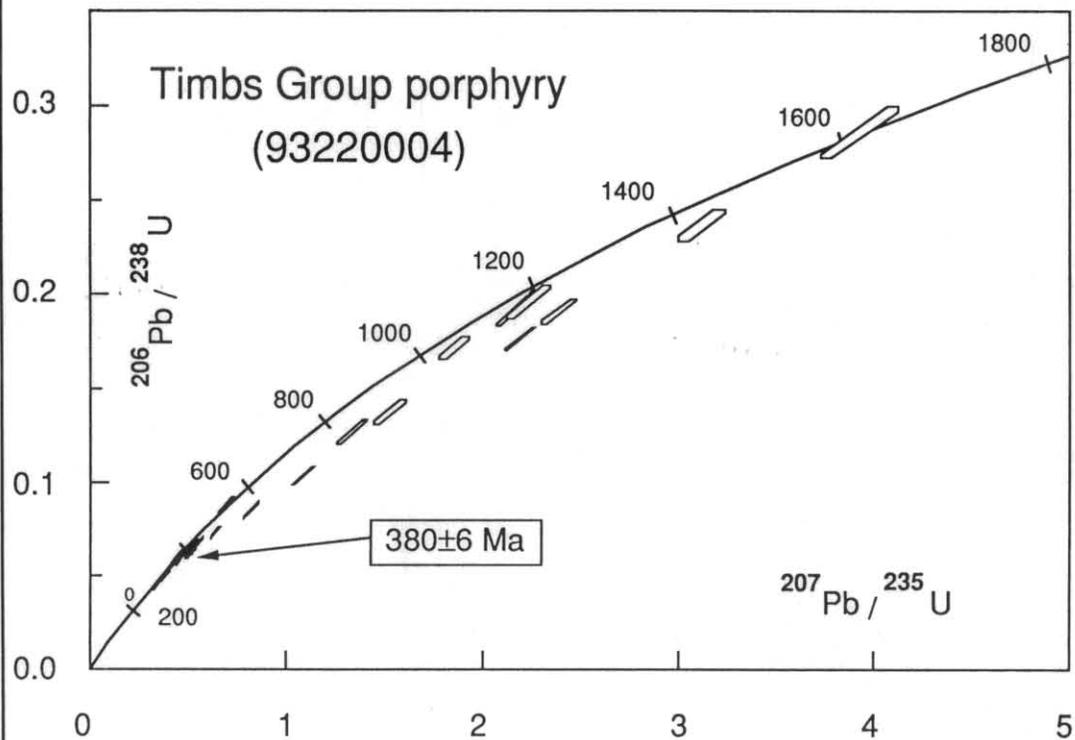
Analysis	U (ppm)	Th (ppm)	Th/U	206/204	f206 (%)	206/238	±	207/235	±	207/206	±	Age (Ma)	±
138.1	354	686	1.938	18282	0	0.0835	0.0044	0.709	0.045	0.0616	0.0018	515	26
139.1	524	1400	2.671	8955	0.1	0.0858	0.0045	0.679	0.047	0.0574	0.0022	530	27
109.2	425	519	1.222	1420	0.99	0.0818	0.0043	0.672	0.039	0.0596	0.0011	505	26
101.2	463	694	1.497	13523	0.07	0.0815	0.0043	0.647	0.04	0.0576	0.0015	505	26
135.2	236	546	2.316	104493	0.62	0.0815	0.0043	0.614	0.054	0.0546	0.0034	506	26
102.2	186	364	1.963	8645	0	0.0794	0.0042	0.703	0.055	0.0643	0.0033	488	25
140.1	122	290	2.388	53333	0.02	0.0806	0.0043	0.654	0.069	0.0589	0.0049	498	25
141.1	173	600	3.459	1739	0	0.0843	0.0045	0.99	0.101	0.0853	0.0068	504	26
142.1	220	601	2.727	3653	0.79	0.0826	0.0044	0.632	0.063	0.0555	0.0043	513	26
143.1	141	431	3.06	1545	0	0.0772	0.0041	0.792	0.084	0.0744	0.0064	469	24
120.2	389	696	1.789	6393	0.51	0.0828	0.0044	0.63	0.04	0.0552	0.0016	514	26
116.2	195	446	2.282	5439	1.1	0.0817	0.0043	0.563	0.048	0.05	0.0031	511	26
117.2	313	574	1.834	2453	0	0.085	0.0045	0.812	0.05	0.0693	0.0018	519	26
113.2	508	982	1.933	14968	0.1	0.0821	0.0043	0.655	0.041	0.0578	0.0016	508	26
106.2	77	94	1.226	4507	0.23	0.0832	0.0044	0.681	0.05	0.0593	0.0026	514	26
107.2	266	390	1.469	12085	0.41	0.0825	0.0044	0.627	0.04	0.0551	0.0016	512	26
105.2	134	366	2.74	13238	0	0.0832	0.0044	0.705	0.067	0.0615	0.0045	513	26
122.2	203	292	1.439	9176	0.06	0.0817	0.0043	0.663	0.043	0.0589	0.0019	505	26
121.2	62	93	1.516	41459	0.56	0.0846	0.0045	0.654	0.057	0.0561	0.0035	524	27
133.2	185	298	1.613	11716	0	0.086	0.0046	0.728	0.049	0.0614	0.0021	529	27

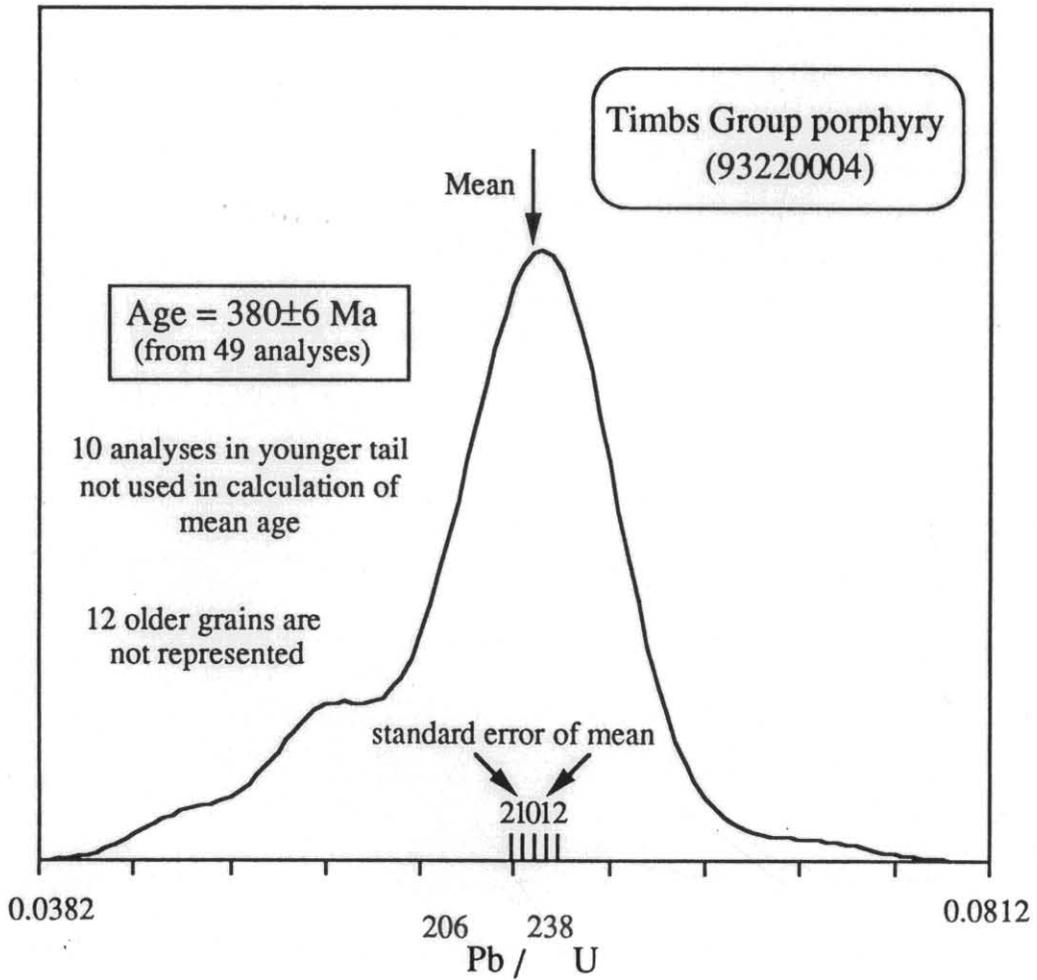


TIMBS GROUP PORPHYRY (sample 93220004)

Analysis	U (ppm)	Th (ppm)	Th/U	206/204	f206 (%)	206/238	±	207/235	±	207/206	±	Age (Ma)	±
50.1	6625	1901	0.287	737	2.53	0.0444	0.0021	0.331	0.016	0.054	0.0004	280	13
51.1	4766	1142	0.24	6823	0.17	0.0521	0.0024	0.394	0.019	0.0549	0.0003	327	15
52.1	5458	1426	0.261	3550	0.33	0.051	0.0024	0.387	0.019	0.0551	0.0003	320	15
53.1	3285	631	0.192	67797	0	0.0607	0.0028	0.456	0.022	0.0544	0.0003	380	17
54.1	2225	416	0.187	7806	0.44	0.0601	0.0028	0.444	0.022	0.0536	0.0004	377	17
55.1	1719	329	0.191	10691	0.11	0.0604	0.0028	0.451	0.022	0.0542	0.0004	378	17
56.1	5534	1284	0.232	3217	0.49	0.053	0.0025	0.402	0.019	0.055	0.0003	333	15
57.1	777	242	0.311	3020	0.42	0.059	0.0028	0.449	0.023	0.0552	0.0008	369	17
58.1	2682	611	0.228	589	2.92	0.0586	0.0028	0.454	0.022	0.0561	0.0005	366	17
59.1	2318	455	0.196	210526	0.07	0.0611	0.0029	0.452	0.022	0.0537	0.0004	382	17
60.1	2817	528	0.187	4225	0.4	0.0619	0.0029	0.46	0.022	0.0539	0.0003	387	18
61.1	595	17	0.028	11692	0.14	0.1929	0.0091	2.176	0.106	0.0818	0.0006	1242	15
61.2	4647	1034	0.223	3190	0.48	0.0513	0.0024	0.383	0.018	0.0542	0.0003	322	15
62.1	1015	314	0.31	21450	0	0.0618	0.0029	0.509	0.025	0.0597	0.0006	384	18
63.1	5042	1249	0.248	6780	0.16	0.0642	0.003	0.487	0.023	0.0551	0.0003	401	18
64.1	3725	700	0.188	9570	0.13	0.0606	0.0028	0.453	0.022	0.0543	0.0003	379	17
53.2	1907	400	0.21	19246	0.07	0.0612	0.0029	0.459	0.022	0.0544	0.0004	383	18
52.2	1783	252	0.141	1364	1.09	0.0637	0.003	0.497	0.024	0.0566	0.0004	397	18
65.1	3534	921	0.26	6184	0.22	0.0613	0.0029	0.464	0.022	0.0549	0.0003	383	18
63.2	2707	457	0.169	112613	0.01	0.0571	0.0027	0.429	0.021	0.0545	0.0004	358	16
66.1	2236	369	0.165	1336	1.03	0.0672	0.0032	0.548	0.026	0.0591	0.0004	419	19
67.1	5996	1671	0.279	6180	0.17	0.0568	0.0027	0.432	0.021	0.0552	0.0003	356	16
68.1	3060	649	0.212	34317	0	0.0581	0.0027	0.441	0.021	0.0551	0.0004	364	17
55.2	1305	221	0.169	16606	0	0.0631	0.003	0.506	0.025	0.0581	0.0005	393	18
69.1	1615	281	0.174	15526	0.12	0.0584	0.0027	0.438	0.021	0.0545	0.0005	365	17
52.3	247	164	0.663	6641	0.24	0.2863	0.0135	3.929	0.194	0.0995	0.001	1615	19
70.1	4227	831	0.197	5479	0.21	0.0549	0.0026	0.413	0.02	0.0545	0.0003	344	16
71.1	860	211	0.245	2646	0.81	0.0582	0.0027	0.43	0.022	0.0535	0.0007	365	17
72.1	4629	1119	0.242	3796	0.36	0.059	0.0028	0.445	0.021	0.0547	0.0003	369	17
59.2	1188	225	0.189	45147	0.04	0.1035	0.0049	1.089	0.053	0.0763	0.0006	1103	15
63.3	546	93	0.171	2983	0.56	0.1374	0.0065	1.526	0.077	0.0806	0.0011	1211	26
73.1	930	59	0.064	1026	1.63	0.1961	0.0092	2.235	0.112	0.0826	0.0011	1261	25
74.1	2595	594	0.229	2029	0.78	0.0627	0.003	0.471	0.023	0.0545	0.0004	392	18
62.2	691	218	0.316	242131	0.01	0.0853	0.004	0.821	0.04	0.0698	0.0006	923	17
62.3	1051	346	0.33	5528	0.13	0.0602	0.0021	0.449	0.017	0.0541	0.0006	377	13
62.4	379	159	0.419	5910	0.28	0.1913	0.0067	2.394	0.089	0.0907	0.0008	1441	17
56.2	5925	1493	0.252	2914	0.5	0.0517	0.0018	0.39	0.014	0.0547	0.0003	325	11
63.4	4752	1101	0.232	6991	0.16	0.0632	0.0022	0.478	0.017	0.0548	0.0003	395	13
52.4	3044	600	0.197	1061	1.62	0.062	0.0022	0.462	0.017	0.054	0.0004	388	13
52.5	5754	1473	0.256	4554	0.28	0.0502	0.0018	0.377	0.014	0.0545	0.0003	315	11
74.2	4311	1029	0.239	2239	0.75	0.0593	0.0021	0.446	0.016	0.0545	0.0003	371	13
59.3	1227	202	0.165	94877	0.02	0.1765	0.0062	2.194	0.078	0.0902	0.0003	1429	7
59.4	2741	525	0.191	29630	0.01	0.0624	0.0022	0.468	0.017	0.0543	0.0003	390	13
63.5	165	74	0.448	4280	0.38	0.2373	0.0083	3.12	0.124	0.0953	0.0014	1535	28

Analysis	U (ppm)	Th (ppm)	Th/U	206/204	f206 (%)	206/238	±	207/235	±	207/206	±	Age (Ma)	±
67.2	6042	1667	0.276	4377	0.32	0.0572	0.002	0.431	0.015	0.0546	0.0003	359	12
73.2	726	78	0.108	1337	1.24	0.172	0.006	1.854	0.073	0.0782	0.0011	1151	27
65.2	2807	673	0.24	19857	0.04	0.0618	0.0022	0.462	0.017	0.0543	0.0003	386	13
54.2	2198	434	0.198	1195	1.58	0.0626	0.0022	0.465	0.017	0.0538	0.0004	392	13
51.2	3460	791	0.229	25400	0	0.0612	0.0021	0.46	0.017	0.0546	0.0003	382	13
68.2	3790	909	0.24	10654	0.14	0.0604	0.0021	0.45	0.016	0.054	0.0003	378	13
53.3	3091	599	0.194	39262	0	0.064	0.0022	0.484	0.017	0.0548	0.0003	400	14
55.3	2004	368	0.184	1477	1.24	0.0623	0.0022	0.464	0.017	0.0541	0.0004	390	13
53.4	1275	218	0.171	4016	0.06	0.0736	0.0026	0.638	0.023	0.0629	0.0004	457	15
54.3	2328	457	0.196	11476	0.15	0.0614	0.0033	0.46	0.025	0.0543	0.0002	384	20
55.4	860	135	0.157	5066	0.16	0.066	0.0035	0.523	0.028	0.0574	0.0003	411	21
56.3	4185	934	0.223	4484	0.36	0.0489	0.0026	0.364	0.019	0.0539	0.0002	308	16
62.5	969	320	0.33	77220	0.12	0.0607	0.0032	0.451	0.025	0.054	0.0004	380	20
57.2	753	231	0.307	2127	0.66	0.0611	0.0032	0.461	0.025	0.0547	0.0005	382	20
75.1	4627	1187	0.256	3278	0.5	0.045	0.0024	0.332	0.018	0.0536	0.0002	284	15
58.2	2455	432	0.176	36969	0.06	0.0604	0.0032	0.447	0.024	0.0537	0.0002	378	20
74.3	2519	586	0.233	157	12.27	0.061	0.0032	0.446	0.024	0.053	0.0005	382	20
51.3	2004	355	0.177	191205	0.06	0.0604	0.0032	0.448	0.024	0.0538	0.0002	378	19
65.3	1372	215	0.157	130378	0.02	0.0602	0.0032	0.447	0.024	0.0539	0.0003	377	19
76.1	1793	451	0.252	1681	0.95	0.0585	0.0031	0.435	0.024	0.0539	0.0004	367	19
77.1	3748	928	0.248	425	3.98	0.0493	0.0026	0.378	0.021	0.0556	0.0004	310	16
78.1	1010	228	0.225	410	6.14	0.0878	0.0047	0.694	0.038	0.0573	0.0006	543	28
79.1	751	60	0.079	2499	0.65	0.1269	0.0067	1.336	0.073	0.0764	0.0007	1104	19
65.4	3018	563	0.187	24278	0.08	0.0581	0.0031	0.434	0.023	0.0543	0.0003	364	19
80.1	2990	474	0.159	80515	0.06	0.0614	0.0033	0.459	0.025	0.0542	0.0002	384	20
52.6	2061	278	0.135	869565	0.03	0.0618	0.0033	0.46	0.025	0.054	0.0002	387	20
60.2	2123	267	0.126	7106	0.27	0.062	0.0033	0.467	0.025	0.0546	0.0002	388	20



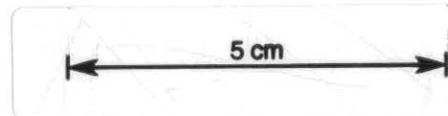
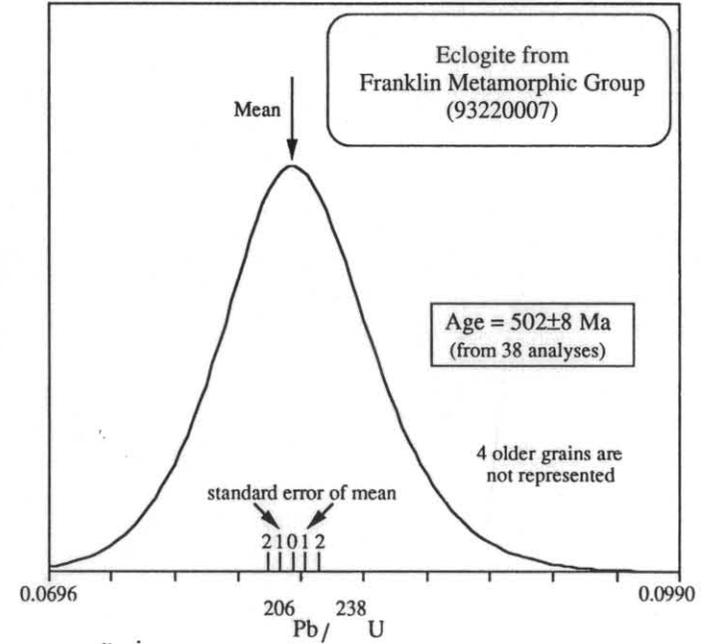
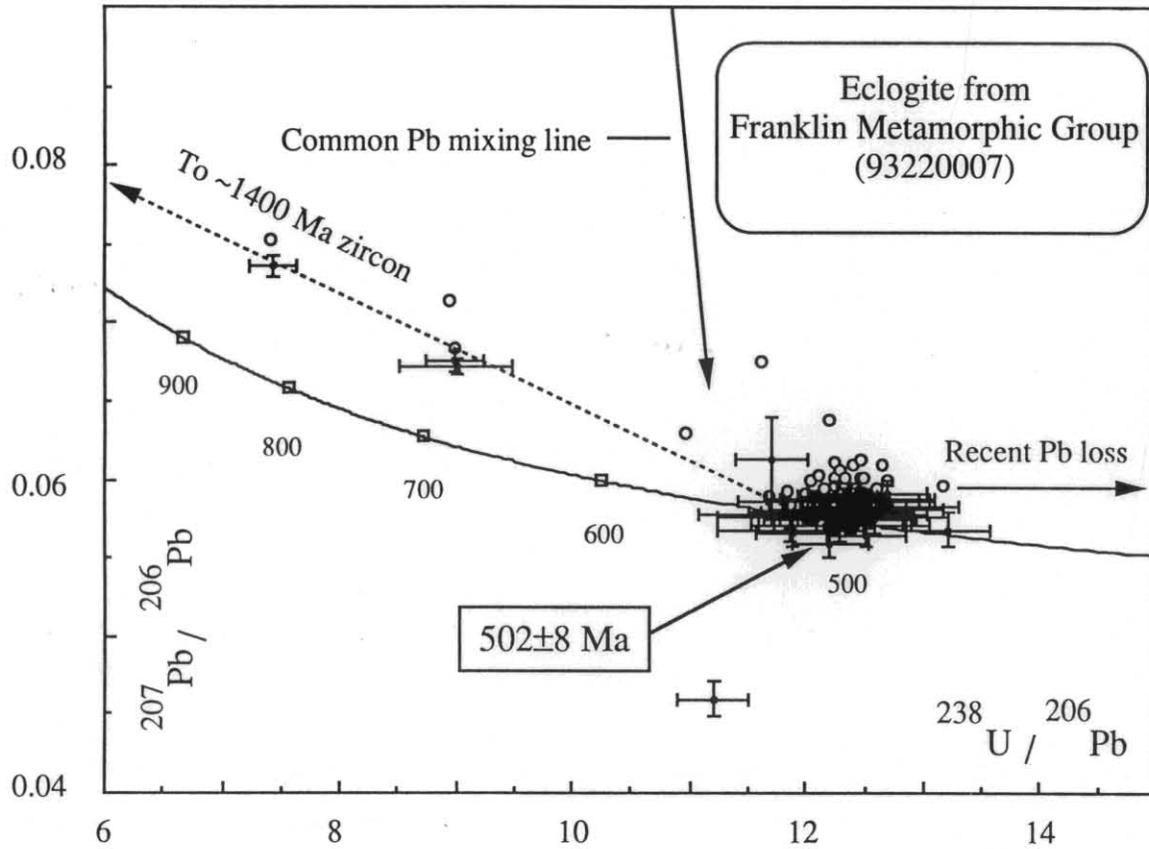


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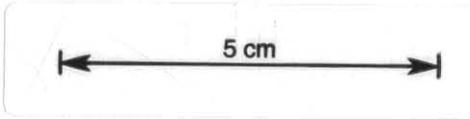
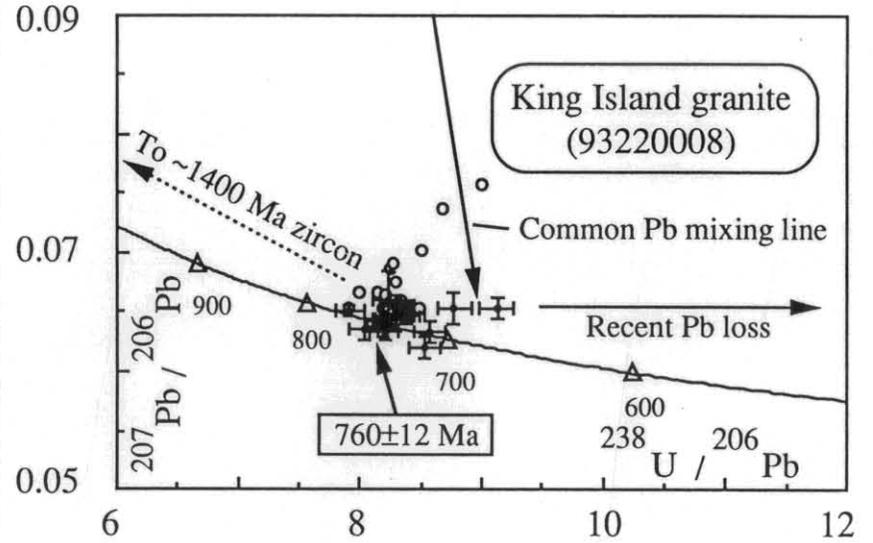
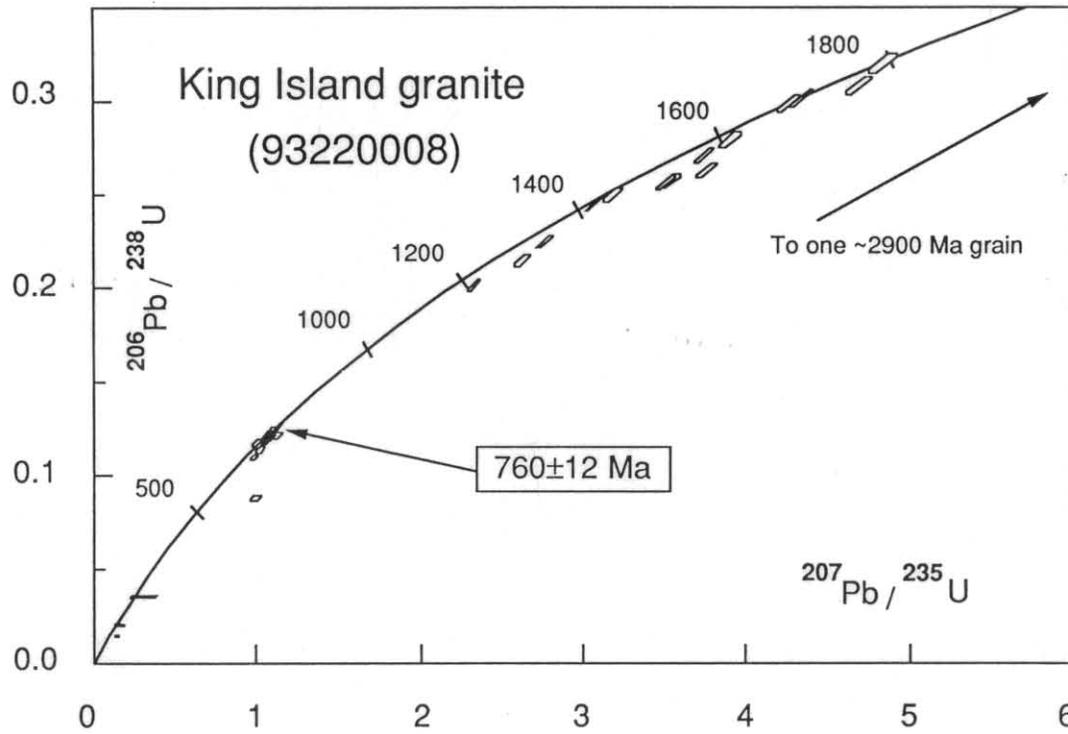
ECLOGITE, FRANKLIN METAMORPHIC GROUP (sample 93220007)

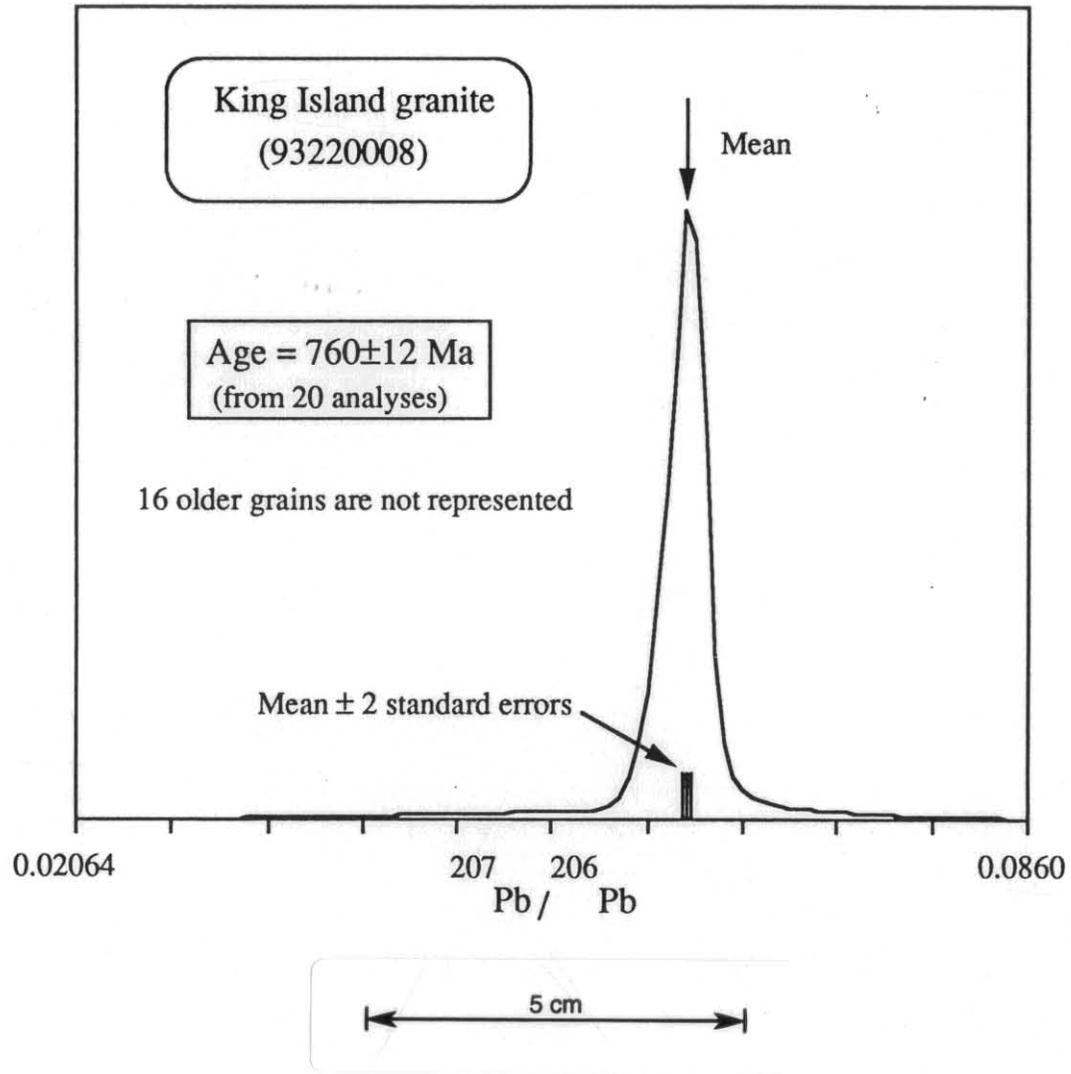
Analysis	U (ppm)	Th (ppm)	Th/U	206/204	f206 (%)	206/238	±	207/235	±	207/206	±	Age (Ma)	±
1.1	244	1	0.006	1786	0.11	0.0819	0.0022	0.649	0.02	0.0574	0.0008	508	13
2.1	23	0	0.005	667	0.76	0.0855	0.0023	0.723	0.039	0.0614	0.0027	526	14
3.1	265	4	0.013	3437	0.19	0.1346	0.0036	1.366	0.04	0.0736	0.0006	812	21
4.1	152	3	0.02	2135	0.33	0.0842	0.0023	0.657	0.022	0.0566	0.001	521	14
5.1	233	2	0.008	15773	0.22	0.0789	0.0021	0.643	0.02	0.0591	0.0008	488	13
6.1	168	2	0.01	2135	0.33	0.08	0.0022	0.633	0.021	0.0574	0.0009	496	13
7.1	188	19	0.103	4114	2.06	0.0893	0.0024	0.566	0.021	0.046	0.0011	559	15
8.1	174	1	0.007	1817	0.28	0.0798	0.0022	0.637	0.021	0.0579	0.0009	495	13
9.1	140	1	0.01	1829	0.37	0.08	0.0022	0.642	0.022	0.0583	0.001	495	13
10.1	203	2	0.01	3312	0.42	0.0819	0.0022	0.632	0.021	0.056	0.0009	508	13
11.1	355	17	0.047	6452	0.46	0.1113	0.003	1.036	0.031	0.0675	0.0006	680	18
12.1	231	1	0.004	3138	0.1	0.0795	0.0021	0.63	0.02	0.0574	0.0008	493	13
13.1	281	3	0.009	1000000	0.09	0.0813	0.0022	0.653	0.02	0.0583	0.0007	503	13
14.1	289	5	0.019	54645	0.08	0.0827	0.0022	0.654	0.02	0.0574	0.0007	512	13
15.1	148	2	0.013	5212	0.24	0.0815	0.0022	0.648	0.022	0.0577	0.001	505	13
16.1	209	1	0.007	12633	0.08	0.0811	0.0022	0.646	0.021	0.0578	0.0008	502	13
17.1	186	3	0.015	4188	0.13	0.0833	0.0023	0.666	0.021	0.058	0.0008	515	13
18.1	231	1	0.005	3856	0.14	0.0809	0.0022	0.659	0.021	0.059	0.0008	501	13
19.1	174	1	0.008	8857	0.15	0.0788	0.0021	0.638	0.021	0.0587	0.0009	488	13
20.1	206	2	0.012	27878	0.11	0.0799	0.0022	0.622	0.02	0.0565	0.0008	496	13
7.2	122	1	0.009	3733	0.35	0.0758	0.0021	0.593	0.021	0.0568	0.0011	471	12
21.1	233	1	0.003	1000000	0.59	0.0815	0.0022	0.663	0.021	0.0589	0.0008	504	13
22.1	235	3	0.013	4946	0.1	0.0816	0.0022	0.645	0.02	0.0573	0.0008	506	13
23.1	157	1	0.007	96805	0.2	0.0798	0.0042	0.633	0.035	0.0575	0.0006	495	25
24.1	188	2	0.009	173913	0.13	0.1111	0.0059	1.029	0.056	0.0672	0.0005	684	34
13.2	207	5	0.022	138313	0.09	0.0817	0.0043	0.642	0.035	0.057	0.0005	506	26
19.2	111	3	0.023	11869	0.28	0.0804	0.0043	0.65	0.037	0.0586	0.0008	498	25
20.2	140	2	0.013	89686	0.24	0.0812	0.0043	0.657	0.037	0.0587	0.0007	502	26
17.2	225	6	0.026	120192	0.13	0.0821	0.0043	0.646	0.035	0.0571	0.0005	509	26
5.2	209	2	0.008	128700	0.14	0.0808	0.0043	0.636	0.035	0.0571	0.0005	501	26
4.2	394	3	0.008	6303	0.29	0.0824	0.0044	0.658	0.036	0.0579	0.0004	510	26
10.2	192	1	0.007	7099	0.29	0.0808	0.0043	0.644	0.035	0.0578	0.0006	501	26
9.2	128	1	0.008	79051	0.16	0.0792	0.0042	0.636	0.035	0.0582	0.0007	491	25
6.2	175	2	0.009	4265	0.15	0.0822	0.0044	0.646	0.036	0.057	0.0006	509	26
22.2	148	1	0.008	49261	0.16	0.08	0.0042	0.64	0.035	0.058	0.0006	496	25
25.1	146	2	0.011	7227	0.09	0.0805	0.0043	0.652	0.036	0.0588	0.0007	498	25
26.1	39	0	0.005	1986	0.47	0.0814	0.0043	0.644	0.039	0.0574	0.0013	504	26
27.1	122	2	0.013	5016	0.27	0.0815	0.0043	0.652	0.036	0.058	0.0007	505	26
28.1	109	1	0.012	10565	0.18	0.083	0.0044	0.669	0.037	0.0585	0.0007	513	26
8.2	121	1	0.007	82034	0.16	0.0844	0.0045	0.66	0.037	0.0567	0.0007	523	27
29.1	115	1	0.01	74571	0.14	0.0855	0.0045	0.681	0.038	0.0578	0.0007	528	27
30.1	164	2	0.011	107991	0.1	0.0843	0.0045	0.669	0.037	0.0576	0.0006	521	27



KING ISLAND GRANITE (sample 93220008)

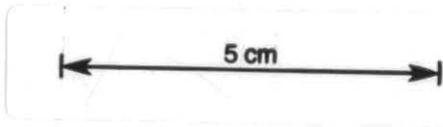
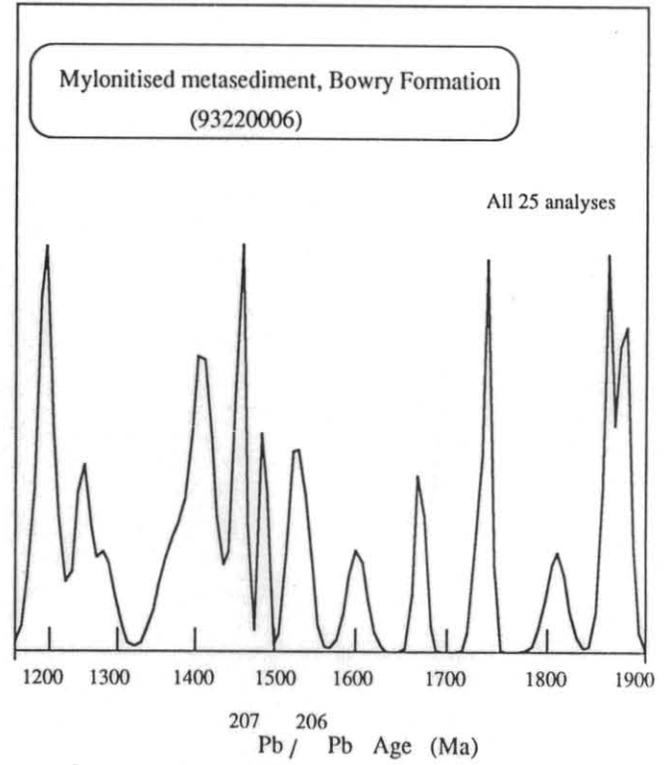
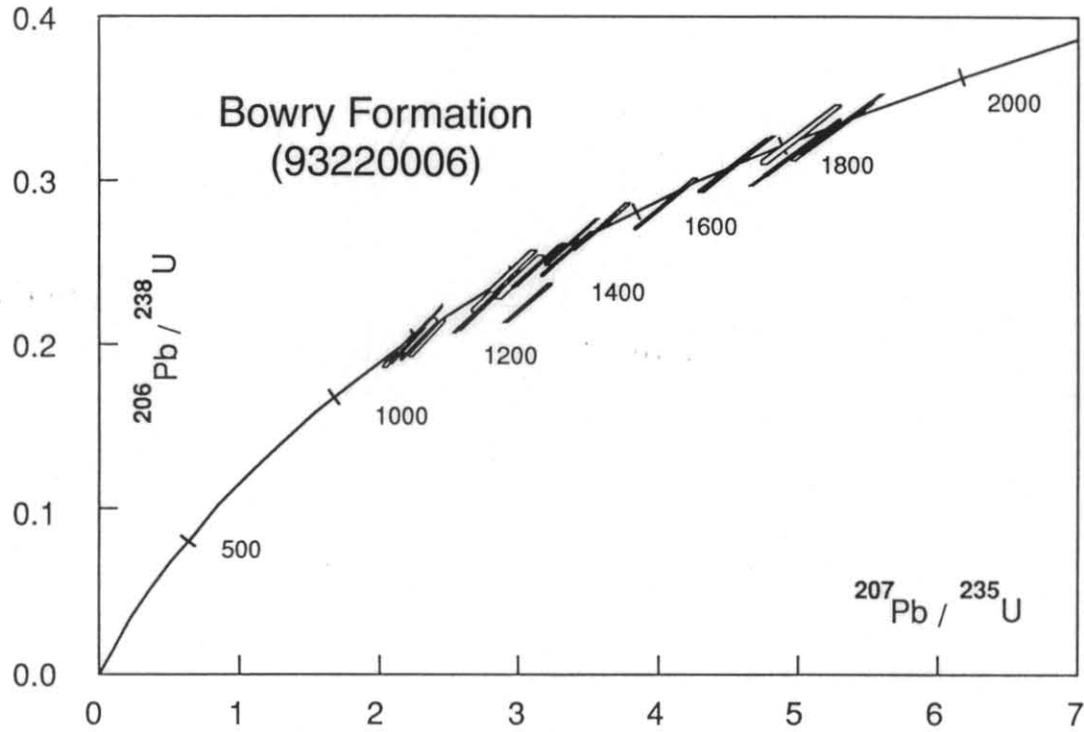
Analysis	U (ppm)	Th (ppm)	Th/U	206/204	f206 (%)	206/238	±	207/235	±	207/206	±	Age (Ma)	±
1.1	170	98	0.574	6320	0.28	0.3205	0.0049	4.839	0.087	0.1095	0.0008	1791	14
2.1	33	26	0.775	7327	0.24	0.5263	0.0089	14.77	0.305	0.2035	0.002	2855	16
3.1	5440	2534	0.466	49	35.66	0.02	0.0004	0.156	0.028	0.0566	0.01	474	436
2.2	4883	2502	0.512	39	44.8	0.0352	0.0008	0.308	0.08	0.0634	0.0161	721	653
4.1	6655	1385	0.208	69	25.34	0.0148	0.0002	0.138	0.013	0.0679	0.006	865	196
5.1	876	643	0.734	17159	0.1	0.2451	0.0037	3.066	0.049	0.0907	0.0003	1441	6
5.2	1295	908	0.701	2251	0.78	0.225	0.0034	2.771	0.046	0.0893	0.0005	1411	10
6.1	183	187	1.023	9508	0.18	0.2506	0.0038	3.185	0.059	0.0922	0.0008	1471	17
7.1	479	43	0.089	10576	0.17	0.1197	0.0018	1.068	0.02	0.0647	0.0006	765	20
7.2	458	36	0.079	4345	0.4	0.1174	0.0018	1.002	0.022	0.0619	0.0009	671	31
8.1	242	147	0.608	5106	0.34	0.2575	0.0039	3.533	0.064	0.0995	0.0008	1615	15
9.1	335	267	0.796	31616	0.06	0.2571	0.0039	3.511	0.059	0.0991	0.0005	1606	10
10.1	454	370	0.814	5014	0.35	0.1223	0.0018	1.076	0.023	0.0638	0.0008	735	28
10.2	443	338	0.761	3915	0.45	0.1205	0.0018	1.089	0.024	0.0655	0.0009	791	30
10.3	333	195	0.585	1000000	-0.05	0.1217	0.0019	1.107	0.046	0.066	0.0024	805	78
11.1	575	197	0.342	2091	0.84	0.1166	0.0018	1.017	0.023	0.0633	0.001	718	32
12.1	683	49	0.071	4738	0.37	0.1201	0.0018	1.069	0.021	0.0646	0.0007	761	23
11.2	498	178	0.359	1694	1.03	0.114	0.0017	1.027	0.027	0.0653	0.0013	785	42
3.2	565	109	0.193	7488	0.23	0.202	0.003	2.333	0.04	0.0838	0.0005	1287	12
13.1	328	77	0.234	6979	0.25	0.1216	0.0018	1.08	0.026	0.0645	0.0011	757	35
14.1	152	109	0.716	12492	0.14	0.2796	0.0043	3.902	0.071	0.1012	0.0008	1647	15
15.1	1033	580	0.561	1374	1.28	0.1096	0.0016	0.986	0.021	0.0653	0.0009	783	30
16.1	202	159	0.785	12393	0.14	0.3089	0.0047	4.695	0.081	0.1102	0.0007	1803	12
17.1	533	128	0.24	2606	0.67	0.2635	0.004	3.761	0.064	0.1035	0.0006	1688	12
19.1	355	121	0.34	3287	0.53	0.1206	0.0018	1.07	0.024	0.0644	0.001	753	32
20.1	315	82	0.259	8444	0.21	0.2154	0.0033	2.629	0.047	0.0886	0.0007	1395	15
21.1	354	97	0.274	4780	0.37	0.1245	0.0019	1.091	0.023	0.0635	0.0009	726	29
21.2	335	93	0.278	29002	0.06	0.1189	0.0018	1.065	0.021	0.065	0.0007	773	24
22.1	590	111	0.188	72833	0.02	0.3021	0.0046	4.348	0.068	0.1044	0.0003	1703	5
23.1	400	215	0.537	5567	0.32	0.2716	0.0041	3.746	0.063	0.1	0.0005	1625	10
24.1	821	375	0.457	249377	0.01	0.1264	0.0019	1.136	0.02	0.0652	0.0005	781	15
24.2	796	335	0.42	18192	0.1	0.1213	0.0018	1.077	0.018	0.0644	0.0004	755	14
25.1	298	150	0.504	21441	0.08	0.2994	0.0045	4.266	0.071	0.1033	0.0005	1685	9
26.1	618	160	0.26	80451	0.02	0.1203	0.0018	1.087	0.019	0.0655	0.0005	791	15
26.2	531	196	0.369	7437	0.24	0.122	0.0018	1.065	0.021	0.0633	0.0007	719	24
27.1	631	277	0.439	448	3.91	0.0883	0.0013	0.993	0.032	0.0815	0.0021	1234	52





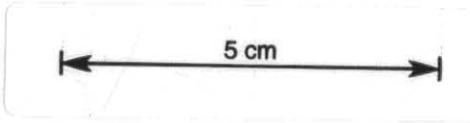
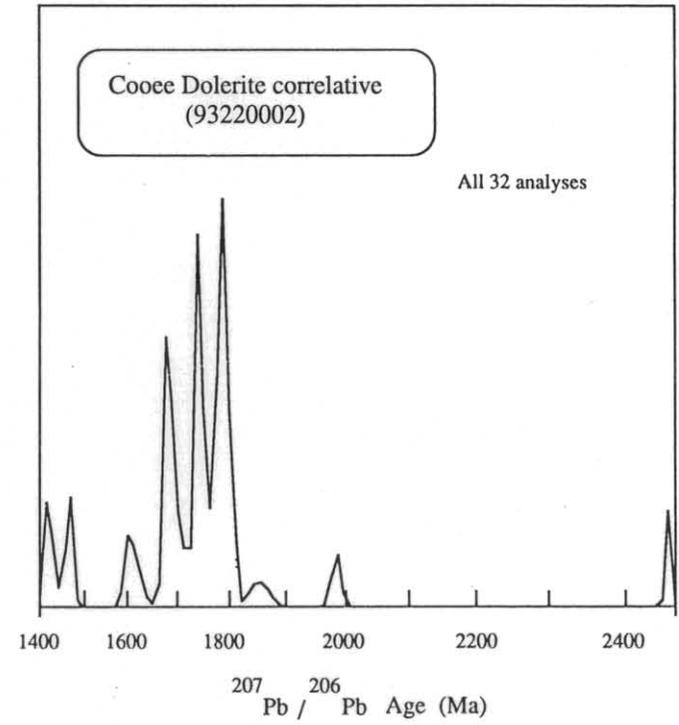
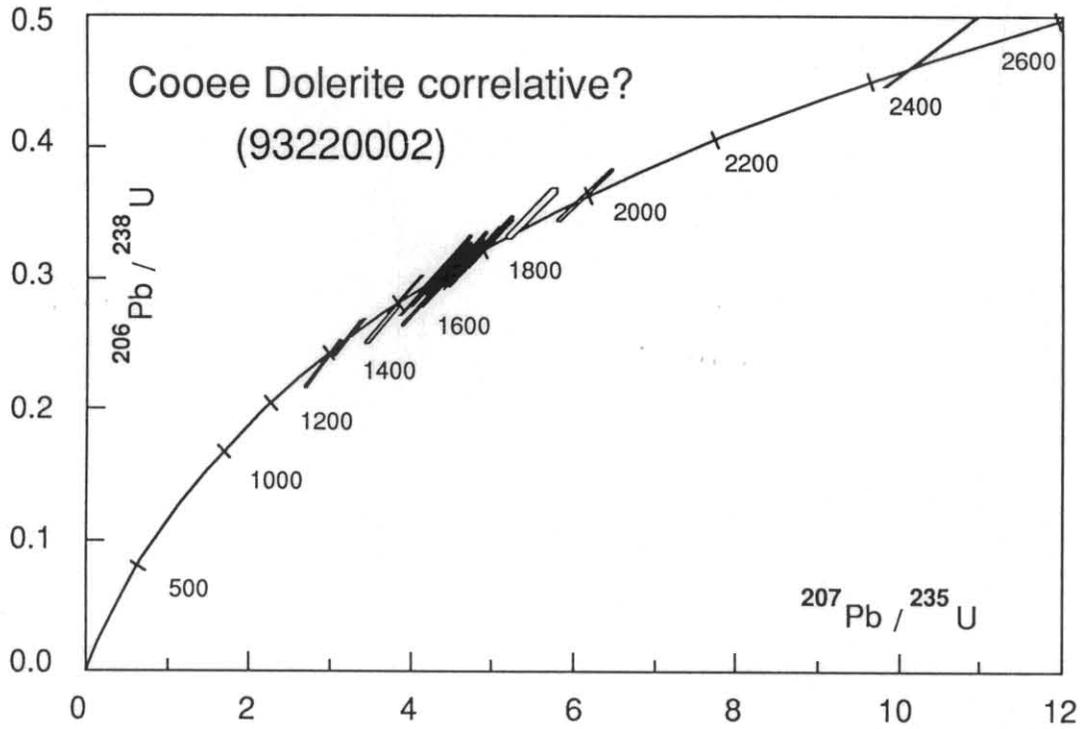
BOWRY FORMATION (sample 93220006)

Analysis	U (ppm)	Th (ppm)	Th/U	206/204	f206 (%)	206/238	±	207/235	±	207/206	±	Age (Ma)	±
1.1	34	16	0.478	16731	0.1	0.2046	0.0112	2.273	0.134	0.0805	0.0014	1211	33
2.1	155	114	0.733	19099	0.09	0.1967	0.0107	2.15	0.12	0.0793	0.0004	1180	11
3.1	266	150	0.565	1086957	0	0.2117	0.0116	2.326	0.128	0.0797	0.0002	1190	6
4.1	101	92	0.915	653595	0	0.3311	0.0181	5.242	0.289	0.1148	0.0004	1877	6
5.1	144	112	0.777	781250	0	0.2865	0.0156	4.047	0.223	0.1024	0.0003	1669	6
6.1	155	106	0.683	57208	0.03	0.2204	0.012	2.716	0.152	0.0894	0.0006	1412	12
7.1	46	25	0.54	10034	0.16	0.2327	0.0127	2.829	0.163	0.0882	0.0011	1386	24
8.1	101	127	1.247	1010101	0	0.2016	0.011	2.281	0.126	0.082	0.0004	1246	9
9.1	177	114	0.644	129702	0.01	0.1992	0.0109	2.203	0.122	0.0802	0.0004	1202	10
10.1	343	188	0.548	1449275	0	0.2632	0.0144	3.373	0.185	0.0929	0.0002	1487	5
11.1	247	164	0.664	190114	0.01	0.2258	0.0123	3.069	0.171	0.0986	0.0006	1597	11
12.1	204	99	0.485	112613	0.01	0.2724	0.0149	3.584	0.199	0.0954	0.0004	1536	9
13.1	76	186	2.433	11674	0.13	0.3293	0.018	5.023	0.279	0.1106	0.0006	1810	10
14.1	48	52	1.085	9020	0.18	0.2452	0.0134	2.959	0.168	0.0875	0.0009	1372	19
15.1	123	126	1.024	584795	0	0.2563	0.014	3.347	0.185	0.0947	0.0004	1522	7
16.1	128	6	0.047	154083	0.01	0.2039	0.0111	2.343	0.131	0.0834	0.0006	1278	15
17.1	298	130	0.436	657895	0	0.3146	0.0172	4.937	0.271	0.1138	0.0002	1861	4
18.1	173	59	0.34	49677	0.03	0.3103	0.017	4.539	0.25	0.1061	0.0004	1733	6
19.1	195	147	0.755	15997	0.1	0.219	0.012	2.689	0.149	0.0891	0.0005	1406	10
20.1	314	238	0.758	78864	0.02	0.2492	0.0136	3.151	0.173	0.0917	0.0002	1461	5
21.1	281	114	0.404	116686	0.01	0.3358	0.0183	5.308	0.292	0.1147	0.0002	1874	4
22.1	69	42	0.61	11328	0.14	0.2417	0.0132	3.005	0.171	0.0902	0.0009	1429	19
23.1	338	172	0.509	2083333	0	0.311	0.017	4.569	0.251	0.1065	0.0002	1741	3
24.1	260	138	0.531	294118	0.01	0.248	0.0135	3.126	0.172	0.0914	0.0003	1455	6
25.1	128	42	0.327	598802	0	0.3211	0.0175	5.029	0.277	0.1136	0.0004	1858	6



COOEE DOLERITE CORRELATIVE (sample 93220002)

Analysis	U (ppm)	Th (ppm)	Th/U	206/204	f206 (%)	206/238	±	207/235	±	207/206	±	Age (Ma)	±
60.1	364	41	0.112	45434	0.03	0.3115	0.017	4.66	0.256	0.1085	0.0002	1774	4
61.1	119	125	1.058	49140	0.03	0.2873	0.0157	3.914	0.217	0.0988	0.0005	1601	9
62.1	341	214	0.629	84246	0.02	0.2554	0.014	3.241	0.178	0.092	0.0002	1468	5
63.1	80	92	1.144	32938	0.05	0.2646	0.0145	3.636	0.203	0.0997	0.0007	1618	13
64.1	190	66	0.349	877193	0	0.3117	0.017	4.708	0.259	0.1096	0.0003	1792	5
65.1	70	32	0.466	87796	0.02	0.3106	0.017	4.483	0.249	0.1047	0.0005	1709	9
66.1	166	36	0.215	43029	0.04	0.326	0.0178	4.928	0.272	0.1096	0.0004	1793	7
67.1	294	82	0.279	1369863	0	0.3226	0.0176	4.835	0.266	0.1087	0.0002	1778	4
68.1	77	47	0.608	9090909	0	0.2946	0.0161	4.214	0.233	0.1037	0.0005	1692	8
69.1	218	136	0.623	1052632	0	0.3275	0.0179	4.986	0.274	0.1104	0.0003	1806	5
70.1	63	58	0.921	233100	0.01	0.2542	0.0139	3.217	0.18	0.0918	0.0006	1463	12
71.1	118	59	0.497	549451	0	0.3013	0.0165	4.42	0.244	0.1064	0.0004	1739	7
72.1	129	102	0.79	28802	0.06	0.3068	0.0168	4.361	0.241	0.1031	0.0004	1681	8
73.1	105	113	1.084	471698	0	0.2929	0.016	4.308	0.238	0.1067	0.0004	1743	7
74.1	250	114	0.456	221729	0.01	0.3161	0.0173	4.767	0.262	0.1094	0.0003	1789	5
75.1	198	72	0.362	869565	0	0.2937	0.016	4.363	0.24	0.1078	0.0003	1762	5
76.1	44	25	0.554	11509	0.14	0.3045	0.0167	4.379	0.251	0.1043	0.0012	1702	22
77.1	282	163	0.579	66313	0.02	0.4734	0.0259	10.388	0.57	0.1591	0.0003	2446	3
78.1	275	60	0.217	1063830	0	0.3082	0.0168	4.643	0.255	0.1093	0.0003	1787	5
79.1	173	84	0.488	800000	0	0.3114	0.017	4.734	0.261	0.1102	0.0003	1804	5
80.1	139	103	0.742	666667	0	0.3302	0.018	4.977	0.274	0.1093	0.0004	1788	6
81.1	134	75	0.558	28121	0.06	0.318	0.0174	4.677	0.259	0.1067	0.0005	1743	8
82.1	211	167	0.789	54825	0.03	0.2392	0.0131	2.962	0.165	0.0898	0.0005	1421	11
83.1	417	378	0.907	1818182	0	0.3151	0.0172	4.632	0.254	0.1066	0.0002	1742	4
84.1	225	63	0.282	49925	0.03	0.279	0.0152	4.112	0.227	0.1069	0.0003	1747	6
85.1	352	103	0.291	64433	0.02	0.3061	0.0167	4.353	0.239	0.1032	0.0003	1682	5
86.1	160	63	0.394	53967	0.03	0.3137	0.0171	4.632	0.256	0.1071	0.0004	1750	8
87.1	77	72	0.934	413223	0	0.3645	0.0199	6.134	0.34	0.122	0.0005	1986	8
88.1	273	86	0.316	107875	0.01	0.2867	0.0157	4.081	0.225	0.1032	0.0004	1683	7
89.1	304	172	0.566	197628	0.01	0.2295	0.0125	2.837	0.157	0.0897	0.0003	1418	7
90.1	58	82	1.426	32321	0.05	0.3499	0.0191	5.472	0.311	0.1134	0.0011	1855	18
91.1	147	78	0.532	43516	0.04	0.3155	0.0172	4.489	0.249	0.1032	0.0005	1682	8



19/90

