Methodology

Carbon and Oxygen isotopes

Samples were drilled using a Sherline microdrill and collected in plastic vials. Analyses were carried out at SUERC on an automated continuous flow VG Prism Series II Isotope Ratio Mass Spectrometer using international standard IAEA-CO-8 (calcite) and internal standard MAB2C. Reproducibility of standards is ±0.2 ‰ and ±0.3 ‰ for carbon and oxygen respectively at 1σ; calibration was via NBS 19. C-isotope ratios were calibrated to Vienna Pee Dee Belemnite (VPDB). Oxygen isotopes were calibrated to Vienna Standard Mean Ocean Water (VSMOW) and values were corrected to account for dolomite-calcite oxygen fractionation during the sample acidification process (McCrea, 1950). All data is presented in Table A1.

XRF - major and trace elements

Major and trace element compositional analysis using X-Ray Fluorescence (XRF) was carried out in the Facility for Earth and Environmental Analysis (FEEA) at the University of St Andrews, Scotland. The aim of which was to determine if there were significant geochemical differences between the carbonate belts. In addition, analysis was carried out on the various 'intrusive' gneiss and quartzo-feldspathic units to determine if they were co-genetic.

Analysis was carried out using a Spectro Analytical X-Lab 2000 Energy Dispersive Polarised XRF Spectrometer. Detection limit is <1 mg/kg. Eight samples were selected for XRF; four carbonate samples and four quartzo-feldspathic samples. The samples were pulverised in a jaw crusher and further reduced in size in a tungsten carbide (WC) TEMA mill. Samples were then prepared as borate fusions for minor element analysis and wax pellets for major element analysis. 0.750 g of sample was weighed into a PtAu crucible and mixed with 5.000 g of lithium tetraborate/metaborate flux and <0.1 g of Ammonium Iodide (release agent). The crucible was placed in a ceramic furnace at 1080 °C for 10 minutes. Upon removal, the sample was poured into a Pt dish (diameter 32 mm) and left to cool before analysis. To make the pressed pellets, 7.000 g of sample was blended with 0.300 g of cellulose wax.

This was placed into an Air-EZ 20 Ton hydraulic press. Fourteen tons of pressure was applied and released. The sample was then removed and labeled for analysis.

Geochemistry results - XRF

Analysis showed that despite petrological differences, the two Cloiche sequence carbonate samples had a similar geochemical fingerprint – see Table A2. As would be expected, based upon the higher % of actinolite and tremolite present, sample *LMG29* has slightly elevated Fe_2O_3 and SiO_2 relative to *LMG1*.

Sample *LMG55*, collected from the Kerrysdale sequence, displays very different geochemistry in both major and trace element composition. The Kerrysdale sample contains more silicate relative to the other three samples; 52.88 wt% compared with a mean of 5.49 wt% (*n=3*). It is impure, with only 10.5 wt% CaO and a loss on ignition (LOI) value of 7.3 %. As reported in other studies (Rock et al., 1987; Park et al., 2002), the Kerrysdale carbonate is enriched in Fe_2O_3, V, Co, Cu, Zn, Zr, and Ba. The barium and vanadium concentrations are significantly higher relative to the other carbonates; 634 ppm compared with a mean of 10.3 ppm (n=3) and 297 ppm compared with a mean of 16.7 ppm (*n=3*) respectively.

The final sample, *LMG85*, collected from the Creag Bhan belt, is considerably more dolomitic than the Cloiche samples with 19.41 wt% MgO compared to 3.40 wt% and 3.94 wt% in *LMG1* and *LMG29* respectively. *LMG85* also shows elevated Sr levels; 543 ppm compared with a mean of 92 ppm (*n=3*), approximately 7-times higher than the levels in the Cloiche samples. Petrologically, it is similar in composition to the Cloiche carbonate rocks and lacks the unusual trace metal concentrations of the Kerrysdale carbonate rocks.

The quartzo-feldspathic samples show similar major elemental compositions – see Table A2. Sample *LMG92*, a sample collected from the Cloiche belt, along strike from sample LMG111 (which was collected for geochronology) is more silicate-rich and has slightly lower Al_2O_3 levels than the three other samples thought to represent intrusive rocks – see Table A2. The results of the trace element analysis are similar to the major element results in that the ‘largest’ variation is seen in sample *LMG92*, which has depressed Sr and Ba levels and elevated Co levels, relative to the other samples. However, the variation between Ba and Sr concentrations between each of the samples is far greater than the other trace elements.

Geochronology

Handpicked zircon grains were mounted in a polished, epoxy-resin block, and targeting was guided by cathodoluminescence images (Fig. A1). Instrument settings were set at a 25 µm spot size at 5 Hz with 70% power, with fluence values c. 2.47 J/cm^2 typical. Data reduction and uncertainty propagation methods are described in Horstwood et al. (2003). Peaks for ^{204}Pb (and Hg), ^{206}Pb and ^{207}Pb were collected on ion-counting detectors; other peaks were collected on Faraday collectors. A DSN-100 (desolvating nebuliser – Nu Instruments) aspirated a ^{203}Tl – ^{205}Tl – ^{235}U solution simultaneously during analysis allowing correction of instrumental bias. Zircon reference material 91500 (1062.4 ± 0.4 Ma, Wiedenbeck et al., 1995) was used as a primary standard; Plešovice was used as a secondary standard (337.33 ± 0.38 Ma, Sláma et al., 2008). The reproducibility of reference material was < 1 % (2σ) for both $^{207}Pb/^{206}Pb$ and $^{206}Pb/^{238}U$. All data is shown in Table A3.

Although the ratio $^{238}U/^{235}U$ of 137.818 has now been suggested for use in U-Pb zircon geochronology (Hiess et al., 2012), for ease of comparison with existing age data the dates in this study have been calculated using $^{238}U/^{235}U$ = 137.88. In online supplementary Table A4 the dates of interest have been calculated using both $^{238}U/^{235}U$ = 137.88 and 137.818 to quantify the effect this parameter has on $^{207}Pb/^{206}Pb$ geochronology.

Table A1– δ^{13}C values in LMG carbonates from the Gairloch and Loch Maree region (this study and Baker & Fallick, 1989)

Sample #	Description	δ^{13}C	δ^{18}O
		‰ (VPDB)	‰ (SMOW)
Gairloch Region – South of Loch Maree			
Cloiche sequence, white to pale pink crystalline calcite marbles			
LMG 1A	Shieldaig Quarry	+9.81	+14.89
LMG 1B	Shieldaig Quarry	+7.68	+13.31
LMG 2	Airigh na Cloiche	+15.37	+18.57
LMG 3	Mill na Claise	+9.70	+14.75
LMG 4	Mill na Claise	+6.30	+12.28
LMG 6	Shieldaig quarry	+10.64	+13.59
LMG 7	Shieldaig quarry	+13.53	+12.76
LMG 8	Shieldaig quarry	+8.55	+14.28
LMG 9	Shieldaig quarry	+11.33	+13.87
LMG 11	Shieldaig quarry	+6.49	+13.46
LMG 15	Airigh na Cloiche	+2.33	+16.36
LMG 16A	Airigh na Cloiche	+6.91	+16.63
LMG 16B	Airigh na Cloiche	+6.66	+16.91
LMG 18	Mill na Claise	+9.62	+14.53
LMG 19	Mill na Claise	+7.98	+13.31
LMG 20	Mill na Claise	+9.10	+13.34
LMG 22	Mill na Claise	+7.71	+18.41
LMG 24	Mill na Claise	+7.96	+12.51
LMG 26A	Mill na Claise	+3.82	+13.61
LMG 26B	Mill na Claise	+8.98	+13.26
LMG 28	Lochan Druim na Fearna	+5.38	+14.90
LMG 29	Lochan Druim na Fearna	+5.90	+15.53
LMG 30	Lochan Druim na Fearna	+9.48	+12.66
LMG 31	Lochan Druim na Fearna	+10.44	+15.20
LMG 32	Lochan Druim na Fearna	+13.18	+14.47
LMG 33	Lochan Druim na Fearna	+13.89	+14.69
LMG 36A	Shieldaig	+4.46	+12.17
LMG 41	Sheidlaig Quarry	+7.49	+11.66
LMG 42	Shieldaig Quarry	+9.88	+14.21
LMG 43	Shieldaig Quarry	+10.75	+18.85
LMG 47	Shieldaig Quarry	+10.99	+18.43
LMG 87	Airigh na Cloiche	+9.14	+13.87
LMG105A	Lochan Druim na Fearna	+3.29	+16.19
LMG105B	Lochan Druim na Fearna	+6.46	+11.80
Kerrysdale sequence, pale to dark grey microbrecciated calcite and dolomite marbles			
LMG 5	Loch Bad an Sgalaig	-2.04	+14.42
LMG 53	Loch bad an Sgalaig	+0.39	+17.23
LMG 55	Loch bad an Sgalaig	-2.03	+15.12
LMG 56	Loch bad an Sgalaig	-4.33	+16.76
LMG 57	Loch bad an Sgalaig	-1.88	+16.20
LMG 58	Loch bad an Sgalaig	-1.13	+14.36
LMG 63	Meall Aundrary	+0.51	+16.67
LMG 64	Meall Aundrary	+1.90	+16.66
LMG 65	Meall Aundrary	-1.64	+15.25
LMG 66	Meall Aundrary	+0.10	+13.72
LMG 68	Meall Aundrary	+0.93	+14.21
LMG 69	Meall Aundrary	-0.06	+14.08
LMG 70	Meall Aundrary	-0.50	+13.71
LMG 71	Meall Aundrary	-1.92	+13.76
LMG 72	Meall Aundrary	-3.83	+15.88
LMG 73	Meall Aundrary	-0.48	+19.59
LMG 74	Meall Aundrary	-1.42	+16.27
LMG 75A	Kerrysdale	+0.26	+15.30
LMG 75B	Kerrysdale	+0.42	+15.43

LMG 76	Kerrysdale	+0.29	+18.63
LMG 77	Kerrysdale	-5.11	+15.10
LMG 78	Kerrysdale	-0.22	+14.51
LMG 79	Kerrysdale	+1.07	+17.20
LMG 80	Flowerdale Mains	+0.05	+13.14
LMG 81	Flowerdale Mains	-0.52	+11.96
LMG 82	Flowerdale Mains	-2.47	+12.33
LMG 83	Flowerdale Mains	+1.07	+13.84
Creag Bhan – pale pink, macrocrystalline calcite marble			
LMG 85	Creag Bhan belt	+7.60	+13.61
LMG 97	Creag Bhan belt	+9.26	+13.73
LMG 100	1¼ miles south of Creag Bhan	+6.08	+11.79
LMG101	1¼ miles south of Creag Bhan	+6.79	+12.09
LMG 98	Creag Bhan belt	+ 10.41	+14.44
LMG 99	Creag Bhan belt	+9.64	+13.90
LMG102	1¼ miles south of Creag Bhan	+ 4.16	+ 13.06
Loch Maree Region – North of Loch Maree			
LMG-A	6m thick unit above basement	+12.40	+15.50
LMG-B	6m thick unit above basement	+13.07	+14.84
LMG-C	6m thick unit above basement	+14.54	+19.83
LMG-D	6m thick unit above basement	+12.38	+13.58
LMG-E	6m thick unit above basement	+11.18	+14.50
LMG-F	6m thick unit above basement	+14.74	+15.78
LMG-G	6m thick unit above basement	+12.94	+14.74
LMG-1	2-3m thick unit above lower marble	+4.46	+15.87
LMG-2	2-3m thick unit above lower marble	+4.05	+16.20
LMG-3	2-3m thick unit above lower marble	+3.73	+15.62
LMG-4	2-3m thick unit above lower marble	+4.95	+14.53
LMG-10	Uppermost marble, 1-2m thick	+1.03	+16.13
LMG-11	Uppermost marble, 1-2m thick	+0.75	+15.85
LMG-12	Uppermost marble, 1-2m thick	+0.59	+14.29
Baker and Fallick Data (Baker & Fallick, 1989)			
Gairloch Region			
S72613	Creag Bhan	+5.8	+11.8
S72614	Creag Bhan	+3.9	+12.8
S72615	Cloiche	+12.0	+17.5
S72616	Cloiche	+12.1	+17.7
S72617	Cloiche	+8.8	+12.8
S72618	Cloiche	+12.8	+17.5
S72620	Cloiche	+4.7	+14.8
S72621	Cloiche	+7.2	+13.6
S72622	Cloiche	+9.4	+21.0
S72627	Flowerdale	-3.3	+15.7
S72632	Flowerdale	-1.6	+16.9
Loch Maree Region – North of Loch Maree			
S72588		+4.0	+13.6
S72591		-1.4	+14.8
S72600		+0.5	+16.9
S72601		+12.9	+18.0
S72604		+11.7	+22.0
S72605		+7.2	+18.9
S72606		+3.1	+17.5

Table A2 – XRF analysis of major and trace elements on representative samples of the Loch Maree Group

Sample #	Grid Ref	SiO_2	Al_2O_3	Na_2O	K_2O	P_2O_5	MgO	MnO	Fe_2O_3	CaO	SO_3	TiO_2	LOI	$\delta^{13}C$	Comments
		wt %											wt %	‰ VPDB	
Carbonates															
LMG 1	NG 81081 72422	5.60	0.60	0.09	0.01	0.03	3.40	0.12	0.15	48.62	0.03	0.02	41.30	+9.81	Cloiche marble
LMG 29	NG 83724 70011	7.77	0.59	0.06	0.01	0.00	3.94	0.17	1.26	47.06	0.06	0.02	39.05	+5.52	Cloiche marble
LMG 55	NG 84666 71619	52.88	12.90	1.46	0.59	0.08	2.43	0.20	10.49	10.50	0.01	1.13	7.30	-2.03	Kerrysdale marble
LMG 85	NG 85527 72211	3.10	0.29	0.20	0.01	0.01	19.41	0.18	1.11	30.00	0.04	0.01	45.60	+7.60	Creag Bhan marble
'Gneiss'															
LMG 90	NG 83051 71571	71.41	15.28	4.61	2.40	0.07	0.70	0.03	1.73	1.72	0.08	0.21	1.46	n/a	Mill na Claise Gneiss
LMG 92	NG 83371 70527	79.81	12.35	5.14	0.64	0.03	0.20	0.01	0.38	0.40	<0.01	0.07	0.76	n/a	Cloiche sequence, quartzo-feldspathic sample
LMG 95	NG 80530 74979	67.01	15.49	3.87	2.40	0.16	1.77	0.07	3.89	3.25	0.09	0.40	1.38	n/a	Ards Gneiss
LMG 96	NG 85452 72189	69.73	15.52	4.11	1.84	0.16	1.10	0.05	3.09	2.08	0.07	0.44	1.62	n/a	Creag Bhan belt, quartzo-feldspathic

Sample #	Grid Ref	V	Cr	Co	Ni	Cu	Zn	Ga	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd	In	Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Hf	Pb	Th	U
		ppm																											
Carbonates																													
LMG 1	NG 81081 72422	2	1	<24	10	5	4	1	<2	68	3	3	1	<2	<2	<2	<2	<2	<2	2	2	2	4	<5	<5	<5	<1	<2	1
LMG 29	NG 83724 70011	45	15	<62	16	3	12	2	<2	120	5	3	1	<2	<2	<2	<2	<2	<2	2	15	3	5	<5	<5	<5	1	<2	2
LMG 55	NG 84666 71619	297	11	39	14	87	67	13	13	89	20	80	4	<2	<2	<2	<2	<2	<2	<2	634	3	9	<5	11	<5	1	<2	<1
LMG 85	NG 85527 72211	3	1	<51	5	3	24	<1	<2	543	5	1	1	<2	<2	<2	<2	<2	<2	<2	14	2	5	<5	<5	<5	4	<2	<1
'Gneiss'																													
LMG 90	NG 83051 71571	11	10	55	1	7	35	19	44	493	3	112	2	<2	<2	<2	<2	<2	<2	<2	1167	15	33	8	13	<5	9	2	<1
LMG 92	NG 83371 70527	7	12	96	<2	10	5	11	13	114	3	123	2	<2	<2	<2	<2	<2	<2	<2	295	2	6	<5	<5	<5	<1	<2	<1
LMG 95	NG 80530 74979	63	50	50	17	5	45	19	61	724	10	109	6	<2	<2	<2	<2	<2	<2	<2	1019	12	29	6	19	<5	19	5	<1
LMG 96	NG 85452 72189	47	12	38	6	22	34	17	34	358	11	152	5	<2	<2	<2	<2	<2	<2	<2	893	49	109	8	35	<5	11	6	<1

Table A3 - Zircon U-Pb LA-ICPMS data for sample LMG-111.

Zr	Signals						Ratios									Isotopic ages						.
	^{204}Pb (cps)	^{206}Pb (mV)	^{207}Pb (mV)	^{238}U (mV)	Pb (ppm)	U (ppm)	^{238}U/^{206}Pb	1σ %	^{207}Pb/^{206}Pb	1σ %	^{207}Pb/^{235}U	1σ %	^{206}Pb/^{238}U	1σ %	Rho	^{207}Pb/^{206}Pb	2σ abs	^{206}Pb/^{238}U	2σ abs	^{207}Pb/^{235}U	2σ abs	% conc.
1	262	16.0	2.4	24.0	184	446	2.19	1.00	0.1798	0.50	11.3027	1.12	0.4560	1.00	0.89	2650.7	8.3	2421.9	40.3	2548.4	20.7	95.0
3	8	9.7	1.5	13.2	111	245	1.98	1.32	0.1880	0.50	13.0610	1.42	0.5039	1.32	0.94	2724.6	8.2	2630.7	57.0	2684.1	26.4	98.0
11	421	8.7	1.2	14.1	100	261	2.24	2.26	0.1685	1.63	10.3827	2.79	0.4469	2.26	0.81	2542.6	27.2	2381.7	89.5	2469.5	50.3	96.4
32	-1	6.1	0.7	11.3	70	210	2.81	1.07	0.1333	0.50	6.5283	1.18	0.3553	1.07	0.91	2141.3	8.7	1960.0	36.1	2049.7	20.6	95.6
33	134	12.5	1.9	16.7	144	309	2.02	1.53	0.1827	0.50	12.4727	1.61	0.4951	1.53	0.95	2677.5	8.3	2592.9	64.9	2640.7	29.8	98.2
36	108	9.0	1.3	13.1	103	244	2.22	1.22	0.1761	0.50	10.9545	1.32	0.4512	1.22	0.93	2616.4	8.3	2400.6	48.8	2519.3	24.3	95.3
41	247	5.2	0.8	6.8	59	126	1.96	1.43	0.1814	0.50	12.7393	1.51	0.5092	1.43	0.94	2666.2	8.3	2653.2	61.9	2660.6	28.1	99.7
41r	200	8.1	1.0	13.3	93	247	2.41	1.85	0.1526	0.50	8.7414	1.92	0.4154	1.85	0.97	2375.3	8.5	2239.7	69.7	2311.4	34.3	96.9
43	-38	6.9	0.8	11.7	79	217	2.53	1.08	0.1428	0.50	7.7910	1.19	0.3958	1.08	0.91	2261.1	8.6	2149.6	39.4	2207.2	21.2	97.4
55	17	4.3	0.7	6.2	49	116	2.10	1.40	0.1877	0.50	12.3305	1.48	0.4764	1.40	0.94	2722.4	8.2	2511.4	57.9	2629.9	27.5	95.5
65	-131	2.6	0.4	3.8	29	70	2.17	1.12	0.1606	1.48	10.1857	1.86	0.4601	1.12	0.60	2461.7	25.0	2439.8	45.4	2451.8	33.8	99.5
66	33	3.1	0.5	4.0	36	75	1.92	1.39	0.1865	0.50	13.3884	1.48	0.5207	1.39	0.94	2711.4	8.2	2702.1	61.0	2707.4	27.5	99.8
72	-19	12.8	2.0	17.6	147	326	2.01	1.08	0.1841	0.50	12.6486	1.19	0.4982	1.08	0.91	2690.5	8.3	2606.0	46.3	2653.8	22.2	98.2
74	-112	11.5	1.9	15.7	131	292	2.02	1.39	0.1967	0.50	13.4021	1.48	0.4942	1.39	0.94	2798.8	8.2	2588.9	59.2	2708.4	27.6	95.6
84	33	8.7	1.3	11.1	100	207	1.96	1.25	0.1810	0.50	12.7546	1.34	0.5111	1.25	0.93	2662.1	8.3	2661.2	54.2	2661.7	25.0	100.0
87	109	11.0	1.7	13.9	126	259	1.96	1.86	0.1821	0.50	12.7808	1.92	0.5091	1.86	0.97	2671.9	8.3	2652.8	80.2	2663.6	35.6	99.6
91	33	13.7	1.7	22.1	157	410	2.44	1.72	0.1501	0.50	8.4767	1.79	0.4095	1.72	0.96	2347.6	8.5	2212.4	64.2	2283.4	32.1	96.9
106	-57	6.0	0.9	8.2	69	153	2.02	1.36	0.1812	0.50	12.3423	1.45	0.4941	1.36	0.94	2663.7	8.3	2588.3	57.8	2630.8	26.9	98.4
109	173	8.6	1.5	11.2	99	207	1.85	1.25	0.1992	0.50	14.8062	1.34	0.5391	1.25	0.93	2819.5	8.2	2779.9	56.1	2802.9	25.3	99.2
111	13	5.7	0.9	7.9	65	146	2.05	1.01	0.1853	0.50	12.4532	1.13	0.4875	1.01	0.90	2700.5	8.3	2560.0	42.5	2639.2	21.0	97.0
119	-251	9.7	1.2	15.6	111	290	2.37	1.17	0.1481	0.50	8.6068	1.27	0.4214	1.17	0.92	2324.4	8.6	2266.9	44.5	2297.3	22.8	98.7
122	-264	9.1	1.0	15.9	104	295	2.45	2.69	0.1507	3.36	8.4820	4.30	0.4081	2.69	0.62	2354.2	57.4	2206.4	99.6	2284.0	75.3	96.6
126	-96	9.1	1.4	14.8	106	220	1.98	1.57	0.1885	0.50	13.0969	1.65	0.5040	1.57	0.95	2729.0	8.2	2630.8	67.6	2686.7	30.7	97.9
127	150	7.8	1.2	12.7	90	188	1.96	1.54	0.1882	0.50	13.2435	1.62	0.5104	1.54	0.95	2726.4	8.2	2658.3	66.9	2697.2	30.2	98.6
131	-72	20.5	3.0	35.0	239	518	2.09	1.95	0.1767	0.50	11.6391	2.02	0.4777	1.95	0.97	2622.2	8.3	2517.2	80.9	2575.8	37.0	97.7
132	-83	1.1	0.2	1.8	12	26	2.00	1.75	0.1823	0.69	12.5622	1.88	0.4998	1.75	0.93	2673.7	11.4	2613.1	74.8	2647.4	34.8	98.7
137	-238	16.5	2.5	26.8	192	397	2.01	2.27	0.1847	0.50	12.6863	2.32	0.4982	2.27	0.98	2695.4	8.3	2606.1	96.6	2656.6	42.8	98.1
145	-260	15.9	2.4	26.2	185	388	2.02	1.60	0.1821	0.50	12.4008	1.67	0.4938	1.60	0.95	2672.3	8.3	2587.2	67.7	2635.2	31.0	98.2
147	-50	3.9	0.6	6.8	46	100	2.07	1.65	0.1854	0.50	12.3462	1.72	0.4831	1.65	0.96	2701.4	8.3	2540.7	68.9	2631.1	31.9	96.6

150	-84	9.5	1.5	15.6	110	231	1.96	1.83	0.1860	0.50	13.0684	1.90	0.5095	1.83	0.96	2707.3	8.2	2654.5	79.1	2684.6	35.1	98.9
156	134	7.5	0.9	16.0	87	237	2.52	1.44	0.1415	0.73	7.7488	1.61	0.3971	1.44	0.89	2246.0	12.6	2155.6	52.5	2202.3	28.6	97.9
157	57	15.3	2.3	26.0	177	385	1.99	1.51	0.1792	0.50	12.4234	1.59	0.5028	1.51	0.95	2645.5	8.3	2625.9	64.8	2637.0	29.4	99.6
165	226	8.4	1.2	15.0	98	221	2.12	1.61	0.1675	0.73	10.8939	1.77	0.4717	1.61	0.91	2533.0	12.3	2490.8	66.3	2514.1	32.4	99.1
166	2	13.6	1.6	28.1	159	416	2.38	1.94	0.1454	0.50	8.4317	2.00	0.4207	1.94	0.97	2292.2	8.6	2263.5	73.6	2278.6	35.7	99.3
171	155	8.4	1.4	13.4	98	199	1.90	1.52	0.1947	0.50	14.1258	1.60	0.5261	1.52	0.95	2782.4	8.2	2725.2	67.1	2758.2	29.9	98.8
175	60	15.4	2.4	26.8	179	397	2.02	1.38	0.1900	0.50	12.9733	1.47	0.4952	1.38	0.94	2742.2	8.2	2593.2	58.8	2677.7	27.4	96.8
177	300	8.8	1.4	14.9	102	221	2.00	1.61	0.1915	0.50	13.2146	1.69	0.5004	1.61	0.96	2755.3	8.2	2615.5	69.0	2695.1	31.4	97.0
180	371	8.8	1.4	14.9	103	221	1.94	1.75	0.1867	0.71	13.2834	1.89	0.5160	1.75	0.93	2713.4	11.7	2682.2	76.4	2700.0	35.1	99.3
183	80	6.2	1.0	10.0	72	148	1.86	1.47	0.1955	0.50	14.4760	1.55	0.5371	1.47	0.95	2788.9	8.2	2771.1	65.9	2781.4	29.1	99.6
184	-67	5.0	0.7	8.6	58	128	2.06	1.68	0.1798	0.50	12.0483	1.76	0.4861	1.68	0.96	2650.7	8.3	2553.7	70.6	2608.2	32.4	97.9
185	-74	6.3	0.9	11.0	73	163	2.03	1.58	0.1724	0.50	11.7008	1.65	0.4924	1.58	0.95	2580.6	8.3	2580.9	66.7	2580.8	30.5	100.0
187	-224	6.3	1.0	10.6	74	157	1.95	1.72	0.1838	0.50	13.0285	1.79	0.5140	1.72	0.96	2687.9	8.3	2673.5	74.7	2681.7	33.2	99.7
193	-250	9.3	1.4	16.7	108	248	2.07	1.83	0.1805	0.50	11.9927	1.89	0.4820	1.83	0.96	2657.2	8.3	2535.8	76.1	2603.8	34.9	97.4
193r	-31	8.0	1.2	13.3	93	197	1.95	2.03	0.1845	0.50	13.0229	2.09	0.5119	2.03	0.97	2693.9	8.3	2664.6	88.2	2681.3	38.8	99.4
194	-24	3.4	0.5	6.3	40	93	2.12	2.13	0.1807	0.50	11.7293	2.19	0.4707	2.13	0.97	2659.5	8.3	2486.7	87.3	2583.0	40.1	96.3
195	-61	18.9	2.8	34.0	219	503	2.10	1.59	0.1816	0.50	11.9467	1.67	0.4772	1.59	0.95	2667.2	8.3	2515.1	66.1	2600.2	30.8	96.7
197	96	2.6	0.4	4.3	30	64	1.86	2.11	0.1970	0.50	14.5851	2.17	0.5369	2.11	0.97	2801.8	8.2	2770.3	94.6	2788.6	40.5	99.3
202	-131	5.1	0.8	9.1	60	135	2.04	1.59	0.1797	0.50	12.1153	1.67	0.4891	1.59	0.95	2649.8	8.3	2566.6	67.0	2613.4	30.8	98.2
204	-4	15.1	2.4	26.6	176	394	1.99	1.94	0.1958	0.83	13.5447	2.11	0.5017	1.94	0.92	2791.6	13.6	2621.0	83.1	2718.4	39.2	96.4
208	-295	4.9	0.9	8.1	57	120	1.89	1.79	0.2028	0.50	14.8099	1.86	0.5295	1.79	0.96	2849.2	8.1	2739.5	79.5	2803.1	34.8	97.7
210	-87	12.8	1.6	28.0	149	415	2.47	1.51	0.1475	0.50	8.2275	1.59	0.4046	1.51	0.95	2317.1	8.6	2190.0	55.7	2256.4	28.3	97.1
211	-28	14.6	1.7	34.2	170	507	2.64	1.78	0.1445	0.50	7.5352	1.85	0.3783	1.78	0.96	2281.4	8.6	2068.3	62.8	2177.2	32.7	95.0
218	142	13.4	2.0	25.3	156	374	2.12	2.31	0.1793	0.50	11.6455	2.36	0.4710	2.31	0.98	2646.5	8.3	2488.1	94.7	2576.3	43.3	96.6
221	23	8.1	1.2	14.9	94	220	2.09	1.89	0.1765	0.50	11.6499	1.96	0.4787	1.89	0.97	2620.5	8.3	2521.4	78.5	2576.7	36.0	97.9
224	-172	5.8	0.9	9.9	67	147	1.96	2.19	0.1835	0.50	12.9036	2.24	0.5099	2.19	0.97	2685.1	8.3	2656.2	94.6	2672.6	41.4	99.4
225	334	10.6	1.8	17.9	123	265	1.89	2.18	0.2075	1.12	15.1464	2.45	0.5293	2.18	0.89	2886.4	18.2	2738.5	96.5	2824.5	45.6	97.0
227	-74	9.0	1.4	15.7	105	232	1.98	1.77	0.1860	0.50	12.9754	1.84	0.5060	1.77	0.96	2706.9	8.3	2639.6	76.1	2677.9	34.1	98.6
229	43	4.6	1.0	6.4	53	95	1.61	2.21	0.2549	0.50	21.8042	2.27	0.6203	2.21	0.98	3215.7	7.9	3111.2	108.3	3175.0	43.1	98.0
233	-114	5.3	0.8	10.1	61	149	2.17	1.68	0.1767	0.50	11.2172	1.76	0.4603	1.68	0.96	2622.5	8.3	2440.9	68.1	2541.3	32.2	96.0
234	-268	5.0	0.8	9.6	59	142	2.12	1.38	0.1823	0.50	11.8490	1.47	0.4714	1.38	0.94	2674.1	8.3	2489.5	56.7	2592.5	27.1	96.0
235	39	6.5	1.0	11.3	75	167	1.95	1.50	0.1898	0.50	13.4414	1.58	0.5137	1.50	0.95	2740.2	8.2	2672.3	65.2	2711.2	29.4	98.6
242	-92	21.9	3.3	40.6	255	601	2.06	1.51	0.1842	0.50	12.3289	1.60	0.4855	1.51	0.95	2690.9	8.3	2551.2	63.5	2629.8	29.5	97.0
246	205	13.9	1.7	30.4	162	451	2.42	1.73	0.1474	0.50	8.3926	1.80	0.4129	1.73	0.96	2316.2	8.6	2228.2	64.7	2274.4	32.1	98.0

247	-64	11.1	1.4	23.8	129	353	2.39	2.12	0.1485	0.50	8.5775	2.18	0.4188	2.12	0.97	2329.2	8.6	2255.0	80.2	2294.2	38.9	98.3
249	-101	3.9	0.6	7.0	46	104	2.00	1.79	0.1852	0.50	12.7855	1.86	0.5007	1.79	0.96	2699.9	8.3	2616.9	76.6	2664.0	34.4	98.2
252	29	8.4	1.3	15.3	98	226	2.03	2.22	0.1825	0.50	12.4231	2.28	0.4937	2.22	0.98	2675.6	8.3	2586.9	94.0	2636.9	41.9	98.1
254	85	11.5	1.8	20.5	134	304	2.00	1.64	0.1875	0.50	12.9408	1.71	0.5006	1.64	0.96	2720.1	8.2	2616.5	70.0	2675.4	31.8	97.8
260	4	6.4	1.0	11.5	74	170	2.00	1.75	0.1823	0.50	12.5476	1.82	0.4991	1.75	0.96	2674.1	8.3	2610.1	74.8	2646.3	33.7	98.6
268	148	14.3	1.7	33.1	166	490	2.57	2.11	0.1452	0.50	7.7789	2.17	0.3886	2.11	0.97	2289.8	8.6	2116.5	75.7	2205.8	38.3	96.0
269	41	11.6	1.9	19.7	135	292	1.91	1.64	0.1996	0.50	14.3915	1.72	0.5228	1.64	0.96	2823.3	8.2	2711.1	72.3	2775.9	32.1	97.7
271	235	12.9	1.5	26.9	150	398	2.37	1.69	0.1447	0.50	8.4196	1.77	0.4219	1.69	0.96	2284.7	8.6	2269.1	64.4	2277.3	31.5	99.6
272	41	10.8	1.6	20.7	125	307	2.14	2.13	0.1845	0.50	11.8747	2.18	0.4669	2.13	0.97	2693.4	8.3	2469.9	86.6	2594.6	40.1	95.2
275	126	5.8	0.7	12.2	68	180	2.37	1.88	0.1460	0.50	8.4887	1.95	0.4217	1.88	0.97	2299.7	8.6	2268.0	71.7	2284.7	34.8	99.3
280	125	9.0	1.1	20.5	105	303	2.55	1.44	0.1442	0.50	7.7817	1.53	0.3915	1.44	0.94	2277.7	8.6	2129.9	52.2	2206.1	27.1	96.5
282	3	1.7	0.3	2.9	20	43	1.96	1.64	0.1844	0.50	12.9742	1.71	0.5104	1.64	0.96	2692.4	8.3	2658.4	70.9	2677.8	31.7	99.3
284	110	4.4	0.7	7.8	51	115	2.00	1.81	0.1791	0.50	12.3557	1.87	0.5003	1.81	0.96	2644.8	8.3	2614.9	77.1	2631.8	34.6	99.4
285	34	7.6	1.1	13.6	88	202	2.04	1.85	0.1777	0.50	12.0233	1.92	0.4907	1.85	0.97	2631.6	8.3	2573.7	78.1	2606.2	35.3	98.8
292	25	6.6	0.8	14.6	77	216	2.38	1.37	0.1482	0.50	8.5901	1.46	0.4205	1.37	0.94	2324.8	8.6	2262.7	52.1	2295.5	26.2	98.6
296	-256	2.0	0.3	4.3	24	63	2.25	1.64	0.1613	0.61	9.8873	1.75	0.4445	1.64	0.94	2469.6	10.3	2370.7	64.7	2424.3	31.8	97.8
297	-303	14.0	2.1	26.4	164	391	2.04	1.67	0.1840	0.50	12.4660	1.75	0.4913	1.67	0.96	2689.5	8.3	2576.2	70.7	2640.2	32.3	97.6
299	11	3.0	0.5	5.3	35	79	1.97	1.49	0.1931	0.50	13.5093	1.58	0.5074	1.49	0.95	2768.8	8.2	2645.5	64.5	2715.9	29.4	97.4
303	-231	8.0	1.2	16.3	94	241	2.18	3.52	0.1804	0.50	11.4065	3.56	0.4587	3.52	0.99	2656.2	8.3	2433.7	141.3	2557.0	64.4	95.2

r = rim

Table A4 - Summary of interpreted $^{207}Pb/^{206}Pb$ dates and uncertainties related to choice of $^{238}U/^{235}U$ ratio.

Sample	Reference	Rock Type	Analysis	Isotopic ratios		Calculated Dates			
				$\frac{^{207}Pb}{^{206}Pb}$	±	$\frac{^{207}Pb}{^{206}Pb}$ (a)	± (b)	$\frac{^{207}Pb}{^{206}Pb}$ (c)	± (d)
LMG-111	This Study	Group I	z119	0.1481	0.50	2324.4	8.6	2324.1	8.61
LMG-111	This Study	Group I	z247	0.1485	0.50	2329.2	8.6	2328.7	8.60
LMG-111	This Study	Group I	z292	0.1482	0.50	2324.8	8.6	2325.3	8.61
LMG-111	This study	Group II	z166	0.1454	0.50	2292.2	8.6	2292.5	8.64
LMG-111	This study	Group II	z271	0.1447	0.50	2284.7	8.6	2284.2	8.64
LMG-111	This study	Group II	z275	0.1460	0.50	2299.7	8.6	2299.6	8.63

a. Age calculated using $^{207}Pb/^{206}Pb$ ratio and $^{238}U/^{235}U = 137.88$

b. Only considers uncertainty in $^{207}Pb/^{206}Pb$ ratio

c. Age calculated using $^{207}Pb/^{206}Pb$ ratio and $^{238}U/^{235}U = 137.818 \pm 0.045$

d. Combines uncertainty in $^{207}Pb/^{206}Pb$ ratio with uncertainty in $^{238}U/^{235}U$ ratio

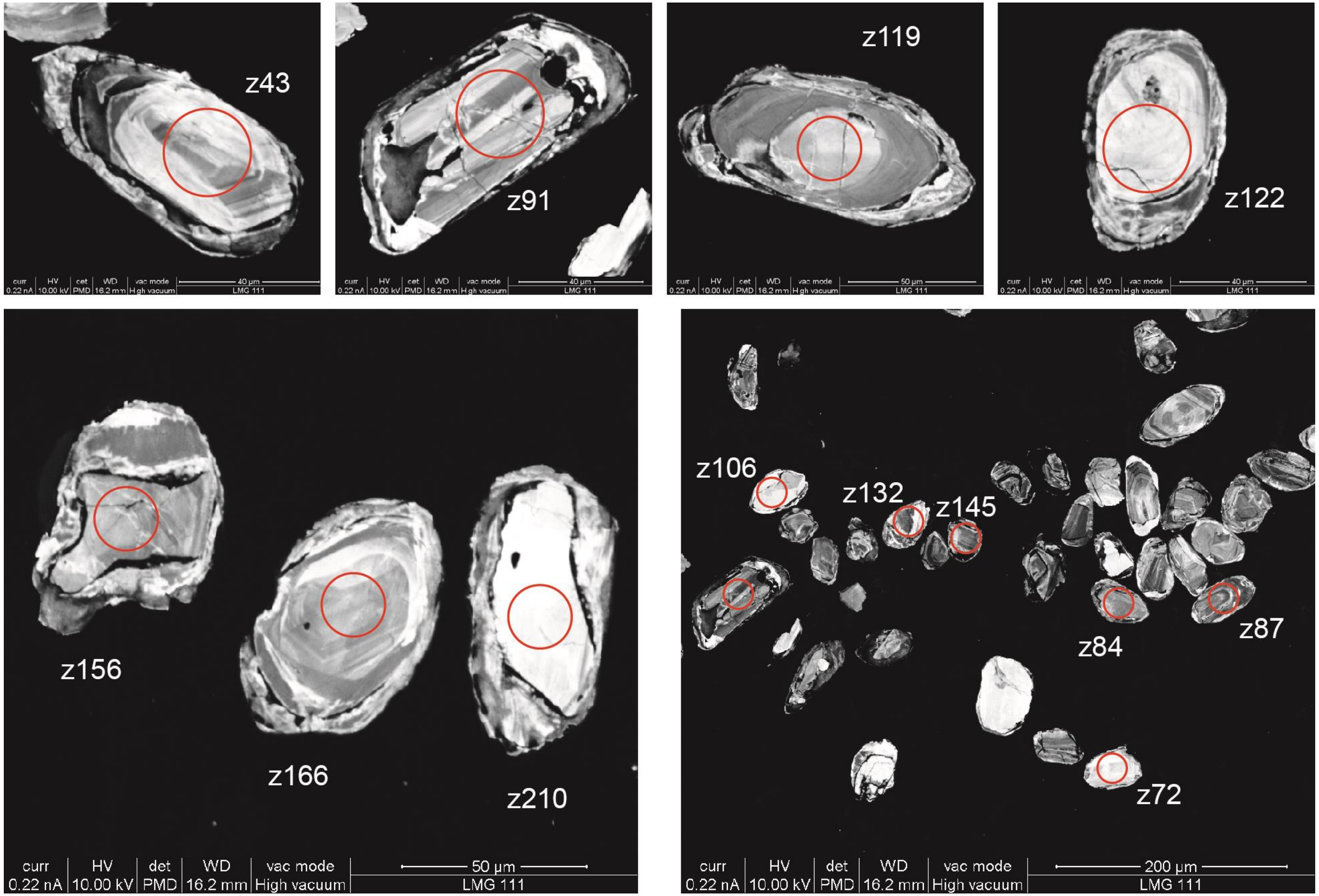

Figure A1 – Representative cathode luminescence images of zircon grains from sample LMG111 showing zoning typical of a magmatic zircon. The red circle depicts the analysis spot and the numbering (z43, z91 etc) is correlated with the zircon grain numbers in the supplementary chronology table

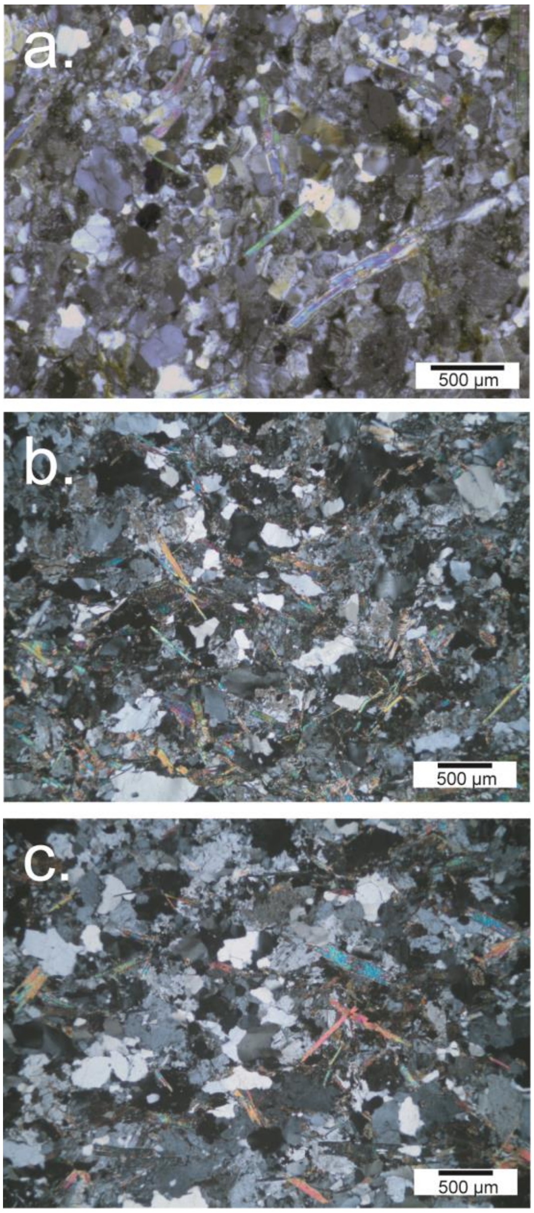

Figure A2 – Photomicrographs of the metapsammitic unit along the contact between Archaean gneiss and the Loch Maree Group. It consists of rounded and angular quartz and feldspar grains and the micas are largely non-aligned. (**a**) Sample from the northeastern segment of the Loch Maree Group outcrop north of Loch Maree. (**b, c**). Samples from southwestern segment of the Loch Maree Group outcrop belt; (**c**) is sample LMG 111, which has yielded Palaeoproterozoic-age zircons (see Fig. 3).

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