Supplementary information

Analytical methods: Whole rock

Samples collected in the field were made as fresh and unaltered as possible by chipping off weathered surfaces using a rock hammer. The sample was crushed in a fly-press to grains <2 cm^3. Any remaining, visibly altered material was removed at this point. The crushed sample was then powdered in an agate ball mill.

1. Major elements

Analysis of whole rock sample splits for their major (samples with prefix BC93 and BC10) and selected trace element (samples with prefix BC93 only) concentrations collected during the 1993 and 2010 fieldwork seasons were carried out at the School of Geosciences, University of Edinburgh. Major element concentrations were determined on glass discs and trace element contents on pressed powder pellets. Major and trace element concentrations of prepared samples were determined on a Philips PW2404 automatic X-ray fluorescence spectrometer equipped with a Rh-anode X-ray tube for sample irradiation. The matrix effects on major element intensities were corrected for using theoretical alpha coefficients which were calculated using the Philips software. Alpha coefficients were calculated to take account for the additional flux that replaced the volatile components in the sample in order for analytical totals to be 100% less the LOI values (see data in the supplementary information excel spreadsheet). Corrections on the longer-wavelength trace element intensities (Ba only in this case) were made using alpha coefficients based on major element concentrations from measurement of the powdered samples. Matrix corrections for the other trace elements were applied by using the count rate from the RhKα Compton scatter line (internal standard). Line-overlap corrections were made using synthetic standards. Throughout the duration of analysis, four international standards were run (BCR, BEN, BHVO-1 and BIR-1) for their trace element compositions. Precision was better than 2% for all elements.

2. Trace elements

Analysis of whole rock powders was undertaken at the Arthur Holmes Isotope Geology Laboratory (AHIGL) which forms part of NCIET (Northern Centre for Isotopic and Elemental Tracing) at Durham University, UK and at UCLA, California (for details of procedure and standard details for samples run at UCLA see Davidson and de Silva, 1995).

For elemental analysis, 0.1g of sample powder was dissolved using digestion techniques involving HF and HNO_3 SpA acid. Trace element concentrations for samples denoted with the prefix BC93 were determined on the Perkin Elmer-Sciex Elan 6000 ICP-MS at NCIET, Durham University. Samples were analysed using an autosampler. Solutions were run for 38 elements and analysed against a calibration line derived from USGS standards AGV-1, BHVO-1, BIR-1 and W-2 and NIST standard reference material NBS 688. Analyses of standards took place throughout the run sequence in order to monitor instrument drift. Trace element concentrations for samples denoted with the prefix BC10 were determined on the ThermoScientific X-Series 2 ICP-MS at NCIET, Durham University. Samples were analysed using an autosampler. Solutions were run for 36 elements and analysed against a calibration line derived from USGS standards AGV-1, BHVO-1 and W-2. USGS standards run at the start and end of the analytical sequence also included BIR-1, BEN and NIST standard reference material NBS 688. Analyses of standards took place throughout the run sequence in order to monitor instrument drift. Elements for all standards were consistently with 2σ of published values. During the period of study 12 analyses of the international standard W2 was carried out, e.g. for Sr: 200.93ppm ± 1.62 (2σ). This is in excellent agreement with the accepted value; 196ppm ± 10 (2σ).

3. Sr-Nd-Pb isotopes

For Sr-Nd-Pb isotopic analysis 0.1g of sample powder was dissolved using standard digestion techniques involving HF and HNO_3 SpA acid. Sr was separated from the sample solution using Sr-spec resin columns and Pb collected in a final elution of 8N HCl. The Nd fraction was collected throughout running of the Sr-spec columns and subsequently separated from the sample solution using cation exchange columns.

Isotope ratios for Sr, Nd and Pb were determined using a PIMMS ThermoElectron Neptune instrument at AHIGL, Durham University. The basic analytical method for both Pb and Sr on the Neptune comprises a static multi-collection routine of 1 block of 50 cycles with an integration time of 4 s per cycle; total analysis time is 3-5 minutes.

Sr whole-rock sample solutions were taken up in 1 ml of 3% TD HNO_3 and introduced into the Neptune using an ESI PFA50 nebulizer and a dual cyclonic-Scott Double Pass spray chamber. With this sample introduction setup, and the normal H skimmer cone, the sensitivity for Sr on the Neptune is typically ~60V total Sr ppm^{-1} at an uptake rate of 90 μl min^{-1}. Prior to analysis a small aliquot was first tested to establish the Sr concentration of each sample by monitoring the size of the ^{88}Sr beam from which a dilution factor was calculated to yield a beam of ~ 20V ^{88}Sr. Instrumental mass bias was corrected for using the $^{88}Sr/^{86}Sr$ ratio (the reciprocal of the $^{86}Sr/^{88}Sr$ ratio) and an exponential law. The average $^{87}Sr/^{86}Sr$ for the NBS 987 standard throughout the course of this study was 0.710256 ± 0.000011 (2σ, n = 14). All sample data throughout this work is reported to relative to a NBS987 standard value of 0.710248 (Thirlwall, 1991).

Nd whole rock sample solutions were taken up in 500 μl of 3% TD HNO_3 and introduced into the Neptune using an ESI PFA50 nebulizer and a dual cyclonic-Scott Double Pass spray chamber. With this sample introduction setup, and the normal H skimmer cone, the sensitivity for Nd on the Neptune is typically ~60-80V total Nd ppm^{-1} at an uptake rate of 90 µl min^{-1}. Instrumental mass bias was corrected for by using a $^{146}Nd/^{145}Nd$ value of 2.079143 (equivalent to a $^{146}Nd/^{144}Nd$ value of 0.7219 which is more commonly used) and an exponential law. The $^{146}Nd/^{145}Nd$ value is used because the Nd isotopic compositions of samples are measured on a total REE-cut from the first stage of cation column chemistry and this ratio is the only Ce and Sm free stable Nd isotopic ratio. The use of the $^{146}Nd/^{145}Nd$ however requires a correction for isobaric interferences from Sm on ^{144}, ^{148} and ^{150}Nd. This correction is based on the method given in Nowell and Parrish (2002). The average values of $^{143}Nd/^{144}Nd$ for the in-house J&M and Sm-doped J&M standard throughout the course of this study were 0.511111 ± 0.000014 (2σ, n = 12) and 0.511121 ± 0.000010 (2σ, n = 4) respectively. These values are comparable to the values reported by Pearson and Nowell (2005) for the long-term reproducibility of this standard. All sample data throughout this work is reported to relative to a J&M standard value of 0.511110 which is equivalent to a La Jolla value of 0.511862.

Pb whole-rock sample solutions were taken up in 500 µl of 3% TD HNO_3. Prior to analysis each sample was tested to determine its Pb concentration. This value was subsequently used to calculate the appropriate amount of Tl spike to add to the sample in order to obtain a Pb/Tl ratio of ~12, which simultaneously minimises the tails from ^{205}Tl onto ^{204}Pb and from ^{206}Pb onto ^{205}Tl. After spiking with Tl each sample was introduced into the Neptune using an ESI PFA50 nebulizer and a Cinnabar cyclonic spray chamber. With this setup, and the normal H skimmer cone, the sensitivity for Pb on the Neptune is typically ~100V total Pb ppm-1 at an uptake rate of 90 µl min-1. Pb mass bias was externally corrected using the $^{205}Tl/^{203}Tl$ ratio and an exponential law. The $^{205}Tl/^{203}Tl$ used for correcting the Pb ratios was determined for each analytical session by minimising the difference in offset between the session average Pb ratios (all ratios for NBS987) and the Galer (1997) triple spike Pb isotope values i.e. the Tl isotope ratio was calculated to give the best fit to all the Pb isotope ratios of Galer (1997) simultaneously. The average $^{206}Pb/^{204}Pb$, $^{207}Pb/^{204}Pb$ and $^{208}Pb/^{204}Pb$ ratios for the NBS981 Pb standard throughout the course of this study were 16.94046 ± 0.00088, 15.49762 ± 0.00116, 36.71676 ± 0.00367 (all 2σ, n = 22).

4. U-Pb in zircon

In-situ U-Pb isotopic analysis of zircons was undertaken at the University of California, Los Angeles on the CAMECA ims-1270 ion probe which forms part of the NSF (National Science Foundation) Instrumentation and Facilities Program. Separation of zircons from their host rocks was undertaken at Oregon State University by Shan de Silva and his graduate students Jason Kaiser and Rodrigo Iriarte using the procedure detailed below.

Splits of samples BC93PAX14 and BC10QSX107 were crushed using a hydraulic press and a disk mill. Splits of samples BC93PAX14 and BC10QSX107 were crushed using a hydraulic press to reduce the size to ≤ 1 cm. The sample was subsequently crushed using a disc mill to produce a coarse grained powder. Powders were then sieved in order to separate grains <355 microns. A Rogers shaking table was used to separate out the heavy mineral fractions using the table vibrations and water. The collected heavy mineral fraction was put into a funnel containing heavy liquid (density of 3.28-33) in which the heavy minerals collected at the bottom whilst the lighter grains floated at the top. The heavy fraction is then passed through a Frantz isodynamic separator which separates the magnetic and non-magnetic (zircon) fractions. From this fraction, zircon grains were handpicked and cleaned with acetone. These were subsequently mounted in epoxy resin and sectioned so that the grain surface was exposed. This surface was then polished with 1 μm of Al_2O_3 and ultrasonically cleaned using 1N HCl de-ionized H_2O and methanol.

Prior to analysis on the ion probe, mounted zircon grains were imaged using cathodoluminescence (CL) to identify growth zonation patterns and any inclusions, the latter which would be avoided during analysis. Resin blocks were coated with 10 μm of gold and were analysed using a mass-filtered 10-20 nA $16O^-$ beam which was focussed to a spot size diameter of 25-30 μm resulting in an analysis crater depth of ~0.5 μm. The secondary ions were extracted at 10 kV with a -10 to +40 eV bandpass. The sensitivity on U and Pb were constrained through analysis of zircon standard AS3. The $^{206}Pb/^{238}U$ age for AS3 is reproducible to within 1.6%, and its $^{207}Pb/^{206}U$ age is accurate to within 0.3%. Further details of the analytical protocol for the UCLA SIMS are given in Folkes et al. (2011). Details of reference zircon AS3 are given in Paces and Miller (1993) and Schmitz et al. (2003).

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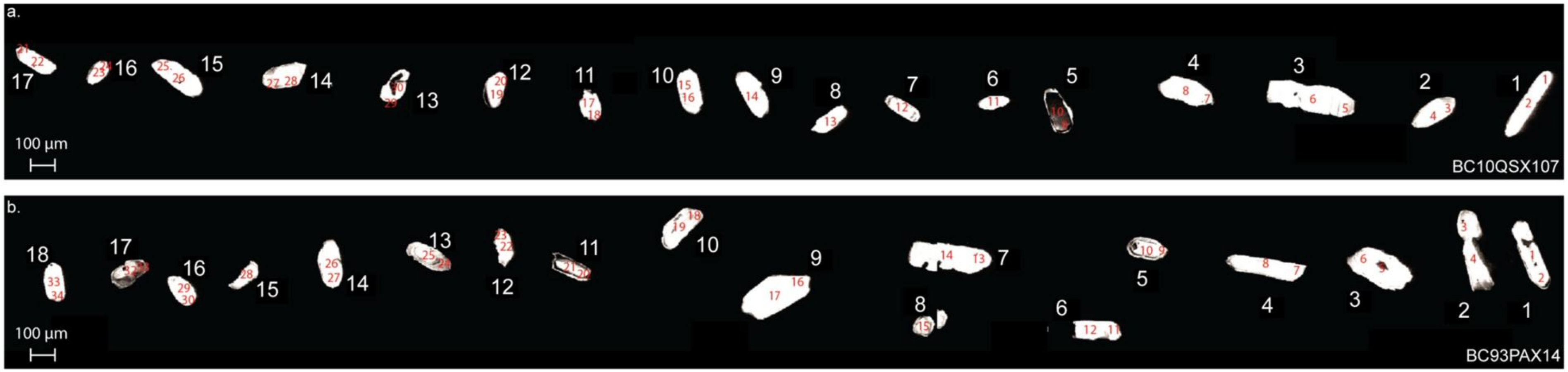


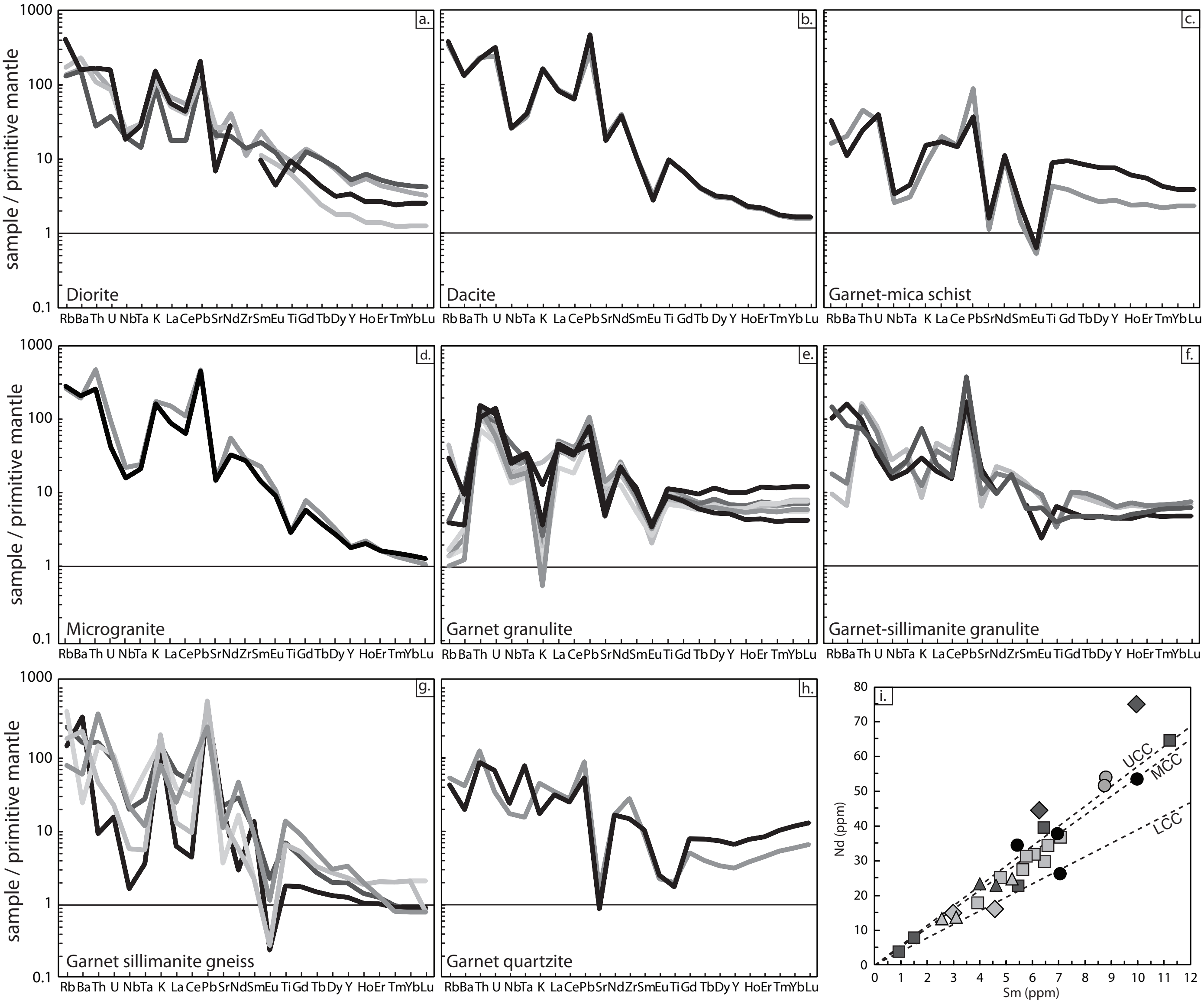
a. BC10QSX107 (R: rim; C: core)

Grain #	**1**	**1**	**2**	**2**	**3**	**3**	**4**	**4**	**5**	**5**	**6**	**7**	**8**	**9**	**10**	**10**	**11**	**11**	**12**	**12**	**13**	**13**	**14**	**14**	**15**	**15**	**16**	**16**	**17**	**17**
Spot #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	29	30	27	18	25	26	23	24	21	22
Location	R	C	R	C	R	C	R	C	R	C	C	C	C	C	R	C	R	R	C	R	R	C	R	C	R	C	C	R	R	C

b. BC93PAX14 (R: rim; C: core)

Grain #	**1**	**1**	**2**	**2**	**3**	**3**	**4**	**4**	**5**	**5**	**6**	**6**	**7**	**7**	**8**	**9**	**9**	**10**	**10**	**11**	**11**	**12**	**12**	**13**	**13**	**14**	**14**	**15**	**16**	**16**	**17**	**17**	**18**	**18**
Spot #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Location	C	R	R	C	C	R	R	C	R	C	R	C	R	C	C	R	C	R	C	R	C	C	R	R	C	C	R	C	C	R	R	C	C	R

McLeod et al. Supplementary figures



Whole rock data

Sample ID	BC93QNX02	BC93QNX03	BC93QSX04	BC93PAX01	BC93PAX03	BC93PAX07	BC93PAX11	BC93PAX12	BC93PAX14	BC10QSX101	BC10QSX104	BC10QSX106	BC10QSX107	BC10QSX108	BC10QSX111
Lithology	Grt-sill granulite	Microgranite	Microgranite	Grt-sill gneiss	Grt-sill granulite	Diorite	Diorite	Grt-sill gneiss	Grt-sill granulite	Grt-granulite	Dacite	Grt-granulite	Grt-granulite	Grt-quartzite	Dacite
SiO_2	68.5	68.7	69.3	88.2	67.7	56.9	57.7	79.8	65.1	67.4	67.2	63.1	67.1	71.3	66.7
Al_2O_3	13.4	15.2	15.3	6.6	13.7	17.0	15.1	13.3	16.7	12.5	16.4	15.2	14.2	14.9	15.7
Fe_2O_3	0.2	5.0	4.6	1.3	2.1	2.8	2.6	0.5	0.3	0.1	4.7	0.03	0.02	4.4	4.8
MgO	1.9	0.9	0.8	0.6	2.8	5.4	5.7	0.8	1.7	2.7	1.0	1.8	1.0	0.6	1.4
CaO	6.5	2.1	2.0	0.0	3.5	6.0	5.9	0.2	8.8	9.7	2.4	12.9	11.5	2.8	2.6
Na_2O	0.6	3.4	3.6	0.2	2.3	1.4	1.9	0.0	0.6	0.4	3.4	0.3	0.2	3.0	4.2
K_2O	0.2	5.0	4.6	1.3	2.1	2.8	2.6	0.5	0.3	0.1	4.7	0.03	0.02	4.4	4.8
TiO_2	0.8	0.6	0.6	0.4	0.8	1.9	1.3	0.4	0.7	0.8	0.6	0.6	0.7	0.5	0.7
MnO	0.2	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.2	0.3	0.02	0.3	0.2	0.02	0.04
P_2O_5	0.2	0.2	0.2	0.0	0.2	0.2	0.4	0.2	0.3	0.1	0.3	0.3	0.2	0.3	0.3
LOI	2.0	0.6	0.2	0.4	0.2	0.7	0.5	0.5	0.1	0.6	1.2	0.2	0.1	0.6	0.2
Total	99.3	99.5	99.6	99.4	99.7	99.6	99.6	99.3	99.3	94.5	101.8	94.7	95.2	102.6	101.4
Sc	11.2	3.1	2.8	7.7	12.3	13.6	24.7	8.5	13.2	12.1	5.3	11.0	11.2	3.8	5.3
V	84.8	35.7	34.4	19.9	77.8	175.4	124.9	27.9	82.5	84.3	40.9	85.6	109.2	28.9	47.8
Cr	58.3	11.3	7.3	14.7	46.1	51.7	199.7	22.6	43.1	15.9	6.5	17.2	14.8	26.8	27.9
Mn	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.0	0.2	0.2	0.0	0.0
Co	6.9	3.7	3.5	1.7	4.9	8.1	13.9	2.0	6.0	10.8	3.7	7.5	4.2	3.2	6.4
Ni	17.6	4.6	2.2	4.0	13.7	13.5	26.7	4.1	11.4	0.8	0.4	0.9	0.7	11.8	12.5
Cu	13.9	4.4	5.7	2.5	18.0	10.9	11.9	6.5	11.8	13.0	7.6	17.3	4.8	7.7	12.8
Zn	42.9	70.4	67.3	20.2	36.9	99.5	103.6	27.2	42.9	42.6	48.8	34.3	33.7	51.9	63.1
Ga	14.7	22.5	21.7	11.4	12.8	19.5	20.0	15.7	16.2	14.9	25.5	21.6	19.7	18.9	24.7
Rb	5.9	165.6	176.7	34.0	91.9	84.1	81.4	27.3	11.1	0.9	242.6	0.9	0.7	168.9	219.8
Sr	131.3	301.7	307.1	33.1	343.0	388.4	416.4	18.5	194.7	214.3	371.5	251.0	306.7	468.7	419.1
Y	26.9	8.3	8.0	14.3	19.2	19.3	22.2	30.2	28.2	32.9	14.4	30.5	29.5	9.3	13.9
Zr	206.3	313.2	301.8	314.4	191.0	117.2	147.6	166.9	172.9	-	-	-	-	-	-
Nb	19.3	15.5	11.2	12.4	13.0	14.5	13.5	17.1	11.4	15.4	18.4	16.6	11.9	14.4	18.3
Cs	1.3	1.8	1.6	0.5	6.4	1.5	1.0	1.5	0.5	0.1	12.7	0.1	0.1	3.5	7.1
Ba	44.6	1333.8	1440.8	291.4	561.3	1123.2	1043.8	138.4	89.8	17.3	919.1	12.4	8.8	1131.0	932.6
La	32.7	106.2	62.4	24.7	16.7	46.5	11.9	22.4	25.7	37.2	58.1	34.8	32.9	44.9	60.2
Ce	64.8	199.8	115.4	50.6	29.1	97.3	31.1	46.0	49.7	78.0	116.4	70.8	67.5	88.3	122.5
Pr	7.7	21.6	12.7	5.9	3.3	12.7	5.1	5.6	6.0	9.4	13.9	8.6	8.0	10.6	14.4
Nd	30.1	75.1	44.3	22.9	12.7	53.5	26.3	22.8	24.0	37.0	52.1	34.3	31.1	39.7	54.3
Sm	5.8	10.0	6.3	4.0	2.6	10.0	7.1	4.7	5.2	7.1	8.8	6.6	5.8	6.4	8.8
Eu	1.3	1.8	1.5	0.4	1.0	2.0	1.9	0.4	1.5	1.7	1.7	1.4	1.5	1.8	1.7
Gd	5.5	4.6	3.4	3.1	2.7	7.7	7.1	4.7	5.8	6.6	5.8	6.2	5.5	4.2	5.8
Tb	0.9	0.6	0.4	0.4	0.5	1.0	1.0	0.8	1.0	1.0	0.7	0.9	0.8	0.5	0.7
Dy	5.0	2.3	1.9	2.5	3.3	4.9	5.3	5.5	5.8	5.5	3.0	4.9	4.7	2.0	3.0
Ho	1.0	0.4	0.3	0.6	0.8	0.8	1.0	1.3	1.1	1.2	0.5	1.0	1.0	0.3	0.5
Er	3.0	0.8	0.8	2.2	2.5	1.9	2.3	4.0	3.1	3.1	1.1	2.7	2.7	0.7	1.1
Tm	0.5	0.1	0.1	0.4	0.4	0.3	0.3	0.8	0.5	0.5	0.2	0.5	0.4	0.1	0.2
Yb	3.1	0.6	0.7	2.8	2.8	1.6	1.9	5.7	3.2	3.3	0.8	2.8	2.7	0.5	0.8
Lu	0.5	0.1	0.1	0.5	0.4	0.2	0.3	1.0	0.5	0.5	0.1	0.4	0.4	0.1	0.1
Ta	1.5	1.0	0.9	0.6	1.1	1.1	0.6	3.2	1.1	1.2	1.7	0.9	0.8	1.1	1.5
Pb	10.4	33.0	32.0	6.3	26.5	8.7	8.3	3.8	9.4	4.9	33.3	3.3	7.8	21.0	19.7
Th	13.6	39.4	21.5	10.5	6.1	12.2	2.2	7.3	12.3	12.2	18.7	9.9	12.1	13.8	19.3
U	1.7	2.0	0.9	0.7	0.8	1.8	0.8	1.4	1.4	2.0	6.7	1.1	1.3	2.0	5.1
$^{87}Sr/^{86}Sr$	0.736760	0.712017	0.712014	0.719380	0.722624	0.712595	0.710481	0.717314	0.732878	-	0.712227	0.730022	0.736619	-	0.711805
$^{143}Nd/^{144}Nd$	0.511850	0.511929	0.511980	0.511872	0.511846	0.512091	0.512168	0.511966	0.511885	-	0.512179	0.511913	0.511829	-	0.512207
$^{206}Pb/^{204}Pb$	18.65	17.77	17.79	18.17	18.43	18.72	18.44	18.67	18.50	-	18.60	18.75	18.61	-	18.77
$^{207}Pb/^{204}Pb$	15.67	15.61	15.61	15.64	15.67	15.68	15.66	15.68	15.67	-	15.65	15.69	15.68	-	15.68
$^{208}Pb/^{204}Pb$	39.13	38.47	38.49	38.95	39.02	39.00	38.96	38.82	39.17	-	38.91	39.46	39.20	-	38.99

Sample ID	BC10PAX102	BC10PAX103	BC10PAX107a	BC10PAX107b	BC10PAX110	BC10PAX112	BC10PAX113	BC10PAX127	BC10PAX128	BC10PAX131	BC10PAX132	BC10PAX134	BC10PAX136	BC10PAX138
Lithology	Grt-mica schist	Diorite	Grt-granulite	Grt-granulite	Grt-granulite	Grt-granulite	Grt-granulite	Diorite	Grt-mica schist	Grt-quartzite	Grt-quartzite	Grt-sill granulite	Grt-quartzite	Grt-quartzite
SiO_2	77.6	53.0	77.4	59.0	60.9	66.8	63.4	52.8	82.4	74.8	76.7	74.2	73.3	70.3
Al_2O_3	18.7	20.3	10.6	17.4	17.5	15.9	15.7	25.7	13.2	16.3	14.9	12.0	15.2	18.1
Fe_2O_3	0.3	3.2	0.1	0.4	0.1	0.8	0.0	4.4	0.5	2.3	4.4	0.8	4.6	6.0
MgO	0.2	4.3	1.1	2.2	1.5	1.6	1.3	4.4	0.3	0.2	0.1	1.5	0.1	0.2
CaO	0.2	5.8	6.8	9.7	12.5	6.8	13.2	0.7	0.7	1.7	0.8	4.0	0.9	1.1
Na_2O	0.03	1.6	0.3	0.5	0.4	1.5	0.2	1.3	0.1	3.0	1.5	2.0	4.3	2.7
K_2O	0.3	3.2	0.1	0.4	0.1	0.8	0.0	4.4	0.5	2.3	4.4	0.8	4.6	6.0
TiO_2	0.1	1.7	0.8	0.7	0.7	0.5	0.6	0.9	0.1	0.2	0.1	0.5	0.1	0.1
MnO	0.02	0.1	0.1	0.8	0.4	0.2	0.4	0.1	0.0	0.0	0.0	0.2	0.0	0.0
P_2O_5	0.2	0.2	0.2	0.3	0.3	0.6	0.2	0.1	0.5	0.1	0.1	0.3	0.1	0.0
LOI	1.3	1.9	0.1	1.6	0.6	0.1	0.0	0.9	0.2	0.3	0.3	0.4	0.5	0.6
Total	98.7	95.2	97.7	93.0	94.9	95.5	94.9	95.5	98.4	101.4	103.3	96.9	103.7	105.1
Sc	3.3	10.8	8.4	11.2	8.8	11.9	10.3	19.7	3.2	14.6	2.5	5.6	2.9	5.3
V	38.6	187.7	45.9	105.6	110.4	93.8	107.4	174.1	22.5	6.3	5.7	34.3	2.3	4.0
Cr	6.8	68.2	95.8	9.8	9.4	15.4	8.5	26.3	58.1	2.5	2.9	5.4	1.2	1.8
Mn	0.0	0.1	0.1	0.7	0.4	0.2	0.3	0.1	0.0	0.0	0.0	0.2	0.0	0.0
Co	0.8	10.8	5.7	5.8	8.0	4.3	7.0	6.0	5.0	0.8	0.7	2.5	0.4	0.9
Ni	0.2	21.7	57.6	0.2	0.4	7.1	0.7	14.8	68.4	0.2	0.9	0.3	0.1	0.1
Cu	1.8	29.7	16.8	3.5	4.7	8.2	2.8	17.8	28.8	1.7	2.6	7.6	3.3	3.3
Zn	12.0	119.7	54.7	41.5	33.5	49.6	24.3	136.4	138.5	10.8	8.6	25.4	24.7	11.7
Ga	25.7	24.3	15.2	24.6	46.1	16.9	22.9	27.9	17.4	27.0	10.3	10.4	23.6	21.5
Rb	10.9	106.6	2.5	19.3	2.7	29.3	1.1	264.0	22.4	50.6	93.0	63.8	278.5	117.3
Sr	24.7	533.1	104.1	127.6	127.3	186.8	288.8	138.2	35.1	235.8	426.6	425.3	78.7	299.1
Y	12.6	7.5	24.8	54.3	38.4	30.3	32.3	13.5	36.6	14.0	6.1	20.6	12.5	5.4
Zr	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nb	1.9	16.7	18.3	20.3	34.2	13.0	9.8	12.7	2.5	15.6	1.2	10.6	18.1	4.2
Cs	0.8	2.1	0.2	0.6	0.2	1.7	0.1	19.3	1.5	0.9	1.4	9.2	4.2	1.0
Ba	150.6	1583.0	26.1	67.9	81.9	52.4	23.5	1105.0	81.6	420.6	2549.0	1102.0	171.1	1629.0
La	15.1	34.8	33.7	29.5	27.2	28.9	16.0	39.3	12.8	17.7	4.5	13.3	27.6	9.4
Ce	29.4	71.1	66.9	60.9	57.9	53.6	34.8	78.3	28.2	148.5	8.2	27.4	55.8	17.7
Pr	3.9	8.9	8.2	7.5	6.9	6.4	4.4	9.7	3.7	16.8	1.0	3.3	6.6	2.1
Nd	14.9	34.5	31.8	29.8	27.6	25.2	17.9	37.8	16.1	64.5	4.1	13.1	23.0	7.9
Sm	2.9	5.4	6.1	6.5	5.6	4.8	3.9	7.0	4.5	11.2	0.9	3.1	5.4	1.5
Eu	0.3	1.8	1.8	2.0	1.7	1.4	1.0	1.6	0.4	1.5	2.3	1.1	0.4	1.7
Gd	2.7	3.5	5.5	6.9	5.6	4.9	4.2	5.4	5.6	8.3	1.1	3.7	4.0	1.3
Tb	0.4	0.4	0.9	1.2	0.9	0.8	0.7	0.7	1.1	1.0	0.2	0.6	0.6	0.2
Dy	2.4	1.7	4.6	7.2	5.3	4.4	4.4	3.1	6.6	3.8	1.1	3.2	2.5	0.9
Ho	0.5	0.3	0.9	1.7	1.2	0.9	1.0	0.5	1.3	0.6	0.2	0.7	0.4	0.2
Er	1.2	0.6	2.1	4.9	3.3	2.8	3.0	1.2	3.1	1.0	0.5	2.0	0.9	0.5
Tm	0.2	0.1	0.3	0.9	0.6	0.5	0.5	0.2	0.4	0.1	0.1	0.4	0.2	0.1
Yb	1.1	0.5	2.0	5.7	3.5	3.4	3.5	1.1	2.2	0.4	0.4	2.2	1.0	0.4
Lu	0.2	0.1	0.3	0.9	0.5	0.6	0.6	0.2	0.3	0.1	0.1	0.3	0.2	0.1
Ta	0.1	1.2	1.4	1.5	1.1	0.9	0.7	1.1	0.2	0.5	0.2	0.8	2.7	0.2
Pb	6.7	8.5	3.2	5.8	3.8	7.2	4.0	14.7	2.8	19.0	36.6	12.0	36.4	42.7
Th	4.1	8.9	13.3	9.1	10.4	8.5	6.3	14.0	2.2	33.9	0.8	8.0	12.4	3.9
U	0.7	1.7	2.5	3.1	1.9	1.7	1.0	3.3	0.9	2.0	0.3	0.7	2.3	0.5
$^{87}Sr/^{86}Sr$	-	-	0.721485	0.721154	-	-	0.732611	-	0.718070	-	-	-	0.720317	-
$^{143}Nd/^{144}Nd$	-	-	0.511917	0.511948	-	-	0.511989	-	0.511937	-	-	-	0.511990	-
$^{206}Pb/^{204}Pb$	-	-	18.61	18.54	-	-	18.56	18.93	18.58	-	18.51	-	18.29	-
$^{207}Pb/^{204}Pb$	-	-	15.67	15.67	-	-	15.68	15.69	15.67	-	15.67	-	15.65	-
$^{208}Pb/^{204}Pb$	-	-	38.76	38.74	-	-	39.36	39.11	38.92	-	38.66	-	39.18	-

Garnet

Na2O	Al2O3	SiO2	CaO	FeO	MgO	MnO
0.02	21.33	37.29	1.40	34.43	4.12	1.82
0.02	21.22	36.98	1.38	34.61	4.14	1.91
0.00	21.34	37.30	1.30	34.29	4.20	2.23
0.00	21.54	37.01	1.77	33.15	4.46	2.36
0.00	21.38	37.33	1.44	34.11	4.08	2.07
0.03	21.39	37.20	1.25	34.15	4.13	2.06
0.01	21.51	37.25	1.30	33.96	4.12	2.27
0.00	21.70	37.09	1.41	33.14	4.40	2.53
0.01	21.39	37.09	1.46	33.03	4.28	2.67
0.01	21.22	36.50	1.80	33.08	4.40	2.49
0.01	21.23	36.73	1.78	32.91	4.52	2.19
0.03	21.33	36.95	1.78	32.74	4.42	2.30
0.02	21.40	37.22	1.44	34.40	4.03	1.99
0.02	21.33	37.31	1.37	34.53	4.13	2.10
0.02	21.38	37.32	1.42	34.19	4.13	2.25
0.01	21.36	37.20	1.45	33.67	4.43	2.46
0.02	21.27	36.83	1.34	33.69	4.07	2.85
0.00	21.24	36.70	1.37	34.07	3.82	2.82
0.01	21.19	36.85	1.44	34.16	3.83	2.83
0.02	21.33	36.93	1.48	34.06	3.77	2.82
0.01	21.27	36.87	1.54	34.07	3.67	2.82
0.03	21.10	36.87	1.47	34.15	3.75	2.83
0.01	21.26	37.05	1.45	33.82	3.75	2.81
0.02	21.20	37.02	1.44	34.17	3.76	2.77
0.03	21.47	36.91	1.40	34.04	3.78	2.81
0.01	21.60	36.93	1.42	33.85	4.17	2.86
0.02	21.25	36.75	1.48	33.47	3.78	3.24
0.01	21.22	36.75	1.46	33.58	3.83	3.19
0.00	21.11	37.13	1.30	33.60	4.06	3.11
0.00	21.21	37.07	1.37	33.32	4.09	3.01
0.02	21.33	37.32	1.26	33.34	4.27	2.98
0.03	21.40	36.77	1.43	33.93	4.13	2.35
0.01	21.28	36.95	1.39	33.80	4.17	2.36
0.01	21.53	36.96	1.37	33.91	4.13	2.41
0.02	21.31	37.02	1.41	34.30	4.10	2.35
0.01	21.26	37.07	1.31	33.76	4.16	2.45
0.01	21.53	36.91	1.37	34.10	4.16	2.28
0.01	21.34	36.71	1.35	34.09	4.13	2.33
0.00	21.27	36.65	1.34	33.71	4.13	2.48
0.01	21.33	37.08	1.30	33.68	4.32	2.76
0.01	21.33	37.02	1.79	32.86	4.34	2.57
0.03	21.12	36.84	1.55	33.31	4.00	3.07
0.02	21.39	37.29	1.52	33.67	3.75	3.15
0.01	21.53	37.26	1.52	33.69	3.75	3.08
0.00	21.27	36.97	1.27	33.96	3.85	3.03
0.01	21.47	37.16	1.39	33.88	4.00	2.97
0.02	21.32	37.03	1.14	33.49	4.48	2.65
0.01	21.29	37.27	1.36	33.52	4.28	2.79
0.01	21.13	36.94	1.43	33.93	3.96	2.52
0.00	21.19	36.66	1.36	34.27	4.04	2.55
0.01	21.15	36.59	1.30	33.92	4.08	2.64
0.02	21.28	36.95	1.35	33.62	4.11	2.74
0.02	21.45	36.70	1.78	33.02	4.50	2.31
0.01	21.19	36.94	1.72	33.30	4.34	2.54
0.02	21.12	36.84	1.76	32.95	4.61	2.19
0.01	21.35	37.61	1.64	31.80	3.98	4.42
0.02	20.98	37.26	1.66	31.58	3.91	4.65
0.00	21.10	37.24	1.67	31.75	3.85	4.77
0.03	21.06	37.55	1.71	31.37	3.84	4.63

0.01	21.24	37.29	1.65	31.94	4.08	4.28
0.00	21.23	37.55	1.72	31.67	4.31	3.90
0.00	21.44	37.38	1.61	31.83	4.14	4.15
0.01	21.48	37.38	1.68	31.80	4.10	4.31
0.00	21.24	37.55	1.64	31.68	4.06	4.37
0.00	21.44	37.68	1.62	31.74	4.13	4.25
0.03	21.40	37.21	1.67	31.69	4.22	4.05
0.02	21.03	37.22	1.67	31.77	3.59	5.20
0.01	21.26	37.15	1.65	31.46	3.55	5.32
0.00	21.23	37.16	1.69	31.57	3.62	5.18
0.01	21.41	37.23	1.76	31.76	3.71	5.09
0.01	21.28	37.15	1.84	31.38	3.69	4.86
0.02	21.46	37.07	1.62	31.99	3.97	4.60
0.01	21.45	37.15	1.54	31.61	4.11	4.36
0.01	21.24	36.93	1.69	31.87	3.91	4.74
0.03	21.10	37.17	1.75	31.83	3.87	4.74
0.01	21.23	37.00	1.72	31.74	3.95	4.55
0.03	21.24	37.28	1.72	31.70	3.96	4.47
0.03	21.38	36.94	1.66	31.69	4.08	4.32
0.01	21.35	37.13	1.57	31.61	4.16	4.21
0.00	21.38	37.39	1.77	31.52	4.19	3.89
0.00	21.18	37.38	1.69	31.57	4.25	3.78
0.01	21.49	37.13	1.65	31.73	3.78	4.73
0.00	21.51	37.28	1.59	31.72	3.84	4.81
0.01	21.32	37.37	1.67	31.98	3.91	4.72
0.02	21.43	37.17	1.63	31.64	3.99	4.61
0.00	21.42	36.99	1.61	31.51	4.06	4.36
0.02	21.31	37.65	1.65	31.73	4.14	4.09
0.01	21.29	37.26	1.57	31.56	4.23	4.03
0.01	21.30	37.55	1.73	31.94	4.27	3.83
0.02	21.26	37.52	1.73	31.74	4.27	3.83
0.01	21.22	37.37	1.65	31.89	4.28	3.91
0.01	21.20	37.51	1.64	31.95	4.25	3.96
0.01	21.42	37.40	1.63	31.85	4.31	3.85
0.01	21.40	37.42	1.73	31.12	4.26	3.75
0.02	21.16	37.54	1.63	31.76	4.16	4.34
0.00	21.27	37.27	1.64	31.88	3.87	4.71
0.02	21.06	37.18	1.66	31.76	3.80	4.68
0.02	21.19	37.32	1.63	31.76	3.89	4.69
0.04	21.42	37.29	1.60	31.67	4.02	4.49
0.01	21.14	37.77	1.53	32.11	4.23	4.17
0.01	21.25	37.54	1.70	31.62	4.19	3.91
0.03	21.26	37.21	1.64	31.78	4.00	4.37
0.02	21.23	36.81	1.68	31.72	3.91	4.51
0.02	21.40	37.29	1.65	31.90	4.03	4.38
0.02	21.44	37.23	1.68	31.70	4.15	4.18
0.03	21.26	37.24	1.62	31.51	4.16	3.96
0.02	21.18	37.40	1.73	31.58	4.01	4.46
0.02	21.04	37.15	1.66	31.99	3.95	4.47
0.03	21.00	37.52	1.64	31.90	4.00	4.36
0.03	21.04	37.37	1.67	32.06	4.13	4.20
0.03	21.13	37.50	1.63	31.57	4.15	3.96
0.03	21.32	37.42	1.68	31.64	4.25	3.89