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U-Pb Geochronology of the Shaler Supergroup, Victoria Island, northwest Canada: 2009-2013

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INTRODUCTION

Overview

This report presents a compilation of U-Pb geochronological results from the Shaler Supergroup of northwest Canada. The Meso- to Neoproterozoic stratigraphy of northwest Laurentia has been subdivided into 3, unconformity-bounded sedimentary successions named A, B and C (Figure i). Sequence B was deposited in the Amundsen Basin where it is termed the Shaler Supergroup and exposed in the Minto Inlier of Victoria Island and along the Coppermine River as well as in the Northern Cordillera where it is termed the Mackenzie Mountain Supergroup and Fifteenmile Group. The Amundsen Basin is interpreted as a shallow intracontinenal, epeiric sea within the supercontinent Rodinia.
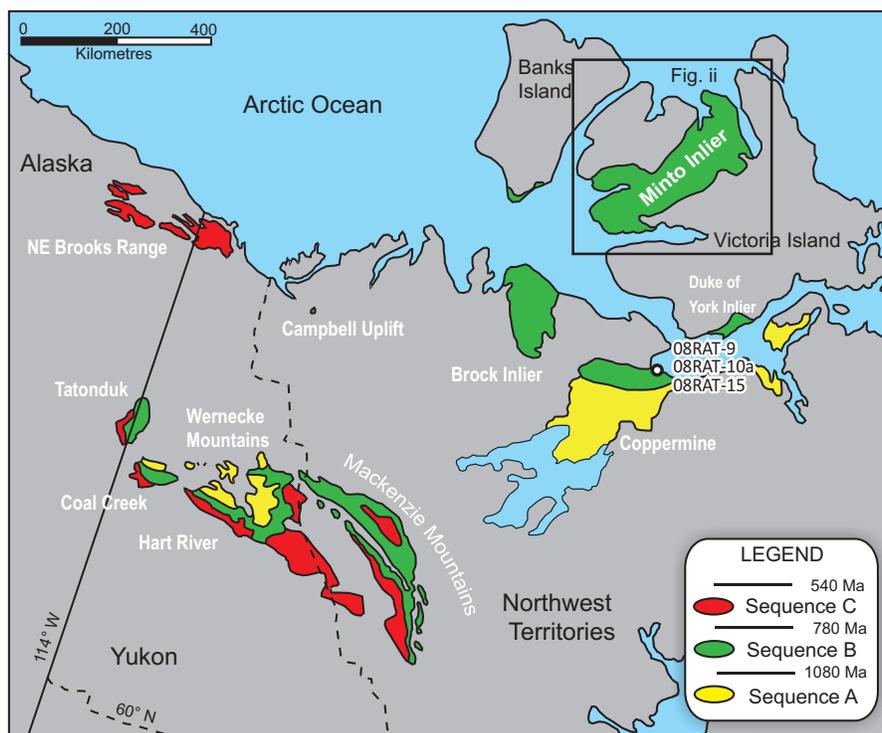
Figure i. Distribution of Meso- and Neoproterozoic sedimentary rocks in north-western Canada and northeast Alaska. Modified from Rainbird et al. 1996. The location of three U-Pb samples from the Coppermine Homocline are shown.

One of the first U-Pb detrital zircon geochronology studies using multiple single-grain fractions was published 20 years ago using samples from the Shaler Supergroup (Rainbird et al. 1992). At that time, 25 zircon grains from 3 samples were analyzed by the labour-intensive isotope dilution-thermal ionization mass spectrometry technique. The conclusions of that study were speculative, suggesting that most grains were transported from the Grenville province of eastern Laurentia, more than 3000 km to the southeast, by a pan-continental river system. Follow-up study included additional detrital zircon analysis of the Shaler Supergroup and correlative strata in the Mackenzie Mountains Supergroup of the northern Canadian Cordillera (Rainbird et al., 1997). Subsequently, there has been an explosion of research in detrital zircon studies, owing largely to the advent of new instruments and techniques for analyzing large numbers of grains, quickly and cheaply. Some of this research included analysis of correlative sedimentary successions in North America and

abroad, which largely supported the original big river hypothesis (Rainbird et al., 2012). Recent field mapping has allowed us to re-sample and re-analyze the Shaler Supergroup and underlying Coppermine River Group via modern techniques to: 1) test the original hypothesis; 2) understand observed stratigraphic changes in provenance in greater detail, and 3) establish maximum depositional ages (MDA) for key stratigraphic horizons.

In this report, we present U-Pb geochronology for >600 detrital zircon grains from 11 samples from all stratigraphic levels of the Shaler Supergroup analysed using the Sensitive High Resolution Ion Microprobe (SHRIMP) at the Geological Survey of Canada. The analytical work presented here utilizes archived samples as well as samples collected during geological mapping of the Minto Inlier in the summers of 2009 and 2010. Field and analytical work was carried out as part of Natural Resources Canada's Geomapping for Energy and Minerals (GEM) program.

Regional Geology

The early Neoproterozoic Shaler Supergroup is exposed in a series of structural inliers on the NW mainland and western Arctic Islands of Canada (Rainbird et al., 1994) including the Minto Inlier on Victoria Island, and within the Coppermine Homocline on the mainland to the south (Figure i, ii). The Shaler Supergroup is a 4-km thick succession of fluvial and shallow marine sandstones, shallow marine carbonate and restricted marine evaporites, all overlain by a > 1 km thick continental flood basalt, part of the Franklin Large Igneous Province. The section is intruded
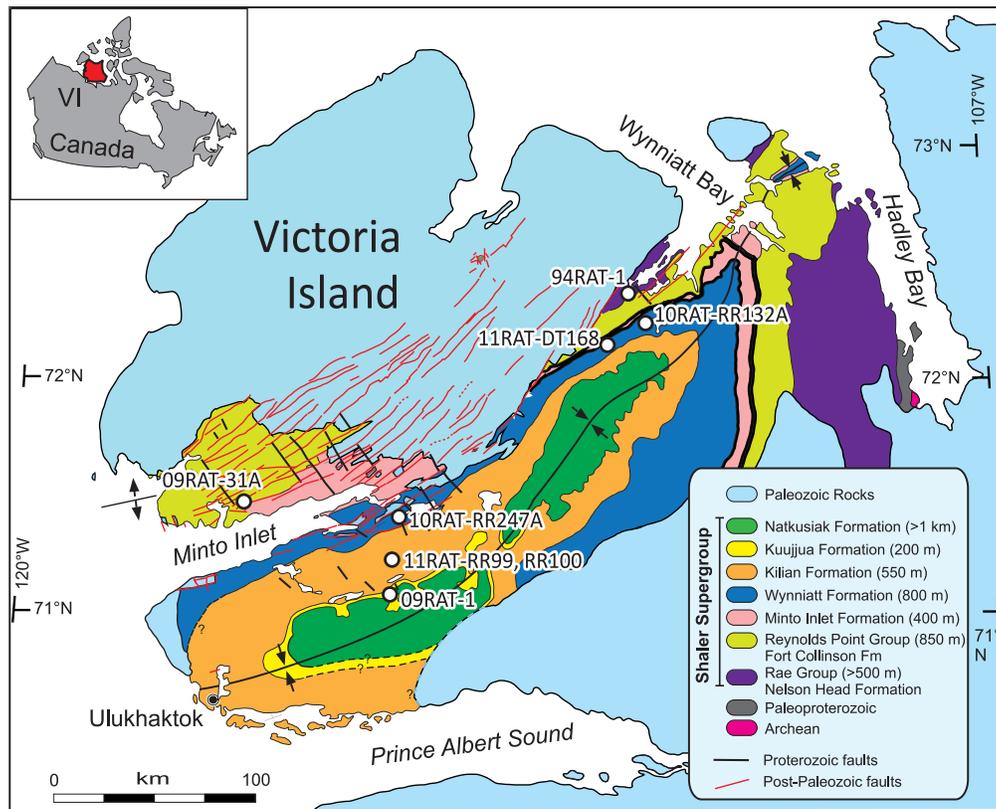
Figure ii. Simplified geological map of the Minto Inlier of Victoria Island (after Thorsteinsson and Tozer, 1962). The location of eight U-Pb samples are shown.

by diabase sills that are the intrusive feeders to the lavas and are dated at ~720 Ma (Heaman et al. 1992). In Minto Inlier, the Neoproterozoic volcano-sedimentary package was broadly folded and uplifted prior to deposition of unconformably overlying lower Cambrian to Ordovician siliciclastic and carbonate rocks. Detailed description of the sedimentary rocks can be found in Thorsteinsson and Tozer (1962), Young (1981), Rainbird et al. (1996), and references therein. Igneous rocks are discussed in Bedard et al. (2012) and references therein. Geological maps of northeastern Minto inlier were compiled by Rainbird (1998) and new maps for the western Minto Inlier are nearing release (Rainbird et al., in press a, b).

Eleven samples were collected across the 300 km-long Minto Inlier as well as from outcrops along the Coppermine River in the Coppermine Homocline. These include samples of all significant clastic units from the base to the top of the stratigraphic succession. The section is illustrated in Figure iii and described briefly below. The stratigraphically lowest sample is from the Husky Creek Formation (08RAT-9, Figure iii), the uppermost unit of the Coppermine River Group in the Coppermine Homocline. It represents the uppermost part of the underlying Sequence A and is characterized by immature, red, fluvial sandstone and intercalated basalts of the Mackenzie Large Igneous Province (Baragar and Donaldson 1973; Hildebrand and Baragar (1992). The lowest Sequence B samples are from the Escape Rapids Formation (08RAT-15, 08RAT-10a), interpreted to have been deposited in a shallow marine setting. This is followed by the carbonate-dominated, shallow marine Mikkelsen Islands Formation (not sampled) which is overlain by the fluvio-deltaic sandstones preserving northwesterly paleocurrents of the Nelson Head Formation (94RAT-1). The Aok (marine platform), Grassy Bay (marine deltaic to fluvial) and Boot Inlet (shelf) formations lack significant clastic horizons and were not sampled for geochronology. Organic-rich shales at the top of the Boot Inlet Formation yielded a Re-Os isochron age of 893±13Ma (van Acken et al. accepted). The Fort Collinson Formation (09RAT-31A) is a quartz arenite-rich unit deposited in an intertidal to lagoonal setting, perhaps representing reworked fluvial

Figure iii. Simplified stratigraphic column of the Shaler Super-group exposed in the Amundsen Basin. Relative stratigraphic position of all eleven U-Pb samples is indicated.

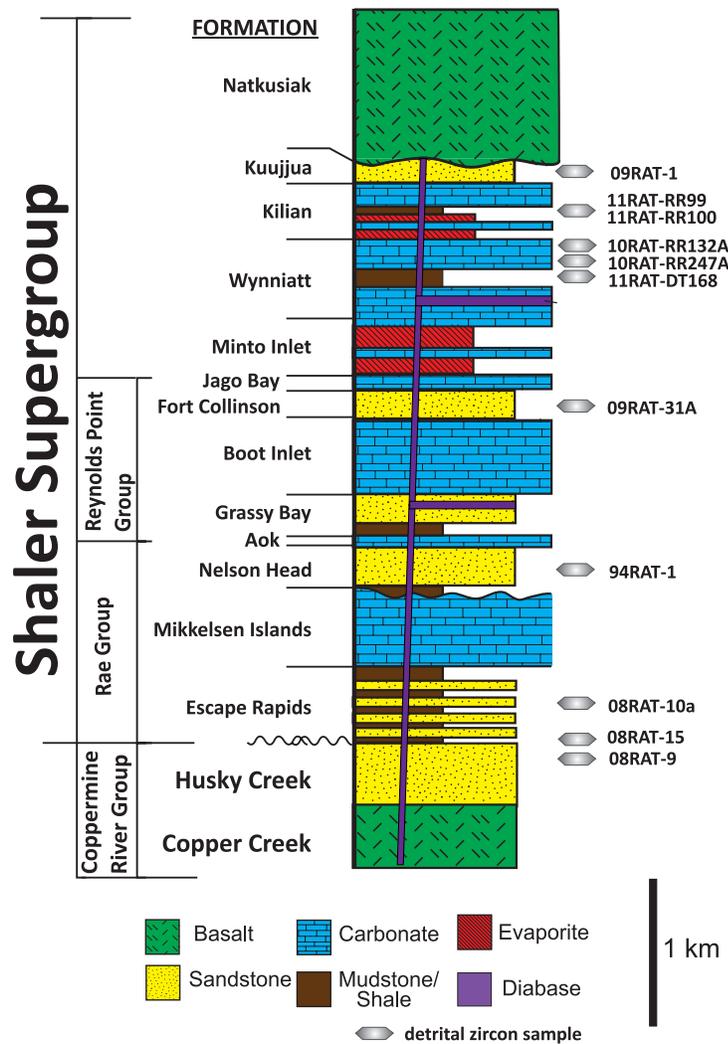deposits. The Jago Bay Formation, composed of shallow water carbonate (not sampled), grades upward into distinctive restricted-basin, sulphate evaporite and carbonate deposits of the Minto Inlet Formation (not sampled). Three samples of the unconformably overlying Wynniatt Formation were collected across the Minto Inlier (11RAT-DT168, 10RAT-RR247A, 10RAT-RR132). The Wynniatt represents a return to deposition in a more open marine peritidal environment. The conformably overlying Kilian Formation is characterized by alternating shallow marine carbonates and supratidal mudstone with sulphate evaporites. Samples from the middle of the formation include a unique volcaniclastic arenite (11RAT-RR99) and approximately 5m above it, a shallow marine quartz arenite (11RAT-RR100). The unconformably overlying Kuujjua Formation is dominated by coarse quartzarenite (09RAT-1), deposited in broad braided fluvial channels (Rainbird, 1992). The Kuujjua Formation is overlain by the Natkusiak Formation, which is represented mainly by ca. 720 Ma basaltic lavas which are the extrusive expression of the Franklin Large Igneous Province (Jefferson et al. 1985; Heaman et al., 1992).

Detailed information for each sample including location coordinates, lithologicaly and zircon description, summary of geochronological results, preferred interpretation and a data table are presented in following sections. In brief, the new results confirm the abundance of Mesoproterozoic (1.0-1.5 Ga) detrital material, initially reported by Rainbird et al (1992) and interpreted to have been transported by a pan-continental river system originating in the eastern Grenville Province (see also Rainbird et al. 1997, for analysis of correlative strata in the northern Cordillera). Gradual influx of progressively younger Mesoproterozoic detritus is observed. Detailed examination of the larger dataset in this report reveal the presence of some age populations (i.e. ca. 1450 Ma) that are not well-represented in the presently exposed Grenville Province and the grains are euhedral, consistent with a proximal source. Some zircon grain ages are unknown in North America suggesting exotic sources (e.g. 1500-1600 Ma). Younger populations from the upper part of the succession (800, 900 and 950 Ma) are common in the Taimyr fold belt of northern Siberia (Khudoley et al., 2012), the Lake Baykal region of southern Siberia and the Tuva-Mongolian massif in northern Mongolia (Demonterova et al., 2011, Kuzmichev et al. 2005, 2001). In the middle and upper parts of the Shaler Supergroup (Fort Collinson and Kilian Formations), the maximum depositional age (MDA) given by the youngest zircon grains, appears to be quite close to the inferred depostional age derived from Re-Os analysis of interbedded black shales. Such bracketing age information is not available lower in the succession where only MDAs can be derived from analysis of the youngest detrital zircon grains in each unit. Wholesale provenance changes are observed between closely spaced members of the Escape Rapids and Wynniatt Formations suggesting the influence of extra-basinal tectonism. The significance of these changes is still under investigation.

Analytical Procedures

Most samples were disaggregated using standard crushing/pulverizing techniques followed by density separation using the Wilfley table and heavy liquids. A magnetic separator was used to isolate a zircon separate. Details regarding the procedure, or any deviations from it, are noted in the section relating to specific samples. SHRIMP analytical procedures followed those described by Stern (1997), with standards and U-Pb calibration methods following Stern and Amelin (2003). Briefly, zircons were cast in 2.5 cm diameter epoxy mounts (along with fragments of the GSC laboratory standard zircon (z6266, with $^{206}Pb/^{238}U$ age = 559 Ma). The mid-sections of the zircons were exposed using 9, 6, and 1 μm diamond compound, and the internal features of the zircons

(such as zoning, structures, alteration, etc.) were characterized in back-scattered electron mode (BSE) utilizing a Zeiss Evo 50 scanning electron microscrope. The count rates at eleven masses including background were sequentially measured with a single electron multiplier. Off-line data processing was accomplished using SQUID2 (version 2.22.08.04.30, rev. 30 Apr 2008). The 1σ external errors of $^{206}Pb/^{238}U$ ratios reported in the data table incorporate the error in calibrating the standard (minimum 1%). Common Pb correction utilized the Pb composition of the surface blank (Stern, 1997). Details of the analytical session, including spot size, number of scans, calibration error and the applications of any intra-element fractionation corrections are given with the samples. Isoplot v. 3.00 (Ludwig, 2003) was used to generate concordia plots and calculate Concordia ages and weighted means. The error ellipses on the concordia diagrams and the weighted mean errors are reported at 2σ. AgeDisplay (Sircombe, 2004) used to generate probability density diagrams.

ACKNOWLEDGMENTS

1. Husky Creek Formation, lithic wacke, Coppermine River Group, Coppermine Homocline

Sample number:	08RAT-09
GSC Laboratory number:	9899
Geographic location:	Coppermine River, NU 67° 35' 13.0"N 115°31'48.0"W, NAD83
Collection History:	Sampled in 2008 by Rob Rainbird
Lithology:	lithic wacke
Mount ID:	IP528
U-Pb standard and reproducibility:	6266, 1.1% (1σ)
External error in U-Pb:	0.2% (1σ)
207Pb/206Pb Standard:	1242 (2679.6±0.2Ma, 95% confidence)
Measured value (±95% confidence):	2676±3 Ma
IMF correction applied?	No
Interpreted Age:	1232±15 Ma
Interpretation:	Maximum age of deposition

Sample description

The sample was collected from a riverbank outcrop near Sandstone Rapids on the Coppermine river (Figure 1.1). The rock is a brick red, slightly friable medium-grained, lithic wacke (Figure 1.2). In outcrop it exhibits planar-tabular to planar-wedge crossbedding in sets ranging in thickness from 10-80 cm.

Figure 1.1 Crossbedded fluvial sandstone 08RAT-9 along the Coppermine River.

Crossbeds indicate paleocurrents ranging from 135°-285°. Crossbedded layers are interbedded with 1- to 2m-thick planar-stratified sandstone beds, which contain heavy mineral laminae. These are preserved on bedding plane surfaces that outline primary current lineation oriented at approximately 150°.

Figure 1.2. Plane light photomicrograph of Husky Creek lithic wacke. Field of view 3.5 mm.

Petrographic Details: Alternating medium- and coarse-grained sand laminae; coarse laminae contain angular (0.1) grains, but fine laminae tend to be subangular to subrounded (0.2-0.3). Framework (90%): chert, detrital carbonate and volcanic lithic grains. Some lithic grains contain partly altered phenocrysts of plagioclase. Cement (10%): calcareous (in coarse laminae) but thin brown rims of iron oxide (haematite, limonite) constitute most of the cement in the fine laminae.

Zircon description

A Frantz Magnetic Separator was used to isolate a zircon separate. Zircons were hand picked from the NONMAG @ MAX Amp, 10°ss fraction. The sample of recovered zircon include colourless as well as pink, pale yellow and orange/brown grains with abundant iron oxide staining (Figure 1.3). Most grains are large and rounded to very well rounded; in rare cases, facets are preserved. Most zircon grains are moderately to highly fractured, some containing clear or opaque inclusions.

Figure 1.3 Transmitted light photomicrograph of zircon population.

U-Pb results and Interpretation

A total of 63 analyses on 61 separate grains were conducted. Results are presented in Table 1. All data are plotted on the Concordia diagram (Figure 1.4), with a detail of the youngest analyses presented in Figure 1.5. The probability density diagram utilizes the Concordia age
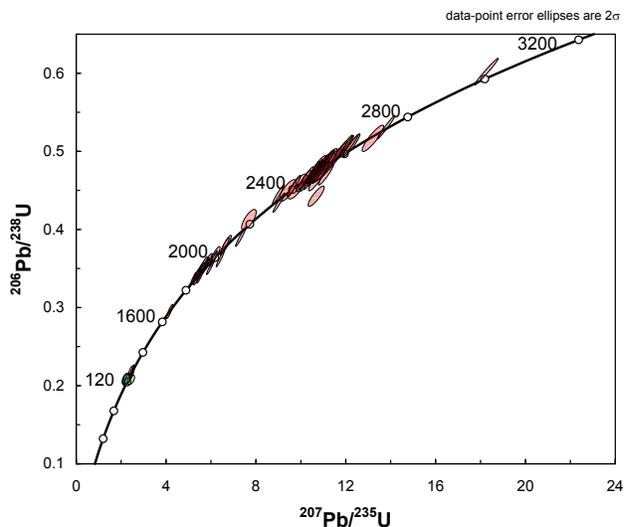
Figure 1.4 Concordia diagram illustrating all results from 08RAT-09. Plotted as 95% confidence ellipses. Colours other than red indicate replicate analyses on individual grains.

on the x-axis (Figure 1.6). The detrital zircon population of the Husky Creek lithic wacke is dominated by 2.3-2.5 Ga ages commonly recorded in the Queen Maud/Western Rae blocks of the Western Churchill Province with a subordinate 1.8-1.95 Ga population consistent with the nearby Great Bear Magmatic zone and Taltson-Thelon Orogen. There is a younger

component represented by single grain with a mean Concordia age of 1232±15 Ma (n=3 replicates), however this grain is identical in appearance to three other grains (pale pink, sharply terminated) that yield ages of ca. 1280 Ma, coeval with the age of flood basalts in the underlying Copper Creek Formation, part of the Mackenzie Large Igneous Province (1270±4 Ma; LeCheminant and Heaman, 1989). The significance of this single ca.1230 Ma zircon is unknown but does provide a bracket on the maximum age of deposition.
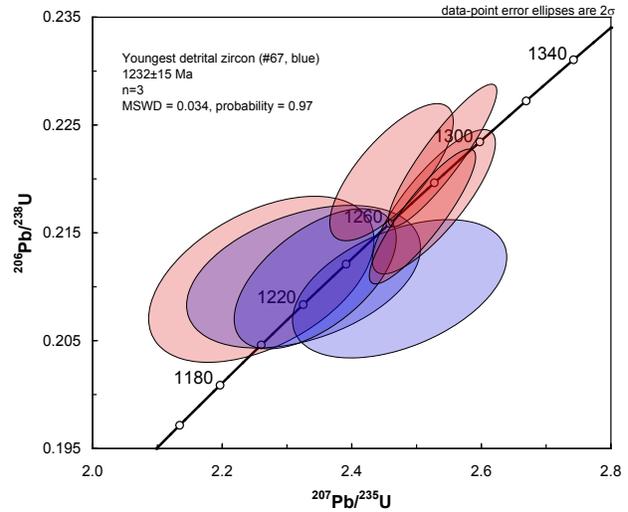
Figure 1.5 Detail of Concordia diagram illustrating the ages of the youngest detrital zircon grains. Colours other than red indicate replicate analyses on individual grains.
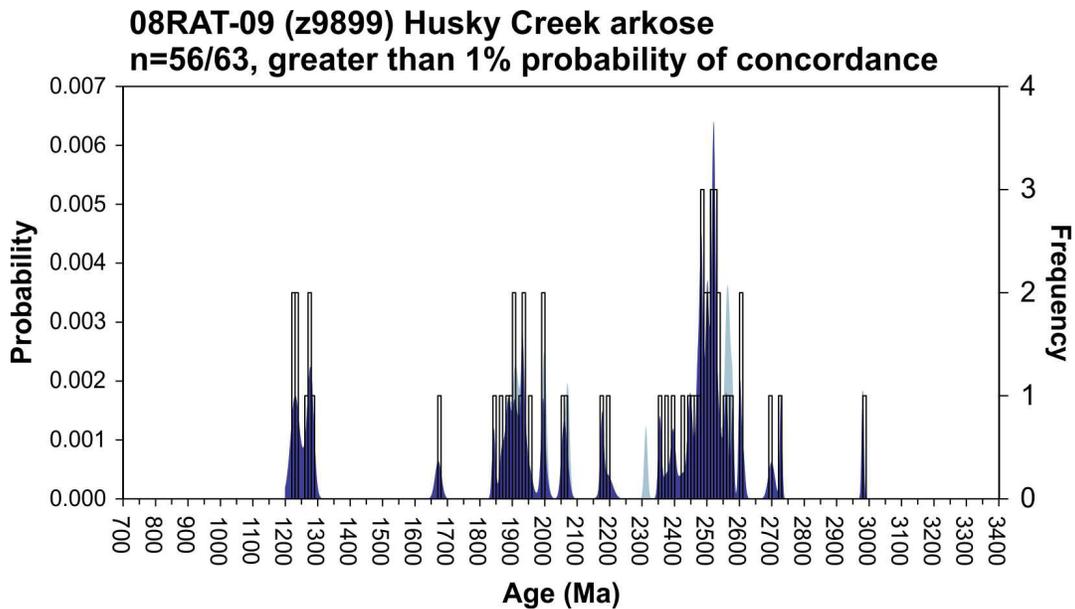
Figure 1.6 Probability density diagram and histogram for sample 08RAT-09. Concordia age (Ludwig, 1998) plotted on x-axis. Results with a probability of concordance greater than 1% are shown in dark blue and in the histogram; all results regardless of probability of concordance are shown in light blue. Replicates are not included.

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Table 1: Husky Creek Formation (08RAT-9)

| Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$^{204}Pb/^{206}Pb$	% ±	$f(206)^{204}$ %	$^{206}Pb^*$ (ppm)	$^{208}Pb/^{206}Pb^*$	% ±	$^{207}Pb^*/^{235}U$	% ±	$^{206}Pb^*/^{238}U$	% ±	Corr Coeff	$^{207}Pb^*/^{206}Pb$	% ±	Concordia Age (Ma)	± Ma (2σ)	MSWD	Probability of conc.
9899-1.1	98	87	0.91	nd	nd	5.4E-5	40	0.09	29	0.274	1.8	5.4	1.3	0.34	1.2	0.93	0.116	0.47	1890	16	0.01	91.3%
9899-109.1	125	64	0.52	nd	nd	-4.2E-6	492	-0.01	23	0.169	2.7	2.5	1.3	0.22	1.2	0.88	0.084	0.63	1280	18	2.74	9.8%
9899-11.1	386	175	0.46	nd	nd	-1.1E-5	95	-0.02	118	0.133	1.4	5.8	1.2	0.36	1.1	0.98	0.118	0.23	1931	8	2.32	12.7%
9899-13.1	156	197	1.29	nd	nd	7.6E-4	12	1.31	60	0.344	1.2	10.7	1.4	0.44	1.2	0.87	0.175	0.70	2563	20	84.88	0.0%
9899-14.1	159	126	0.81	nd	nd	7.1E-5	29	0.12	47	0.238	1.6	5.6	1.2	0.34	1.2	0.95	0.118	0.39	1923	13	1.76	18.4%
9899-15.1	87	41	0.49	nd	nd	1.1E-4	29	0.20	34	0.133	2.5	10.2	1.3	0.46	1.2	0.94	0.159	0.43	2446	14	0.11	73.6%
9899-16.1	53	26	0.51	nd	nd	1.7E-4	38	0.30	22	0.152	2.9	11.4	1.4	0.49	1.3	0.89	0.170	0.64	2555	20	0.27	60.4%
9899-18.1	20	21	1.06	nd	nd	2.9E-4	26	0.50	8	0.289	3.5	11.1	1.7	0.48	1.5	0.85	0.167	0.91	2532	27	0.00	99.6%
9899-19.1	105	48	0.46	nd	nd	1.1E-4	85	0.18	41	0.119	2.4	9.4	1.6	0.45	1.3	0.77	0.152	1.04	2378	29	1.12	29.0%
9899-20.1	72	69	0.98	nd	nd	3.2E-5	108	0.06	29	0.288	1.9	10.3	1.3	0.46	1.2	0.94	0.161	0.46	2469	15	0.32	57.3%
9899-21.1	60	35	0.59	nd	nd	4.2E-4	35	0.72	11	0.182	3.6	2.3	3.1	0.21	1.5	0.47	0.078	2.76	1224	32	2.60	10.7%
9899-22.1	250	97	0.40	nd	nd	2.0E-5	94	0.03	78	0.114	1.9	6.4	1.2	0.36	1.1	0.96	0.129	0.32	2072	10	15.03	0.0%
9899-23.1	144	79	0.56	nd	nd	1.9E-5	154	0.03	58	0.156	1.8	11.1	1.2	0.47	1.2	0.95	0.171	0.40	2565	13	10.90	0.1%
9899-24.1	73	35	0.49	nd	nd	6.0E-5	36	0.10	29	0.133	2.7	10.5	1.3	0.47	1.2	0.95	0.163	0.40	2485	13	0.62	43.0%
9899-25.1	182	141	0.79	nd	nd	2.9E-5	54	0.05	74	0.229	1.3	10.7	1.2	0.47	1.2	0.98	0.164	0.26	2501	9	0.60	43.9%
9899-26.1	320	107	0.34	nd	nd	1.6E-4	12	0.28	130	0.097	1.5	10.6	1.2	0.47	1.1	0.97	0.163	0.26	2483	9	0.27	60.5%
9899-28.1	67	36	0.55	nd	nd	3.2E-5	41	0.06	26	0.163	3.6	9.7	1.3	0.46	1.2	0.95	0.154	0.42	2396	14	1.32	25.0%
9899-29.1	175	70	0.41	nd	nd	6.0E-5	27	0.10	65	0.120	2.0	9.1	1.2	0.44	1.2	0.97	0.151	0.30	2355	10	1.31	25.3%
9899-3.1	57	64	1.16	nd	nd	2.4E-4	23	0.41	23	0.335	1.9	10.7	1.4	0.46	1.3	0.91	0.168	0.59	2525	18	6.85	0.9%
9899-32.1	231	73	0.33	nd	nd	9.8E-5	21	0.17	97	0.089	1.8	11.2	1.6	0.49	1.4	0.89	0.167	0.72	2531	23	1.06	30.4%
9899-33.1	155	62	0.41	nd	nd	5.3E-5	43	0.09	46	0.128	2.3	5.5	1.2	0.35	1.2	0.94	0.115	0.43	1885	15	4.35	3.7%
9899-35.1	324	150	0.47	nd	nd	1.1E-5	204	0.02	124	0.132	1.4	9.0	1.2	0.45	1.1	0.97	0.147	0.30	2312	10	8.25	0.4%
9899-36.1	242	133	0.56	nd	nd	7.3E-5	24	0.13	106	0.161	1.4	12.2	1.2	0.51	1.1	0.98	0.174	0.24	2601	8	3.58	5.9%
9899-37.1	377	109	0.30	nd	nd	2.5E-5	48	0.04	115	0.087	1.7	5.8	1.2	0.35	1.1	0.95	0.119	0.37	1937	13	1.11	29.3%
9899-38.1	184	100	0.56	nd	nd	1.5E-5	85	0.03	95	0.158	1.5	18.3	1.2	0.60	1.2	0.98	0.220	0.21	2980	7	4.45	3.5%
9899-4.1	53	24	0.47	nd	nd	4.0E-5	65	0.07	10	0.144	4.4	2.5	1.5	0.22	1.2	0.81	0.084	0.90	1280	22	1.16	28.1%
9899-40.1	188	91	0.50	nd	nd	1.9E-5	56	0.03	82	0.139	1.7	12.0	1.2	0.51	1.2	0.98	0.172	0.25	2579	8	6.22	1.3%
9899-41.1	194	273	1.44	nd	nd	1.5E-4	29	0.25	59	0.425	1.2	5.7	1.3	0.36	1.2	0.90	0.116	0.60	1913	19	7.58	0.6%
9899-42.1	127	89	0.72	nd	nd	3.8E-5	58	0.07	54	0.201	1.8	11.7	1.2	0.50	1.2	0.96	0.170	0.33	2560	11	4.53	3.3%
9899-43.1	203	159	0.80	nd	nd	1.6E-4	23	0.28	52	0.243	1.8	4.2	1.4	0.30	1.3	0.90	0.103	0.63	1672	20	0.02	88.1%
9899-44.1	118	83	0.72	nd	nd	1.8E-4	21	0.31	52	0.207	1.7	12.3	1.3	0.51	1.2	0.95	0.175	0.40	2609	13	2.74	9.8%
9899-46.1	112	65	0.60	nd	nd	1.3E-4	38	0.22	35	0.178	2.2	6.2	1.4	0.37	1.2	0.87	0.122	0.67	1998	21	2.07	15.1%
9899-47.1	202	72	0.37	nd	nd	3.3E-5	72	0.06	85	0.108	1.8	11.2	1.2	0.49	1.2	0.96	0.166	0.35	2519	12	3.20	7.4%
9899-48.1	46	58	1.28	nd	nd	6.4E-4	15	1.11	18	0.365	2.0	9.9	1.7	0.46	1.4	0.81	0.157	1.02	2425	30	0.02	89.2%
9899-49.1	178	57	0.33	nd	nd	2.9E-5	60	0.05	54	0.101	2.2	6.0	1.2	0.35	1.2	0.96	0.123	0.34	2001	11	7.24	0.7%
9899-51.1	145	86	0.61	nd	nd	7.1E-5	24	0.12	28	0.187	2.4	2.5	1.3	0.22	1.2	0.90	0.083	0.58	1278	18	1.98	15.9%
9899-54.1	87	81	0.96	nd	nd	1.3E-4	32	0.22	36	0.263	1.8	10.8	1.3	0.48	1.2	0.93	0.164	0.47	2499	15	0.15	69.7%
9899-56.1	163	160	1.01	nd	nd	2.0E-5	95	0.03	66	0.285	1.2	10.8	1.2	0.47	1.2	0.97	0.166	0.28	2520	9	0.86	35.4%
9899-57.1	99	43	0.45	nd	nd	5.0E-5	125	0.09	40	0.122	2.8	10.9	1.3	0.48	1.2	0.90	0.167	0.57	2525	18	0.60	44.0%
9899-58.1	210	130	0.63	nd	nd	6.9E-6	85	0.01	86	0.181	1.4	10.6	1.2	0.47	1.2	0.97	0.161	0.30	2473	10	1.67	19.6%
9899-59.1	74	207	2.85	nd	nd	7.9E-5	38	0.14	31	0.808	1.1	10.9	1.3	0.48	1.2	0.94	0.164	0.44	2503	14	2.02	15.6%
9899-60.1	39	19	0.49	nd	nd	8.9E-5	58	0.15	16	0.141	3.5	10.8	1.5	0.48	1.3	0.90	0.163	0.64	2491	20	2.23	13.5%
9899-62.1	133	70	0.54	nd	nd	3.0E-5	95	0.05	54	0.153	1.9	10.9	1.4	0.48	1.3	0.97	0.166	0.35	2515	11	0.01	93.6%
9899-64.1	36	25	0.71	nd	nd	2.3E-4	29	0.40	16	0.190	3.1	13.2	1.5	0.52	1.3	0.90	0.185	0.66	2699	20	0.17	68.1%
9899-65.1	289	282	1.00	nd	nd	4.5E-5	28	0.08	84	0.307	1.1	5.2	1.2	0.34	1.1	0.97	0.113	0.30	1843	10	2.51	11.3%
9899-67.1	54	31	0.58	nd	nd	2.7E-4	58	0.47	10	0.168	4.0	2.3	3.2	0.21	1.3	0.40	0.080	2.91	1232	28	0.42	51.6%
9899-67.2	100	76	0.78	nd	nd	-1.4E-5	888	-0.03	18	0.238	3.2	2.5	2.7	0.21	1.2	0.46	0.086	2.43	1235	27	3.90	4.8%
9899-67.3	87	63	0.74	nd	nd	2.6E-4	20	0.46	16	0.231	6.0	2.3	2.2	0.21	1.3	0.58	0.081	1.78	1230	26	0.28	59.4%

Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$\frac{^{204}Pb}{^{206}Pb}$	%±	$f(206)^{204}$ %	$^{206}Pb^*$ (ppm)	$\frac{^{208^*}Pb}{^{206^*}Pb}$	%±	$\frac{^{207^*}Pb}{^{235}U}$	%±	$\frac{^{206^*}Pb}{^{238}U}$	%±	Corr Coeff	$\frac{^{207^*}Pb}{^{206^*}Pb}$	%±	Concordia Age (Ma)	±Ma (2σ)	MSWD	Probability of conc.
9899-7.1	153	88	0.59	nd	nd	2.8E-5	91	0.05	46	0.160	1.9	5.6	1.4	0.35	1.3	0.95	0.117	0.43	1910	15	0.26	60.8%
9899-70.1	110	81	0.75	nd	nd	1.1E-4	33	0.20	36	0.229	2.3	6.7	1.3	0.38	1.2	0.89	0.127	0.60	2066	19	1.15	28.4%
9899-71.1	66	93	1.45	nd	nd	1.5E-5	69	0.03	26	0.441	1.7	10.3	1.3	0.47	1.2	0.95	0.159	0.42	2451	14	0.55	45.9%
9899-72.1	211	119	0.58	nd	nd	9.1E-6	137	0.02	96	0.167	1.4	13.8	1.2	0.53	1.2	0.98	0.188	0.22	2728	7	0.55	46.0%
9899-75.1	141	83	0.60	nd	nd	5.0E-5	33	0.09	58	0.178	1.7	10.7	1.2	0.48	1.2	0.97	0.162	0.29	2482	10	1.65	19.9%
9899-76.1	200	102	0.52	nd	nd	1.1E-4	30	0.20	60	0.150	1.8	5.6	1.3	0.35	1.2	0.92	0.116	0.50	1904	16	2.20	13.8%
9899-77.1	227	95	0.43	nd	nd	1.7E-5	98	0.03	95	0.129	1.6	11.2	1.2	0.49	1.1	0.98	0.166	0.25	2523	8	2.92	8.7%
9899-78.1	143	52	0.37	nd	nd	5.4E-5	64	0.09	46	0.106	2.5	6.6	1.3	0.38	1.2	0.92	0.127	0.49	2058	16	0.73	39.4%
9899-8.1	147	74	0.52	nd	nd	9.7E-5	25	0.17	43	0.148	2.1	5.4	1.3	0.34	1.2	0.93	0.114	0.46	1869	15	1.61	20.4%
9899-80.1	78	29	0.38	nd	nd	2.0E-4	26	0.35	24	0.113	3.3	5.9	1.4	0.36	1.2	0.85	0.119	0.76	1950	23	3.22	7.3%
9899-81.1	51	78	1.56	nd	nd	2.6E-4	38	0.46	18	0.452	2.1	7.7	1.7	0.41	1.3	0.75	0.135	1.14	2193	31	4.12	4.2%
9899-82.1	115	54	0.48	nd	nd	2.8E-6	311	0.00	50	0.143	2.2	11.9	1.2	0.51	1.2	0.97	0.171	0.31	2570	10	8.44	0.4%
9899-9.1	164	134	0.84	nd	nd	3.2E-6	430	0.01	55	0.245	1.4	7.3	1.2	0.39	1.2	0.97	0.136	0.31	2177	10	6.24	1.2%
9899-90.1	247	184	0.76	nd	nd	3.6E-5	53	0.06	77	0.225	1.3	6.1	1.2	0.36	1.1	0.96	0.123	0.33	1995	11	0.05	82.1%
9899-94.1	151	84	0.57	nd	nd	2.7E-4	20	0.47	29	0.168	2.4	2.5	1.6	0.22	1.2	0.74	0.081	1.07	1265	23	6.92	0.9%

Notes:

Spot name follows the convention x-y.z; where x = sample number, y = grain number and z = spot number. Multiple analyses in an individual spot are labelled as x-y.z.z

nd=not determined

$f206^{204}$ refers to mole percent of total 206Pb that is due to common Pb, calculated using the 204Pb-method; common Pb composition used is the surface blank (4/6: 0.05770; 7/6: 0.89500; 8/6: 2.13840)

* refers to radiogenic Pb (corrected for common Pb)

Errors are reported at 1σ uncertainty level unless otherwise noted

Analytical details: 25µm spot size, 12nA primary beam intensity, 5 scans

2. Lower Escape Rapids Formation, quartz arenite, Shaler Supergroup, Coppermine Homocline

Sample number:	08RAT-10a
GSC Laboratory number:	9900
Geographic location:	Coppermine River, NU 67° 35' 21.0"N 115°32'9.0"W, NAD83
Collection History:	Sampled in 2008 by Rob Rainbird
Lithology:	quartz arenite
Mount ID:	IP528
U-Pb standard and reproducibility:	6266, 1.1% (1σ)
External error in U-Pb:	0.2% (1σ)
207Pb/206Pb Standard:	z1242 (2679.6±0.2Ma, 95% confidence)
Measured value (±95% confidence):	2676±3 Ma
IMF correction applied?	No
Interpreted Age:	1666±30 Ma
Interpretation:	Maximum age of deposition

Sample description

Buff to light-green silty quartz arenite, collected at an outcrop on the Coppermine River, is located about 2 m above the unconformity with the Husky Creek Formation (Figure 2.1). The sandstone exhibits cryptic, small-scale trough crossbedding and overlies light green, parallel-laminated siltstone to ripple-crosslaminated, very fine sandstone.

Petrographic description: Medium to coarse sand, moderate- to well-sorted with moderate rounding (0.5). Framework (>90%) composed

Figure 2.1 Crossbedded fluvial sandstone 08RAT-10a along the Coppermine River. Unconformity with underlying Husky Creek Formation is at the interface between the red and green units, approximately 1m below the feet of the geologist.

of quartz (92%), chert and chalcedony (5%) and feldspar, opaque oxides and recrystallized ooid fragments (3%). Cement (<10%) composed mostly of quartz overgrowths and some pore filling, radial-fibrous chalcedony (Figure 2.2).
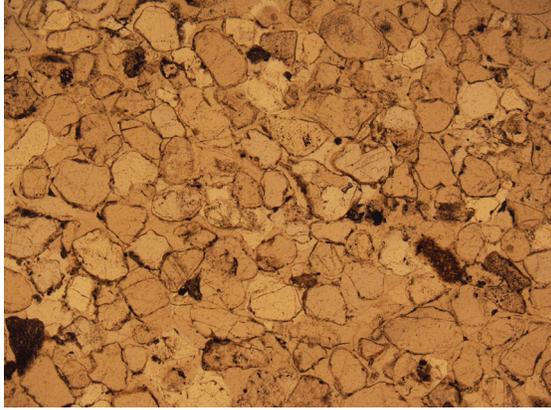
Figure 2.2 Plane-light photomicrograph of 08RAT-9. Field of view 3.5 mm

Zircon description

A Frantz Magnetic Separator was used to isolate a zircon separate. Zircons were hand picked from the NONMAG @ MAX Amp, 10°ss fraction. Abundant, large, clear and colourless zircon grains were recovered (Figure 2.3). While the majority of the grains are rounded, a number preserve sharp facets and terminations. The zircon sample includes relatively rare, pristine, fracture-free zircons, but most grains are fractured and exhibit minor alteration in back-scattered electron images (not shown).
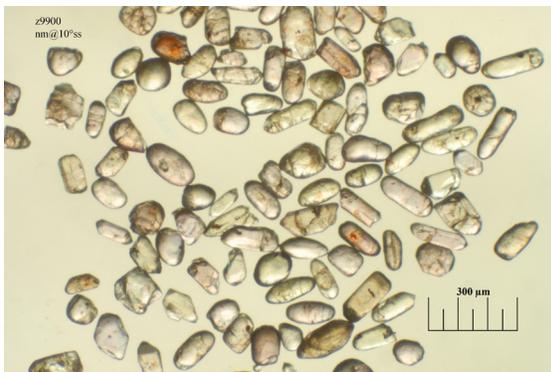
Figure 2.3 Transmitted light photograph of zircon population. Scale bar at lower right is 300µm.

U-Pb results and interpretation

A total of 63 analyses were conducted on 61 separate grains. The results are presented in Table 2. All data are plotted on the Concordia diagram (Figure 2.4). The probability density diagram utilizes the Concordia age on the x-axis (Figure 2.5). The detrital zircons preserve a minor Slave/Rae basement signature (2.6 Ga and older) as well as a minor 2.3-2.5 Ga component typical of the Queen Maud block or western Rae Province. The population is dominated by Taltson-Thelon/Great Bear Magmatic zone ages ranging from 1.8-1.95 Ga. Replicate analyses on the youngest detrital grain were not reproducible, but the most concordant result yields an age of 1666±30 Ma (2σ). Only one grain of this age was identified. The distribution and frequency of grain ages very closely mimics that of the unconformably underlying Husky Creek Formation.
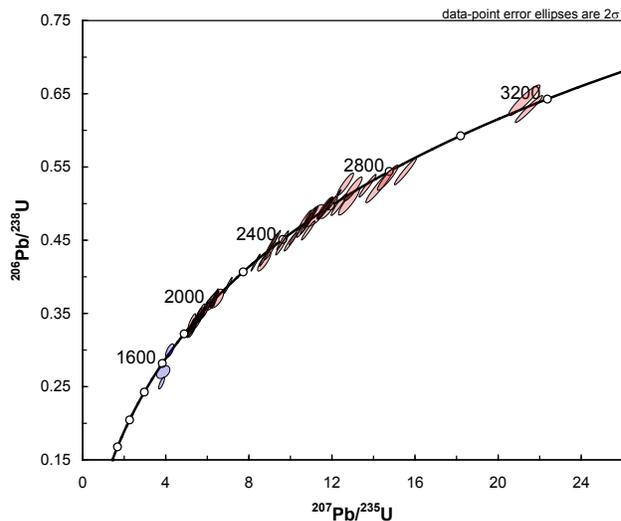
Figure 2.4 Concordia diagram illustrating all results from 08RAT-10a. Plotted as 95% confidence ellipses. Colours other than red indicate replicate analyses on individual grains.

08RAT-10a (z9900) Escape Rapids Lower, n=54/61, greater than 1% probability of concordance
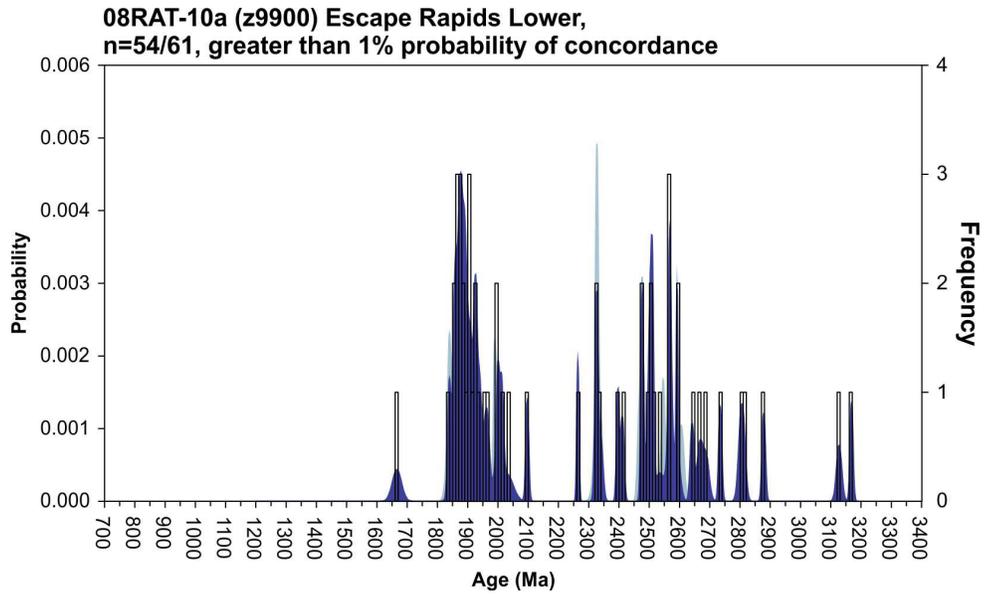
Figure 2.5 Probability density diagram and histogram for sample 08RAT-10a. Concordia age (Ludwig, 1998) plotted on x-axis. Results with a probability of concordance greater than 1% are shown in dark blue and in the histogram; all results regardless of probability of concordance are shown in light blue. Replicates are not included.

Table 2: Lower Escape Rapids Formation (08RAT-10A)

| Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$\frac{^{204}Pb}{^{206}Pb}$	% ±	f(206)^{204} %	^{206}Pb* (ppm)	$\frac{^{208}Pb}{^{206}Pb}$	% ±	$\frac{^{207}Pb}{^{235}U}$	% ±	$\frac{^{206}Pb}{^{238}U}$	% ±	Corr Coeff	$\frac{^{207}Pb}{^{206}Pb}$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
9900-1.1	179	273	1.56	nd	nd	8.2E-5	25	0.14	52	0.446	1.1	5.3	1.3	0.33	1.2	0.95	0.116	0.39	1890	13	2.62	10.5%
9900-10.1	19	13	0.70	nd	nd	9.1E-5	40	0.16	8	0.199	4.1	12.8	1.6	0.50	1.5	0.91	0.185	0.69	2687	21	3.93	4.7%
9900-105.1	143	79	0.56	nd	nd	4.6E-5	152	0.08	41	0.163	2.0	5.2	1.5	0.33	1.2	0.80	0.114	0.91	1853	25	1.14	28.5%
9900-11.1	161	41	0.26	nd	nd	2.1E-5	61	0.04	62	0.075	2.5	10.0	1.2	0.45	1.2	0.96	0.161	0.35	2467	11	12.22	0.0%
9900-12.1	43	20	0.47	nd	nd	1.8E-4	28	0.32	19	0.133	3.3	13.0	1.4	0.52	1.3	0.91	0.181	0.57	2667	18	1.66	19.7%
9900-14.1	50	55	1.13	nd	nd	6.0E-5	105	0.10	23	0.329	2.0	14.3	1.9	0.53	1.8	0.96	0.197	0.55	2802	17	4.32	3.8%
9900-15.1	131	50	0.39	nd	nd	9.2E-6	95	0.02	39	0.121	2.5	5.7	1.2	0.35	1.2	0.95	0.119	0.36	1939	12	0.24	62.3%
9900-16.1	133	72	0.56	nd	nd	-5.6E-5	46	-0.10	50	0.161	1.9	9.5	1.2	0.44	1.2	0.96	0.156	0.35	2411	11	4.09	4.3%
9900-19.1	172	94	0.56	nd	nd	1.0E-5	63	0.02	68	0.160	1.6	10.2	1.2	0.46	1.2	0.98	0.162	0.25	2477	8	4.85	2.8%
9900-20.1	86	66	0.79	nd	nd	-1.0E-5	129	-0.02	39	0.221	1.8	13.7	1.2	0.53	1.2	0.97	0.189	0.31	2735	10	0.28	59.8%
9900-23.1	119	73	0.63	nd	nd	5.6E-5	39	0.10	64	0.170	1.6	21.5	1.2	0.63	1.2	0.97	0.248	0.31	3169	10	0.39	53.5%
9900-24.1	144	73	0.52	nd	nd	-4.0E-6	1038	-0.01	54	0.148	1.9	9.0	1.3	0.44	1.2	0.93	0.149	0.45	2339	15	0.06	81.2%
9900-26.1	148	35	0.24	nd	nd	1.2E-5	94	0.02	42	0.071	3.1	5.1	1.3	0.33	1.2	0.96	0.114	0.37	1857	13	2.26	13.3%
9900-27.1	69	66	0.98	nd	nd	8.6E-5	59	0.15	29	0.273	1.9	11.6	1.3	0.49	1.2	0.92	0.171	0.52	2567	17	0.89	34.6%
9900-28.1	113	54	0.49	nd	nd	6.5E-5	31	0.11	46	0.144	2.1	10.8	1.2	0.47	1.2	0.96	0.165	0.33	2509	11	0.26	61.0%
9900-30.1	98	33	0.35	nd	nd	7.5E-5	139	0.13	31	0.102	3.1	6.2	1.8	0.37	1.3	0.72	0.122	1.22	1998	31	0.61	43.5%
9900-31.1	86	57	0.68	nd	nd	6.9E-5	47	0.12	25	0.193	2.4	5.3	1.3	0.34	1.2	0.90	0.114	0.60	1869	19	0.08	77.7%
9900-32.1	65	40	0.63	nd	nd	5.4E-5	40	0.09	28	0.168	2.4	12.3	1.3	0.50	1.2	0.95	0.179	0.39	2642	12	1.48	22.4%
9900-33.1	139	64	0.47	nd	nd	9.8E-5	24	0.17	43	0.143	2.2	5.9	1.2	0.36	1.2	0.94	0.121	0.43	1965	14	0.05	83.0%
9900-34.1	132	67	0.52	nd	nd	2.8E-5	57	0.05	38	0.149	2.2	5.4	1.2	0.34	1.2	0.95	0.115	0.40	1880	14	0.00	96.4%
9900-35.1	178	85	0.49	nd	nd	7.2E-5	31	0.13	68	0.136	1.8	9.1	1.3	0.45	1.2	0.97	0.148	0.33	2325	11	4.64	3.1%
9900-36.1	68	29	0.44	nd	nd	3.4E-5	153	0.06	19	0.138	3.2	5.2	1.5	0.33	1.3	0.85	0.115	0.79	1867	23	5.43	2.0%
9900-37.1	146	58	0.41	nd	nd	-1.2E-5	165	-0.02	42	0.115	2.4	5.4	1.2	0.34	1.2	0.94	0.116	0.41	1890	14	1.68	19.5%
9900-38.1	172	116	0.69	nd	nd	2.0E-5	40	0.03	66	0.197	1.5	9.6	1.2	0.45	1.2	0.98	0.154	0.26	2396	9	0.00	95.3%
9900-39.1	239	201	0.87	nd	nd	4.7E-5	25	0.08	101	0.251	1.1	11.6	1.2	0.49	1.1	0.98	0.171	0.21	2568	7	0.48	49.1%
9900-4.1	40	43	1.11	nd	nd	6.7E-5	104	0.12	14	0.340	2.4	8.7	1.5	0.42	1.3	0.85	0.150	0.80	2326	24	7.53	0.6%
9900-41.1	367	130	0.36	nd	nd	3.7E-5	26	0.06	132	0.104	1.5	8.3	1.2	0.42	1.1	0.98	0.143	0.20	2264	7	0.03	86.9%
9900-42.1	83	61	0.75	nd	nd	1.3E-4	32	0.22	24	0.218	2.3	5.2	1.4	0.34	1.2	0.87	0.111	0.68	1839	21	7.66	0.6%
9900-43.1	87	38	0.45	nd	nd	4.7E-5	70	0.08	26	0.131	2.9	5.5	1.3	0.34	1.2	0.90	0.117	0.59	1905	19	0.00	99.1%
9900-44.1	317	62	0.20	nd	nd	2.4E-5	44	0.04	95	0.061	2.2	5.7	1.2	0.35	1.1	0.98	0.118	0.26	1926	9	0.26	60.8%
9900-45.1	317	142	0.46	nd	nd	1.9E-5	81	0.03	92	0.132	1.5	5.3	1.2	0.34	1.2	0.97	0.115	0.30	1875	10	0.02	89.4%
9900-48.1	206	156	0.78	nd	nd	2.3E-4	12	0.40	82	0.153	1.5	10.8	1.2	0.46	1.2	0.97	0.169	0.31	2546	10	15.29	0.0%
9900-49.1	202	145	0.74	nd	nd	4.2E-6	89	0.01	67	0.212	1.5	7.0	1.2	0.39	1.2	0.97	0.130	0.28	2097	10	1.02	31.2%
9900-5.1	77	44	0.59	nd	nd	5.3E-5	37	0.09	31	0.169	2.3	10.6	1.3	0.47	1.2	0.96	0.164	0.38	2497	12	0.55	46.0%
9900-52.1	206	89	0.44	nd	nd	2.4E-5	24	0.04	65	0.132	1.9	6.3	1.2	0.37	1.2	0.97	0.123	0.29	2000	10	2.17	14.1%
9900-55.1	99	52	0.54	nd	nd	4.6E-5	83	0.08	30	0.157	2.5	5.9	1.3	0.35	1.2	0.90	0.120	0.59	1952	19	0.07	79.1%
9900-56.1	213	108	0.52	nd	nd	3.6E-5	127	0.06	65	0.152	1.8	5.7	1.3	0.35	1.2	0.89	0.116	0.60	1910	19	5.55	1.8%
9900-57.1	73	30	0.42	nd	nd	1.6E-4	50	0.27	22	0.124	3.2	5.6	1.6	0.35	1.2	0.77	0.117	1.03	1918	27	0.32	57.3%
9900-58.1	72	127	1.80	nd	nd	2.7E-4	27	0.48	31	0.404	1.8	11.9	1.4	0.50	1.2	0.88	0.174	0.68	2592	21	0.00	95.7%
9900-59.1	424	258	0.62	nd	nd	8.7E-6	95	0.02	136	0.182	1.1	6.3	1.2	0.37	1.2	0.98	0.122	0.22	1989	8	8.26	0.4%
9900-6.1	204	112	0.56	nd	nd	4.0E-5	69	0.07	57	0.158	1.7	5.1	1.2	0.33	1.2	0.93	0.114	0.44	1862	14	6.30	1.2%
9900-60.1	90	103	1.18	nd	nd	1.5E-4	35	0.25	26	0.339	1.8	5.5	1.4	0.34	1.2	0.86	0.117	0.73	1905	22	0.65	42.1%
9900-62.1	150	156	1.07	nd	nd	2.6E-6	60	0.00	48	0.319	1.4	6.3	1.2	0.37	1.2	0.97	0.124	0.31	2012	11	1.08	29.8%
9900-63.1	280	138	0.51	nd	nd	1.8E-5	44	0.03	80	0.152	1.6	5.2	1.2	0.33	1.2	0.97	0.112	0.28	1839	10	0.94	33.3%
9900-64.1	58	38	0.67	nd	nd	5.2E-5	309	0.09	24	0.199	2.6	11.2	1.8	0.48	1.3	0.70	0.167	1.29	2535	34	0.34	55.7%
9900-65.1	95	44	0.47	nd	nd	1.5E-4	23	0.26	45	0.121	2.3	15.5	1.4	0.54	1.4	0.97	0.207	0.35	2878	11	6.21	1.3%
9900-66.1	229	173	0.78	nd	nd	5.7E-5	23	0.10	84	0.215	1.3	8.7	1.2	0.43	1.1	0.98	0.148	0.25	2327	8	2.74	9.8%
9900-67.1	187	101	0.56	nd	nd	1.8E-6	1096	0.00	77	0.158	1.6	10.9	1.2	0.48	1.2	0.97	0.164	0.28	2503	9	1.17	28.0%

Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$^{204}Pb/^{206}Pb$	% ±	f(206)^{204} %	$^{206}Pb^{*}$ (ppm)	$^{208^{*}}Pb/^{206^{*}}Pb$	% ±	$^{207^{*}}Pb/^{235}U$	% ±	$^{206^{*}}Pb/^{238}U$	% ±	Corr Coeff	$^{207^{*}}Pb/^{206^{*}}Pb$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
9900-68.1	97	102	1.08	nd	nd	4.4E-5	28	0.08	30	0.315	1.8	5.8	1.5	0.35	1.4	0.95	0.118	0.44	1928	15	1.66	19.8%
9900-70.1	26	21	0.81	nd	nd	2.5E-4	58	0.44	8	0.250	3.8	6.4	2.3	0.37	1.4	0.63	0.125	1.76	2033	39	0.00	99.9%
9900-71.1	134	104	0.79	nd	nd	1.9E-4	28	0.32	61	0.153	2.2	12.6	1.3	0.53	1.2	0.92	0.174	0.49	2608	16	23.20	0.0%
9900-72.1	346	108	0.32	nd	nd	2.9E-5	24	0.05	151	0.093	1.4	12.1	1.1	0.51	1.1	0.99	0.173	0.17	2592	6	3.66	5.6%
9900-74.1	197	121	0.63	nd	nd	1.4E-5	45	0.03	82	0.177	1.5	11.0	1.2	0.48	1.2	0.98	0.165	0.23	2511	8	1.71	19.1%
9900-76.1	215	87	0.41	nd	nd	4.1E-6	221	0.01	84	0.121	1.8	9.2	1.2	0.45	1.2	0.98	0.148	0.25	2328	9	10.66	0.1%
9900-79.1	255	187	0.75	nd	nd	2.8E-4	13	0.49	76	0.186	1.5	5.5	1.3	0.35	1.2	0.92	0.115	0.52	1889	17	3.81	5.1%
9900-8.1	100	53	0.54	nd	nd	-7.0E-5	17	-0.12	29	0.157	2.5	5.3	1.3	0.33	1.2	0.90	0.115	0.58	1876	18	1.48	22.4%
9900-80.1	67	66	1.01	nd	nd	-6.5E-5	73	-0.11	37	0.295	1.7	21.3	1.4	0.64	1.3	0.93	0.240	0.54	3127	17	4.78	2.9%
9900-81.1	139	75	0.56	nd	nd	4.8E-5	45	0.08	57	0.164	1.8	10.7	1.2	0.48	1.2	0.97	0.162	0.32	2477	11	3.11	7.8%
9900-82.1	98	63	0.66	nd	nd	3.1E-5	99	0.05	42	0.193	1.9	11.7	1.3	0.50	1.2	0.95	0.171	0.38	2570	12	0.83	36.3%
9900-84.1	56	55	1.00	nd	nd	3.2E-4	28	0.55	15	0.304	2.5	4.1	1.9	0.30	1.3	0.66	0.100	1.44	1666	30	4.34	3.7%
9900-84.2	64	75	1.20	nd	nd	2.2E-4	105	0.39	15	0.346	2.5	3.8	3.5	0.27	1.3	0.38	0.103	3.22	1550	35	4.33	3.7%
9900-84.3	45	43	0.97	nd	nd	5.8E-5	82	0.10	10	0.284	3.2	3.8	1.6	0.26	1.3	0.80	0.107	0.95	1592	25	139.74	0.0%
9900-99.1	38	41	1.11	nd	nd	8.5E-5	33	0.15	17	0.301	2.3	14.7	1.4	0.54	1.3	0.93	0.199	0.53	2811	16	2.33	12.7%

Notes:

Spot name follows the convention x-y.z; where x = sample number, y = grain number and z = spot number. Multiple analyses in an individual spot are labelled as x-y.z.z

nd=not determined

f206^{204} refers to mole percent of total 206Pb that is due to common Pb, calculated using the 204Pb-method; common Pb composition used is the surface blank (4/6: 0.05770; 7/6: 0.89500; 8/6: 2.13840)

* refers to radiogenic Pb (corrected for common Pb)

Errors are reported at 1σ uncertainty level unless otherwise noted

Analytical details: 25µm spot size, 12nA primary beam intensity, 5 scans

3. Middle Escape Rapids Formation, lithic arenite, Shaler Supergroup, Coppermine Homocline

Sample number:	08RAT-15
GSC Laboratory number:	9901
Geographic location:	Coppermine River, NU 67° 40' 57.0"N 115°29'52.0"W, NAD83
Collection History:	Sampled in 2008 by Rob Rainbird
Lithology:	lithic arenite
Mount ID:	IP527
U-Pb standard and reproducibility:	6266, 1.1% (1σ)
External error in U-Pb:	0.3% (1σ)
207Pb/206Pb Standard:	z1242 (2679.6±0.2Ma, 95% confidence)
Measured value (±95% confidence):	2682±6 Ma
IMF correction applied?	No
Interpreted Age:	1151±13 Ma
Interpretation:	Maximum age of deposition

Sample description

The sample was collected at an outcrop on the Coppermine River from a section of ripple cross-laminated, light-green to buff, fine lithic arenite (Figure 3.1). Short wave-length, sinuous-crested current ripples characterize the sandstone layers, which are interbedded with green-grey, parallel-laminated siltstone. Stratigraphically, the sample comes from the Hihotok (lower) member just below its contact

Figure 3.1 Field photograph upper Escape Rapids formation sample 08RAT-15.

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with the overlying Nipartoktuak (middle) member.

Petrographic description: Very fine sand to coarse silt, moderately well sorted and subangular to subrounded (0.2 to 0.3). Framework (90%) composed of quartz (68%), carbonate (10%) feldspar (10%), mica (10%) and glauconite, chert, and opaque minerals (2%). Cement (10%) quartz overgrowths > carbonate (Figure 3.2).
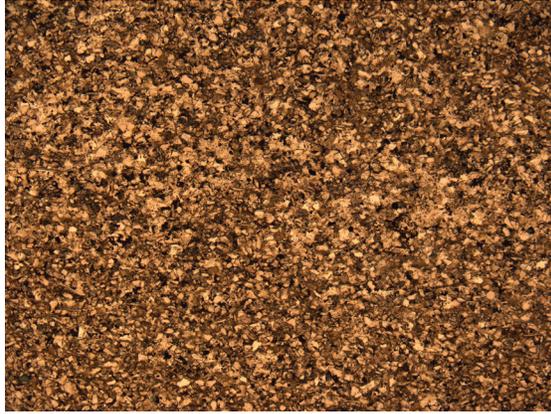
Figure 3.2 Photomicrograph in plane light of upper Escape Rapids formation sample. Field of view is 3.5 mm.
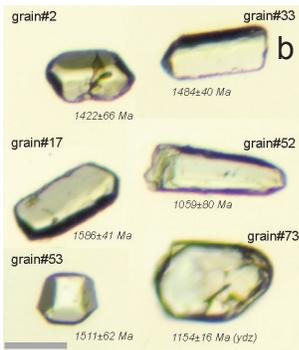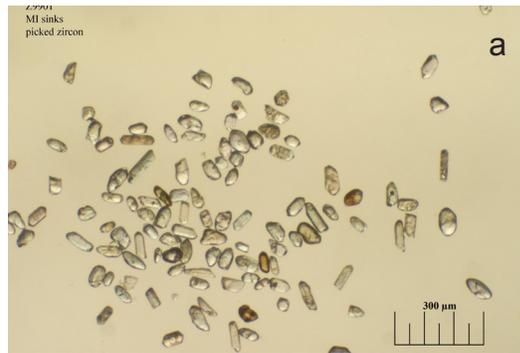
Figure 3.3a Transmitted light photograph of zircon population. Scale bar at lower right is 300μm. Figure 3.3b Detail of well-faceted zircon grains yielding 1.1-1.6 Ga ages (2σ errors). Grey scale bar in lower left is 20μm. See text for discussion.

Zircon description

A limited number of small zircons were recovered from the heavy split of the MI density separation. The zircon grains are largely clear, colourless prisms and variably rounded. Small, euhedral, well-terminated zircon crystals are a minor component of the population (Figure 3.3a,b).

U-Pb results and interpretation

A total of 42 analyses were conducted on 40 separate grains. The results are presented in Table 3. All data are plotted on the Concordia diagram (Figure 3.4). The probability density diagram utilizes the Concordia age on the x-axis (Figure 3.5). The middle Escape Rapids Formation sample displays a wholesale change in provenance to mainly 1600-1400 Ma sources. Many such grains are euhedral and well-terminated (Figure 3.3b) indicating limited abrasion, which suggests local provenance, but zircon-bearing rocks of this age are unknown in this region suggesting a non-Laurentian source. Nine zircon grains yield ages younger than 1.3 Ga, with the replicate analyses on the youngest detrital zircon constraining the maximum age of deposition to 1151±13 Ma . In other samples, grains with early Mesoproterozoic
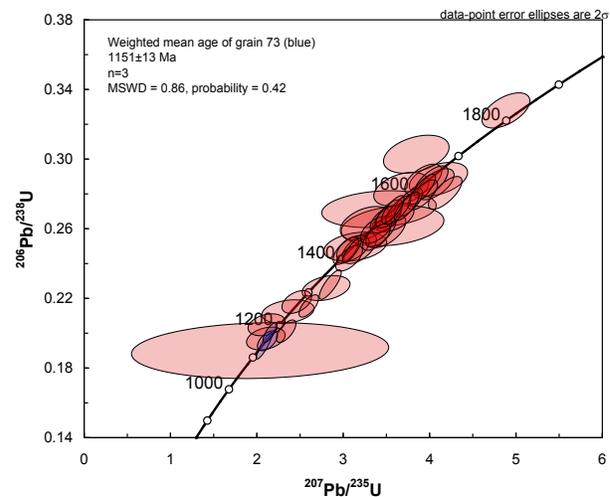
Figure 3.4 Concordia diagram illustrating all results from 08RAT-15. Plotted as 95% confidence ellipses. Colours other than red indicate replicate analyses on individual grains.

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ages are inferred to be sourced from the eastern Grenville Province. Given the indications of a non-Laurentian source for other detritus, this cannot be ruled out for the 1.3-1.15 Ga detrital component as well.

08RAT-15 (z9901) Escape Rapids Formation, Md
n=34/40, greater than 1% probability of concordance

Figure 3.5 Probability density diagram and histogram for sample 08RAT-15. Concordia age (Ludwig, 1998) plotted on x-axis. Results with a probability of concordance greater than 1% are shown in dark blue and in the histogram, all results regardless of probability of concordance are shown in light blue. Replicates are not included.

Table 3: Upper Escape Rapids Formation (08RAT-15)

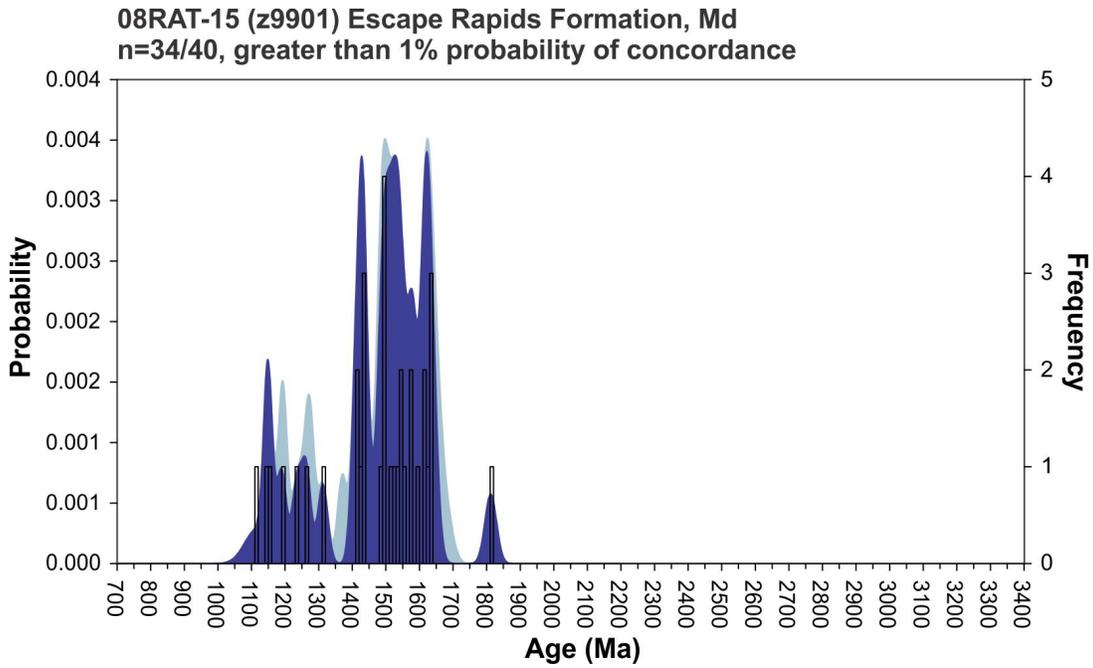| Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$\frac{^{204}Pb}{^{206}Pb}$	% ±	f(206)[204] %	$^{206}Pb^*$ (ppm)	$\frac{^{208^*}Pb}{^{206}Pb}$	% ±	$\frac{^{207^*}Pb}{^{235}U}$	% ±	$\frac{^{206^*}Pb}{^{238}U}$	% ±	Corr Coeff	$\frac{^{207^*}Pb}{^{206}Pb}$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
9901-2.1	114	116	1.05	nd	nd	1.8E-4	118	0.304	26	0.271	5.0	3.3	3.8	0.26	1.5	0.4	0.090	3.4	1495	39	1.4	23.3%
9901-13.1	251	157	0.65	nd	nd	1.3E-5	139	0.022	53	0.195	3.8	3.1	1.4	0.25	1.2	0.8	0.091	0.8	1432	22	0.9	33.8%
9901-24.1	224	21	0.10	nd	nd	1.9E-4	32	0.328	41	0.028	10.5	2.6	1.8	0.21	1.2	0.7	0.087	1.3	1277	25	16.0	0.0%
9901-4.1	144	113	0.81	nd	nd	-1.2E-4	97	-0.202	35	0.247	4.3	4.1	2.2	0.29	1.3	0.6	0.103	1.7	1633	32	3.3	6.8%
9901-7.1	180	144	0.83	nd	nd	-2.6E-5	152	-0.045	42	0.231	4.1	3.7	1.6	0.27	1.2	0.8	0.099	1.0	1579	25	5.3	2.1%
9901-9.1	156	91	0.61	nd	nd	7.7E-5	112	0.133	32	0.182	5.2	3.1	2.1	0.24	1.3	0.6	0.092	1.6	1410	29	2.8	9.2%
9901-10.1	169	102	0.62	nd	nd	6.6E-5	59	0.114	39	0.193	4.7	3.6	1.6	0.27	1.3	0.8	0.097	1.0	1556	26	1.5	21.7%
9901-11.1	274	150	0.57	nd	nd	1.8E-4	78	0.319	51	0.172	4.1	2.4	2.9	0.22	1.2	0.4	0.082	2.6	1264	27	0.2	63.6%
9901-17.1	100	46	0.48	nd	nd	-1.3E-6	---	-0.002	22	0.148	7.0	3.5	2.7	0.26	1.5	0.6	0.098	2.2	1498	37	5.4	2.1%
9901-20.1	118	99	0.87	nd	nd	2.7E-4	81	0.466	29	0.237	5.0	4.1	3.4	0.29	1.4	0.4	0.103	3.1	1636	37	0.7	41.6%
9901-23.1	255	384	1.55	nd	nd	4.5E-4	29	0.780	54	0.455	2.6	3.1	2.5	0.25	1.2	0.5	0.091	2.2	1429	29	0.1	79.7%
9901-25.1	19	0	0.01	nd	nd	2.0E-3	77	3.546	3	-0.004	31.2	2.0	30.3	0.19	3.5	0.1	0.078	30.1	1115	71	0.0	96.9%
9901-30.1	94	116	1.29	nd	nd	1.7E-3	29	2.913	22	0.323	4.6	3.4	8.0	0.27	1.6	0.2	0.091	7.8	1542	44	0.4	52.4%
9901-31.1	199	120	0.62	nd	nd	-1.7E-4	50	-0.298	44	0.199	4.5	3.4	1.9	0.25	1.2	0.6	0.096	1.5	1482	29	7.4	0.7%
9901-33.1	71	42	0.61	nd	nd	3.0E-4	28	0.519	15	0.208	8.0	3.2	2.6	0.25	1.5	0.6	0.093	2.1	1438	34	1.6	21.3%
9901-35.1	217	110	0.52	nd	nd	7.3E-4	30	1.264	37	0.168	5.1	2.1	4.4	0.20	1.4	0.3	0.077	4.2	1152	29	0.1	77.2%
9901-34.1	220	130	0.61	nd	nd	3.0E-4	25	0.512	51	0.158	4.3	3.5	1.8	0.27	1.2	0.7	0.095	1.4	1532	28	0.0	89.5%
9901-36.1	173	136	0.81	nd	nd	2.5E-3	11	4.410	31	0.217	3.9	2.3	5.3	0.21	1.3	0.3	0.080	5.1	1236	30	0.1	78.2%
9901-38.1	173	116	0.69	nd	nd	4.3E-4	27	0.751	43	0.200	4.5	3.9	2.3	0.29	1.3	0.6	0.099	1.9	1624	32	0.5	46.0%
9901-40.1	242	125	0.53	nd	nd	2.3E-4	39	0.404	58	0.148	4.3	4.2	1.9	0.28	1.4	0.7	0.108	1.3	1654	32	31.5	0.0%
9901-41.1	175	115	0.68	nd	nd	2.3E-4	33	0.400	37	0.185	4.8	3.0	2.0	0.25	1.3	0.6	0.089	1.5	1415	29	0.4	54.8%
9901-48.1	170	89	0.54	nd	nd	1.6E-4	19	0.274	41	0.137	5.4	3.9	1.6	0.28	1.3	0.8	0.101	1.0	1618	26	1.6	21.2%
9901-47.1	246	136	0.57	nd	nd	3.2E-4	35	0.554	55	0.175	4.1	3.4	2.2	0.26	1.2	0.6	0.094	1.8	1489	30	0.8	38.1%
9901-50.1	124	69	0.58	nd	nd	4.1E-4	69	0.717	27	0.185	5.6	3.1	4.8	0.25	1.4	0.3	0.091	4.6	1434	35	0.0	86.4%
9901-51.1	143	73	0.53	nd	nd	1.3E-3	18	2.266	37	0.095	6.6	3.8	4.1	0.30	1.5	0.4	0.092	3.8	1676	42	10.9	0.1%
9901-52.1	202	49	0.25	nd	nd	1.0E-3	19	1.744	35	0.047	8.0	2.1	4.2	0.20	1.3	0.3	0.075	4.0	1190	28	3.0	8.3%
9901-53.1	97	69	0.73	nd	nd	7.9E-4	26	1.365	23	0.233	7.5	3.7	3.6	0.28	1.4	0.4	0.094	3.3	1593	38	2.1	15.0%
9901-54.1	76	42	0.57	nd	nd	1.4E-4	36	0.245	17	0.186	7.2	3.4	2.1	0.26	1.4	0.7	0.096	1.6	1500	32	4.8	2.8%
9901-55.1	204	107	0.54	nd	nd	5.5E-5	140	0.095	48	0.152	4.7	3.7	1.8	0.27	1.2	0.7	0.099	1.3	1576	29	1.7	19.3%
9901-57.1	117	63	0.56	nd	nd	1.5E-4	27	0.261	20	0.179	6.9	2.3	2.0	0.20	1.3	0.7	0.084	1.5	1195	26	13.9	0.0%
9901-64.1	174	103	0.61	nd	nd	-1.3E-4	22	-0.221	34	0.189	5.3	2.8	1.9	0.23	1.5	0.8	0.091	1.1	1370	28	19.6	0.0%
9901-66.1	41	51	1.27	nd	nd	3.7E-4	121	0.646	9	0.328	7.4	3.6	6.9	0.26	1.8	0.3	0.099	6.6	1499	48	0.7	40.7%
9901-69.1	352	313	0.92	nd	nd	3.7E-3	6	6.478	68	0.216	2.5	2.8	4.1	0.23	1.3	0.3	0.090	3.8	1312	30	2.2	13.7%
9901-73.1	371	434	1.21	nd	nd	1.4E-5	691	0.024	62	0.354	2.8	2.1	2.3	0.19	1.2	0.5	0.078	1.9	1147	24	0.1	74.0%
9901-73.2	336	397	1.22	nd	nd	2.1E-5	159	0.037	58	0.350	2.8	2.1	1.5	0.20	1.2	0.8	0.078	1.0	1161	21	2.3	13.2%
9901-73.2.2	322	377	1.21	nd	nd	-5.1E-5	37	-0.089	53	0.348	2.8	2.1	1.8	0.19	1.6	0.9	0.078	0.9	1141	24	0.9	34.8%
9901-3.1	92	40	0.45	nd	nd	3.2E-4	22	0.548	23	0.113	7.3	4.0	2.0	0.29	1.3	0.7	0.102	1.5	1632	32	0.8	37.9%
9901-8.1	149	162	1.12	nd	nd	-4.8E-6	1382	-0.008	36	0.278	4.1	3.9	1.8	0.28	1.3	0.7	0.102	1.3	1610	29	5.3	2.1%
9901-16.1	223	94	0.44	nd	nd	1.9E-4	77	0.325	63	0.119	4.5	4.9	2.3	0.33	1.3	0.5	0.108	1.9	1812	35	2.3	12.7%
9901-27.1	191	151	0.81	nd	nd	7.3E-4	21	1.260	44	0.228	3.8	3.6	2.6	0.27	1.3	0.5	0.098	2.3	1527	32	1.7	19.8%
9901-29.1	318	262	0.85	nd	nd	1.5E-4	33	0.256	74	0.242	2.9	3.6	1.5	0.27	1.2	0.8	0.096	1.0	1542	24	0.0	88.0%
9901-39.1	180	192	1.10	nd	nd	4.9E-4	21	0.85	41	0.320	3.1	3.5	2.1	0.26	1.2	0.58	0.095	1.70	1519	29	0.31	57.7%

Notes:

Spot name follows the convention x-y.z; where x = sample number, y = grain number and z = spot number. Multiple analyses in an individual spot are labelled as x-y.z.z

nd=not determined

f206[204] refers to mole percent of total 206Pb that is due to common Pb, calculated using the 204Pb-method; common Pb composition used is the surface blank (4/6: 0.05770; 7/6: 0.89500; 8/6: 2.13840)

* refers to radiogenic Pb (corrected for common Pb)

Errors are reported at 1σ uncertainty level unless otherwise noted

Analytical details: 20μm spot size, 5 scans

4. Nelson Head Formation quartz arenite, Shaler Supergroup, Minto Inlier

Sample number:	94RAT-001
GSC Laboratory number:	6814
Geographic location:	Victoria Island, Wynniatt Bay, NWT 72°19'6.9"N 111°53'6.1"W, NAD83
Collection History:	Sampled in 1994 by Rob Rainbird
Lithology:	Feldspathic arenite
Mount ID:	IP528
U-Pb standard and reproducibility:	6266, 1.1% (1σ)
External error in U-Pb:	0.2% (1σ)
207Pb/206Pb Standard:	1242 (2679.6±0.2Ma, 95% confidence)
Measured value (±95% confidence):	2676±3 Ma
IMF correction applied?	No
Interpreted Age:	1013±25 Ma
Interpretation:	Maximum age of deposition

Sample Description

The cliff-face outcrop from which the sample was collected displays large-scale, planar-tabular crossbedded, white to tan feldspathic arenite, interbedded with parallel-laminated to ripple cross-laminated red-maroon siltstone (Figure 4.1). Crossbeds indicate consistent northwesterly transport with low-moderate variance. Heavy mineral laminae are preserved on some crossbed foresets. Deposition by a broad, braided river system is indicated.
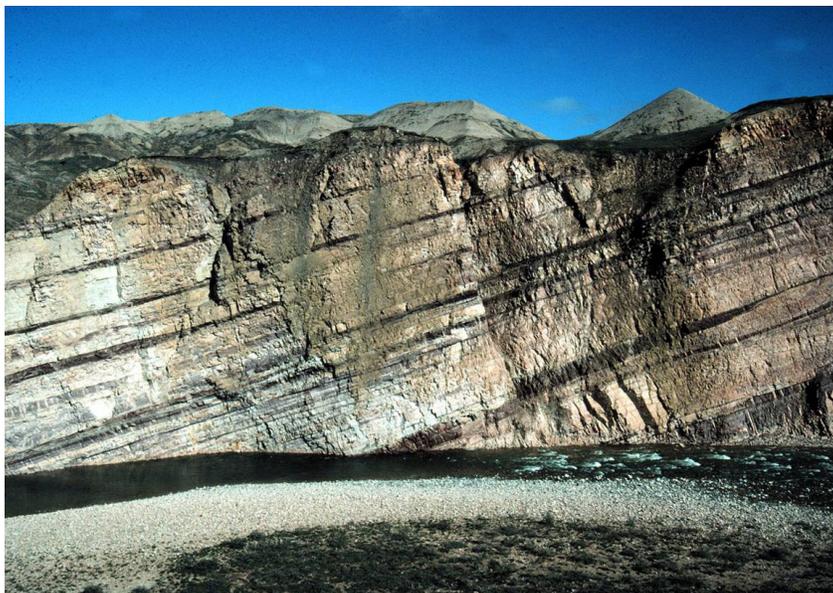
Figure 4.1 Field photograph upper Nelson Head Formation sample 94RAT-1. Exposed section has a true thickness of approximately 35m.

Petrographic Details: Medium- to coarse-grained sand, moderately well sorted and subrounded (0.4 – 0.6) grains (Figure 4.2). Framework (90%): quartz (83%), feldspar (12%), mica (3%) and chert (2%). Cement (10%): clay > hematite.
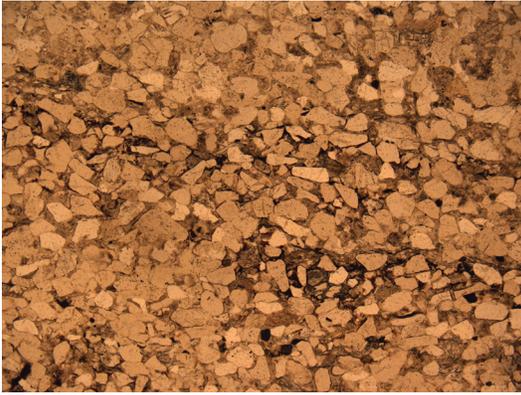
Figure 4.2 Photomicrograph in plane light of Nelson Head Formation sample 94RAT-01. Field of view is 3.5 mm.

Zircon Description

Sample processing details are unknown for this sample. A magnetic separator was used to isolate a zircon separate. Zircons were hand picked from the NONMAG fraction (magnet power and side slope parameters are unknown). Abundant, large, zircon grains were recovered ranging in colour from light pink to pale brown to colourless (Figure 4.3). The majority of the grains are well-rounded but a small number preserve sharp facets and terminations. Both clear and opaque inclusions are common as are fractures.

Figure 4.3 Transmitted light photograph of zircon population. Scale bar at lower right is 300μm.

U-Pb Results and Interpretation

A total of 57 analyses were conducted on separate grains, with no replicates. The results are presented in Table 4. All data are plotted on the Concordia diagram (Figure 4.4) with the youngest results shown in greater detail in Figure 4.5. The probability density diagram
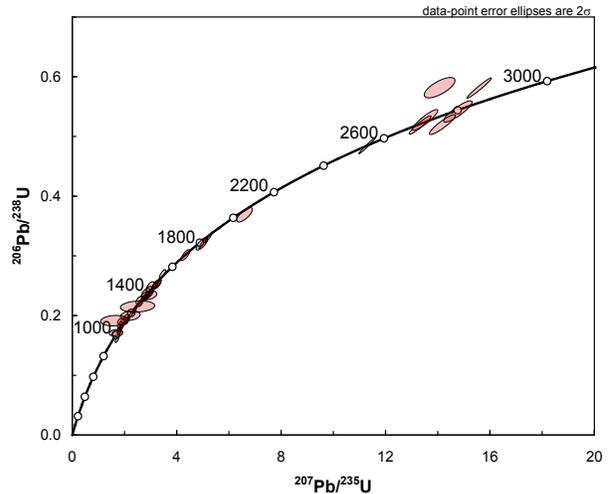
Figure 4.4 Concordia diagram illustrating all results from 94RAT-1. Plotted as 95% confidence ellipses.
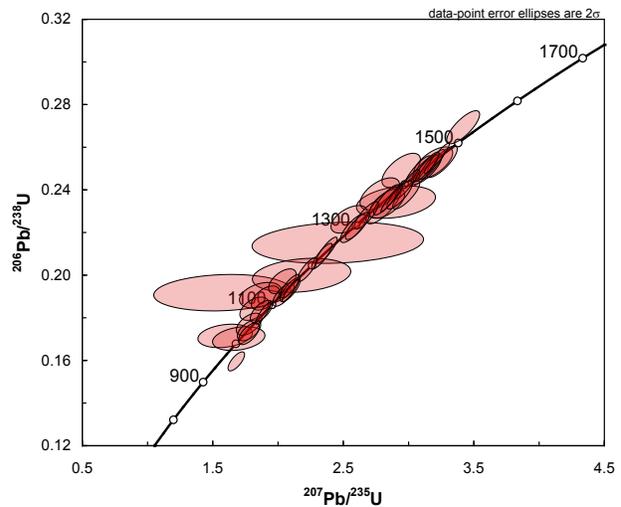
Figure 4.5 Detail of Concordia diagram illustrating the ages of the youngest detrital ziron grains.

utilizes the Concordia age on the x-axis (Figure 4.6). The majority of the detrital zircon grains yield ages between 1.0 and 1.5 Ga, which are considered to be first-cycle and sourced

from the eastern Grenville Province. There is no obvious correlation between degree of roundness and age. The maximum age of deposition (1013±25 Ma) is based on a single analysis of the youngest concordant zircon.

94RAT-001 (z6814) Nelson Head quartz arenite
n=46/57, greater than 1% probability of concordance

Figure 4.6 Probability density diagram and histogram for sample 94RAT-1. Concordia age (Ludwig, 1998) plotted on x-axis. Results with a probability of concordance greater than 1% are shown in dark blue and in the histogram, all results regardless of probability of concordance are shown in light blue.

Table 4: Nelson Head Formation (94RAT-1)

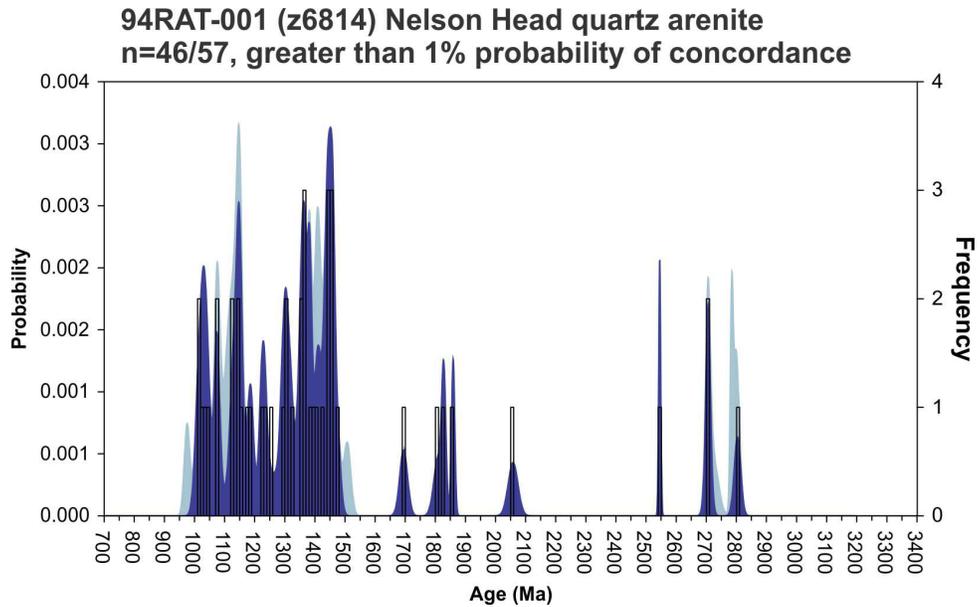| Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$\frac{^{204}Pb}{^{206}Pb}$	% ±	f(206)^{204} %	$^{206}Pb*$ (ppm)	$\frac{^{208}Pb}{^{206*}Pb}$	% ±	$\frac{^{207*}Pb}{^{235}U}$	% ±	$\frac{^{206*}Pb}{^{238}U}$	% ±	Corr Coeff	$\frac{^{207*}Pb}{^{206*}Pb}$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
6814-01.1	121	106	0.90	nd	nd	7.7E-5	87	0.13	18	0.272	2.6	1.8	1.9	0.17	1.2	0.63	0.074	1.45	1030	21	0.71	40.0%
6814-02.1	101	47	0.47	nd	nd	1.8E-4	48	0.32	15	0.137	3.9	1.8	2.2	0.18	1.2	0.54	0.073	1.89	1047	22	1.46	22.7%
6814-03.1	37	27	0.75	nd	nd	3.2E-4	32	0.55	12	0.219	3.5	6.6	1.9	0.37	1.3	0.73	0.129	1.27	2058	33	3.49	6.2%
6814-04.1	186	48	0.27	nd	nd	5.0E-5	34	0.09	39	0.078	3.2	3.0	1.3	0.24	1.2	0.92	0.089	0.51	1409	16	0.37	54.0%
6814-05.1	322	160	0.51	nd	nd	1.6E-4	28	0.28	63	0.151	1.8	2.7	1.4	0.23	1.1	0.81	0.085	0.82	1321	21	0.27	60.2%
6814-06.1	17	6	0.35	nd	nd	2.5E-3	21	4.36	3	0.058	8.7	1.6	13.8	0.19	1.8	0.13	0.059	13.70	1126	37	4.92	2.7%
6814-07.1	309	378	1.25	nd	nd	4.0E-5	38	0.07	88	0.373	1.0	5.2	1.2	0.33	1.1	0.96	0.114	0.32	1859	11	0.41	52.2%
6814-08.1	137	95	0.71	nd	nd	4.5E-4	15	0.78	35	0.183	2.2	4.3	1.6	0.30	1.2	0.77	0.103	1.02	1695	26	0.37	54.4%
6814-09.1	387	101	0.27	nd	nd	4.3E-4	10	0.75	79	0.079	2.0	2.9	1.4	0.24	1.1	0.83	0.089	0.77	1393	20	3.44	6.4%
6814-10.1	128	53	0.43	nd	nd	4.6E-4	22	0.79	20	0.119	3.9	1.8	2.5	0.18	1.2	0.49	0.071	2.16	1081	23	7.83	0.5%
6814-11.1	130	74	0.59	nd	nd	2.1E-4	22	0.37	25	0.178	2.6	2.6	1.6	0.22	1.2	0.78	0.084	0.98	1294	23	0.01	91.4%
6814-12.1	83	25	0.31	nd	nd	1.2E-4	33	0.21	37	0.085	3.1	13.3	1.3	0.52	1.2	0.94	0.186	0.44	2706	14	0.03	85.7%
6814-13.1	343	421	1.26	nd	nd	8.8E-4	17	1.52	172	0.239	2.8	14.1	1.7	0.58	1.2	0.70	0.175	1.22	2725	33	93.42	0.0%
6814-14.1	228	139	0.63	nd	nd	1.4E-4	34	0.24	47	0.176	2.0	3.0	1.4	0.24	1.2	0.81	0.091	0.83	1407	21	10.79	0.1%
6814-15.1	36	22	0.63	nd	nd	1.3E-4	39	0.23	16	0.175	3.4	13.5	1.5	0.53	1.3	0.90	0.185	0.64	2706	20	1.12	29.0%
6814-16.1	166	75	0.46	nd	nd	1.1E-4	33	0.19	28	0.140	2.9	2.1	1.5	0.19	1.2	0.80	0.078	0.86	1145	20	0.22	63.9%
6814-17.1	182	80	0.45	nd	nd	6.8E-5	57	0.12	35	0.133	2.7	2.6	1.4	0.22	1.2	0.82	0.085	0.81	1304	21	0.26	61.1%
6814-18.1	176	438	2.55	nd	nd	4.1E-5	39	0.07	49	0.762	1.0	5.0	1.2	0.32	1.2	0.94	0.112	0.41	1828	14	2.83	9.2%
6814-19.1	95	39	0.42	nd	nd	1.9E-5	486	0.03	19	0.135	3.5	2.8	2.0	0.23	1.2	0.61	0.088	1.57	1360	27	0.63	42.8%
6814-20.1	129	48	0.38	nd	nd	5.4E-5	89	0.09	28	0.119	3.1	3.3	1.5	0.25	1.2	0.80	0.093	0.87	1473	23	2.58	10.8%
6814-21.1	182	91	0.51	nd	nd	2.5E-4	33	0.43	30	0.155	2.8	1.9	2.3	0.19	1.2	0.53	0.073	1.96	1106	23	7.42	0.6%
6814-22.1	128	92	0.74	nd	nd	5.2E-4	17	0.91	22	0.211	2.6	2.0	2.2	0.20	1.2	0.55	0.075	1.80	1148	24	7.13	0.8%
6814-23.1	47	69	1.50	nd	nd	6.5E-5	90	0.11	13	0.459	2.3	4.9	1.8	0.32	1.3	0.74	0.112	1.18	1810	30	1.19	27.4%
6814-24.1	93	76	0.85	nd	nd	1.1E-4	38	0.18	19	0.250	2.7	2.8	1.9	0.23	1.5	0.78	0.087	1.22	1358	29	0.51	47.4%
6814-25.1	308	152	0.51	nd	nd	1.4E-4	16	0.25	154	0.128	1.7	15.6	1.2	0.58	1.2	0.98	0.194	0.27	2784	9	38.47	0.0%
6814-26.1	183	122	0.69	nd	nd	8.5E-4	12	1.48	36	0.173	2.4	2.5	2.2	0.23	1.2	0.52	0.081	1.91	1304	26	4.29	3.8%
6814-27.1	273	110	0.41	nd	nd	8.8E-6	352	0.02	59	0.126	2.2	3.2	1.3	0.25	1.1	0.89	0.091	0.60	1454	18	0.14	70.8%
6814-28.1	154	55	0.36	nd	nd	2.1E-4	25	0.36	36	0.099	3.3	3.4	1.5	0.27	1.2	0.78	0.092	0.95	1507	24	8.51	0.4%
6814-29.1	57	42	0.76	nd	nd	8.1E-4	24	1.40	8	0.251	4.0	1.6	5.4	0.17	1.3	0.24	0.067	5.24	1017	25	2.83	9.2%
6814-30.1	68	41	0.62	nd	nd	1.9E-3	13	3.24	14	0.164	3.4	2.9	4.3	0.23	1.3	0.31	0.090	4.07	1360	32	0.64	42.4%
6814-31.1	344	287	0.86	nd	nd	4.1E-5	22	0.07	143	0.247	1.0	11.3	1.2	0.49	1.1	0.98	0.169	0.20	2546	7	0.08	78.4%
6814-32.1	532	170	0.33	nd	nd	7.4E-4	7	1.28	73	0.108	1.8	1.7	1.6	0.16	1.1	0.72	0.076	1.10	975	19	32.85	0.0%
6814-33.1	149	83	0.57	nd	nd	3.2E-4	27	0.55	32	0.165	2.7	2.9	2.1	0.25	1.3	0.63	0.086	1.61	1410	29	9.15	0.2%
6814-34.1	177	68	0.39	nd	nd	8.4E-5	64	0.15	38	0.121	2.7	3.1	1.5	0.25	1.2	0.78	0.091	0.94	1443	23	0.17	68.3%
6814-36.1	39	20	0.52	nd	nd	-8.9E-6	971	-0.02	18	0.139	3.6	14.8	1.5	0.54	1.3	0.88	0.197	0.72	2804	22	0.07	78.9%
6814-37.1	328	123	0.38	nd	nd	9.5E-5	33	0.16	71	0.110	2.0	3.1	1.3	0.25	1.1	0.89	0.091	0.58	1442	18	0.05	82.3%
6814-38.1	459	147	0.33	nd	nd	5.3E-5	45	0.09	76	0.097	2.1	2.1	1.3	0.19	1.1	0.90	0.079	0.54	1152	16	2.98	8.4%
6814-39.1	168	37	0.22	nd	nd	1.6E-4	23	0.28	34	0.069	3.6	2.8	1.5	0.24	1.2	0.85	0.087	0.78	1365	21	0.01	90.5%
6814-40.1	163	34	0.21	nd	nd	2.1E-4	32	0.36	26	0.064	4.2	1.9	1.8	0.18	1.2	0.64	0.074	1.40	1077	22	1.98	15.9%
6814-41.1	120	52	0.45	nd	nd	1.1E-4	35	0.19	20	0.136	3.4	2.1	1.5	0.19	1.2	0.78	0.078	0.95	1145	21	0.80	37.0%
6814-42.1	148	36	0.25	nd	nd	1.7E-4	31	0.30	24	0.073	4.2	2.0	1.7	0.19	1.2	0.71	0.077	1.16	1128	22	0.02	89.4%
6814-43.1	26	9	0.36	nd	nd	5.2E-4	71	0.90	5	0.103	7.8	2.2	7.1	0.20	1.6	0.23	0.079	6.92	1175	35	0.00	97.8%
6814-44.1	57	37	0.65	nd	nd	6.3E-4	24	1.09	9	0.192	3.9	1.9	3.6	0.19	1.3	0.36	0.071	3.33	1117	26	6.97	0.8%
6814-45.1	198	136	0.70	nd	nd	1.4E-4	24	0.23	42	0.207	2.0	3.1	1.4	0.25	1.2	0.87	0.090	0.66	1423	19	0.83	36.2%
6814-46.1	120	37	0.32	nd	nd	1.2E-4	21	0.20	26	0.097	3.5	3.1	1.4	0.25	1.2	0.88	0.091	0.65	1440	19	0.20	65.2%
6814-47.1	42	23	0.55	nd	nd	1.8E-4	32	0.32	19	0.155	3.2	14.2	1.4	0.52	1.3	0.91	0.198	0.60	2797	18	11.55	0.1%
6814-48.1	493	11	0.02	nd	nd	9.2E-5	30	0.16	77	0.001	10.7	1.9	1.3	0.18	1.2	0.88	0.075	0.63	1073	17	0.53	46.9%
6814-49.1	333	167	0.52	nd	nd	1.4E-4	25	0.24	61	0.141	2.0	2.4	1.4	0.21	1.2	0.86	0.081	0.70	1233	19	0.49	48.4%

Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$\frac{^{204}Pb}{^{206}Pb}$	% ±	f(206)^{204} %	$^{206}Pb^*$ (ppm)	$\frac{^{208*}Pb}{^{206*}Pb}$	% ±	$\frac{^{207*}Pb}{^{235}U}$	% ±	$\frac{^{206*}Pb}{^{238}U}$	% ±	Corr Coeff	$\frac{^{207*}Pb}{^{206*}Pb}$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
6814-50.1	534	130	0.25	nd	nd	8.7E-4	9	1.51	80	0.095	2.4	1.8	2.1	0.17	1.1	0.55	0.074	1.73	1036	21	0.00	99.5%
6814-51.1	22	8	0.39	nd	nd	2.3E-3	25	4.06	4	0.123	6.3	2.5	11.0	0.22	1.8	0.17	0.083	10.83	1258	42	0.00	98.5%
6814-52.1	52	34	0.67	nd	nd	4.2E-4	55	0.72	8	0.196	4.6	1.7	4.9	0.17	1.3	0.27	0.072	4.70	1013	25	0.06	80.6%
6814-53.1	109	57	0.54	nd	nd	2.6E-4	40	0.45	22	0.159	3.1	2.8	2.3	0.24	1.3	0.57	0.085	1.86	1366	29	3.37	6.7%
6814-54.1	177	107	0.62	nd	nd	1.1E-4	25	0.19	32	0.198	2.3	2.3	1.4	0.21	1.2	0.86	0.081	0.69	1223	19	0.03	85.2%
6814-55.1	235	123	0.54	nd	nd	3.9E-5	22	0.07	51	0.161	2.1	3.2	1.2	0.26	1.2	0.94	0.092	0.42	1460	14	0.15	69.8%
6814-59.1	316	160	0.52	nd	nd	1.7E-4	21	0.30	55	0.158	2.1	2.2	1.4	0.20	1.1	0.83	0.079	0.77	1187	19	0.12	72.8%
6814-60.1	329	90	0.28	nd	nd	7.3E-5	11	0.13	67	0.084	2.4	2.9	1.2	0.24	1.1	0.95	0.088	0.36	1383	12	1.37	24.3%
6814-62.1	94	42	0.45	nd	nd	4.0E-4	22	0.69	20	0.138	3.3	3.2	1.9	0.25	1.2	0.64	0.092	1.47	1455	28	0.02	88.4%

Notes:

Spot name follows the convention x-y.z; where x = sample number, y = grain number and z = spot number. Multiple analyses in an individual spot are labelled as x-y.z.z

nd=not determined

f206^{204} refers to mole percent of total 206Pb that is due to common Pb, calculated using the 204Pb-method; common Pb composition used is the surface blank (4/6: 0.05770; 7/6: 0.89500; 8/6: 2.13840)

* refers to radiogenic Pb (corrected for common Pb)

Errors are reported at 1σ uncertainty level unless otherwise noted

Analytical details: 25µm spot size, 12nA primary beam intensity, 5 scans

5. Fort Collinson Formation, quartz arenite, Shaler Supergroup, Minto Inlier

Sample number:	09RAT-031A
GSC Laboratory number:	9898
Geographic location:	Victoria Island, Minto Inlet, NWT 71° 28' 35.2"N 117°8'19.9"W, NAD83
Collection History:	Sampled in 2009 by Rob Rainbird
Lithology:	Quartz arenite
Mount ID:	IP528
U-Pb standard and reproducibility:	6266, 1.1% (1σ)
External error in U-Pb:	0.2% (1σ)
207Pb/206Pb Standard:	1242 (2679.6±0.2Ma, 95% confidence)
Measured value (±95% confidence):	2676±3 Ma
IMF correction applied?	No
Interpreted Age:	891±22 Ma
Interpretation:	Maximum age of deposition

Sample description

The sample was collected from a well-exposed section, east of Boot Inlet, near the western end of the Minto Inlier (Figure 5.1). The rock is a white, medium-grained quartzarenite with moderate-scale trough crossbedding indicating bi-modal, bi-polar paleocurrents which suggests deposition on a high-energy shoreline where tidal currents were active.

Petrographic Description: Medium to coarse-grained quartz arenite with moderate to well sorted and rounded to very well rounded (0.5 – 0.7) framework (Figure 5.2). Framework (90%) is composed of quartz (90%), chert (5%) and carbonate (3%), rutile, zircon, carbonate and Fe-oxides (2%). Cement (10%) is composed of quartz (80%) and carbonate (20%).

Figure 5.1 Field photograph upper Fort Collinson formation sample 09RAT-31A. Hammer is approximately 30cm long.
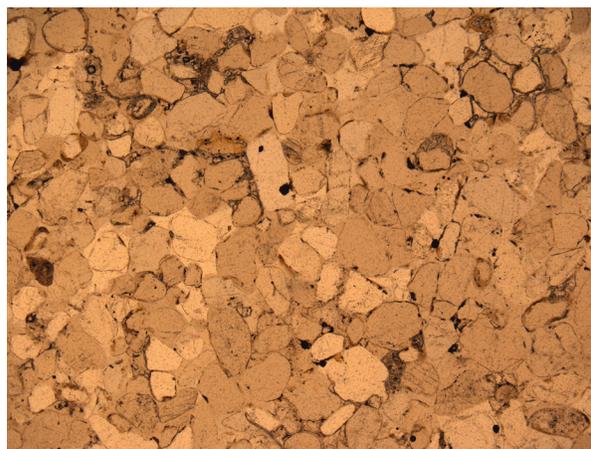
Figure 5.2 Plane light photomicrograph of Fort Collinson formation sample 09RAT-31A. Field of view is 3.5mm

Zircon description

Zircons were hand picked from the NONMAG @ MAX Amp, 3°ss fraction. Large, good quality, zircon grains ranging from pink, to pale yellow/brown to colourless were recovered (Figure 5.3). All grains are rounded to very well rounded. The zircon sample varies widely in quality with pristine, fracture-free and inclusion-free zircon as well as highly fractured grains with numerous clear inclusions.

Figure 5.3 Transmitted light photograph of zircon population. Scale bar at lower right is 300 μm.

U-Pb results and interpretation

A total of 61 analyses on separate grains (no replicates) were conducted. The results are presented in Table 5. All data are plotted on the Concordia diagram (Figure 5.4), with a detail of the youngest analyses presented in Figure 5.5. The probability density diagram utilizes the Concordia age on the x-axis (Figure 5.6). The majority of the detrital zircon grains yield ages between 1.0 and 1.5 Ga, with a distinct maxima grouping between 1180-1260 Ma. This age is not common in the exposed Grenville Province of northeast North America, but may be a relict of differential preservation of source rocks in the Neoproterozoic. Three moderately rounded zircon grains yield ages of ca. 900 Ma. As these small grains were not suitable for replicate analyses, the maximum age of deposition is imprecisely constrained by a single analysis of grain #29 with an age of 891±22 Ma. This age is very close to the Re-Os age of 893±13 Ma from the conformably underlying Boot Inlet Formation (Van Acken et al. accepted). The ages recorded in the Fort Collinson are similar, although with varying relative proportions, to those in the underlying Nelson Head Formation which suggests a similar source or reworking of the sedimentary pile.

Figure 5.4 Concordia diagram illustrating all results from 09RAT-31A. Plotted as 95% confidence ellipses.
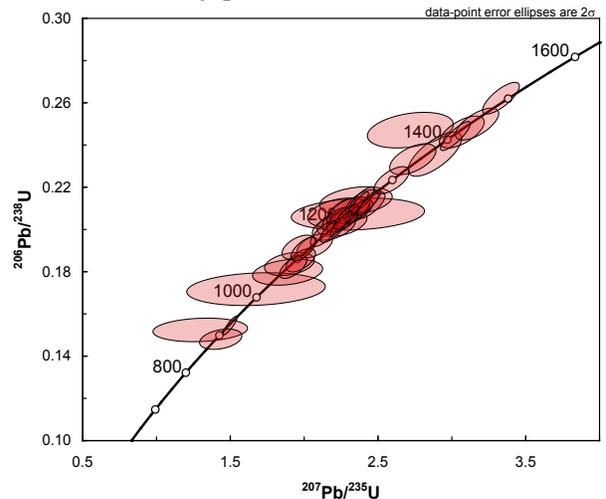
Figure 5.5 Detail of Concordia diagram illustrating the ages of the youngest detrital zircon grains.

Figure 5.6 (overleaf) Probability density diagram and histogram for sample 09RAT-31A. Concordia age (Ludwig, 1998) plotted on x-axis. Results with a probability of concordance greater than 1% are shown in dark blue and in the histogram, all results regardless of probability of concordance are shown in light blue.

09RAT-31 (z9898) Ft Collinson orthoquartzite, n=55/61, greater than 1% probability of concordant
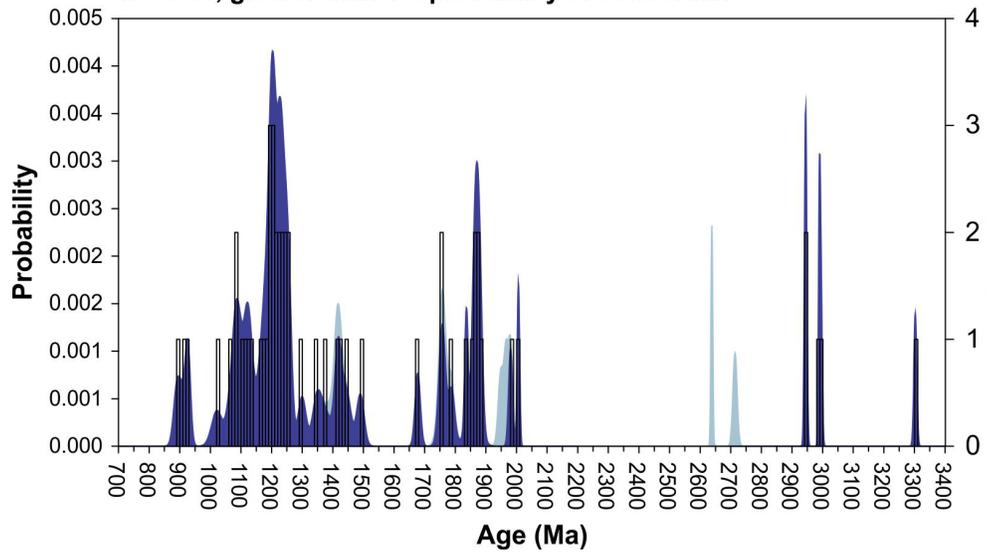
Table 5: Fort Collinson Formation (09RAT-31A)

Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$\frac{^{204}Pb}{^{206}Pb}$	% ±	$f(206)^{204}$ %	$^{206}Pb^*$ (ppm)	$\frac{^{208}Pb}{^{206}Pb}$	% ±	$\frac{^{207}Pb}{^{235}U}$	% ±	$\frac{^{206}Pb}{^{238}U}$	% ±	Corr Coeff	$\frac{^{207}Pb}{^{206}Pb}$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
9898-1.1	89	51	0.59	nd	nd	1.3E-4	41	0.22	25	0.168	2.6	5.3	1.4	0.33	1.2	0.84	0.115	0.79	1867	23	1.75	18.6%
9898-10.1	129	59	0.47	nd	nd	1.4E-4	54	0.24	20	0.146	3.0	1.9	2.0	0.18	1.2	0.63	0.076	1.53	1084	23	0.66	41.6%
9898-104.1	327	67	0.21	nd	nd	4.6E-5	29	0.08	93	0.060	2.4	5.1	1.2	0.33	1.1	0.97	0.112	0.30	1836	10	0.00	96.1%
9898-106.1	85	81	0.98	nd	nd	1.1E-4	30	0.19	49	0.266	1.6	24.7	1.2	0.67	1.2	0.97	0.270	0.30	3303	9	0.19	66.5%
9898-11.1	60	68	1.17	nd	nd	2.6E-4	31	0.45	13	0.358	2.5	3.2	1.9	0.25	1.2	0.66	0.092	1.41	1447	28	0.78	37.6%
9898-111.1	487	380	0.80	nd	nd	4.2E-5	23	0.07	152	0.235	1.0	6.2	1.2	0.36	1.1	0.98	0.123	0.22	2006	8	0.38	53.8%
9898-112.1	131	112	0.88	nd	nd	3.0E-4	20	0.53	22	0.262	3.1	2.1	1.8	0.20	1.2	0.70	0.078	1.25	1162	23	0.34	56.2%
9898-113.1	195	199	1.05	nd	nd	4.6E-5	67	0.08	56	0.310	1.3	5.2	1.3	0.33	1.2	0.92	0.114	0.48	1863	16	0.83	36.2%
9898-114.1	230	231	1.03	nd	nd	1.2E-4	37	0.20	41	0.316	1.6	2.3	1.5	0.21	1.2	0.79	0.080	0.89	1207	21	0.07	79.5%
9898-13.1	380	252	0.68	nd	nd	3.7E-5	29	0.06	154	0.206	1.0	11.6	1.1	0.47	1.1	0.99	0.179	0.18	2638	6	44.28	0.0%
9898-14.1	49	123	2.59	nd	nd	5.3E-5	266	0.09	13	0.818	1.6	4.8	2.2	0.31	1.3	0.58	0.113	1.81	1763	34	7.85	0.5%
9898-15.1	113	70	0.63	nd	nd	4.1E-5	75	0.07	48	0.181	1.8	12.9	1.3	0.50	1.2	0.94	0.188	0.44	2714	13	15.03	0.0%
9898-16.1	37	22	0.63	nd	nd	6.9E-4	27	1.19	7	0.183	4.8	2.2	3.8	0.21	1.4	0.35	0.078	3.58	1216	29	1.25	26.4%
9898-17.1	195	181	0.95	nd	nd	5.8E-5	23	0.10	26	0.292	2.0	1.5	1.3	0.15	1.2	0.89	0.070	0.62	927	16	0.01	91.8%
9898-18.1	87	80	0.95	nd	nd	8.6E-5	57	0.15	15	0.287	2.6	2.2	1.6	0.20	1.2	0.74	0.080	1.11	1178	22	0.20	65.8%
9898-19.1	100	110	1.12	nd	nd	2.3E-4	34	0.39	19	0.347	2.1	2.6	1.9	0.22	1.2	0.64	0.084	1.45	1300	25	0.03	85.5%
9898-23.1	120	63	0.54	nd	nd	2.0E-4	89	0.35	19	0.157	3.2	1.9	3.7	0.18	1.2	0.33	0.075	3.47	1087	24	0.10	74.9%
9898-24.1	113	64	0.58	nd	nd	2.3E-4	27	0.39	19	0.175	3.1	2.0	1.8	0.19	1.2	0.67	0.076	1.33	1119	22	1.68	19.4%
9898-25.1	126	118	0.96	nd	nd	1.9E-4	22	0.33	37	0.293	1.7	5.4	1.3	0.34	1.2	0.88	0.114	0.64	1875	20	1.24	26.6%
9898-26.1	22	44	2.04	nd	nd	4.8E-4	55	0.83	6	0.590	2.9	5.2	3.6	0.33	1.5	0.42	0.114	3.30	1857	45	0.01	94.0%
9898-27.1	158	166	1.08	nd	nd	6.7E-5	18	0.12	49	0.320	1.5	6.1	1.2	0.36	1.2	0.95	0.122	0.38	1981	13	0.29	59.2%
9898-28.1	68	30	0.46	nd	nd	2.4E-4	45	0.41	14	0.146	3.7	2.9	2.6	0.24	1.8	0.71	0.089	1.82	1376	38	0.64	42.2%
9898-29.1	40	43	1.10	nd	nd	5.7E-5	313	0.10	5	0.330	4.3	1.4	4.1	0.15	1.3	0.33	0.070	3.84	891	22	0.24	62.7%
9898-3.1	180	50	0.28	nd	nd	7.7E-5	38	0.13	49	0.083	2.6	4.7	1.3	0.32	1.2	0.90	0.107	0.59	1759	19	1.96	16.1%
9898-30.1	41	44	1.10	nd	nd	1.1E-3	37	1.94	5	0.333	4.0	1.3	10.2	0.15	1.5	0.15	0.061	10.11	913	25	1.74	18.8%
9898-31.1	120	119	1.01	nd	nd	8.2E-5	35	0.14	35	0.302	2.0	5.4	1.3	0.34	1.2	0.91	0.115	0.53	1881	17	0.73	39.2%
9898-32.1	85	38	0.46	nd	nd	2.4E-4	38	0.42	18	0.134	5.0	3.1	2.0	0.25	1.3	0.62	0.090	1.57	1423	28	0.16	69.3%
9898-34.1	87	54	0.64	nd	nd	2.8E-4	37	0.48	14	0.183	3.4	2.1	2.4	0.19	1.2	0.51	0.078	2.05	1136	24	0.09	76.2%
9898-35.1	35	24	0.72	nd	nd	4.9E-4	52	0.84	5	0.209	4.9	1.9	5.1	0.18	1.4	0.27	0.076	4.95	1067	27	0.08	78.1%
9898-36.1	81	100	1.26	nd	nd	3.0E-4	77	0.51	15	0.382	2.5	2.4	4.3	0.21	1.3	0.30	0.080	4.13	1247	29	0.51	47.7%
9898-37.1	214	176	0.85	nd	nd	1.2E-4	38	0.20	39	0.262	1.8	2.4	1.5	0.21	1.2	0.79	0.081	0.91	1239	21	2.32	12.8%
9898-38.1	139	49	0.36	nd	nd	7.2E-5	48	0.12	41	0.099	2.7	5.6	1.3	0.34	1.2	0.91	0.121	0.53	1949	17	13.86	0.0%
9898-39.1	207	107	0.53	nd	nd	7.5E-5	40	0.13	53	0.161	1.9	4.2	1.3	0.30	1.2	0.91	0.103	0.53	1678	17	0.22	64.2%
9898-4.1	49	57	1.20	nd	nd	4.1E-4	30	0.72	8	0.361	3.0	2.2	2.7	0.20	1.3	0.47	0.079	2.39	1182	27	0.01	92.2%
9898-41.1	211	3	0.01	nd	nd	8.7E-5	50	0.15	38	0.004	10.2	2.4	1.4	0.21	1.2	0.80	0.082	0.87	1231	21	1.27	25.9%
9898-42.1	134	110	0.85	nd	nd	9.0E-5	38	0.16	39	0.263	1.8	5.4	1.3	0.34	1.2	0.90	0.114	0.57	1872	18	1.06	30.3%
9898-43.1	46	30	0.66	nd	nd	1.9E-4	240	0.32	8	0.208	4.2	2.4	7.8	0.21	1.5	0.19	0.083	7.70	1216	33	0.08	77.2%
9898-44.1	191	93	0.50	nd	nd	4.4E-5	63	0.08	55	0.144	1.9	5.6	1.2	0.33	1.2	0.94	0.122	0.44	1966	14	37.65	0.0%
9898-45.1	215	54	0.26	nd	nd	7.1E-6	473	0.01	39	0.087	3.1	2.4	1.4	0.21	1.2	0.85	0.083	0.72	1257	19	1.94	16.4%
9898-47.1	128	152	1.22	nd	nd	5.8E-5	96	0.10	23	0.383	1.9	2.5	1.6	0.21	1.2	0.74	0.084	1.08	1253	23	4.70	3.0%
9898-48.1	179	127	0.73	nd	nd	9.4E-5	62	0.16	40	0.216	2.2	3.3	1.5	0.26	1.2	0.76	0.092	1.00	1490	24	1.65	20.0%
9898-49.1	92	90	1.00	nd	nd	4.8E-4	20	0.83	15	0.296	2.6	2.0	2.3	0.19	1.2	0.52	0.074	2.01	1122	24	4.52	3.3%
9898-5.1	153	70	0.47	nd	nd	5.0E-5	104	0.09	42	0.145	2.2	4.8	1.4	0.32	1.2	0.84	0.109	0.74	1787	22	0.17	67.9%
9898-50.1	15	7	0.46	nd	nd	1.6E-3	32	2.78	2	0.156	8.8	1.7	11.5	0.17	1.9	0.16	0.070	11.35	1022	35	0.12	72.5%
9898-52.1	59	28	0.48	nd	nd	2.1E-4	44	0.37	12	0.149	4.7	2.7	2.4	0.23	1.3	0.54	0.085	1.97	1348	29	0.84	36.0%
9898-54.1	206	54	0.27	nd	nd	5.4E-5	31	0.09	108	0.072	2.2	18.6	1.2	0.61	1.2	0.98	0.222	0.23	2994	8	6.52	1.1%
9898-55.1	110	58	0.54	nd	nd	1.0E-4	121	0.18	20	0.179	3.1	2.3	2.6	0.21	1.2	0.47	0.080	2.26	1224	26	0.24	62.5%
9898-56.1	147	106	0.74	nd	nd	1.8E-4	25	0.31	40	0.218	2.1	4.7	1.4	0.32	1.2	0.85	0.106	0.73	1755	22	4.34	3.7%

Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$\frac{^{204}Pb}{^{206}Pb}$	%±	$f(206)^{204}$ %	$^{206}Pb^*$ (ppm)	$\frac{^{208^*}Pb}{^{206^*}Pb}$	%±	$\frac{^{207^*}Pb}{^{235}U}$	%±	$\frac{^{206^*}Pb}{^{238}U}$	%±	Corr Coeff	$\frac{^{207^*}Pb}{^{206^*}Pb}$	%±	Concordia Age	±Ma (2σ)	MSWD	Probability of conc.
9898-58.1	130	74	0.58	nd	nd	3.0E-4	22	0.52	23	0.168	2.9	2.3	1.8	0.21	1.2	0.67	0.078	1.33	1208	23	5.96	1.5%
9898-61.1	148	75	0.52	nd	nd	6.9E-5	21	0.12	26	0.166	2.7	2.3	1.3	0.20	1.2	0.89	0.080	0.60	1199	17	0.56	45.3%
9898-64.1	130	68	0.53	nd	nd	1.4E-4	55	0.25	24	0.141	4.2	2.4	1.9	0.21	1.2	0.62	0.081	1.50	1242	24	0.16	69.1%
9898-65.1	102	50	0.50	nd	nd	1.6E-4	60	0.27	18	0.149	3.4	2.2	2.2	0.21	1.2	0.56	0.079	1.80	1200	25	0.38	53.8%
9898-67.1	110	95	0.89	nd	nd	1.6E-4	50	0.28	19	0.272	2.5	2.3	2.0	0.21	1.2	0.62	0.080	1.57	1202	25	0.01	93.1%
9898-68.1	264	85	0.33	nd	nd	5.2E-5	42	0.09	48	0.099	2.6	2.4	1.3	0.21	1.1	0.90	0.081	0.56	1226	17	1.91	16.7%
9898-69.1	36	17	0.49	nd	nd	1.1E-3	21	1.86	8	0.134	5.2	2.7	4.4	0.25	1.4	0.32	0.080	4.17	1410	34	8.65	0.3%
9898-70.1	74	41	0.56	nd	nd	1.8E-4	87	0.30	13	0.159	3.9	2.3	3.1	0.20	1.3	0.41	0.081	2.80	1193	26	0.10	75.4%
9898-71.1	173	67	0.40	nd	nd	1.3E-4	28	0.22	36	0.114	2.6	3.0	1.4	0.24	1.2	0.85	0.090	0.71	1416	20	0.25	61.4%
9898-73.1	180	43	0.25	nd	nd	5.9E-5	24	0.10	87	0.068	2.2	16.7	1.2	0.56	1.2	0.98	0.215	0.22	2945	7	5.96	1.5%
9898-8.1	99	22	0.23	nd	nd	3.8E-4	22	0.66	16	0.072	4.7	2.0	2.1	0.19	1.2	0.58	0.077	1.70	1101	23	0.63	42.8%
9898-88.1	271	3	0.01	nd	nd	1.7E-5	39	0.03	139	0.003	7.6	18.2	1.2	0.60	1.1	0.99	0.221	0.18	2989	6	0.81	36.9%
9898-9.1	162	29	0.18	nd	nd	8.2E-5	21	0.14	81	0.049	2.7	17.1	1.2	0.58	1.2	0.98	0.215	0.24	2945	8	0.05	82.3%

Notes:

Spot name follows the convention x-y.z; where x = sample number, y = grain number and z = spot number. Multiple analyses in an individual spot are labelled as x-y.z.z

nd=not determined

$f206^{204}$ refers to mole percent of total 206Pb that is due to common Pb, calculated using the 204Pb-method; common Pb composition used is the surface blank (4/6: 0.05770; 7/6: 0.89500; 8/6: 2.13840)

* refers to radiogenic Pb (corrected for common Pb)

Errors are reported at 1σ uncertainty level unless otherwise noted

Analytical details: 25µm spot size, 12nA primary beam intensity, 5 scans

6. Wynniatt Formation, black shale member, sandstone, Shaler Supergroup, Minto Inlier

Sample number:	11RAT-DT168
GSC Laboratory number:	10612
Geographic location:	Victoria Island, Wynniatt Bay, NWT 72° 7' 20.2"N 112°16'29.5"W, NAD83
Collection History:	Sampled in 2011 by Danielle Thompson
Lithology:	sandstone
Mount ID:	IP628
U-Pb standard and reproducibility:	6266, 1.0% (1σ)
External error in U-Pb:	0.2% (1σ)
207Pb/206Pb Standard:	1242 (2679.6±0.2Ma, 95% confidence)
Measured value (±95% confidence):	2679±3 Ma
IMF correction applied?	No
Interpreted Age:	983±15 Ma
Interpretation:	Maximum age of deposition

Sample description

The sample was collected in a small creek gully in the northeastern Minto Inlier, southwest of Kilian Lake. The rock is a massive, carbonaceous, well-rounded, moderately to well-sorted, and medium- to fine-grained quartz arenite from a 20 cm-thick bed of sandstone interbedded within siltstones and shales of the Black Shale Member, Wynniatt Formation (Figure 6.1).

Figure 6.1 Field photograph lower Wynniatt formation (black shale member) sample 11RAT-DT168. Hammer is approximately 25cm long.

Zircon description

Zircons were hand picked from the NONMAG @ MAX Amp, 10°ss fraction. The zircon population varies widely in size, with the larger grains (200μm) being generally clear, colourless and well-rounded or frosted (Figure 6.2a,b). Small zircon grains (50-100μm) are generally clear and colourless to pale yellow. While the majority are subrounded, a small number are well-faceted.
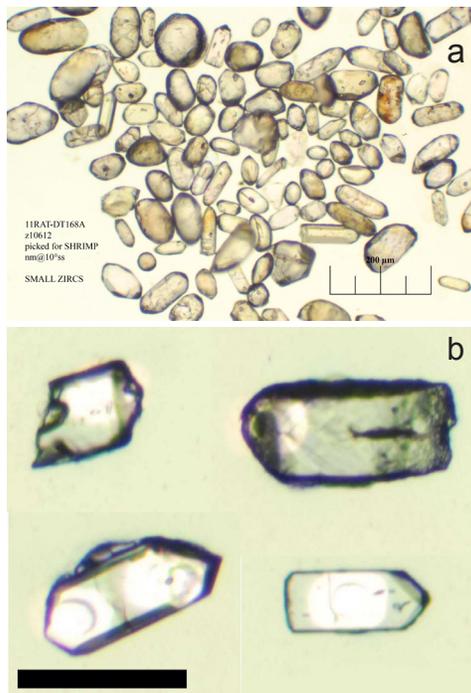
Figure 6.2a Transmitted light photograph of zircon population. Scale bar at lower right is 300μm. Figure 6.2b Detail illustrating well-faceted zircon grains yielding ca. 1080 Ma ages. Black bar in lower left is 100μm. See text for discussion.

U-Pb results and interpretation

A total of 64 analyses on 61 separate grains were conducted. The results are presented in Table 6. All data are plotted on the Concordia diagram (Figure 6.3), with a detail of the youngest analyses presented in Figure 6.4. The probability density diagram utilizes the Concordia age on the x-axis (Figure 6.5). Detrital zircon grains predominantly yield ages between 1.05-1.25
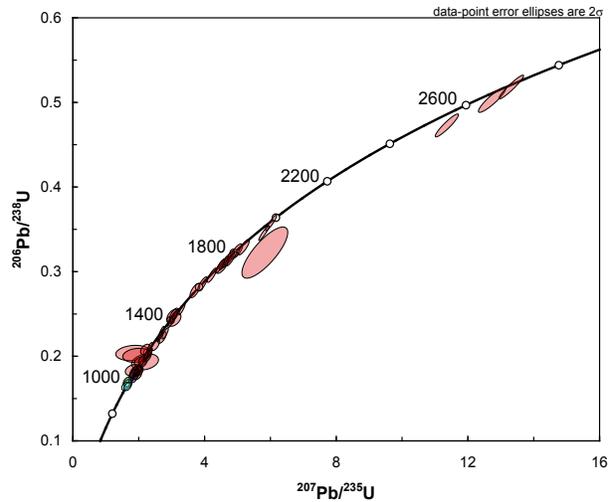
Figure 6.3 Concordia diagram illustrating all results from 11RAT-DT168. Plotted as 95% confidence ellipses. Colours other than red indicate replicate analyses on individual grains.
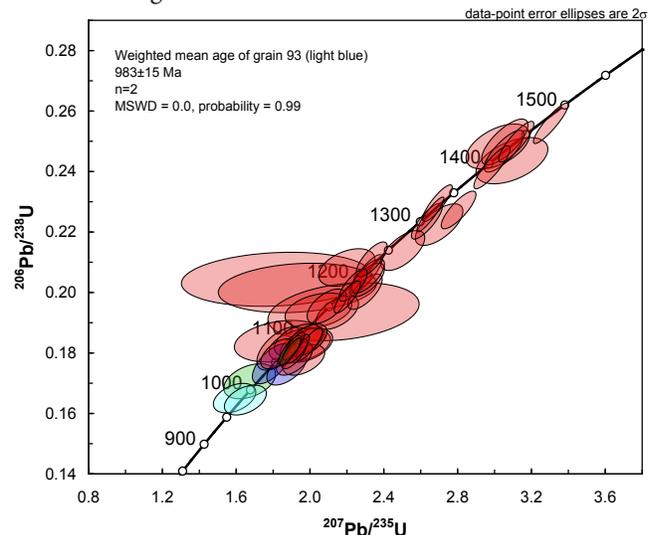
Figure 6.4 Detail of Concordia illustrating youngest results. Colours other than red indicate replicate analyses.

Ga, with subordinate populations at ca. 1.42 Ga and 1.75 Ga as well as diffuse results as old as 2.7 Ga. Two replicates on the youngest detrital zircon yield a mean concordia age of 983±15 Ma constraining the maximum age of deposition. Only a single zircon of this age was identified. Other young zircon grains (ca. 1080 Ma) are small and well faceted (Figure 6.2b). A Re-Os age of 849±48 Ma was recently obtained from the black shale member (Van Acken et al. accepted).

11RAT-DT168 (z10612) Wynniatt Formation
n=52/61, greater than 1% probability of concordance
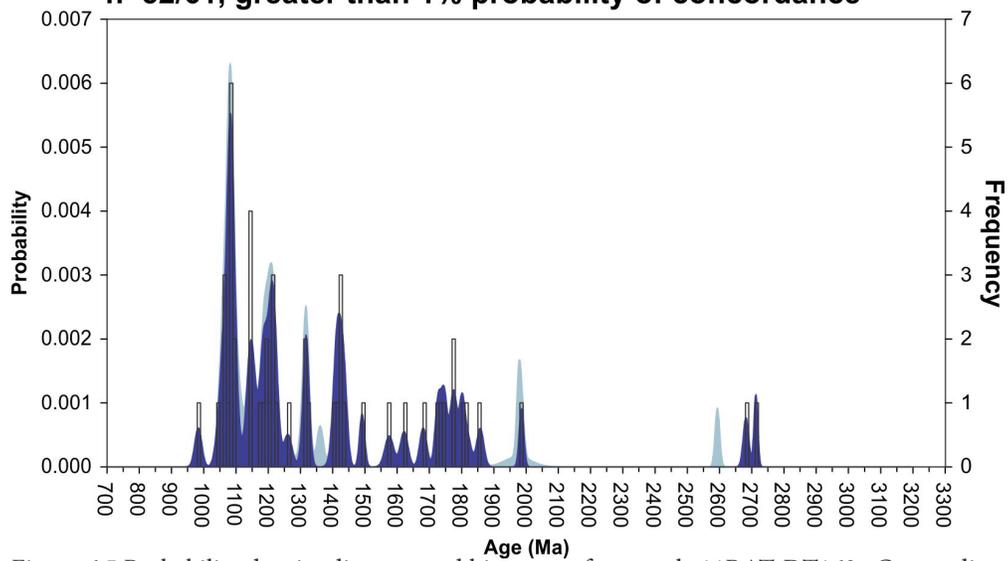
Figure 6.5 Probability density diagram and histogram for sample 11RAT-DT168. Concordia age (Ludwig, 1998) plotted on x-axis. Results with a probability of concordance greater than 1% are shown in dark blue and in the histogram, all results regardless of probability of concordance are shown in light blue. Replicates are not included.

Table 6: Black shale member (lower) Wynniatt Formation (11RAT-DT168)

| Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$^{204}Pb/^{206}Pb$	% ±	$f(206)^{204}$ %	$^{206}Pb^*$ (ppm)	$^{208^*}Pb/^{206^*}Pb$	% ±	$^{207^*}Pb/^{235}U$	% ±	$^{206^*}Pb/^{238}U$	% ±	Corr Coeff	$^{207^*}Pb/^{206^*}Pb$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
10612-10.1	175	224	1.32	673	9224	4.0E-5	23	0.07	35	0.398	1.7	2.7	1.2	0.230	1.08	0.86	0.085	0.6	1323	18	1.0	31.6%
10612-100.1	79	42	0.55	311	9956	-7.2E-5	90	-0.13	12	0.176	5.2	1.9	2.1	0.178	1.24	0.58	0.078	1.7	1066	23	5.2	2.2%
10612-101.1	97	49	0.52	237	9903	4.1E-4	26	0.72	21	0.150	4.2	3.0	2.3	0.248	1.21	0.52	0.088	2.0	1424	29	1.2	27.9%
10612-102.1	97	38	0.41	400	10331	3.9E-4	31	0.68	17	0.113	5.2	2.2	2.8	0.208	1.21	0.43	0.076	2.6	1212	26	4.8	2.8%
10612-103.1	127	61	0.50	269	9650	2.0E-4	84	0.35	20	0.152	4.5	1.9	3.5	0.183	1.26	0.36	0.077	3.3	1083	25	0.4	53.2%
10612-104.1	202	130	0.67	343	9613	7.8E-5	43	0.13	31	0.214	2.8	1.9	1.5	0.180	1.13	0.75	0.077	1.0	1080	20	7.3	0.7%
10612-106.1	109	72	0.68	297	10933	7.4E-5	51	0.13	19	0.206	3.9	2.3	1.7	0.200	1.18	0.70	0.083	1.2	1197	23	12.7	0.0%
10612-109.1	166	284	1.77	472	11270	9.5E-5	46	0.16	29	0.539	1.9	2.3	1.6	0.206	1.12	0.71	0.082	1.1	1212	21	1.6	20.5%
10612-14.1	117	65	0.57	309	10879	1.4E-4	17	0.24	25	0.169	3.4	3.1	1.4	0.247	1.15	0.80	0.090	0.9	1421	22	0.0	94.0%
10612-15.1	249	98	0.41	92	10634	4.6E-5	36	0.08	77	0.113	2.4	6.0	1.2	0.358	1.07	0.92	0.122	0.4	1986	14	0.6	42.6%
10612-16.1	256	383	1.54	165	10375	1.3E-4	31	0.23	46	0.476	1.7	2.3	1.5	0.211	1.11	0.75	0.080	1.0	1224	21	2.1	14.9%
10612-18.1	138	46	0.34	223	9978	-1.7E-5	95	-0.03	27	0.114	4.1	2.8	1.4	0.227	1.13	0.82	0.089	0.8	1361	20	21.7	0.0%
10612-2.1	156	45	0.30	286	10273	1.4E-4	90	0.25	24	0.086	5.1	2.0	2.9	0.183	1.25	0.43	0.079	2.6	1085	24	2.1	14.5%
10612-20.1	96	167	1.80	329	10483	5.0E-4	34	0.87	16	0.541	2.4	2.0	3.6	0.194	1.21	0.34	0.076	3.4	1142	25	0.3	56.1%
10612-22.1	154	201	1.35	536	10640	3.2E-6	2229	0.01	43	0.398	1.6	5.0	1.5	0.324	1.09	0.74	0.111	1.0	1816	25	0.2	69.1%
10612-24.1	158	43	0.28	215	9333	2.1E-4	35	0.36	24	0.077	5.3	1.8	2.1	0.180	1.13	0.55	0.074	1.7	1062	21	1.1	30.3%
10612-25.1	275	222	0.83	583	11522	5.1E-5	39	0.09	57	0.248	2.1	3.0	1.4	0.242	1.19	0.87	0.090	0.7	1409	19	1.6	21.1%
10612-26.1	101	25	0.25	161	9951	1.8E-4	42	0.32	15	0.081	6.3	1.8	2.4	0.177	1.54	0.64	0.074	1.9	1046	28	0.2	65.7%
10612-26.2	77	19	0.25	128	9891	-9.3E-5	93	-0.16	12	0.083	6.9	1.9	2.3	0.175	1.31	0.56	0.077	1.9	1048	24	5.0	2.5%
10612-27.1	88	26	0.31	115	9611	1.6E-4	36	0.28	23	0.094	5.0	4.5	1.6	0.307	1.21	0.74	0.107	1.1	1737	27	0.7	41.3%
10612-29.1	189	66	0.36	304	12600	1.3E-4	27	0.23	48	0.101	3.3	4.2	1.4	0.296	1.18	0.85	0.103	0.7	1681	22	0.4	52.1%
10612-3.1	157	104	0.68	396	9640	-1.9E-5	62	-0.03	25	0.227	3.0	2.0	1.5	0.183	1.20	0.82	0.079	0.8	1112	20	19.9	0.0%
10612-30.1	97	50	0.53	119	9774	1.6E-4	42	0.27	23	0.157	3.8	3.7	1.7	0.278	1.19	0.69	0.097	1.3	1575	27	0.4	53.1%
10612-31.1	240	115	0.49	188	11247	2.3E-5	145	0.04	65	0.154	2.5	4.7	1.4	0.315	1.22	0.88	0.109	0.6	1772	20	0.3	60.4%
10612-32.1	135	33	0.25	256	10590	2.5E-4	30	0.44	25	0.072	5.2	2.5	2.0	0.214	1.25	0.64	0.085	1.5	1261	26	3.3	6.9%
10612-33.1	151	67	0.46	229	10788	1.1E-4	37	0.18	41	0.137	3.2	4.8	1.4	0.317	1.13	0.82	0.109	0.8	1779	22	0.2	66.4%
10612-34.1	327	111	0.35	527	10549	1.3E-4	30	0.23	57	0.108	2.9	2.2	1.4	0.203	1.06	0.76	0.080	0.9	1191	19	0.1	80.1%
10612-38.1	521	183	0.36	395	10930	6.7E-5	35	0.12	155	0.113	1.8	5.8	1.1	0.346	1.04	0.94	0.122	0.4	1976	13	14.5	0.0%
10612-40.1	227	82	0.37	198	10408	6.4E-5	37	0.11	60	0.096	3.0	4.5	1.2	0.307	1.08	0.88	0.106	0.6	1726	18	0.0	99.4%
10612-43.1	314	100	0.33	411	8885	3.0E-5	78	0.05	49	0.101	2.7	1.9	1.2	0.182	1.04	0.84	0.076	0.7	1085	16	0.6	43.9%
10612-47.1	69	129	1.93	160	12246	-8.5E-5	151	-0.15	14	0.602	3.1	3.1	2.6	0.244	1.28	0.50	0.092	2.2	1413	30	2.0	16.1%
10612-48.1	452	157	0.36	1068	11366	2.2E-5	27	0.04	88	0.110	2.4	2.7	1.1	0.226	1.04	0.92	0.085	0.5	1317	14	0.2	68.5%
10612-5.1	62	0	0.00	38	10823	6.3E-4	40	1.09	10	-0.007	18.6	1.8	5.5	0.184	1.52	0.28	0.072	5.3	1087	30	0.8	36.0%
10612-50.1	46	15	0.34	100	8004	3.0E-4	24	0.52	7	0.073	9.6	1.8	2.7	0.182	1.60	0.59	0.073	2.2	1069	30	1.4	22.9%
10612-52.1	219	45	0.21	71	12117	3.3E-5	39	0.06	59	0.058	4.0	4.8	1.2	0.316	1.09	0.90	0.111	0.5	1801	16	4.7	2.9%
10612-53.1	89	53	0.61	335	10162	5.4E-4	26	0.94	13	0.182	4.5	1.7	3.5	0.171	1.38	0.40	0.071	3.2	1014	25	0.9	35.1%
10612-53.2	185	82	0.46	384	11444	6.0E-5	29	0.10	29	0.135	3.4	1.9	1.3	0.181	1.08	0.80	0.076	0.8	1077	18	0.5	48.9%
10612-54.1	192	71	0.38	698	8608	8.7E-5	45	0.15	34	0.121	3.8	2.3	1.7	0.204	1.11	0.67	0.082	1.2	1207	22	2.8	9.6%
10612-55.1	138	113	0.85	272	10214	1.2E-4	34	0.21	39	0.255	2.3	5.2	1.4	0.329	1.13	0.83	0.114	0.8	1858	22	2.6	10.4%
10612-58.1	98	47	0.50	237	6919	1.9E-4	37	0.33	16	0.153	4.6	2.1	2.1	0.196	1.19	0.57	0.077	1.7	1150	23	0.3	59.5%
10612-59.1	7	3	0.46	121	10627	5.2E-4	32	0.90	2	0.098	14.8	5.8	4.9	0.323	3.85	0.79	0.131	3.0	1975	82	15.7	0.0%
10612-6.1	246	150	0.63	444	10547	2.2E-5	112	0.04	38	0.193	2.7	1.9	1.4	0.182	1.08	0.79	0.077	0.8	1089	18	6.1	1.4%
10612-62.1	362	96	0.27	326	11916	2.5E-5	27	0.04	56	0.082	3.4	1.9	1.2	0.181	1.05	0.87	0.076	0.6	1080	16	2.3	12.9%
10612-67.1	223	76	0.35	477	10751	-3.7E-5	77	-0.06	39	0.113	3.5	2.3	1.5	0.206	1.26	0.83	0.081	0.8	1216	21	0.5	47.9%
10612-69.1	117	72	0.64	324	7256	7.6E-5	101	0.13	22	0.201	3.4	2.7	1.9	0.222	1.26	0.65	0.088	1.5	1312	27	7.2	0.7%
10612-7.1	120	31	0.26	123	12285	-2.2E-5	401	-0.04	20	0.087	5.9	2.1	2.2	0.193	1.17	0.53	0.080	1.9	1146	23	3.0	8.5%
10612-71.1	150	128	0.88	536	9866	1.4E-4	36	0.25	32	0.266	2.7	3.1	1.7	0.250	1.23	0.74	0.089	1.1	1423	25	2.3	13.3%
10612-73.1	290	121	0.43	456	9983	8.9E-5	33	0.16	56	0.127	2.9	2.6	1.3	0.224	1.07	0.82	0.085	0.8	1311	19	1.5	22.3%

Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	204Pb/206Pb	% ±	f(206)204 %	206Pb* (ppm)	208*Pb/206*Pb	% ±	207*Pb/235U	% ±	206*Pb/238U	% ±	Corr Coeff	207*Pb/206*Pb	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
10612-74.1	87	65	0.77	298	8623	1.2E-4	20	0.20	21	0.208	3.4	3.9	1.5	0.286	1.19	0.80	0.100	0.9	1622	24	0.0	97.0%
10612-75.1	14	0	0.01	172	15656	8.3E-4	47	1.43	2	0.016	23.0	2.2	7.7	0.194	2.02	0.26	0.082	7.4	1144	42	0.4	53.6%
10612-76.1	142	76	0.56	253	8663	4.9E-5	21	0.08	30	0.169	2.8	3.1	1.3	0.250	1.09	0.86	0.090	0.6	1437	19	0.0	90.4%
10612-77.1	197	98	0.51	356	8424	1.7E-5	51	0.03	34	0.153	3.4	2.2	1.3	0.199	1.10	0.82	0.080	0.8	1182	19	4.0	4.6%
10612-78.1	299	205	0.71	252	10185	-1.1E-6	2627	0.00	80	0.209	1.6	4.6	1.2	0.311	1.11	0.90	0.107	0.5	1747	17	0.0	90.0%
10612-79.1	35	6	0.17	104	10433	1.5E-3	27	2.61	6	0.038	10.2	1.9	9.1	0.202	1.64	0.18	0.069	8.9	1180	35	2.6	11.0%
10612-81.1	29	4	0.13	147	14855	2.0E-3	24	3.45	5	-0.030	16.2	1.8	11.7	0.204	1.78	0.15	0.064	11.5	1194	39	4.4	3.6%
10612-82.1	152	37	0.25	192	10680	1.9E-4	49	0.33	24	0.071	5.4	2.0	2.2	0.184	1.18	0.53	0.078	1.9	1095	23	1.8	18.1%
10612-87.1	91	32	0.36	260	9077	3.5E-4	34	0.60	14	0.115	5.4	1.9	2.8	0.184	1.21	0.44	0.076	2.5	1091	24	0.1	80.6%
10612-89.1	205	132	0.67	150	9713	8.0E-5	28	0.14	91	0.191	1.9	13.3	1.2	0.518	1.10	0.95	0.187	0.4	2713	12	0.8	36.9%
10612-9.1	118	179	1.57	84	10180	2.4E-5	29	0.04	48	0.452	1.6	11.4	1.2	0.473	1.16	0.93	0.175	0.5	2593	14	18.2	0.0%
10612-93.1	90	35	0.40	134	10499	3.5E-4	31	0.60	13	0.120	6.0	1.6	2.8	0.165	1.23	0.44	0.073	2.5	983	22	0.1	72.6%
10612-93.2	75	27	0.37	127	10728	3.1E-4	37	0.54	11	0.105	6.1	1.6	3.0	0.165	1.21	0.40	0.070	2.7	983	22	1.3	25.3%
10612-97.1	133	137	1.06	525	8840	-2.4E-5	373	-0.04	20	0.338	3.0	2.0	2.4	0.178	1.16	0.49	0.080	2.1	1063	22	10.9	0.1%
10612-98.1	92	72	0.81	92	7330	1.2E-4	34	0.21	40	0.226	2.4	12.8	1.3	0.503	1.19	0.91	0.184	0.6	2682	17	5.1	2.4%
10612-99.1	219	76	0.36	410	11106	1.3E-5	76	0.02	48	0.107	2.7	3.3	1.2	0.26	1.1	0.90	0.094	0.51	1491	16	3.70	5.4%

Notes:

Spot name follows the convention x-y.z; where x = sample number, y = grain number and z = spot number. Multiple analyses in an individual spot are labelled as x-y.z.z

f206204 refers to mole percent of total 206Pb that is due to common Pb, calculated using the 204Pb-method; common Pb composition used is the surface blank (4/6: 0.05770; 7/6: 0.89500; 8/6: 2.13840)

* refers to radiogenic Pb (corrected for common Pb)

Errors are reported at 1σ uncertainty level unless otherwise noted

Analytical details: 20µm spot size, 6nA primary beam intensity, 5 scans

7. Wynniatt Formation, stromatolitic carbonate member, quartz arenite, Shaler Supergroup, Minto Inlier

Sample number:	10RAT-RR132A
GSC Laboratory number:	10339
Geographic location:	Victoria Island, Minto Inlet, NWT 72° 11' 51.3"N 111°43'44.1"W, NAD83
Collection History:	Sampled in 2010 by Rob Rainbird
Lithology:	quartz arenite
Mount ID:	IP585
U-Pb standard and reproducibility:	6266, 1.4% (1σ)
External error in U-Pb:	0.4% (1σ)
207Pb/206Pb Standard:	1242 (2679.6±0.2Ma, 95% confidence)
Measured value (±95% confidence):	2676±7 Ma
IMF correction applied?	Yes (1.0029)
Interpreted Age:	1031±20 Ma
Interpretation:	Maximum age of deposition

Sample description

A white to rusty weathering sandstone layer was collected near the base of a waterfall section along a creek draining Kilian Lake in the eastern Minto Inlier. The sample is from a 50-60 cm thick, wavy topped layer with small-scale crossbedding (mega-ripples) just above a sequence boundary that marks the base of the stromatolitic carbonate member. (Figure 7.1).

Petrographic Description: The rock is a quartz arenite composed of well-sorted, medium to coarse sand and rare, very coarse sand grains. It exhibits a moderately well to well sorted and rounded to very well rounded (0.5 – 0.7) framework (Figure 7.2). Framework (85%) is composed of quartz (85%), carbonate (10%), feldspar, chert and glauconite (5%). Cement (15%) is composed of quartz (70%) and carbonate (15%).

Figure 7.1 Field photograph lower Wynniatt Formation (stromatolitic carbonate member) sample 10RAT-RR132A. Hammer is approximately 30cm long.

Figure 7.2 Plane light photomicrograph of lower Wynniatt Formation sample 10RAT-RR132A. Field of view 3.5mm

Zircon description

Abundant zircon grains were recovered and those for analysis were hand-picked from the NONMAG @ MAX Amp, 10°ss fraction. These are morphologically very similar to those recovered from sample 10RAT-RR247A. The majority are large, well rounded, colourless to pale brown/pink grains with few inclusions and iron oxide staining common along fractures (Figure 7.3).

10RAT-RR132A01
Z10339
Non mag @ MAX 10°SS
~140 zircons for SHRIMP
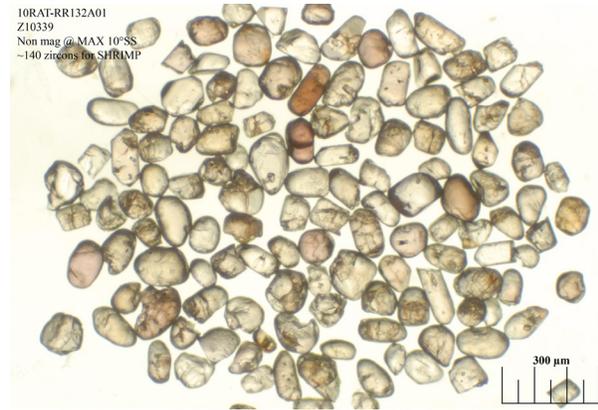
300 μm

Figure 7.3 Transmitted light photograph of zircon population. Scale bar at lower right is 300μm.

U-Pb results and interpretation

A total of 54 separate zircon grains were analyzed, with no replicates. The results are presented in Table 7. All data are plotted on the Concordia diagram (Figure 7.4). The probability

data-point error ellipses are 2σ
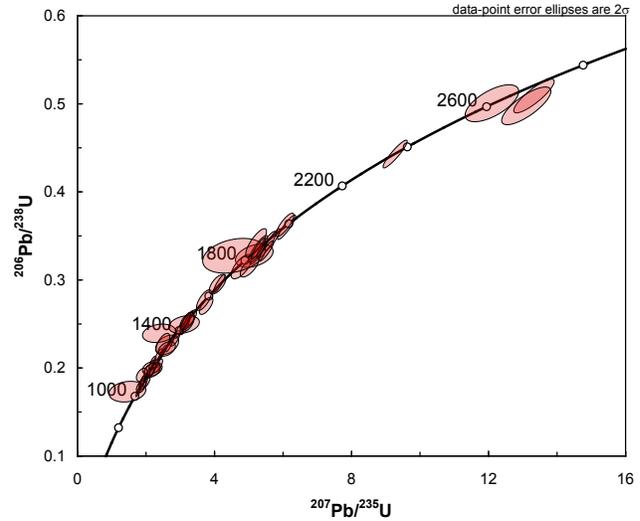
Figure 7.4 Concordia diagram illustrating all results from 10RAT-RR132A. Plotted as 95% confidence ellipses.

density diagram utilizes the Concordia age on the x-axis (Figure 7.5). The age distribution of the middle Wynniatt sample is similar to that of the underlying black shale member but with a prominent peak centred on 1.45 Ga (7 analyses) and a subordinate mode ca. 1.85 Ga. The youngest concordant zircon yields an age of 1031±20 Ma (grain #4, no replicates). Three other zircon grains also have ages within error. The MDA is better constrained by the age of the youngest detrital zircon in the underlying Fort Collinson Formation (ca. 900 Ma).

10RAT-RR132A (z10339) Wynniatt Formation
n=46/54, greater than 1% probability of concordance
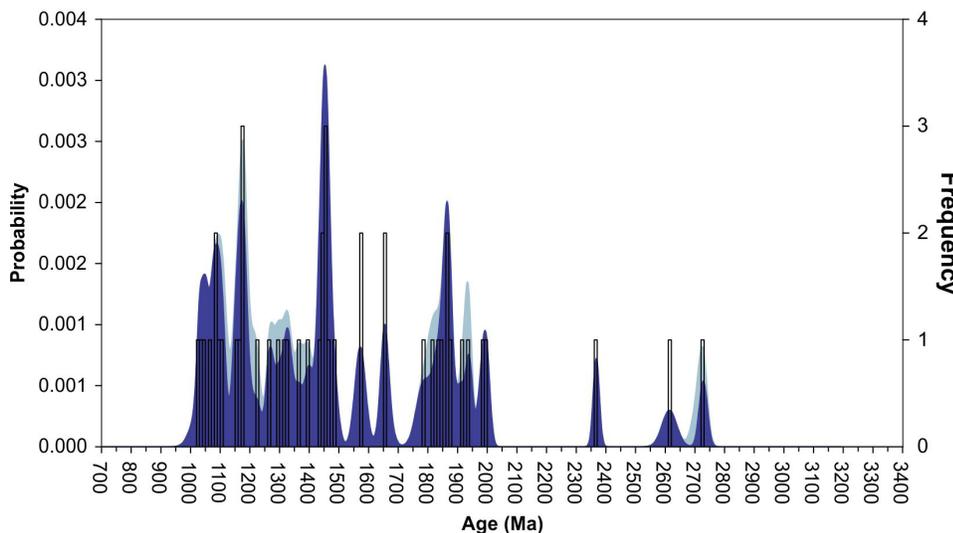
Figure 7.5 Probability density diagram and histogram for sample 10RAT-RR132A. Concordia age (Ludwig, 1998) plotted on x-axis. Results with a probability of concordance greater than 1% are shown in dark blue and in the histogram, all results regardless of probability of concordance are shown in light blue.

Table 7: Stromatolitic carbonate member (middle) Wynniatt Formation (10RAT-RR132)

| Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$^{204}Pb/^{206}Pb$	% ±	$f(206)^{204}$ %	$^{206}Pb^*$ (ppm)	$^{208*}Pb/^{206*}Pb$	% ±	$^{207*}Pb/^{235}U$	% ±	$^{206*}Pb/^{238}U$	% ±	Corr Coeff	$^{207*}Pb/^{206*}Pb$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
10339-02.1	60	31	0.53	208	9849	9.3E-5	293	0.161	12	0.151	6.6	2.6	5.2	0.227	2.00	0.382	0.084	4.8	1316	46	0.13	71.4%
10339-04.2	826	603	0.75	1120	11711	-4.8E-6	427	-0.008	123	0.238	1.7	1.8	1.6	0.174	1.44	0.909	0.074	0.7	1031	19	0.07	78.6%
10339-05.2	45	21	0.50	213	8419	-2.6E-5	1234	-0.046	13	0.145	6.2	5.2	4.4	0.328	1.65	0.376	0.114	4.1	1832	50	0.26	60.9%
10339-06.2	154	177	1.19	566	8504	1.9E-5	501	0.033	36	0.351	2.6	3.8	2.2	0.271	1.47	0.683	0.100	1.6	1573	34	5.78	1.6%
10339-07.2	319	119	0.39	343	11960	-5.1E-5	56	-0.088	68	0.117	3.2	3.1	1.6	0.247	1.40	0.880	0.092	0.8	1452	23	4.62	3.2%
10339-11.2	51	21	0.43	161	8674	9.9E-5	110	0.171	14	0.121	6.8	4.8	2.6	0.315	1.77	0.684	0.110	1.9	1780	43	0.56	45.6%
10339-13.1	151	54	0.37	259	10949	-1.8E-4	37	-0.319	26	0.121	4.9	2.4	2.2	0.203	1.56	0.720	0.084	1.5	1216	30	9.75	0.2%
10339-14.1	118	73	0.64	200	9841	1.7E-4	139	0.298	20	0.191	4.7	2.1	4.8	0.200	1.51	0.313	0.077	4.6	1175	32	0.24	62.1%
10339-15.1	169	205	1.25	151	9478	---	100	0.000	49	0.356	2.2	5.5	2.1	0.340	1.85	0.881	0.117	1.0	1910	31	0.76	38.3%
10339-16.1	169	44	0.27	185	12806	-3.3E-5	232	-0.057	34	0.097	5.0	2.8	2.2	0.234	1.57	0.716	0.088	1.5	1364	32	0.67	41.4%
10339-18.1	160	56	0.36	178	10762	---	100	0.000	49	0.119	4.1	6.1	1.7	0.360	1.58	0.904	0.123	0.7	1997	24	0.39	53.3%
10339-25.1	54	50	0.95	165	9865	8.4E-5	37	0.146	24	0.254	3.8	13.4	1.8	0.509	1.55	0.862	0.190	0.9	2728	28	6.01	1.4%
10339-28.1	222	139	0.65	189	10720	1.1E-6	4057	0.002	63	0.190	2.6	5.2	1.6	0.330	1.42	0.869	0.115	0.8	1872	25	3.59	5.8%
10339-31.1	74	26	0.37	188	8786	---	100	0.000	16	0.109	6.7	3.1	2.0	0.251	1.49	0.760	0.091	1.3	1442	30	0.09	76.7%
10339-32.1	160	94	0.61	103	9745	---	100	0.000	48	0.183	3.1	5.7	1.6	0.346	1.44	0.900	0.119	0.7	1940	22	1.16	28.1%
10339-33.1	119	42	0.37	249	9012	---	100	0.000	25	0.113	5.4	3.0	1.8	0.243	1.45	0.808	0.089	1.1	1399	27	0.06	80.0%
10339-34.1	71	106	1.53	143	8957	-8.5E-5	107	-0.147	19	0.474	3.2	5.0	2.2	0.315	1.51	0.697	0.116	1.6	1815	37	11.25	0.1%
10339-35.1	49	34	0.71	255	8919	1.5E-4	38	0.262	12	0.219	5.4	3.7	2.4	0.278	1.75	0.717	0.096	1.7	1571	39	0.32	57.2%
10339-36.1	131	39	0.31	192	8461	6.6E-5	118	0.115	29	0.088	5.6	3.3	2.1	0.257	1.45	0.690	0.093	1.5	1481	32	0.23	63.1%
10339-37.1	23	8	0.34	110	9429	-2.5E-4	32	-0.442	10	0.100	9.7	13.1	2.2	0.498	1.74	0.776	0.191	1.4	2712	40	11.73	0.1%
10339-38.1	139	30	0.22	197	12872	2.8E-5	853	0.049	24	0.066	9.0	2.2	4.7	0.199	1.60	0.338	0.080	4.5	1172	34	0.16	69.4%
10339-39.1	185	98	0.54	426	9050	2.7E-4	40	0.465	47	0.151	5.0	4.1	2.5	0.295	1.57	0.637	0.100	1.9	1657	38	0.82	36.6%
10339-40.1	559	0	0.00	160	14603	3.7E-5	29	0.065	85	-0.001	61.9	1.8	1.6	0.176	1.40	0.872	0.074	0.8	1049	21	0.21	64.3%
10339-41.1	540	120	0.23	393	15715	-5.7E-5	1	-0.100	101	0.076	5.0	2.5	1.7	0.219	1.44	0.866	0.083	0.8	1266	23	0.54	46.3%
10339-42.1	59	30	0.52	235	8984	2.0E-3	26	3.458	17	0.139	7.4	4.6	8.2	0.328	2.46	0.301	0.101	7.8	1811	75	1.67	19.6%
10339-44.1	201	178	0.92	383	9073	1.2E-4	22	0.212	58	0.273	3.8	5.3	2.2	0.335	1.84	0.850	0.114	1.1	1865	34	0.00	98.8%
10339-51.1	99	71	0.73	65	9583	2.2E-4	25	0.381	43	0.199	6.0	12.1	2.6	0.501	1.70	0.643	0.176	2.0	2614	50	0.02	89.4%
10339-52.1	38	15	0.40	130	8737	2.0E-3	28	3.549	6	0.081	13.6	1.4	15.1	0.174	2.72	0.180	0.060	14.8	1027	51	2.14	14.4%
10339-53.1	71	28	0.41	133	9010	7.5E-4	24	1.294	12	0.123	11.4	2.2	4.6	0.198	1.69	0.371	0.080	4.2	1167	35	0.05	82.3%
10339-54.1	332	160	0.50	1136	7689	-8.6E-5	43	-0.148	57	0.166	3.6	2.2	1.8	0.198	1.42	0.794	0.080	1.1	1179	25	1.92	16.6%
10339-55.1	58	27	0.49	341	7970	2.7E-4	38	0.469	10	0.148	8.6	1.9	3.5	0.193	1.59	0.459	0.071	3.1	1121	31	8.90	0.3%
10339-56.1	85	19	0.24	203	8319	8.7E-5	76	0.151	19	0.064	12.7	3.2	2.6	0.253	1.56	0.591	0.092	2.1	1458	36	0.03	86.9%
10339-59.1	283	127	0.46	213	10512	7.4E-5	30	0.128	72	0.128	3.5	4.1	1.6	0.296	1.42	0.881	0.101	0.8	1654	24	1.29	25.6%
10339-60.1	296	55	0.19	139	12307	---	100	0.000	48	0.065	6.1	1.9	2.0	0.188	1.42	0.702	0.075	1.4	1100	26	2.48	11.6%
10339-61.1	268	105	0.41	73	10479	-3.0E-5	75	-0.051	77	0.120	3.9	5.5	1.6	0.333	1.43	0.887	0.120	0.7	1931	23	14.99	0.0%
10339-62.1	241	84	0.36	198	11223	4.6E-5	32	0.080	70	0.094	7.2	5.3	1.6	0.336	1.45	0.894	0.114	0.7	1864	23	0.04	83.4%
10339-63.1	88	36	0.43	219	8915	-1.6E-4	37	-0.279	19	0.146	6.9	3.2	2.3	0.251	1.53	0.672	0.093	1.7	1458	34	1.95	16.3%
10339-65.1	143	55	0.39	328	8557	2.2E-4	158	0.384	31	0.104	6.5	3.1	5.8	0.250	1.64	0.282	0.090	5.6	1438	42	0.01	93.3%
10339-67.1	123	56	0.47	444	9046	---	100	0.000	22	0.161	6.1	2.3	2.7	0.211	2.23	0.830	0.080	1.5	1220	38	0.62	43.0%
10339-69.1	255	83	0.33	286	11672	7.9E-5	48	0.137	40	0.096	6.0	1.9	2.6	0.183	1.61	0.625	0.076	2.0	1085	30	0.02	87.5%
10339-70.1	309	172	0.57	181	11124	7.7E-5	33	0.134	118	0.161	2.9	9.3	1.6	0.443	1.43	0.918	0.152	0.6	2368	20	0.01	92.2%
10339-71.1	617	309	0.52	997	10023	3.5E-5	59	0.062	136	0.156	2.7	3.2	1.6	0.257	1.41	0.894	0.091	0.7	1461	22	0.62	42.9%
10339-73.1	52	33	0.66	318	8831	1.1E-3	34	1.896	11	0.190	7.7	2.4	8.4	0.240	1.79	0.212	0.072	8.2	1373	44	7.11	0.8%
10339-74.1	185	157	0.88	159	10326	1.2E-4	39	0.207	58	0.275	3.1	6.1	1.8	0.363	1.48	0.823	0.121	1.0	1982	30	0.47	49.3%
10339-75.1	221	64	0.30	203	11483	1.2E-4	31	0.200	37	0.081	7.2	2.1	2.1	0.196	1.46	0.706	0.078	1.5	1152	27	0.00	94.8%
10339-77.1	257	47	0.19	262	11139	8.2E-5	31	0.142	46	0.060	7.1	2.2	1.9	0.206	1.46	0.766	0.077	1.2	1181	26	9.52	0.2%
10339-78.1	101	58	0.59	129	9777	2.2E-4	23	0.387	30	0.164	5.5	5.2	2.4	0.343	1.89	0.802	0.111	1.4	1845	39	4.95	2.6%
10339-79.1	304	93	0.32	209	11145	-6.9E-5	85	-0.120	48	0.087	6.0	2.0	2.1	0.185	1.44	0.694	0.079	1.5	1108	26	5.69	1.7%

Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$^{204}Pb/^{206}Pb$	% ±	$f(206)^{204}$ %	$^{206}Pb^*$ (ppm)	$^{208*}Pb/^{206*}Pb$	% ±	$^{207*}Pb/^{235}U$	% ±	$^{206*}Pb/^{238}U$	% ±	Corr Coeff	$^{207*}Pb/^{206*}Pb$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
10339-80.1	78	38	0.51	285	9712	3.1E-4	24	0.531	12	0.152	8.5	1.9	3.1	0.179	1.59	0.514	0.075	2.7	1064	30	0.00	99.2%
10339-82.1	428	203	0.49	437	11649	2.1E-4	25	0.363	68	0.150	3.2	1.9	1.9	0.185	1.42	0.737	0.074	1.3	1080	25	3.23	7.3%
10339-84.1	61	31	0.52	303	8779	3.8E-4	23	0.656	12	0.163	7.3	2.5	3.2	0.229	2.03	0.629	0.079	2.5	1293	43	7.93	0.5%
10339-85.1	189	81	0.44	303	10600	---	100	0.000	41	0.136	7.1	3.2	1.9	0.254	1.57	0.847	0.090	1.0	1442	28	1.16	28.1%
10339-87.1	287	142	0.51	397	10826	---	100	0.000	56	0.155	3.5	2.7	1.8	0.228	1.64	0.892	0.086	0.8	1329	25	0.07	79.2%
10339-89.1	96	31	0.33	228	7882	1.0E-4	188	0.18	18	0.110	7.1	2.6	3.8	0.22	1.5	0.40	0.085	3.50	1295	35	0.08	77.1%

Notes:

Spot name follows the convention x-y.z; where x = sample number, y = grain number and z = spot number. Multiple analyses in an individual spot are labelled as x-y.z.z

$f206^{204}$ refers to mole percent of total 206Pb that is due to common Pb, calculated using the 204Pb-method; common Pb composition used is the surface blank (4/6: 0.05770; 7/6: 0.89500; 8/6: 2.13840)

* refers to radiogenic Pb (corrected for common Pb)

Errors are reported at 1σ uncertainty level unless otherwise noted

Analytical details: 25μm spot size, 4nA primary beam intensity, 6 scans

8. Wynniatt Formation, upper carbonate member, quartz arenite, Shaler Supergroup, Minto Inlier

Sample number:	10RAT-RR247A
GSC Laboratory number:	10338
Geographic location:	Victoria Island, Wynniatt Bay, NWT 71° 22' 40.9"N 115°9'40.0"W, NAD83
Collection History:	Sampled in 2010 by Rob Rainbird
Lithology:	quartz arenite
Mount ID:	IP582
U-Pb standard and reproducibility:	6266, 1.0% (1σ)
External error in U-Pb:	0.2% (1σ)
207Pb/206Pb Standard:	1242 (2679.6±0.2Ma, 95% confidence)
Measured value (±95% confidence):	2677±4 Ma
IMF correction applied?	No
Interpreted Age:	1106±40 Ma
Interpretation:	Maximum age of deposition

Sample description

The sample was collected below a small waterfall on a creek section in the western Minto Inlier, south of Minto Inlet. The rock is a white to tan, small-scale crossbedded quartz arenite from a 2m-thick quartz sandy interval in an otherwise carbonate-rich section (Figure 8.1).

Petrographic Description: moderately well to well-sorted, subrounded (0.3) to well rounded (0.7) coarse sand with interstitial, fine sand grains (bi-modal) (Figure 8.2). Framework (88%) is composed of quartz (80%), carbonate (15%), feldspar, chert (5%) and cement (12%) is composed of quartz (50%) and carbonate (50%) including fine and coarse sparry calcite, which

Figure 8.1 Thinly bedded quartz arenite interval in the upper carbonate member (Wynniatt Formation) from which sample 10RAT-RR247A was collected. Hammer is approximately 30cm long.

Figure 8.2 Plane light photomicrograph of upper Wynniatt formation. Field of view 3.5mm.

is partly replaced by coarse dolomite rhombs.

Zircon description

Zircon grains were hand picked from the NONMAG @ MAX Amp, 10°ss fraction. Abundant, large, well rounded, colourless to pale brown/pink grains were recovered (Figure 8.3). Fractures with iron oxide staining and inclusions are common.
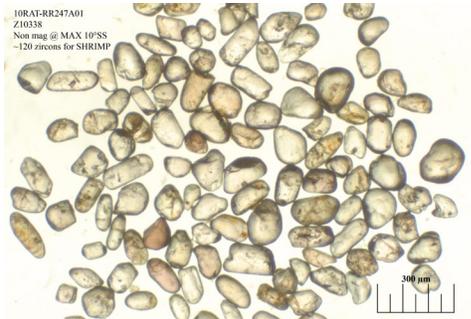
Figure 8.3 Transmitted light photograph of zircon population. Scale bar at lower right is 300µm

U-Pb results and interpretation

A total of 62 separate zircon grains were analyzed, with no replicates. The results are presented in Table 8. All data are plotted on the Concordia diagram (Figure 8.4). The probability density diagram utilizes the Concordia age on the x-axis (Figure 8.5). The detrital zircon profile shifts distinctly from that of the sandstone of the underlying stromatolitic
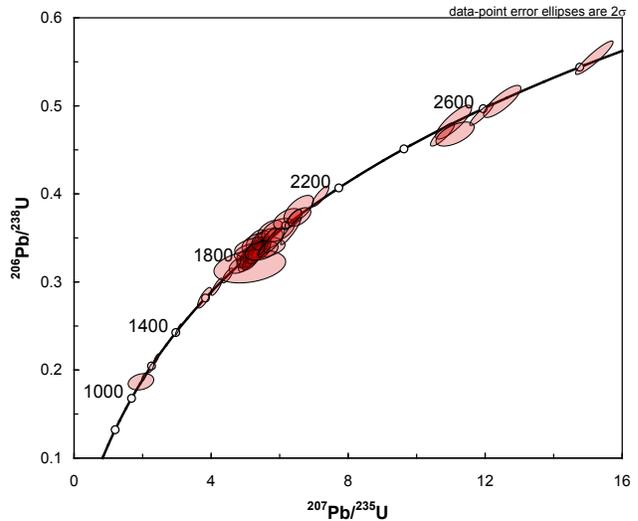
Figure 8.4 Concordia diagram illustrating all results from 10RAT-RR247A. Plotted as 95% confidence ellipses.

carbonate member. A prominent maxima at 1.85 Ga is inferred to be sourced from the Great Bear Magmatic zone to the south. There is a minor 1.0-1.5 Ga component but there are no obvious morphological differences between the older and younger populations as all are strongly abraded. No replicate analyses were conducted. The youngest detrital zircon (grain #45) yields an age of 1106±40 Ma. Only one other zircon grain overlaps within error with this age (grain #49). The MDA is better constrained by the age of the youngest detrital zircon in the underlying Fort Collinson Formation (ca. 900 Ma).

Figure 8.5 Probability density diagram and histogram for sample 10RAT-RR247A. Concordia age (Ludwig, 1998) plotted on x-axis. Results with a probability of concordance greater than 1% are shown in dark blue and in the histogram, all results regardless of probability of concordance are shown in light blue.

Table 8: Upper carbonate member (upper) Wynniatt Formation (10RAT-RR247A)

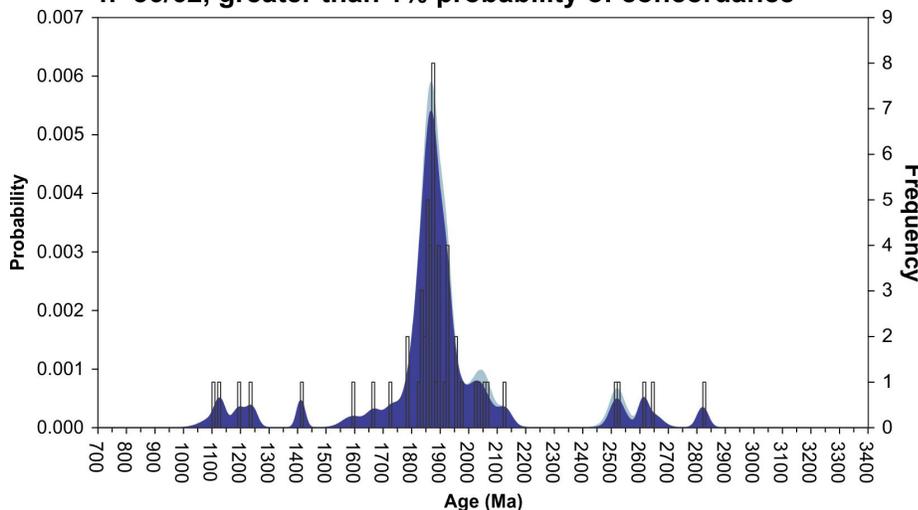| Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$\frac{^{204}Pb}{^{206}Pb}$	% ±	$\frac{f(206)^{204}}{\%}$	$^{206}Pb^*$ (ppm)	$\frac{^{208^*}Pb}{^{206}Pb}$	% ±	$\frac{^{207^*}Pb}{^{235}U}$	% ±	$\frac{^{206^*}Pb}{^{238}U}$	% ±	Corr Coeff	$\frac{^{207^*}Pb}{^{206}Pb}$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
10338-45.1	44	29	0.69	274	8007	7.4E-4	53	1.29	7	0.181	6.2	1.9	8.0	0.19	2.0	0.25	0.075	7.7	1106	40	0.037	84.7%
10338-49.1	581	266	0.47	653	11042	1.3E-4	20	0.23	96	0.142	2.0	2.0	1.3	0.19	1.0	0.79	0.076	0.8	1127	18	2.141	14.3%
10338-51.1	139	40	0.29	243	10685	2.5E-4	14	0.43	24	0.092	4.9	2.2	1.5	0.20	1.1	0.72	0.080	1.0	1195	20	0.468	49.4%
10338-19.1	249	131	0.54	563	9954	8.2E-5	35	0.14	46	0.169	3.0	2.4	1.3	0.21	1.0	0.80	0.081	0.8	1239	19	1.179	27.8%
10338-74.1	841	118	0.14	593	15767	5.8E-5	26	0.10	178	0.039	3.1	3.0	1.2	0.25	1.1	0.94	0.089	0.4	1411	14	0.41	52.2%
10338-60.1	124	132	1.10	405	9986	3.7E-4	21	0.64	30	0.324	2.7	3.8	2.2	0.28	1.7	0.78	0.098	1.4	1593	35	0.412	52.1%
10338-71.1	199	83	0.43	300	9223	1.9E-4	24	0.33	50	0.128	3.2	4.2	1.6	0.29	1.3	0.85	0.102	0.8	1668	25	0.011	91.6%
10338-16.1	78	54	0.72	163	9740	1.6E-4	26	0.28	20	0.237	4.0	4.5	1.5	0.31	1.1	0.78	0.106	0.9	1729	24	0.008	92.8%
10338-62.1	58	71	1.26	218	9055	6.2E-4	27	1.08	16	0.362	3.6	4.8	2.6	0.32	1.2	0.47	0.110	2.3	1790	35	0.072	78.8%
10338-7.1	53	33	0.65	102	10054	4.4E-4	24	0.76	16	0.150	5.3	5.3	2.1	0.35	1.3	0.63	0.110	1.6	1882	34	11.54	0.1%
10338-9.1	50	32	0.67	94	9987	5.5E-4	29	0.95	14	0.188	4.5	5.0	2.5	0.33	1.2	0.50	0.111	2.2	1834	35	0.359	54.9%
10338-47.1	40	26	0.67	106	9849	5.6E-4	37	0.97	12	0.172	5.6	5.3	3.1	0.34	1.3	0.43	0.112	2.8	1893	40	2.083	14.9%
10338-30.1	54	39	0.74	121	9536	4.6E-4	29	0.79	15	0.229	4.0	5.0	2.2	0.33	1.2	0.54	0.112	1.8	1821	33	0.225	63.5%
10338-20.1	105	69	0.68	266	9294	3.2E-4	25	0.56	30	0.193	3.1	5.2	1.7	0.34	1.2	0.72	0.113	1.2	1855	28	0.862	35.3%
10338-64.1	72	55	0.80	129	9778	3.0E-4	105	0.51	21	0.239	3.8	5.2	4.0	0.33	1.3	0.31	0.113	3.8	1856	39	0.031	86.0%
10338-8.1	44	35	0.82	105	9971	4.7E-4	31	0.82	13	0.221	4.4	5.2	2.5	0.33	1.5	0.60	0.113	2.0	1846	40	1E-04	99.2%
10338-13.1	66	57	0.90	202	9366	2.9E-4	26	0.50	19	0.250	3.5	5.1	1.7	0.33	1.2	0.71	0.113	1.2	1843	29	0.281	59.6%
10338-54.1	86	64	0.77	121	9696	4.0E-4	26	0.70	24	0.243	3.4	5.1	2.3	0.33	1.7	0.76	0.113	1.5	1835	39	0.825	36.4%
10338-10.1	53	38	0.73	121	9823	2.8E-4	37	0.49	16	0.216	4.2	5.4	2.4	0.34	1.8	0.77	0.114	1.5	1877	40	0.934	33.4%
10338-25.1	143	94	0.68	168	11187	1.9E-4	28	0.32	41	0.197	2.7	5.2	1.5	0.33	1.3	0.84	0.114	0.8	1853	24	0.733	39.2%
10338-59.1	148	129	0.90	260	9772	2.0E-4	39	0.34	42	0.269	2.5	5.2	2.0	0.33	1.7	0.83	0.114	1.1	1855	33	0.429	51.3%
10338-22.1	110	100	0.94	193	9860	9.4E-5	21	0.16	32	0.270	2.7	5.3	1.3	0.34	1.1	0.86	0.114	0.6	1871	20	1.01	31.5%
10338-40.1	80	72	0.94	176	9748	1.2E-4	132	0.20	23	0.282	3.0	5.3	2.6	0.34	1.7	0.64	0.114	2.0	1868	43	0.014	90.6%
10338-83.1	59	53	0.92	169	9292	5.6E-4	26	0.98	17	0.267	3.7	5.1	2.4	0.33	1.4	0.57	0.114	2.0	1835	38	1.072	30.0%
10338-29.1	166	126	0.78	226	9722	9.8E-5	24	0.17	48	0.233	2.2	5.3	1.2	0.34	1.1	0.89	0.114	0.5	1870	17	0.082	77.4%
10338-34.1	49	30	0.63	105	9866	2.2E-4	60	0.38	14	0.221	4.5	5.3	2.2	0.34	1.2	0.56	0.114	1.8	1875	34	0.039	84.4%
10338-33.1	123	107	0.90	251	9508	3.9E-5	187	0.07	35	0.289	2.5	5.3	1.5	0.34	1.1	0.73	0.114	1.0	1867	26	0.07	79.2%
10338-39.1	131	148	1.17	331	9480	3.4E-5	299	0.06	38	0.347	2.1	5.3	1.7	0.34	1.1	0.65	0.115	1.3	1870	29	0.145	70.3%
10338-41.1	195	115	0.61	185	12363	4.0E-5	67	0.07	55	0.190	2.5	5.2	1.3	0.33	1.1	0.88	0.115	0.6	1871	19	4.731	3.0%
10338-44.1	132	84	0.66	186	11402	9.7E-5	26	0.17	37	0.209	2.9	5.2	1.5	0.32	1.3	0.89	0.115	0.7	1865	21	10.25	0.1%
10338-61.1	117	88	0.78	181	9718	2.7E-4	28	0.47	33	0.228	3.0	5.2	1.6	0.33	1.1	0.71	0.115	1.1	1850	27	5.59	1.8%
10338-52.1	312	76	0.25	69	11983	1.5E-4	34	0.26	92	0.072	3.0	5.5	1.3	0.34	1.0	0.82	0.116	0.7	1892	21	0.198	65.6%
10338-11.1	96	84	0.90	141	9192	6.5E-5	179	0.11	28	0.276	3.0	5.3	2.0	0.33	1.3	0.67	0.116	1.5	1866	34	1.146	28.4%
10338-57.1	48	35	0.76	151	9561	2.0E-4	37	0.34	13	0.228	4.6	5.2	1.8	0.32	1.2	0.67	0.116	1.4	1836	31	7.456	0.6%
10338-76.1	48	35	0.75	118	9327	4.9E-4	34	0.85	15	0.201	4.7	5.7	2.6	0.36	1.3	0.51	0.116	2.2	1957	38	3.86	4.9%
10338-6.1	55	39	0.72	117	9611	2.0E-4	230	0.34	16	0.224	4.1	5.4	5.5	0.34	1.5	0.26	0.116	5.3	1885	46	0.017	89.5%
10338-46.1	44	32	0.75	125	9285	2.8E-4	21	0.48	13	0.211	4.8	5.4	1.8	0.34	1.3	0.72	0.116	1.3	1890	31	0.268	60.5%
10338-48.1	83	66	0.82	182	9786	8.2E-5	66	0.14	24	0.256	3.1	5.4	1.9	0.34	1.6	0.86	0.117	1.0	1896	29	0.859	35.4%
10338-77.1	71	54	0.79	122	9782	2.4E-4	43	0.41	20	0.231	3.5	5.3	2.0	0.33	1.4	0.70	0.117	1.4	1873	34	2.807	9.4%
10338-73.1	48	34	0.74	118	9480	3.5E-4	43	0.61	14	0.230	5.1	5.4	2.5	0.34	1.3	0.51	0.117	2.1	1874	37	1.077	29.9%
10338-58.1	38	24	0.65	95	9676	6.5E-4	102	1.13	10	0.194	6.3	5.1	8.3	0.32	2.4	0.29	0.117	8.0	1786	73	0.766	38.1%
10338-75.1	42	30	0.74	96	10045	8.0E-4	30	1.39	13	0.249	4.8	5.6	3.3	0.35	1.4	0.43	0.117	3.0	1928	44	0.078	77.9%
10338-43.1	153	89	0.60	162	11055	1.3E-4	49	0.22	46	0.183	2.6	5.7	1.4	0.35	1.1	0.77	0.117	0.9	1926	24	1.104	29.3%
10338-5.1	125	69	0.57	140	10633	1.7E-4	29	0.30	38	0.171	3.0	5.7	1.3	0.35	1.1	0.82	0.117	0.8	1928	22	1.889	16.9%
10338-56.1	312	65	0.21	63	11984	5.6E-5	42	0.10	91	0.062	3.7	5.5	1.2	0.34	1.1	0.90	0.118	0.5	1912	17	3.303	6.9%
10338-23.1	38	27	0.72	115	9507	2.1E-5	1319	0.04	11	0.209	5.2	5.5	3.6	0.34	1.3	0.36	0.118	3.4	1875	41	0.851	35.6%
10338-63.1	389	69	0.18	47	11951	3.9E-5	79	0.07	114	0.059	3.4	5.6	1.2	0.34	1.0	0.89	0.119	0.5	1923	17	6.287	1.2%
10338-3.1	161	152	0.97	268	11148	2.5E-4	21	0.44	47	0.267	2.1	5.6	1.3	0.34	1.1	0.81	0.119	0.8	1920	22	10.85	0.1%
10338-67.1	51	24	0.49	162	8631	8.7E-4	27	1.51	16	0.116	6.0	6.0	3.3	0.36	1.5	0.47	0.120	2.9	1975	47	0.1	75.2%

Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$^{204}Pb/^{206}Pb$	% ±	f(206)^{204} %	$^{206}Pb^*$ (ppm)	$^{208*}Pb/^{206*}Pb$	% ±	$^{207*}Pb/^{235}U$	% ±	$^{206*}Pb/^{238}U$	% ±	Corr Coeff	$^{207*}Pb/^{206*}Pb$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
10338-27.1	68	90	1.37	168	9266	1.2E-4	75	0.21	20	0.410	2.8	5.8	2.2	0.35	1.7	0.78	0.122	1.3	1959	37	2.306	12.9%
10338-31.1	40	30	0.77	173	7858	7.3E-4	27	1.27	13	0.218	4.6	6.2	2.7	0.37	1.3	0.47	0.122	2.4	2026	39	1.295	25.5%
10338-80.1	52	40	0.80	306	8376	6.0E-4	29	1.05	17	0.210	6.7	6.6	2.7	0.38	1.7	0.63	0.124	2.1	2062	46	2.132	14.4%
10338-28.1	109	47	0.44	201	9791	3.0E-4	25	0.53	35	0.127	3.4	6.4	1.6	0.37	1.2	0.78	0.125	1.0	2031	27	0.288	59.2%
10338-68.1	92	59	0.66	316	7857	2.2E-4	68	0.39	30	0.198	3.6	6.6	2.1	0.37	1.1	0.55	0.128	1.7	2053	34	0.169	68.1%
10338-79.1	84	46	0.57	176	8862	3.0E-5	89	0.05	26	0.170	3.8	6.3	1.9	0.36	1.8	0.92	0.128	0.8	2057	24	9.252	0.2%
10338-15.1	124	58	0.48	273	9736	1.6E-4	31	0.27	42	0.144	3.3	7.2	1.4	0.40	1.2	0.83	0.131	0.8	2128	24	2.535	11.1%
10338-1.1	109	52	0.50	148	9784	1.1E-4	117	0.19	45	0.141	3.2	11.1	2.0	0.48	1.6	0.83	0.167	1.1	2530	33	0.028	86.7%
10338-53.1	89	3	0.03	82	12225	1.9E-4	30	0.34	36	0.010	9.9	10.8	1.3	0.47	1.1	0.85	0.167	0.7	2518	21	4.571	3.3%
10338-26.1	63	38	0.63	204	8605	1.3E-4	171	0.22	26	0.169	3.7	11.1	2.0	0.47	1.2	0.59	0.173	1.7	2521	37	8.527	0.3%
10338-81.1	154	45	0.30	268	11645	9.6E-5	47	0.17	65	0.081	3.2	11.9	1.2	0.49	1.1	0.90	0.176	0.5	2612	16	3.277	7.0%
10338-32.1	56	36	0.66	66	10463	4.1E-4	30	0.71	24	0.175	3.5	12.5	1.8	0.51	1.5	0.82	0.180	1.0	2647	30	0.149	70.0%
10338-35.1	53	22	0.43	142	7494	1.8E-4	22	0.31	25	0.129	4.0	15.2	1.5	0.55	1.4	0.93	0.199	0.56	2820	19	0.65	42.0%

Notes:

Spot name follows the convention x-y.z; where x = sample number, y = grain number and z = spot number. Multiple analyses in an individual spot are labelled as x-y.z.z

f206^{204} refers to mole percent of total 206Pb that is due to common Pb, calculated using the 204Pb-method; common Pb composition used is the surface blank (4/6: 0.05770; 7/6: 0.89500; 8/6: 2.13840)

* refers to radiogenic Pb (corrected for common Pb)

Errors are reported at 1σ uncertainty level unless otherwise noted

Analytical details: 25µm spot size, 5nA primary beam intensity, 6 scans

9. Kilian Formation, lithic wacke, Shaler Supergroup, Minto Inlier

Sample number:	11RAT-RR99A
GSC Laboratory number:	10611
Geographic location:	Victoria Island, Minto Inlet, NWT 71° 15' 18.2"N 115°18'48.7"W, NAD83
Collection History:	Sampled in 2011 by Rob Rainbird
Lithology:	lithic wacke
Mount ID:	IP628
U-Pb standard and reproducibility:	6266, 1.0% (1σ)
External error in U-Pb:	0.2% (1σ)
207Pb/206Pb Standard:	1242 (2679.6±0.2Ma, 95% confidence)
Measured value (±95% confidence):	2679±3 Ma
IMF correction applied?	No
Interpreted Age:	795±10 Ma
Interpretation:	Maximum age of deposition

Sample description

A section of the clastic-carbonate member of the middle Kilian Formation (Rainbird, 1993), approximately 10 km north of the Kuujjua River in the western Minto Inlier contains a 60 cm thick layer of massive, pinkish-green litharenite interpreted as a reworked volcanic/epiclastic debris flow (Figure 9.1). A geochronology sample was collected from this very unusual clastic rock.

Petrographic description: contains large irregular clots and wispy, irregular and brecciated laminae of K-feldspar with accesory Fe-Ti oxide, set in a matrix of green, very fine-grained, quartzose sandstone and siltstone. Figure 9.2a,b

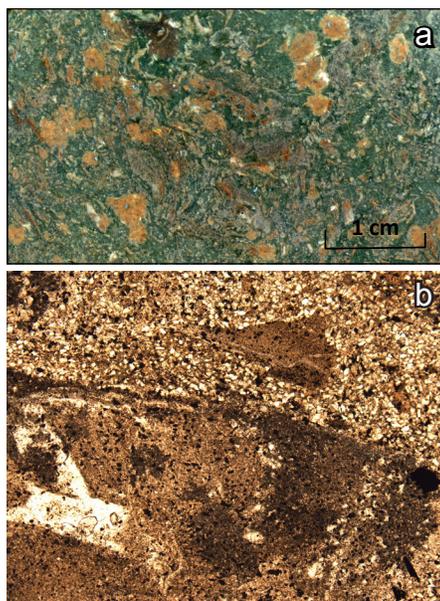Figure 9.1 Field photograph of Kilian Formation lithic tuff 11 RAT-RR99. Hammer is approximately 25cm long.

Figure 9.2a Polished slab of sample 11RAT-RR99 showing distict pink clotted texture.
Figure 9.2b Plane light photomicrograph of 11RAT-RR99. Field of view is 3.5mm.

Zircon description

Abundant, good quality, small, prismatic zircon was recovered and hand picked from the NONMAG @ MAX 10°ss fraction (Figure 9.3). While many grains are well rounded, a number of them preserve facets. The zircon grains vary from primarily clear and colourless, to pale yellow.
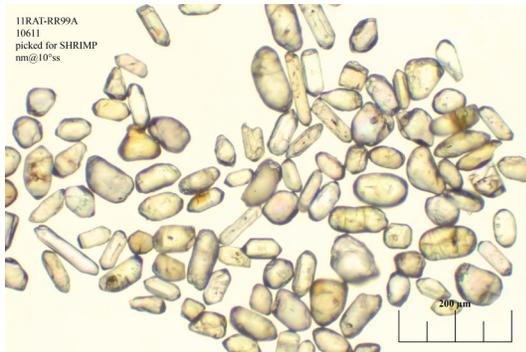

11RAT-RR99A
10611
picked for SHRIMP
nm@10°ss

200 µm

Figure 9.3 Transmitted light photograph of zircon population.

U-Pb results and interpretation

A total of 65 analyses were conducted on 61 separate grains. The results are presented in Table 9.1. All data are plotted on the Concordia diagram (Figure 9.4), with a detail of the youngest analyses presented in Figure 9.5. Replicate analyses are indicated by ellipses other than red. The probability density diagram utilizes the Concordia age on the x-axis (Figure 9.7). The detrital zircon population of this lithologically distinct sample is also unique. The majority of the zircon results fall into clusters at 800 (n=11), 900 (n=8) and 950 Ma (n=8) while older zircon grains ranging in age from 1080 Ma to 3040 Ma are mostly only represented by single analyses. The weighted mean concordia age of the single youngest detrital zircon is 795±10 Ma, and is the most conservative estimate for the maximum age of deposition of the litharenite. However, an age of 800 Ma is unusual in this part of the western Arctic and all zircons of this age could be reasonably assumed to come from a single source. If we take a weighted mean concordia

data-point error ellipses are 2σ
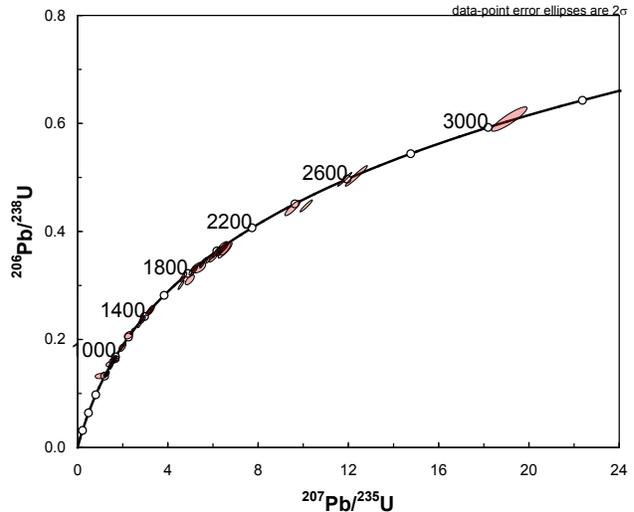
Figure 9.4 Concordia diagram illustrating all results from 11RAT-RR99. Plotted as 95% confidence ellipses. Colours other than red indicate replicate analyses on individual grains.

data-point error ellipses are 2σ

Weighted mean age of grain 49 (light blue)
795±10 Ma
n=2
MSWD = 0.59, probability = 0.44

Weighted mean age of population of young zircons
801±6 Ma
n=15, no rejects
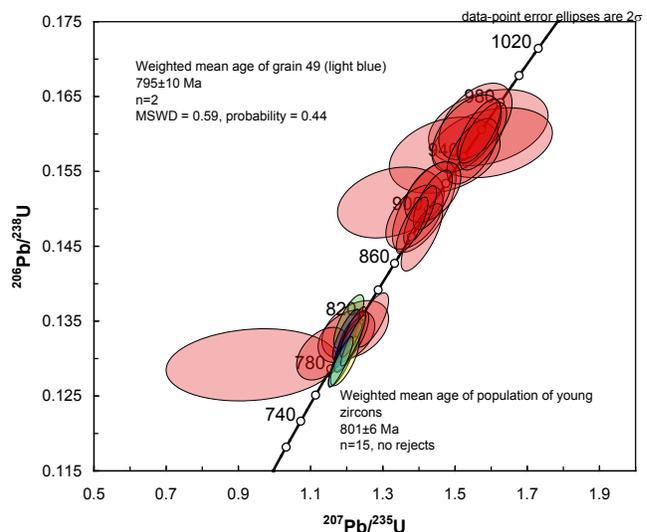
Figure 9.5 Detail of Concordia illustrating youngest results. Colours other than red indicate replicate analyses.
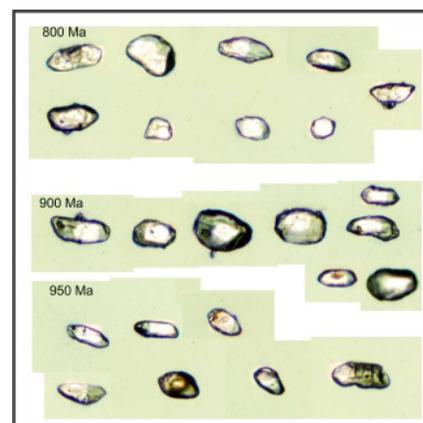
Figure 9.6 Transmitted light images of zircon grains recording ages of 800, 900 and 950 Ma. See text for discussion.

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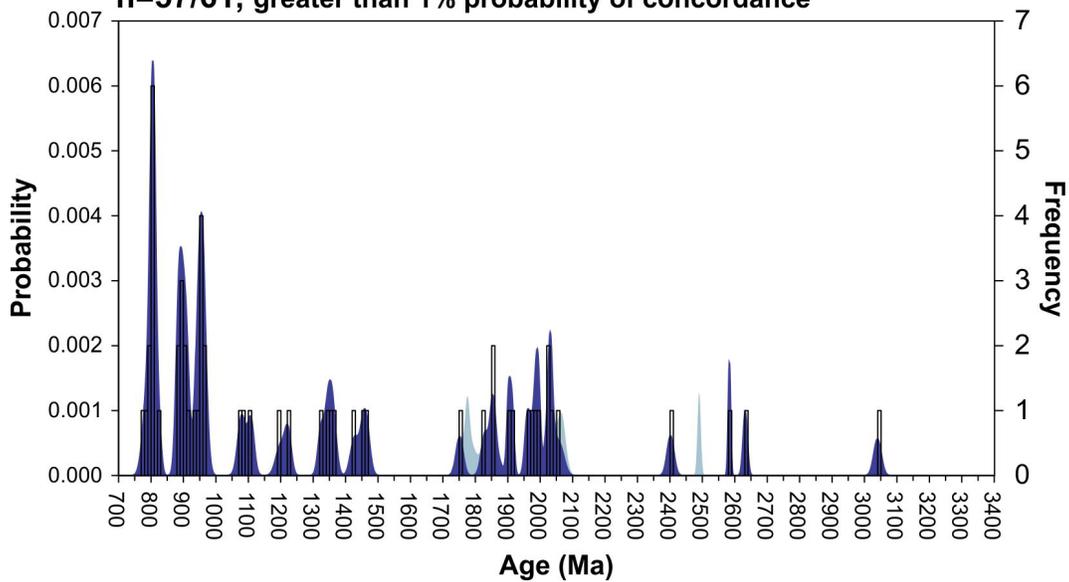
Figure 9.6 Probability density diagram and histogram for sample 11RAT-RR99. Concordia age (Ludwig, 1998) plotted on x-axis. Results with a probability of concordance greater than 1% are shown in dark blue and in the histogram, all results regardless of probability of concordance are shown in light blue. Replicates are not included.

age of the entire population of young zircons (n=15 analyses of 11 grains) we get an age of 801±6 Ma.

Zircon grains yielding ages of 900 and 950 Ma are not materially different in morphology, degree of roundedness or chemistry (U, Th, Yb, and Hf) than the 800 Ma zircon grains (Figure 9.6). The source of these three populations of young zircons remains enigmatic. The preservation of facets in the ca. 950 Ma zircon is inconsistent with long distance travel from the eastern Grenville province. Ages of 900 and 800 Ma have been reported from age-equivalent strata in northern Mongolia and southern Siberia (Demonterova et al., 2011, Kuzmichev et al. 2005, 2001).

Table 9: Kilian Formation (11RAT-RR99)

Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$^{204}Pb/^{206}Pb$	% ±	$f(206)^{204}$ %	$^{206}Pb^*$ (ppm)	$^{208^*}Pb/^{206^*}Pb$	% ±	$^{207^*}Pb/^{235}U$	% ±	$^{206^*}Pb/^{238}U$	% ±	Corr Coeff	$^{207^*}Pb/^{206^*}Pb$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
10611-27.1	276	127	0.48	263	9357	3.6E-5	297	0.06	32	0.147	3.5	1.2	2.7	0.133	1.09	0.40	0.065	2.5	803	16	0.2	68.9%
10611-29.1	36	40	1.14	258	7549	1.1E-3	31	1.98	4	0.340	6.0	0.9	10.5	0.129	1.54	0.15	0.052	10.4	779	23	5.6	1.8%
10611-30.1	132	154	1.21	474	9496	-2.3E-5	527	-0.04	15	0.381	3.1	1.2	3.1	0.134	1.20	0.39	0.066	2.9	809	18	0.0	94.9%
10611-43.1	302	166	0.57	275	10299	5.5E-5	53	0.09	34	0.174	3.1	1.2	1.5	0.133	1.07	0.72	0.066	1.0	805	15	0.2	62.2%
10611-49.1	366	105	0.30	122	10754	3.7E-5	28	0.06	41	0.088	3.8	1.2	1.3	0.131	1.05	0.81	0.066	0.8	799	14	1.3	26.2%
10611-49.2	501	169	0.35	176	10247	2.1E-5	46	0.04	56	0.112	2.6	1.2	1.2	0.129	1.07	0.88	0.066	0.6	792	13	3.3	6.9%
10611-5.1	196	177	0.93	384	9410	-2.2E-5	90	-0.04	23	0.300	2.8	1.3	1.5	0.135	1.10	0.73	0.068	1.0	823	16	5.1	2.4%
10611-55.1	437	231	0.55	454	11146	1.6E-4	17	0.28	51	0.171	2.6	1.2	1.4	0.135	1.09	0.76	0.065	0.9	807	15	5.5	1.9%
10611-55.2	254	136	0.55	270	10729	1.5E-5	1	0.03	28	0.182	2.8	1.2	1.3	0.130	1.10	0.83	0.066	0.7	792	14	3.0	8.6%
10611-59.1	501	113	0.23	227	10454	4.6E-5	62	0.08	56	0.073	3.7	1.2	1.4	0.129	1.04	0.76	0.067	0.9	791	14	4.9	2.7%
10611-59.2	705	180	0.26	221	10672	5.5E-6	204	0.01	80	0.083	2.4	1.2	1.2	0.132	1.05	0.91	0.067	0.5	810	13	3.8	5.1%
10611-6.1	181	198	1.12	622	8988	2.9E-4	31	0.51	20	0.343	2.7	1.1	2.6	0.130	1.11	0.42	0.063	2.4	788	16	3.3	6.9%
10611-60.1	423	480	1.17	416	8788	6.1E-5	18	0.11	48	0.373	2.6	1.2	1.3	0.133	1.05	0.82	0.065	0.7	799	14	2.7	9.9%
10611-60.2	282	299	1.10	303	9139	1.6E-5	139	0.03	32	0.346	1.9	1.2	1.4	0.132	1.11	0.79	0.066	0.9	800	15	0.5	46.5%
10611-84.1	508	154	0.31	214	10399	-6.3E-6	200	-0.01	58	0.099	3.1	1.2	1.2	0.133	1.04	0.84	0.066	0.7	807	14	0.0	96.7%
10611-46.1	397	132	0.34	262	10846	5.4E-5	41	0.09	50	0.109	3.1	1.4	1.3	0.148	1.05	0.80	0.068	0.8	882	15	2.7	9.9%
10611-39.1	169	72	0.44	212	10066	-4.8E-5	36	-0.08	21	0.127	4.8	1.4	1.7	0.146	1.27	0.76	0.070	1.1	886	19	3.0	8.3%
10611-67.1	281	128	0.47	258	11018	3.6E-5	46	0.06	36	0.153	3.1	1.4	1.4	0.149	1.07	0.79	0.068	0.8	891	16	1.4	23.3%
10611-19.1	105	106	1.04	406	10376	1.6E-4	45	0.28	13	0.323	3.5	1.4	2.3	0.149	1.17	0.50	0.067	2.0	892	19	1.0	32.6%
10611-88.1	110	91	0.86	257	9652	1.7E-4	41	0.30	14	0.260	3.8	1.4	2.6	0.150	1.66	0.65	0.068	2.0	899	26	0.4	52.5%
10611-66.1	67	58	0.90	84	8795	5.0E-4	36	0.87	9	0.250	4.8	1.3	4.6	0.151	1.28	0.28	0.063	4.4	902	21	4.1	4.3%
10611-13.1	232	166	0.74	464	9489	7.2E-5	45	0.12	30	0.221	2.9	1.4	1.5	0.151	1.08	0.71	0.069	1.1	906	17	0.2	64.4%
10611-15.1	218	124	0.59	380	10575	1.7E-5	476	0.03	28	0.188	3.1	1.4	2.2	0.152	1.09	0.50	0.068	1.9	912	18	0.6	43.7%
10611-20.1	106	60	0.59	545	11264	2.9E-4	64	0.50	14	0.180	4.4	1.5	4.3	0.157	1.33	0.31	0.068	4.1	939	23	0.9	34.9%
10611-73.1	147	59	0.42	230	9944	1.3E-4	42	0.22	20	0.118	4.9	1.5	1.9	0.158	1.14	0.61	0.071	1.5	946	19	0.3	56.4%
10611-17.1	106	78	0.76	458	10268	-1.2E-4	163	-0.21	14	0.252	3.8	1.6	4.3	0.159	1.21	0.28	0.073	4.1	951	21	0.6	42.2%
10611-69.1	101	96	0.98	321	10195	2.4E-4	36	0.41	14	0.278	3.9	1.5	2.6	0.160	1.33	0.51	0.069	2.2	954	23	1.1	30.3%
10611-97.1	110	70	0.66	177	10564	-3.4E-5	63	-0.06	15	0.211	4.2	1.6	1.7	0.160	1.17	0.68	0.072	1.2	958	19	0.4	51.7%
10611-25.1	193	122	0.65	706	11781	1.5E-4	24	0.25	27	0.202	3.1	1.6	1.6	0.160	1.09	0.70	0.071	1.1	958	18	0.1	76.8%
10611-1.1	68	63	0.95	301	8866	1.3E-4	141	0.23	9	0.296	4.0	1.6	4.3	0.161	1.31	0.30	0.072	4.1	962	23	0.0	85.5%
10611-77.1	80	39	0.50	485	11410	3.4E-4	26	0.60	11	0.150	5.6	1.6	2.7	0.162	1.30	0.49	0.070	2.3	964	23	0.9	35.0%
10611-70.1	147	51	0.36	317	10550	2.5E-4	32	0.43	23	0.106	4.7	1.9	2.1	0.183	1.14	0.53	0.074	1.8	1078	22	1.4	23.7%
10611-90.1	34	24	0.71	197	9888	---	100	0.00	5	0.224	7.2	1.9	2.7	0.184	1.80	0.67	0.076	2.0	1089	33	0.2	65.2%
10611-26.1	326	152	0.48	408	10544	6.2E-5	55	0.11	52	0.155	2.6	2.0	1.4	0.187	1.11	0.78	0.077	0.9	1109	19	0.1	73.8%
10611-85.1	51	33	0.67	150	9979	4.0E-4	40	0.70	9	0.188	5.5	2.2	3.6	0.205	1.34	0.37	0.077	3.4	1199	29	1.5	22.0%
10611-96.1	147	64	0.45	532	9182	5.3E-5	26	0.09	27	0.141	3.8	2.3	1.4	0.212	1.13	0.79	0.080	0.9	1222	20	6.1	1.4%
10611-64.1	188	106	0.58	397	11782	-2.4E-5	50	-0.04	36	0.163	3.1	2.7	1.3	0.225	1.10	0.84	0.086	0.7	1324	19	3.3	6.9%
10611-61.1	223	115	0.53	404	11865	1.1E-4	33	0.20	45	0.155	2.8	2.8	1.4	0.235	1.09	0.77	0.085	0.9	1345	21	2.8	9.5%
10611-81.1	149	132	0.91	366	10068	1.6E-4	26	0.27	30	0.232	3.1	2.8	1.6	0.235	1.24	0.75	0.086	1.1	1353	24	1.2	28.1%
10611-41.1	139	52	0.38	336	8923	-2.4E-6	1109	0.00	28	0.115	3.7	2.8	1.4	0.234	1.11	0.77	0.088	0.9	1362	22	0.9	33.5%
10611-21.1	205	63	0.32	223	11247	3.1E-5	216	0.05	44	0.096	3.5	3.1	1.6	0.248	1.09	0.68	0.090	1.2	1427	24	0.0	82.6%
10611-3.1	132	92	0.72	360	9634	5.4E-5	109	0.09	29	0.215	2.7	3.2	1.7	0.253	1.16	0.69	0.091	1.2	1455	25	0.0	92.2%
10611-58.1	106	81	0.79	290	11238	9.5E-5	20	0.16	23	0.242	3.1	3.2	1.6	0.252	1.29	0.82	0.092	0.9	1463	24	1.0	30.9%
10611-11.1	132	31	0.24	126	8144	8.9E-5	40	0.15	36	0.070	4.5	4.6	1.4	0.314	1.13	0.83	0.107	0.8	1751	22	0.5	49.1%
10611-23.1	258	2	0.01	127	10111	-4.5E-6	75	-0.01	66	0.004	14.7	4.5	1.2	0.299	1.13	0.93	0.110	0.5	1775	14	35.1	0.0%
10611-53.1	78	56	0.74	143	9795	-3.9E-5	157	-0.07	21	0.236	3.3	4.9	1.8	0.309	1.22	0.69	0.115	1.3	1791	30	26.9	0.0%
10611-18.1	137	88	0.67	245	10258	3.4E-5	138	0.06	38	0.204	2.6	5.0	1.4	0.326	1.13	0.81	0.112	0.8	1829	23	0.4	53.2%
10611-80.1	196	223	1.18	313	11920	-5.2E-6	47	-0.01	55	0.350	1.7	5.1	1.2	0.325	1.13	0.92	0.114	0.5	1854	16	6.4	1.1%

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Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	$^{204}Pb/^{206}Pb$	% ±	$f(206)^{204}$ %	$^{206}Pb*$ (ppm)	$^{208*}Pb/^{206*}Pb$	% ±	$^{207*}Pb/^{235}U$	% ±	$^{206*}Pb/^{238}U$	% ±	Corr Coeff	$^{207*}Pb/^{206}Pb$	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
10611-71.1	79	50	0.66	186	9191	-2.5E-5	671	-0.04	22	0.195	3.4	5.3	2.4	0.332	1.23	0.52	0.116	2.0	1859	35	1.3	24.6%
10611-63.1	477	6	0.01	39	13498	2.7E-5	37	0.05	140	0.003	9.7	5.5	1.1	0.342	1.05	0.95	0.117	0.3	1902	11	0.2	62.3%
10611-54.1	426	11	0.03	243	10557	3.3E-5	39	0.06	124	0.007	7.3	5.5	1.1	0.340	1.05	0.94	0.117	0.4	1913	12	3.2	7.4%
10611-92.1	185	97	0.54	97	12785	3.0E-5	44	0.05	56	0.166	2.5	5.8	1.2	0.349	1.10	0.91	0.121	0.5	1960	16	3.1	7.6%
10611-89.1	154	53	0.35	113	11427	6.3E-5	90	0.11	46	0.101	3.5	6.0	1.4	0.352	1.13	0.81	0.123	0.8	1978	23	5.7	1.7%
10611-40.1	175	84	0.49	549	11794	3.7E-5	26	0.06	54	0.146	2.5	6.1	1.2	0.361	1.10	0.91	0.122	0.5	1987	16	0.0	93.6%
10611-74.1	266	120	0.47	176	11941	7.0E-6	2	0.01	82	0.153	2.8	6.1	1.1	0.359	1.07	0.94	0.123	0.4	1994	13	1.2	27.5%
10611-38.1	126	50	0.41	348	9649	4.2E-5	221	0.07	40	0.118	3.3	6.4	1.6	0.370	1.15	0.71	0.125	1.1	2029	28	0.0	96.0%
10611-2.1	75	43	0.60	220	10028	6.1E-5	33	0.11	23	0.176	3.4	6.3	1.5	0.365	1.29	0.87	0.126	0.7	2029	22	1.8	18.1%
10611-76.1	365	249	0.70	925	8645	2.6E-5	44	0.04	116	0.202	1.5	6.4	1.2	0.369	1.10	0.95	0.125	0.4	2031	12	0.1	78.1%
10611-48.1	49	37	0.79	200	8715	1.8E-4	25	0.31	16	0.231	3.9	6.5	1.7	0.367	1.35	0.80	0.129	1.0	2060	29	5.8	1.6%
10611-94.1	80	49	0.64	154	10025	1.0E-4	33	0.18	25	0.174	3.5	6.5	1.8	0.363	1.59	0.90	0.129	0.8	2068	24	9.1	0.3%
10611-45.1	78	35	0.46	127	7557	1.0E-4	41	0.18	30	0.124	3.9	9.5	1.5	0.442	1.32	0.88	0.156	0.7	2402	21	3.0	8.3%
10611-87.1	846	257	0.31	243	12275	9.9E-6	53	0.02	325	0.090	1.4	10.1	1.1	0.447	1.05	0.95	0.164	0.3	2490	10	30.3	0.0%
10611-86.1	538	318	0.61	322	10871	1.7E-5	29	0.03	229	0.168	1.3	11.8	1.1	0.496	1.04	0.98	0.173	0.2	2583	7	0.4	50.7%
10611-47.1	205	95	0.48	103	12217	-1.4E-5	78	-0.02	88	0.141	2.2	12.3	1.6	0.502	1.56	0.97	0.178	0.4	2632	13	0.1	79.9%
10611-34.1	102	72	0.72	123	9400	1.1E-4	42	0.20	54	0.202	2.3	19.1	1.7	0.61	1.5	0.90	0.228	0.76	3040	23	0.50	47.9%

Notes:

Spot name follows the convention x-y.z; where x = sample number, y = grain number and z = spot number. Multiple analyses in an individual spot are labelled as x-y.z.z

f206^{204} refers to mole percent of total 206Pb that is due to common Pb, calculated using the 204Pb-method; common Pb composition used is the surface blank (4/6: 0.05770; 7/6: 0.89500; 8/6: 2.13840)

* refers to radiogenic Pb (corrected for common Pb)

Errors are reported at 1σ uncertainty level unless otherwise noted

Analytical details: 20µm spot size, 6nA primary beam intensity, 5 scans

10. Kilian Formation, quartz arenite, Shaler Supergroup, Minto Inlier

Sample number:	11RAT-RR100A
GSC Laboratory number:	10636
Geographic location:	Victoria Island, Minto Inlet, NWT 71° 15' 18.2"N 115°18'48.7"W, NAD83
Collection History:	Sampled in 2011 by Rob Rainbird
Lithology:	quartz arenite
Mount ID:	IP652
U-Pb standard and reproducibility:	6266, 1.2% (1σ)
External error in U-Pb:	0.3% (1σ)
207Pb/206Pb Standard:	1242 (2679.6±0.2Ma, 95% confidence)
Measured value (±95% confidence):	2670±6 Ma1, 2683±5 Ma2
IMF correction applied?	Yes (1.0061, 0.9982)
Interpreted Age:	837±12 Ma
Interpretation:	Maximum age of deposition

Sample description

A specimen from a ~5m-thick unit of mainly parallel-stratified to wavy bedded quartz arenite (Figure 10.1) was collected from a section of the clastic-carbonate member of the middle Kilian Formation. The sample is from the same section as sample 11RAT-RR99A, approximately 5 m stratigraphically above it.

Petrographic description: A well-sorted coarse and fine grained (bi-modal) quartz arenite with rounded to well-rounded (0.5-0.7) framework (Figure 10.2). Framework (90%): quartz (96%), chert (3%) and heavy minerals (mainly opaque oxides; <1%). Cement (10%): quartz.

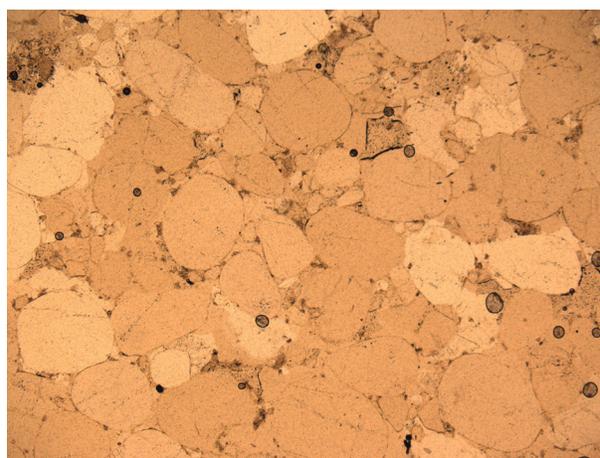Figure 10.1 Kilian Formation quartz arenite sample 11RAT-RR100. Hammer is approximately 25cm long.

Figure 10.2 Plane light photomicrograph of Kilian Formation sandstone 11RAT-RR100. Field of view 3.5mm.

Zircon description

Abundant, good quality, well-rounded zircon grains were recovered and hand picked from the NONMAG @ MAX Amps, 3°ss magnetic fraction. Well-faceted zircon grains are rare. The zircon grains vary from medium brown, to pale pink to colourless. Inclusions are common, fractures less so (Figure 10.3).

Figure 10.3 Transmitted light photograph of zircon population. Scale bar at lower right is 3.5mm

U-Pb results and interpretation

A total of 62 analyses were made on 58 individual grains. The results are presented in Table 10. All data are plotted on the Concordia diagram (Figure 10.4), with a detail of the youngest analyses presented in Figure 10.5. Replicate analyses are indicated by ellipses other than red. The probability density diagram utilizes the Concordia age on the x-axis (Figure 10.6). The detrital zircon population is dominated by 2.0-2.1 Ga zircons, for which there are few known sources in Laurentia, with a subordinate grouping at 1.9 Ga. Ten detrital zircon grains fall into the 1.2-1.6 Ga age range which are representative of the Grenville province and four grains between 2.6-2.8 Ga are typical of the more proximal Slave Province. Three zircon grains younger than 1.0 Ga have been identified and replicate analyses of the youngest grain (#32) yield a mean Concordia age of 837±12 Ma.
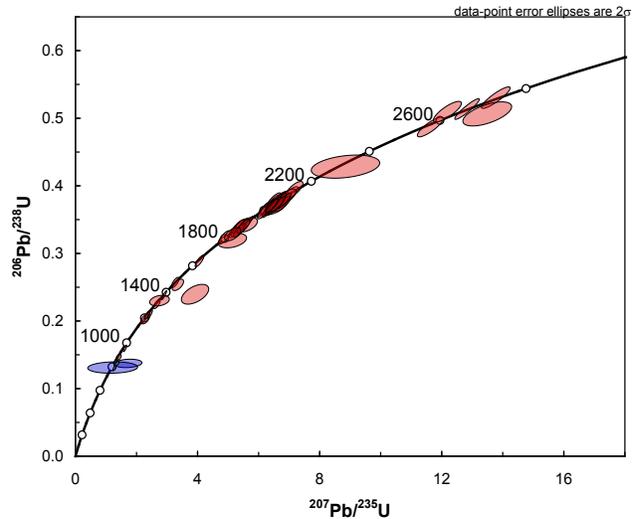
Figure 10.4 Concordia diagram illustrating all results from 11RAT-RR100. Plotted as 95% confidence ellipses. Colours other than red indicate replicate analyses on individual grains.
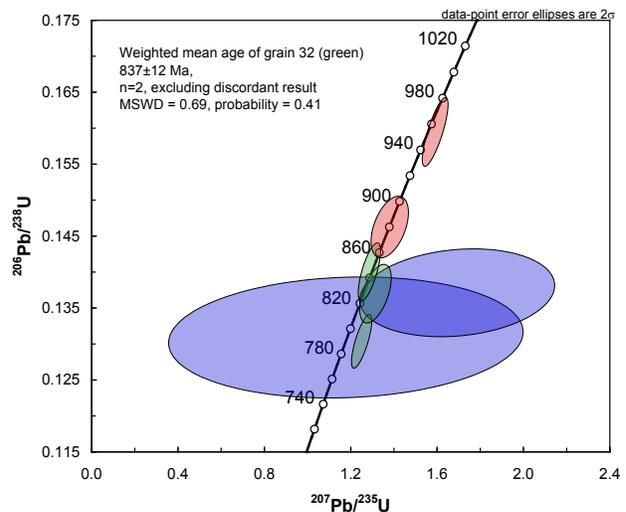
Figure 10.5 Detail of Concordia diagram illustrating the ages of the youngest detrital zircon grains. Colours other than red indicate replicate analyses.

Figure 10.6 Probability density diagram and histogram for sample 11RAT-RR100. Concordia age (Ludwig, 1998) plotted on x-axis. Results with a probability of concordance greater than 1% are shown in dark blue and in the histogram, all results regardless of probability of concordance are shown in light blue. Replicates are not included.

Table 10: Kilian Formation (11RAT-RR100)

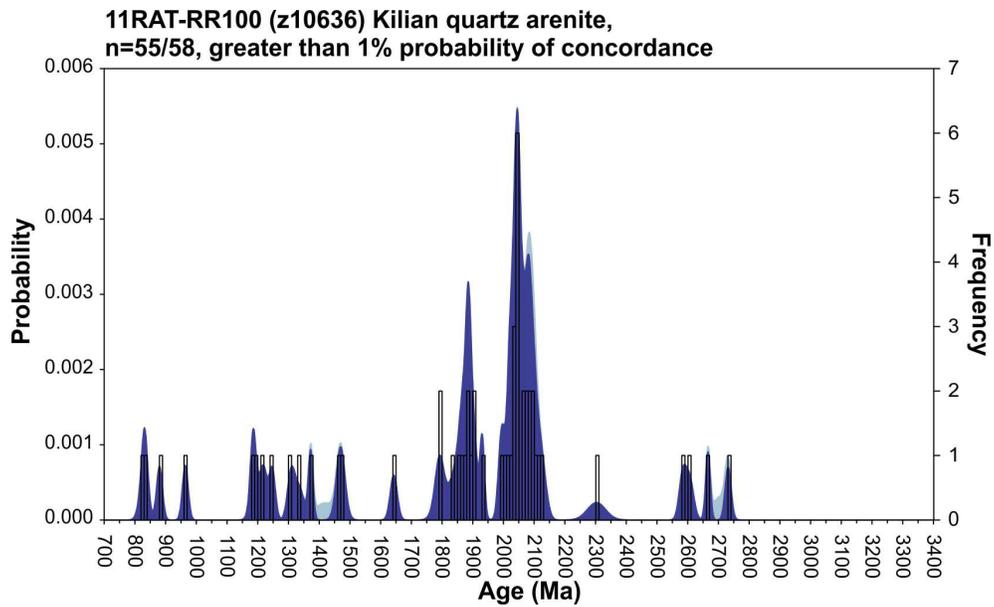| Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	204Pb/206Pb	% ±	f(206)204 %	206Pb* (ppm)	208*Pb/206Pb	% ±	207*Pb/235U	% ±	206*Pb/238U	% ±	Corr Coeff	207*Pb/206Pb	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.	IMF
10636-22.2	13	6	0.51	101	6020	1.6E-3	75	2.82	1	0.198	10.9	1.2	28.6	0.131	2.62	0.09	0.065	28.5	794	39	0.0	97.9%	2
10636-32.3	408	233	0.59	341	10024	3.2E-5	54	0.06	46	0.190	2.2	1.2	1.5	0.130	1.17	0.76	0.069	1.0	806	16	29.8	0.0%	2
10636-22.1	20	11	0.56	122	6025	-3.5E-4	191	-0.61	2	0.230	10.8	1.7	10.9	0.137	1.82	0.17	0.089	10.8	829	28	5.6	1.8%	1
10636-32.1	158	106	0.69	320	8424	-3.5E-5	224	-0.06	19	0.218	3.7	1.3	2.3	0.137	1.21	0.53	0.069	1.9	832	18	4.2	3.9%	1
10636-32.2	296	166	0.58	370	9861	4.4E-5	41	0.08	36	0.182	4.0	1.3	1.6	0.140	1.17	0.72	0.067	1.1	842	17	0.7	41.9%	2
10636-13.1	239	241	1.04	144	8354	4.2E-4	23	0.73	30	0.313	2.6	1.4	2.6	0.146	1.20	0.47	0.068	2.3	880	19	0.0	98.2%	1
10636-30.1	353	37	0.11	195	12441	-5.2E-5	66	-0.09	48	0.035	5.8	1.6	1.5	0.159	1.22	0.80	0.072	0.9	964	19	3.8	5.1%	1
10636-35.1	386	58	0.15	92	8724	2.9E-5	62	0.05	67	0.052	5.1	2.2	1.3	0.202	1.17	0.89	0.079	0.6	1185	17	0.0	98.1%	1
10636-56.1	94	35	0.38	285	9288	5.4E-5	209	0.09	16	0.118	4.9	2.2	2.7	0.203	1.49	0.56	0.080	2.2	1192	30	0.1	76.9%	2
10636-62.1	151	64	0.44	607	10795	5.4E-3	63	0.09	27	0.142	3.5	2.3	1.6	0.209	1.25	0.79	0.081	1.0	1220	22	0.1	71.4%	2
10636-58.1	235	89	0.39	545	7211	-7.1E-6	462	-0.01	42	0.123	2.9	2.4	1.4	0.210	1.18	0.83	0.083	0.8	1247	20	3.7	5.3%	2
10636-48.1	139	51	0.38	294	8650	7.7E-5	66	0.13	27	0.115	3.9	2.6	1.6	0.225	1.19	0.73	0.085	1.1	1308	24	0.0	82.4%	2
10636-8.1	47	34	0.74	187	8932	9.9E-4	27	1.71	9	0.204	5.5	2.7	4.9	0.230	1.37	0.28	0.086	4.7	1334	33	0.0	97.3%	1
10636-81.1	356	85	0.25	409	13667	3.0E-5	35	0.05	73	0.073	2.9	2.9	1.3	0.238	1.17	0.93	0.087	0.5	1372	15	0.2	67.6%	2
10636-11.1	8	2	0.23	193	11192	4.3E-4	52	0.75	2	0.120	17.2	3.9	4.8	0.240	2.50	0.53	0.118	4.1	1416	61	37.5	0.0%	1
10636-16.1	102	33	0.34	249	8902	-6.1E-5	72	-0.11	22	0.103	5.2	3.2	1.6	0.257	1.22	0.74	0.092	1.1	1470	25	0.3	56.3%	1
10636-5.1	38	14	0.39	184	8649	-1.2E-4	59	-0.21	8	0.110	9.6	3.3	2.3	0.254	1.34	0.58	0.095	1.9	1470	32	3.4	6.4%	1
10636-21.1	101	129	1.32	478	8841	5.1E-5	49	0.09	25	0.405	2.3	4.0	1.5	0.289	1.21	0.83	0.101	0.8	1643	23	0.3	57.2%	1
10636-28.1	148	53	0.37	114	9733	4.9E-5	135	0.08	41	0.108	6.8	4.8	1.6	0.324	1.23	0.77	0.109	1.0	1792	27	1.2	26.5%	1
10636-10.1	52	36	0.72	97	9811	8.4E-4	33	1.46	14	0.213	4.5	5.1	3.8	0.319	1.37	0.36	0.116	3.5	1795	41	2.8	9.7%	1
10636-80.1	92	83	0.93	197	9682	2.5E-4	53	0.43	26	0.293	2.5	5.1	2.1	0.328	1.23	0.58	0.113	1.7	1836	33	0.2	61.7%	2
10636-38.1	87	84	1.01	235	9725	1.3E-4	53	0.23	25	0.304	2.6	5.2	1.7	0.334	1.36	0.78	0.114	1.1	1859	29	0.0	96.7%	1
10636-45.1	110	93	0.87	186	9987	1.4E-5	356	0.02	32	0.257	2.5	5.3	1.5	0.340	1.20	0.81	0.114	0.9	1869	24	1.1	28.8%	1
10636-39.1	54	42	0.79	127	9228	5.6E-5	168	0.10	16	0.246	3.6	5.3	2.1	0.337	1.51	0.73	0.115	1.4	1875	35	0.0	92.9%	1
10636-46.1	66	52	0.81	164	9563	-9.7E-5	48	-0.17	19	0.245	3.3	5.3	1.6	0.334	1.23	0.79	0.116	0.9	1881	26	2.7	9.8%	1
10636-24.1	260	103	0.41	263	11297	3.6E-6	65	0.01	76	0.121	2.5	5.4	1.3	0.340	1.18	0.94	0.115	0.4	1885	14	0.0	99.8%	1
10636-27.1	158	75	0.49	59	11940	1.4E-5	262	0.03	46	0.150	2.8	5.4	1.4	0.340	1.19	0.86	0.116	0.7	1892	21	0.0	83.4%	1
10636-6.1	125	58	0.48	97	10969	4.6E-5	137	0.08	36	0.146	3.6	5.5	1.6	0.340	1.22	0.77	0.117	1.0	1900	27	1.0	32.9%	1
10636-42.1	50	38	0.78	120	9287	-3.0E-4	64	-0.51	15	0.242	3.8	5.6	2.6	0.342	1.29	0.49	0.118	2.3	1904	38	0.5	48.8%	1
10636-50.1	206	67	0.34	148	10638	8.5E-6	53	0.01	61	0.102	2.8	5.6	1.3	0.345	1.20	0.94	0.119	0.4	1931	14	1.2	26.4%	1
10636-47.1	117	80	0.70	240	10210	4.8E-5	52	0.08	37	0.211	2.5	6.1	1.3	0.364	1.20	0.89	0.122	0.6	1992	20	0.3	56.8%	1
10636-57.1	90	45	0.51	172	8661	1.5E-4	33	0.26	28	0.158	3.2	6.2	1.5	0.362	1.21	0.83	0.123	0.8	2001	24	0.3	55.8%	2
10636-37.1	234	127	0.56	61	14126	4.5E-5	38	0.08	74	0.165	2.0	6.3	1.3	0.370	1.18	0.94	0.124	0.4	2019	15	0.3	57.9%	1
10636-17.1	89	58	0.67	223	10282	1.7E-4	64	0.29	28	0.195	3.2	6.3	1.9	0.368	1.29	0.69	0.125	1.3	2025	33	0.1	80.2%	1
10636-52.1	112	67	0.62	348	7373	1.3E-4	29	0.22	35	0.178	2.7	6.3	1.4	0.364	1.23	0.88	0.126	0.7	2032	21	2.6	10.9%	2
10636-18.1	72	32	0.46	139	8268	-1.8E-5	245	-0.03	24	0.148	4.2	6.5	1.5	0.378	1.24	0.81	0.124	0.9	2036	26	2.8	9.6%	1
10636-7.1	158	46	0.30	290	10393	-9.8E-6	190	-0.02	50	0.088	4.0	6.4	1.3	0.370	1.20	0.90	0.126	0.6	2040	19	0.2	62.9%	1
10636-53.1	168	64	0.39	83	9787	3.2E-5	49	0.06	54	0.114	2.7	6.5	1.3	0.372	1.18	0.93	0.126	0.5	2041	15	0.0	96.6%	2
10636-12.1	63	23	0.38	130	9455	1.1E-4	42	0.19	20	0.104	5.6	6.5	1.6	0.375	1.26	0.78	0.126	1.0	2043	28	0.4	53.8%	1
10636-59.1	75	34	0.46	159	9078	3.6E-5	284	0.06	24	0.144	3.6	6.5	1.7	0.372	1.23	0.70	0.127	1.2	2044	31	0.2	62.5%	2
10636-3.1	60	20	0.35	129	9768	-4.0E-5	41	-0.07	19	0.125	5.4	6.5	1.6	0.368	1.27	0.81	0.128	0.9	2048	26	2.7	9.9%	1
10636-2.1	49	22	0.48	140	8688	2.5E-4	54	0.44	15	0.125	5.8	6.6	2.2	0.370	1.41	0.63	0.129	1.7	2049	39	1.6	20.4%	1
10636-61.1	211	36	0.18	82	12428	2.0E-5	38	0.04	68	0.054	3.5	6.5	1.2	0.373	1.18	0.95	0.127	0.4	2049	13	0.1	72.8%	2

Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	204Pb/206Pb	% ±	f(206)204 %	206Pb* (ppm)	208*Pb/206*Pb	% ±	207*Pb/235U	% ±	206*Pb/238U	% ±	Corr Coeff	207*Pb/206*Pb	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.	IMF
10636-14.1	187	43	0.24	166	12377	3.2E-5	122	0.06	61	0.066	3.9	6.6	1.6	0.378	1.44	0.92	0.127	0.6	2060	21	0.1	76.7%	1
10636-31.1	147	94	0.66	218	9646	3.9E-4	17	0.67	48	0.197	2.3	6.6	1.6	0.378	1.33	0.84	0.127	0.9	2063	26	0.1	75.5%	1
10636-44.1	127	65	0.53	161	10655	4.1E-5	94	0.07	41	0.160	2.7	6.7	1.4	0.378	1.20	0.88	0.128	0.7	2071	20	0.1	78.5%	1
10636-60.1	95	49	0.54	110	9662	4.3E-5	89	0.07	30	0.164	2.9	6.6	1.4	0.373	1.20	0.87	0.129	0.7	2073	21	2.3	12.7%	2
10636-23.1	271	95	0.36	321	10763	-3.4E-5	72	-0.06	89	0.109	2.4	6.7	1.3	0.380	1.19	0.94	0.129	0.5	2081	15	0.1	76.2%	1
10636-20.1	131	110	0.86	357	8502	----	9999	0.00	42	0.259	2.3	6.7	1.3	0.372	1.20	0.91	0.130	0.5	2088	17	6.4	1.1%	1
10636-1.1	136	93	0.70	244	10113	-2.1E-5	201	-0.04	44	0.218	2.7	6.8	1.4	0.375	1.22	0.86	0.131	0.7	2095	22	5.5	1.9%	1
10636-51.1	107	53	0.51	183	11708	1.2E-5	377	0.02	35	0.150	3.1	6.8	1.4	0.378	1.20	0.86	0.131	0.7	2096	22	2.7	10.2%	2
10636-49.1	45	22	0.50	116	9684	1.4E-5	95	0.02	14	0.149	4.7	6.8	1.5	0.373	1.26	0.83	0.132	0.9	2097	25	9.0	0.3%	1
10636-33.1	44	26	0.61	167	9109	-1.4E-4	63	-0.25	14	0.191	5.1	6.9	1.8	0.383	1.28	0.71	0.131	1.3	2100	32	0.3	56.7%	1
10636-19.1	63	29	0.48	211	9300	6.7E-5	74	0.12	21	0.140	4.6	7.0	1.6	0.387	1.25	0.80	0.131	0.9	2114	27	0.1	73.0%	1
10636-26.1	70	36	0.52	142	11783	-1.3E-4	61	-0.23	24	0.161	4.0	7.2	1.7	0.394	1.24	0.75	0.131	1.1	2128	29	0.8	38.1%	1
10636-40.1	27	13	0.48	229	8956	4.3E-4	127	0.75	10	0.147	5.7	8.8	5.2	0.428	1.64	0.31	0.150	4.9	2303	60	0.3	61.1%	1
10636-36.1	59	45	0.80	101	9322	1.2E-4	56	0.21	24	0.212	3.1	11.6	1.5	0.487	1.24	0.84	0.173	0.8	2584	23	1.3	25.3%	1
10636-41.1	59	30	0.52	163	9388	1.3E-4	67	0.23	26	0.152	3.6	12.2	1.5	0.509	1.25	0.81	0.174	0.9	2607	26	4.0	4.6%	1
10636-4.1	115	147	1.33	556	8115	2.8E-5	38	0.05	51	0.386	1.8	12.8	1.3	0.513	1.21	0.93	0.181	0.5	2666	15	0.0	84.1%	1
10636-34.1	21	13	0.64	70	9590	3.7E-5	699	0.06	9	0.161	6.0	13.5	2.4	0.506	1.45	0.60	0.193	1.9	2704	45	8.5	0.3%	1
10636-29.1	138	76	0.57	395	9237	4.3E-5	124	0.07	63	0.155	2.4	13.8	1.4	0.53	1.2	0.89	0.189	0.63	2731	20	0.18	67.1%	1

Notes:

Spot name follows the convention x-y.z; where x = sample number, y = grain number and z = spot number. Multiple analyses in an individual spot are labelled as x-y.z.z

f206[204] refers to mole percent of total 206Pb that is due to common Pb, calculated using the 204Pb-method; common Pb composition used is the surface blank (4/6: 0.05770; 7/6: 0.89500; 8/6: 2.13840)

* refers to radiogenic Pb (corrected for common Pb)

Errors are reported at 1σ uncertainty level unless otherwise noted

Analytical details: 20µm spot size, 6nA primary beam intensity, 5 scans

IMF: intramass fractionation correction - two separate corrections (1, 2) needed. See sample summary box for details.

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11. Kuujjua Formation, quartz arenite, Shaler Supergroup, Minto Inlier

Sample number:	09RAT-001A
GSC Laboratory number:	9897
Geographic location:	Victoria Island, Minto Inlet, NWT 71° 5' 32.6"N 115°15'17.5"W, NAD83
Collection History:	Sampled in 2009 by Rob Rainbird
Lithology:	Quartz arenite
Mount ID:	IP528
U-Pb standard and reproducibility:	6266, 1.1% (1σ)
External error in U-Pb:	0.2% (1σ)
207Pb/206Pb Standard:	1242 (2679.6±0.2Ma, 95% confidence)
Measured value (±95% confidence):	2676±3 Ma
IMF correction applied?	No
Interpreted Age:	780±10 Ma
Interpretation:	Maximum age of deposition

Sample Description

The sample is a white to tan, large-scale compound crossbedded quartz arenite from a section near the top of the formation located about 6 km south of the Kuujjua River, in the western Minto Inlier (Rainbird et al., 1992; Figure 11.1).

Petrographic Description: moderate to moderately well sorted, rounded (0.5) to well rounded (0.7) coarse to very coarse sand (Figure 11.2). Framework (95%) is composed of monocrystalline quartz (93%), polycrystalline quartz (3%), chert (3%) and heavy minerals (1%); cement (5%) is composed of quartz (100%).

Figure 11.1 Kuujjua Formation quartz arenite sample 09RAT-001.
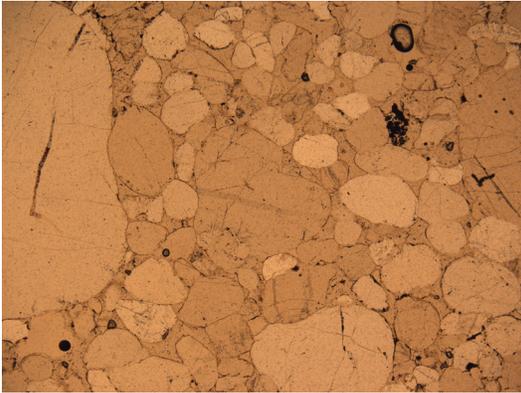Hammer (centre-right of rock face) is approximately 30cm long.

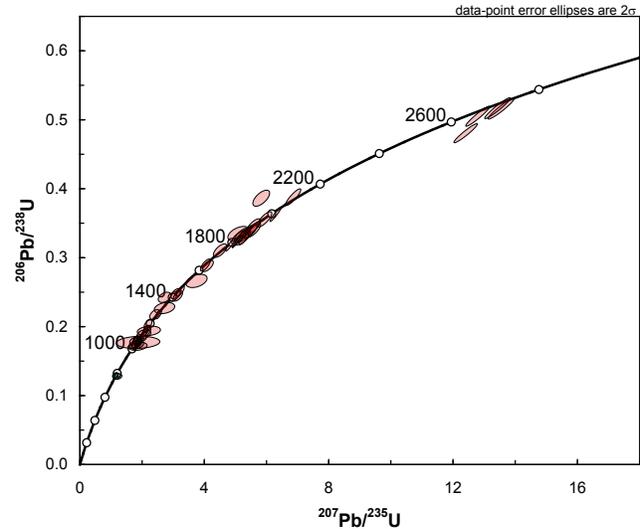Figure 11.2 Plane light photomicrograph of Kuujjua formation sandstone 09RAT-001. Field of view 3.5mm

Figure 11.4 Concordia diagram illustrating all results from 09RAT-001. Plotted as 95% confidence ellipses. Colours other than red indicate replicate analyses on individual grains.

Zircon description

Zircons were hand picked from the dense fraction of the heavy liquid separation. Large, good quality, zircon grains exhibiting a range of colours were recovered (Figure 11.3). While the majority of the grains are very well rounded, a number of them preserve sharp facets and

Figure 11.3 Transmitted light photograph of zircon population.

terminations. The zircon sample varies widely in quality with pristine fracture-free and inclusion-free zircon as well as highly fractured grains with numerous clear and opaque inclusions.

U-Pb results and interpretation

A total of 65 analyses were conducted on 61 separate grains. The results are presented in Table 11. All data are plotted on the Concordia diagram (Figure 11.4), with a detail of the youngest analyses presented in Figure 11.5.

The probability density diagram utilizes the Concordia age on the x-axis (Figure 11.6). The detrital zircon grains preserve a limited Archean signature, a minor 1.8-2.0 Ga component matching ages typical of the Great Bear Magmatic zone and Thelon-Taltson orogen
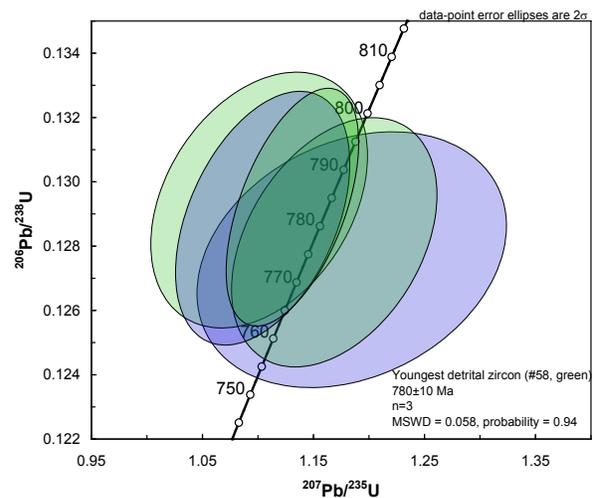

Figure 11.5 Detail of Concordia illustrating youngest results. Replicates on individual grains represented by the same colour (blue or green)

and are dominated by a 1.05 Ga population which is inferred to be sourced from the eastern Grenville Province. There appears to be no

**09RAT-01A (z9897) Kuujjua Fm,
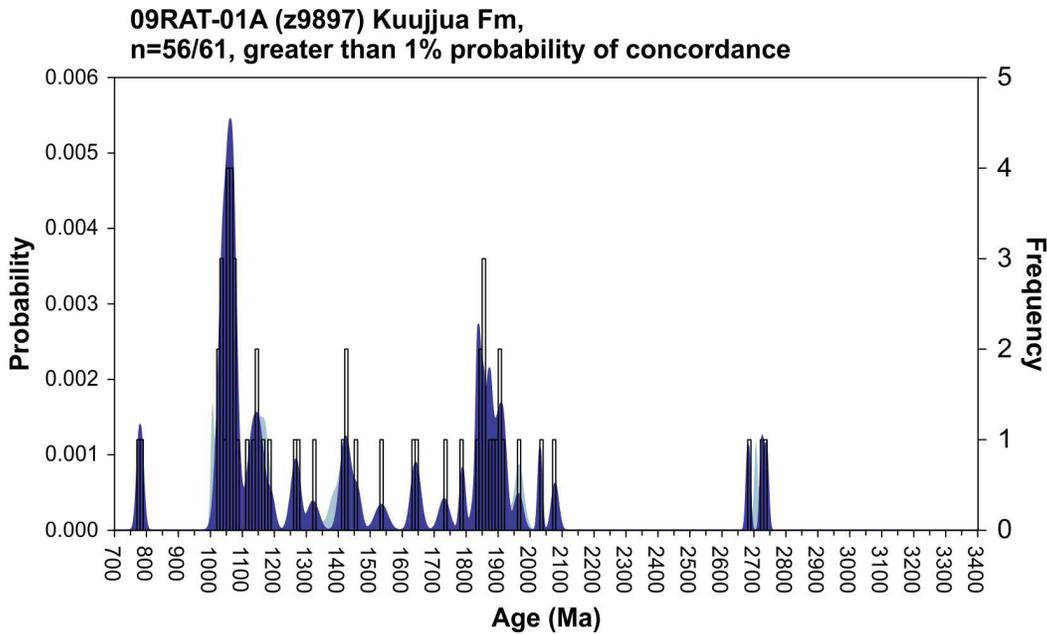n=56/61, greater than 1% probability of concordance**

Figure 11.6 Probability density diagram and histogram for sample 09RAT-001. Concordia age (Ludwig, 1998) plotted on x-axis. Results with a probability of concordance greater than 1% are shown in dark blue and in the histogram, all results regardless of probability of concordance are shown in light blue. Replicates are not included.

correlation between age and zircon morphology in this sample For example, rare (n=8), well-faceted zircon grains range in age from 1.06 to 1.97 Ga exhibiting no correlation with degree of roundedness (and inferred duration of abrasion in the sedimentary cycle). Some of the well-faceted grains could have been liberated from larger quartz grains during the crushing stage of sample preparation. The maximum age of

deposition is constrained by a mean concordia age of 780±10 Ma from replicates on one of two similar-aged grains. This age is consistent with that of the Gunbarrel magmatic event that extends from the Yukon to Wyoming (Harlan et al., 2003). Dykes and sills of that age have been identified cutting Shaler Supergroup equivalents in the Mackenzie Mountains (Ootes, 2008).

Table 11: Kuujjua Formation (09RAT-1)

Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	^{204}Pb/^{206}Pb	% ±	f(206)^{204} %	^{206}Pb* (ppm)	^{208}Pb/^{206}Pb*	% ±	^{207}Pb/^{235}U	% ±	^{206}Pb/^{238}U	% ±	Corr Coeff	^{207}Pb/^{206}Pb*	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
9897-01.1	83	84	1.04	nd	nd	1.5E-4	39	0.26	16	0.319	2.5	2.5	1.7	0.22	1.2	0.71	0.083	1.22	1271	24	0.00	98.2%
9897-02.1	25	19	0.81	nd	nd	2.8E-4	84	0.49	6	0.240	4.5	3.7	3.7	0.27	1.5	0.40	0.101	3.41	1535	38	3.28	7.0%
9897-04.1	57	23	0.42	nd	nd	3.1E-4	23	0.53	17	0.114	3.8	5.9	1.6	0.36	1.3	0.79	0.120	0.99	1964	27	0.01	93.6%
9897-06.1	74	33	0.46	nd	nd	3.2E-4	46	0.56	11	0.150	4.1	1.8	3.2	0.18	1.3	0.39	0.073	2.99	1066	24	0.62	43.2%
9897-07.1	32	16	0.53	nd	nd	5.1E-4	56	0.88	6	0.154	5.5	2.7	5.1	0.23	1.4	0.29	0.086	4.86	1321	34	0.04	84.8%
9897-09.1	46	23	0.51	nd	nd	6.3E-4	26	1.09	7	0.144	5.0	1.7	3.8	0.18	1.3	0.34	0.070	3.58	1058	25	4.21	4.0%
9897-10.1	52	25	0.49	nd	nd	3.0E-4	28	0.53	14	0.140	3.9	4.5	1.9	0.31	1.3	0.66	0.104	1.47	1731	31	1.59	20.7%
9897-11.1	157	116	0.76	nd	nd	2.1E-4	33	0.36	24	0.229	2.3	1.8	1.9	0.18	1.2	0.63	0.074	1.46	1067	21	0.76	38.3%
9897-112.1	2873	186	0.07	nd	nd	8.5E-5	10	0.15	445	0.027	1.6	1.8	1.2	0.18	1.1	0.97	0.072	0.26	1006	10	39.61	0.0%
9897-12.1	73	30	0.42	nd	nd	4.0E-4	26	0.69	11	0.126	4.5	1.7	2.6	0.17	1.2	0.48	0.072	2.23	1029	23	0.93	33.6%
9897-13.1	81	65	0.83	nd	nd	1.4E-4	55	0.24	24	0.253	2.2	5.5	1.6	0.34	1.2	0.77	0.117	1.01	1896	27	0.94	33.3%
9897-14.1	91	79	0.90	nd	nd	4.7E-5	103	0.08	26	0.258	2.1	5.3	1.5	0.33	1.3	0.87	0.116	0.72	1882	22	6.79	0.9%
9897-15.1	58	28	0.50	nd	nd	1.0E-3	21	1.80	9	0.158	4.3	2.0	4.4	0.19	1.4	0.32	0.078	4.21	1117	29	0.06	80.4%
9897-17.1	105	81	0.79	nd	nd	1.9E-4	27	0.33	23	0.248	2.4	3.2	1.6	0.25	1.2	0.74	0.092	1.10	1459	25	0.73	39.3%
9897-18.1	213	133	0.65	nd	nd	3.5E-5	60	0.06	66	0.193	1.5	6.3	1.2	0.36	1.2	0.95	0.125	0.36	2031	12	2.82	9.3%
9897-19.1	152	153	1.03	nd	nd	4.8E-5	48	0.08	42	0.310	1.6	4.8	1.3	0.32	1.2	0.92	0.109	0.48	1788	16	0.01	94.2%
9897-20.1	64	64	1.04	nd	nd	1.1E-4	89	0.19	13	0.327	2.6	3.1	2.1	0.25	1.2	0.60	0.092	1.65	1426	29	3.17	7.5%
9897-22.1	73	32	0.45	nd	nd	2.4E-4	46	0.42	15	0.130	3.7	3.1	2.2	0.25	1.2	0.56	0.090	1.85	1428	29	0.16	68.8%
9897-23.1	148	63	0.44	nd	nd	2.9E-5	51	0.05	23	0.140	3.2	1.9	1.3	0.18	1.2	0.87	0.076	0.65	1074	17	4.11	4.3%
9897-24.1	64	22	0.36	nd	nd	3.3E-4	31	0.57	11	0.105	5.0	2.2	2.4	0.20	1.3	0.52	0.077	2.07	1187	26	3.19	7.4%
9897-25.1	109	50	0.47	nd	nd	4.9E-5	56	0.08	18	0.155	3.3	2.2	1.4	0.19	1.2	0.83	0.082	0.80	1173	20	28.53	0.0%
9897-26.1	31	38	1.27	nd	nd	5.0E-4	163	0.86	5	0.410	3.9	1.8	15.6	0.18	2.0	0.13	0.075	15.49	1053	38	0.00	95.4%
9897-28.1	147	109	0.77	nd	nd	7.5E-5	133	0.13	37	0.234	1.9	4.1	1.8	0.29	1.2	0.65	0.103	1.40	1647	29	1.77	18.3%
9897-29.1	58	54	0.96	nd	nd	1.5E-4	237	0.26	8	0.331	3.4	1.8	6.9	0.17	1.4	0.20	0.077	6.77	1023	26	0.44	50.7%
9897-30.1	106	63	0.61	nd	nd	1.9E-4	49	0.32	16	0.193	3.1	1.8	2.2	0.18	1.2	0.55	0.076	1.84	1050	22	1.36	24.3%
9897-32.1	50	29	0.59	nd	nd	3.4E-4	27	0.59	11	0.167	5.4	3.0	2.1	0.24	1.3	0.61	0.090	1.67	1413	29	0.01	92.8%
9897-33.1	27	15	0.56	nd	nd	7.0E-4	35	1.21	4	0.194	6.1	1.8	5.2	0.17	1.5	0.28	0.074	5.00	1037	28	0.01	92.5%
9897-34.1	231	152	0.68	nd	nd	6.3E-6	90	0.01	64	0.203	1.5	5.0	1.2	0.32	1.1	0.97	0.112	0.31	1836	11	2.23	13.5%
9897-35.1	76	52	0.70	nd	nd	2.3E-4	29	0.39	19	0.197	2.9	4.0	1.6	0.29	1.2	0.75	0.100	1.09	1638	27	0.12	73.3%
9897-37.1	185	80	0.44	nd	nd	1.4E-4	29	0.24	28	0.130	2.9	1.8	1.5	0.18	1.2	0.77	0.074	0.95	1054	19	0.60	44.0%
9897-38.1	107	60	0.58	nd	nd	1.3E-4	169	0.23	17	0.181	3.2	1.9	4.4	0.18	1.3	0.29	0.075	4.25	1085	25	0.03	86.5%
9897-39.1	133	74	0.57	nd	nd	2.1E-4	26	0.36	23	0.180	2.7	2.1	1.7	0.20	1.2	0.71	0.077	1.17	1147	22	2.44	11.8%
9897-40.1	52	36	0.72	nd	nd	1.3E-4	23	0.22	17	0.222	3.0	6.9	1.4	0.39	1.3	0.89	0.128	0.67	2078	21	3.63	5.7%
9897-42.1	44	19	0.44	nd	nd	1.4E-4	81	0.24	13	0.139	4.4	5.2	2.0	0.33	1.3	0.65	0.113	1.53	1854	34	0.00	95.4%
9897-44.1	85	50	0.61	nd	nd	4.8E-4	23	0.83	13	0.158	4.0	1.8	2.7	0.18	1.2	0.46	0.072	2.38	1063	23	3.59	5.8%
9897-45.1	146	139	0.98	nd	nd	2.9E-4	13	0.50	60	0.286	1.4	12.4	1.2	0.48	1.2	0.95	0.187	0.37	2706	11	52.67	0.0%
9897-46.1	231	85	0.38	nd	nd	5.1E-5	43	0.09	67	0.111	2.1	5.3	1.2	0.34	1.2	0.94	0.115	0.40	1873	14	0.03	85.5%
9897-47.1	188	128	0.70	nd	nd	2.8E-5	55	0.05	28	0.231	2.3	1.8	1.3	0.17	1.2	0.88	0.075	0.62	1039	17	6.29	1.2%
9897-48.1	117	72	0.63	nd	nd	3.7E-4	27	0.64	13	0.166	3.7	1.1	2.9	0.13	1.3	0.43	0.062	2.64	778	18	3.50	6.1%
9897-48.2	92	37	0.41	nd	nd	2.3E-4	93	0.39	10	0.123	5.7	1.2	4.8	0.13	1.3	0.26	0.067	4.66	775	19	0.54	46.2%
9897-49.1	121	82	0.70	nd	nd	1.6E-4	19	0.28	52	0.205	1.7	12.8	1.2	0.51	1.2	0.96	0.183	0.37	2682	12	2.80	9.4%
9897-50.1	117	146	1.29	nd	nd	7.9E-5	59	0.14	33	0.380	1.6	5.2	1.4	0.33	1.2	0.86	0.113	0.71	1853	21	0.05	81.6%
9897-51.1	94	42	0.47	nd	nd	2.4E-4	20	0.42	14	0.134	6.2	1.9	1.7	0.18	1.2	0.71	0.076	1.18	1061	21	2.44	11.8%
9897-52.1	121	55	0.47	nd	nd	5.1E-5	100	0.09	34	0.133	2.6	5.2	1.4	0.33	1.2	0.85	0.113	0.74	1846	22	0.16	69.0%
9897-53.1	56	51	0.94	nd	nd	3.0E-4	28	0.51	17	0.283	2.6	5.6	1.7	0.35	1.3	0.74	0.116	1.15	1909	29	0.41	52.3%
9897-54.1	201	58	0.30	nd	nd	4.3E-5	143	0.07	34	0.087	3.4	2.1	1.7	0.20	1.2	0.69	0.079	1.22	1162	22	0.24	62.7%
9897-55.1	94	49	0.54	nd	nd	2.9E-4	38	0.50	14	0.166	3.7	1.7	2.6	0.17	1.2	0.46	0.072	2.34	1037	23	0.88	34.8%
9897-56.1	128	52	0.42	nd	nd	4.6E-4	30	0.80	14	0.129	4.1	1.1	3.6	0.13	1.3	0.35	0.062	3.42	782	18	2.97	8.5%

Spot name	U (ppm)	Th (ppm)	Th/U	Yb (ppm)	Hf (ppm)	^{204}Pb/^{206}Pb	% ±	f(206)^{204} %	^{206}Pb* (ppm)	^{208*}Pb/^{206*}Pb	% ±	^{207*}Pb/^{235}U	% ±	^{206*}Pb/^{238}U	% ±	Corr Coeff	^{207*}Pb/^{206*}Pb	% ±	Concordia Age	± Ma (2σ)	MSWD	Probability of conc.
9897-56.2	145	73	0.52	nd	nd	2.9E-4	45	0.51	16	0.169	4.0	1.2	3.3	0.13	1.2	0.38	0.066	3.01	778	18	0.27	60.5%
9897-56.4	205	110	0.55	nd	nd	2.5E-4	29	0.43	23	0.161	3.5	1.1	2.2	0.13	1.2	0.54	0.063	1.82	780	17	2.39	12.2%
9897-57.1	63	25	0.41	nd	nd	9.2E-4	17	1.60	13	0.091	4.7	2.7	3.2	0.24	1.3	0.40	0.080	2.91	1384	31	12.02	0.1%
9897-58.1	53	51	0.99	nd	nd	5.5E-4	34	0.95	15	0.273	2.8	5.1	2.8	0.34	1.3	0.47	0.110	2.46	1851	38	1.83	17.6%
9897-59.1	57	64	1.15	nd	nd	1.3E-4	28	0.23	9	0.392	3.1	1.9	2.0	0.18	1.3	0.64	0.076	1.51	1072	23	1.44	23.1%
9897-60.1	114	40	0.36	nd	nd	4.2E-5	106	0.07	34	0.105	5.8	5.6	1.4	0.34	1.2	0.87	0.118	0.67	1916	20	0.69	40.6%
9897-62.1	138	92	0.69	nd	nd	5.7E-5	61	0.10	61	0.196	1.6	13.4	1.2	0.52	1.2	0.96	0.188	0.35	2725	11	1.87	17.2%
9897-63.1	157	108	0.71	nd	nd	1.1E-4	150	0.19	24	0.215	2.5	1.9	3.4	0.18	1.2	0.35	0.075	3.23	1070	23	0.00	95.5%
9897-64.1	40	51	1.30	nd	nd	1.8E-4	71	0.32	11	0.369	2.8	5.1	2.3	0.33	1.3	0.58	0.113	1.86	1841	36	0.19	65.9%
9897-65.1	103	87	0.88	nd	nd	7.7E-5	45	0.13	46	0.253	1.6	13.6	1.3	0.52	1.2	0.95	0.190	0.38	2739	12	3.93	4.7%
9897-66.1	37	25	0.72	nd	nd	3.3E-4	27	0.58	11	0.209	3.7	5.5	1.9	0.34	1.3	0.72	0.118	1.29	1908	32	1.31	25.2%
9897-67.1	55	41	0.77	nd	nd	5.0E-4	25	0.87	10	0.228	3.7	2.4	2.8	0.22	1.3	0.47	0.079	2.44	1261	28	4.39	3.6%
9897-68.1	54	28	0.54	nd	nd	2.4E-4	40	0.41	8	0.168	4.7	1.8	2.4	0.18	1.3	0.53	0.076	2.07	1047	24	1.62	20.4%
9897-79.1	145	93	0.66	nd	nd	7.5E-4	14	1.30	48	0.158	3.0	5.8	1.9	0.39	1.2	0.63	0.109	1.48	1969	32	87.59	0.0%
9897-85.1	169	66	0.40	nd	nd	1.8E-4	43	0.31	28	0.119	3.1	2.1	1.9	0.19	1.2	0.62	0.078	1.49	1131	23	0.07	79.5%
9897-99.1	46	21	0.46	nd	nd	2.2E-4	173	0.39	8	0.146	5.2	2.2	7.0	0.19	1.5	0.21	0.082	6.80	1145	30	0.46	49.7%

Notes:

Spot name follows the convention x-y.z; where x = sample number, y = grain number and z = spot number. Multiple analyses in an individual spot are labelled as x-y.z.z

nd=not determined

f206^{204} refers to mole percent of total 206Pb that is due to common Pb, calculated using the 204Pb-method; common Pb composition used is the surface blank (4/6: 0.05770; 7/6: 0.89500; 8/6: 2.13840)

* refers to radiogenic Pb (corrected for common Pb)

Errors are reported at 1σ uncertainty level unless otherwise noted

Analytical details: 25µm spot size, 12nA primary beam intensity, 5 scans

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