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APPENDIX DR1. COST No. G-1 CORE AND SAMPLE DESCRIPTIONS

The well was drilled on Georges Bank, 143 km east-southeast of Nantucket Island (40º 55' 52.108" N, 68º 18' 18.917" W) and penetrated about 4.5 km of biostratigraphically constrained Paleocene and Mesozoic coastal plain sedimentary rocks before reaching metasedimentary rocks, interpreted as basement, at a depth of 4764 m (15,630 ft, as marked on the core). This depth and others cited are measured below the kelly bushing, which is 30 m above sea level and 78 m above the sea floor (Arthur, 1982). Above the unconformity with this basement is 200 m of undated basal conglomerate (Amato and Bebout, 1980; Arthur, 1982; Wade and MacLean, 1990). Based on poorly preserved pollen genera, Steinkraus (1980) suggested a highly speculative Early Jurassic age for sedimentary rocks from the interval just above this conglomerate. However, more reliably, ostracod assemblages indicated a Bajocian (Middle Jurassic) maximum age for sediments 250 m above the unconformity (P. Ascoli, pers. comm., 1983; Table 5.1 in Wade and MacLean, 1990).

As described by Amato and Bebout (1980) and Arthur (1982), the basement succession underlying the unconformity consists of about 113 m (apparent thickness) of dolostone and sandy argillaceous dolostone, underlain by about 21 m of graphitic schist and slate that continues to the bottom of the hole at 4898 m (16,071 ft). The metasedimentary basement rocks were recovered in the form of cuttings, other than about 3.7 m of conventional core from the interval between 4892 and 4896 m; no recovery was obtained from the lowermost part 2 m of the hole

(Amato and Bebout, 1980). An average dip of 25° was reported in the schistose basement rocks, and the dolomitic rocks were described as recrystallized and sericitic (Arthur, 1982).

During early analysis of the core three chips from the highly fractured, black, graphitic schist were processed for palynomorphs, but none were recovered (Steinkraus, 1980). In addition, three samples of core were dated by the whole-rock K–Ar method and yielded apparent ages ranging from 450 to 550 Ma (Krueger Enterprises Inc., written communication, 1976 in Steinkraus, 1980). The two samples that yielded younger ages contained coarsely crystalline quartz/feldspar lenses, whereas the 550 Ma sample was described as a fine-grained phyllite. The older age was considered to represent the timing of metamorphism (Steinkraus, 1980). Data tables for these results are no longer available.

Two boxes of core fragments from depths of 4892–4896 m (16,051–16,063 ft) are currently archived at the Delaware Geological Survey. Initially, one of us (S. Barr) borrowed thin sections archived with the core and determined that zircon grains are present in the coarser metawacke samples. Subsequently, the archived material was examined by M. Thompson. Depths below are given in feet for easier reference to the core boxes. It is mostly dark gray, commonly pyritiferous phyllite, locally with 1–10 cm thick layers or discontinuous lozenges of olive gray metasiltstone or fine-grained metasandstone. In some horizons, the lozenges are contorted into sigmoidal shapes or appear to be detached fold hinges, suggesting transposition of bedding parallel to the gently dipping foliation in the phyllite. Other horizons are laced with quartz-filled fractures or contain substantial carbonate. Because fragments in Box 1 have been pieced together and glued in place, five samples from loose fragments in Box 2 between 16,056 and 16,060 ft were selected for petrographic study. Three of the samples contain abundant carbonate (50–70%), as well as carbonate and quartz veins, with fine-grained quartz and

abundant sericite. The other two samples (MS-1 and MS-5) are coarser grained metawacke consisting of slightly recrystallized subrounded quartz grains and minor carbonate grains in a sericitic matrix. They have a weak fabric defined by aligned detrital muscovite and sericite. They also contain shear zones in finer grained muscovite/sericite-rich layers that display strong shape preferred orientation. Where graphite is present numerous rootless folds are apparent. This confirms that compositional banding has been transposed parallel to foliation. Scattered rounded grains of detrital zircon are visible in thin section, as well as rare tourmaline grains. Subhedral grains of pyrite are scattered throughout the samples. Although depths are approximate because all the material has shifted around in the un-partitioned core trays, MS-1 is from the 16,056–16,058 ft depth interval, and MS-5 represents the lowest segment of the core (16,058–16,060 ft). A small sample was also examined for microfossils and organic material as part of this study but none was found (T. Palacios, pers. comm., 2016), consistent with the report by Steinkraus (1980).

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APPENDIX DR2. LA-ICPMS METHODS

Sample preparation and analysis were carried out at Boise State University. Zircon (generally < 100μm) was separated from samples MS-1 and MS-5 using standard techniques and annealed at 900^{o}C for 60 hours in a muffle furnace. Randomly selected grains varying from rounded to subangular to subhedral in morphology were mounted in epoxy and polished until their centers were exposed**.** Cathodoluminescence (CL) images were obtained with a JEOL JSM-1300 scanning electron microscope and Gatan MiniCL. Zircon was analyzed by laser ablation inductively coupled plasma mass spectrometry (LA-ICPMS) using a ThermoElectron X-Series II quadrupole ICPMS and New Wave Research UP-213 Nd:YAG UV (213 nm) laser ablation system. In-house analytical protocols, standard materials, and data reduction software were used for acquisition and calibration of U–Pb dates and a suite of high field strength elements (HFSE) and rare earth elements (REE). Zircon was ablated with a laser spot of 30 μm wide using fluence and pulse rates of 5 J/cm^2 and 10 Hz, respectively, during a 45 second analysis (15 sec gas blank, 30 sec ablation) that excavated a pit ~25 μm deep. Ablated material was carried by a 1.2 L/min He gas stream to the nebulizer flow of the plasma. Quadrupole dwell times were 5 ms for Si and Zr, 200 ms for ^{49}Ti and ^{207}Pb, 80 ms for ^{206}Pb, 40 ms for ^{202}Hg, ^{204}Pb, ^{208}Pb, ^{232}Th, and ^{238}U and 10 ms for all other HFSE and REE; total sweep duration is 950 ms. Background count rates for each analyte were obtained prior to each spot analysis and subtracted from the raw count rate for each analyte. For concentration calculations, background-subtracted count rates for each analyte were internally normalized to ^{29}Si and calibrated with respect to NIST SRM-610 and -612 glasses as the primary standards. Ablation pits that appear to have intersected glass or mineral inclusions were identified based on Ti and P signal excursions, and associated sweeps were discarded. U–Pb dates from these analyses are considered valid if the U–Pb ratios appear to have

been unaffected by the inclusions. Signals at mass 204 were normally indistinguishable from zero following subtraction of mercury backgrounds measured during the gas blank (<1000 cps ^{202}Hg), and thus dates are reported without common Pb correction. Rare analyses that appear contaminated by common Pb were rejected based on mass 204 greater than baseline. Temperature was calculated from the Ti-in-zircon thermometer (Watson et al., 2006). Because there are no constraints on the activity of TiO_2 in the source rocks, an average value in crustal rocks of 0.8 was used.

Data were collected from sample MS-1 in October 2016 and sample MS-5 in September 2016. For U–Pb and $^{207}Pb/^{206}Pb$ dates, instrumental fractionation of the background-subtracted ratios was corrected and dates were calibrated with respect to interspersed measurements of zircon standards and reference materials. The primary standard Plešovice zircon (Sláma et al., 2008) was used to monitor time-dependent instrumental fractionation based on two analyses for every 10 analyses of unknown zircon. A secondary correction to the $^{206}Pb/^{238}U$ dates was made based on results from the zircon standards Seiland (530 Ma, unpublished data, Boise State University) and Zirconia (327 Ma, unpublished data, Boise State University), which were treated as unknowns and measured once for every 10 analyses of unknown zircon. These results showed a linear age bias of up to several percent that is related to the ^{206}Pb count rate. The secondary correction is thought to mitigate matrix-dependent variations due to contrasting compositions and ablation characteristics between the Plešovice zircon and other standards (and unknowns).

Radiogenic isotope ratio and age error propagation for all analyses includes uncertainty contributions from counting statistics and background subtraction. Age interpretations are based on $^{207}Pb/^{206}Pb$ dates and relative probability diagrams were made using Isoplot 3.0 (Ludwig, 2003). Analyses with more than 15% positive discordance and -6% negative discordance are not

considered. Errors on the dates are given at 2σ and do not include the standard calibration uncertainties. Standard calibrations uncertainties are the local standard deviations of the polynomial fits to the interspersed primary standard measurements versus time for the time-dependent, relatively larger U/Pb fractionation factor and the standard errors of the means of the consistently time-invariant and smaller $^{207}Pb/^{206}Pb$ fractionation factor. These uncertainties for the experiments are 1.26 and 1.44% (2σ) for $^{206}Pb/^{238}U$ and 0.56 and 0.68% (2σ) for $^{207}Pb/^{206}Pb$.

For the October 2016 experiment, dates on the secondary reference material FC1 (1098 Ma, unpublished data, Boise State University) are used to assess the accuracy. Weighted mean dates are calculated using Isoplot 3.0 (Ludwig, 2003) from errors on individual dates that do not include the standard calibration uncertainties. However, errors on weighted mean dates include the standard calibration uncertainties within each experiment and are given at 2σ. The weighted mean $^{206}Pb/^{238}U$ and $^{207}Pb/^{206}Pb$ dates from 10 analyses are 1096 ± 15 and 1084 ± 19 Ma, respectively.

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TABLE DR1. LA-ICPMS ISOTOPIC U-Pb AND TRACE ELEMENT CONCENTRATION DATA

	Corrected isotope ratios							Dates (Ma)						
	207Pb*	±2σ	206Pb*	±2σ	error	207Pb*	±2σ	207Pb*	±2σ	207Pb*	±2σ	206Pb*	±2σ	%
Analysis	235U*	(%)	238U	(%)	corr.	206Pb*	(%)	206Pb*	(Ma)	235U	(Ma)	238U*	(Ma)	disc.
MS-1 XS 58	18.93851	4.37	0.59811	4.22	0.95	0.22965	1.17	3050	19	3039	42	3022	102	1
MS-1 XS 82	16.89199	4.44	0.56395	4.16	0.93	0.21724	1.57	2960	25	2929	43	2883	97	3
MS-1 XS 17	17.24685	3.84	0.57659	3.17	0.81	0.21694	2.18	2958	35	2949	37	2935	75	1
MS-1 S 2	13.28818	5.02	0.51481	4.74	0.94	0.18721	1.66	2718	27	2700	47	2677	104	1
MS-1 XS 46	13.49444	6.21	0.52956	5.94	0.95	0.18481	1.80	2697	30	2715	59	2740	133	-2
MS-1 XS 61	10.71371	5.66	0.43162	5.20	0.91	0.18003	2.23	2653	37	2499	53	2313	101	13
MS-1 XS 26	10.60308	5.35	0.47705	4.83	0.90	0.16120	2.30	2468	39	2489	50	2514	101	-2
MS-1 XS 18	8.43878	4.50	0.39495	4.16	0.92	0.15496	1.71	2401	29	2279	41	2146	76	11
MS-1 XS 54	7.45419	3.94	0.38885	3.72	0.93	0.13903	1.29	2215	22	2167	35	2117	67	4
MS-1 S 13	7.37890	5.85	0.38805	5.30	0.90	0.13791	2.47	2201	43	2158	52	2114	96	4
MS-1 S 10	8.00852	4.08	0.42174	2.44	0.58	0.13772	3.27	2199	57	2232	37	2268	47	-3
MS-1 XS 33	7.24669	4.22	0.38186	3.87	0.91	0.13764	1.70	2198	29	2142	38	2085	69	5
MS-1 XS 37	6.68521	3.92	0.35290	3.20	0.80	0.13739	2.26	2195	39	2071	35	1948	54	11
MS-1 XS 42	6.73446	5.41	0.36130	4.96	0.91	0.13519	2.14	2166	37	2077	48	1988	85	8
MS-1 XS 65	7.64873	5.46	0.41049	4.85	0.88	0.13514	2.50	2166	44	2191	49	2217	91	-2
MS-1 XS 38	7.27269	4.47	0.39042	3.99	0.88	0.13510	2.03	2165	35	2145	40	2125	72	2
MS-1 S 11	7.38436	4.42	0.39845	3.48	0.78	0.13441	2.73	2156	48	2159	40	2162	64	0
MS-1 XS 59	7.09067	5.39	0.38309	4.84	0.89	0.13424	2.36	2154	41	2123	48	2091	86	3
MS-1 XS 64	7.38695	9.17	0.40026	8.58	0.93	0.13385	3.26	2149	57	2159	82	2170	158	-1
MS-1 XS 91	6.46771	4.02	0.35105	3.42	0.84	0.13362	2.11	2146	37	2042	35	1940	57	10
MS-1 XS 79	6.60457	7.62	0.35900	6.78	0.89	0.13343	3.48	2144	61	2060	67	1977	115	8
MS-1 XS 47	7.00851	5.39	0.38235	5.00	0.92	0.13294	2.02	2137	35	2113	48	2087	89	2
MS-1 S 12	6.58098	5.49	0.36003	5.13	0.93	0.13257	1.97	2132	34	2057	48	1982	88	7
MS-1 XS 49	6.73108	5.00	0.36929	4.54	0.90	0.13220	2.11	2127	37	2077	44	2026	79	5
MS-1 S 8	7.51276	4.77	0.41230	4.22	0.88	0.13215	2.23	2127	39	2175	43	2225	79	-5
MS-1 XS 39	6.89049	3.64	0.37886	3.20	0.87	0.13191	1.72	2124	30	2097	32	2071	57	2
MS-1 XS 34	6.60405	5.10	0.36427	4.51	0.88	0.13149	2.37	2118	42	2060	45	2002	78	5
MS-1 XS 22	7.35849	6.44	0.40590	4.85	0.75	0.13148	4.23	2118	74	2156	58	2196	90	-4
MS-1 XS 60	6.81901	5.32	0.37709	4.47	0.83	0.13115	2.87	2113	50	2088	47	2063	79	2
MS-1 XS 70	6.85095	4.24	0.37899	3.10	0.72	0.13111	2.89	2113	51	2092	38	2072	55	2
MS-1 XS 50	6.77615	4.65	0.37590	4.48	0.96	0.13074	1.22	2108	21	2083	41	2057	79	2
MS-1 XS 80	6.80366	5.68	0.37756	5.46	0.96	0.13069	1.55	2107	27	2086	50	2065	97	2
MS-1 S 6	7.07790	4.75	0.39393	3.93	0.82	0.13031	2.66	2102	47	2121	42	2141	72	-2
MS-1 S 1	6.64732	5.41	0.37025	4.95	0.91	0.13021	2.18	2101	38	2066	48	2031	86	3
MS-1 XS 53	6.71660	4.51	0.37690	4.15	0.91	0.12925	1.75	2088	31	2075	40	2062	73	1
MS-1 XS 27	6.25610	4.59	0.35120	3.05	0.65	0.12920	3.42	2087	60	2012	40	1940	51	7
MS-1 S 5	6.58645	4.02	0.36988	3.38	0.83	0.12915	2.19	2086	38	2058	35	2029	59	3
MS-1 S 7	7.01822	4.96	0.39423	4.16	0.83	0.12911	2.69	2086	47	2114	44	2142	76	-3
MS-1 XS 83	6.53102	5.64	0.36702	5.28	0.93	0.12906	1.99	2085	35	2050	50	2015	91	3
MS-1 XS 44	6.84013	5.16	0.38476	4.45	0.85	0.12893	2.62	2083	46	2091	46	2098	80	-1
MS-1 XS 30	6.24288	4.47	0.35127	3.84	0.85	0.12890	2.30	2083	40	2010	39	1941	64	7
MS-1 XS 23	6.48962	4.37	0.36549	4.07	0.92	0.12878	1.58	2081	28	2044	38	2008	70	4
MS-1 XS 56	6.38945	4.81	0.35999	4.55	0.94	0.12873	1.56	2081	27	2031	42	1982	78	5
MS-1 XS 55	6.58955	4.39	0.37126	3.74	0.84	0.12873	2.30	2081	40	2058	39	2035	65	2
MS-1 XS 24	6.86617	5.31	0.38698	4.38	0.82	0.12868	3.00	2080	53	2094	47	2109	79	-1
MS-1 XS 57	6.87852	4.24	0.38794	3.43	0.80	0.12860	2.50	2079	44	2096	38	2113	62	-2
MS-1 XS 85	6.39042	3.40	0.36090	3.16	0.92	0.12842	1.25	2076	22	2031	30	1986	54	4
MS-1 XS 81	6.59922	5.32	0.37304	4.93	0.92	0.12830	2.00	2075	35	2059	47	2044	86	2
MS-1 XS 90	6.62177	4.30	0.37485	3.43	0.79	0.12812	2.60	2072	46	2062	38	2052	60	1
MS-1 XS 20	6.46121	4.28	0.36582	3.78	0.87	0.12810	2.01	2072	35	2041	38	2010	65	3
MS-1 S 15	6.58412	4.23	0.37311	3.51	0.82	0.12799	2.36	2070	42	2057	37	2044	62	1
MS-1 XS 52	6.16097	4.46	0.34948	3.61	0.80	0.12786	2.63	2069	46	1999	39	1932	60	7
MS-1 S 14	6.62274	4.73	0.37581	4.33	0.91	0.12781	1.89	2068	33	2062	42	2057	76	1
MS-1 XS 71	6.61968	6.99	0.37594	6.86	0.98	0.12771	1.36	2067	24	2062	62	2057	121	0
MS-1 S 4	6.55422	8.54	0.37240	5.91	0.69	0.12765	6.16	2066	109	2053	75	2041	103	1
MS-1 XS 78	5.92376	4.08	0.34108	3.84	0.93	0.12596	1.40	2042	25	1965	35	1892	63	7
MS-1 XS 89	6.17770	3.98	0.35616	3.82	0.95	0.12580	1.12	2040	20	2001	35	1964	65	4
MS-1 XS 40	6.45517	4.81	0.37222	3.50	0.72	0.12578	3.30	2040	58	2040	42	2040	61	0
MS-1 XS 32	6.70117	5.70	0.38667	5.23	0.91	0.12569	2.27	2039	40	2073	50	2107	94	-3
MS-1 XS 35	6.23898	5.11	0.36130	4.99	0.97	0.12524	1.13	2032	20	2010	45	1988	85	2
MS-1 S 3	6.47380	5.16	0.37602	4.23	0.81	0.12487	2.94	2027	52	2042	45	2058	75	-2
MS-1 XS 51	6.45739	5.82	0.37859	4.63	0.79	0.12370	3.52	2010	62	2040	51	2070	82	-3
MS-1 XS 36	6.32745	4.08	0.37098	3.01	0.73	0.12370	2.75	2010	49	2022	36	2034	53	-1
MS-1 XS 88	5.95385	4.38	0.34967	3.73	0.84	0.12349	2.29	2007	41	1969	38	1933	62	4
MS-1 XS 69	6.30590	4.60	0.37097	4.13	0.89	0.12328	2.02	2004	36	2019	40	2034	72	-1

	Corrected isotope ratios							Dates (Ma)						
Analysis	207Pb*/235U*	±2σ (%)	206Pb*/238U	±2σ (%)	error corr.	207Pb*/206Pb*	±2σ (%)	207Pb*/206Pb*	±2σ (Ma)	207Pb*/235U	±2σ (Ma)	206Pb*/238U*	±2σ (Ma)	% disc.
MS-1 XS 72	5.77201	4.58	0.33972	4.31	0.93	0.12323	1.55	2003	28	1942	40	1885	70	6
MS-1 XS 45	5.94665	4.49	0.35099	4.00	0.88	0.12288	2.03	1998	36	1968	39	1939	67	3
MS-1 XS 29	6.09490	4.12	0.36074	3.08	0.73	0.12254	2.74	1993	49	1990	36	1986	53	0
MS-1 XS 31	5.85523	3.20	0.34819	2.64	0.81	0.12196	1.80	1985	32	1955	28	1926	44	3
MS-1 S 16	5.94813	5.05	0.35470	4.66	0.92	0.12162	1.94	1980	35	1968	44	1957	79	1
MS-1 XS 63	5.86283	6.03	0.35150	3.89	0.64	0.12097	4.61	1971	82	1956	52	1942	65	1
MS-1 XS 21	5.42368	4.97	0.33444	4.62	0.92	0.11762	1.83	1920	33	1889	43	1860	75	3
MS-1 XS 87	5.32471	4.13	0.33236	3.67	0.88	0.11619	1.90	1898	34	1873	35	1850	59	3
MS-1 XS 28	4.83072	5.85	0.32171	5.28	0.90	0.10890	2.52	1781	46	1790	49	1798	83	-1
MS-1 XS 19	3.34607	4.87	0.26097	4.32	0.88	0.09299	2.23	1488	42	1492	38	1495	58	0

Experiment on October 28, 2016

Isotope ratio and date errors do not include systematic calibration errors of 0.56% (207Pb/206Pb) and 1.26% (206Pb/238U) (2σ).
Trace element concentrations were deleted from analyses known to have intersected inclusions of other minerals based on P and Ti.
Activity of TiO2 for Ti-in-Zircon temperature calculation is 0.8.

	Corrected isotope ratios							Dates (Ma)						
Analysis	207Pb*/235U*	±2σ (%)	206Pb*/238U	±2σ (%)	error corr.	207Pb*/206Pb*	±2σ (%)	207Pb*/206Pb*	±2σ (Ma)	207Pb*/235U	±2σ (Ma)	206Pb*/238U*	±2σ (Ma)	% disc.
MS-5 XS 31	12.94825	4.71	0.49602	3.57	0.74	0.18933	3.08	2736	51	2676	44	2597	76	5
MS-5 XS 37	7.52060	5.16	0.38802	4.31	0.83	0.14057	2.83	2234	49	2175	46	2114	78	5
MS-5 XS 7	7.48713	6.33	0.38928	4.91	0.77	0.13949	4.00	2221	69	2171	57	2119	89	5
MS-5 XS 30	7.89786	5.49	0.41094	4.65	0.84	0.13939	2.92	2220	51	2219	49	2219	87	0
MS-5 XS 40	7.36733	8.49	0.38663	6.77	0.79	0.13820	5.12	2205	89	2157	76	2107	122	4
MS-5 XS 10	7.10214	7.19	0.37689	6.53	0.90	0.13667	3.02	2185	52	2124	64	2062	115	6
MS-5 S 3	7.27324	7.34	0.39404	5.77	0.78	0.13387	4.54	2149	79	2146	66	2142	105	0
MS-5 S 2	5.97977	3.85	0.32518	3.44	0.88	0.13337	1.72	2143	30	1973	33	1815	54	15
MS-5 XS 5	6.73169	5.82	0.37273	4.61	0.78	0.13099	3.56	2111	62	2077	51	2042	81	3
MS-5 XS 24	6.84742	5.96	0.37977	4.66	0.77	0.13077	3.71	2108	65	2092	53	2075	83	2
MS-5 XS 22	6.86811	5.68	0.38146	4.41	0.77	0.13058	3.58	2106	63	2095	50	2083	79	1
MS-5 XS 16	6.32491	4.50	0.35225	3.71	0.81	0.13023	2.54	2101	45	2022	39	1945	62	7
MS-5 XS 4	6.63186	4.57	0.37036	3.59	0.77	0.12987	2.82	2096	50	2064	40	2031	63	3
MS-5 XS 35	6.72180	8.82	0.37618	6.24	0.70	0.12959	6.24	2092	110	2075	78	2058	110	2
MS-5 XS 26	6.43505	4.10	0.36105	3.32	0.79	0.12927	2.42	2088	43	2037	36	1987	57	5
MS-5 XS 28	6.57935	6.31	0.36927	3.99	0.62	0.12922	4.89	2087	86	2057	56	2026	69	3
MS-5 XS 39	6.80291	6.42	0.38239	4.74	0.73	0.12903	4.34	2085	76	2086	57	2087	84	0
MS-5 XS 33	6.78720	5.44	0.38213	3.86	0.70	0.12882	3.83	2082	67	2084	48	2086	69	0
MS-5 XS 6	7.21542	6.57	0.40626	5.30	0.80	0.12881	3.88	2082	68	2138	59	2198	99	-6
MS-5 XS 23	6.03235	5.49	0.34026	4.96	0.89	0.12858	2.36	2079	41	1981	48	1888	81	9
MS-5 XS 25	6.87617	5.24	0.38787	4.50	0.85	0.12858	2.70	2079	48	2096	46	2113	81	-2
MS-5 XS 17	6.38137	4.96	0.36177	4.02	0.80	0.12793	2.90	2070	51	2030	43	1991	69	4
MS-5 XS 27	6.24511	5.45	0.35509	4.42	0.80	0.12755	3.18	2065	56	2011	48	1959	75	5
MS-5 XS 34	6.42519	4.25	0.36542	3.89	0.90	0.12752	1.72	2064	30	2036	37	2008	67	3
MS-5 XS 8	6.43728	5.85	0.36679	5.09	0.86	0.12729	2.88	2061	51	2037	51	2014	88	2
MS-5 XS 21	6.48858	5.62	0.36980	3.93	0.69	0.12726	4.02	2060	71	2044	49	2028	68	2
MS-5 XS 12	6.41101	4.38	0.36775	3.49	0.78	0.12644	2.65	2049	47	2034	38	2019	60	1
MS-5 XS 13	5.82159	5.04	0.33631	4.23	0.83	0.12555	2.74	2036	48	1950	44	1869	69	8
MS-5 XS 18	6.70275	5.86	0.38888	4.71	0.79	0.12501	3.50	2029	62	2073	52	2118	85	-4
MS-5 XS 19	5.90806	5.06	0.34372	4.14	0.81	0.12466	2.91	2024	52	1962	44	1905	68	6
MS-5 XS 29	6.17566	3.58	0.36092	2.45	0.66	0.12410	2.61	2016	46	2001	31	1987	42	1
MS-5 XS 36	6.29015	7.58	0.36971	5.78	0.76	0.12339	4.91	2006	87	2017	66	2028	101	-1
MS-5 XS 38	5.96943	5.43	0.35549	5.15	0.94	0.12179	1.71	1983	30	1971	47	1961	87	1
MS-5 XS 32	5.69660	5.54	0.34831	4.70	0.84	0.11862	2.92	1936	52	1931	48	1927	78	0
MS-5 XS 9	5.26726	4.98	0.33319	4.58	0.91	0.11465	1.95	1874	35	1864	42	1854	74	1
MS-5 XS 11	4.90498	7.08	0.32378	5.97	0.84	0.10987	3.82	1797	69	1803	60	1808	94	-1
MS-5 S 1	0.07305	15.28	0.01010	5.54	0.36	0.05248	14.24	306	324	72	11	65	4	79

Experiment on September 23, 2016

Isotope ratio and date errors do not include systematic calibration errors of 0.68% (207Pb/206Pb) and 1.44% (206Pb/238U) (2σ).
Trace element concentrations were deleted from analyses known to have intersected inclusions of other minerals based on P and Ti.
Activity of TiO2 for Ti-in-Zircon temperature calculation is 0.8.

	Concentrations (ppm)												
Analysis	P	Ti	Y	Nb	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy
MS-1 XS 58	162	7.38	433	2.61		5.10		0.51	0.59		6.37	2.50	39.2
MS-1 XS 82	295	14.45	1274	2.43		62.36	0.54	5.58	9.43	3.25	40.07	10.75	116.8
MS-1 XS 17	58	4.66	84	0.30		5.98			0.41	0.13	0.97	0.50	6.4
MS-1 S 2	122	6.59	907	0.47		11.89	0.08	2.14	4.83	0.62	27.02	7.65	85.9
MS-1 XS 46	114	5.14	274	0.58	0.10	2.46	0.03	0.14	0.90	0.21	5.04	1.84	24.8
MS-1 XS 61													
MS-1 XS 26	189	9.56	410	1.74		32.36		0.99	2.34		8.77	3.69	40.7
MS-1 XS 18													
MS-1 XS 54	334	7.77	943	5.40		21.15	0.06	1.19	2.23	0.18	13.49	6.51	79.0
MS-1 S 13	268	14.45	732	1.41	0.12	10.88	0.13	2.92	4.34	0.71	21.25	6.33	74.0
MS-1 S 10	238	5.70	1217	0.59		8.18	0.09	2.31	5.22	1.24	31.68	10.10	125.6
MS-1 XS 33	323	2.97	997	1.91		11.96	0.00	0.72	2.89	0.53	16.83	5.60	80.8
MS-1 XS 37	311	9.21	1292	2.91	0.07	9.74	0.22	3.05	5.34	1.71	30.30	11.00	114.3
MS-1 XS 42	252	5.56	1020	2.07		20.45	0.08	2.18	4.37	1.84	29.80	8.61	103.4
MS-1 XS 65	279	9.70	962	0.83		7.15	0.05	2.24	4.02	1.11	20.37	6.61	85.2
MS-1 XS 38	305	8.01	1093	3.94	0.03	15.23	0.11	1.79	4.92	0.26	25.42	9.35	108.6
MS-1 S 11	216	10.59	596	0.50		19.91	0.08	1.35	2.99	0.87	10.85	3.93	51.8
MS-1 XS 59	78	2.45	253	0.52	0.03	11.67	0.03	0.48	1.07	0.56	4.15	1.74	20.9
MS-1 XS 64	293	9.19	1199	1.70		16.66	0.12	3.76	6.21	1.79	33.29	9.28	118.5
MS-1 XS 91													
MS-1 XS 79	193	10.32	460	0.73		12.23	0.03	0.86	2.60	0.37	8.84	3.39	41.3
MS-1 XS 47	792	12.59	1125	0.25	118.60	242.63	35.09	180.13	44.89	0.34	77.22	18.23	160.1
MS-1 S 12	265	2.76	905	1.04		17.11	0.14	2.36	4.90	1.04	25.86	7.68	91.7
MS-1 XS 49	164	11.65	884	0.91		6.98	0.11	1.85	6.61	0.32	30.02	8.09	95.0
MS-1 S 8	237	10.07	800	1.44		14.69	0.06	1.13	3.51	0.59	17.35	6.11	73.1
MS-1 XS 39	1237	5.36	1643	4.67	28.61	107.27	14.67	92.82	31.46	4.17	67.51	16.19	182.7
MS-1 XS 34	178	23.30	502	1.09	0.09	17.75	0.09	1.77	2.71	0.49	10.09	4.09	46.5
MS-1 XS 22	83	0.77	166	0.09		6.27		0.26	0.40	0.10	1.87	0.97	13.2
MS-1 XS 60	290	8.18	566	0.92	0.88	20.20	0.43	2.74	2.58	0.44	10.36	3.79	51.7
MS-1 XS 70	230	16.89	520	0.76		23.66	0.07	2.56	4.70	0.83	17.70	4.49	54.1
MS-1 XS 50	222	4.93	953	1.86		6.97	0.02	0.46	2.16	0.41	14.38	6.05	81.0
MS-1 XS 80	192	5.55	653	1.30	0.50	13.33	0.26	3.42	4.27	1.21	17.41	5.16	63.6
MS-1 S 6	182	9.36	428	0.74		20.01	0.06	2.03	3.14	0.85	16.92	3.70	42.2
MS-1 S 1	184	6.60	585	1.33		19.05		0.82	1.68	0.63	10.66	3.74	44.0
MS-1 XS 53	96	4.84	36	0.10		2.99		0.37	0.54	0.30	2.88	0.63	4.5
MS-1 XS 27	344	22.36	1270	3.11		57.89	0.30	6.91	10.57	3.38	46.47	12.70	139.0
MS-1 S 5	168	2.51	605	1.33		24.81	0.05	0.39	1.95	0.66	11.68	4.32	51.2
MS-1 S 7	169	2.13	464	1.03		9.80		0.43	1.22	0.44	7.43	2.98	40.1
MS-1 XS 83	928	12.49	2123	0.57		1.25	0.26	3.91	9.28	0.79	47.58	16.54	212.0
MS-1 XS 44	129	5.74	314	1.94		20.05	0.01	0.81	1.08	0.15	5.47	2.45	28.8
MS-1 XS 30	245	5.90	1369	1.12		17.21	0.40	8.94	13.54	5.82	58.34	15.03	163.0
MS-1 XS 23	237	2.33	1047	5.76		6.13		0.85	3.40		23.07	8.85	109.6
MS-1 XS 56	194	4.11	653	3.09		27.61		0.86	2.29	0.26	12.63	4.11	56.4
MS-1 XS 55	248	15.27	742	0.68		12.40	0.15	2.92	5.51	0.65	21.87	6.75	78.0
MS-1 XS 24	182	7.23	942	1.35		18.35	0.18	4.60	7.57	0.97	27.61	8.46	93.6
MS-1 XS 57	245	8.84	621	0.80		35.07	0.18	3.62	8.77	1.85	26.13	6.48	68.8
MS-1 XS 85	199	9.29	759	5.17		14.73	0.06	1.03	2.95	0.10	17.10	5.87	70.7
MS-1 XS 81	619	8.50	1346	1.01		2.12	0.03	1.20	3.84	0.06	28.77	10.29	130.7
MS-1 XS 90	170	6.49	560	1.79		25.21	0.07	1.18	2.30	0.58	10.53	3.55	45.1
MS-1 XS 20	185	8.74	1316	0.58		3.66	0.16	4.61	8.25	0.34	42.92	12.82	136.6
MS-1 S 15	222	6.53	812	1.50		6.97		0.51	2.31	0.29	11.20	5.18	67.5
MS-1 XS 52	145	5.06	443	1.56		5.36	0.02	0.63	1.45	0.57	8.93	3.59	42.2
MS-1 S 14	185	20.75	1057	2.79	0.05	5.75	0.52	4.89	10.35	0.43	39.83	11.53	122.2
MS-1 XS 71	131	2.48	879	1.06	0.06	7.15	0.16	3.28	6.18	0.84	23.26	7.35	84.7
MS-1 S 4	157	22.56	382	0.62	0.06	3.15		1.30	1.05	0.23	10.95	2.99	37.8
MS-1 XS 78	179	4.82	643	0.71		3.41	0.04	1.08	2.25	0.46	11.74	3.96	51.8
MS-1 XS 89	241	4.40	1059	7.73		19.29		1.79	3.04	0.04	16.96	6.99	92.4
MS-1 XS 40	139	3.79	350	0.30		14.58	0.10	0.84	2.82	0.96	8.35	3.16	33.4
MS-1 XS 32	328	9.43	665	0.96		3.11	0.19	1.04	2.66	0.13	17.65	5.93	65.6
MS-1 XS 35	210	3.91	777	3.94	0.07	14.38	0.07	1.77	2.64	0.29	19.04	6.28	72.6
MS-1 S 3	122	14.93	513	1.87		5.22		1.01	2.90	0.08	10.69	3.89	49.6
MS-1 XS 51	220	10.83	734	0.77		12.09	0.23	2.14	5.85	1.36	21.98	7.33	79.4
MS-1 XS 36	187	9.02	475	1.82		17.25	0.05	0.54	1.16	0.13	7.95	3.19	42.7
MS-1 XS 88	390	10.10	1308	3.12	0.71	51.33	0.57	4.18	6.87	1.67	31.11	10.15	130.5
MS-1 XS 69	471	14.15	2747	4.16		162.22	0.69	11.58	20.03	9.20	89.66	25.35	299.9

	Concentrations (ppm)												
Analysis	P	Ti	Y	Nb	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy
MS-1 XS 72	208	6.38	539	3.59		21.20	0.07	0.76	2.09	0.12	13.60	4.11	51.8
MS-1 XS 45													
MS-1 XS 29	385	15.77	1720	2.18	0.10	36.54	0.34	6.06	11.15	3.88	47.94	14.94	178.1
MS-1 XS 31													
MS-1 S 16	596	12.51	1600	0.58	0.08	3.02	0.09	2.32	6.26	0.17	34.97	13.32	150.6
MS-1 XS 63	250	19.64	627	2.04		26.04	0.03	1.32	3.23	0.53	16.15	4.97	66.9
MS-1 XS 21	155	11.70	529	5.84		15.32	0.07	1.76	3.38	0.25	13.98	4.70	57.0
MS-1 XS 87	69	2.17	306	4.95		13.33	0.01		0.71		5.28	1.95	25.5
MS-1 XS 28	238	21.23	512	1.22		2.89	0.01	0.62	2.39		10.81	3.84	47.6
MS-1 XS 19	207	5.85	1385	6.84		80.25	0.12	4.01	8.77	2.41	28.55	11.29	129.0

	Concentrations (ppm)												
Analysis	P	Ti	Y	Nb	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy
MS-5 XS 31	101	4.09	208	0.87		8.84			0.61	0.21	4.83	1.65	16.4
MS-5 XS 37	88	1.45	129	0.04		2.38					0.19	0.55	9.6
MS-5 XS 7	222	2.88	869	4.36		8.31		0.32	2.41	0.20	13.82	5.80	79.7
MS-5 XS 30	144	5.01	386	0.66		8.23		0.68	1.42	0.73	7.06	2.89	31.8
MS-5 XS 40	391	21.97	924	1.67		18.20	0.08	1.54	3.29	2.07	22.06	6.29	80.4
MS-5 XS 10	231	8.38	555	0.95		8.59	0.10	1.85	3.95	0.76	23.21	5.52	57.1
MS-5 S 3	197	8.37	676	1.89		28.19	0.03	1.32	2.46	0.96	15.40	5.31	64.5
MS-5 S 2	171	5.20	736	0.85		16.57	0.12	2.70	6.67	0.99	19.16	5.56	64.0
MS-5 XS 5	247	6.57	821	0.72		14.73	0.07	1.76	3.01	1.35	19.02	5.40	69.3
MS-5 XS 24	165	11.56	638	1.30		3.48	0.08	0.61	2.23		17.02	4.55	65.0
MS-5 XS 22	242	24.25	818	0.97		17.68	0.17	3.85	6.48	0.76	30.54	7.40	85.8
MS-5 XS 16	394	16.35	1638	3.30		38.64	0.14	4.79	6.77	2.38	37.28	11.07	148.0
MS-5 XS 4	445	10.48	1273	0.64		8.75	0.15	3.03	4.59	0.49	32.26	10.19	122.5
MS-5 XS 35	173	8.95	394	0.56		21.08		1.06	1.51	0.42	8.08	2.50	33.6
MS-5 XS 26													
MS-5 XS 28	351	11.06	1098	1.44		14.03	0.25	2.86	9.12	1.97	34.02	10.00	111.6
MS-5 XS 39	151	8.36	420	0.31		10.70		0.98	2.32	0.14	9.89	2.98	37.2
MS-5 XS 33	204	16.07	561	0.67		25.74	0.09	3.40	5.93	1.20	18.50	5.20	58.5
MS-5 XS 6	107	5.52	369	0.19		12.57		0.63	1.15	0.60	9.54	2.31	25.6
MS-5 XS 23	334	7.55	1649	1.99		44.05	0.14	5.58	12.52	2.77	44.42	13.57	153.3
MS-5 XS 25	163	2.88	480	0.73		6.57			0.82	0.57	8.77	3.33	39.7
MS-5 XS 17	370	8.30	1374	2.69	0.09	20.85	0.10	3.15	4.14	1.54	31.08	10.79	128.2
MS-5 XS 27	367	10.95	2575	6.78	0.13	84.50	0.55	8.14	19.46	4.40	82.63	23.20	261.2
MS-5 XS 34													
MS-5 XS 8	403	10.38	977	0.75		14.69	0.11	2.08	4.16	0.44	25.05	7.24	92.4
MS-5 XS 21	338	17.33	922	1.35		5.02	0.32	4.99	5.52	0.00	28.18	9.66	102.9
MS-5 XS 12	187	6.10	730	2.24		9.26	0.12	0.77	3.63	0.08	19.83	6.80	75.0
MS-5 XS 13	242	13.49	715	2.20		23.58		1.67	2.78	0.12	10.62	5.22	64.2
MS-5 XS 18	468	44.61	1107	1.48		17.81	0.71	8.09	10.77	3.01	47.01	12.76	123.0
MS-5 XS 19	426	15.64	1942	2.90		57.45	0.26	3.92	9.07	2.73	36.65	14.34	159.9
MS-5 XS 29	485	7.96	1252	0.74		5.63		1.25	2.69	0.23	26.35	9.15	123.2
MS-5 XS 36	289	12.47	939	1.61		30.04	0.21	3.73	6.48	1.23	32.02	8.82	104.2
MS-5 XS 38	525	6.31	1422	1.28		17.42	0.14	3.89	6.16	1.50	26.35	9.32	121.4
MS-5 XS 32	172	13.13	754	4.81		9.96	0.02	0.85	4.31	0.13	20.05	6.96	75.4
MS-5 XS 9	312	11.39	717	0.80		19.14		1.45	2.58	0.49	17.36	5.49	72.3
MS-5 XS 11	148	8.65	1419	6.17		10.60	0.56	7.00	12.68	0.26	48.91	15.79	163.8
MS-5 S 1	276	3.51	2174	14.10	0.71	20.95	0.22	3.32	6.50		46.51	17.12	210.8

	Concentrations (ppm)										
Analysis	Ho	Er	Tm	Yb	Lu	Hf	Ta	Th	U	Th/U	Ti-in-zircon T(°C)
MS-1 XS 58	15.18	69.2	17.2	180	24.7	9133	2.09	41.4	114	0.36	738
MS-1 XS 82	44.95	188.6	41.6	430	61.0	6733	0.53	264.1	154	1.72	805
MS-1 XS 17	2.37	14.0	4.0	53	9.2	8971	0.08	30.2	157	0.19	698
MS-1 S 2	31.73	134.0	28.9	277	41.2	9551	0.61	137.7	184	0.75	728
MS-1 XS 46	9.90	41.2	10.4	108	16.1	6595	0.22	34.1	75	0.45	706
MS-1 XS 61											
MS-1 XS 26	14.80	65.4	14.7	159	22.0	9836	0.73	120.9	78	1.55	763
MS-1 XS 18											
MS-1 XS 54	33.12	165.4	44.2	488	69.6	10254	2.64	128.7	260	0.49	743
MS-1 S 13	26.18	112.9	25.9	251	37.4	7415	0.60	50.6	72	0.70	805
MS-1 S 10	43.69	192.3	45.6	426	61.9	8869	0.32	45.4	73	0.62	715
MS-1 XS 33	34.63	163.7	39.5	431	72.6	10244	0.89	83.6	177	0.47	661
MS-1 XS 37	44.01	188.5	47.4	478	73.6	8057	1.66	111.6	183	0.61	759
MS-1 XS 42	35.01	152.5	36.8	381	57.4	9027	0.78	130.9	161	0.81	713
MS-1 XS 65	33.87	155.3	37.3	375	55.2	7599	0.87	64.0	79	0.81	764
MS-1 XS 38	39.61	179.4	39.1	375	52.2	10086	2.01	152.5	137	1.11	746
MS-1 S 11	18.91	95.1	23.1	248	40.7	8072	0.29	98.4	117	0.84	773
MS-1 XS 59	8.28	38.6	10.9	134	20.6	9490	0.18	53.3	148	0.36	646
MS-1 XS 64	43.24	178.1	41.2	417	59.2	7688	0.68	73.9	119	0.62	759
MS-1 XS 91											
MS-1 XS 79	15.09	78.7	19.1	224	32.7	8516	0.64	33.5	54	0.62	770
MS-1 XS 47	38.66	122.4	23.1	181	20.4	10834	0.21	74.8	152	0.49	790
MS-1 S 12	34.07	143.2	34.1	324	49.5	8713	0.87	207.5	220	0.94	655
MS-1 XS 49	32.19	131.4	26.9	271	35.8	8545	0.51	116.7	183	0.64	782
MS-1 S 8	27.53	119.3	28.7	277	42.8	7758	0.57	60.3	102	0.59	768
MS-1 XS 39	61.34	256.6	56.0	523	72.6	7600	1.45	130.6	160	0.81	710
MS-1 XS 34	17.24	71.0	17.3	164	25.8	8898	0.60	46.1	49	0.94	857
MS-1 XS 22	5.84	26.1	7.4	93	15.8	10537	0.31	12.1	42	0.29	565
MS-1 XS 60	19.32	87.0	21.6	242	36.1	9047	0.57	56.7	102	0.56	748
MS-1 XS 70	18.72	75.9	17.1	177	24.7	8347	0.34	63.9	60	1.07	821
MS-1 XS 50	32.33	145.2	36.4	369	50.0	8610	2.11	126.8	225	0.56	702
MS-1 XS 80	21.96	97.0	24.6	273	44.7	8833	0.28	102.4	165	0.62	713
MS-1 S 6	14.47	64.7	15.3	161	23.7	8345	0.32	56.1	75	0.75	761
MS-1 S 1	19.10	94.6	23.1	266	47.6	9208	0.59	65.6	91	0.72	728
MS-1 XS 53	1.30	4.1	0.8	6	0.8	8007		10.9	241	0.05	701
MS-1 XS 27	47.09	195.6	42.3	402	58.2	6926	0.71	64.3	53	1.21	853
MS-1 S 5	20.23	95.3	22.9	260	42.7	10998	0.68	75.2	111	0.68	647
MS-1 S 7	15.71	76.0	19.1	207	33.8	10610	0.66	34.1	92	0.37	635
MS-1 XS 83	75.35	310.6	70.7	653	88.2	10601	0.32	63.7	223	0.29	790
MS-1 XS 44	11.32	49.7	13.1	134	19.5	10360	0.98	24.3	56	0.43	716
MS-1 XS 30	54.40	208.2	41.7	391	52.6	6023	0.41	55.4	98	0.57	718
MS-1 XS 23	41.28	175.0	39.1	388	50.8	10547	2.29	74.4	245	0.30	642
MS-1 XS 56	19.55	101.8	28.2	329	49.9	11928	2.40	114.6	275	0.42	687
MS-1 XS 55	28.10	115.3	26.5	278	36.3	7346	0.36	40.9	49	0.83	810
MS-1 XS 24	35.11	142.9	32.4	312	46.2	9391	0.68	56.4	76	0.74	736
MS-1 XS 57	19.70	83.0	19.6	196	26.8	9236	0.49	103.4	130	0.79	755
MS-1 XS 85	27.53	114.2	24.6	242	30.7	10488	2.23	119.9	278	0.43	760
MS-1 XS 81	49.59	208.5	48.1	454	63.0	10470	0.61	56.8	177	0.32	752
MS-1 XS 90	18.64	89.7	24.3	284	45.8	9553	0.93	86.9	131	0.66	727
MS-1 XS 20	47.66	195.8	43.7	395	50.5	8070	0.36	88.2	201	0.44	754
MS-1 S 15	27.44	132.7	34.6	383	61.4	8830	0.91	50.8	112	0.45	727
MS-1 XS 52	14.84	67.8	16.2	168	25.1	9415	1.03	58.7	173	0.34	705
MS-1 S 14	39.75	152.2	31.1	288	40.5	8867	1.09	82.1	116	0.71	844
MS-1 XS 71	31.23	134.3	32.3	322	50.2	8569	0.47	121.7	263	0.46	647
MS-1 S 4	13.86	55.9	12.8	125	17.2	8546	0.46	12.8	21	0.62	854
MS-1 XS 78	20.09	101.6	28.5	316	52.3	8588	0.72	59.6	311	0.19	700
MS-1 XS 89	38.61	170.7	43.1	444	60.3	9416	3.37	114.9	324	0.35	693
MS-1 XS 40	12.27	50.3	12.5	126	20.2	9907	0.28	57.3	66	0.87	680
MS-1 XS 32	25.06	108.3	24.7	239	35.1	9974	0.52	28.8	81	0.35	762
MS-1 XS 35	28.27	118.6	26.8	251	38.2	11205	2.17	159.9	324	0.49	683
MS-1 S 3	19.91	76.7	18.4	173	24.1	9511	0.79	44.2	84	0.53	808
MS-1 XS 51	27.24	107.9	25.0	248	35.0	7504	0.36	39.3	50	0.79	775
MS-1 XS 36	16.81	76.3	19.0	195	31.5	10165	1.07	46.2	75	0.61	757
MS-1 XS 88	47.12	215.7	48.5	495	73.0	8279	1.41	214.3	183	1.17	768
MS-1 XS 69	102.80	404.5	88.7	855	119.6	6487	1.19	348.3	183	1.90	802

	Concentrations (ppm)										
Analysis	Ho	Er	Tm	Yb	Lu	Hf	Ta	Th	U	Th/U	Ti-in-zircon T(°C)
MS-1 XS 72	18.10	82.0	19.5	192	27.2	9161	1.41	169.4	308	0.55	725
MS-1 XS 45											
MS-1 XS 29	63.15	265.5	60.7	590	87.1	7267	0.85	131.4	111	1.19	814
MS-1 XS 31											
MS-1 S 16	56.32	245.0	55.0	522	80.2	10934	0.45	77.6	177	0.44	790
MS-1 XS 63	22.29	99.5	25.5	253	34.7	8723	0.82	44.9	40	1.13	838
MS-1 XS 21	19.84	78.1	17.3	185	22.0	8985	2.60	180.3	197	0.92	783
MS-1 XS 87	10.25	45.9	12.3	136	19.8	11178	2.42	85.0	232	0.37	637
MS-1 XS 28	18.68	77.5	17.9	187	24.5	8903	0.61	67.0	113	0.59	847
MS-1 XS 19	46.84	230.2	57.0	589	78.1	8916	2.24	240.4	191	1.26	717

	Concentrations (ppm)										
Analysis	Ho	Er	Tm	Yb	Lu	Hf	Ta	Th	U	Th/U	Ti-in-zircon T(°C)
MS-5 XS 31	6.49	31.4	7.9	76	14.5	10581	0.40	34.7	71	0.49	686
MS-5 XS 37	4.08	22.9	6.0	72	14.0	13479	0.34	20.3	99	0.21	607
MS-5 XS 7	31.07	143.7	33.0	304	47.5	10733	2.61	33.9	89	0.38	658
MS-5 XS 30	11.82	59.7	16.4	179	37.4	10722	0.64	69.9	163	0.43	704
MS-5 XS 40	31.52	145.3	32.1	294	53.9	9200	0.34	30.2	43	0.70	851
MS-5 XS 10	17.64	75.3	16.2	154	26.2	10218	0.23	54.7	166	0.33	750
MS-5 S 3	23.42	110.7	26.5	266	44.0	9191	1.06	66.2	81	0.82	750
MS-5 S 2	23.42	110.4	26.9	289	54.3	9755	0.37	198.1	300	0.66	707
MS-5 XS 5	26.00	124.9	30.0	318	60.1	8695	0.26	49.2	96	0.51	728
MS-5 XS 24	23.00	95.8	22.0	216	31.1	9047	0.43	34.5	107	0.32	782
MS-5 XS 22	27.74	117.4	25.0	243	33.2	8195	0.34	53.7	60	0.89	862
MS-5 XS 16	56.51	254.7	58.1	565	85.6	7503	1.29	160.1	188	0.85	818
MS-5 XS 4	44.67	188.7	40.5	364	58.7	10664	0.49	78.7	136	0.58	772
MS-5 XS 35	12.94	61.6	14.8	155	26.6	11122	0.20	37.2	47	0.79	757
MS-5 XS 26											
MS-5 XS 28	37.27	162.8	36.8	326	57.3	8611	0.39	73.4	108	0.68	777
MS-5 XS 39	13.69	64.3	14.4	143	24.9	11272	0.32	37.6	58	0.65	750
MS-5 XS 33	19.77	79.4	16.3	159	27.3	9252	0.36	89.6	78	1.15	816
MS-5 XS 6	11.36	62.5	16.1	186	36.0	8870	0.20	32.4	60	0.54	712
MS-5 XS 23	57.80	258.3	60.4	610	90.0	8193	0.88	241.1	233	1.04	740
MS-5 XS 25	16.67	78.2	19.6	229	42.2	9142	0.41	86.5	191	0.45	658
MS-5 XS 17	48.34	213.7	49.3	483	74.7	7666	1.14	138.5	186	0.74	749
MS-5 XS 27	98.05	399.1	84.3	779	115.2	9266	1.88	123.0	192	0.64	776
MS-5 XS 34											
MS-5 XS 8	31.50	149.7	33.5	324	55.0	9792	0.68	65.2	115	0.57	771
MS-5 XS 21	33.16	137.6	31.8	261	35.4	8531	0.54	96.0	146	0.66	824
MS-5 XS 12	25.71	111.0	24.1	211	33.7	8375	0.42	65.0	125	0.52	721
MS-5 XS 13	22.32	101.2	24.4	251	38.6	9689	1.50	126.1	221	0.57	797
MS-5 XS 18	39.87	156.6	34.5	304	41.6	7975	0.56	195.9	110	1.77	938
MS-5 XS 19	64.59	299.7	79.1	793	116.6	6818	0.87	259.3	242	1.07	813
MS-5 XS 29	45.81	199.4	43.4	408	64.1	10706	0.48	64.0	178	0.36	745
MS-5 XS 36	32.12	143.9	30.9	299	48.4	10286	0.62	46.1	52	0.88	789
MS-5 XS 38	44.64	225.1	52.7	512	88.0	11202	0.85	117.2	224	0.52	724
MS-5 XS 32	26.83	111.0	23.3	214	37.8	10870	1.39	242.7	285	0.85	795
MS-5 XS 9	25.68	109.4	25.4	238	40.9	10302	0.64	110.6	205	0.54	780
MS-5 XS 11	52.28	214.5	42.5	378	55.8	7109	2.47	81.0	138	0.59	753
MS-5 S 1	82.44	362.2	78.1	724	101.7	9325	3.82	226.0	623	0.36	674