Supplementary text for Holland et al., 2014 – Crystal shear zone

Geochemical Evolution and Metallogeny of Continents (GEMOC) Methods

U-Pb geochronology

U-Pb geochronology at the GEMOC Key Centre was conducted *in-situ* using an HP 4500 inductively coupled plasma quadrupole mass spectrometer (ICP-MS) paired with a custom-made UV laser ablation microprobe (LAM) that incorporates a petrographic microscope for detailed sample scrutiny (Norman et al., 1996). Samples and standards were ablated also in a custom-made chamber and transported to the ICP-MS with He carrier gas in order to minimize U/Pb fractionation. In addition, the laser was focused above the sample in order to further minimize fractionation effects; laser conditions were rigorously maintained throughout the duration of sample analysis.

Samples were compared to the zircon standard 02123, with four standard analyses completed before and after every 12 unknowns. The 02123 standard is a gem quality zircon from a Norwegian syenite that yields a perfectly concordant ID-TIMS age of 295 ± 1 Ma (Ketchum et al., 2001). Isotope ratios for both standards and unknowns are determined from background-subtracted signals; the uncertainties in both the background and signal are added in quadrature.

Masses 206, 207, 208, 232, and 238 were measured, and all isotopic ratios were calculated using the in-house on-line data reduction software GLITTER. Mass 204 was not measured due to large isobaric interference from Hg. Common Pb correction was therefore conducted after Andersen (2002), using $^{206}Pb/^{238}U$, $^{207}Pb/^{235}U$, and $^{208}Pb/^{232}Th$ ratios to solve mass-balance equations and correct the data in three-dimensional concordia space.

For additional details regarding analytical methods see Belousova et al. (2001), Griffin et al. (2004), and Jackson et al. (2004).

Hf isotopes

Hf-isotope analyses at GEMOC were carried out in-situ using a New Wave/Merchantek UP-213 laser-ablation microprobe, attached to a Nu Plasma multi-collector ICPMS. The analyses were carried out with a beam diameter of ca 55 µm and a 5 Hz repetition rate. This resulted in total Hf signals of 1-6 × 10^{-11} A, depending on conditions and the Hf contents. Typical ablation times were 100-120 seconds, resulting in pits 40-60 µm deep. He carrier gas transported the ablated sample from the laser-ablation cell via a mixing chamber to the ICPMS torch.

Interference of ^{176}Lu on ^{176}Hf is corrected by measuring the intensity of the interference-free ^{175}Lu isotope and using ^{176}Lu/^{175}Lu = 0.02669 (DeBievre & Taylor 1993) to calculate ^{176}Lu/^{177}Hf. Similarly, the interference of ^{176}Yb on ^{176}Hf has been corrected by measuring the interference-free ^{172}Yb isotope and using ^{176}Yb/^{172}Yb to calculate ^{176}Yb/^{177}Hf. The appropriate value of ^{176}Yb/^{172}Yb was determined by spiking the JMC475 Hf standard with Yb, and finding the value of ^{176}Yb/^{172}Yb (0.58669) required to yield the value of 176Hf/177Hf obtained on the pure Hf solution. Detailed discussions regarding the overlap corrections for ^{176}Lu and ^{176}Yb are provided in Pearson et al. (2008). Analyses of standard zircons (Griffin et al., 2000; Pearson et al., 2008) illustrate the precision and accuracy obtainable on the ^{176}Hf/^{177}Hf ratio, despite the severe corrections on ^{176}Hf. The typical 2 SE precision on the ^{176}Hf/^{177}Hf ratios presented here is ± 0.00002, equivalent to ± 0.7 εHf unit.

The Mud Tank and 91500 zircon standards, analyzed together with the samples, were used as independent control on reproducibility and instrument stability. Average ^{176}Hf/^{177}Hf values obtained for the Mud Tank (0.282523 ± 0.000066) and 91500 (0.282299 ± 0.000042) during this study are similar to the long-term averages, which in turn are similar to the TIMS values (Griffin et al., 2006, 2007).

For the calculation of εHf values, we have adopted the chondritic values of Bouvier et al. (2008): ^{176}Lu/^{177}Hf (CHUR, today) = 0.0336 and ^{176}Hf/^{177}Hf (CHUR, today) = 0.282785. For the calculation of εHf values, we have adopted the decay constant (1.867 × 10-11 yr^{-1}) for ^{176}Lu proposed by Scherer et al. (2001) because it gives the best fit for terrestrial rocks (Amelin and Davis, 2005; Albarède et al., 2006).

For additional details regarding analytical methods see Griffin et al. (2000, 2002, 2004).

Arizona Laserchron Center (ALC) Methods

U-Pb geochronology

U-Pb geochronology of zircons is conducted *in-situ* by laser ablation multicollector inductively coupled plasma mass spectrometry (LA-MC-ICPMS). The analyses involve ablation of zircon with a New Wave UP193HE Excimer laser prior to May 2011, and afterwards a Photon Machines Analyte G2 excimer laser using a spot diameter of 30 microns. The ablated material is carried in helium into the plasma source of a Nu HR ICPMS, which is equipped with a flight tube of sufficient width that U, Th, and Pb isotopes are measured simultaneously. All measurements are made in static mode, using Faraday detectors with 3 × 10^{11} ohm resistors for ^{238}U, ^{232}Th, ^{208}Pb-^{206}Pb, and discrete dynode ion counters for ^{204}Pb and ^{202}Hg. Ion yields are ~0.8 mv per ppm. Each analysis consists of one 15-second integration on peaks with the laser off (for backgrounds), 15 one-second integrations with the laser firing, and a 30 second delay to purge the previous sample and prepare for the next analysis. The resulting ablation pit is ~15 microns in depth.

For each analysis, the errors in determining ^{206}Pb/238U and ^{206}Pb/^{204}Pb result in a measurement error of ~1-2% (at 2-sigma level) in the ^{206}Pb/^{238}U age. The errors in measurement of ^{206}Pb/^{207}Pb and ^{206}Pb/^{204}Pb also result in ~1-2% (at 2-sigma level) uncertainty in age for grains that are >1.0 Ga, but are substantially larger for younger grains due to low intensity of the ^{207}Pb signal. For most analyses, the cross-over in precision of ^{206}Pb/^{238}U and ^{206}Pb/^{207}Pb ages occurs at ~1.0 Ga.

^{204}Hg interference with ^{204}Pb is accounted for measurement of ^{202}Hg during laser ablation and subtraction of ^{204}Hg according to the natural ^{202}Hg/^{204}Hg of 4.35. This Hg is correction is not significant for most analyses because our Hg backgrounds are low (generally ~150 cps at mass 204).

Common Pb correction is accomplished by using the Hg-corrected ^{204}Pb and assuming an initial Pb composition from Stacey and Kramers (1975). Uncertainties of 1.5 for ^{206}Pb/^{204}Pb and 0.3 for ^{207}Pb/^{204}Pb are applied to these compositional values based on the variation in Pb isotopic composition in modern crystal rocks.

Inter-element fractionation of Pb/U is generally ~5%, whereas apparent fractionation of Pb isotopes is generally <0.2%. In-run analysis of fragments of a large zircon crystal (generally every fifth measurement) with known age of 563.5 ± 3.2 Ma (2-sigma error) is used to correct for this fractionation. The uncertainty resulting from the calibration correction is generally 1-2% (2-sigma) for both ^{206}Pb/^{207}Pb and ^{206}Pb/^{238}U ages.

For additional details regarding analytical methods see Gehrels et al. (2006, 2008), and Gehrels and Pecha (2014).

Hf isotopes

Hf isotope analyses are conducted with a Nu HR ICPMS connected to a New Wave UP193HE laser (2009-2010) or a Photon Machines Analyte G2 excimer laser (2011). Instrument settings are established first by analysis of 10 ppb solutions of JMC475 and a Spex Hf solution, and then by analysis of 10 ppb solutions containing Spex Hf, Yb, and Lu. The mixtures range in concentration of Yb and Lu, with ^{176}(Yb+Lu) up to 70% of the ^{176}Hf. When all solutions yield $^{176}Hf/^{177}Hf$ of ~0.28216, instrument settings are optimized for laser ablation analyses and seven different standard zircons (Mud Tank, 91500, Temora, R33, FC52, Plesovice, and Sri Lanka) are analyzed. These standards are included with unknowns on the same epoxy mounts. When precision and accuracy are acceptable, unknowns are analyzed using exactly the same acquisition parameters.

Laser ablation analyses are conducted with a laser beam diameter of 40 microns, with the ablation pits located on top of the U-Pb analysis pits. CL images are used to ensure that the ablation pits do not overlap multiple age domains or inclusions. Each acquisition consists of one 40-second integration on backgrounds (on peaks with no laser firing) followed by 60 one-second integrations with the laser firing. Using a typical laser fluence of ~5 J/cm2 and pulse rate of 7 hz, the ablation rate is ~0.8 microns per second. Each standard is analyzed once for every ~20 unknowns.

Isotope fractionation is accounted for using the method of Woodhead et al. (2004): βHf is determined from the measured $^{179}Hf/^{177}Hf$; βYb is determined from the measured $^{173}Yb/^{171}Yb$ (except for very low Yb signals); βLu is assumed to be the same as βYb; and an exponential formula is used for fractionation correction. Yb and Lu interferences are corrected by measurement of $^{176}Yb/^{171}Yb$ and $^{176}Lu/^{175}Lu$ (respectively), as advocated by Woodhead et al. (2004). Critical isotope ratios are $^{179}Hf/^{177}Hf$ =0.73250 (Patchett & Tatsumoto, 1980); $^{173}Yb/^{171}Yb$ = 1.132338 (Vervoort et al. 2004); $^{176}Yb/^{171}Yb$ =0.901691 (Vervoort et al., 2004; Amelin and Davis, 2005); $^{176}Lu/^{175}Lu$ = 0.02653 (Patchett, 1983). All corrections are done line-by-line. For very low Yb signals, βHf is used for fractionation of Yb isotopes. The corrected $^{176}Hf/^{177}Hf$ values are filtered for outliers (2-sigma filter), and the average and standard error are calculated from the resulting ~58 integrations. There is no capability to use only a portion of the acquired data.

All solutions, standards, and unknowns analyzed during a session are reduced together such that unknown values are calibrated based on the standards analyzed during the same session. The most weight is put on the following standards: Temore2, 91500, Mud Tank, FC1, and Plesovice, with less reliance placed on R33. The cutoff for using βHf versus βYb is determined by monitoring the average offset of the standards from their known values, and the cutoff is set at the minimum offset. For most data sets, this is achieved at ~6 mv of ^{171}Yb. For sessions in which the standards yield $^{176}Hf/^{177}Hf$ values that are shifted consistently from the know values, a correction factor is applied to the $^{176}Hf/^{177}Hf$ of all standards and unknowns. This correction factor is generally less than 1 epsilon unit. For example: all values were increased by 1.0 epsilon units for samples analyzed in August 2012, all values increased by 0.3 epsilon units for samples analyzed in May 2013, all values were decreased by 0.2 epsilon units for samples analyzed in May 2014.

The $^{176}Hf/^{177}Hf$ at time of crystallization is calculated from measurement of present-day $^{176}Hf/^{177}Hf$ and $^{176}Lu/^{177}Hf$, using the decay constant of ^{176}Lu ($\lambda = 1.867 \times 10^{-11}$) from Scherer et al. (2001) and Söderlund et al. (2004). No capability is provided for calculating Hf Depleted Mantle model ages because the $^{176}Hf/^{177}Hf$ and $^{176}Lu/^{177}Hf$ of the source material(s) from which the zircon crystallized is not known.

For additional details regarding analytical methods see Cecil et al. (2011), and Gehrels and Pecha (2014).

Pluton descriptions by sample

Grapevine Camp pluton (K12-81L): The 1737 ± 1 Ma Grapevine camp pluton is a medium grained, biotite granite exposed at river mile 81 as a narrow body aligned with S_2

foliation (Hawkins et al., 1996). Truncated on its western margin by the Vishnu fault zone, the Grapevine Camp pluton is marks the edge of the Mineral Canyon block. The Vishnu fault zone is the first of several thermal boundaries juxtaposing blocks with peak temperatures that vary up to 200 °C, but remarkably constant pressures of 0.6 – 0.7 GPa (Ilg et al., 1996; Dumond et al., 2007). The Mineral Canyon block is characterized by peak temperatures of 735 ± 135 °C (Dumond et al., 2007). The pluton preserves an annealed mylonitic fabric defined by ribbons of quartz and feldspar rich layers (S_1) that is cut by the Phanerozoic Vishnu fault (Huntoon et al., 1980), but the last ductile motion on the shear zone is inferred to be between 1.68 – 1.3 Ga (Ilg et al., 1996). The eastern edge of the pluton displays clear intrusive relations to the Vishnu schist on its eastern side (Hawkins et al., 1996; Ilg et al., 1996). The age of the pluton and the presence of early gneissic layering suggests that the Grapevine Camp pluton is part of the 1.74 – 1.71 Ga suite of arc-plutons, however it is compositionally similar to the younger granite-pegmatite anatectic suite.

Hawkins et al. (1996) described the external morphology an appearance of zircons separated from the Grapevine Camp pluton as slightly rounded and colorless, with pitted crystal faces and ubiquitous fractures and dusty inclusions. Our observations show similar features; zircons from the Grapevine Camp pluton range in size from long axes of approximately 70 – 200 µm with aspect ratios from 1:1 to 2:1. Grains are predominantly rounded and subhedral. Internal textures revealed by CL imaging show many blotchy CL-dark regions disrupting, and in some cases completely obliterating, igneous growth zoning.

A total of 18 grains from the Grapevine Camp pluton were analyzed, with 21 total analyses conducted; 3 attempts were made to analyses distinct zircon domains, but those analyses did not pass the data reduction process. Of the 21 analyses, only 6 yielded satisfactory results. Most of the analyses were discarded due to high common Pb. Several grains yielded high U and Th concentrations (>1000 ppm), but all analyses yielded U/Th ratios between 0.8 – 2.6. No systematic variation was observed between age, U concentration, U/Th ratios, or concordance.

Hawkins et al. (1996) interpreted the external features of these zircons to mean that they were partially resorbed during magmatism, recrystallization, or deformation. The internal textures revealed by our CL provide additional evidence for the alteration of Grapevine Camp pluton zircons. Quenching of CL is an effect of radiation damage (Geisler et al., 2001; Nasdala et al., 2002, 2003), thus the morphology, internal texture, and U and Th concentrations of these grains are consistent with extensive metamictization. The lack of reliable ages obtained from these zircons and common Pb contamination is therefore not surprising. Nevertheless, 6 grains yielded >95% concordant ages with a weighted mean of 1756 ± 16 Ma (MSWD = 0.3). This age is in contrast with the age of 1737 ± 1 Ma reported by Hawkins et al. (1996), and the depositional constraints of 1750 – 1740 Ma for the Grand Canyon Metamorphic Suite, but is within uncertainty of the latter. Given the high degree of metamictization of these grains, it is likely that some open-system behavior is influencing the age determination. While the Hf data presented herein is linked to these ages, we defer to the 1737 ± 1 Ma reported by Hawkins et al. (1996) for the true crystallization age of the Grapevine Camp pluton.

Of the 6 Grapevine Camp pluton zircons that yielded reliable U-Pb ages, we obtained Hf isotopic data from 4 of them. ε $Hf_{(t)}$ values ranged from 6.3 to 10.4. The ε Hf of the depleted mantle at 1756 Ma is 10.1. Three of the four analyses are indistinguishable from the depleted mantle ε $Hf_{(t)}$, and the fourth is still juvenile at 3.8 epsilon units below depleted mantle (Bahlburg et al., 2011).

Zoroaster pluton (K12-85.3L): The 1740 ± 2 Ma Zoroaster pluton is a medium grained biotite granite to granodiorite orthogneiss (Hawkins et al., 1996). Well-documented intrusive relationships into the Grand Canyon Metamorphic Suite include screens of Vishnu schist that are entrained in the pluton (Figure 11). Localized mafic domains suggest some degree of mamga mixing (Figure 11). The compositional layering of the pluton and adjacent schists define a kilometer-scale F_2 plunging 44° towards 226° (Lingley, 1973; Ilg et al., 1996). The Zoroaster pluton lies in the Clear Creek metamorphic block, which is characterized by temperatures from 518 – 552 ± 110 °C.

The morphology of Zoroaster pluton zircons as described by Hawkins et al. (1996) are doubly terminated and prismatic. Our observations consist of predominantly rounded and subhedral, with a few euhedral grains. Zircons range in size from long axes of approximately 50 – 250 µm with aspect ratios from 1:1 to 2:1. Internal textures revealed by CL imaging show many blotchy CL-dark regions disrupting, and in some cases completely obliterating, igneous growth zoning. Some grains preserve pristine igneous growth zoning.

A total of 25 grains from the Zoroaster pluton were analyzed, with 22 grains passing the data reduction process. 2 analyses were discarded due to high ^{204}Pb counts, and 1 was discarded due to reverse discordance. No attempts were made to analyze distinct crystal domains based on CL texture. The two grains excluded for high ^{204}Pb yielded high U concentrations. Finally, 2 ages were manually removed from the population based on filtering of age, concordance, U concentration, and U/Th ratios using the AgePick program (Gehrels, 2009). The Remaining 20 grains yielded a weighted mean age of 1755 ± 14 Ma (MSWD = 0.6). This is within uncertainty of the 1740 ± 2 Ma reported by Hawkins et al. (1996).

We obtained Hf isotopic data from 21 zircons separated from the Zoroaster pluton. $\varepsilon Hf_{(t)}$ values range from 5.9 to 12.7. The εHf value of the depleted mantle at 1755 Ma is 10.1, and of the 21 Zoroaster pluton zircons, 19 of them yielded $\varepsilon Hf_{(t)}$ values that are indistinguishable from the depleted mantle at the 2σ level. All analyses are juvenile after Bahlburg et al. (2011).

Horn Pluton (K12-90.5R): The 1713 ± 2 Ma Horn pluton is a medium grained hornblende quartz diorite to tonalite (Hawkins et al., 1996). The pluton outcrops as a long sliver oriented parallel to the S_2 foliation, but displays intrusive relations with the Grand Canyon Metamorphic suite (Ilg et al., 1996). A strong northwest striking magmatic foliation (S_1) is transposed by the S_2 foliation. Peak temperatures for the Trinity Creek metamorphic block, in which the Horn pluton lies, are 722 ± 83 °C (Dumond et al., 2007).

Hawkins et al. (1996) described the external morphology of zircons from the Horn pluton as clear grains ranging from prismatic to equant. Our observations show that zircons range in size from long axes of approximately 100 – 400 μm with aspect ratios from 1:1 to 2:1. Grains are predominantly subhedral, with many broken and some showing signs of resorption. Internal textures revealed by CL imaging show igneous growth zoning; most grains shows fairly pristine concentric zoning, but some show irregular sector zoning and some appear nearly homogenous. Blotchy, CL-dark sections are minimal any typically restricted to the edges of grains.

A total of 30 grains from the Horn Creek pluton were analyzed, and every analysis passed the data reduction process. Two attempts were made to date distinct crystal domains, however both attempted resulted in overlapping ages. Three analyses were excluded after manual filtering using the AgePick program revealed much higher U concentrations than all other grains. The remaining 29 analyses yielded a weighted mean age of 1719 ± 14 Ma (MSWD = 0.3), in good agreement with the 1713 ± 1 Ma age of Hawkins et al. (1996). Interestingly, Hawkins et al. (1996) reported a single grains that plotted to the right of their best chord. They interpreted this result as a mixture of a 1713 Ma overgrowth and an inherited core that they were unable to identify by transmitted light observation (Hanchar and Rudnick, 1995). However, our CL images show no evidence for inherited cores in Horn pluton zircons, and our attempts to identify distinct age domains failed.

We obtained 28 Hf isotopic analyses from the Horn pluton. $\varepsilon Hf_{(t)}$ values ranged from 5.5 to 12.4. Of the 28 analyses, 18 were indistinguishable from the εHf value of the depleted mantle at 1719 Ma, and all were within 5 epsilon units of the depleted mantle value of 10.2.

Trinity pluton (K12-91.5R): The 1730 ± 3 Trinity pluton is a medium to coarse grained granodiorite to granitic biotite orthogneiss (Hawkins et al., 1996). In the past it has been speculated that the Trinity gneiss was basement to the supracrustal Grand Canyon Metamorphic Suite (Noble and Hunter, 1916), however its age and field relations clearly show that it is intrusive to the Brahma schist (Ilg et al., 1996). The pluton preserves a strong gneissic layering (S_1) and outcrops as an isoclinally folded (F_2) sheet (Ilg et al., 1996). Trinity pluton is naturally underlain by the Trinity Creek metamorphic block.

Hawkins et al. (1996) described the zircons of the Trinity pluton as clear, colorless, doubly terminated and euhedral. Our observations show that zircons from the Trinity pluton range in size from long axes of approximately 100 – 300 µm with aspect ratios from 1:1 to 3:1. Grains are predominantly elongate and subhedral to euhedral. Internal textures revealed by CL imaging show concentric igneous growth zoning and many grains with CL-dark rims that were avoided during analysis. Several apparently distinct cores were identified in CL images, and attempts were made to date discrete crystal domains (see below).

A total of 20 grains from the Trinity pluton were analyzed with 17 core-mantle pair analyses conducted yielding 37 total analyses. Of the 37, 28 analyses passed the data reduction process. 7 analyses were discarded due to high ^{204}Pb counts, 1 due to unacceptable ^{206}Pb/^{238}U age uncertainty, and 1 due to discordance. Many analyses discarded for high ^{204}Pb counts were conducted quite near to CL-dark rims and likely included some metamict material. Finally, 1 age was removed during manual filtering using AgePick.

Although there appeared to be many CL-distinct crystal domains, all analyses attempting to discern cores from mantles yielded overlapping ages. Furthermore, no systematic variation was observed between U concentration, U/Th, or concordance for cores and mantles. A weighted mean age of 1755 ± 16 Ma (MSWD = 0.4) was determined from 27 analyses. This age is in contrast with Hawkins et al. (1996) age of 1730 ± 3 Ma, but within uncertainty of the depositional age of the Granite Gorge Metamorphic Suite into which it intrudes.

We obtained 23 Hf isotopic analyses from the Trinity pluton. $\varepsilon Hf_{(t)}$ values range from 5.7 to 11.4 and of the 23 total grains 18 are indistinguishable from the 10.1 $\varepsilon Hf_{(t)}$ of the depleted mantle. All grains are within five epsilon units of the depleted mantle.

Boucher pluton (K12-96.2L): The Boucher pluton is a granodiorite to tonalitic pluton that outcrops at river mile 96.2 and is bounded on its eastern side by the 96 Mile shear zone (Ilg et al., 1996). The pluton is weakly foliated with strain localization on its western margin related to motion on the 96 Mile shear zone (Hawkins et al., 199; Ilg et al., 1996). The 96 Mile shear zone marks the boundary between the Trinity Creek block and the Topaz Canyon block, which at greenshist to lower amphibolite grade preserves the lowest grade metamorphism in the Upper Granite Gorge (Ilg et al., 1996; Dumond et al., 1996). An identical age of 1714 ± 1 Ma was determined from both Pb-Pb and U-Pb analysis of titanite (Hawkins, 1996), indicating that peak temperatures in the Topaz Canyon block were below the closure temperature of titanite (~590 °C). In this paper, we present 25 new U-Pb zircon ages from the Boucher pluton.

Zircons from the Boucher pluton range in size from long axes of approximately 100 – 300 μm with aspect ratios from 1:1 to 3:1. Grains are predominantly elongate and subhedral to euhedral. Internal textures revealed by CL imaging show concentric igneous growth zoning and many grains with CL-dark rims that were avoided during analysis. Several apparently distinct cores were identified in CL images, and attempts were made to date discrete crystal domains on every grain (see below).

A total of 25 grains from the Trinity pluton were analyzed with 25 core-mantle pair analyses conducted yielding 50 total analyses. Of the 50, 25 analyses passed the data reduction process. 20 analyses were discarded due to high ^{204}Pb counts, 1 due to unacceptable ^{206}Pb/^{238}U age uncertainty, 2 due to reverse discordance, and 2 due to discordance.

In total, 8 core-mantle pair analyses passed the data reduction process, however only 2 core-mantle pairs yielded non-overlapping ages. 20 of the 25 analyses were used to calculate a weighted mean age of 1730 ± 15 Ma (MSWD = 0.5). This age includes 6 core-mantle pairs that yielded overlapping ages. This age is barely within uncertainty of the titanite ages of Hawkins (1996); however, with the higher closure temperature of zircon, it is likely that our new age of 1730 Ma is a more accurate crystallization age for the Boucher pluton.

No systematic variation was observed between U concentration, U/Th, or concordance in these core-mantle pairs. The remaining 4 analyses came from core analyses and yield a variety of ages. Grain K12-96.2L-1C yielded an age of 1839 ± 19 Ma, which corresponds to the 1840 ± 1 Ma age of the Elves Chasm gneiss (Hawkins et al., 1996). Grain K12-96.2L-22C yielded an age of 1945 ± 22 Ma. Grain K12-96.2L-17C yielded an age of 2483 ± 24 Ma, corresponding quite closely to the 2481 Ma age peak defined in the Vishnu schist (Shufeldt et al., 2010). Finally, grain K12-96.2L-3C yielded an age of 2598 ± 22 Ma. Grains K12-96.2L-1C and 22C did not yield mantle analyses that passed the data reduction process, however grains K12-96.2L-1C and 3C yielded mantle analyses that contributed to the 1730 Ma weighted mean age.

The morphology of these inherited cores varies, however all mantles display concentric igneous growth zoning. K12-96.2L-1C is a homogenous CL-dark care with an irregular shape. K12-96.2L-3C is slightly rounded with igneous growth zoning evident in CL-texture. Between the core and mantle is a thin CL-dark rim. K12-96.2L-17C is nearly euhedral with complex igneous zoning. K12-96.2L-22C is also nearly euhedral, with faint igneous growth zoning and a generally CL-dark texture.

We obtained 20 Hf isotopic analyses from Boucher pluton zircons. 17 Analyses from the 1730 Ma population yield $\varepsilon Hf_{(t)}$ values that range from 5.7 to 11.8. All grains from this population yielded $\varepsilon Hf_{(t)}$ values within five epsilon units of the depleted mantle, and 15 analyses were indistinguishable from the depleted mantle $\varepsilon Hf_{(t)}$ value of 10.1 at 1730 Ma. Grain K12-96.2L-1C yielded an epsilon Hf value of 8.7, which suggests the involvement of Elves Chasm gneiss like crust. Grain K12-96.2L-17C yielded an evolved $\varepsilon Hf_{(t)}$ value of -2.9, and grain K12-96.2L-17C yielded an intermediate value of -2.9.

Tuna Creek Pluton (13H-99R; K05-100.5): Zircons from the Tuna Creek pluton range in size from long axes of approximately 50 – 200 µm, though most grains are ≤100 µm, with aspect ratios from 1:1 to 1:3. Grains are predominantly subhedral to euhedral. Internal textures revealed by CL imaging show concentric igneous growth zoning, and many have CL-dark rims. Distinct core and rim textures were identified in some cases, but were unable to be resolved by a 30 µm beam.

A total of 54 grains from the Tuna Creek pluton were analyzed at the ALC, with 40 grains passing the data reduction process. Manual filtering of ages via AgePick yielded interesting results; 34 grains show a near continuum of ages from 1725 – 1928 Ma. An additional 6 grains yield ages ranging from 2399 – 3007 Ma. 17 grains of similar U/Th ratios, U concentration, and concordance yielded a weighted mean age of 1751 ± 15 Ma (MSWD = 1.1). Similarly, 25 grains analyzed at the GEMOC Key Centre yield ages ranging from 1732 – 2936 Ma, with 7 grains defining a weighted mean age of 1737 ± 7 Ma (MSWD = 0.7). In total, 65 ages from the Tuna Creek pluton range from 1725 ± 10 Ma to 3007 ± 60 Ma. 24 grains contribute to a peak age of 1740 ± 14 Ma (MSWD = 1.5) which we take to be the crystallization age of the Tuna Creek pluton. The inherited population defines an age peak of 2.48 Ga that is identical to that of the Vishnu Schist. The morphology and CL-texture of inherited grains is varied, but all together indistinguishable the younger population.

Inheritance was identified in the Tuna pluton previously, however those workers were unable to assign a reliable age to the Tuna pluton. Hawkins et al. (1996) reported that the age of the Tuna pluton ranged from 1750 – 1710 Ma with >2.0 Ga inheritance. Our age of 1740 ± 14 Ma is consistent with both previous geochronologic constraints and field relations; the Tuna pluton displays both S_1 and S_2 foliations, and is thus interpreted to have been emplaced either before or during D_1 deformation (Karlstrom et al., 2003).

Elves Chasm gneiss (K12-115L; K06-113): The Elves Chasm gneiss is a lineated hornblende-biotite tonalite to quartz diorite which at 1840 ± 1 Ma is presently the oldest plutonic rock in the southwestern United States.

Zircons from the Elves Chasm gneiss range in size from long axes of approximately 60 – 200 µm with aspect ratios from 1:1 to 2:1. Grains are predominantly subhedral. Internal textures revealed by CL imaging show concentric igneous growth zoning commonly with CL-dark rims.

A total of 27 grains from the Elves Chasm gneiss were analyzed at the ALC, with 4 core-mantle pair analyses conducted for a total of 31 analyses. No core-mantle pairs passed the data reduction process; however, our results show that there was no distinct age population of cores. In all, 14 analyses passed the data reduction process. 16 analyses were discarded due to high ^{204}Pb counts, and 1 analysis due to low $^{206}Pb/^{204}Pb$ ratios. The remaining 14 grains yield a weighted mean age of 1850 ± 18 Ma (MSWD = 1.4). This age is within 2σ error of the 1840 ± 1 Ma age of Hawkins et al. (1996).

24 U-Pb ages were obtained from zircons analyzed at the GEMOC Key Centre. These ages yielded a weighted mean age of 1842 ± 5 Ma (MSWD = 0.9) in excellent agreement with the age of Hawkins et al. (1996).

Ruby Pluton (K06-107): The 1716.6 ± 0.5 Ma Ruby pluton, exposed from river mile 102 – 108, comprises intermingled mafic to intermediate phases (Hawkins et al., 1996). The eastern margin of the pluton shows intrusive relations with supracrustal rocks. Meanwhile, the pluton is bounded in its western side by the Bass shear zone, and displays a weak magmatic foliation near the contact that is concordant with the S_1 fabric in the adjacent supracrustal rocks (Ilg et al., 1996). The Bass shear zone marks the western edge of the Tuna Creek metamorphic block, which is underlain mostly by the Ruby pluton and Tuna Creek plutons, and characterized by peak temperatures of 769 ± 188 °C.

Hawkins et al. (1996) described the zircon population from the Ruby pluton as large, clear, equant, and inclusion free grains. BSE imaging of zircons analyzed at the GEMOC Key Centre shows rounded equant to subhedral grains with some inclusions and ubiquitous fractures. Back scattered electron images (BSE) are less effective at revealing internal textures than CL images, however internal oscillatory zoning is displayed in most grains. Some show irregular zoning and nearly homogenous textures. No inherited grains or xenocrystic cores were identified in the Ruby pluton.

A weighted mean of 10 analyses yields an age of 1726 ± 14 Ma (MSWD = 0.1), in good agreement with the previous age of Hawkins et al. (1996).

$\varepsilon Hf_{(t)}$ values from the Ruby pluton yielded a tight cluster from 7.2 to 9.8, suggesting that the Ruby pluton is derived from juvenile 1.75 Ga crust.

Diamond Creek Pluton (K06-228.3): The 1736 ± 1 Ma Diamond Creek pluton is exposed from river mile 212 – 228.5 (Karlstrom et al., 2003). It displays abundant magma mingling textures including local ultramafic cumulate texture.

Zircons separated from the Diamond Creek pluton are rounded to anhedral with abundant inclusions and fractures. Internal textures revealed by BSE are irregular, although igneous zoning is locally preserved. A weighted mean of 10 analyses yields an age of 1738 ± 14 Ma (MSWD = 0.2), in excellent agreement with the previous age of Karlstrom et al. (2003). One grain yielded an age of 1820 ± 50 Ma, which overlaps with the age of the Elves Chasm Gneiss, but no older xenocrystic grains were found.

$\varepsilon Hf_{(t)}$ values range from 5.0 to 10.3 and most are indistinguishable from the depleted mantle curve. The presence of a juvenile 1820 Ma zircon may suggest that the Diamond Creek pluton was in part derived from, or interacted with Elves Chasm age crust during its formation.

238-Mile Pluton (K06-238-2): The 238-Mile pluton is a granitic gneiss from within the Gneiss Canyon shear zone. The Gneiss Canyon shear zone extends from river mile 234 – 242 and is a broad high strain zone with locally developed mylonite zones. A variety of supracrustal migmatitic gneisses are injected with granitic melts. The Gneiss Canyon shear zone represents the largest significant metamorphic discontinuity in the Grand Canyon region, where rocks to the west of the Gneiss Canyon shear zone record P-T conditions that correspond to ~15 – 20 km depths are juxtaposed against ~10 km rocks to the east.

Zircons separated from the 238-Mile pluton are primarily rounded with aspect ratios of 1:1 to 1:2. Some grains preserve pristine igneous zoning, and others yield more homogenous BSE textures.

The 238-Mile pluton has never been previously dated. A weighted mean of 21 analyses yields an age of 1731 ± 14. The 238-Mile pluton yielded 3 grains that overlap with the age of the Elves Chasm Gneiss, and an additional 2 ages of 2275 Ma and 2453 Ma. The latter corresponds well to the age peak found in the Vishnu Schist, and the age of 2275 is a globally rare age.

$\varepsilon Hf_{(t)}$ values in the primary 1730 Ma population range from 10.5 to -2.8; values indistinguishable from the depleted mantle to more evolved values that reflect the involvement of older crustal material in the pluton’s genesis. Of the 3 grains that overlap with the Elves

Chasm Gneiss, only one grain yielded a juvenile $\varepsilon Hf_{(t)}$ value. The oldest grains yield evolved $\varepsilon Hf_{(t)}$ values from -0.9 to -3.4, which is similar to the $\varepsilon Hf_{(t)}$ values of other xenocrystic grains found in the Tuna and 245-Mile plutons.

245-Mile Pluton (K06-245-2):

Zircons separated from the 245-Mile pluton are primarily subhedral and somewhat rounded, but two grains are extensively resorbed. Aspect ratios range from 1:1 to 1:3. Most grains contain inclusions and show some fracturing. Pristine igneous zoning is also displayed in all grains except the two that are extensively resorbed.

An age of 1720 ± 5 Ma was reported for the 245-Mile pluton (Karlstrom et al., 2003), which is in contrast to our weighted mean of 15 ages that yields 1741 ± 13 Ma, however the well-developed S_1 foliation preserved in the pluton may suggest that the older age is more accurate. Three older ages ranging from 2454 Ma to 2658 Ma were also obtained. One of these ages comes from a resorbed grain, however the other two are subhedral grains that display pristine igneous zoning indistinguishable from the younger population

$\varepsilon Hf_{(t)}$ values in the young population range from 2.0 to 7.2, which is somewhat lower than most of the other plutons in Grand Canyon. None of these primary grains yield $\varepsilon Hf_{(t)}$ values that are within error of the depeted mantle. In contrast, one of the older xenocrystic grains yielded a juvenile value of 8.9 at 2645 Ma. The other two grains yielded more evolved $\varepsilon Hf_{(t)}$ values ranging from 0.2 to -2.6.

Table DR1. U-Pb geochronologic analyses of Vishnu Schist (ALC).

						Isotope ratios							Apparent ages (Ma)						
Analysis	U (ppm)	206Pb 204Pb	U/Th	206Pb* 207Pb*	± (%)	207Pb* 235U*	± (%)	206Pb* 238U	± (%)	error corr.	206Pb* 238U*	± (Ma)	207Pb* 235U	± (Ma)	206Pb* 207Pb*	± (Ma)	Best age (Ma)	± (Ma)	Conc (%)
OS08842A-1	588	45658	3.3	8.8246	0.2	5.3112	0.8	0.3399	0.8	0.98	1886.3	13.6	1870.7	7.2	1853.3	2.9	1853.3	2.9	101.8
OS08842A-2	595	4986	7.5	9.0902	0.8	4.7549	1.6	0.3135	1.4	0.88	1757.8	21.5	1777.0	13.4	1799.5	13.8	1799.5	13.8	97.7
OS08842A-3	113	13212	1.5	5.5290	0.4	12.7337	1.1	0.5106	1.1	0.94	2659.3	23.3	2660.2	10.7	2660.8	6.6	2660.8	6.6	99.9
OS08842A-4	171	115575	2.1	5.4956	0.3	12.4391	2.6	0.4958	2.6	0.99	2595.7	55.4	2638.1	24.5	2670.9	4.6	2670.9	4.6	97.2
OS08842A-5	205	21671	1.9	8.2260	0.4	5.9110	2.6	0.3527	2.5	0.99	1947.3	42.7	1962.9	22.3	1979.3	7.0	1979.3	7.0	98.4
OS08842A-6	73	320950	2.1	5.7147	0.4	11.9465	1.1	0.4951	1.0	0.93	2592.9	21.3	2600.2	10.1	2605.9	6.7	2605.9	6.7	99.5
OS08842A-8	164	238621	2.3	6.1475	0.2	10.5619	0.7	0.4709	0.6	0.93	2487.6	13.1	2485.4	6.3	2483.6	4.2	2483.6	4.2	100.2
OS08842A-9	152	136824	2.8	9.1746	0.3	4.7772	1.3	0.3179	1.3	0.98	1779.3	20.0	1780.9	11.1	1782.7	5.2	1782.7	5.2	99.8
OS08842A-10	126	2176	2.7	9.0692	1.5	4.6245	7.6	0.3042	7.5	0.98	1712.0	112.4	1753.7	63.8	1803.7	28.1	1803.7	28.1	94.9
OS08842A-11	132	1717	1.7	8.9075	4.4	4.9522	5.8	0.3199	3.8	0.65	1789.4	59.6	1811.2	49.3	1836.4	80.0	1836.4	80.0	97.4
OS08842A-12	427	8353	3.6	5.6475	0.3	11.2544	3.4	0.4610	3.4	1.00	2443.9	69.1	2544.4	31.8	2625.6	5.0	2625.6	5.0	93.1
OS08842A-16	190	7979	1.7	8.7863	1.7	5.2399	3.0	0.3339	2.5	0.83	1857.3	40.0	1859.1	25.6	1861.2	30.4	1861.2	30.4	99.8
OS08842A-17	205	17628	2.5	6.1426	0.2	10.6348	0.8	0.4738	0.7	0.96	2500.1	14.9	2491.7	7.0	2484.9	3.5	2484.9	3.5	100.6
OS08842A-18	319	357901	3.0	8.7838	0.2	5.3482	1.9	0.3407	1.9	1.00	1890.1	31.7	1876.6	16.6	1861.7	3.5	1861.7	3.5	101.5
OS08842A-19	372	1973	4.0	9.0218	2.4	4.5185	3.9	0.2957	3.0	0.78	1669.7	44.6	1734.4	32.1	1813.3	43.5	1813.3	43.5	92.1
OS08842A-20	495	25846	1.9	5.8219	0.9	11.6090	1.1	0.4902	0.6	0.56	2571.4	13.4	2573.4	10.6	2574.9	15.8	2574.9	15.8	99.9
OS08842A-22	249	6719	1.7	9.0031	0.9	4.9700	2.1	0.3245	1.9	0.91	1811.8	30.0	1814.2	17.7	1817.0	15.8	1817.0	15.8	99.7
OS08842A-23	756	3964	0.8	5.4523	4.0	13.4333	7.9	0.5312	6.9	0.87	2746.5	153.2	2710.6	74.9	2683.9	65.5	2683.9	65.5	102.3
OS08842A-24	102	189339	1.4	5.4952	0.4	12.8493	1.2	0.5121	1.1	0.93	2665.6	23.5	2668.7	10.9	2670.9	7.0	2670.9	7.0	99.8
OS08842A-26	142	3647	4.1	8.6077	1.2	5.4435	3.8	0.3398	3.7	0.95	1885.9	59.9	1891.7	33.0	1898.2	21.0	1898.2	21.0	99.4
OS08842A-27	507	18533	1.2	8.8609	0.6	5.2128	1.1	0.3350	0.9	0.84	1862.6	15.2	1854.7	9.5	1845.9	10.8	1845.9	10.8	100.9
OS08842A-28	161	9874	3.1	9.1445	3.1	4.6816	3.2	0.3105	1.0	0.30	1743.1	15.0	1764.0	27.1	1788.7	56.2	1788.7	56.2	97.5
OS08842A-29	123	960	2.5	6.1510	2.5	10.0472	3.1	0.4482	1.8	0.59	2387.3	36.5	2439.1	28.7	2482.6	42.4	2482.6	42.4	96.2
OS08842A-30	874	5227	2.5	9.1396	0.7	3.7842	2.8	0.2508	2.7	0.97	1442.8	35.3	1589.4	22.6	1789.7	12.2	1789.7	12.2	80.6
OS08842A-32	322	56887	1.5	9.2180	0.3	4.7591	1.1	0.3182	1.1	0.97	1780.8	16.3	1777.7	9.1	1774.1	5.1	1774.1	5.1	100.4
OS08842A-33	376	5055	4.6	9.2201	0.8	4.3168	4.9	0.2887	4.8	0.99	1634.9	69.2	1696.6	40.0	1773.7	14.4	1773.7	14.4	92.2
OS08842A-34	463	10216	1.1	5.3927	0.4	12.0593	9.2	0.4717	9.2	1.00	2490.8	189.6	2609.0	86.3	2702.1	6.2	2702.1	6.2	92.2
OS08842A-35	302	1395	1.5	8.2050	1.0	5.9496	1.6	0.3540	1.2	0.76	1953.9	20.1	1968.5	13.7	1983.9	18.4	1983.9	18.4	98.5
OS08842A-36	220	4451	1.2	8.5327	2.4	5.3154	6.4	0.3289	5.9	0.92	1833.3	94.0	1871.3	54.5	1913.9	43.8	1913.9	43.8	95.8
OS08842A-37	256	3866	1.3	8.4832	1.7	5.6248	2.7	0.3461	2.1	0.78	1915.8	35.3	1919.9	23.5	1924.3	30.6	1924.3	30.6	99.6
OS08842A-38	485	23182	2.7	5.9428	0.3	11.5527	2.0	0.4979	2.0	0.99	2604.9	43.5	2568.9	19.1	2540.5	4.6	2540.5	4.6	102.5
OS08842A-39	459	2800	2.4	8.9282	1.0	4.6374	2.6	0.3003	2.4	0.92	1692.7	35.1	1756.0	21.5	1832.2	18.6	1832.2	18.6	92.4
OS08842A-40	335	92264	2.5	9.1600	0.2	4.8312	0.8	0.3210	0.8	0.96	1794.4	12.1	1790.3	6.8	1785.6	4.1	1785.6	4.1	100.5
OS08842A-42	210	37721	1.6	9.2027	0.6	4.7698	1.9	0.3184	1.8	0.95	1781.7	27.5	1779.6	15.6	1777.1	10.6	1777.1	10.6	100.3
OS08842A-43	304	6355	5.1	8.6851	0.7	5.0918	2.0	0.3207	1.8	0.93	1793.3	28.9	1834.7	16.9	1882.0	13.3	1882.0	13.3	95.3
OS08842A-44	218	2317	1.4	8.5799	2.2	5.4938	2.6	0.3419	1.2	0.48	1895.6	20.1	1899.6	21.9	1904.0	40.2	1904.0	40.2	99.6
OS08842A-45	148	10879	1.1	5.8516	1.2	12.0167	2.3	0.5100	2.0	0.85	2656.6	42.5	2605.7	21.6	2566.4	20.5	2566.4	20.5	103.5
OS08842A-47	446	8040	4.9	9.1431	1.1	5.0682	3.6	0.3361	3.5	0.95	1867.8	56.2	1830.8	30.9	1789.0	20.7	1789.0	20.7	104.4
OS08842A-48	412	10414	1.8	8.8327	0.8	5.2740	3.1	0.3379	2.9	0.96	1876.3	47.9	1864.7	26.1	1851.7	14.9	1851.7	14.9	101.3
OS08842A-50	225	4135	2.0	5.8635	0.6	11.0862	3.6	0.4715	3.5	0.99	2489.9	72.8	2530.4	33.3	2563.0	10.0	2563.0	10.0	97.1
OS08842A-53	391	14631	3.1	8.7663	0.3	5.2935	1.0	0.3366	0.9	0.96	1870.1	15.0	1867.8	8.2	1865.3	5.1	1865.3	5.1	100.3
OS08842A-54	418	2786	1.9	7.5257	4.1	7.3605	4.2	0.4017	0.8	0.19	2177.1	14.6	2156.2	37.6	2136.3	72.2	2136.3	72.2	101.9
OS08842A-55	588	29221	1.8	6.1677	0.2	10.4434	1.4	0.4672	1.4	0.99	2471.1	28.3	2474.9	12.9	2478.0	3.0	2478.0	3.0	99.7
OS08842A-56	411	6409	2.0	5.6483	0.7	12.5600	2.7	0.5145	2.6	0.96	2675.9	56.5	2647.2	25.2	2625.4	12.2	2625.4	12.2	101.9
OS08842A-57	271	4701	2.7	9.0831	1.4	4.9715	2.2	0.3275	1.7	0.77	1826.3	26.7	1814.5	18.5	1801.0	25.6	1801.0	25.6	101.4
OS08842A-58	276	12827	1.7	9.1281	0.5	4.9351	1.7	0.3267	1.6	0.95	1822.5	25.3	1808.3	14.2	1791.9	9.8	1791.9	9.8	101.7
OS08842A-59	127	5567	2.5	5.8146	0.4	11.6703	1.9	0.4922	1.9	0.98	2580.0	39.4	2578.3	17.7	2577.0	6.0	2577.0	6.0	100.1
OS08842A-60	124	22780	2.6	6.1817	0.6	10.6211	0.9	0.4762	0.7	0.77	2510.6	15.0	2490.6	8.7	2474.2	10.2	2474.2	10.2	101.5
OS08842A-61	119	33440	2.6	6.2878	0.3	10.0650	1.6	0.4590	1.6	0.98	2435.1	32.3	2440.8	14.9	2445.5	4.8	2445.5	4.8	99.6
OS08842A-62	182	37198	3.0	6.1502	0.2	10.6656	3.5	0.4757	3.5	1.00	2508.7	73.5	2494.4	32.9	2482.8	4.1	2482.8	4.1	101.0
OS08842A-63	328	8938	1.7	7.9447	0.3	6.3771	0.8	0.3675	0.7	0.90	2017.4	11.9	2029.1	6.7	2041.0	6.0	2041.0	6.0	98.8
OS08842A-66	277	3429	3.2	6.3863	1.1	9.2770	2.7	0.4297	2.5	0.92	2304.3	49.0	2365.8	25.2	2419.1	18.0	2419.1	18.0	95.3
OS08842A-67	246	8018	3.3	9.2745	0.6	4.6187	1.7	0.3107	1.6	0.94	1744.0	23.7	1752.7	13.9	1762.9	10.7	1762.9	10.7	98.9
OS08842A-69	652	3796	1.8	9.1186	1.8	4.6743	3.1	0.3091	2.6	0.83	1736.4	39.2	1762.6	26.1	1793.8	32.0	1793.8	32.0	96.8
OS08842A-70	96	12221	2.5	8.8164	0.7	5.3935	1.5	0.3449	1.3	0.87	1910.1	21.2	1883.8	12.6	1855.0	13.2	1855.0	13.2	103.0
OS08842A-71	220	8655	2.5	9.1357	0.6	4.8123	1.1	0.3189	0.9	0.82	1784.2	14.1	1787.1	9.2	1790.4	11.3	1790.4	11.3	99.6
OS08842A-72	182	226170	2.1	6.1487	0.1	10.6908	0.9	0.4768	0.9	0.99	2513.1	18.9	2496.6	8.5	2483.2	2.4	2483.2	2.4	101.2
OS08842A-73	142	3818	1.3	8.7652	0.9	5.2654	1.4	0.3347	1.1	0.77	1861.3	17.5	1863.3	12.0	1865.5	16.3	1865.5	16.3	99.8
OS08842A-74	169	19694	2.6	6.1428	0.4	10.6710	1.0	0.4754	0.9	0.92	2507.2	18.3	2494.9	8.9	2484.9	6.5	2484.9	6.5	100.9
OS08842A-75	184	3156	1.5	6.8117	1.2	8.5391	3.0	0.4219	2.8	0.91	2268.9	53.1	2290.1	27.6	2309.0	21.3	2309.0	21.3	98.3
OS08842A-76	166	34278	3.3	9.1682	0.6	4.9184	1.0	0.3270	0.8	0.83	1824.0	13.4	1805.4	8.5	1784.0	10.1	1784.0	10.1	102.2
OS08842A-78	123	3312	2.6	6.2410	0.3	10.0831	1.8	0.4564	1.7	0.98	2423.7	35.0	2442.4	16.3	2458.1	5.6	2458.1	5.6	98.6
OS08842A-79	557	9847	2.2	9.3724	0.7	4.4744	2.1	0.3041	2.0	0.94	1711.9	29.5	1726.2	17.4	1743.7	13.5	1743.7	13.5	98.2
OS08842A-80	559	10558	1.2	5.4044	0.2	13.2816	1.4	0.5206	1.4	0.99	2701.7	30.4	2699.9	13.1	2698.5	2.9	2698.5	2.9	100.1
OS08842A-81	187	47954	3.1	12.9384	1.2	2.0672	1.7	0.1940	1.2	0.72	1142.9	12.6	1138.0	11.4	1128.7	23.0	1128.7	23.0	101.3
OS08842A-83	462	12841	2.7	9.1968	0.4	4.7891	1.1	0.3194	1.0	0.93	1787.0	15.3	1783.0	8.9	1778.3	7.0	1778.3	7.0	100.5
OS08842A-84	305	5886	2.4	8.0131	1.7	6.4238	1.9	0.3733	0.8	0.42	2045.0	13.9	2035.5	16.7	2025.9	30.7	2025.9	30.7	100.9
OS08842A-88	383	33911	2.2	9.3333	0.3	4.6929	1.5	0.3177	1.5	0.99	1778.3	23.3	1766.0	12.7	1751.4	4.7	1751.4	4.7	101.5
OS08842A-90	134	34178	1.9	9.3499	0.8	4.4766	1.5	0.3036	1.3	0.86	1709.0	19.9	1726.6	12.9	1748.1	14.6	1748.1	14.6	97.8
OS08842A-92	557	33506	7.0	5.6165	0.3	12.2118	1.8	0.4974	1.7	0.99	2602.8	37.4	2620.8	16.6	2634.7	4.3	2634.7	4.3	98.8
OS08842A-93	219	2389	2.2	9.2389	2.4	4.3330	3.7	0.2903	2.8	0.76	1643.2	41.0	1699.7	30.6	1770.0	44.0	1770.0	44.0	92.8
OS08842A-95	509	275465	1.5	9.2259	0.3	4.6985	1.7	0.3144	1.6	0.98	1762.3	25.0	1767.0	13.8	1772.5	6.1	1772.5	6.1	99.4
OS08842A-96	211	73584	2.1	9.1914	0.2	4.7290	1.0	0.3152	1.0	0.97	1766.5	14.9	1772.4	8.3	1779.4	4.3	1779.4	4.3	99.3
OS08842A-97	183	7882	1.0	5.1893	0.9	14.1576	2.5	0.5328	2.4	0.94	2753.4	53.5	2760.3	24.1	2765.4	14.2	2765.4	14.2	99.6
OS08842A-99	179	250810	1.7	5.5043	0.3	12.8994	1.1	0.5150	1.1	0.97	2677.7	24.3	2672.3	10.8	2668.2	4.6	2668.2	4.6	100.4
OS08842A-100	201	57978	2.3	9.2024	0.5	4.8754	1.5	0.3254	1.4	0.95	1816.0	22.4	1798.0	12.5	1777.2	8.3	1777.2	8.3	102.2
K05-986-104-1	830	1381	4.1	9.0766	1.3	2.9416	6.6	0.1936	6.5	0.98	1141.1	67.6	1392.7	50.0	1802.3	23.0	1802.3	23.0	63.3
K05-986-104-4	242	3028	1.3	5.9905	1.8	10.1160	2.7	0.4395	2.0	0.74	2348.4	39.5	2445.4	25.2	2527.1	31.1	2527.1	31.1	92.9
K05-986-104-5	192	22659	2.1	9.3791	0.4	4.6817	1.4	0.3185	1.4	0.97	1782.2	21.4	1764.0	11.9	1742.4	6.8	1742.4	6.8	102.3
K05-986-104-6	258	5032	1.4	6.1769	0.2	10.0099	0.9	0.4484	0.9	0.98	2388.3	17.3	2435.7	8.1	2475.5	2.6	2475.5	2.6	96.5
K05-986-104-7	244	7692	1.0	9.3142	0.7	4.5265	1.2	0.3058	1.0	0.79	1719.9	14.4	1735.9	10.0	1755.1	13.6	1755.1	13.6	98.0
K05-986-104-8	138	12048	1.0	9.3143	0.5	4.5003	0.7	0.3040	0.6	0.78	1711.2	8.6	1731.0	6.1	1755.1	8.4	1755.1	8.4	97.5
K05-986-104-9	313	5834	1.8	9.3542	0.4	4.1122	0.9	0.2790	0.8	0.89	1586.3	11.9	1656.7	7.8	1747.3	7.8	1747.3	7.8	90.8
K05-986-104-10	369	2056	1.3	9.0653	3.5	4.5578	9.8	0.2997	9.1	0.93	1689.6	136.0	1741.6	81.8	1804.5	64.2	1804.5	64.2	93.6
K05-986-104-14	204	8778	1.0	5.6284	0.2	11.9633	0.7	0.4884	0.7	0.96	2563.6	14.7	2601.5	6.8	2631.2	3.3	2631.2	3.3	97.4
K05-986-104-15	293	1408	1.3	8.8712	6.2	4.4617	6.4	0.2871	1.7	0.26	1626.8	24.2	1723.9	53.0	1843.8	111.5	1843.8	111.5	88.2
K05-986-104-16	91	150005	1.5	9.3946	0.6	4.5478	1.2	0.3099	1.0	0.88	1740.1	15.9	1739.8	9.8	1739.4	10.1	1739.4	10.1	100.0
K05-986-104-17	74	102799	2.5	9.3699	0.5	4.5814	1.3	0.3113	1.2	0.91	1747.3	18.0	1745.9	10.8	1744.2	10.0	1744.2	10.0	100.2
K05-986-104-18	128	22996	2.1	6.2827	1.9	11.1220	6.1	0.5068	5.8	0.95	2642.9	125.9	2533.4	57.1	2446.8	32.7	2446.8	32.7	108.0
K05-986-104-20	120	1157	1.1	8.9314	3.6	4.5807	4.7	0.2967	3.0	0.63	1675.0	43.6	1745.8	39.1	1831.5	66.1	1831.5	66.1	91.5
K05-986-104-24	342	4979	1.8	8.0869	0.8	6.0475	4.7	0.3547	4.6	0.98	1957.0	77.3	1982.7	40.6	2009.6	14.7	2009.6	14.7	97.4
K05-986-104-26	170	194538	2.0	8.9960	0.4	5.1036	1.1	0.3330	1.0	0.94	1852.8	16.2	1836.7	9.1	1818.5	6.6	1818.5	6.6	101.9
K05-986-104-28	251	8655	0.9	9.2958	1.1	4.5231	1.2	0.3049	0.5	0.45	1715.8	8.1	1735.2	9.9	1758.7	19.4	1758.7	19.4	97.6
K05-986-104-32	280	314924	2.2	8.1661	0.1	6.1980	0.5	0.3671	0.5	0.99	2015.6	9.1	2004.2	4.6	1992.3	1.2	1992.3	1.2	101.2
K05-986-104-34	397	10724	1.5	9.3691	0.6	4.5634	1.1	0.3101	0.9	0.84	1741.1	13.6	1742.6	8.9	1744.4	10.7	1744.4	10.7	99.8

K05-986-104-35	209	132336	1.6	9.3386	0.4	4.6442	0.8	0.3146	0.7	0.87	1763.1	10.6	1757.3	6.6	1750.3	7.2	1750.3	7.2	100.7
K05-986-104-36	250	1262	1.3	8.8793	4.0	4.6292	4.7	0.2981	2.5	0.53	1681.9	36.5	1754.5	39.0	1842.1	71.7	1842.1	71.7	91.3
K05-986-104-37	111	154798	1.4	9.3703	0.3	4.6279	0.9	0.3145	0.8	0.93	1762.9	12.9	1754.3	7.5	1744.1	6.1	1744.1	6.1	101.1
K05-986-104-38	87	279928	1.4	8.9715	0.6	5.0837	2.0	0.3308	1.9	0.95	1842.2	31.0	1833.4	17.3	1823.4	11.7	1823.4	11.7	101.0
K05-986-104-40	102	201577	0.9	9.4381	0.6	4.5528	0.9	0.3116	0.7	0.74	1748.8	10.2	1740.7	7.5	1730.9	11.0	1730.9	11.0	101.0
K05-986-104-41	215	13494	1.5	9.3215	0.5	4.5830	1.1	0.3098	1.0	0.90	1739.9	14.9	1746.2	9.0	1753.7	8.5	1753.7	8.5	99.2
K05-986-104-42	611	1166	0.9	9.0851	0.6	2.9318	6.0	0.1932	6.0	1.00	1138.6	62.4	1390.2	45.5	1800.6	10.3	1800.6	10.3	63.2
K05-986-104-43	105	14482	1.2	9.2984	0.9	4.6050	1.5	0.3106	1.3	0.81	1743.4	19.2	1750.2	12.9	1758.2	16.5	1758.2	16.5	99.2
K05-986-104-44	123	2799	0.8	9.2008	1.3	4.5540	1.7	0.3039	1.1	0.63	1710.6	15.9	1740.9	14.0	1777.5	23.9	1777.5	23.9	96.2
K05-986-104-47	193	357875	1.6	9.3762	0.2	4.5844	0.7	0.3118	0.7	0.95	1749.3	10.0	1746.4	5.7	1743.0	3.9	1743.0	3.9	100.4
K05-986-104-46	302	3219	1.5	9.3176	0.4	4.3013	4.7	0.2907	4.7	1.00	1644.9	68.3	1693.6	39.0	1754.4	8.0	1754.4	8.0	93.8
K05-986-104-49	188	4038	2.4	9.0598	1.0	4.9456	1.2	0.3250	0.7	0.59	1813.9	11.5	1810.1	10.4	1805.6	18.1	1805.6	18.1	100.5
K05-986-104-50	104	10391	1.4	9.3402	0.7	4.5905	1.3	0.3110	1.2	0.87	1745.5	17.7	1747.5	11.1	1750.0	12.2	1750.0	12.2	99.7
OS081084A-2	318	15764	1.4	9.3770	0.3	4.3287	1.8	0.2944	1.7	0.98	1663.4	25.4	1698.9	14.5	1742.8	6.3	1742.8	6.3	95.4
OS081084A-3	717	99257	3.1	9.1754	0.1	4.8294	0.4	0.3214	0.4	0.95	1796.4	5.9	1790.0	3.3	1782.5	2.3	1782.5	2.3	100.8
OS081084A-4	135	127978	1.6	5.6327	0.3	12.3175	2.4	0.5032	2.3	0.99	2627.5	50.5	2628.9	22.1	2630.0	4.6	2630.0	4.6	99.9
OS081084A-5	230	82242	2.1	9.3230	0.5	4.7122	0.7	0.3186	0.5	0.67	1783.0	7.0	1769.4	5.6	1753.4	9.0	1753.4	9.0	101.7
OS081084A-6	149	64143	1.6	9.3705	0.5	4.6468	1.7	0.3158	1.6	0.96	1769.2	24.7	1757.7	14.0	1744.1	9.1	1744.1	9.1	101.4
OS081084A-7	154	9908	2.3	6.1768	0.4	10.3292	2.5	0.4627	2.5	0.98	2451.6	51.2	2464.7	23.6	2475.5	7.6	2475.5	7.6	99.0
OS081084A-8	218	12998	1.0	9.3711	0.5	4.6244	0.9	0.3143	0.8	0.81	1761.8	11.6	1753.7	7.8	1744.0	9.9	1744.0	9.9	101.0
OS081084A-9	165	121550	1.6	9.3511	0.8	4.5349	1.9	0.3076	1.7	0.91	1728.7	25.7	1737.4	15.5	1747.9	14.1	1747.9	14.1	98.9
OS081084A-10	176	19928	1.7	9.2803	0.9	4.7012	1.7	0.3164	1.5	0.85	1772.2	22.7	1767.5	14.5	1761.8	16.7	1761.8	16.7	100.6
OS081084A-11	191	110670	1.2	9.3625	0.3	4.6376	0.8	0.3149	0.7	0.92	1764.8	11.3	1756.1	6.7	1745.6	5.8	1745.6	5.8	101.1
OS081084A-12	186	135569	2.0	9.3866	0.6	4.6024	1.9	0.3133	1.8	0.95	1757.0	27.5	1749.7	15.6	1740.9	10.4	1740.9	10.4	100.9
OS081084A-13	500	11617	1.9	9.3056	0.3	4.5772	1.4	0.3089	1.4	0.98	1735.4	20.6	1745.1	11.5	1756.8	4.6	1756.8	4.6	98.8
OS081084A-15	148	2770	1.7	9.2668	1.1	3.9392	3.2	0.2648	3.0	0.94	1514.1	40.6	1621.8	26.0	1764.4	20.4	1764.4	20.4	85.8
OS081084A-16	99	253724	2.1	9.1073	0.7	4.9574	2.9	0.3274	2.8	0.97	1826.0	44.0	1812.1	24.2	1796.1	13.3	1796.1	13.3	101.7
OS081084A-17	194	31939	2.5	9.2355	0.4	4.7554	2.5	0.3185	2.5	0.99	1782.5	38.3	1777.1	21.0	1770.6	7.7	1770.6	7.7	100.7
OS081084A-18	500	61432	1.7	9.3695	0.2	4.6620	0.7	0.3168	0.7	0.97	1774.1	11.1	1760.5	6.2	1744.3	3.5	1744.3	3.5	101.7
OS081084A-19	349	28714	2.1	9.3680	0.3	4.5977	0.9	0.3124	0.8	0.94	1752.4	12.5	1748.9	7.2	1744.6	5.4	1744.6	5.4	100.5
OS081084A-20	210	14219	1.1	8.7618	0.4	5.2079	0.8	0.3309	0.8	0.90	1842.9	12.1	1853.9	7.1	1866.2	6.5	1866.2	6.5	98.8
OS081084A-21	268	228678	2.4	9.3428	0.4	4.6342	0.9	0.3140	0.7	0.87	1760.4	11.4	1755.5	7.1	1749.5	7.7	1749.5	7.7	100.6
OS081084A-22	323	4044	1.2	9.2513	1.8	4.4306	2.2	0.2973	1.2	0.54	1677.8	17.3	1718.1	17.8	1767.5	33.0	1767.5	33.0	94.9
OS081084A-23	257	150584	3.0	9.1794	0.3	4.8256	0.9	0.3213	0.9	0.95	1795.9	13.5	1789.4	7.6	1781.7	5.1	1781.7	5.1	100.8
OS081084A-24	193	133971	1.0	9.4194	0.3	4.6109	0.6	0.3150	0.5	0.82	1765.3	7.4	1751.2	4.9	1734.5	6.1	1734.5	6.1	101.8
OS081084A-26	158	67211	1.7	9.4024	0.3	4.7002	1.8	0.3205	1.8	0.98	1792.3	27.5	1767.3	15.0	1737.9	6.0	1737.9	6.0	103.1
OS081084A-27	227	43036	1.7	9.3857	0.2	4.5293	0.6	0.3083	0.6	0.92	1732.4	8.7	1736.4	5.2	1741.1	4.4	1741.1	4.4	99.5
OS081084A-28	342	42528	1.4	9.3725	0.4	4.5490	1.4	0.3092	1.4	0.96	1736.9	21.0	1740.0	12.0	1743.7	7.6	1743.7	7.6	99.6
OS081084A-29	157	86640	1.2	9.3931	0.6	4.5694	1.1	0.3113	0.9	0.86	1747.0	14.4	1743.7	9.1	1739.7	10.2	1739.7	10.2	100.4
OS081084A-30	247	47528	1.4	9.3907	0.3	4.6186	0.8	0.3146	0.7	0.92	1763.1	11.3	1752.6	6.6	1740.1	5.7	1740.1	5.7	101.3
OS081084A-31	140	187648	1.5	9.3851	0.5	4.5498	0.9	0.3097	0.8	0.83	1739.2	11.7	1740.1	7.7	1741.2	9.4	1741.2	9.4	99.9
OS081084A-32	368	92979	1.4	9.3727	0.3	4.5781	0.7	0.3112	0.7	0.92	1746.7	10.6	1745.3	6.2	1743.7	5.2	1743.7	5.2	100.2
OS081084A-33	301	28489	2.4	8.8694	0.3	5.1836	1.1	0.3334	1.0	0.97	1855.1	16.9	1849.9	9.2	1844.2	5.1	1844.2	5.1	100.6
OS081084A-35	221	3968	1.7	6.2203	1.5	9.5372	2.8	0.4303	2.4	0.84	2306.9	46.2	2391.1	26.1	2463.7	26.1	2463.7	26.1	93.6
OS081084A-37	217	53461	0.8	7.8960	0.3	6.4130	1.0	0.3673	1.0	0.94	2016.5	16.7	2034.0	9.0	2051.9	6.1	2051.9	6.1	98.3
OS081084A-38	123	67202	1.4	9.3877	1.0	4.5401	1.2	0.3091	0.7	0.54	1736.4	10.0	1738.3	10.1	1740.7	18.6	1740.7	18.6	99.7
OS081084A-39	183	85874	2.1	9.1249	0.8	4.8650	1.3	0.3220	1.0	0.79	1799.3	16.3	1796.2	11.1	1792.6	14.6	1792.6	14.6	100.4
OS081084A-40	157	27788	1.4	6.0905	1.2	10.8122	8.9	0.4776	8.8	0.99	2516.8	184.0	2507.1	83.0	2499.3	20.3	2499.3	20.3	100.7
OS081084A-41	127	8664	1.6	9.1150	1.2	4.5180	3.1	0.2987	2.9	0.92	1684.7	42.6	1734.3	26.0	1794.6	22.5	1794.6	22.5	93.9
OS081084A-42	115	111104	1.3	9.4312	1.1	4.3916	1.4	0.3004	0.8	0.60	1693.3	12.3	1710.8	11.3	1732.2	19.9	1732.2	19.9	97.7
OS081084A-43	78	87863	0.5	5.8336	0.4	11.5480	0.8	0.4886	0.7	0.86	2564.6	15.0	2568.5	7.7	2571.6	7.1	2571.6	7.1	99.7
OS081084A-44	202	127828	1.9	6.1876	0.2	10.3607	0.7	0.4650	0.6	0.93	2461.4	12.9	2467.5	6.2	2472.6	4.1	2472.6	4.1	99.5
OS081084A-45	77	30571	2.1	8.2306	0.7	5.9967	2.0	0.3580	1.9	0.94	1972.5	31.8	1975.4	17.3	1978.3	12.2	1978.3	12.2	99.7
OS081084A-46	313	51164	2.7	9.1050	0.4	4.7408	1.6	0.3131	1.5	0.97	1755.8	23.8	1774.5	13.3	1796.6	6.7	1796.6	6.7	97.7
OS081084A-47	258	2346	2.9	9.3608	1.4	3.9489	3.0	0.2681	2.7	0.89	1531.1	37.1	1623.8	24.7	1746.0	25.1	1746.0	25.1	87.7
OS081084A-48	487	43009	2.2	9.3240	0.8	4.6450	3.5	0.3141	3.4	0.97	1760.9	51.8	1757.4	28.9	1753.2	14.6	1753.2	14.6	100.4
OS081084A-49	174	20970	2.4	9.0127	0.4	4.8174	1.9	0.3149	1.8	0.97	1764.8	28.4	1787.9	15.9	1815.1	7.8	1815.1	7.8	97.2
OS081084A-50	413	6301	1.6	8.9043	0.6	5.1005	1.9	0.3294	1.8	0.95	1835.4	29.5	1836.2	16.4	1837.0	10.6	1837.0	10.6	99.9
OS081084A-51	275	265308	2.7	6.7867	0.2	8.7576	1.4	0.4311	1.4	0.99	2310.5	27.1	2313.1	12.8	2315.4	3.2	2315.4	3.2	99.8
OS081084A-52	235	22017	2.0	5.1894	0.4	14.7560	8.0	0.5554	8.0	1.00	2847.5	185.1	2799.6	76.7	2765.3	5.9	2765.3	5.9	103.0
OS081084A-53	243	19783	1.5	9.4385	0.9	4.6827	6.3	0.3206	6.3	0.99	1792.4	98.0	1764.2	53.0	1730.8	17.2	1730.8	17.2	103.6
OS081084A-54	475	31217	1.6	9.3914	0.3	4.4573	0.7	0.3036	0.6	0.91	1709.2	9.6	1723.1	5.9	1740.0	5.4	1740.0	5.4	98.2
OS081084A-55	118	28039	0.9	3.9003	0.4	22.1873	1.1	0.6276	1.0	0.94	3140.2	25.8	3192.0	10.7	3224.6	5.7	3224.6	5.7	97.4
OS081084A-57	250	243530	4.6	9.0068	0.2	4.9847	0.6	0.3256	0.5	0.93	1817.1	8.6	1816.7	4.9	1816.3	4.0	1816.3	4.0	100.0
OS081084A-58	205	10869	1.1	9.4491	0.4	4.1978	2.7	0.2877	2.7	0.99	1629.9	38.3	1673.6	22.1	1728.8	8.1	1728.8	8.1	94.3
OS081084A-59	214	38658	1.0	9.3396	1.3	4.7546	3.4	0.3221	3.1	0.93	1799.8	49.1	1776.9	28.3	1750.1	23.3	1750.1	23.3	102.8
OS081084A-60	36	45771	2.1	5.8193	1.0	11.8006	2.0	0.4980	1.7	0.86	2605.4	36.9	2588.7	18.7	2575.7	16.9	2575.7	16.9	101.2
OS081084A-62	274	256305	2.9	9.1619	0.2	4.7781	0.5	0.3175	0.5	0.92	1777.5	7.7	1781.1	4.5	1785.2	3.8	1785.2	3.8	99.6
OS081084A-65	241	21650	1.7	9.4060	0.5	4.5640	1.1	0.3113	0.9	0.87	1747.3	14.4	1742.7	8.9	1737.2	9.5	1737.2	9.5	100.6
OS081084A-68	114	67712	2.7	9.3177	1.2	4.6995	1.5	0.3176	0.8	0.57	1777.9	13.1	1767.1	12.5	1754.4	22.4	1754.4	22.4	101.3
OS081084A-71	187	15202	0.7	9.4297	0.6	4.5665	2.5	0.3123	2.4	0.97	1752.0	37.3	1743.2	20.9	1732.5	11.4	1732.5	11.4	101.1
OS081084A-72	370	10148	2.1	8.8052	1.0	5.2982	5.6	0.3384	5.5	0.98	1878.7	90.3	1868.6	48.2	1857.3	18.9	1857.3	18.9	101.2
OS081084A-74	277	82513	2.2	6.1525	0.2	10.6335	1.1	0.4745	1.1	0.99	2503.2	21.8	2491.6	9.9	2482.2	2.7	2482.2	2.7	100.8
OS081084A-75	179	332331	2.5	6.1642	0.2	10.3847	2.1	0.4643	2.1	1.00	2458.4	43.1	2469.7	19.6	2479.0	3.5	2479.0	3.5	99.2
OS081084A-76	365	6562	1.7	9.2988	1.4	4.7600	2.8	0.3210	2.5	0.87	1794.7	38.6	1777.9	23.8	1758.1	25.7	1758.1	25.7	102.1
OS081084A-77	158	168317	1.1	9.3965	0.6	4.5518	0.9	0.3102	0.7	0.75	1741.7	10.0	1740.5	7.3	1739.0	10.7	1739.0	10.7	100.2
OS081084A-80	365	32625	1.6	9.3441	0.3	4.5746	2.6	0.3100	2.5	0.99	1740.8	38.9	1744.7	21.4	1749.2	6.3	1749.2	6.3	99.5
OS081084A-81	267	33389	3.1	9.1015	0.4	4.7792	1.2	0.3155	1.1	0.94	1767.6	17.0	1781.2	9.8	1797.3	7.3	1797.3	7.3	98.3
OS081084A-82	206	39643	2.1	6.7622	0.3	8.7455	0.8	0.4289	0.8	0.94	2300.8	14.9	2311.8	7.5	2321.5	4.9	2321.5	4.9	99.1
OS081084A-83	222	7560	2.0	9.3087	0.4	4.4304	3.1	0.2991	3.1	0.99	1686.9	45.3	1718.0	25.5	1756.2	7.1	1756.2	7.1	96.1
OS081084A-84	204	100006	1.4	9.3630	0.5	4.5396	1.2	0.3083	1.1	0.89	1732.2	16.1	1738.3	9.9	1745.5	9.9	1745.5	9.9	99.2
OS081084A-86	300	63370	1.7	7.9590	0.3	6.5532	1.1	0.3783	1.0	0.97	2068.2	18.2	2053.1	9.3	2037.9	4.5	2037.9	4.5	101.5
OS081084A-87	503	10371	2.6	8.1935	0.3	5.9866	1.8	0.3558	1.8	0.98	1962.0	30.6	1973.9	16.0	1986.4	6.0	1986.4	6.0	98.8
OS081084A-88	162	140138	1.8	9.3293	1.0	4.6720	1.5	0.3161	1.1	0.76	1770.7	17.4	1762.2	12.3	1752.2	17.4	1752.2	17.4	101.1
OS081084A-89	431	21393	1.9	9.3533	0.3	4.5920	1.2	0.3115	1.2	0.96	1748.1	17.6	1747.8	9.9	1747.5	5.8	1747.5	5.8	100.0
OS081084A-90	531	10537	4.1	6.4613	0.7	8.7020	5.3	0.4078	5.2	0.99	2204.8	97.6	2307.3	48.1	2399.3	12.7	2399.3	12.7	91.9
OS081084A-91	315	54495	2.7	9.0721	0.6	4.9656	1.1	0.3267	0.9	0.85	1822.5	14.4	1813.5	9.0	1803.2	10.2	1803.2	10.2	101.1
OS081084A-92	326	5703	1.9	9.3805	0.9	3.9758	4.5	0.2705	4.4	0.98	1543.3	60.7	1629.3	36.6	1742.1	16.9	1742.1	16.9	88.6
OS081084A-93	525	134423	3.5	9.1451	0.3	4.7804	1.2	0.3171	1.2	0.98	1775.4	18.6	1781.5	10.3	1788.6	4.8	1788.6	4.8	99.3
OS081084A-94	263	72629	1.0	9.3851	0.3	4.6370	1.2	0.3156	1.1	0.95	1768.3	17.0	1756.0	9.7	1741.2	6.4	1741.2	6.4	101.6
OS081084A-95	185	297147	1.2	9.4041	0.4	4.4688	1.3	0.3048	1.2	0.94	1715.0	18.1	1725.2	10.7	1737.5	8.2	1737.5	8.2	98.7
OS081084A-96	232	18951	1.7	9.3451	0.8	4.4869	1.2	0.3041	1.0	0.78	1711.6	14.4	1728.5	10.1	1749.1	13.8	1749.1	13.8	97.9
OS081084A-97	295	30392	2.0	8.9764	0.3	5.1940	1.4	0.3381	1.3	0.97	1877.7	21.7	1851.6	11.7	1822.4	5.8	1822.4	5.8	103.0
OS081084A-98	103	44189	0.8	9.1745	0.5	4.6945	0.8	0.3124	0.7	0.79	1752.4	10.3	1766.3	7.1	1782.7	9.5	1782.7	9.5	98.3
OS081084A-99	93	119123	2.5	5.4863	0.5	13.3492	1.2	0.5312	1.1	0.93	2746.4	24.9	2704.7	11.4	2673.6	7.6	2673.6	7.6	102.7
OS081084A-100	171	18365	1.6	9.0039	0.6	5.2613	4.2	0.3436	4.2	0.99	1903.8	68.5	1862.6	35.9	1816.9	11.3	1816.9	11.3	104.8
K05110-108A-1	168	257185	2.0	5.9584	0.6	11.4868	2.0	0.4964	2.0	0.96	2598.3	41.9	2563.5	19.0	2536.1	9.3	2536.1	9.3	102.5
K05110-108A-2	399	67404	1.4	3.6427	0.2	24.1800	2.6	0.6388	2.6	1.00	3184.4	65.1	3275.7	25.3	3332.0	2.9	3332.0	2.9	95.6
K05110-108A-3	438	238848	1.7	5.9819	0.2	11.4510	3.2	0.4968	3.2	1.00	2600.0	68.0	2560.6	29.7	2529.5	3.8	2529.5	3.8	102.8
K05110-108A-4	241	892575	2.3	8.8699	0.9	5.1960	2.6	0.3343	2.5	0.94	1859.0	39.6	1852.0	22.2	1844.0	16.1	1844.0	16.1	100.8
K05110-108A-6	194	1193113	2.4	6.0115	0.3	10.9488	2.6	0.4774	2.5	0.99	2515.8	52.9	2518.8	23.8	2521.2	5.0	2521.2	5.0	99.8

K05110-108A-7	262	711570	1.5	5.9991	0.7	11.2364	4.1	0.4889	4.0	0.98	2565.9	84.6	2542.9	37.9	2524.7	12.3	2524.7	12.3	101.6
K05110-108A-8	257	338859	2.1	9.0977	1.0	5.0859	2.0	0.3356	1.7	0.86	1865.4	27.5	1833.8	16.8	1798.0	18.6	1798.0	18.6	103.7
K05110-108A-9	334	61241	2.2	5.5104	0.7	12.8636	2.2	0.5141	2.1	0.95	2674.1	45.1	2669.7	20.4	2666.4	10.9	2666.4	10.9	100.3
K05110-108A-10	387	31954	2.0	8.8455	0.5	5.0493	2.5	0.3239	2.5	0.98	1808.9	38.6	1827.6	21.3	1849.0	9.8	1849.0	9.8	97.8
K05110-108A-11	587	284552	1.4	5.7491	0.3	11.9706	2.5	0.4991	2.5	0.99	2610.1	52.7	2602.1	23.1	2595.9	4.8	2595.9	4.8	100.5
K05110-108A-13	29	108843	0.6	7.6644	3.3	7.2844	4.3	0.4049	2.8	0.64	2191.7	52.1	2146.9	38.8	2104.3	58.4	2104.3	58.4	104.2
K05110-108A-14	84	662704	1.2	5.2498	0.6	14.3455	3.5	0.5462	3.5	0.99	2809.4	79.8	2772.8	33.7	2746.3	9.1	2746.3	9.1	102.3
K05110-108A-15	208	801164	0.8	9.1931	0.7	4.7877	3.5	0.3192	3.4	0.98	1785.9	52.7	1782.7	29.0	1779.0	12.7	1779.0	12.7	100.4
K05110-108A-16	163	1533661	1.1	5.4920	1.1	12.7298	2.0	0.5070	1.7	0.84	2644.0	36.9	2659.9	19.1	2671.9	18.2	2671.9	18.2	99.0
K05110-108A-18	824	635018	1.6	6.0530	0.2	11.3382	4.1	0.4978	4.1	1.00	2604.1	88.1	2551.3	38.4	2509.6	3.0	2509.6	3.0	103.8
K05110-108A-19	1031	28086	4.8	8.9880	2.5	5.0196	2.8	0.3272	1.2	0.43	1824.9	19.2	1822.6	23.7	1820.1	45.8	1820.1	45.8	100.3
K05110-108A-20	264	53197	2.2	8.7958	1.3	5.4121	9.7	0.3453	9.6	0.99	1911.9	158.3	1886.8	82.9	1859.2	23.7	1859.2	23.7	102.8
K05110-108A-21	1195	81433	4.4	9.0182	0.3	4.8365	1.6	0.3163	1.6	0.98	1771.8	24.0	1791.3	13.2	1814.0	5.0	1814.0	5.0	97.7
K05110-108A-22	392	1504985	7.0	9.0040	0.4	5.2685	1.8	0.3441	1.8	0.97	1906.1	28.9	1863.8	15.4	1816.9	7.6	1816.9	7.6	104.9
K05110-108A-23	485	475551	3.0	7.9718	0.3	6.6905	3.2	0.3868	3.2	0.99	2108.1	57.3	2071.4	28.3	2035.0	5.9	2035.0	5.9	103.6
K05110-108A-24	550	71622	4.9	6.0990	0.5	10.6767	2.2	0.4723	2.2	0.97	2493.5	44.9	2495.4	20.8	2496.9	9.2	2496.9	9.2	99.9
K05110-108A-25	281	826822	1.1	9.2011	0.6	4.6207	1.6	0.3084	1.5	0.92	1732.6	22.9	1753.0	13.7	1777.4	11.5	1777.4	11.5	97.5
K05110-108A-26	318	988727	3.0	8.9762	0.8	5.2366	2.5	0.3409	2.4	0.95	1891.0	38.9	1858.6	21.2	1822.5	13.8	1822.5	13.8	103.8
K05110-108A-27	786	276100	2.0	5.6072	0.2	12.3762	1.1	0.5033	1.1	0.98	2628.0	23.1	2633.4	10.3	2637.5	3.7	2637.5	3.7	99.6
K05110-108A-28	587	26839	1.8	8.8125	1.1	4.7879	2.8	0.3060	2.6	0.92	1721.1	38.5	1782.8	23.2	1855.8	19.1	1855.8	19.1	92.7
K05110-108A-29	457	87070	2.5	3.8490	0.2	24.2911	2.0	0.6781	2.0	1.00	3337.1	52.4	3280.1	19.7	3245.5	2.9	3245.5	2.9	102.8
K05110-108A-30	259	730485	2.3	6.0422	0.5	10.7038	3.9	0.4691	3.8	0.99	2479.5	79.0	2497.8	35.9	2512.6	8.5	2512.6	8.5	98.7
K05110-108A-31	290	53440	1.9	5.1784	0.7	13.6381	2.3	0.5122	2.2	0.96	2666.1	47.4	2724.9	21.5	2768.8	10.9	2768.8	10.9	96.3
K05110-108A-32	700	23777	3.1	7.8324	1.5	5.9974	3.2	0.3407	2.9	0.89	1890.0	47.1	1975.5	28.2	2066.2	26.1	2066.2	26.1	91.5
K05110-108A-34	154	2326533	1.5	5.8391	0.6	11.2903	1.3	0.4781	1.1	0.87	2519.1	23.0	2547.4	11.8	2570.0	10.5	2570.0	10.5	98.0
K05110-108A-35	759	25343	2.3	6.0588	0.9	9.4128	3.0	0.4136	2.8	0.95	2231.5	53.1	2379.1	27.2	2508.0	15.5	2508.0	15.5	89.0
K05110-108A-36	272	88091	2.0	6.0731	0.5	11.3153	1.2	0.4984	1.1	0.90	2606.9	23.4	2549.5	11.3	2504.1	8.9	2504.1	8.9	104.1
K05110-108A-37	126	511506	2.1	6.0607	0.9	10.8773	1.5	0.4781	1.3	0.83	2519.1	26.7	2512.7	14.4	2507.5	14.6	2507.5	14.6	100.5
K05110-108A-38	147	1654619	3.3	8.6082	0.8	5.4850	1.5	0.3424	1.3	0.85	1898.4	21.0	1898.3	12.9	1898.1	14.3	1898.1	14.3	100.0
K05110-108A-39	190	10289	2.6	5.9306	0.6	8.8708	3.3	0.3816	3.2	0.98	2083.6	57.3	2324.8	30.0	2543.9	10.8	2543.9	10.8	81.9
K05110-108A-40	371	96622	1.8	5.7357	0.4	10.5061	3.0	0.4370	3.0	0.99	2337.4	58.5	2480.5	27.9	2599.8	6.3	2599.8	6.3	89.9
K05110-108A-41	150	1326951	1.7	9.0954	0.9	4.8694	3.5	0.3212	3.4	0.97	1795.7	53.9	1797.0	29.9	1798.5	15.8	1798.5	15.8	99.8
K05110-108A-42	306	469995	1.3	9.1870	0.5	4.7814	2.4	0.3186	2.3	0.98	1782.8	36.0	1781.6	19.9	1780.2	9.4	1780.2	9.4	100.1
K05110-108A-44	299	76811	1.6	8.5867	0.5	5.0521	1.7	0.3146	1.7	0.95	1763.4	25.5	1828.1	14.7	1902.6	9.3	1902.6	9.3	92.7
K05110-108A-45	198	634807	0.7	5.3595	0.4	13.5196	1.9	0.5255	1.9	0.97	2722.6	41.7	2716.7	18.3	2712.3	7.3	2712.3	7.3	100.4
K05110-108A-46	162	360676	1.9	8.6830	1.3	5.4353	4.1	0.3423	3.9	0.95	1897.7	64.2	1890.4	35.4	1882.5	24.2	1882.5	24.2	100.8
K05110-108A-47	216	802479	2.5	8.9695	1.1	4.9632	3.5	0.3229	3.3	0.94	1803.7	51.8	1813.1	29.5	1823.8	20.7	1823.8	20.7	98.9
K05110-108A-48	257	650903	1.9	6.5514	0.7	12.6758	3.7	0.5196	3.6	0.98	2697.3	79.8	2655.9	34.6	2624.4	10.8	2624.4	10.8	102.8
K05110-108A-49	215	231324	1.7	8.2562	2.1	5.9414	4.1	0.3558	3.5	0.86	1962.1	59.9	1967.3	35.6	1972.8	36.7	1972.8	36.7	99.5
K05110-108A-50	489	72799	1.4	8.9982	0.8	4.8188	3.1	0.3145	3.0	0.97	1762.7	45.8	1788.2	25.8	1818.0	13.7	1818.0	13.7	97.0
K05110-108A-51	726	48555	2.2	5.9707	1.0	11.1221	2.8	0.4816	2.6	0.93	2534.3	53.6	2533.4	25.7	2532.6	17.4	2532.6	17.4	100.1
K05110-108A-52	314	20983	2.8	8.4661	0.8	4.9657	2.4	0.3049	2.3	0.95	1715.6	34.8	1813.5	20.6	1927.9	13.7	1927.9	13.7	89.0
K05110-108A-53	984	59575	8.9	8.8744	0.3	5.0126	1.7	0.3226	1.7	0.98	1802.6	26.4	1821.5	14.5	1843.1	5.9	1843.1	5.9	97.8
K05110-108A-55	485	46637	1.8	8.9599	0.3	5.2535	1.3	0.3414	1.2	0.97	1893.3	20.0	1861.3	10.8	1825.7	5.8	1825.7	5.8	103.7
K05110-108A-56	1104	20370	2.2	5.9407	0.8	10.6466	1.9	0.4587	1.7	0.90	2433.9	34.1	2492.8	17.2	2541.1	13.3	2541.1	13.3	95.8
K05110-108A-57	242	1295032	2.1	6.0000	0.2	11.2338	2.7	0.4889	2.7	1.00	2565.7	57.7	2542.7	25.5	2524.4	3.6	2524.4	3.6	101.6
K05110-108A-58	330	1753021	1.5	6.0043	0.4	11.1871	3.1	0.4872	3.1	0.99	2558.4	65.6	2538.8	29.2	2523.2	6.8	2523.2	6.8	101.4
K05110-108A-59	387	1180681	2.2	8.2662	0.4	5.9075	2.1	0.3542	2.0	0.98	1954.5	34.5	1962.3	18.1	1970.6	7.7	1970.6	7.7	99.2
K05110-108A-60	305	817129	1.6	6.0119	0.6	10.3524	3.8	0.4514	3.8	0.99	2401.4	75.6	2466.8	35.4	2521.1	10.8	2521.1	10.8	95.3
K05110-108A-61	411	346525	1.2	9.0811	0.6	4.8019	3.8	0.3163	3.8	0.99	1771.4	58.7	1785.2	32.2	1801.4	10.1	1801.4	10.1	98.3
K05110-108A-62	492	108764	1.5	9.0666	0.3	4.8574	1.6	0.3194	1.6	0.98	1786.8	24.6	1794.9	13.6	1804.3	6.3	1804.3	6.3	99.0
K05110-108A-63	339	1080927	1.9	9.0902	0.3	4.9456	2.1	0.3261	2.1	0.99	1819.2	33.6	1810.1	18.2	1799.5	6.3	1799.5	6.3	101.1
K05110-108A-64	354	675299	0.9	9.1067	0.7	4.8303	1.3	0.3190	1.1	0.83	1785.0	16.5	1790.2	10.7	1796.2	12.7	1796.2	12.7	99.4
K05110-108A-65	471	38246	1.9	8.4533	0.4	5.6523	2.5	0.3465	2.5	0.99	1918.1	41.5	1924.1	21.9	1930.6	7.5	1930.6	7.5	99.3
K05110-108A-66	548	76722	1.9	8.0247	0.5	6.1309	2.1	0.3568	2.0	0.97	1967.1	33.9	1994.7	18.0	2023.3	9.2	2023.3	9.2	97.2
K05110-108A-67	350	58720	2.6	6.2580	1.0	10.1722	3.4	0.4617	3.2	0.96	2447.0	65.7	2450.6	31.2	2453.5	16.9	2453.5	16.9	99.7
K05110-108A-68	986	38550	1.8	5.9404	0.5	10.9015	1.5	0.4697	1.4	0.93	2482.2	28.2	2514.8	13.7	2541.2	8.9	2541.2	8.9	97.7
K05110-108A-69	432	578678	4.1	8.8422	0.9	5.1157	2.1	0.3281	1.9	0.91	1829.0	30.7	1838.7	18.0	1849.7	15.9	1849.7	15.9	98.9
K05110-108A-71	230	107743	1.9	6.0345	0.6	10.6477	1.3	0.4660	1.2	0.90	2466.0	24.2	2492.9	12.1	2514.8	9.4	2514.8	9.4	98.1
K05110-108A-72	486	271964	2.1	6.0363	0.4	11.0754	2.0	0.4849	2.0	0.98	2548.5	42.3	2529.5	19.0	2514.3	6.0	2514.3	6.0	101.4
K05110-108A-73	183	168211	2.4	6.0867	1.4	10.8628	2.1	0.4795	1.5	0.72	2525.2	31.3	2511.5	19.3	2500.3	24.1	2500.3	24.1	101.0
K05110-108A-74	127	692000	2.5	6.0035	0.8	10.4094	2.2	0.4532	2.0	0.92	2409.6	41.1	2471.9	20.5	2523.5	14.3	2523.5	14.3	95.5
K05110-108A-75	409	55680	2.2	8.5104	0.5	5.2793	3.0	0.3259	3.0	0.99	1818.3	46.8	1865.5	25.6	1918.6	9.2	1918.6	9.2	94.8
K05110-108A-76	355	2038199	1.6	6.0226	0.2	11.2478	2.0	0.4913	2.0	0.99	2576.3	42.3	2543.9	18.7	2518.1	3.4	2518.1	3.4	102.3
K05110-108A-77	1537	712999	26.2	8.3047	0.5	5.7029	1.7	0.3435	1.6	0.95	1903.5	26.9	1931.8	14.9	1962.3	9.8	1962.3	9.8	97.0
K05110-108A-79	358	70449	1.4	8.9584	1.8	4.9263	2.6	0.3201	1.9	0.74	1790.1	30.0	1806.8	21.9	1826.1	31.8	1826.1	31.8	98.0
K05110-108A-80	632	56696	1.7	5.4103	0.5	12.1708	2.8	0.4776	2.8	0.99	2516.7	57.7	2617.7	26.4	2696.7	8.0	2696.7	8.0	93.3
K05110-108A-81	1211	36642	2.5	8.6428	2.0	5.0105	3.5	0.3141	2.9	0.82	1760.7	44.5	1821.1	29.9	1890.8	36.8	1890.8	36.8	93.1
K05110-108A-82	257	19759	0.8	8.0816	1.7	5.7119	3.1	0.3348	2.5	0.82	1861.6	40.7	1933.2	26.5	2010.8	30.9	2010.8	30.9	92.6
K05110-108A-83	297	131164	1.7	2.6337	1.3	33.3601	1.9	0.6372	1.4	0.74	3178.1	35.1	3591.3	18.8	3830.6	19.5	3830.6	19.5	83.0
K05110-108A-84	500	173338	1.4	5.8614	1.2	11.0266	1.7	0.4688	1.3	0.73	2478.1	25.7	2525.4	16.0	2563.6	19.7	2563.6	19.7	96.7
K05110-108A-85	330	3788622	1.6	5.3489	0.4	14.0220	2.6	0.5440	2.5	0.99	2800.0	57.7	2751.2	24.5	2715.5	7.3	2715.5	7.3	103.1
K05110-108A-86	620	115076	1.9	7.1644	2.2	7.6376	2.6	0.3969	1.5	0.56	2154.5	26.9	2189.3	23.6	2222.0	37.8	2222.0	37.8	97.0
K05110-108A-87	249	833652	2.2	8.9619	0.5	5.0703	2.7	0.3296	2.6	0.98	1836.2	41.9	1831.1	22.6	1825.3	8.6	1825.3	8.6	100.6
K05110-108A-88	1587	32319	2.9	8.0452	0.5	6.3489	3.2	0.3705	3.2	0.99	2031.5	55.9	2025.2	28.5	2018.8	8.2	2018.8	8.2	100.6
K05110-108A-89	536	51521	2.6	8.9762	0.6	4.7938	3.8	0.3121	3.8	0.99	1750.9	57.9	1783.8	32.2	1822.5	11.8	1822.5	11.8	96.1
K05110-108A-91	389	617773	1.8	9.1807	0.3	4.9873	1.8	0.3321	1.8	0.98	1848.5	28.8	1817.2	15.4	1781.5	5.9	1781.5	5.9	103.8
K05110-108A-92	546	90614	2.0	8.5073	0.6	5.3428	2.9	0.3297	2.9	0.98	1836.7	45.8	1875.7	25.0	1919.2	10.5	1919.2	10.5	95.7
K05110-108A-93	179	654416	0.6	5.7095	0.3	12.1507	2.8	0.5032	2.8	0.99	2627.3	61.1	2616.1	26.7	2607.4	4.8	2607.4	4.8	100.8
K05110-108A-94	312	111982	0.8	5.8422	0.7	11.8822	1.3	0.5035	1.1	0.86	2628.7	24.0	2595.2	12.1	2569.1	11.1	2569.1	11.1	102.3
K05110-108A-95	561	241146	2.3	8.9934	0.4	4.9038	3.0	0.3199	3.0	0.99	1789.0	47.1	1802.9	25.6	1819.0	6.5	1819.0	6.5	98.4
K05110-108A-96	258	476812	1.3	8.8785	1.0	5.4137	2.0	0.3486	1.7	0.87	1927.9	28.8	1887.0	17.0	1842.3	17.4	1842.3	17.4	104.6
K05110-108A-97	204	35676	2.2	8.7130	0.8	5.4415	1.4	0.3439	1.2	0.84	1905.2	19.5	1891.4	12.1	1876.3	14.0	1876.3	14.0	101.5
K05110-108A-99	518	82585	0.6	5.7505	0.8	11.2853	2.1	0.4707	1.9	0.92	2486.5	39.8	2547.0	19.6	2595.5	13.9	2595.5	13.9	95.8
K05110-108A-100	204	238620	2.7	7.1309	1.9	7.7744	2.4	0.4021	1.4	0.58	2178.6	25.5	2205.3	21.5	2230.1	33.8	2230.1	33.8	97.7
K061121A-2	119	65946	0.9	5.8761	0.2	11.1631	1.3	0.4757	1.3	0.99	2508.7	27.0	2536.8	12.2	2559.4	3.1	2559.4	3.1	98.0
K061121A-3	153	318351	1.7	5.7528	0.1	11.6724	1.7	0.4870	1.7	1.00	2557.7	35.3	2578.5	15.7	2594.8	2.2	2594.8	2.2	98.6
K061121A-4	192	31071	1.2	3.7737	0.4	20.1908	4.3	0.5526	4.2	1.00	2836.0	97.2	3100.5	41.2	3276.6	6.3	3276.6	6.3	86.6
K061121A-6	94	445799	1.7	5.5514	0.4	12.5710	1.2	0.5061	1.1	0.95	2640.1	24.8	2648.1	11.3	2654.1	6.1	2654.1	6.1	99.5
K061121A-8	82	32060	1.2	8.8998	0.4	4.6009	3.0	0.2970	3.0	0.99	1676.3	44.3	1749.4	25.3	1838.0	7.4	1838.0	7.4	91.2
K061121A-9	137	15048	1.7	6.3002	0.7	8.8815	5.5	0.4058	5.5	0.99	2195.8	102.2	2325.9	50.5	2442.1	11.3	2442.1	11.3	89.9
K061121A-10	170	18652	1.9	8.9818	0.2	4.7284	3.5	0.3080	3.5	1.00	1730.9	52.9	1772.3	29.3	1821.3	4.0	1821.3	4.0	95.0
K061121A-13	79	109057	0.6	9.2117	0.6	4.7450	1.3	0.3170	1.1	0.89	1775.1	17.7	1775.2	10.7	1775.3	10.5	1775.3	10.5	100.0
K061121A-15	190	9898	1.0	6.1047	0.7	9.7762	8.1	0.4328	8.1	1.00	2318.5	156.8	2413.9	74.5	2495.3	11.1	2495.3	11.1	92.9
K061121A-16	155	68242	0.8	5.8807	0.3	11.2486	0.9	0.4798	0.9	0.95	2526.3	18.6	2544.0	8.8	2558.1	5.1	2558.1	5.1	98.8
K061121A-17	166	98306	1.6	6.1634	0.2	10.4686	0.7	0.4680	0.6	0.93	2474.6	13.1	2477.1	6.3	2479.2	4.2	2479.2	4.2	99.8
K061121A-18	88	183949	1.0	5.4909	0.4	12.6604	0.6	0.5042	0.4	0.68	2631.8	8.6	2654.7	5.5	2672.2	7.2	2672.2	7.2	98.5
K061121A-19	138	287293	1.6	8.8409	0.5	5.2733	0.8	0.3381	0.6	0.74	1877.6	9.3	1864.6	6.5	1850.0	9.2	1850.0	9.2	101.5
K061121A-20	119	351988	2.0	6.1598	0.3	10.6880	0.5	0.4775	0.4	0.76	2516.3	7.8	2496.4	4.6	2480.2	5.4	2480.2	5.4	101.5
K061121A-21	146	273112	1.8	6.1608	0.3	10.6714	0.8	0.4768	0.7	0.93	2513.4	14.8	2494.9	7.1	2479.9	4.6	2479.9	4.6	101.4
K061121A-22	122	62098	2.2	8.7815	0.5	5.0495	1.2	0.3216	1.1	0.92	1797.5	16.7	1827.7	9.8	1862.2	8.2	1862.2	8.2	96.5

K06246-1A-1	275	119362	2.3	9.4230	0.3	4.5007	2.8	0.3076	2.7	0.99	1728.8	41.5	1731.1	22.9	1733.9	5.7	1733.9	5.7	99.7
K06246-1A-2	734	5358	7.2	4.2634	1.2	14.4105	2.9	0.4456	2.7	0.92	2375.6	53.9	2777.1	28.0	3083.4	18.5	3083.4	18.5	77.0
K06246-1A-3	656	3087	2.3	9.5061	1.8	3.9540	3.7	0.2726	3.3	0.88	1554.0	45.1	1624.8	30.2	1717.7	32.9	1717.7	32.9	90.5
K06246-1A-5	140	116347	2.5	6.1753	0.2	10.4418	0.6	0.4677	0.6	0.93	2473.3	12.1	2474.8	5.9	2475.9	3.9	2475.9	3.9	99.9
K06246-1A-6	250	44193	2.6	9.3995	0.4	4.5276	0.8	0.3087	0.6	0.83	1734.1	9.6	1736.1	6.4	1738.4	7.9	1738.4	7.9	99.8
K06246-1A-7	236	261923	2.9	9.4087	0.4	4.4931	1.1	0.3066	1.0	0.95	1724.0	15.8	1729.7	9.1	1736.6	6.5	1736.6	6.5	99.3
K06246-1A-8	274	1409383	1.1	3.8727	0.1	23.2149	0.9	0.6520	0.9	0.99	3236.2	23.6	3236.0	9.1	3235.9	2.2	3235.9	2.2	100.0
K06246-1A-9	401	6160	1.2	5.7906	4.1	10.3891	10.3	0.4363	9.4	0.92	2334.1	184.3	2470.1	95.2	2583.9	68.0	2583.9	68.0	90.3
K06246-1A-10	235	141645	2.9	9.4209	0.5	4.4994	0.8	0.3074	0.6	0.77	1728.0	9.5	1730.9	6.8	1734.3	9.6	1734.3	9.6	99.6
K06246-1A-11	241	254904	2.9	9.4203	0.4	4.5568	1.0	0.3113	0.9	0.93	1747.3	13.7	1741.4	8.0	1734.4	6.7	1734.4	6.7	100.7
K06246-1A-12	270	59398	2.7	9.3871	0.3	4.5520	1.1	0.3099	1.0	0.97	1740.3	15.9	1740.5	9.0	1740.8	5.0	1740.8	5.0	100.0
K06246-1A-13	266	113569	2.9	9.4011	0.4	4.6878	4.4	0.3196	4.4	1.00	1787.9	68.2	1765.1	36.7	1738.1	7.0	1738.1	7.0	102.9
K06246-1A-14	343	200038	2.5	9.4329	0.4	4.4205	4.9	0.3024	4.9	1.00	1703.3	73.2	1716.2	40.6	1731.9	6.5	1731.9	6.5	98.3
K06246-1A-15	347	9130	2.6	9.3956	0.3	4.3109	1.4	0.2938	1.3	0.97	1660.3	19.6	1695.4	11.4	1739.2	6.2	1739.2	6.2	95.5
K06246-1A-17	544	22230	1.1	5.5022	4.0	10.5337	7.0	0.4204	5.7	0.82	2262.1	109.5	2482.9	65.0	2668.9	66.3	2668.9	66.3	84.8
K06246-1A-18	226	45261	2.7	9.4198	0.4	4.5677	0.5	0.3121	0.4	0.72	1750.8	5.8	1743.4	4.3	1734.5	6.6	1734.5	6.6	100.9
K06246-1A-19	131	134109	3.5	6.2273	0.4	10.5243	1.0	0.4753	0.9	0.89	2506.9	17.9	2482.1	9.0	2461.8	7.3	2461.8	7.3	101.8
K06246-1A-20	368	32427	2.3	9.4064	0.1	4.4932	0.6	0.3065	0.6	0.97	1723.6	9.5	1729.7	5.4	1737.1	2.7	1737.1	2.7	99.2
K06246-1A-21	280	279398	2.6	5.4001	0.3	13.4078	1.2	0.5251	1.2	0.98	2720.9	26.5	2708.8	11.6	2699.8	4.4	2699.8	4.4	100.8
K06246-1A-22	210	481861	2.2	5.1164	0.2	14.6815	0.9	0.5448	0.9	0.98	2803.5	19.4	2794.8	8.3	2788.6	2.9	2788.6	2.9	100.5
K06246-1A-23	192	220996	2.7	6.1750	0.3	10.5045	0.5	0.4704	0.5	0.87	2485.5	9.6	2480.3	4.9	2476.0	4.3	2476.0	4.3	100.4
K06246-1A-24	143	114394	3.0	6.1895	0.2	10.5498	0.8	0.4736	0.8	0.98	2499.3	16.8	2484.3	7.7	2472.1	2.5	2472.1	2.5	101.1
K06246-1A-26	112	164263	3.3	6.2056	0.4	10.6589	1.4	0.4797	1.3	0.95	2526.1	26.9	2493.9	12.6	2467.7	7.2	2467.7	7.2	102.4
K06246-1A-27	188	49554	0.7	5.8788	0.3	11.6006	1.1	0.4946	1.1	0.97	2590.6	23.7	2572.7	10.7	2558.6	4.9	2558.6	4.9	101.3
K06246-1A-28	265	130083	2.6	9.0944	0.4	4.9591	0.8	0.3271	0.7	0.88	1824.3	10.9	1812.4	6.6	1798.7	6.6	1798.7	6.6	101.4
K06246-1A-29	958	4819	1.6	8.7869	0.3	4.3855	2.8	0.2795	2.7	0.99	1588.8	38.5	1709.6	22.8	1861.0	5.9	1861.0	5.9	85.4
K06246-1A-30	113	21152	1.5	8.9643	0.8	5.1216	1.5	0.3330	1.3	0.85	1852.8	20.3	1839.7	12.6	1824.9	14.0	1824.9	14.0	101.5
K06246-1A-31	466	6470	1.0	5.6217	0.5	11.8205	1.9	0.4819	1.8	0.97	2535.7	37.9	2590.3	17.5	2633.2	7.7	2633.2	7.7	96.3
K06246-1A-32	258	102984	2.6	9.4107	0.4	4.5576	0.8	0.3111	0.7	0.90	1746.0	11.0	1741.5	6.7	1736.2	6.5	1736.2	6.5	100.6
K06246-1A-33	279	29192	1.9	8.5900	0.4	5.5428	0.7	0.3453	0.6	0.87	1912.2	10.5	1907.3	6.2	1901.9	6.5	1901.9	6.5	100.5
K06246-1A-34	306	50100	2.6	9.4033	0.3	4.6688	0.7	0.3184	0.6	0.90	1781.9	9.4	1761.7	5.6	1737.7	5.4	1737.7	5.4	102.5
K06246-1A-35	208	61163	2.1	9.3828	0.4	4.5000	0.8	0.3062	0.7	0.86	1722.1	10.1	1731.0	6.4	1741.7	7.2	1741.7	7.2	98.9
K06246-1A-36	260	4337	3.0	8.9443	7.6	4.8755	10.1	0.3163	6.7	0.66	1771.5	104.1	1798.0	85.4	1828.9	137.3	1828.9	137.3	96.9
K06246-1A-37	134	81178	2.9	6.1882	0.6	10.5227	3.2	0.4723	3.2	0.98	2493.5	65.7	2481.9	30.0	2472.4	10.5	2472.4	10.5	100.9
K06246-1A-38	156	318372	2.3	6.1640	0.3	10.5057	1.1	0.4697	1.0	0.96	2482.1	21.3	2480.4	10.0	2479.0	5.2	2479.0	5.2	100.1
K06246-1A-39	263	69938	2.5	9.3834	0.2	4.5262	0.7	0.3080	0.7	0.96	1731.0	10.7	1735.8	6.1	1741.6	3.7	1741.6	3.7	99.4
K06246-1A-41	517	32318	4.5	9.5294	0.3	4.3428	2.0	0.3001	2.0	0.99	1692.0	29.8	1701.5	16.8	1713.2	5.8	1713.2	5.8	98.8
K06246-1A-42	260	167042	2.6	9.3893	0.4	4.5711	0.8	0.3113	0.7	0.88	1747.0	10.4	1744.0	6.4	1740.4	6.7	1740.4	6.7	100.4
K06246-1A-43	362	6899	0.7	8.8773	0.4	5.2079	2.0	0.3353	2.0	0.98	1864.1	31.8	1853.9	17.2	1842.5	7.8	1842.5	7.8	101.2
K06246-1A-44	453	13128	1.7	9.3854	0.4	4.4061	2.3	0.2999	2.3	0.98	1690.9	33.9	1713.5	19.2	1741.2	8.0	1741.2	8.0	97.1
K06246-1A-46	417	60996	1.8	9.4041	0.2	4.5466	1.3	0.3101	1.3	0.99	1741.2	19.3	1739.5	10.6	1737.5	3.0	1737.5	3.0	100.2
K06246-1A-47	399	4876	4.1	9.4071	0.7	4.1246	2.7	0.2814	2.6	0.96	1598.5	36.9	1659.2	22.1	1736.9	13.5	1736.9	13.5	92.0
K06246-1A-49	250	13048	2.6	9.3921	0.4	4.6460	1.3	0.3165	1.3	0.96	1772.5	19.9	1757.6	11.1	1739.9	6.6	1739.9	6.6	101.9
K06246-1A-50	344	5910	2.3	9.3665	0.6	4.5102	1.1	0.3064	0.9	0.82	1722.9	13.8	1732.9	9.3	1744.9	11.9	1744.9	11.9	98.7
K06246-1A-51	286	31916	2.4	9.4270	0.3	4.5991	0.6	0.3144	0.6	0.89	1762.6	9.0	1749.1	5.4	1733.1	5.3	1733.1	5.3	101.7
K06246-1A-52	296	35160	2.5	6.3544	0.2	9.6824	1.0	0.4462	1.0	0.98	2378.4	20.0	2405.0	9.5	2427.6	3.5	2427.6	3.5	98.0
K06246-1A-53	138	54169	0.6	5.5137	0.3	12.8861	2.7	0.5153	2.7	0.99	2679.2	59.2	2671.4	25.6	2665.4	4.5	2665.4	4.5	100.5
K06246-1A-54	361	7184	2.5	9.4517	0.5	4.3502	1.3	0.2982	1.2	0.92	1682.4	17.4	1702.9	10.5	1728.3	9.0	1728.3	9.0	97.3
K06246-1A-55	432	3846	3.7	9.4696	1.6	4.4097	2.9	0.3029	2.5	0.84	1705.4	37.0	1714.2	24.3	1724.8	29.0	1724.8	29.0	98.9
K06246-1A-56	398	4298	2.2	9.4120	0.6	4.2341	1.0	0.2890	0.8	0.82	1636.7	11.8	1680.6	8.2	1736.0	10.5	1736.0	10.5	94.3
K06246-1A-57	463	6672	2.2	9.4143	0.8	4.5491	5.2	0.3106	5.2	0.99	1743.7	78.9	1740.0	43.6	1735.5	15.4	1735.5	15.4	100.5
K06246-1A-59	257	13589	2.7	9.3844	0.4	4.6033	1.2	0.3133	1.1	0.93	1757.0	16.7	1749.9	9.7	1741.4	7.7	1741.4	7.7	100.9
K06246-1A-60	440	34335	2.1	9.3863	0.4	4.5240	2.2	0.3080	2.1	0.98	1730.7	32.1	1735.4	17.9	1741.0	7.4	1741.0	7.4	99.4
K06246-1A-61	536	5137	1.7	9.3885	0.7	4.5365	1.6	0.3089	1.5	0.91	1735.3	22.6	1737.7	13.6	1740.6	12.4	1740.6	12.4	99.7
K06246-1A-63	273	14812	1.3	5.8755	1.2	11.0348	3.4	0.4702	3.2	0.93	2484.6	65.0	2526.1	31.4	2559.6	20.1	2559.6	20.1	97.1
K06246-1A-64	418	14003	1.9	9.4074	0.4	4.3779	0.9	0.2987	0.8	0.91	1684.9	12.4	1708.2	7.6	1736.9	6.9	1736.9	6.9	97.0
K06246-1A-65	289	11794	2.6	9.3989	0.5	4.4842	1.6	0.3057	1.5	0.95	1719.4	22.6	1728.0	13.2	1738.5	9.5	1738.5	9.5	98.9
K06246-1A-66	259	71530	2.5	9.4184	0.4	4.5656	0.9	0.3119	0.9	0.91	1749.9	13.1	1743.0	7.8	1734.7	7.1	1734.7	7.1	100.9
K06246-1A-67	218	32459	2.8	9.4123	0.3	4.6215	1.3	0.3155	1.3	0.98	1767.6	19.9	1753.2	11.0	1735.9	5.2	1735.9	5.2	101.8
K06246-1A-69	286	168423	2.6	9.4324	0.3	4.4996	1.6	0.3078	1.5	0.98	1729.9	23.1	1730.9	13.0	1732.0	6.3	1732.0	6.3	99.9
K06246-1A-70	530	18323	1.6	9.4227	0.3	4.5031	1.7	0.3077	1.6	0.99	1729.6	24.9	1731.5	13.8	1733.9	4.9	1733.9	4.9	99.7
K06246-1A-71	284	2823	2.9	9.3712	0.2	4.0413	1.0	0.2747	1.0	0.97	1564.5	14.0	1642.6	8.4	1744.0	4.6	1744.0	4.6	89.7
K06246-1A-74	336	7328	1.3	9.4550	0.7	4.3185	1.7	0.2961	1.5	0.90	1672.1	22.2	1696.9	13.8	1727.6	13.2	1727.6	13.2	96.8
K06246-1A-75	248	31795	2.9	9.4096	0.5	4.5728	1.5	0.3121	1.4	0.94	1750.9	21.2	1744.3	12.3	1736.4	9.3	1736.4	9.3	100.8
K06246-1A-77	353	38988	2.2	9.4231	0.3	4.5343	1.1	0.3099	1.1	0.96	1740.2	16.9	1737.3	9.6	1733.8	5.6	1733.8	5.6	100.4
K06246-1A-78	242	90372	3.3	9.4217	0.5	4.5099	2.2	0.3082	2.2	0.97	1731.7	33.1	1732.8	18.6	1734.1	9.2	1734.1	9.2	99.9
K06246-1A-79	110	3159	1.7	6.1288	0.5	8.9566	1.2	0.3981	1.1	0.90	2160.4	20.6	2333.6	11.4	2488.7	9.2	2488.7	9.2	86.8
K06246-1A-81	253	46135	2.3	9.4291	0.4	4.5357	1.8	0.3102	1.7	0.98	1741.6	26.1	1737.5	14.6	1732.7	7.1	1732.7	7.1	100.5
K06246-1A-82	388	6648	2.3	9.3578	0.5	4.4239	1.2	0.3002	1.1	0.92	1692.5	16.5	1716.8	9.9	1746.6	8.5	1746.6	8.5	96.9
K06246-1A-83	323	19485	2.5	9.4036	0.6	4.5415	1.2	0.3097	1.0	0.85	1739.4	15.5	1738.6	10.0	1737.6	11.6	1737.6	11.6	100.1
K06246-1A-86	342	158585	2.4	9.3931	0.2	4.6764	0.9	0.3186	0.9	0.98	1782.8	14.0	1763.0	7.7	1739.7	3.7	1739.7	3.7	102.5
K06246-1A-88	365	70655	2.1	9.4020	0.2	4.5157	0.8	0.3079	0.7	0.96	1730.5	10.9	1733.9	6.3	1737.9	4.1	1737.9	4.1	99.6
K06246-1A-89	391	15711	2.5	9.4135	0.3	4.3955	1.0	0.3001	0.9	0.95	1691.8	13.9	1711.5	8.2	1735.7	5.9	1735.7	5.9	97.5
K06246-1A-90	323	4852	2.0	9.3729	0.8	4.1890	1.2	0.2848	0.9	0.77	1615.3	13.2	1671.9	9.9	1743.6	14.2	1743.6	14.2	92.6
K06246-1A-91	195	75545	2.5	9.3936	0.7	4.6267	1.0	0.3152	0.7	0.70	1766.3	10.7	1754.1	8.2	1739.6	12.8	1739.6	12.8	101.5
K06246-1A-92	330	184751	1.9	9.3925	0.4	4.6771	0.8	0.3186	0.7	0.84	1782.9	10.5	1763.1	6.7	1739.8	7.9	1739.8	7.9	102.5
K06246-1A-93	487	205451	2.0	9.3878	0.3	4.5375	1.0	0.3089	1.0	0.96	1735.5	15.1	1737.9	8.6	1740.7	5.0	1740.7	5.0	99.7
K06246-1A-94	246	121810	3.3	9.3935	0.5	4.5305	0.8	0.3087	0.7	0.82	1734.1	10.3	1736.6	6.8	1739.6	8.5	1739.6	8.5	99.7
K06246-1A-95	373	23183	2.6	8.7657	0.7	5.1765	1.2	0.3291	1.0	0.84	1834.0	16.5	1848.8	10.5	1865.4	12.2	1865.4	12.2	98.3
K06246-1A-96	330	13331	2.3	9.3982	0.5	4.4245	0.9	0.3016	0.7	0.86	1699.2	11.2	1716.9	7.2	1738.7	8.3	1738.7	8.3	97.7
K06246-1A-97	536	11859	1.0	5.2180	0.4	12.9523	2.3	0.4902	2.3	0.99	2571.5	48.6	2676.2	21.9	2756.3	6.1	2756.3	6.1	93.3
K06246-1A-98	245	499348	2.6	9.4188	0.2	4.4880	0.9	0.3066	0.9	0.97	1723.9	13.5	1728.8	7.6	1734.7	4.1	1734.7	4.1	99.4
K06246-1A-100	294	5392	1.9	9.3902	0.7	4.6344	2.3	0.3156	2.1	0.95	1768.3	33.1	1755.5	18.9	1740.2	13.5	1740.2	13.5	101.6

Notes:

Analyses with >10% uncertainty (1-sigma) in 206Pb/238U age are not included.

Analyses with >10% uncertainty (1-sigma) in 206Pb/207Pb age are not included, unless 206Pb/238U age is <500 Ma.

Best age is determined from 206Pb/238U age for analyses with 206Pb/238U age < 900 Ma and from 206Pb/207Pb age for analyses with 206Pb/238Uage > 900 Ma.

Concordance is based on 206Pb/238U age / 206Pb/207Pb age. Value is not reported for 206Pb/238U ages <500 Ma because of large uncertainty in 206Pb/207Pb age.

Analyses with 206Pb/238U age > 500 Ma and with >20% discordance (<80% concordance) are not included.

Analyses with 206Pb/238U age > 500 Ma and with >5% reverse discordance (<105% concordance) are not included.

All uncertainties are reported at the 1-sigma level, and include only measurement errors.

Systematic errors are shown as 206Pb/238U uncertainty, 206Pb/207Pb uncertainty to the right of each sample (at 2-sigma level).

U concentration and U/Th are calibrated relative to Sri Lanka zircon and are accurate to ~20%.

Common Pb correction is from 204Pb, with composition interpreted from Stacey and Kramers (1975).

Uncertainties of 1.5 for 206Pb/ 204Pb, 0.3 for 207Pb/ 204Pb, and 2.0 for 208Pb/ 204Pb are applied to common Pb composition.

U/Pb and 206Pb/207Pb fractionation is calibrated relative to fragments of a large Sri Lanka zircon of 563.5 ± 3.2 Ma (2-sigma).

U decay constants and composition as follows: 238U = 9.8485 x 10-10, 235U = 1.55125 x 10-10, 238U/235U = 137.88

Analytical methods as described by Gehrels et al. (2008).

Table DR2. Hf isotopic data of Vishnu Schist (ALC).

Sample	(176Yb + 176Lu) / 176Hf (%)	Volts Hf	176Hf/177Hf	± (1s)	176Lu/177Hf	176Hf/177Hf (T)	E-Hf (0)	E-Hf (0) ± (1s)	E-Hf (T)	Age (Ma)
OS0884-2-1	20.0	2.2	0.281644	0.000035	0.001396	0.281594	-40.4	1.2	-0.3	1853
OS0884-2-2	28.0	2.8	0.281638	0.000037	0.001754	0.281578	-40.6	1.3	-2.1	1800
OS0884-2-3	8.9	2.7	0.280834	0.000034	0.000555	0.280806	-69.0	1.2	-9.5	2661
OS0884-2-4	15.5	2.8	0.281022	0.000040	0.000912	0.280975	-62.4	1.4	-3.3	2671
OS0884-2-6	7.4	2.5	0.281196	0.000041	0.000462	0.281173	-56.2	1.5	2.2	2606
OS0884-2-8	11.1	2.7	0.281217	0.000032	0.000690	0.281184	-55.5	1.1	-0.2	2484
OS0884-2-9	8.5	1.9	0.281457	0.000039	0.000629	0.281436	-47.0	1.4	-7.5	1783
OS0884-2-17	10.4	2.8	0.281145	0.000036	0.000649	0.281114	-58.0	1.3	-2.7	2485
OS0884-2-18	16.2	3.3	0.281590	0.000028	0.000998	0.281554	-42.3	1.0	-1.5	1862
OS0884-2-22	15.7	2.8	0.281581	0.000025	0.001013	0.281546	-42.6	0.9	-2.8	1817
OS0884-2-27	21.1	2.4	0.281445	0.000036	0.001316	0.281399	-47.4	1.3	-7.4	1846
OS0884-2-30	13.9	2.8	0.281632	0.000034	0.000931	0.281601	-40.8	1.2	-1.5	1790
OS0884-2-32	12.9	1.1	0.281924	0.000050	0.001155	0.281885	-30.4	1.8	8.2	1774
OS0884-2-38	13.6	1.9	0.281275	0.000042	0.000919	0.281230	-53.4	1.5	2.7	2541
OS0884-2-40	32.0	2.9	0.281711	0.000033	0.001944	0.281645	-38.0	1.2	0.0	1786
OS0884-2-41	27.0	1.0	0.281318	0.000048	0.001904	0.281252	-51.9	1.7	-12.9	1831
OS0884-2-50	12.2	1.5	0.281193	0.000050	0.000866	0.281151	-56.3	1.8	0.5	2563
OS0884-2-100	15.6	2.3	0.281648	0.000038	0.000832	0.281620	-40.2	1.3	-1.1	1777
OS0884-2-53	15.0	2.4	0.281667	0.000044	0.000856	0.281636	-39.5	1.5	1.5	1865
OS0884-2-55	25.8	1.6	0.281189	0.000048	0.001586	0.281114	-56.4	1.7	-2.9	2478
OS0884-2-56	15.5	2.3	0.281209	0.000038	0.000969	0.281160	-55.7	1.3	2.2	2625
OS0884-2-57	13.6	2.0	0.281688	0.000042	0.000911	0.281657	-38.8	1.5	0.7	1801
OS0884-2-58	18.8	2.2	0.281659	0.000041	0.001052	0.281623	-39.8	1.5	-0.7	1792
OS0884-2-59	16.3	2.0	0.281229	0.000035	0.001033	0.281178	-55.0	1.2	1.8	2577
OS0884-2-60	14.5	1.9	0.281212	0.000033	0.000863	0.281171	-55.6	1.2	-0.9	2474
OS0884-2-61	11.8	2.1	0.281122	0.000037	0.000694	0.281090	-58.8	1.3	-4.5	2445
OS0884-2-62	11.3	2.3	0.281199	0.000035	0.000663	0.281167	-56.1	1.2	-0.8	2483
OS0884-2-66	17.3	1.5	0.281223	0.000045	0.001134	0.281170	-55.2	1.6	-2.2	2419
OS0884-2-67	29.0	0.9	0.281778	0.000043	0.001862	0.281716	-35.6	1.5	2.0	1763
OS0884-2-69	16.6	1.8	0.281746	0.000044	0.001003	0.281712	-36.7	1.5	2.5	1794
OS0884-2-70	8.2	1.9	0.281718	0.000040	0.000545	0.281698	-37.7	1.4	3.5	1855
OS0884-2-71	22.7	2.4	0.281747	0.000036	0.001348	0.281701	-36.7	1.3	2.1	1790
OS0884-2-72	19.9	2.2	0.281215	0.000044	0.001143	0.281161	-55.5	1.5	-1.0	2483
OS0884-2-74	11.2	2.1	0.281267	0.000036	0.000660	0.281236	-53.7	1.3	1.7	2485
OS0884-2-75	24.3	2.4	0.281467	0.000039	0.001468	0.281403	-46.6	1.4	3.5	2309
OS0884-2-76	9.5	2.5	0.281581	0.000038	0.000555	0.281562	-42.6	1.4	-3.0	1784
OS0884-2-78	14.3	2.1	0.281322	0.000030	0.000843	0.281282	-51.7	1.1	2.7	2458
OS0884-2-79	25.1	2.3	0.281912	0.000032	0.001573	0.281860	-30.9	1.1	6.6	1744
OS0884-2-80	22.0	2.4	0.281002	0.000035	0.001299	0.280935	-63.1	1.3	-4.1	2699
OS0884-2-83	15.3	0.9	0.281705	0.000093	0.001011	0.281671	-38.2	3.3	0.7	1778
OS0884-2-88	18.8	2.2	0.281883	0.000032	0.001114	0.281846	-31.9	1.1	6.3	1751
OS0884-2-90	20.4	1.8	0.281736	0.000056	0.001254	0.281695	-37.1	2.0	0.9	1748
OS0884-2-92	17.2	1.7	0.281157	0.000045	0.001108	0.281101	-57.6	1.6	0.3	2635
OS0884-2-93	27.7	1.4	0.281787	0.000043	0.001753	0.281728	-35.3	1.5	2.6	1770
OS0884-2-95	47.7	1.6	0.281753	0.000061	0.002621	0.281665	-36.5	2.2	0.4	1773
OS0884-2-96	12.5	2.1	0.281571	0.000037	0.000672	0.281549	-42.9	1.3	-3.6	1779
OS0884-2-97	16.3	1.7	0.281017	0.000050	0.000993	0.280964	-62.5	1.8	-1.4	2765
OS0884-2-99	29.8	2.0	0.281191	0.000049	0.001772	0.281100	-56.4	1.7	1.1	2668
K0598.6-104-1	41.1	2.2	0.281637	0.000040	0.003100	0.281531	-40.6	1.4	-3.7	1802
K0598.6-104-5	12.7	2.7	0.281757	0.000035	0.000834	0.281730	-36.3	1.2	2.0	1742
K0598.6-104-9	32.8	2.5	0.281704	0.000041	0.002097	0.281634	-38.2	1.5	-1.3	1747
K0598.6-104-10	22.0	1.7	0.281722	0.000065	0.001356	0.281675	-37.6	2.3	1.5	1805
K0598.6-104-17	10.2	2.2	0.281815	0.000038	0.000770	0.281790	-34.3	1.4	4.1	1744
K0598.6-104-20	17.7	1.6	0.281821	0.000050	0.001304	0.281776	-34.1	1.8	5.7	1832
K0598.6-104-26	17.5	3.3	0.281657	0.000024	0.001065	0.281620	-39.9	0.8	-0.2	1819
K0598.6-104-28	26.1	2.7	0.281749	0.000035	0.001700	0.281692	-36.6	1.2	1.0	1759
K0598.6-104-34	38.8	2.4	0.281779	0.000046	0.002534	0.281695	-35.6	1.6	0.8	1744
K0598.6-104-35	17.2	2.1	0.281744	0.000042	0.001256	0.281702	-36.8	1.5	1.2	1750
K0598.6-104-36	12.0	2.8	0.281813	0.000034	0.000764	0.281786	-34.4	1.2	6.3	1842
K0598.6-104-37	18.7	2.4	0.281912	0.000046	0.001247	0.281871	-30.9	1.6	7.0	1744
K0598.6-104-41	15.3	2.2	0.281808	0.000036	0.000984	0.281775	-34.6	1.3	3.8	1754
K0598.6-104-47	18.5	1.6	0.281753	0.000039	0.001459	0.281704	-36.5	1.4	1.1	1743
K0598.6-104-49	14.8	2.7	0.281558	0.000037	0.001014	0.281523	-43.4	1.3	-3.9	1806
K0598.6-104-50	21.3	2.0	0.281773	0.000037	0.001261	0.281731	-35.8	1.3	2.2	1750
OS08108-4-2	25.8	1.2	0.281777	0.000049	0.001782	0.281718	-35.6	1.7	1.6	1743
OS08108-4-3	12.2	1.7	0.281626	0.000057	0.000798	0.281599	-41.0	2.0	-1.7	1783
OS08108-4-4	14.5	2.1	0.281234	0.000048	0.000996	0.281184	-54.8	1.7	3.2	2630
OS08108-4-6	23.3	1.8	0.281808	0.000041	0.001627	0.281754	-34.5	1.5	2.9	1744
OS08108-4-7	15.4	2.3	0.281173	0.000045	0.000926	0.281130	-57.0	1.6	-2.3	2476
OS08108-4-8	20.1	2.3	0.281789	0.000042	0.001315	0.281745	-35.2	1.5	2.6	1744
OS08108-4-11	23.5	2.2	0.281661	0.000048	0.001552	0.281609	-39.8	1.7	-2.2	1746
OS08108-4-13	16.7	2.3	0.281702	0.000030	0.001009	0.281668	-38.3	1.1	0.1	1757
OS08108-4-17	19.6	2.7	0.281751	0.000033	0.001248	0.281709	-36.6	1.2	1.9	1771
OS08108-4-21	19.7	2.3	0.281740	0.000050	0.001247	0.281698	-37.0	1.8	1.0	1750
OS08108-4-27	23.0	2.1	0.281738	0.000037	0.001421	0.281691	-37.0	1.3	0.6	1741
OS08108-4-28	31.4	2.4	0.281803	0.000040	0.001957	0.281738	-34.7	1.4	2.3	1744
OS08108-4-30	21.6	2.5	0.281887	0.000036	0.001497	0.281837	-31.8	1.3	5.8	1740
OS08108-4-32	15.3	2.6	0.281736	0.000029	0.001010	0.281703	-37.1	1.0	1.0	1744
OS081084-1-39	24.6	2.3	0.281775	0.000041	0.001547	0.281722	-35.7	1.4	2.9	1793
OS081084-1-40	15.6	0.9	0.281437	0.000072	0.001242	0.281377	-47.7	2.6	7.0	2499
OS081084-1-43	15.0	1.8	0.281210	0.000041	0.000842	0.281168	-55.7	1.4	1.3	2572
OS081084-1-44	32.9	0.9	0.281308	0.000094	0.002268	0.281201	-52.2	3.3	0.1	2473
OS081084-1-47	23.9	2.5	0.281843	0.000044	0.001595	0.281790	-33.3	1.6	4.2	1746
OS081084-1-48	23.8	1.0	0.281756	0.000045	0.001497	0.281706	-36.4	1.6	1.4	1753
OS081084-1-57	45.5	2.1	0.281702	0.000034	0.002855	0.281603	-38.3	1.2	-0.8	1816

K051108-108A-2	17.4	1.9	0.280736	0.000053	0.000992	0.280673	-72.4	1.9	1.6	3332
K051108-108A-3	31.5	1.4	0.280989	0.000058	0.001797	0.280903	-63.5	2.0	-9.2	2529
K051108-108A-6	11.8	1.9	0.281140	0.000046	0.000575	0.281112	-58.2	1.6	-1.9	2521
K051108-108A-7	33.0	1.5	0.281376	0.000016	0.001563	0.281300	-49.8	0.6	4.9	2525
K051108-108A-10	19.5	2.1	0.281930	0.000047	0.001207	0.281888	-30.2	1.7	10.0	1849
K051108-108A-11	17.7	1.8	0.280942	0.000056	0.000827	0.280901	-65.2	2.0	-7.7	2596
K051108-108A-15	47.8	1.2	0.281929	0.000056	0.002623	0.281840	-30.3	2.0	6.7	1779
K051108-108A-21	24.5	1.6	0.281750	0.000043	0.001250	0.281707	-36.6	1.5	2.8	1814
K051108-108A-28	38.1	0.8	0.281665	0.000039	0.002695	0.281570	-39.6	1.4	-1.1	1856
K051108-108A-29	20.4	1.0	0.280596	0.000036	0.001104	0.280527	-77.4	1.3	-5.7	3246
K051108-108A-30	16.6	1.7	0.281386	0.000037	0.000900	0.281343	-49.5	1.3	6.1	2513
K051108-108A-32	17.2	0.9	0.281008	0.000054	0.000971	0.280970	-62.8	1.9	-17.5	2066
K051108-108A-44	28.5	1.3	0.281476	0.000059	0.001567	0.281420	-46.3	2.1	-5.3	1903
K051108-108A-46	15.0	1.7	0.281566	0.000041	0.000711	0.281540	-43.1	1.4	-1.5	1882
K051108-108A-48	12.0	2.0	0.281201	0.000039	0.000656	0.281168	-56.0	1.4	2.5	2624
K051108-108A-50	28.5	1.6	0.281820	0.000045	0.001694	0.281761	-34.1	1.6	4.8	1818
K051108-108A-51	15.4	1.7	0.281152	0.000052	0.000737	0.281116	-57.8	1.8	-1.5	2533
K051108-108A-52	49.9	1.3	0.281802	0.000044	0.001854	0.281734	-34.8	1.6	6.4	1928
K051108-108A-53	24.0	2.5	0.281694	0.000043	0.001210	0.281651	-38.6	1.5	1.5	1843
K051108-108A-57	11.6	1.8	0.281264	0.000040	0.000586	0.281236	-53.8	1.4	2.6	2524
K051108-108A-58	14.9	1.9	0.281051	0.000040	0.000732	0.281016	-61.3	1.4	-5.3	2523
K051108-108A-59	13.2	1.6	0.281389	0.000053	0.000709	0.281362	-49.4	1.9	-5.8	1971
K051108-108A-61	37.0	1.4	0.281641	0.000048	0.002329	0.281562	-40.4	1.7	-2.6	1801
K051108-108A-62	21.1	1.4	0.281685	0.000056	0.001075	0.281648	-38.9	2.0	0.5	1804
K051108-108A-63	18.0	1.4	0.281646	0.000043	0.000880	0.281616	-40.3	1.5	-0.7	1800
K051108-108A-64	37.4	1.4	0.281682	0.000039	0.001818	0.281620	-39.0	1.4	-0.7	1796
K051108-108A-65	4.5	1.7	0.281624	0.000049	0.000228	0.281615	-41.1	1.7	2.3	1931
K051108-108A-66	30.9	1.5	0.281558	0.000033	0.001520	0.281500	-43.4	1.2	0.3	2023
K051108-108A-68	28.9	1.7	0.281117	0.000048	0.001394	0.281050	-59.0	1.7	-3.7	2541
K051108-108A-69	28.5	2.2	0.281551	0.000041	0.001483	0.281499	-43.6	1.5	-3.7	1850
K051108-108A-71	23.5	1.3	0.281298	0.000043	0.001171	0.281242	-52.6	1.5	2.6	2515
K051108-108A-72	18.5	1.1	0.281430	0.000045	0.001145	0.281375	-47.9	1.6	7.3	2514
K051108-108A-74	9.6	1.6	0.281135	0.000044	0.000455	0.281113	-58.3	1.6	-1.8	2523
K051108-108A-75	12.0	1.5	0.281788	0.000031	0.000755	0.281760	-35.3	1.1	7.1	1919
K051108-108A-76	21.8	1.8	0.281236	0.000046	0.000973	0.281189	-54.8	1.6	0.8	2518
K051108-108A-77	11.8	1.5	0.281813	0.000045	0.000753	0.281785	-34.4	1.6	9.0	1962
K051108-108A-82	21.8	0.9	0.281466	0.000046	0.001174	0.281421	-46.7	1.6	-2.8	2011
K051108-108A-84	17.7	1.5	0.281044	0.000041	0.000867	0.281001	-61.6	1.4	-4.9	2564
K051108-108A-87	22.7	1.5	0.281783	0.000043	0.001332	0.281737	-35.4	1.5	4.1	1825
K051108-108A-89	24.4	1.4	0.281647	0.000036	0.001323	0.281601	-40.2	1.3	-0.7	1822
K051108-108A-92	32.0	0.9	0.281478	0.000019	0.001907	0.281409	-46.2	0.7	-5.3	1919
K051108-108A-93	22.6	1.5	0.281189	0.000035	0.001314	0.281123	-56.4	1.2	0.5	2607
K051108-108A-94	26.9	1.1	0.280728	0.000038	0.001725	0.280643	-72.7	1.3	-17.5	2569
K051108-108A-99	16.7	1.5	0.281010	0.000041	0.000771	0.280972	-62.8	1.4	-5.2	2596
K06-112-1-2	14.6	2.5	0.281092	0.000042	0.000914	0.281047	-59.9	1.5	-3.3	2559
K06-112-1-3	14.7	3.1	0.281184	0.000040	0.001008	0.281134	-56.6	1.4	0.6	2595
K06-112-1-4	6.9	3.0	0.280690	0.000030	0.000460	0.280661	-74.1	1.0	-0.1	3277
K06-112-1-6	10.9	3.1	0.281214	0.000031	0.000715	0.281177	-55.6	1.1	3.5	2654
K06-112-1-8	7.3	2.7	0.281581	0.000039	0.000436	0.281566	-42.6	1.4	-1.6	1838
K06-112-1-9	21.0	2.3	0.281165	0.000040	0.001215	0.281109	-57.3	1.4	-3.9	2442
K06-112-1-10	13.3	2.3	0.281722	0.000030	0.001049	0.281686	-37.6	1.0	2.2	1821
K06-112-1-13	8.8	2.5	0.281522	0.000054	0.000495	0.281505	-44.7	1.9	-5.2	1775
K06-112-1-15	15.3	2.5	0.281110	0.000039	0.000993	0.281062	-59.2	1.4	-4.3	2495
K06-112-1-16	18.9	2.6	0.281202	0.000034	0.001105	0.281148	-56.0	1.2	0.2	2558
K06-112-1-17	17.3	2.8	0.281179	0.000037	0.001039	0.281130	-56.8	1.3	-2.3	2479
K06-112-1-18	5.4	2.7	0.281165	0.000030	0.000364	0.281146	-57.3	1.1	2.9	2672
K06-112-1-19	21.5	2.4	0.281777	0.000044	0.001392	0.281728	-35.6	1.6	4.4	1850
K06-112-1-20	9.9	2.6	0.281198	0.000044	0.000613	0.281169	-56.1	1.5	-0.8	2480
K06-112-1-21	13.3	2.6	0.281109	0.000039	0.000794	0.281071	-59.3	1.4	-4.3	2480
K06-112-1-22	15.4	2.4	0.281519	0.000049	0.000937	0.281486	-44.8	1.7	-3.9	1862
K06-246-2-1	22.5	2.0	0.281806	0.000050	0.001527	0.281756	-34.6	1.8	2.7	1734
K06-246-2-5	9.8	2.5	0.281200	0.000035	0.000597	0.281172	-56.0	1.2	-0.8	2476
K06-246-2-6	19.1	2.8	0.281846	0.000033	0.001337	0.281802	-33.2	1.2	4.5	1738
K06-246-2-7	14.2	2.5	0.281880	0.000036	0.000931	0.281849	-32.0	1.3	6.1	1737
K06-246-2-8	24.4	2.6	0.280557	0.000036	0.001872	0.280440	-78.8	1.3	-9.0	3236
K06-246-2-12	16.2	2.7	0.281874	0.000041	0.001174	0.281835	-32.2	1.4	5.7	1741
K06-246-2-13	23.2	1.7	0.281970	0.000042	0.001898	0.281908	-28.8	1.5	8.2	1738
K06-246-2-14	25.8	1.9	0.281863	0.000046	0.001825	0.281803	-32.6	1.6	4.3	1732
K06-246-2-15	25.9	1.9	0.281837	0.000034	0.001743	0.281780	-33.5	1.2	3.7	1739
K06-246-2-17	19.3	2.5	0.280905	0.000034	0.001211	0.280843	-66.5	1.2	-8.0	2669
K06-246-2-18	20.7	1.8	0.281806	0.000040	0.001224	0.281766	-34.6	1.4	3.1	1735
K06-246-2-20	24.3	2.4	0.281897	0.000040	0.001684	0.281842	-31.4	1.4	5.8	1737
K06-246-2-23	8.8	2.9	0.281127	0.000038	0.000544	0.281101	-58.6	1.3	-3.3	2476
K06-246-2-24	8.7	2.3	0.281193	0.000047	0.000557	0.281167	-56.3	1.6	-1.1	2472
K06-246-2-26	7.9	2.9	0.281227	0.000030	0.000498	0.281204	-55.1	1.1	0.1	2468
K06-246-2-28	34.2	1.8	0.281151	0.000053	0.001787	0.281090	-57.8	1.9	-19.4	1799
K06-246-2-29	13.4	2.4	0.281626	0.000064	0.001227	0.281582	-41.0	2.3	-0.5	1861
K06-246-2-31	18.1	1.7	0.281148	0.000047	0.001440	0.281075	-57.9	1.7	-0.6	2633
K06-246-2-32	20.2	2.2	0.281881	0.000057	0.001181	0.281842	-32.0	2.0	5.8	1736
K06-246-2-33	13.3	2.9	0.281560	0.000041	0.000926	0.281527	-43.3	1.5	-1.6	1902
K06-246-2-34	22.5	2.5	0.281886	0.000046	0.001347	0.281842	-31.8	1.6	5.8	1738
K06-246-2-42	19.1	2.0	0.281887	0.000043	0.001304	0.281844	-31.8	1.5	6.0	1740
K06-246-2-43	26.2	2.0	0.281833	0.000041	0.001657	0.281775	-33.7	1.4	5.9	1843
K06-246-2-46	30.9	1.1	0.281732	0.000080	0.002376	0.281654	-37.2	2.8	-0.8	1738
K06-246-1-100	26.1	1.9	0.281949	0.000037	0.001830	0.281889	-29.6	1.3	7.6	1740
K06-246-1-53	31.2	0.8	0.281307	0.000097	0.002276	0.281191	-52.3	3.4	4.3	2665
K06-246-1-59	23.3	1.7	0.281918	0.000052	0.001461	0.281870	-30.7	1.8	6.9	1741
K06-246-1-60	44.5	1.6	0.281915	0.000061	0.002560	0.281831	-30.7	2.2	5.5	1741
K06-246-1-61	54.7	1.4	0.281958	0.000065	0.003116	0.281855	-29.2	2.3	6.4	1741

K06-246-1-63	13.5	2.2	0.281323	0.000044	0.000878	0.281280	-51.7	1.6	5.0	2560
K06-246-1-65	21.8	2.0	0.281920	0.000032	0.001402	0.281874	-30.6	1.1	7.0	1739
K06-246-1-71	24.0	2.4	0.281853	0.000033	0.001713	0.281797	-32.9	1.2	4.4	1744
K06-246-1-79	28.4	1.8	0.281362	0.000048	0.001759	0.281278	-50.3	1.7	3.2	2489
K06-246-1-82	30.4	1.6	0.281956	0.000057	0.001983	0.281890	-29.3	2.0	7.8	1747
K06-246-1-90	41.9	2.3	0.281876	0.000038	0.002300	0.281800	-32.1	1.3	4.5	1744
K06-246-1-91	28.1	1.9	0.281733	0.000045	0.001636	0.281679	-37.2	1.6	0.1	1740
K06-246-1-92	40.9	2.0	0.281881	0.000049	0.002339	0.281804	-32.0	1.7	4.5	1740
K06-246-1-93	41.2	1.3	0.281840	0.000050	0.002360	0.281762	-33.4	1.8	3.1	1741
K06-246-1-94	19.7	2.3	0.281980	0.000038	0.001262	0.281938	-28.5	1.3	9.3	1740
K06-246-1-95	19.5	2.3	0.281879	0.000039	0.001198	0.281837	-32.0	1.4	8.6	1865
K06-246-1-96	34.8	2.7	0.281963	0.000039	0.002109	0.281893	-29.1	1.4	7.7	1739
K06-246-1-97	20.4	2.8	0.280806	0.000033	0.001284	0.280738	-70.0	1.2	-9.7	2756

Notes:

Hf fractionation is corrected by comparing measured 179Hf/177Hf against known 179/177 (line by line). Beta Hf is applied as a power law.

Yb fractionation is corrected by comparing measured 173Yb/171Yb against known 173/171 (line by line) if 171Yb intensity is more than ~1 mv. Beta Yb is applied as a power law.

If 171Yb intensity is less than can be measured reliably, Beta Hf is used to correct for Yb fractionation.

The actual cutoff used is determined from the analysis of standards during the same session as unknowns (see below).

Data are filtered by intensity of Hf (removed if below cutoff value determined by monitoring the average offset of the standards from their known values, which is set at the minimum offset)

Data are filtered by removing 1 max and 1 min value (out of 60).

Data are aflso filtered by 95% filter (rejected if outside of 2-sigma std dev of full set)

Uncertainties are standard error of the mean, expressed at 1-sigma

Hf, Yb, Lu Sol "cocktails" behaved strangely during April 2013 session - same solutions run during different times in the session displayed variable interferrences. They also fractionated slightly different than the matrix matched in-run standards. Therefore, the Hf and Yb biases were determined by only looking at the in-run matrix matched standard analyses which was appropriate due to the large number of standards run during this session.

Table DR3. U-Pb geochronologic analyses of Grand Canyon plutons (ALC).

						Isotope ratios							Apparent ages (Ma)						
Analysis	U (ppm)	206Pb 204Pb	U/Th	206Pb* 207Pb*	± (%)	207Pb* 235U*	± (%)	206Pb* 238U	± (%)	error corr.	206Pb* 238U*	± (Ma)	207Pb* 235U	± (Ma)	206Pb* 207Pb*	± (Ma)	Best age (Ma)	± (Ma)	Conc (%)
K12-81L-3	380	13227	2.9	9.3282	0.3	4.3766	1.6	0.2961	1.5	0.98	1671.9	22.5	1707.9	12.9	1752.4	5.8	1752.4	5.8	95.4
K12-81L-4	326	31750	2.6	9.2709	0.4	4.6048	1.3	0.3096	1.2	0.94	1738.9	18.1	1750.1	10.6	1763.6	8.1	1763.6	8.1	98.6
K12-81L-5	461	13045	2.1	9.2852	0.5	4.7474	1.0	0.3197	0.8	0.86	1788.3	13.0	1775.6	8.2	1760.8	9.2	1760.8	9.2	101.6
K12-81L-7	613	32924	2.2	9.3032	0.3	4.7505	1.1	0.3205	1.0	0.96	1792.3	16.1	1776.2	9.0	1757.3	5.4	1757.3	5.4	102.0
K12-81L-8	535	717972	2.3	9.3100	0.1	4.7798	0.6	0.3227	0.6	0.98	1803.1	9.3	1781.4	5.1	1755.9	2.4	1755.9	2.4	102.7
K12-81L-11	331	25079	2.1	9.3239	0.4	4.5433	1.8	0.3072	1.8	0.98	1727.1	26.8	1738.9	15.1	1753.2	7.3	1753.2	7.3	98.5
K12-85-3L-1	431	799646	2.5	9.2997	0.2	4.7879	1.0	0.3229	1.0	0.99	1804.0	16.2	1782.8	8.8	1758.0	3.3	1758.0	3.3	102.6
K12-85-3L-2	355	463479	2.4	9.3229	0.2	4.6172	0.9	0.3122	0.9	0.98	1751.5	13.9	1752.4	7.7	1753.4	3.1	1753.4	3.1	99.9
K12-85-3L-3	337	203658	2.1	9.3185	0.2	4.6001	1.8	0.3109	1.8	1.00	1745.1	28.1	1749.3	15.4	1754.3	3.3	1754.3	3.3	99.5
K12-85-3L-4	207	130576	2.7	9.3132	0.3	4.5137	1.4	0.3049	1.4	0.98	1715.5	21.2	1733.5	11.9	1755.3	5.2	1755.3	5.2	97.7
K12-85-3L-6	439	506467	2.6	9.3141	0.1	4.7203	0.7	0.3189	0.7	0.99	1784.2	10.7	1770.8	5.8	1755.1	1.7	1755.1	1.7	101.7
K12-85-3L-7	420	64044	2.6	9.3325	0.2	4.6445	0.9	0.3144	0.8	0.98	1762.1	13.0	1757.3	7.2	1751.5	3.1	1751.5	3.1	100.6
K12-85-3L-8	584	315929	2.0	9.3141	0.2	4.6076	0.6	0.3113	0.6	0.93	1746.9	9.0	1750.7	5.3	1755.1	4.4	1755.1	4.4	99.5
K12-85-3L-8	400	426493	2.1	9.2974	0.1	4.6399	1.2	0.3129	1.2	0.99	1754.8	17.9	1756.5	9.8	1758.4	2.2	1758.4	2.2	99.8
K12-85-3L-9	429	98216	2.1	9.3035	0.1	4.6497	3.0	0.3137	3.0	1.00	1759.1	45.6	1758.2	24.8	1757.2	2.3	1757.2	2.3	100.1
K12-85-3L-10	548	75545	2.1	9.3054	0.2	4.5951	1.1	0.3101	1.0	0.98	1741.3	15.9	1748.4	8.9	1756.9	3.9	1756.9	3.9	99.1
K12-85-3L-11	377	527926	2.3	9.3240	0.3	4.5178	2.3	0.3055	2.3	0.99	1718.6	34.5	1734.3	19.1	1753.2	4.6	1753.2	4.6	98.0
K12-85-3L-12	482	140658	2.1	9.2977	0.2	4.7447	2.7	0.3199	2.7	1.00	1789.5	42.7	1775.2	23.0	1758.4	3.0	1758.4	3.0	101.8
K12-85-3L-13	246	351595	2.7	9.3070	0.3	4.8653	2.5	0.3284	2.5	0.99	1830.7	40.0	1796.3	21.3	1756.5	5.6	1756.5	5.6	104.2
K12-85-3L-14	291	709520	2.5	9.3189	0.2	4.7576	0.6	0.3215	0.6	0.92	1797.3	8.7	1777.4	5.1	1754.2	4.4	1754.2	4.4	102.5
K12-85-3L-15	254	208016	2.6	9.3676	0.4	4.6381	1.5	0.3151	1.4	0.97	1765.8	21.9	1756.1	12.2	1744.7	6.9	1744.7	6.9	101.2
K12-85-3L-16	594	20945	2.4	9.3229	0.3	4.4926	1.6	0.3038	1.6	0.98	1710.0	23.5	1729.6	13.2	1753.4	5.2	1753.4	5.2	97.5
K12-85-3L-17	405	33649	2.9	9.4042	0.3	4.3643	6.6	0.2977	6.6	1.00	1679.7	97.1	1705.6	54.4	1737.5	5.6	1737.5	5.6	96.7
K12-85-3L-18	417	824257	2.5	9.3182	0.2	4.8390	1.1	0.3270	1.1	0.98	1824.0	17.9	1791.7	9.6	1754.3	4.1	1754.3	4.1	104.0
K12-85-3L-19	150	135133	2.8	9.3566	0.5	4.1866	1.7	0.2841	1.6	0.95	1612.0	23.2	1671.4	14.1	1746.8	9.9	1746.8	9.9	92.3
K12-85-3L-20	464	381133	2.6	9.3217	0.1	4.6711	0.8	0.3158	0.8	0.99	1769.2	12.6	1762.1	6.9	1753.6	2.3	1753.6	2.3	100.9
K12-85-3L-23	681	15378	2.1	9.3178	0.5	3.8783	3.0	0.2621	2.9	0.99	1500.5	39.4	1609.2	24.1	1754.4	8.5	1754.4	8.5	85.5
K12-85-3L-24	467	7421	2.5	9.4001	0.4	3.9772	2.8	0.2712	2.7	0.99	1546.6	37.7	1629.6	22.5	1738.3	6.8	1738.3	6.8	89.0
K12-90-5R-1C	115	33405	1.0	9.4239	1.0	4.4444	1.5	0.3038	1.2	0.76	1710.0	17.5	1720.7	12.8	1733.7	18.6	1733.7	18.6	98.6
K12-90-5R-1M	119	37574	1.3	9.4634	0.8	4.4370	1.5	0.3045	1.3	0.87	1713.7	19.7	1719.3	12.5	1726.0	13.8	1726.0	13.8	99.3
K12-90-5R-2	251	211913	1.0	9.5060	0.3	4.4226	1.1	0.3049	1.0	0.95	1715.6	15.6	1716.6	9.0	1717.7	6.2	1717.7	6.2	99.9
K12-90-5R-3	141	15553	1.1	9.4735	0.8	4.4505	1.0	0.3058	0.6	0.64	1719.9	9.7	1721.8	8.4	1724.0	14.3	1724.0	14.3	99.8
K12-90-5R-4	136	32743	1.0	9.4269	0.8	4.4577	1.3	0.3048	1.0	0.80	1715.0	15.2	1723.1	10.5	1733.1	14.1	1733.1	14.1	99.0
K12-90-5R-5	207	141355	1.1	9.5034	0.4	4.4539	0.7	0.3070	0.6	0.86	1725.9	9.5	1722.4	6.0	1718.2	6.8	1718.2	6.8	100.4
K12-90-5R-6	208	70867	1.0	9.5112	0.6	4.4272	0.7	0.3054	0.4	0.57	1718.0	6.0	1717.4	5.8	1716.7	10.6	1716.7	10.6	100.1
K12-90-5R-7	189	178549	1.0	9.5204	0.4	4.4147	1.6	0.3048	1.6	0.97	1715.2	24.0	1715.1	13.6	1715.0	7.2	1715.0	7.2	100.0
K12-90-5R-8	181	91224	1.0	9.4794	0.7	4.4312	1.1	0.3046	0.8	0.73	1714.3	11.6	1718.2	8.7	1722.9	13.2	1722.9	13.2	99.5
K12-90-5R-9	441	378955	1.1	9.4358	0.9	4.6737	5.5	0.3198	5.4	0.99	1789.0	84.6	1762.5	45.9	1731.4	16.2	1731.4	16.2	103.3
K12-90-5R-10	154	99876	1.1	9.4618	0.5	4.4630	1.2	0.3063	1.1	0.92	1722.3	16.0	1724.1	9.6	1726.3	8.4	1726.3	8.4	99.8
K12-90-5R-11	167	117174	1.0	9.5222	0.5	4.4192	1.2	0.3052	1.1	0.92	1717.0	16.7	1715.9	10.0	1714.6	8.8	1714.6	8.8	100.1
K12-90-5R-12	117	19173	1.2	9.2963	3.2	4.5555	3.8	0.3071	2.0	0.52	1726.7	29.5	1741.2	31.4	1758.6	59.0	1758.6	59.0	98.2
K12-90-5R-13C	138	25690	1.1	9.3503	2.9	4.5458	3.3	0.3083	1.7	0.51	1732.2	25.7	1739.4	27.8	1748.0	52.7	1748.0	52.7	99.1
K12-90-5R-13M	110	121576	1.0	9.3826	1.3	4.4767	2.3	0.3046	1.9	0.83	1714.2	28.8	1726.7	19.2	1741.7	23.7	1741.7	23.7	98.4
K12-90-5R-14	193	92830	1.2	9.4921	0.7	4.4856	0.9	0.3088	0.5	0.61	1734.8	8.0	1728.3	7.2	1720.4	12.6	1720.4	12.6	100.8
K12-90-5R-15	169	117329	1.0	9.4638	0.5	4.4635	1.2	0.3064	1.1	0.89	1722.8	16.5	1724.2	10.1	1725.9	10.1	1725.9	10.1	99.8
K12-90-5R-16	324	30961	1.0	9.5005	0.5	4.4532	1.3	0.3068	1.2	0.94	1725.2	18.8	1722.3	11.0	1718.8	8.4	1718.8	8.4	100.4
K12-90-5R-17	515	326735	1.7	9.5112	0.1	4.4376	1.2	0.3061	1.2	1.00	1721.5	17.9	1719.4	9.9	1716.7	2.1	1716.7	2.1	100.3
K12-90-5R-18	258	343994	1.1	9.5194	0.4	4.4434	0.8	0.3068	0.7	0.88	1724.8	10.0	1720.5	6.2	1715.1	6.6	1715.1	6.6	100.6
K12-90-5R-19	141	156619	1.1	9.4506	0.4	4.4431	1.1	0.3045	1.0	0.93	1713.8	15.6	1720.4	9.3	1728.5	7.6	1728.5	7.6	99.1
K12-90-5R-20	180	48838	1.0	9.5083	0.4	4.4371	1.1	0.3060	1.0	0.93	1720.9	15.1	1719.3	8.9	1717.3	7.1	1717.3	7.1	100.2
K12-90-5R-21	196	147613	1.0	9.5292	0.4	4.4239	0.8	0.3057	0.7	0.84	1719.7	9.8	1716.8	6.5	1713.3	7.8	1713.3	7.8	100.4
K12-90-5R-22	219	37869	0.9	9.5326	0.4	4.4496	1.0	0.3076	0.9	0.89	1729.0	13.0	1721.6	8.0	1712.6	8.3	1712.6	8.3	101.0
K12-90-5R-23	170	83577	1.1	9.4930	0.5	4.4653	1.1	0.3074	1.0	0.90	1728.1	15.1	1724.5	9.1	1720.3	8.7	1720.3	8.7	100.5
K12-90-5R-24	99	57895	1.1	9.4984	0.9	4.4522	1.3	0.3067	1.0	0.74	1724.5	15.0	1722.1	11.1	1719.2	16.4	1719.2	16.4	100.3
K12-90-5R-25	74	89557	1.2	9.5656	1.3	4.4562	1.7	0.3092	1.0	0.61	1736.5	15.6	1722.8	14.0	1706.2	24.6	1706.2	24.6	101.8
K12-90-5R-26	273	96485	0.9	9.5024	0.2	4.4849	0.7	0.3091	0.7	0.97	1736.2	10.6	1728.2	6.0	1718.4	3.0	1718.4	3.0	101.0
K12-90-5R-27	154	81917	1.4	9.4674	0.9	4.4940	3.0	0.3086	2.9	0.95	1733.7	44.0	1729.9	25.2	1725.2	16.7	1725.2	16.7	100.5
K12-90-5R-28	78	83153	1.2	9.5267	0.6	4.4115	1.2	0.3048	1.0	0.86	1715.1	15.2	1714.5	9.7	1713.7	10.9	1713.7	10.9	100.1
K12-90-5R-29	212	262351	1.1	9.5087	0.3	4.4222	1.1	0.3050	1.1	0.96	1715.9	16.0	1716.5	9.2	1717.2	6.0	1717.2	6.0	99.9
K12-90-5R-30	143	138158	1.0	9.4820	0.5	4.3788	1.3	0.3011	1.2	0.93	1696.9	17.4	1708.3	10.4	1722.4	8.6	1722.4	8.6	98.5
K12-91-5R-1C	96	77959	3.0	9.3640	0.6	4.6967	1.8	0.3190	1.6	0.93	1784.7	25.4	1766.6	14.7	1745.4	11.8	1745.4	11.8	102.3
K12-91-5R-1M	138	8020	3.1	9.3817	0.6	4.4841	1.4	0.3051	1.3	0.90	1716.6	19.7	1728.0	12.0	1741.9	11.4	1741.9	11.4	98.5
K12-91-5R-3C	72	84597	3.3	9.3512	0.8	4.6271	1.9	0.3138	1.7	0.90	1759.5	26.3	1754.2	15.8	1747.9	14.9	1747.9	14.9	100.7
K12-91-5R-4	138	110976	3.5	9.2780	0.4	4.6955	1.9	0.3160	1.8	0.98	1770.0	28.5	1766.4	15.8	1762.2	7.6	1762.2	7.6	100.4
K12-91-5R-5	77	92938	4.4	9.2800	0.8	4.7534	2.0	0.3199	1.9	0.93	1789.4	29.3	1776.7	17.0	1761.8	13.8	1761.8	13.8	101.6
K12-91-5R-6	55	9627	4.3	9.2835	1.0	4.6528	1.5	0.3133	1.2	0.75	1756.8	17.9	1758.8	12.9	1761.2	18.7	1761.2	18.7	99.8
K12-91-5R-7C	99	13047	3.5	9.3867	0.6	4.7587	3.4	0.3240	3.4	0.98	1809.1	53.3	1777.6	28.8	1740.9	11.6	1740.9	11.6	103.9
K12-91-5R-7M	73	91492	4.1	9.2886	0.6	4.7030	0.9	0.3168	0.7	0.76	1774.2	11.0	1767.8	7.8	1760.2	11.0	1760.2	11.0	100.8
K12-91-5R-8C	114	94340	3.6	9.2979	0.6	4.8008	1.6	0.3237	1.4	0.93	1808.0	22.8	1785.0	13.1	1758.3	10.4	1758.3	10.4	102.8
K12-91-5R-9M	150	8283	3.5	9.2875	0.7	4.6691	1.1	0.3145	0.8	0.75	1762.9	12.5	1761.7	9.1	1760.4	13.2	1760.4	13.2	100.1
K12-91-5R-11C	68	68023	3.1	9.2391	0.8	4.6654	1.5	0.3126	1.2	0.83	1753.6	18.8	1761.1	12.3	1769.9	14.8	1769.9	14.8	99.1
K12-91-5R-11M	183	7464	2.5	9.3039	0.6	4.5070	1.4	0.3041	1.3	0.91	1711.7	19.6	1732.3	11.9	1757.1	10.9	1757.1	10.9	97.4
K12-91-5R-12C	251	4096	2.7	9.2960	1.6	4.0832	5.8	0.2753	5.6	0.96	1567.6	78.0	1650.9	47.5	1758.7	28.8	1758.7	28.8	89.1
K12-91-5R-12M	173	1831	3.2	9.2921	1.5	4.4807	2.1	0.3020	1.4	0.68	1701.1	21.2	1727.4	17.4	1759.5	28.2	1759.5	28.2	96.7
K12-91-5R-13C	164	7345	2.7	9.3155	0.8	4.6572	2.0	0.3147	1.8	0.91	1763.6	28.4	1759.6	16.9	1754.9	15.1	1754.9	15.1	100.5
K12-91-5R-14M	105	68791	2.5	9.2795	0.8	4.6847	1.9	0.3153	1.7	0.91	1766.7	26.3	1764.5	15.7	1761.9	14.5	1761.9	14.5	100.3
K12-91-5R-15C	232	118209	2.2	9.2958	0.3	4.5305	1.1	0.3054	1.1	0.97	1718.3	16.7	1736.6	9.5	1758.7	5.2	1758.7	5.2	97.7
K12-91-5R-15M	182	4316	2.6	9.3209	0.7	4.1898	2.1	0.2832	2.0	0.94	1607.7	28.3	1672.0	17.2	1753.8	12.6	1753.8	12.6	91.7
K12-91-5R-16C	88	23766	3.7	9.3794	0.8	4.6177	1.8	0.3141	1.6	0.90	1761.0	25.2	1752.5	15.1	1742.3	14.2	1742.3	14.2	101.1
K12-91-5R-16M	128	3630	4.2	9.3646	0.7	4.4041	1.7	0.2991	1.6	0.92	1686.9	23.1	1713.1	14.0	1745.2	12.1	1745.2	12.1	96.7
K12-91-5R-17C	160	242434	2.7	9.2920	0.6	4.7905	0.9	0.3228	0.7	0.77	1803.6	11.2	1783.2	7.7	1759.5	10.6	1759.5	10.6	102.5
K12-91-5R-17M	95	97255	4.7	9.3484	0.7	4.7828	2.1	0.3243	2.0	0.94	1810.6	31.6	1781.9	17.9	1748.4	13.0	1748.4	13.0	103.6
K12-91-5R-18C	174	49787	2.4	9.3289	0.3	4.8721	1.7	0.3296	1.6	0.98	1836.7	26.2	1797.4	14.1	1752.2	5.4	1752.2	5.4	104.8
K12-91-5R-18M	73	85222	3.7	9.3621	0.7	4.6703	1.2	0.3171	0.9	0.80	1775.6	14.6	1761.9	9.9	1745.7	12.9	1745.7	12.9	101.7
K12-91-5R-19C	130	86977	2.8	9.3324	0.6	4.5787	3.1	0.3099	3.0	0.98	1740.2	46.0	1745.4	25.6	1751.5	10.9	1751.5	10.9	99.4
K12-91-5R-19M	156	14648	2.4	9.2814	0.6	4.4832	2.6	0.3018	2.5	0.97	1700.2	37.9	1727.9	21.7	1761.6	11.6	1761.6	11.6	96.5
K12-91-5R-20C	216	176130	2.3	9.3241	0.4	4.7960	0.7	0.3243	0.5	0.75	1810.8	7.9	1784.2	5.6	1753.2	8.1	1753.2	8.1	103.3
K12-91-5R-20M	324	5231	2.0	9.5152	1.2	3.7112	6.0	0.2561	5.9	0.98	1469.9	77.7	1573.8	48.3	1716.0	22.8	1716.0	22.8	85.7
K12-96-2L-1C	299	433373	4.7	8.8942	0.3	5.3051	1.2	0.3422	1.1	0.96	1897.3	18.6	1869.7	10.1	1839.1	6.1	1839.1	6.1	103.2
K12-96-2L-1M	159	12082	2.5	9.2863	2.7	4.2832	8.9	0.2885	8.5	0.95	1633.9	122.9	1690.1	73.7	1760.6	49.8	1760.6	49.8	92.8
K12-96-2L-3C	137	66872	2.1	5.7429	0.2	11.8153	1.1	0.4921	1.0	0.98	2579.9	22.0	2589.9	9.9	2597.7	3.8	2597.7	3.8	99.3
K12-96-2L-3M	296	2373	3.3	9.4565	0.9	4.0201	2.3	0.2757	2.1	0.92	1569.8	29.6	1638.3	18.9	1727.3	17.2	1727.3	17.2	90.9
K12-96-2L-4C	109	38120	3.1	9.4614	2.0	4.2090	3.4	0.2888	2.8	0.81	1635.6	40.1	1675.8	28.2	1726.4	37.0	1726.4	37.0	94.7
K12-96-2L-4M	353	6561	2.5	9.4284	1.0	3.9456	6.5	0.2698	6.4	0.99	1539.8	87.5	1623.1	52.5	1732.8	19.2	1732.8	19.2	88.9
K12-96-2L-6C	143	7423	2.4	9.4053	0.8	4.2221	1.9	0.2880	1.7	0.89	1631.6	23.8	1678.3	15.3	1737.3	15.6	1737.3	15.6	93.9
K12-96-2L-8C	247	7513	1.5	9.1461	5.0	4.6895	7.8	0.3111	6.1	0.77	1746.0	92.6	1765.4	65.7	1788.4	90.8	1788.4	90.8	97.6
K12-96-2L-8M	393	12965	2.4	9.4255	0.4	4.4963	1.3	0.3074	1.3	0.96	1727.7	19.3	1730.3	11.0	1733.4	6.9	1733.4	6.9	99.7

K12-96-2L-10C	245	21268	1.9	9.4165	0.6	4.5690	1.0	0.3120	0.7	0.78	1750.7	11.4	1743.6	8.0	1735.1	11.0	1735.1	11.0	100.9
K12-96-2L-10M	303	29155	2.3	9.4425	0.3	4.4238	0.9	0.3030	0.9	0.96	1705.9	13.3	1716.8	7.6	1730.1	4.7	1730.1	4.7	98.6
K12-96-2L-11C	370	11399	2.1	9.4134	1.0	4.4912	3.2	0.3066	3.0	0.95	1724.1	45.2	1729.4	26.2	1735.7	18.6	1735.7	18.6	99.3
K12-96-2L-13C	190	20888	2.7	9.4546	0.8	4.6071	2.3	0.3159	2.2	0.95	1769.7	34.4	1750.5	19.6	1727.7	14.1	1727.7	14.1	102.4
K12-96-2L-15M	289	12891	2.6	9.4467	0.9	4.0431	2.3	0.2770	2.1	0.92	1576.3	30.0	1642.9	19.0	1729.2	17.1	1729.2	17.1	91.2
K12-96-2L-16M	292	5085	3.3	9.4271	1.1	4.3433	1.9	0.2970	1.5	0.79	1676.2	22.1	1701.6	15.6	1733.0	21.1	1733.0	21.1	96.7
K12-96-2L-17C	119	128553	1.5	6.1481	0.4	10.3573	1.3	0.4618	1.2	0.95	2447.7	24.4	2467.2	11.7	2483.4	6.4	2483.4	6.4	98.6
K12-96-2L-20C	270	8362	1.6	9.4455	0.9	4.5058	1.4	0.3087	1.1	0.76	1734.2	16.5	1732.0	11.8	1729.5	16.8	1729.5	16.8	100.3
K12-96-2L-20M	281	8304	2.5	9.4712	0.7	4.3726	1.7	0.3004	1.6	0.92	1693.1	23.8	1707.2	14.4	1724.5	12.4	1724.5	12.4	98.2
K12-96-2L-21C	288	4029	1.8	9.4417	1.0	3.9402	5.7	0.2698	5.6	0.99	1539.9	76.6	1622.0	46.0	1730.2	17.8	1730.2	17.8	89.0
K12-96-2L-21M	289	15520	2.2	9.4660	0.4	4.3755	2.7	0.3004	2.7	0.99	1693.3	39.5	1707.7	22.2	1725.5	8.1	1725.5	8.1	98.1
K12-96-2L-22C	385	12063	3.7	8.3873	0.4	5.5761	1.3	0.3392	1.2	0.94	1882.8	19.5	1912.4	10.9	1944.7	7.5	1944.7	7.5	96.8
K12-96-2L-23C	170	40636	2.9	9.4925	0.5	3.9623	4.1	0.2728	4.1	0.99	1554.9	56.5	1626.5	33.4	1720.4	8.5	1720.4	8.5	90.4
K12-96-2L-23M	305	4225	2.2	9.3194	2.1	4.2628	3.3	0.2881	2.6	0.78	1632.2	37.4	1686.2	27.5	1754.1	38.4	1754.1	38.4	93.0
K12-96-2L-24M	235	2515	2.7	9.4278	0.7	4.0426	2.5	0.2764	2.4	0.96	1573.3	33.8	1642.8	20.4	1732.9	12.2	1732.9	12.2	90.8
K12-96-2L-25C	156	4941	2.8	9.0883	1.6	4.8628	5.4	0.3205	5.2	0.96	1792.3	81.3	1795.8	45.8	1799.9	29.1	1799.9	29.1	99.6
13H99R-1	182	26688	1.5	6.1151	0.3	9.9157	2.8	0.4398	2.8	0.99	2349.6	55.6	2427.0	26.2	2492.5	5.1	2492.5	5.1	94.3
13H99R-2	594	3043	1.5	8.8354	0.9	4.3208	7.6	0.2769	7.5	0.99	1575.6	105.0	1697.3	62.5	1851.1	17.1	1851.1	17.1	85.1
13H99R-3	284	7617	1.8	9.1764	0.8	4.6818	5.8	0.3116	5.8	0.99	1748.5	88.3	1764.0	48.7	1782.3	14.2	1782.3	14.2	98.1
13H99R-5	236	8397	3.8	9.0816	0.5	4.5334	1.7	0.2986	1.6	0.95	1684.3	23.6	1737.1	13.9	1801.3	9.6	1801.3	9.6	93.5
13H99R-6	488	31647	1.5	9.3239	0.5	4.3688	2.6	0.2954	2.5	0.98	1668.6	37.1	1706.5	21.3	1753.2	9.3	1753.2	9.3	95.2
13H99R-7	210	2547	3.2	6.4635	1.1	7.4739	5.1	0.3504	4.9	0.98	1936.3	82.7	2169.9	45.4	2398.7	18.7	2398.7	18.7	80.7
13H99R-8	104	8643	1.4	9.1875	0.9	4.5280	2.0	0.3017	1.8	0.91	1699.8	27.3	1736.1	16.8	1780.1	15.6	1780.1	15.6	95.5
13H99R-9	273	376297	1.9	5.8047	0.7	11.0905	1.6	0.4669	1.5	0.89	2470.0	30.0	2530.8	15.3	2579.8	12.5	2579.8	12.5	95.7
13H99R-10	87	52781	1.4	9.2677	1.0	4.6966	2.1	0.3157	1.8	0.87	1768.6	28.3	1766.6	17.5	1764.3	18.6	1764.3	18.6	100.2
13H99R-11	171	27888	1.8	9.2666	0.4	4.5933	1.9	0.3087	1.8	0.97	1734.3	27.5	1748.0	15.5	1764.5	8.2	1764.5	8.2	98.3
13H99R-14	292	21578	1.5	9.3921	0.3	4.4287	3.8	0.3017	3.8	1.00	1699.6	57.2	1717.7	31.9	1739.9	6.3	1739.9	6.3	97.7
13H99R-16	96	112110	0.6	9.3901	1.1	4.6451	1.9	0.3164	1.5	0.81	1771.9	23.3	1757.4	15.5	1740.3	20.1	1740.3	20.1	101.8
13H99R-17	311	13117	2.2	8.8841	0.4	4.8707	2.1	0.3138	2.1	0.98	1759.6	32.5	1797.2	18.1	1841.2	7.0	1841.2	7.0	95.6
13H99R-18	393	502265	1.2	9.4576	0.3	4.4806	1.3	0.3073	1.2	0.98	1727.6	18.7	1727.4	10.5	1727.1	4.6	1727.1	4.6	100.0
13H99R-21	229	5245	1.9	8.8350	0.5	4.4312	7.1	0.2839	7.1	1.00	1611.2	101.1	1718.2	59.0	1851.2	9.8	1851.2	9.8	87.0
13H99R-22	275	125193	1.2	9.3497	0.5	4.6308	1.9	0.3140	1.8	0.96	1760.4	28.0	1754.8	15.8	1748.1	9.8	1748.1	9.8	100.7
13H99R-25	120	1888	2.6	8.4678	2.2	5.4297	2.8	0.3335	1.7	0.62	1855.1	27.7	1889.5	24.0	1927.6	39.4	1927.6	39.4	96.2
13H99R-26	251	6101	1.8	9.3748	0.4	4.1993	4.3	0.2855	4.2	1.00	1619.1	60.7	1673.9	34.9	1743.2	7.8	1743.2	7.8	92.9
13H99R-27	297	17385	1.5	9.3579	1.1	4.2727	4.0	0.2900	3.8	0.96	1641.5	55.2	1688.1	32.7	1746.6	20.5	1746.6	20.5	94.0
13H99R-29	404	2622	2.2	9.3227	1.5	3.6403	7.2	0.2461	7.0	0.98	1418.5	89.4	1558.4	57.3	1753.4	27.7	1753.4	27.7	80.9
13H99R-31	88	44061	1.5	9.4100	1.1	4.6444	2.3	0.3170	2.0	0.88	1774.9	30.8	1757.3	18.9	1736.4	20.1	1736.4	20.1	102.2
13H99R-32	78	41883	1.3	9.3974	1.0	4.5706	2.6	0.3115	2.4	0.93	1748.2	37.4	1743.9	21.9	1738.8	17.6	1738.8	17.6	100.5
13H99R-34	457	1639	2.3	9.0079	1.4	4.0491	4.5	0.2645	4.3	0.95	1513.0	58.2	1644.1	37.0	1816.1	26.1	1816.1	26.1	83.3
13H99R-35	497	14746	1.5	9.4478	0.4	4.5454	4.9	0.3115	4.9	1.00	1747.9	74.8	1739.3	40.8	1729.0	6.8	1729.0	6.8	101.1
13H99R-36	221	2153	1.4	8.8360	3.4	4.9510	3.9	0.3173	1.9	0.48	1776.5	29.4	1811.0	33.2	1851.0	62.2	1851.0	62.2	96.0
13H99R-37	430	5151	18.3	8.9898	1.4	4.6823	2.4	0.3053	1.9	0.81	1717.5	29.0	1764.1	19.9	1819.7	25.4	1819.7	25.4	94.4
13H99R-38	87	11535	1.5	9.2538	1.0	4.4421	3.4	0.2981	3.3	0.96	1682.0	48.6	1720.2	28.4	1767.0	18.2	1767.0	18.2	95.2
13H99R-40	163	1680	1.5	4.4711	1.9	14.8802	4.6	0.4825	4.2	0.91	2538.3	89.1	2807.6	44.3	3007.2	30.4	3007.2	30.4	84.4
13H99R-41	509	17898	1.2	9.3356	0.6	4.7559	2.6	0.3220	2.5	0.97	1799.6	39.6	1777.2	21.7	1750.9	11.1	1750.9	11.1	102.8
13H99R-44	149	633	1.3	8.7013	3.4	4.1948	8.8	0.2647	8.1	0.92	1514.0	109.7	1673.0	72.3	1878.7	60.9	1878.7	60.9	80.6
13H99R-45	373	2183	4.3	8.4715	1.1	4.5690	3.9	0.2807	3.7	0.96	1595.0	52.9	1743.6	32.5	1926.8	19.7	1926.8	19.7	82.8
13H99R-46	393	1727	1.7	9.1488	1.6	3.7464	7.3	0.2486	7.2	0.98	1431.2	92.0	1581.3	58.9	1787.8	28.7	1787.8	28.7	80.1
13H99R-47	212	199649	1.4	6.1362	0.1	10.7699	1.6	0.4793	1.6	1.00	2524.2	33.3	2503.5	14.9	2486.7	2.5	2486.7	2.5	101.5
13H99R-48	300	2111	1.7	9.3204	2.6	3.8341	3.4	0.2592	2.1	0.62	1485.6	27.7	1599.9	27.0	1753.9	47.9	1753.9	47.9	84.7
13H99R-49	295	2911	3.7	8.5752	1.2	5.5863	2.1	0.3474	1.8	0.83	1922.3	29.2	1914.0	18.3	1905.0	21.5	1905.0	21.5	100.9
13H99R-50	250	3809	3.5	8.7385	0.9	4.3227	2.3	0.2740	2.1	0.91	1560.9	29.1	1697.7	19.0	1871.0	17.1	1871.0	17.1	83.4
13H99R-51	217	8454	1.4	9.3373	0.4	4.3790	3.1	0.2965	3.0	0.99	1674.2	44.8	1708.4	25.4	1750.6	8.1	1750.6	8.1	95.6
13H99R-52	203	154052	1.4	5.1664	0.2	14.0706	2.3	0.5272	2.3	1.00	2729.8	50.2	2754.5	21.5	2772.6	3.5	2772.6	3.5	98.5
13H99R-53	268	85058	1.4	9.4682	0.3	4.3289	1.1	0.2973	1.1	0.97	1677.7	15.6	1698.9	8.9	1725.1	4.8	1725.1	4.8	97.3
13H99R-54	153	349886	1.6	9.0904	0.5	5.0225	2.2	0.3311	2.2	0.98	1843.9	34.5	1823.1	18.6	1799.5	8.3	1799.5	8.3	102.5
K12-115L-1	139	8526	5.2	8.8216	0.8	5.1334	2.1	0.3284	1.9	0.93	1830.8	30.7	1841.6	17.7	1853.9	14.3	1853.9	14.3	98.8
K12-115L-2	223	9227	3.5	8.7873	0.7	5.0700	1.9	0.3231	1.8	0.93	1805.0	28.4	1831.1	16.3	1860.9	12.4	1860.9	12.4	97.0
K12-115L-3	235	73680	4.2	8.8243	0.6	5.3889	5.9	0.3449	5.9	0.99	1910.1	97.8	1883.1	50.9	1853.4	10.8	1853.4	10.8	103.1
K12-115L-4C	305	33153	3.2	8.6783	1.9	5.5604	3.4	0.3500	2.8	0.82	1934.5	46.1	1910.0	28.9	1883.5	34.5	1883.5	34.5	102.7
K12-115L-7	403	5072	2.4	8.8436	0.5	4.7426	2.0	0.3042	1.9	0.97	1712.1	29.1	1774.8	16.7	1849.4	8.5	1849.4	8.5	92.6
K12-115L-9	121	62444	4.2	8.8486	0.6	5.2156	0.9	0.3347	0.7	0.77	1861.2	11.7	1855.2	8.0	1848.4	11.0	1848.4	11.0	100.7
K12-115L-12	172	152547	5.4	8.7540	1.4	5.5466	4.0	0.3522	3.7	0.94	1944.9	62.4	1907.8	34.0	1867.8	24.5	1867.8	24.5	104.1
K12-115L-15	446	27207	3.4	8.8187	0.5	5.3982	1.8	0.3453	1.7	0.96	1911.9	27.8	1884.6	15.1	1854.5	9.2	1854.5	9.2	103.1
K12-115L-18	583	8327	2.0	8.8279	0.7	5.0921	2.8	0.3260	2.7	0.97	1819.1	42.8	1834.8	23.7	1852.6	13.1	1852.6	13.1	98.2
K12-115L-19C	393	8479	2.5	8.8105	0.5	5.2372	1.5	0.3347	1.4	0.93	1860.9	21.9	1858.7	12.5	1856.2	9.9	1856.2	9.9	100.3
K12-115L-22	335	15181	4.1	8.9769	0.4	4.8055	2.7	0.3129	2.7	0.99	1754.8	41.6	1785.9	23.0	1822.3	7.8	1822.3	7.8	96.3
K12-115L-25	279	12954	3.2	8.7714	0.8	5.2038	2.7	0.3310	2.6	0.96	1843.4	41.4	1853.2	23.0	1864.2	14.2	1864.2	14.2	98.9
K12-115L-26	335	11325	4.1	8.7958	0.7	5.2784	3.5	0.3367	3.4	0.98	1870.9	55.4	1865.4	29.7	1859.2	11.9	1859.2	11.9	100.6
K12-115L-27	441	47257	3.1	8.8096	0.6	5.2132	2.6	0.3331	2.5	0.97	1853.3	41.0	1854.8	22.3	1856.4	10.8	1856.4	10.8	99.8

Notes:

Analyses with >10% uncertainty (1-sigma) in 206Pb/238U age are not included.

Analyses with >10% uncertainty (1-sigma) in 206Pb/207Pb age are not included, unless 206Pb/238U age is <500 Ma.

Best age is determined from 206Pb/238U age for analyses with 206Pb/238U age < 900 Ma and from 206Pb/207Pb age for analyses with 206Pb/238Uage > 900 Ma.

Concordance is based on 206Pb/238U age / 206Pb/207Pb age. Value is not reported for 206Pb/238U ages <500 Ma because of large uncertainty in 206Pb/207Pb age.

Analyses with 206Pb/238U age > 500 Ma and with >20% discordance (<80% concordance) are not included.

Analyses with 206Pb/238U age > 500 Ma and with >5% reverse discordance (<105% concordance) are not included.

All uncertainties are reported at the 1-sigma level, and include only measurement errors.

Systematic errors are shown as 206Pb/238U uncertainty, 206Pb/207Pb uncertainty to the right of each sample (at 2-sigma level).

U concentration and U/Th are calibrated relative to Sri Lanka zircon and are accurate to ~20%.

Common Pb correction is from 204Pb, with composition interpreted from Stacey and Kramers (1975).

Uncertainties of 1.5 for 206Pb/ 204Pb, 0.3 for 207Pb/ 204Pb, and 2.0 for 208Pb/ 204Pb are applied to common Pb composition.

U/Pb and 206Pb/207Pb fractionation is calibrated relative to fragments of a large Sri Lanka zircon of 563.5 ± 3.2 Ma (2-sigma).

U decay constants and composition as follows: 238U = 9.8485 x 10-10, 235U = 1.55125 x 10-10, 238U/235U = 137.88

Analytical methods as described by Gehrels et al. (2008).

Table DR4. Hf isotopic data of Grand Canyon plutons (ALC).

Sample	(176Yb + 176Lu) / 176Hf (%)	Volts Hf	176Hf/177Hf	± (1s)	176Lu/177Hf	176Hf/177Hf (T)	E-Hf (0)	E-Hf (0) ± (1s)	E-Hf (T)	Age (Ma)
K12-81L-3	44.7	2.4	0.281931	0.000036	0.002576	0.281846	-30.2	1.3	6.3	1752
K12-81L-5	55.6	2.5	0.282024	0.000041	0.003186	0.281918	-26.9	1.5	9.1	1761
K12-81L-7	81.2	2.2	0.282124	0.000051	0.004981	0.281957	-23.4	1.8	10.4	1757
K12-81L-8	62.8	2.3	0.282152	0.000050	0.003547	0.282034	-22.4	1.8	13.1	1756
K12-81L-11	49.0	2.2	0.282006	0.000048	0.002820	0.281912	-27.5	1.7	8.7	1753
K12-85.3L-1	78.5	1.9	0.281997	0.000056	0.004510	0.281847	-27.9	2.0	6.5	1758
K12-85.3L-2	68.3	2.0	0.282141	0.000045	0.003789	0.282015	-22.8	1.6	12.3	1753
K12-85.3L-3	55.8	1.9	0.282081	0.000049	0.003088	0.281978	-24.9	1.7	11.1	1754
K12-85.3L-4	32.1	2.0	0.282002	0.000048	0.001816	0.281941	-27.7	1.7	9.8	1755
K12-85.3L-6	42.2	1.7	0.282064	0.000053	0.002334	0.281986	-25.5	1.9	11.4	1755
K12-85.3L-7	84.0	1.9	0.282039	0.000055	0.004704	0.281883	-26.4	1.9	7.6	1751
K12-85.3L-8	55.6	1.8	0.281937	0.000040	0.003132	0.281833	-30.0	1.4	5.9	1755
K12-85.3L-9	62.6	1.7	0.282112	0.000058	0.003778	0.281986	-23.8	2.1	11.4	1757
K12-85.3L-10	58.4	1.4	0.281998	0.000075	0.003973	0.281865	-27.8	2.7	7.1	1757
K12-85.3L-11	66.9	2.1	0.282058	0.000044	0.003757	0.281933	-25.7	1.5	9.4	1753
K12-85.3L-12	69.2	2.1	0.282036	0.000052	0.003929	0.281905	-26.5	1.9	8.5	1758
K12-85.3L-13	56.9	2.0	0.282065	0.000046	0.003384	0.281952	-25.5	1.6	10.2	1756
K12-85.3L-14	44.4	2.1	0.282003	0.000048	0.002453	0.281921	-27.6	1.7	9.1	1754
K12-85.3L-15	39.0	2.0	0.282042	0.000043	0.002178	0.281970	-26.3	1.5	10.6	1745
K12-85.3L-16	86.7	1.9	0.282187	0.000055	0.004845	0.282025	-21.2	2.0	12.7	1753
K12-85.3L-17	60.1	2.2	0.282003	0.000046	0.003463	0.281889	-27.6	1.6	7.5	1737
K12-85.3L-18	71.7	2.2	0.282062	0.000050	0.004324	0.281918	-25.6	1.8	8.9	1754
K12-85.3L-19	48.5	1.7	0.282019	0.000058	0.003019	0.281919	-27.1	2.0	8.8	1747
K12-85.3L-20	52.0	2.4	0.282035	0.000036	0.003011	0.281935	-26.5	1.3	9.5	1754
K12-85.3L-23	73.0	2.3	0.282058	0.000046	0.004162	0.281920	-25.7	1.6	9.0	1754
K12-85.3L-24	68.4	2.2	0.282087	0.000061	0.004303	0.281945	-24.7	2.2	9.5	1738
K12-90.5R-1C	7.4	2.6	0.281923	0.000069	0.000422	0.281909	-30.5	2.4	8.2	1734
K12-90.5R-1M	5.2	2.8	0.281952	0.000046	0.000308	0.281942	-29.4	1.6	9.1	1726
K12-90.5R-2	16.1	2.7	0.281900	0.000057	0.000946	0.281869	-31.3	2.0	6.5	1724
K12-90.5R-3	7.7	2.5	0.281941	0.000043	0.000455	0.281926	-29.8	1.5	8.4	1718
K12-90.5R-4	11.7	2.5	0.282016	0.000048	0.000672	0.281994	-27.2	1.7	11.1	1733
K12-90.5R-5	11.2	2.6	0.281906	0.000041	0.000639	0.281885	-31.1	1.4	6.9	1718
K12-90.5R-6	15.6	2.3	0.281894	0.000044	0.000909	0.281864	-31.5	1.6	6.2	1717
K12-90.5R-7	15.4	2.3	0.282050	0.000048	0.000899	0.282020	-26.0	1.7	11.7	1715
K12-90.5R-8	13.2	2.4	0.281903	0.000037	0.000762	0.281878	-31.2	1.3	6.8	1723
K12-90.5R-9	12.4	2.3	0.281860	0.000050	0.000737	0.281836	-32.7	1.8	5.5	1731
K12-90.5R-10	11.9	2.5	0.281895	0.000049	0.000675	0.281873	-31.5	1.7	6.7	1726
K12-90.5R-11	14.2	2.4	0.281931	0.000050	0.000819	0.281904	-30.2	1.8	7.5	1715
K12-90.5R-14	13.1	2.5	0.281995	0.000051	0.000765	0.281970	-27.9	1.8	10.0	1720
K12-90.5R-15	11.7	2.4	0.281862	0.000038	0.000659	0.281841	-32.6	1.3	5.5	1726
K12-90.5R-16	16.7	2.5	0.281895	0.000031	0.000968	0.281863	-31.5	1.1	6.2	1719
K12-90.5R-17	15.7	3.2	0.281988	0.000033	0.000990	0.281956	-28.2	1.2	9.4	1717
K12-90.5R-18	10.6	2.9	0.281923	0.000046	0.000635	0.281902	-30.5	1.6	7.5	1715
K12-90.5R-19	10.7	2.4	0.281938	0.000050	0.000618	0.281918	-29.9	1.8	8.3	1728
K12-90.5R-20	15.0	2.3	0.282068	0.000042	0.000871	0.282039	-25.4	1.5	12.4	1717
K12-90.5R-21	15.3	2.3	0.281981	0.000045	0.000878	0.281953	-28.4	1.6	9.2	1713
K12-90.5R-22	18.5	2.2	0.281937	0.000042	0.001057	0.281903	-30.0	1.5	7.5	1713
K12-90.5R-23	12.4	2.4	0.282026	0.000048	0.000726	0.282002	-26.8	1.7	11.1	1720
K12-90.5R-24	13.4	2.4	0.282021	0.000038	0.000789	0.281996	-27.0	1.3	10.9	1719
K12-90.5R-26	19.1	2.3	0.281942	0.000040	0.001108	0.281906	-29.8	1.4	7.7	1718
K12-90.5R-27	6.3	2.8	0.281900	0.000032	0.000372	0.281887	-31.3	1.1	7.2	1725
K12-90.5R-28	9.2	2.5	0.281957	0.000038	0.000527	0.281940	-29.3	1.4	8.8	1714
K12-90.5R-29	13.1	2.3	0.281923	0.000040	0.000762	0.281898	-30.5	1.4	7.4	1717
K12-90.5R-30	10.7	2.6	0.281958	0.000039	0.000605	0.281938	-29.2	1.4	8.9	1722
K12-91.5R-1C	21.2	2.3	0.282031	0.000041	0.001308	0.281988	-26.7	1.5	11.2	1745
K12-91.5R-1M	20.5	2.8	0.281959	0.000038	0.001341	0.281914	-29.2	1.3	8.5	1742
K12-91.5R-3C	21.6	2.1	0.281997	0.000043	0.001336	0.281953	-27.9	1.5	10.0	1748
K12-91.5R-4	15.1	2.7	0.281937	0.000030	0.000943	0.281905	-30.0	1.1	8.7	1762
K12-91.5R-5	15.1	2.6	0.281978	0.000049	0.000894	0.281948	-28.5	1.7	10.2	1762
K12-91.5R-6	12.6	2.4	0.281988	0.000041	0.000778	0.281962	-28.2	1.4	10.7	1761
K12-91.5R-7C	18.3	2.3	0.282034	0.000034	0.001137	0.281996	-26.6	1.2	11.4	1741
K12-91.5R-7M	12.1	2.6	0.281859	0.000032	0.000753	0.281834	-32.7	1.1	6.1	1760
K12-91.5R-8C	18.5	2.5	0.281981	0.000035	0.001137	0.281943	-28.4	1.2	9.9	1758
K12-91.5R-14M	18.5	2.7	0.281941	0.000038	0.001543	0.281889	-29.9	1.3	8.1	1762
K12-91.5R-13C	34.5	2.3	0.281980	0.000042	0.002134	0.281909	-28.5	1.5	8.6	1755
K12-91.5R-15C	46.1	2.3	0.282030	0.000046	0.002696	0.281940	-26.7	1.6	9.8	1759
K12-91.5R-15M	21.1	2.6	0.282010	0.000043	0.001286	0.281967	-27.4	1.5	10.7	1754
K12-91.5R-16C	19.6	2.2	0.281934	0.000039	0.001204	0.281894	-30.1	1.4	7.8	1742
K12-91.5R-16M	21.8	2.4	0.281961	0.000045	0.001336	0.281917	-29.1	1.6	8.7	1745
K12-91.5R-17C	20.9	2.3	0.281969	0.000043	0.001268	0.281927	-28.8	1.5	9.4	1759
K12-91.5R-17M	15.6	2.7	0.281962	0.000038	0.001021	0.281928	-29.1	1.4	9.2	1748
K12-91.5R-18M	11.2	2.5	0.281958	0.000046	0.000686	0.281935	-29.3	1.6	9.3	1746
K12-91.5R-18C	31.3	2.0	0.281890	0.000039	0.001869	0.281828	-31.7	1.4	5.7	1752

K12-91.5R-19C	27.2	2.3	0.281904	0.000044	0.001600	0.281850	-31.2	1.6	6.5	1751
K12-91.5R-19M	23.9	2.4	0.281892	0.000040	0.001373	0.281847	-31.6	1.4	6.6	1762
K12-91.5R-20C	30.9	2.7	0.282012	0.000050	0.002182	0.281939	-27.3	1.8	9.7	1753
K12-91.5R-20M	41.0	2.6	0.281989	0.000037	0.002581	0.281905	-28.1	1.3	7.6	1716
K12-96.2L-1C	12.7	3.0	0.281889	0.000035	0.000929	0.281856	-31.7	1.2	8.7	1839
K12-96.2L-3M	23.8	2.7	0.281986	0.000033	0.002053	0.281918	-28.3	1.2	8.3	1727
K12-96.2L-4M	23.7	1.7	0.281995	0.000063	0.001817	0.281935	-28.0	2.2	9.0	1733
K12-96.2L-8M	17.5	2.8	0.281910	0.000040	0.001212	0.281870	-30.9	1.4	6.6	1726
K12-96.2L-6C	14.2	2.7	0.282045	0.000044	0.001055	0.282010	-26.2	1.6	11.8	1737
K12-96.2L-11C	13.3	2.4	0.281910	0.000045	0.000925	0.281879	-31.0	1.6	7.1	1736
K12-96.2L-10C	16.3	2.6	0.281974	0.000040	0.001080	0.281938	-28.7	1.4	9.2	1735
K12-96.2L-10M	16.4	1.8	0.281927	0.000052	0.001242	0.281886	-30.3	1.8	7.2	1730
K12-96.2L-13C	13.6	2.4	0.281884	0.000045	0.000972	0.281852	-31.9	1.6	6.0	1728
K12-96.2L-15M	11.2	2.5	0.281927	0.000044	0.000795	0.281901	-30.3	1.6	7.7	1729
K12-96.2L-16M	10.3	2.7	0.281877	0.000039	0.000706	0.281854	-32.1	1.4	6.2	1733
K12-96.2L-17C	16.4	2.8	0.281156	0.000029	0.000960	0.281110	-57.6	1.0	-2.9	2483
K12-96.2L-20C	18.6	2.3	0.281947	0.000039	0.001250	0.281906	-29.6	1.4	7.9	1729
K12-96.2L-20M	12.4	2.7	0.281901	0.000039	0.000892	0.281872	-31.2	1.4	6.6	1724
K12-96.2L-21M	21.1	2.4	0.282034	0.000042	0.001848	0.281973	-26.6	1.5	10.2	1725
K12-96.2L-21C	13.9	2.6	0.282024	0.000037	0.001022	0.281990	-26.9	1.3	10.9	1730
K12-96.2L-22C	5.5	3.2	0.281412	0.000033	0.000360	0.281399	-48.5	1.2	-5.1	1945
K12-96.2L-23C	13.9	2.1	0.281933	0.000048	0.001024	0.281900	-30.1	1.7	7.5	1720
K12-96.2L-23M	30.2	3.1	0.282071	0.000043	0.002679	0.281982	-25.3	1.5	11.2	1754
K12-96.2L-24M	13.7	2.6	0.281872	0.000033	0.000939	0.281841	-32.3	1.2	5.7	1733
13H-099R-1	21.0	2.2	0.281262	0.000050	0.001186	0.281205	-53.9	1.8	0.7	2492
13H-099R-11	27.7	2.0	0.281907	0.000043	0.001571	0.281854	-31.0	1.5	6.9	1764
13H-099R-14	23.2	1.6	0.281987	0.000052	0.001426	0.281940	-28.2	1.8	9.4	1740
13H-099R-17	36.8	1.7	0.281918	0.000054	0.002224	0.281840	-30.7	1.9	8.2	1841
13H-099R-18	15.5	1.8	0.282021	0.000040	0.000794	0.281995	-27.0	1.4	11.1	1727
13H-099R-2	24.6	2.5	0.281524	0.000034	0.001427	0.281474	-44.6	1.2	-4.6	1851
13H-099R-21	22.5	1.8	0.281836	0.000039	0.001598	0.281780	-33.5	1.4	6.3	1851
13H-099R-22	25.4	2.4	0.281787	0.000038	0.001631	0.281733	-35.3	1.3	2.2	1748
13H-099R-26	3.0	1.6	0.281863	0.000046	0.000145	0.281858	-32.6	1.6	6.6	1743
13H-099R-35	31.3	1.7	0.281913	0.000045	0.001775	0.281855	-30.8	1.6	6.1	1729
13H-099R-47	27.3	1.5	0.281349	0.000050	0.001619	0.281272	-50.8	1.8	3.0	2487
13H-099R-52	7.3	2.7	0.281087	0.000043	0.000528	0.281059	-60.0	1.5	2.1	2773
13H-099R-6	37.1	1.9	0.281808	0.000041	0.002253	0.281733	-34.6	1.5	2.3	1753
13H-099R-7	8.0	2.4	0.281319	0.000030	0.000543	0.281294	-51.8	1.1	1.7	2399
K12-115L-1	22.5	2.1	0.281891	0.000048	0.001511	0.281838	-31.6	1.7	8.4	1854
K12-115L-3	33.1	2.5	0.281896	0.000049	0.002146	0.281820	-31.4	1.7	7.7	1853
K12-115L-2	38.3	2.4	0.281993	0.000039	0.002361	0.281910	-28.0	1.4	11.1	1861
K12-115L-7	37.2	2.4	0.281954	0.000042	0.002559	0.281864	-29.4	1.5	9.2	1849
K12-115L-9	18.5	2.2	0.281921	0.000041	0.001254	0.281877	-30.5	1.4	9.7	1848
K12-115L-15	46.1	2.1	0.281916	0.000059	0.003148	0.281805	-30.7	2.1	7.2	1854
K12-115L-18	48.2	1.5	0.281920	0.000066	0.003738	0.281788	-30.6	2.3	6.6	1853
K12-115L-19C	46.2	2.0	0.281941	0.000042	0.003042	0.281834	-29.9	1.5	8.3	1856
K12-115L-22	31.6	2.3	0.281943	0.000043	0.002153	0.281869	-29.8	1.5	8.7	1822
K12-115L-25	35.5	2.1	0.282010	0.000043	0.002696	0.281914	-27.4	1.5	11.3	1864
K12-115L-26	29.2	2.3	0.281908	0.000055	0.001978	0.281838	-31.0	1.9	8.5	1859
K12-115L-27	38.7	1.9	0.281882	0.000051	0.003121	0.281772	-31.9	1.8	6.1	1856

Notes:

Hf fractionation is corrected by comparing measured 179Hf/177Hf against known 179/177 (line by line). Beta Hf is applied as a power law.

Yb fractionation is corrected by comparing measured 173Yb/171Yb against known 173/171 (line by line) if 171Yb intensity is more than ~1 mv. Beta Yb is applied as a power law.

If 171Yb intensity is less than can be measured reliably, Beta Hf is used to correct for Yb fractionation.

The actual cutoff used is determined from the analysis of standards during the same session as unknowns (see below).

Data are filtered by intensity of Hf (removed if below cutoff value determined by monitoring the average offset of the standards from their known values, which is set at the minimum offset)

Data are filtered by removing 1 max and 1 min value (out of 60).

Data are aflso filtered by 95% filter (rejected if outside of 2-sigma std dev of full set)

Uncertainties are standard error of the mean, expressed at 1-sigma

Table DR5. U-Pb Geochronologic data of Grand Canyon plutons (GEMOC).

				RATIOS (common-Pb corrected)								AGES (common-Pb corrected, Ma)								
Analysis No.	Th (ppm)	U (ppm)	Th/U	$^{207}Pb/^{206}Pb$	± 1σ	$^{207}Pb/^{235}U$	± 1σ	$^{206}Pb/^{238}U$	± 1σ	$^{208}Pb/^{232}Th$	± 1σ	$^{207}Pb/^{206}Pb$	± 1σ	$^{207}Pb/^{235}U$	± 1σ	$^{206}Pb/^{238}U$	± 1σ	$^{208}Pb/^{232}Th$	± 1σ	Disc. (%)
K05-100.5-1Rim	106	137	0.78	0.10645	0.00106	4.54659	0.0455	0.30976	0.00316	0.09303	0.00091	1739	8	1740	8	1740	16	1798	17	0.0
K05-100.5-2Core	130	129	1.01	0.16888	0.00165	11.27981	0.1148	0.48443	0.00508	0.14455	0.00142	2547	8	2547	9	2547	22	2729	25	0.0
K05-100.5-3	68	149	0.46	0.16185	0.00159	10.43206	0.0997	0.46742	0.00459	0.13658	0.00132	2475	7	2474	9	2472	20	2588	23	0.1
K05-100.5-4	91	124	0.74	0.21394	0.00208	17.01605	0.1547	0.57683	0.00542	0.16272	0.00147	2936	7	2936	9	2936	22	3047	26	0.0
K05-100.5-5	86	146	0.59	0.16195	0.00158	10.45337	0.1018	0.46812	0.00471	0.13707	0.00132	2476	8	2476	9	2475	21	2596	23	0.0
K05-100.5-6	67	123	0.55	0.106	0.00109	4.41778	0.0427	0.30228	0.00289	0.09151	0.00092	1732	8	1716	8	1703	14	1770	17	1.9
K05-100.5-7	199	286	0.69	0.10699	0.00104	4.58849	0.0449	0.31101	0.00314	0.09449	0.00088	1749	8	1747	8	1746	15	1825	16	0.2
K05-100.5-8	129	218	0.59	0.16131	0.00162	10.3355	0.1204	0.46479	0.00553	0.1425	0.00167	2469	9	2465	11	2461	24	2693	30	0.4
K05-100.5-9	106	209	0.51	0.16137	0.00156	10.39729	0.1006	0.46731	0.00468	0.13585	0.00128	2470	8	2471	9	2472	21	2575	23	-0.1
K05-100.5-12	90	166	0.54	0.16402	0.0016	10.69335	0.1061	0.47287	0.00485	0.15023	0.00146	2498	8	2497	9	2496	21	2829	26	0.1
K05-100.5-19	78	555	0.14	0.19166	0.00184	14.06761	0.1367	0.53237	0.00538	0.15268	0.00147	2756	7	2754	9	2751	23	2872	26	0.2
K05-100.5-39	175	194	0.90	0.10613	0.00115	4.50234	0.0554	0.30772	0.00372	0.09692	0.00116	1734	10	1731	10	1729	18	1870	21	0.3
K05-100.5-54	103	205	0.51	0.10598	0.00104	4.50107	0.0459	0.30807	0.00323	0.09404	0.00095	1731	9	1731	8	1731	16	1817	18	0.0
K05-100.5-57	220	497	0.44	0.16301	0.00157	10.58026	0.1092	0.47079	0.00505	0.14775	0.00147	2487	8	2487	10	2487	22	2785	26	0.0
K05-100.5-58	280	1625	0.17	0.15459	0.0015	9.5826	0.1062	0.44964	0.00516	0.20338	0.00216	2397	9	2396	10	2394	23	3742	36	0.2
K05-100.5-71	162	132	1.22	0.10874	0.00108	4.75403	0.045	0.31711	0.00304	0.09731	0.0009	1778	8	1777	8	1776	15	1877	17	0.2
K05-100.5-75	90	168	0.54	0.16461	0.00161	10.76181	0.1125	0.47421	0.00511	0.14641	0.0015	2504	8	2503	10	2502	22	2762	26	0.1
K05-100.5-82	109	212	0.52	0.16116	0.00158	10.34974	0.0974	0.46582	0.0045	0.13955	0.00137	2468	7	2467	9	2465	20	2640	24	0.1
K05-100.5-89	261	706	0.37	0.10752	0.00194	4.71492	0.0658	0.31805	0.00363	0.09219	0.00106	1758	34	1770	12	1780	18	1782	20	-1.5
K05-100.5-95	66	144	0.46	0.15636	0.00273	9.61792	0.1326	0.44613	0.00477	0.12458	0.00133	2417	30	2399	13	2378	21	2373	24	1.9
K05-100.5-97	42	101	0.42	0.10598	0.00113	4.47645	0.0453	0.30638	0.00301	0.13763	0.00155	1731	8	1727	8	1723	15	2606	28	0.6
K05-100.5-100	408	754	0.54	0.16165	0.00157	10.41672	0.0994	0.46737	0.00461	0.13874	0.00132	2473	8	2473	9	2472	20	2626	23	0.0
K05-100.5-101	241	247	0.98	0.11327	0.00111	5.20055	0.0509	0.33299	0.00334	0.10036	0.00095	1853	8	1853	8	1853	16	1933	17	0.0
K05-100.5-110	1403	1278	1.10	0.15241	0.00263	5.28359	0.0752	0.25142	0.00244	0.07038	0.00066	2373	30	1866	12	1446	13	1375	13	43.5
K05-100.5-113	362	652	0.56	0.16156	0.00326	9.88067	0.1527	0.44357	0.00577	0.12347	0.00161	2472	35	2424	14	2367	26	2353	29	5.1
K06-107-2	161	192	0.84	0.10537	0.00131	4.47856	0.0545	0.3083	0.00323	0.09036	0.00237	1721	23	1727	10	1732	16	1749	44	-0.8
K06-107-3	155	226	0.69	0.10547	0.00111	4.46211	0.0435	0.30686	0.00287	0.09132	0.00164	1723	20	1724	8	1725	14	1766	30	-0.2
K06-107-4	104	147	0.70	0.1064	0.00176	4.53773	0.0762	0.30931	0.0039	0.08511	0.00352	1739	31	1738	14	1737	19	1651	66	0.1
K06-107-5	126	133	0.95	0.1053	0.00114	4.40599	0.0444	0.30348	0.00288	0.09002	0.00173	1720	20	1713	8	1709	14	1742	32	0.7
K06-107-6	101	129	0.78	0.10652	0.00134	4.50938	0.0574	0.30705	0.00339	0.08989	0.00244	1741	24	1733	11	1726	17	1740	45	1
K06-107-7	149	135	1.10	0.10545	0.00163	3.95136	0.0543	0.27175	0.00246	0.08378	0.00342	1722	29	1624	11	1550	12	1626	64	11.3
K06-107-8	177	185	0.96	0.10618	0.00132	4.45851	0.0533	0.30456	0.00311	0.09064	0.00252	1735	23	1723	10	1714	15	1754	47	1.4
K06-107-9	167	197	0.85	0.10556	0.00129	4.46014	0.0543	0.30648	0.00326	0.08949	0.00248	1724	23	1724	10	1723	16	1732	46	0.1
K06-107-10	180	223	0.81	0.1056	0.00141	4.47359	0.0599	0.30731	0.00339	0.08766	0.00287	1725	25	1726	11	1727	17	1698	53	-0.2
K06-107-12	153	182	0.84	0.1054	0.00116	4.27694	0.0437	0.29433	0.00277	0.08552	0.00175	1721	21	1689	8	1663	14	1659	33	3.8
K05-113-01	208	673	0.31	0.11267	0.00122	5.135	0.056	0.33059	0.00343	0.09990	0.00198	1843	9	1842	9	1841	17	1925	36	0.1
K05-113-02	145	616	0.24	0.11331	0.00139	5.180	0.067	0.33158	0.00380	0.09508	0.00267	1853	10	1849	11	1846	18	1836	49	0.4
K05-113-03	126	429	0.29	0.11291	0.00169	4.907	0.069	0.31517	0.00321	0.09268	0.00363	1847	12	1803	12	1766	16	1791	67	5.0
K05-113-05	147	551	0.27	0.11071	0.00173	4.755	0.078	0.31149	0.00400	0.09111	0.00397	1811	14	1777	14	1748	20	1762	74	4.0
K05-113-06	91	307	0.29	0.11209	0.00123	5.080	0.055	0.32872	0.00332	0.09534	0.00197	1834	9	1833	9	1832	16	1841	36	0.1
K05-113-07	145	474	0.31	0.11260	0.00140	4.900	0.063	0.31564	0.00359	0.09220	0.00273	1842	10	1802	11	1768	18	1783	51	4.6
K05-113-08	223	627	0.35	0.11292	0.00146	5.116	0.068	0.32864	0.00372	0.09642	0.00310	1847	11	1839	11	1832	18	1861	57	1.0
K05-113-09	67	328	0.20	0.11197	0.00141	5.071	0.058	0.32849	0.00308	0.09559	0.00281	1832	9	1831	10	1831	15	1845	52	0.0
K05-113-10	58	285	0.20	0.10948	0.00289	4.621	0.122	0.30616	0.00476	0.09400	0.00811	1791	26	1753	22	1722	23	1816	150	4.4
K05-113-11	191	692	0.28	0.11227	0.00151	5.100	0.067	0.32951	0.00343	0.09594	0.00340	1836	11	1836	11	1836	17	1852	63	0.0
K05-113-15	84	336	0.25	0.11176	0.00181	5.054	0.085	0.32800	0.00413	0.09115	0.00418	1828	14	1828	14	1829	20	1763	77	0.0
K05-113-16	64	344	0.19	0.11131	0.00231	4.660	0.079	0.30365	0.00364	0.08770	0.00104	1821	39	1760	14	1709	18	1699	19	7.0
K05-113-17	292	864	0.34	0.11277	0.00161	4.737	0.064	0.30476	0.00315	0.09253	0.00351	1845	12	1774	11	1715	16	1789	65	8.0
K05-113-18	91	369	0.25	0.11243	0.00163	4.990	0.055	0.32191	0.00305	0.09288	0.00088	1839	27	1818	9	1799	15	1795	16	2.5
K05-113-19	205	617	0.33	0.11294	0.00240	4.561	0.099	0.29293	0.00423	0.09161	0.00625	1847	20	1742	18	1656	21	1772	116	11.7
K05-113-20	74	280	0.26	0.11250	0.00127	5.101	0.057	0.32886	0.00337	0.09232	0.00215	1840	9	1836	9	1833	16	1785	40	0.5
K05-113-21	118	502	0.23	0.11409	0.00177	4.829	0.078	0.30703	0.00388	0.09155	0.00409	1866	14	1790	14	1726	19	1771	76	8.5
K05-113-38	94	351	0.27	0.11416	0.00222	5.276	0.104	0.33514	0.00451	0.09187	0.00523	1867	18	1865	17	1863	22	1776	97	0.2
K05-113-41	148	571	0.26	0.11253	0.00141	5.122	0.063	0.33014	0.00342	0.09295	0.00269	1841	10	1840	10	1839	17	1796	50	0.1
K05-113-43	150	578	0.26	0.11297	0.00133	5.169	0.056	0.33184	0.00313	0.09498	0.00259	1848	9	1847	9	1847	15	1834	48	0.0
K05-113-45	163	599	0.27	0.11284	0.00134	5.152	0.061	0.33116	0.00346	0.09767	0.00250	1846	10	1845	10	1844	17	1884	46	0.1
K05-113-46	54	247	0.22	0.11311	0.00147	5.166	0.068	0.33124	0.00372	0.10537	0.00321	1850	11	1847	11	1844	18	2025	59	0.3
K05-113-47	91	361	0.25	0.11250	0.00141	5.045	0.062	0.32521	0.00337	0.09354	0.00276	1840	10	1827	10	1815	16	1807	51	1.6
K05-113-48	46	219	0.21	0.11329	0.00210	5.202	0.093	0.33302	0.00392	0.11087	0.00591	1853	17	1853	15	1853	19	2125	108	0.0
K06-228.3-1-1	414	558	0.74	0.10631	0.00119	4.49345	0.0489	0.30657	0.00306	0.09586	0.00169	1737	21	1730	9	1724	15	1850	31	0.9
K06-228.3-1-5	122	191	0.64	0.10567	0.00119	4.44063	0.0515	0.3048	0.00329	0.09273	0.00155	1726	21	1720	10	1715	16	1792	29	0.7
K06-228.3-1-7	159	200	0.79	0.10746	0.00118	4.55592	0.0514	0.3075	0.00328	0.09469	0.00148	1757	21	1741	9	1728	16	1829	27	1.8
K06-228.3-1-8	596	649	0.92	0.1061	0.00111	4.5088	0.0463	0.30825	0.00307	0.09304	0.00123	1733	20	1733	9	1732	15	1798	23	0.1
K06-228.3-1-12	427	447	0.96	0.11123	0.00151	4.74696	0.0703	0.30952	0.00387	0.09359	0.00258	1820	25	1776	12	1738	19	1808	48	5.1
K06-228.3-1-13	544	491	1.11	0.10647	0.00112	4.58024	0.0476	0.31203	0.00312	0.09328	0.0013	1740	20	1746	9	1751	15	1803	24	-0.7
K06-228.3-1-15	1023	883	1.16	0.10636	0.00112	4.55734	0.0472	0.31078	0.00309	0.09271	0.00131	1738	20	1742	9	1745	15	1792	24	-0.4
K06-228.3-1-16	1092	895	1.22	0.10621	0.00117	4.43863	0.0502	0.30313	0.00321	0.08964	0.00153	1735	21	1720	9	1707	16	1735	28	1.9
K06-228.3-1-18	348	352	0.99	0.10658	0.00143	4.52943	0.0569	0.30824	0.00299	0.09252	0.00252	1742	25	1736	10	1732	15	1789	47	0.6
K06-228.3-1-22	992	846	1.17	0.10635	0.00121	4.48232	0.0524	0.30571	0.00327	0.09105	0.00172	1738	21	1728	10	1720	16	1761	32	1.2
K06-238-1	26	77	0.34	0.10557	0.00129	4.44922	0.0535	0.30569	0.00319	0.09111	0.00192	1724	23	1722	10	1719	16	1762	36	0.3
K06-238-2	42	144	0.29	0.14392	0.00363	7.58045	0.1632	0.382	0.00504	0.10754	0.00148	2275	45	2183	19	2086	24	2064	27	9.7
K06-238-5	22	70	0.31	0.1063	0.00139	4.4262	0.0569	0.30202	0.00322	0.09064	0.00225	1737	25	1717	11	1701	16	1754	42	2.3
K06-238-6	203	871	0.23	0.10539	0.00127	4.41081	0.0524	0.30356	0.00311	0.09146	0.00215	1721	23	1714	10	1709	15	1769	40	0.8
K06-238-9	65	141	0.46	0.10643	0.00126	4.51304	0.0497	0.30755	0.0029	0.09871	0.00218	1739	22	1733	9	1729	14	1903	40	0.7
K06-238-10	103	713	0.14	0.10592	0.00156	4.56932	0.0682	0.31288	0.00356	0.09624	0.00345	1730	28	1744	12	1755	17	1857	64	-1.6
K06-238-12	68	183	0.37	0.1058	0.00131	4.41717	0.0523	0.30282	0.00299	0.09244	0.00229	1728	23	1716	10	1705	15	1787	42	1.5
K06-238-13Core	51	253	0.20	0.10557	0.00187	4.45322	0.0647	0.30593	0.00312	0.08884	0.00097	1724	33	1722	12	1721	15	1720	18	0.2
K06-238-13Rim	85	729	0.12	0.10595	0.00168	3.74648	0.0616	0.25647	0.00311	0.07565	0.00319	1731	30	1581	13	1472	16	1474	60	16.7
K06-238-16	141	278	0.51	0.11009	0.00121	4.89768	0.0512	0.32268	0.00312	0.10583	0.00184	1801	20	1802	9	1803	15	2033	34	-0.1
K06-238-17	131	301	0.43	0.10596	0.00119	4.61251	0.048	0.31574	0.00296	0.09635	0.0018	1731	21	1752	9	1769	15	1859	33	-2.5
K06-238-18	111	240	0.46	0.10642	0.00157	4.54729	0.0705	0.30995	0.00385	0.09409	0.00311	1739	28	1740	13	1740	19	1818	57	-0.1
K06-238-19	233	419	0.56	0.11305	0.00158	5.32214	0.077	0.34146	0.00402	0.10078	0.00315	1849	26	1872	12	1894	19	1941	58	-2.8
K06-238-22	53	179	0.30	0.11368	0.00142	5.17239	0.0646	0.33002	0.00354	0.09643	0.00239	1859	23	1848	11	1838	17	1861	44	1.3
K06-238-24	453	730	0.62	0.10646	0.00201	4.58448	0.0892	0.31234	0.00425	0.1006	0.00508	1740	35	1746	16	1752	21	1937	93	-0.8
K06-238-26	260	450	0.58	0.10591	0.00123	4.50831	0.053	0.30877	0.00327	0.09506	0.00197	1730	22	1733	10	1735	16	1835	36	-0.3
K06-238-30	170	444	0.38	0.15976	0.00234	10.41417	0.1455	0.47288	0.00491	0.13828	0.0047	2453	25	2472	13	2496	21	2618	83	-2.1
K06-238-31	83	268	0.31	0.10768	0.00134	4.68809	0.0573	0.31579	0.0033	0.09575	0.00233	1761	23	1765	10	1769	16	1848	43	-0.6
K06-238-32	195	433	0.45	0.10767	0.00169	4.74808	0.0731	0.31987	0.00359	0.09699	0.0037	1760	29	1776	13	1789	18	1871	68	-1.9
K06-238-35	208	463	0.45	0.10701	0.00137	4.62265	0.0593	0.31334	0.00339	0.09993	0.00269	1749	24	1753	11	1757	17	1925	49	-0.5
K06-238-36	156	413	0.38	0.10609	0.00221	4.51651	0.0965	0.3088	0.00435	0.1064	0.00627	1733	39	1734	18	1735	21	2044	115	-0.1
K06-245-2-3	100	421	0.24	0.18054	0.00387	11.16085	0.1928	0.44837	0.00568	0.12348	0.00168	2658	36	2537	16	2388	25	2353	30	12.1
K06-245-2-4	103	383	0.27	0.10596	0.0012	4.44792	0.0447	0.30448	0.0027	0.09159	0.00178	1731	21	1721	8	1713	13	1771	33	1.2
K06-245-2-6	202	531	0.38	0.10813	0.00161	3.73901	0.0494	0.25089	0.00223	0.07772	0.00271	1768	28	1580	11	1443	11	1513	51	20.5
K06-245-2-7	269	862	0.31	0.10613	0.00151	4.27543	0.0637	0.2922	0.00351	0.08801	0.00287	1734	27	1689	12	1653	18	1705	53	5.3
K06-245-2-11	241	822	0.29	0.10591	0.00145	3.96818	0.0545	0.27175	0.00299	0.08329	0.00253	1730	26	1628	11	1550	15	1617	47	11.7
K06-245-2-13	403	876	0.46	0.10871	0.00137	4.53897	0.0593	0.30284	0.00342	0.09208	0.00234	1778	24	1738	11	1705	17	1780	43	4.6
K06-245-2-14	237	644	0.37	0.10606	0.00126	3.81638	0.0389	0.26102	0.00221	0.07582	0.00168	1733	22	1596	8	1495	11	1477	32	15.4
K06-245-2-15	391	1004	0.39	0.10628	0.00152	4.45688	0.0677	0.30416	0.00375	0.09328	0.00309	1737	27	1723	13	1712	19	1803	57	1.6
K06-245-2-16	84	434	0.19	0.10673	0.00175	4.52552	0.0779	0.30755	0.00398	0.09168	0.00377	1744	31	1736	14	1729	20	1773	70	1
K06-245-2-17	373	847	0.44	0.10694	0.00132	3.84457	0.044	0.26074	0.00249	0.07804	0.0019	1748	23	1602	9	1494	13	1519	36	16.3
K06-245-2-19	144	124	1.16	0.17918	0.0021	12.10642	0.1356	0.49009	0.00486	0.16177	0.00347	2645	20	2613	11	2571	21	3031	60	3.4
K06-245-2-20	71	623	0.11	0.10304	0.00181	4.15806	0.058	0.29268	0.00312	0.0852	0.00099	1680	33	1666	11	1655	16	1653	18	1.7
K06-245-2-24	125	948	0.13	0.10656	0.00118	3.68514	0.0381	0.2508	0.00236	0.05402	0.00098	1741	21	1568	8	1443	12	1063	19	19.1
K06-245-2-26	157	395	0.40	0.10638	0.00152	4.25556	0.053	0.29014	0.00242	0.08441	0.00273	1738	27	1685	10	1642	12	1638	51	6.3
K06-245-2-31	189	580	0.33	0.10687	0.00124	4.02446	0.0427	0.27309	0.00251	0.07951	0.00163	1747	22	1639	9	1556	13	1546	31	12.2
K06-245-2-34	117	368	0.32	0.10596	0.00166	3.63747	0.0525	0.24892	0.00232	0.06771	0.00252	1731	29	1558	11	1433	12	1324	48	19.2
K06-245-2-36	158	345	0.46	0.15985	0.00195	10.15193	0.1328	0.46069	0.0054	0.13356	0.00314	2454	21	2449	12	2443	24	2534	56	0.6
K06-245-2-38	85	237	0.36	0.10706	0.00152	4.04954	0.051	0.27432	0.00245	0.07372	0.00226	1750	27	1644	10	1563	12	1438	43	12

Table DR6. Hf isotopic analyses of Grand Canyon plutons (GEMOC).

Analysis No.	Total Hf beam (V)	176Hf/177Hf	1 se	176Lu/177Hf	176Yb/177Hf	176Hf/177Hf (T)	E Hf (0)	Epsilon Hf (T)	1 sigma	Age
K05-100.5-1Rim	4.2	0.281768	0.000008	0.000519	0.013449	0.281751	-36.0	2.6	0.6	1739
K05-100.5-2Core	3.8	0.281134	0.000009	0.000679	0.019937	0.281101	-58.4	-1.8	0.6	2547
K05-100.5-3	4.0	0.281192	0.000009	0.000666	0.020580	0.281161	-56.3	-1.3	0.6	2475
K05-100.5-4	4.0	0.280895	0.000009	0.000843	0.026216	0.280848	-66.8	-1.7	0.7	2936
K05-100.5-5	4.2	0.281187	0.000011	0.000640	0.019970	0.281157	-56.5	-1.4	0.8	2476
K05-100.5-6	5.2	0.281806	0.000009	0.001013	0.030814	0.281773	-34.6	3.2	0.7	1732
K05-100.5-7	4.3	0.281767	0.000008	0.000704	0.021542	0.281744	-36.0	2.6	0.6	1749
K05-100.5-8	4.3	0.281196	0.000010	0.000563	0.017581	0.281169	-56.2	-1.1	0.7	2469
K05-100.5-9	4.2	0.281195	0.000009	0.000723	0.021907	0.281161	-56.2	-1.4	0.7	2470
K05-100.5-12	4.5	0.281168	0.000008	0.000576	0.017933	0.281141	-57.2	-1.5	0.6	2498
K05-100.5-19	4.2	0.280887	0.000009	0.000744	0.021132	0.280848	-67.1	-5.9	0.6	2756
K05-100.5-39	6.1	0.281802	0.000010	0.002025	0.067581	0.281735	-34.8	1.9	0.8	1734
K05-100.5-54	4.7	0.281799	0.000006	0.001065	0.032319	0.281764	-34.9	2.9	0.5	1731
K05-100.5-57	4.9	0.281209	0.000007	0.000493	0.017771	0.281186	-55.7	-0.2	0.5	2487
K05-100.5-58	5.4	0.281257	0.000010	0.001673	0.056721	0.281180	-54.0	-2.4	0.8	2397
K05-100.5-71	4.3	0.281601	0.000007	0.000834	0.028402	0.281573	-41.9	-2.8	0.5	1778
K05-100.5-75	4.1	0.281188	0.000011	0.000580	0.019558	0.281160	-56.5	-0.7	0.8	2504
K05-100.5-82	3.8	0.281191	0.000009	0.000698	0.027452	0.281158	-56.4	-1.6	0.6	2468
K05-100.5-89	4.5	0.281821	0.000009	0.001555	0.060198	0.281769	-34.1	3.7	0.7	1758
K05-100.5-95	3.8	0.281383	0.000012	0.002979	0.119935	0.281246	-49.6	0.4	0.8	2417
K05-100.5-97	4.4	0.281900	0.000010	0.002843	0.112162	0.281807	-31.3	4.4	0.7	1731
K05-100.5-100	3.9	0.281225	0.000009	0.000711	0.026387	0.281191	-55.2	-0.3	0.6	2473
K05-100.5-101	3.9	0.281303	0.000008	0.000465	0.017549	0.281287	-52.4	-11.3	0.6	1853
K05-100.5-110	4.0	0.281275	0.000010	0.001983	0.076397	0.281185	-53.4	-2.8	0.7	2373
K05-100.5-113	4.3	0.281314	0.000009	0.002261	0.092867	0.281207	-52.0	0.3	0.7	2472
K06-107-2	2.3	0.281942	0.000016	0.000547	0.017978	0.281924	-29.8	8.3	0.9	1721
K06-107-3	2.4	0.281915	0.000011	0.000729	0.023342	0.281891	-30.8	7.2	0.6	1723
K06-107-4	2.3	0.281969	0.000014	0.000443	0.014067	0.281955	-28.9	9.8	0.8	1739
K06-107-5	2.6	0.281948	0.000010	0.000437	0.013009	0.281934	-29.6	8.7	0.6	1720
K06-107-6	2.3	0.281941	0.000011	0.000482	0.014935	0.281925	-29.8	8.8	0.6	1741
K06-107-7	2.5	0.281980	0.000014	0.000663	0.020988	0.281958	-28.5	9.6	0.8	1722
K06-107-8	2.6	0.281966	0.000011	0.000554	0.017581	0.281948	-29.0	9.5	0.6	1735
K06-107-9	2.2	0.281940	0.000013	0.000512	0.015312	0.281923	-29.9	8.4	0.7	1724
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K06-107-12	2.3	0.281942	0.000011	0.000459	0.014632	0.281927	-29.8	8.4	0.6	1721
K05-113-1	3.2	0.281954	0.000012	0.001725	0.045964	0.281894	-29.4	10.1	0.8	1843
K05-113-2	3.4	0.281969	0.000008	0.002175	0.058386	0.281893	-28.9	10.3	0.5	1853
K05-113-3	4.2	0.282057	0.000017	0.003080	0.092991	0.281949	-25.7	12.1	1.2	1847
K05-113-5	5.7	0.281965	0.000015	0.002119	0.062598	0.281892	-29.0	9.3	1.3	1811
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K06-245-2-26	0.281887	0.000016	0.000936	0.037167	0.281856	-31.8	6.3	0.6	1738
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K06-245-2-38	0.281830	0.000011	0.000396	0.011753	0.281817	-33.8	5.2	0.4	1750

Vishnu Schist
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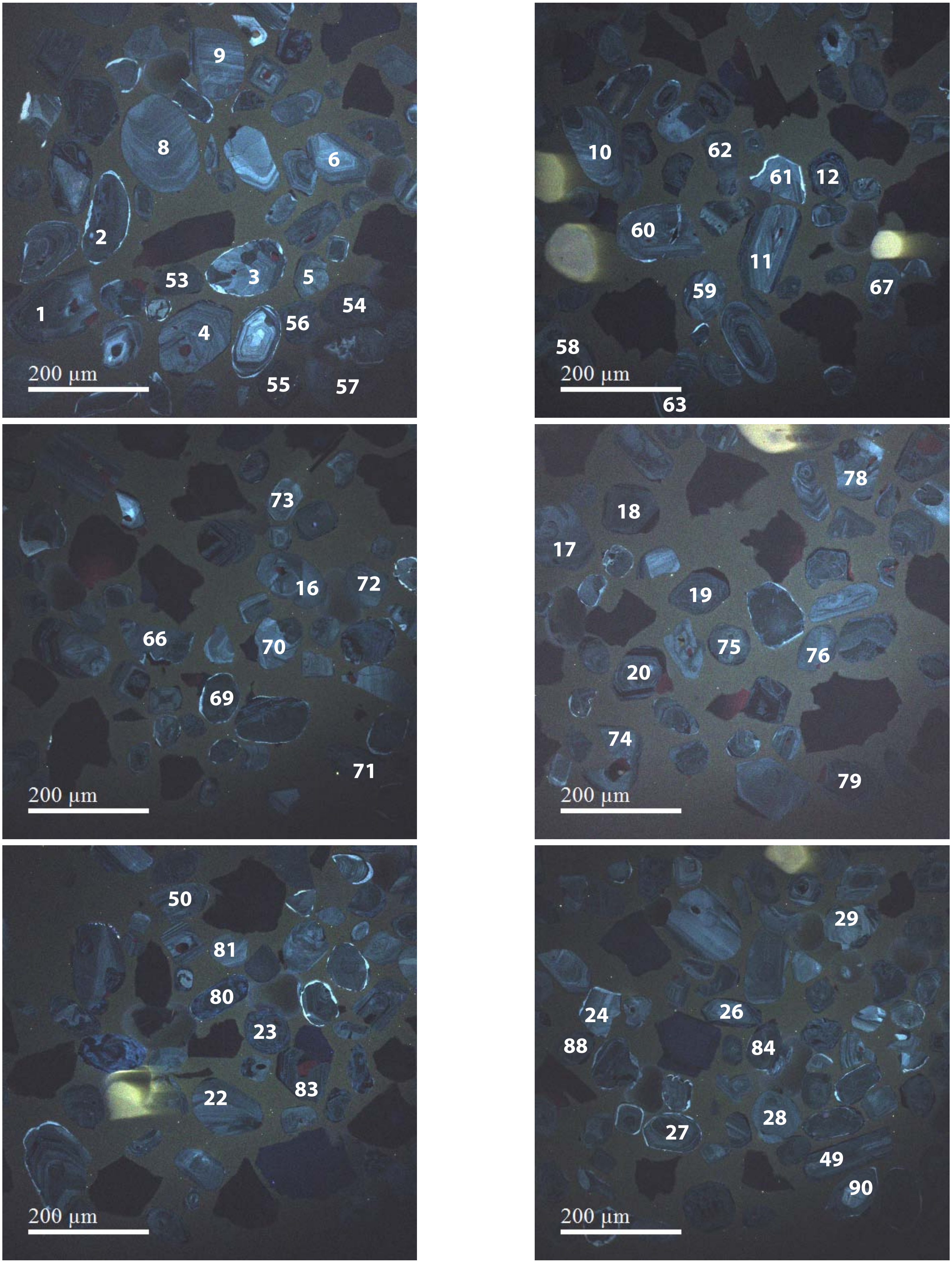

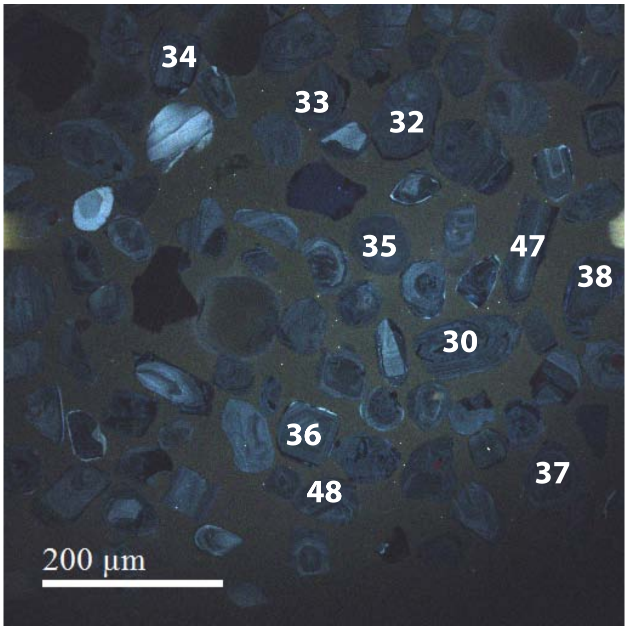
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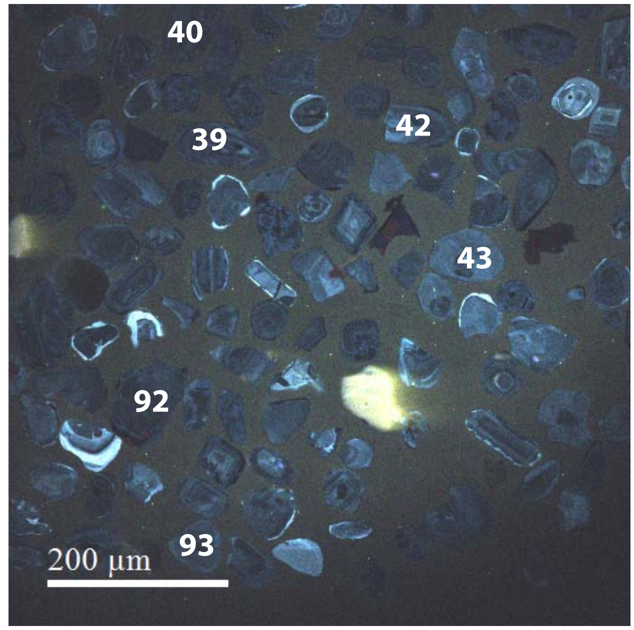
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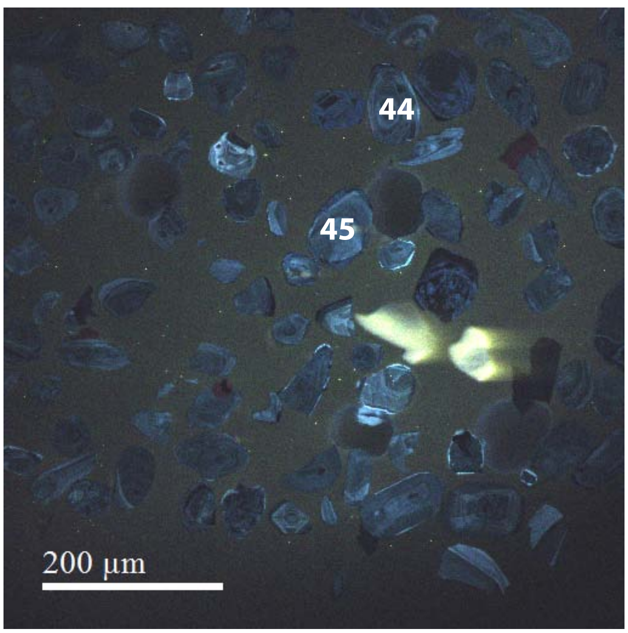
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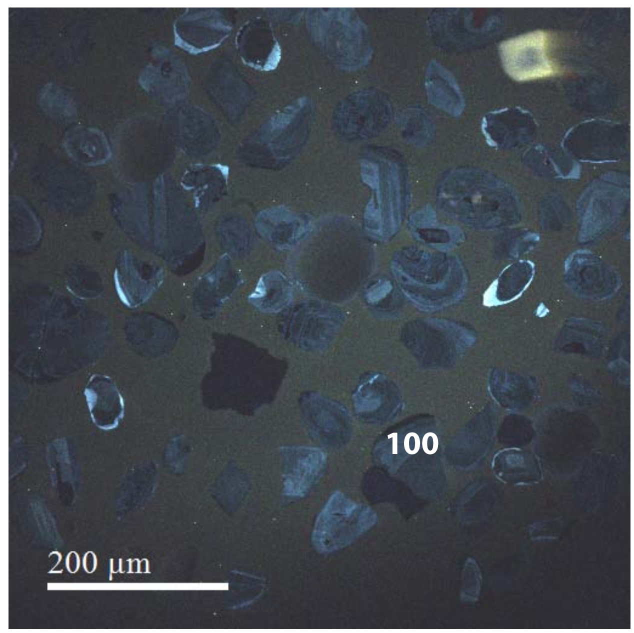
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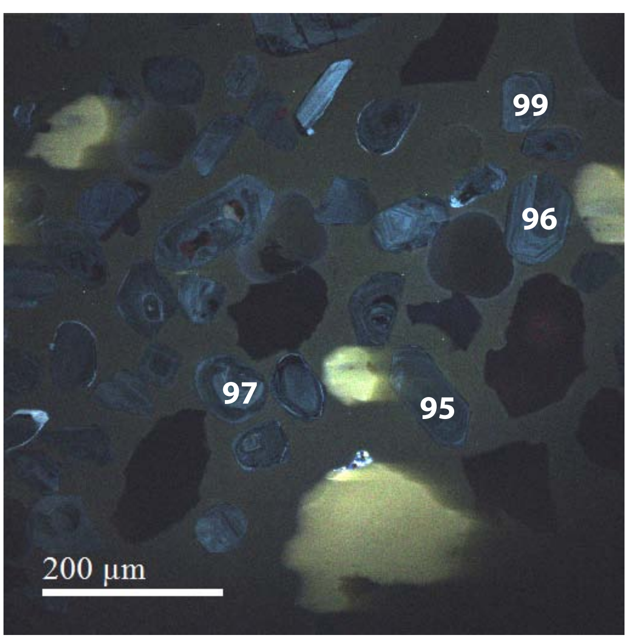
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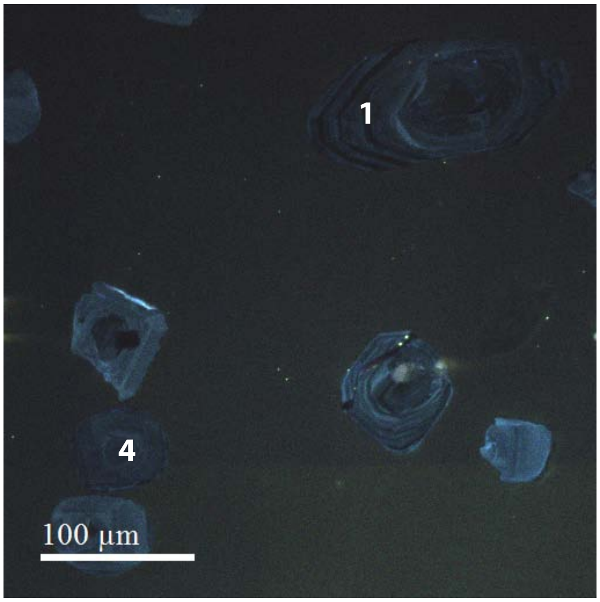
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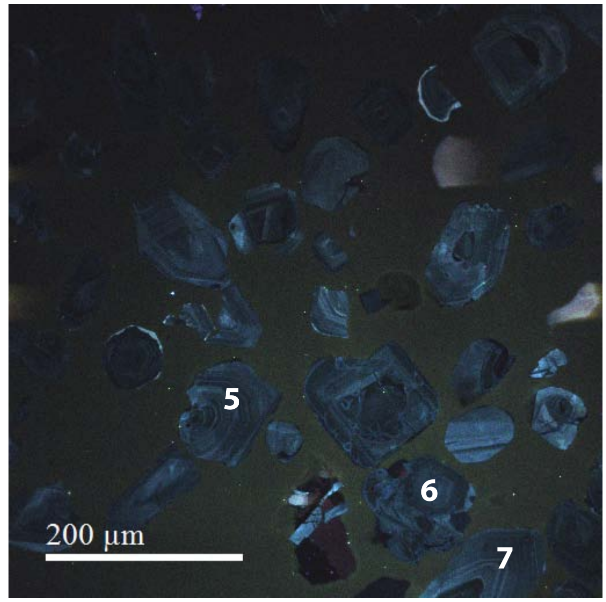
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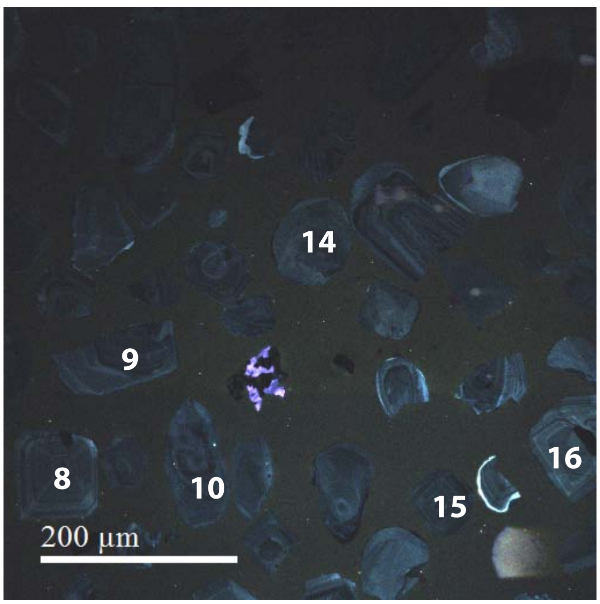
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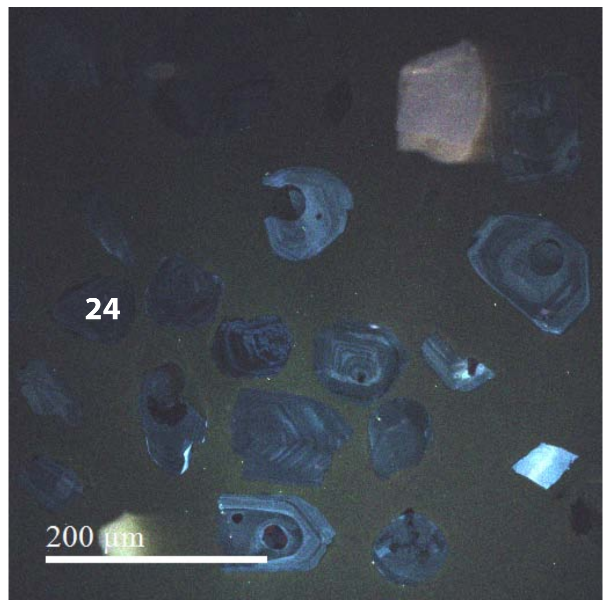
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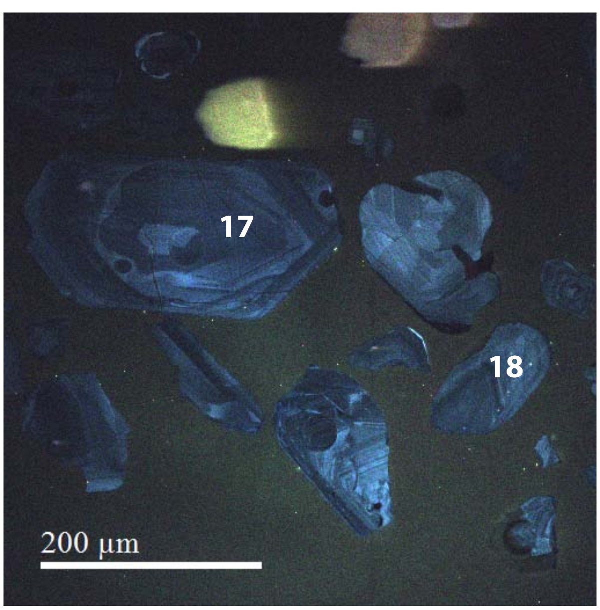
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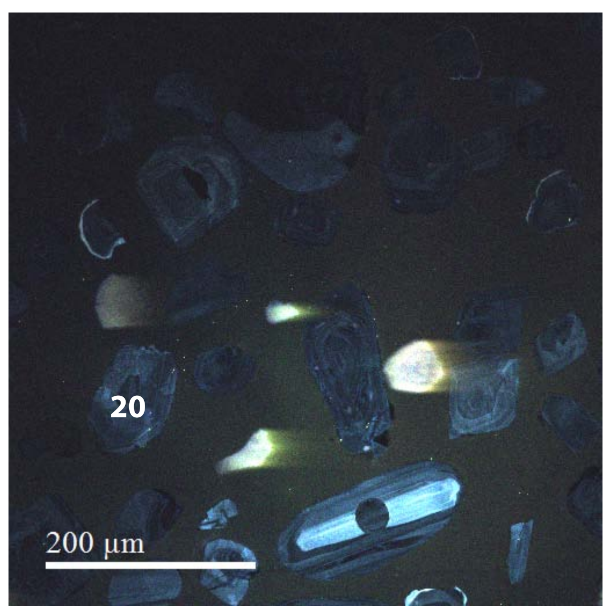
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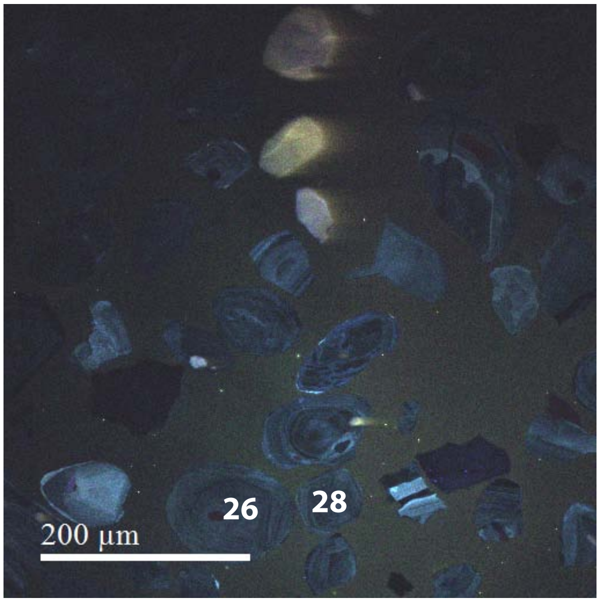
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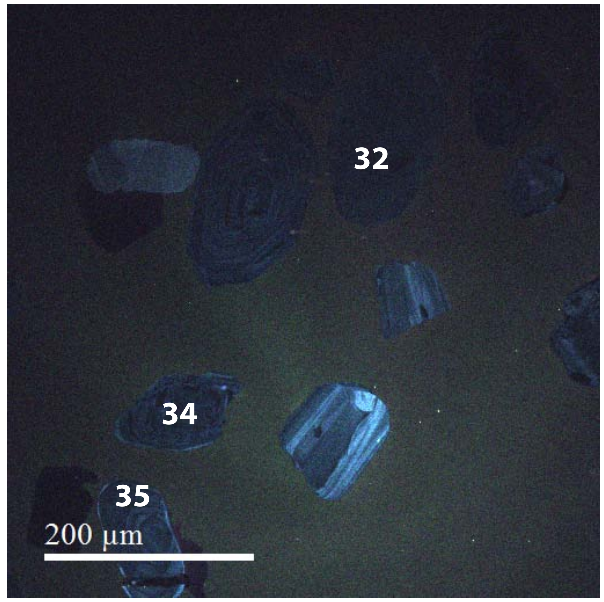
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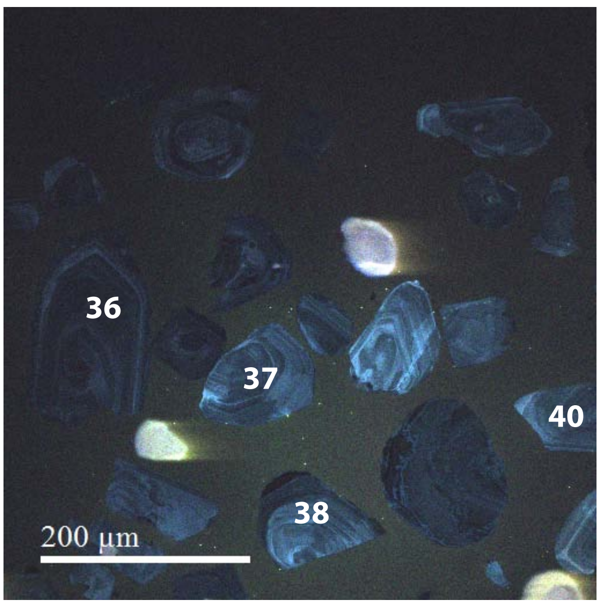
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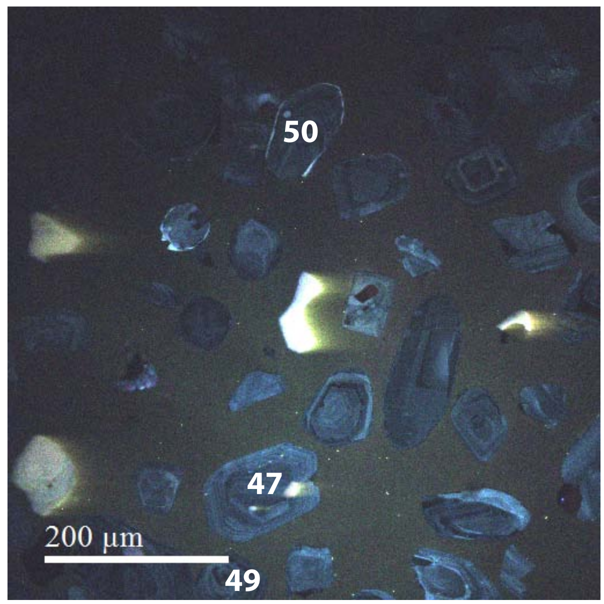
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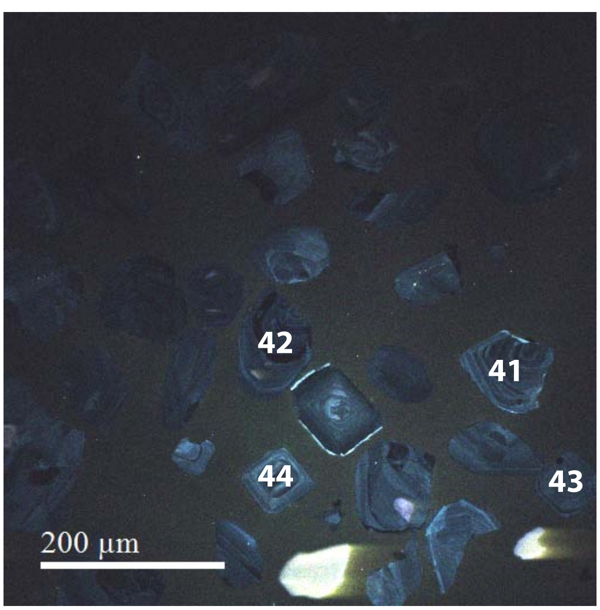
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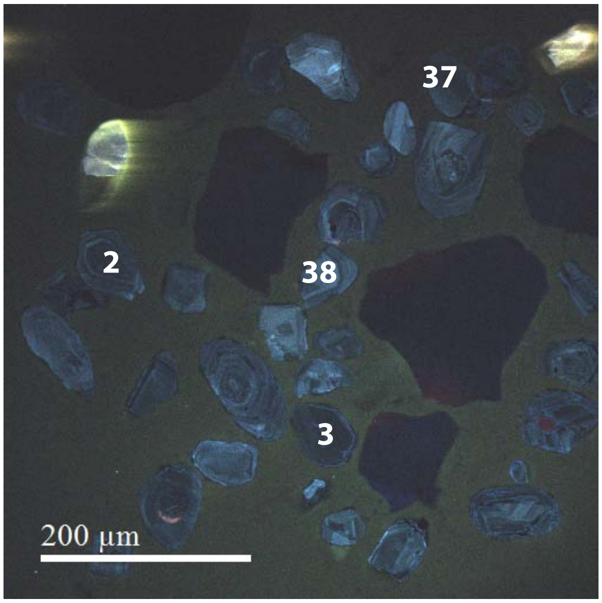
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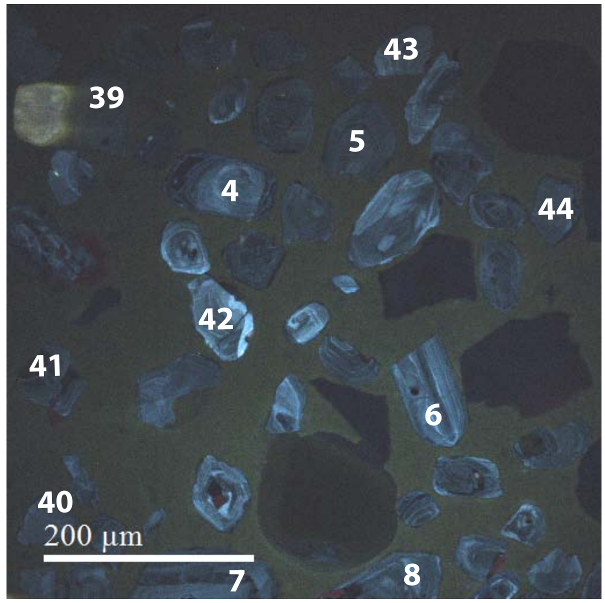
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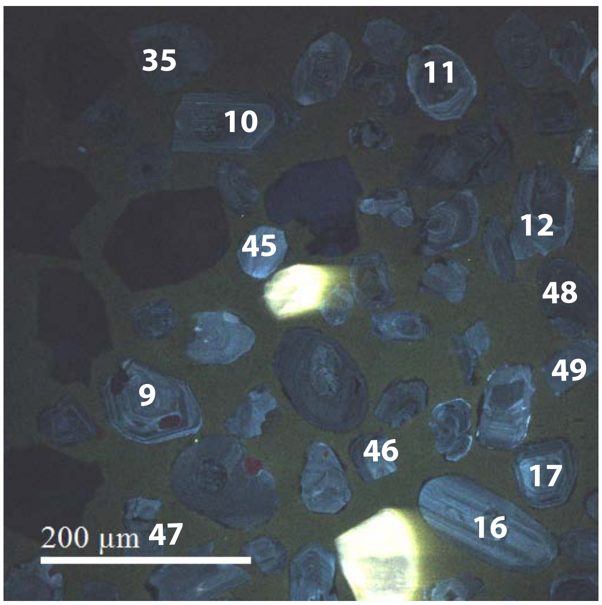
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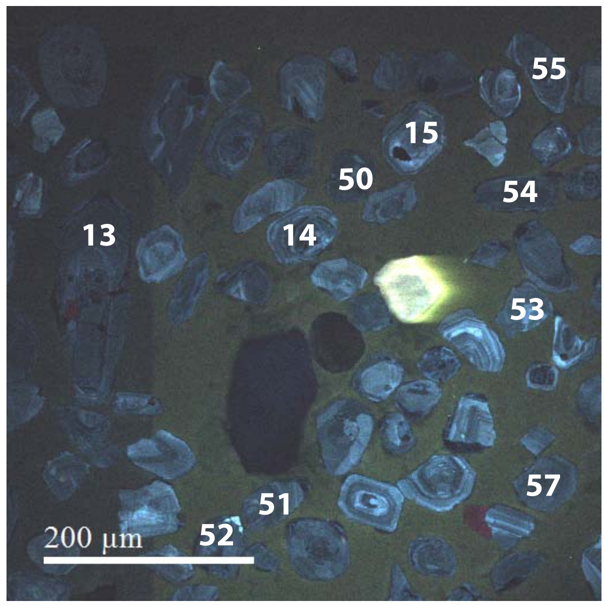
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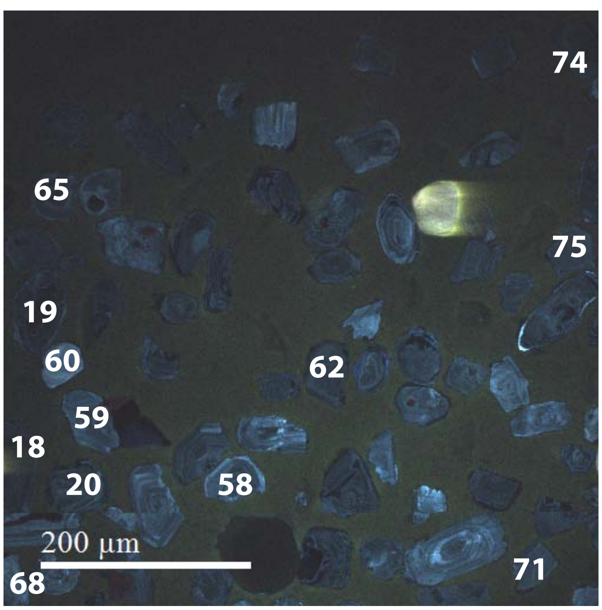
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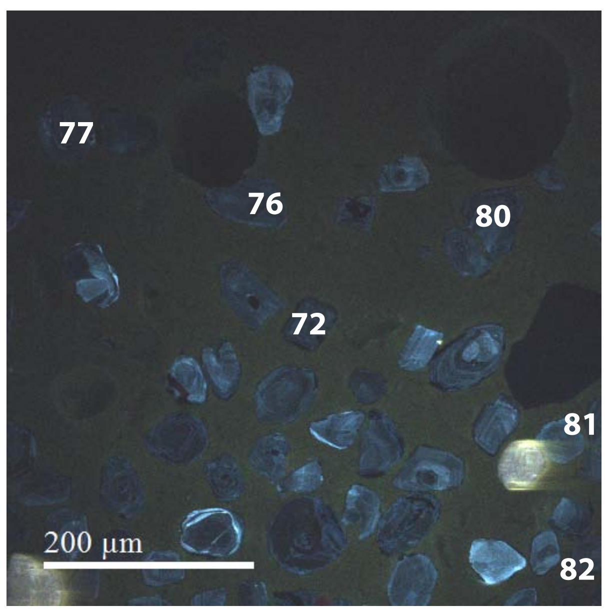
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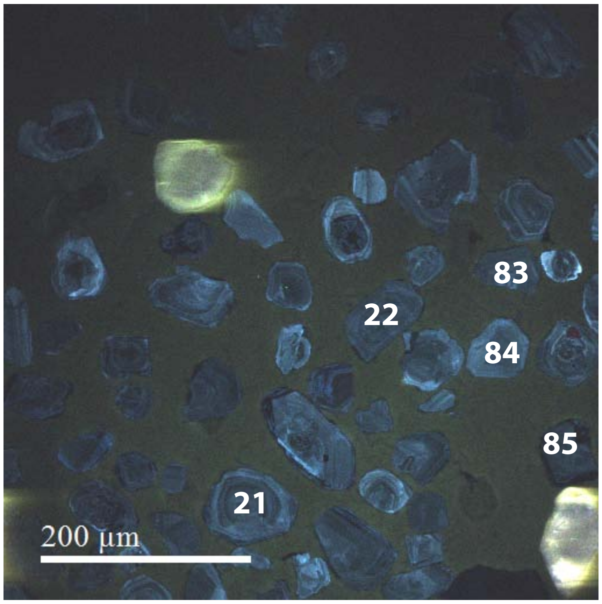
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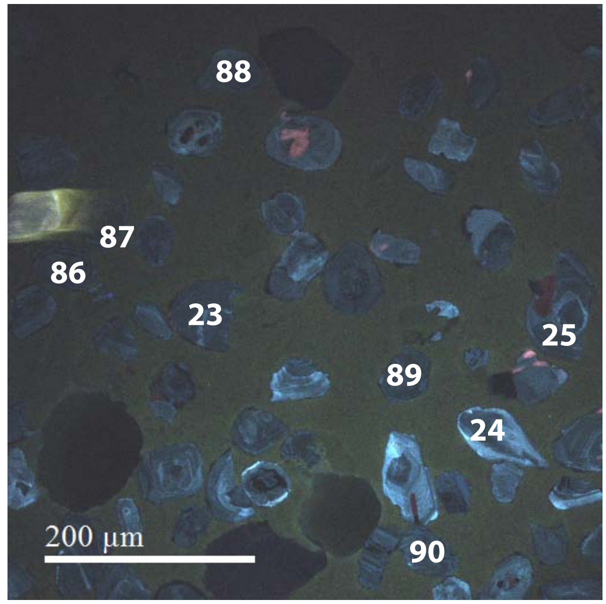
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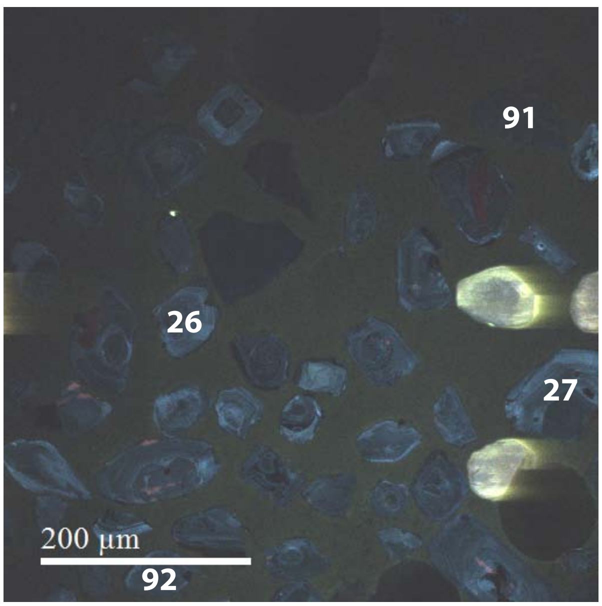
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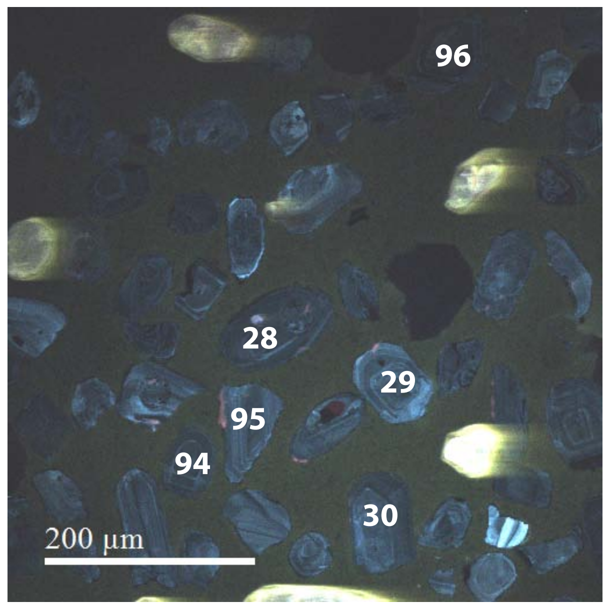
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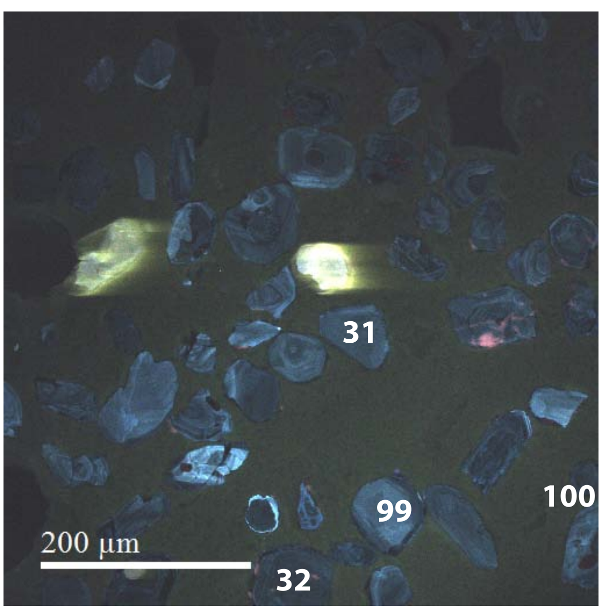
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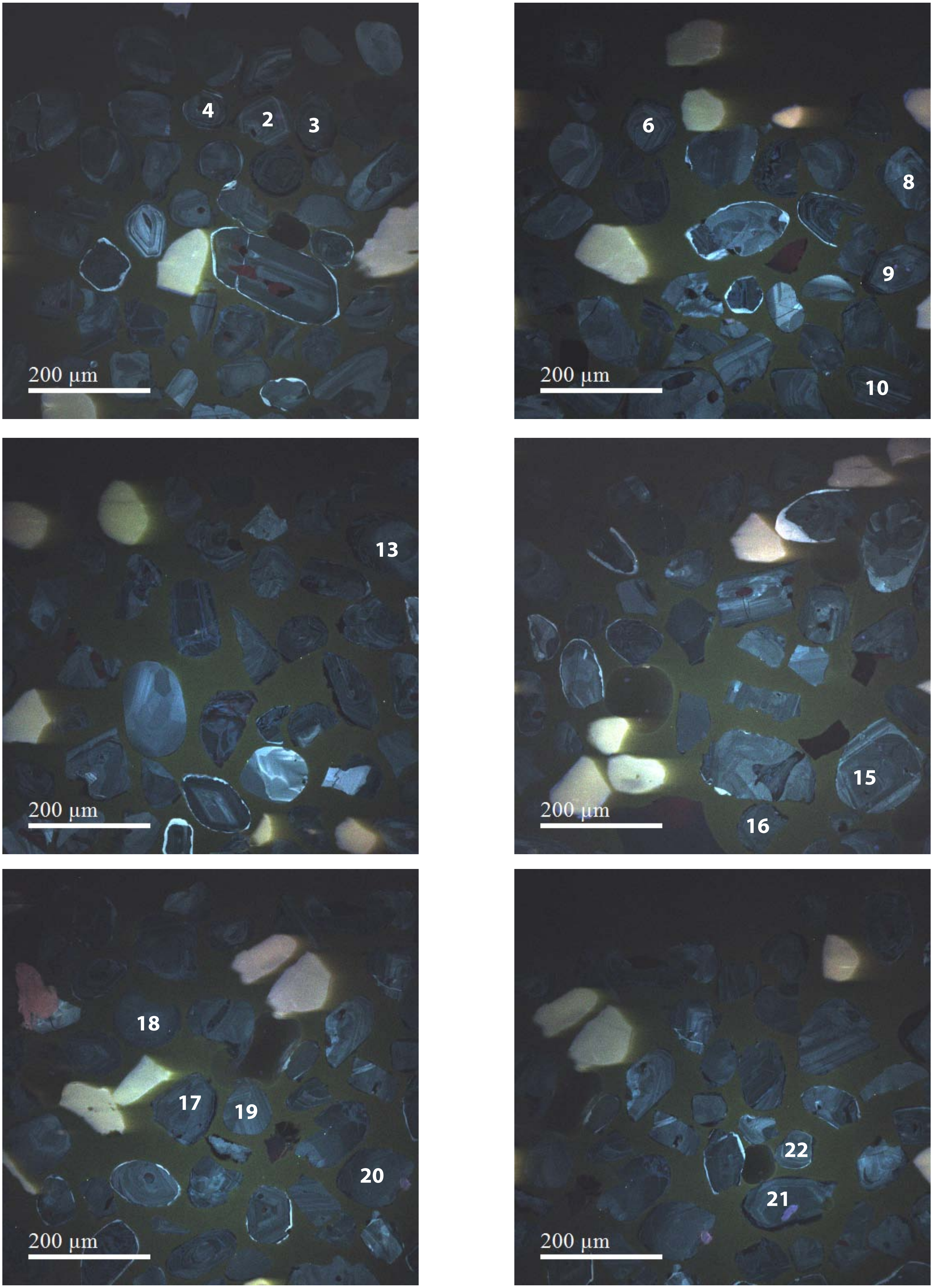
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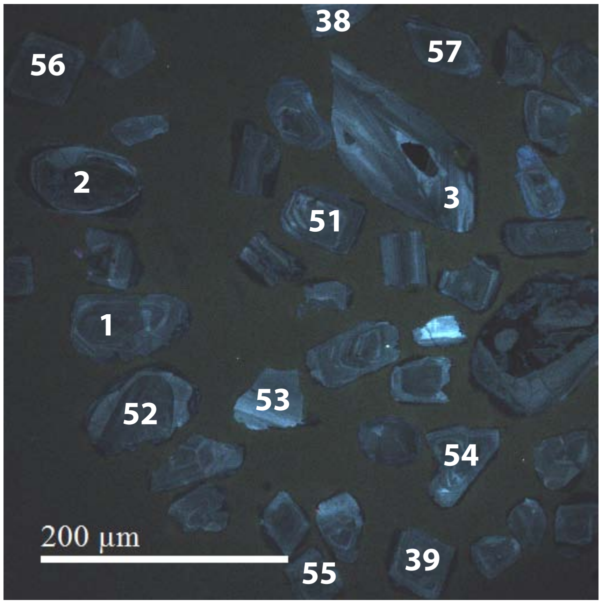
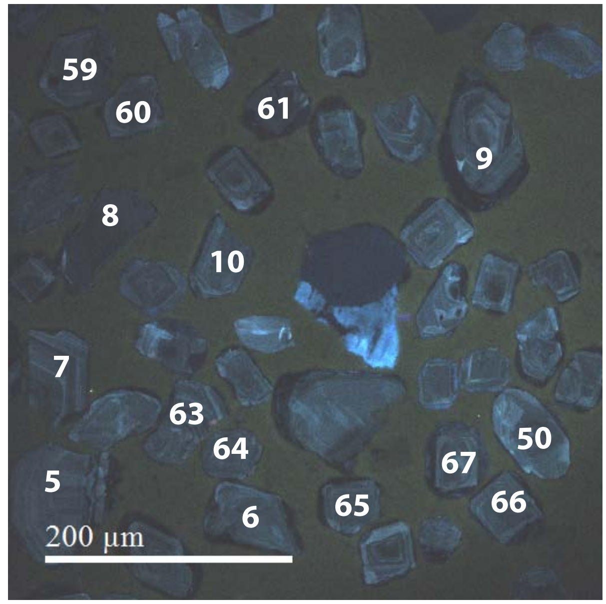
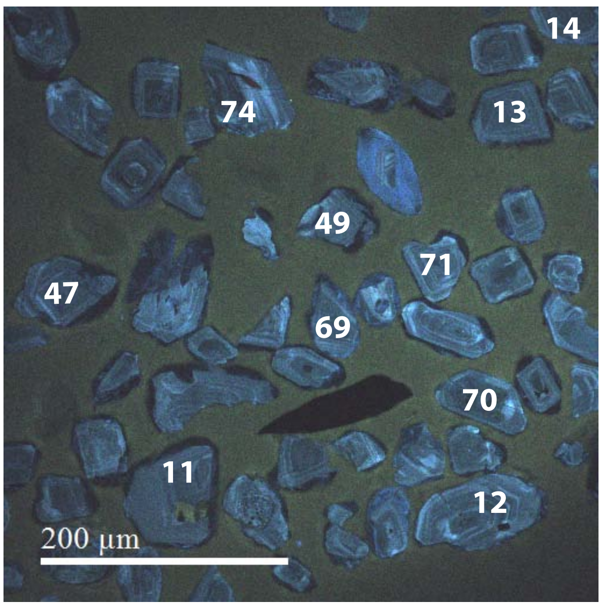
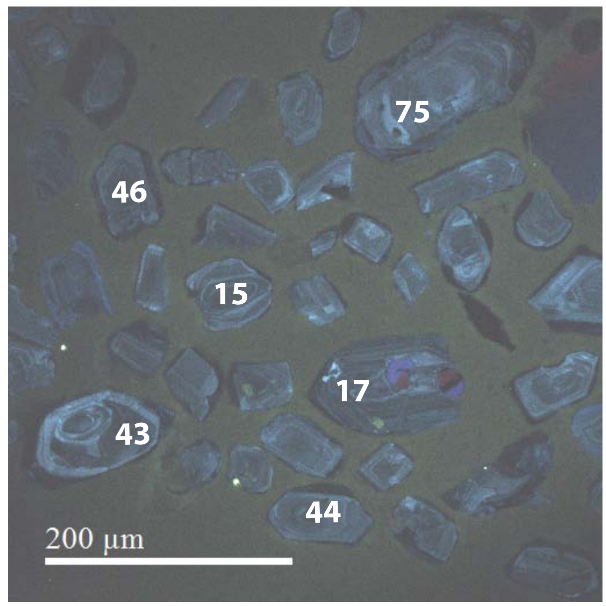
17
19
20
200 μm
22
21
200 μm

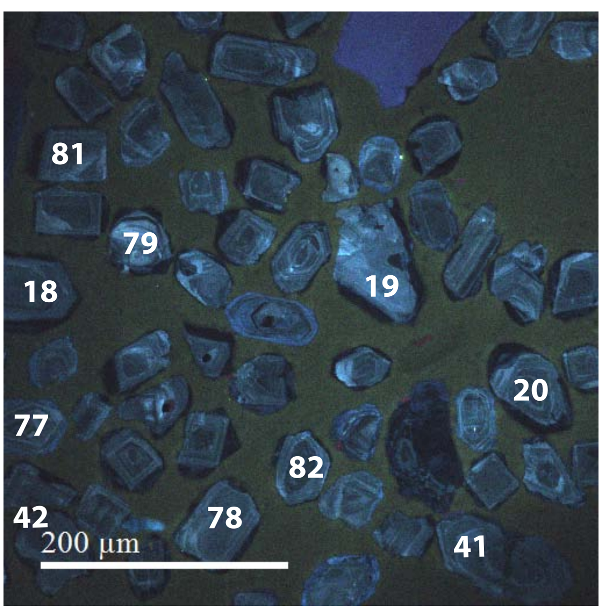
K06-246-1

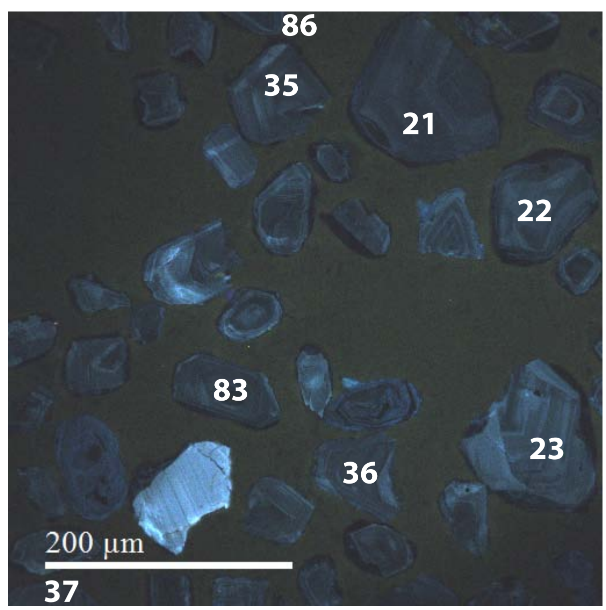

38
56
57
2
3
51
1
52
53
54
200 µm
55
39

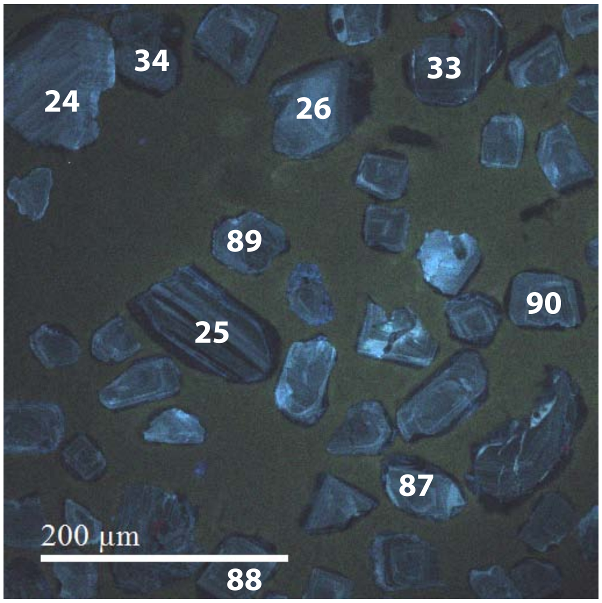

59
60
61
9
8
10
7
63
64
50
67
5
6
65
66
200 µm

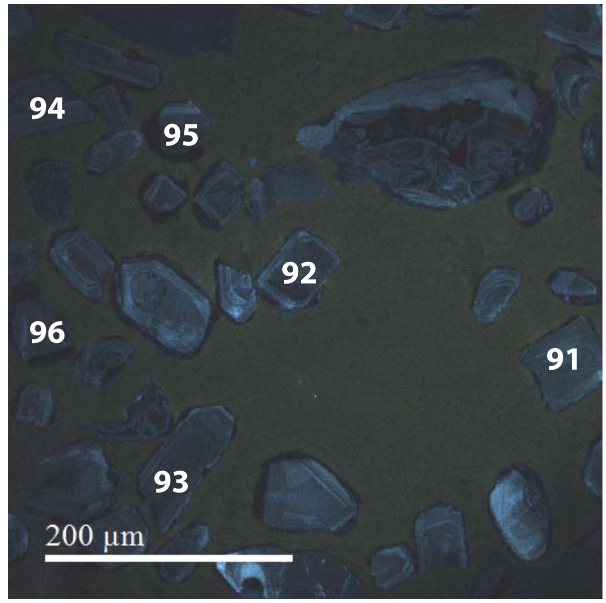

14
74
13
49
71
47
69
70
11
12
200 µm

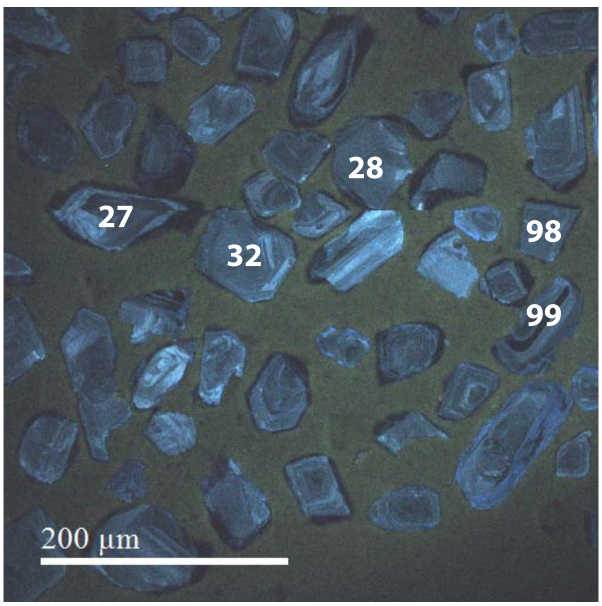

75
46
15
17
43
44
200 µm

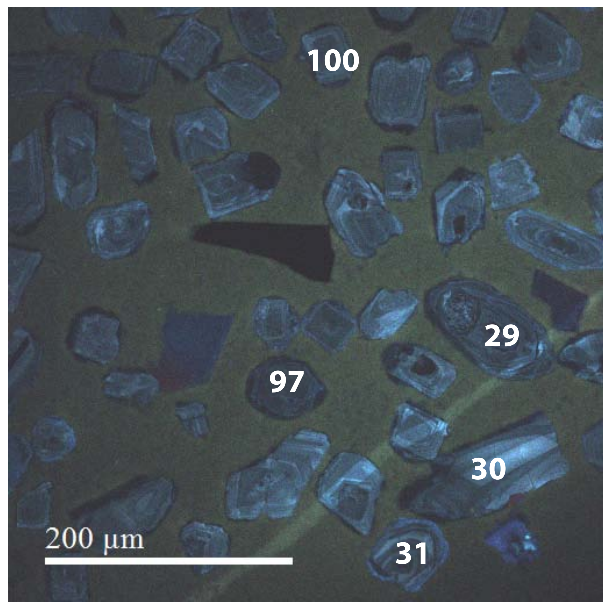

81
79
18
19
20
77
82
42
78
41
200 µm


86
35
21
22
83
23
36
200 µm
37

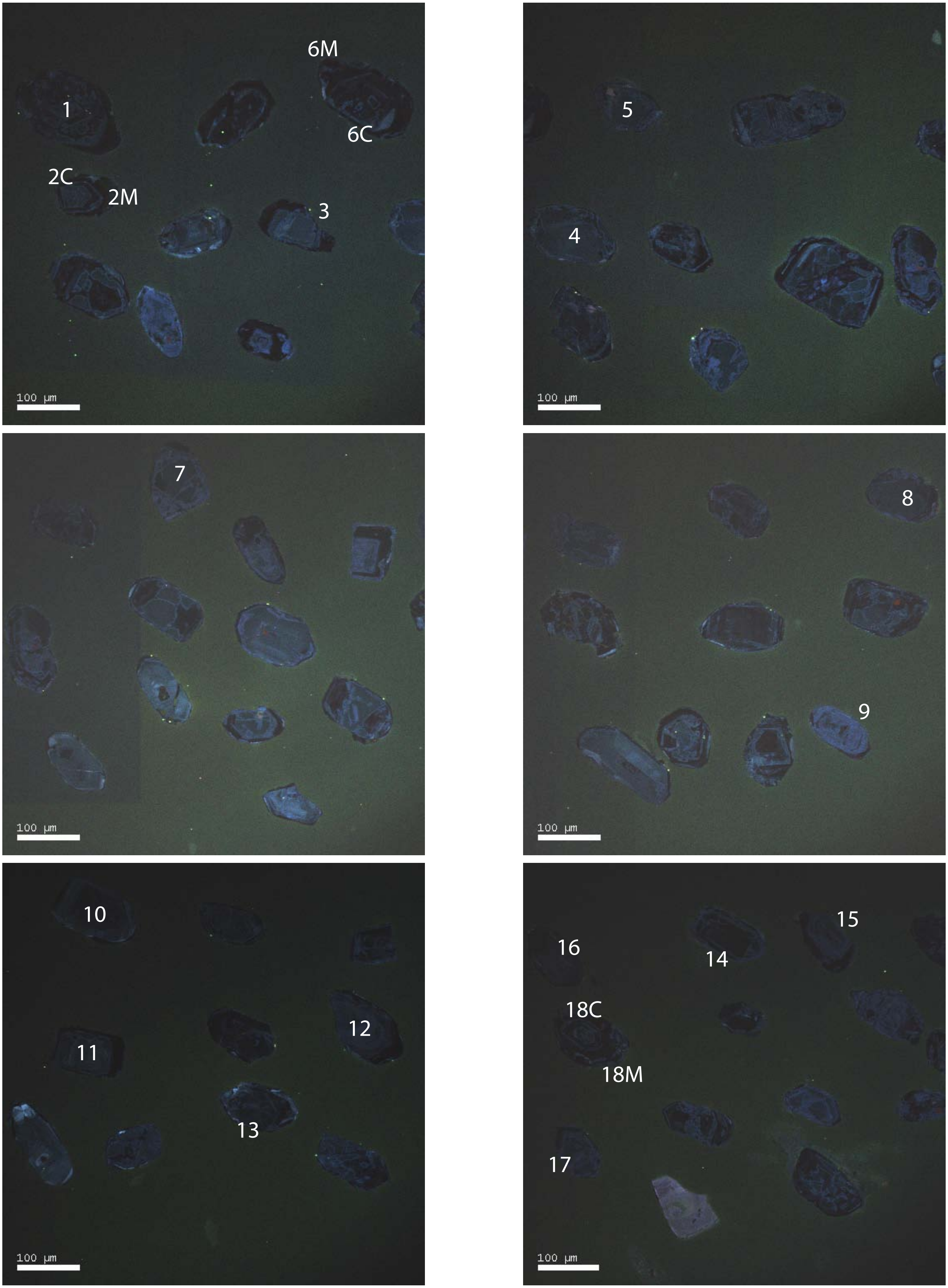

34
24
26
33
89
90
25
87
200 µm
88


94
95
92
96
91
93
200 µm

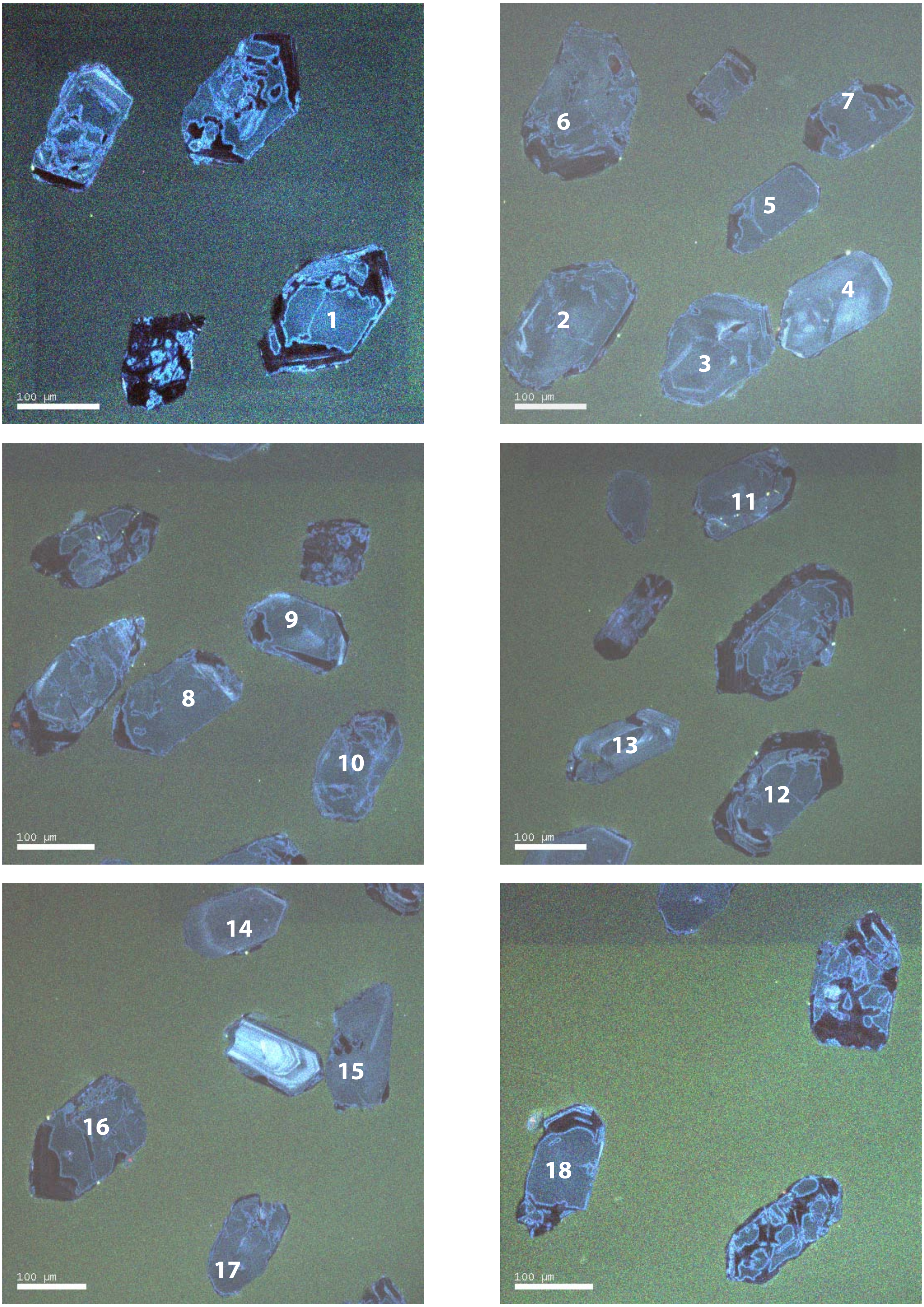

28
27
98
32
99
200 µm

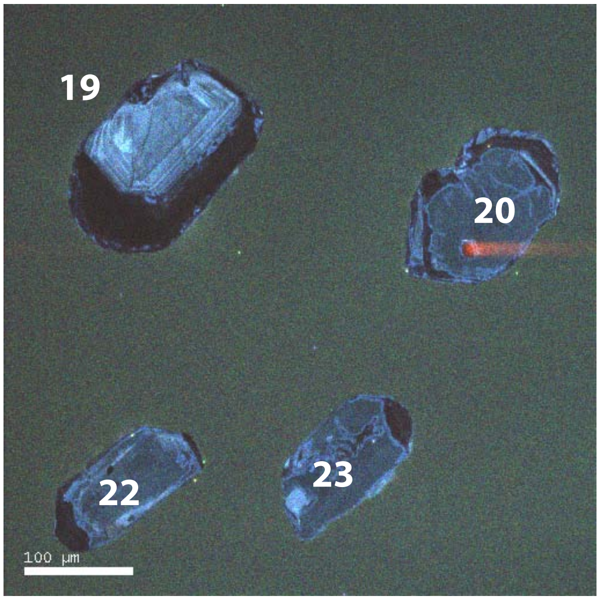

100
29
97
30
200 µm
31

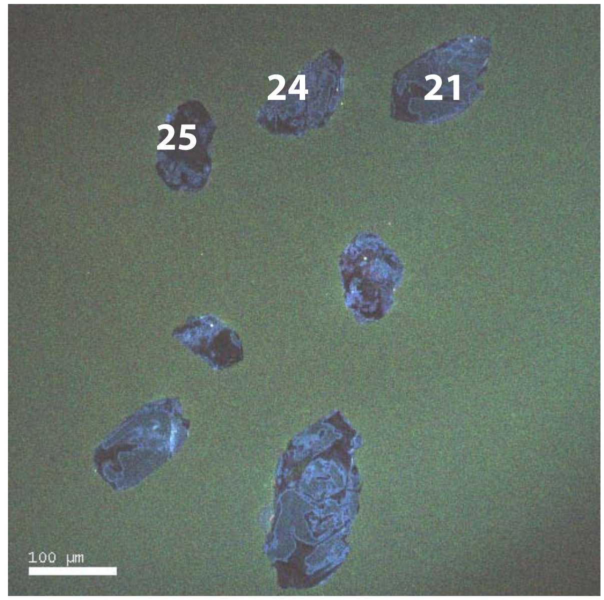
K12-81L - Grapevine Camp Pluton



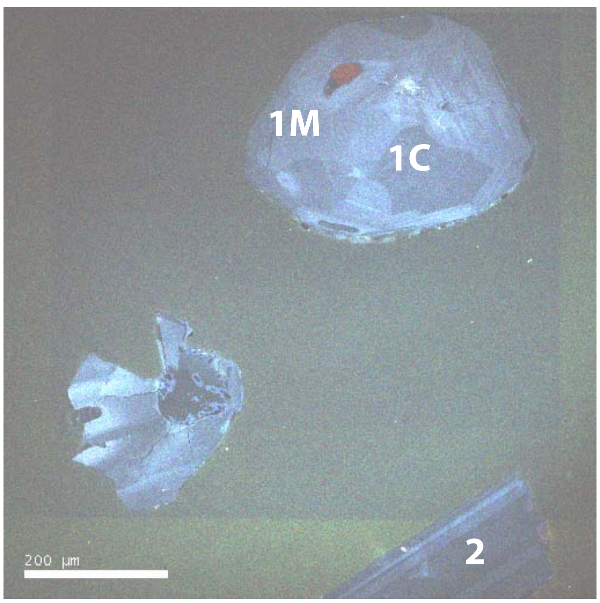
K12-85.3L - Zoroaster Pluton

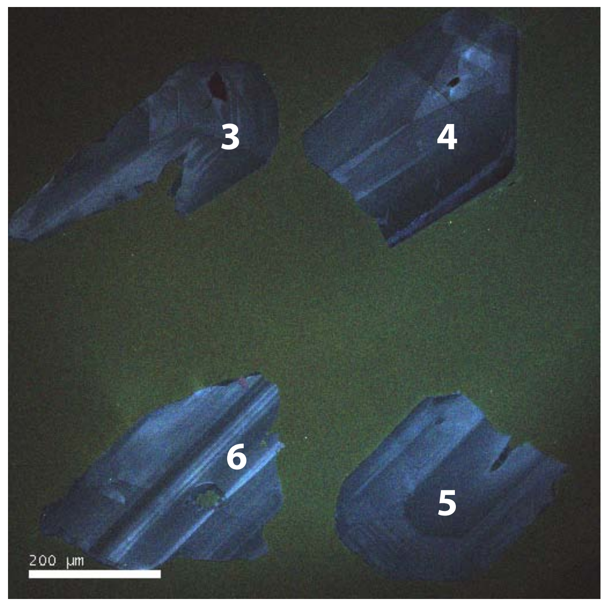


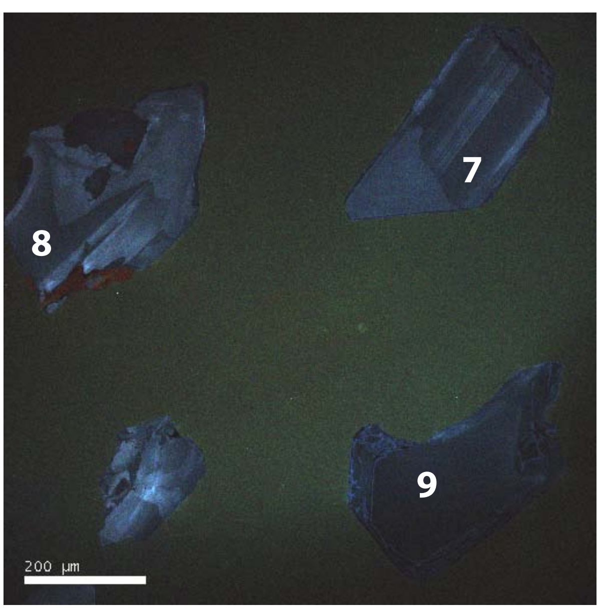


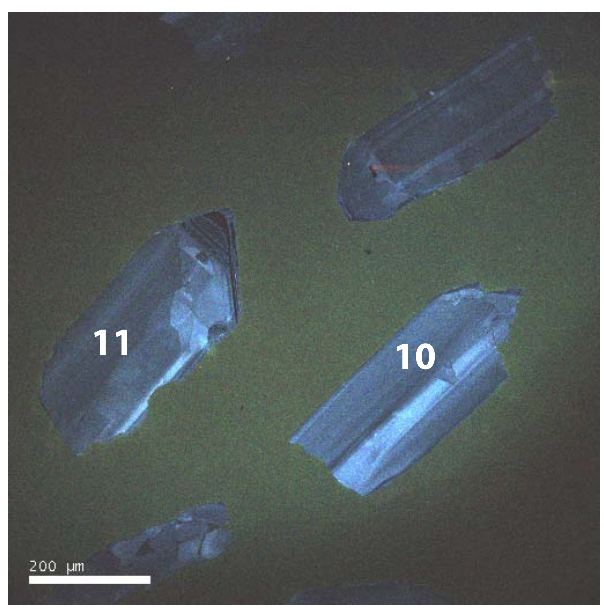


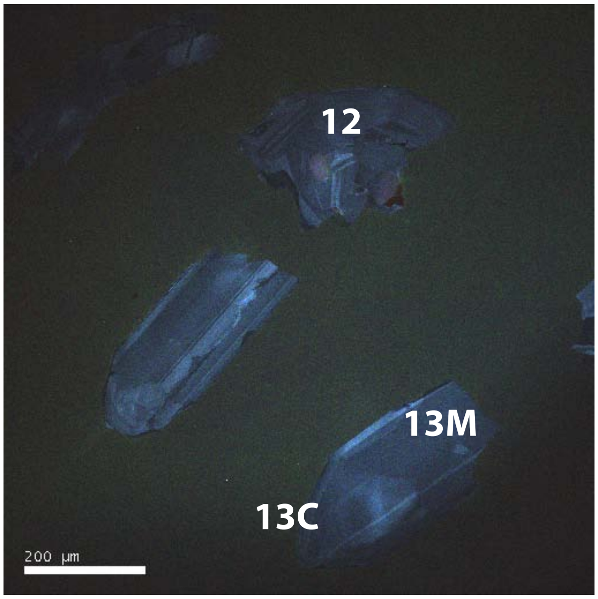
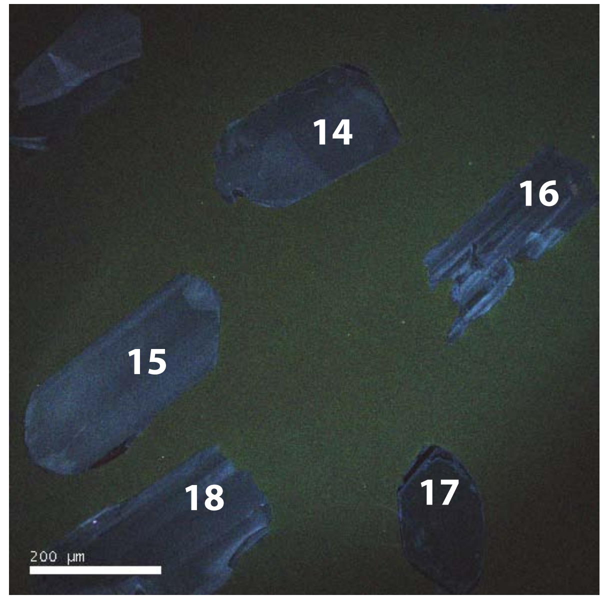
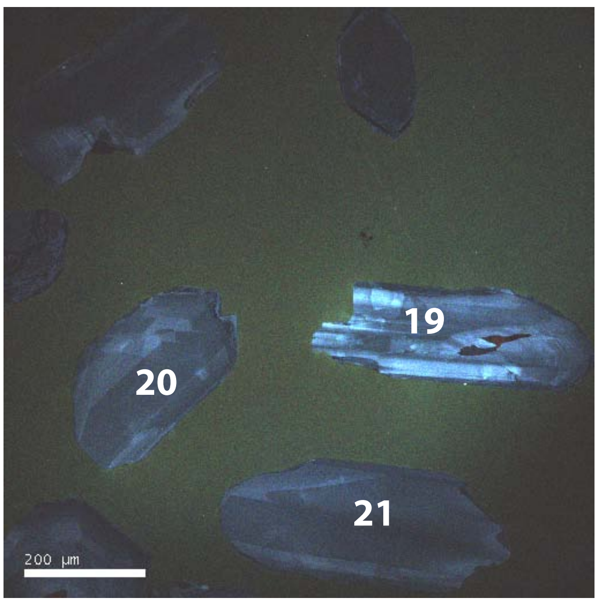
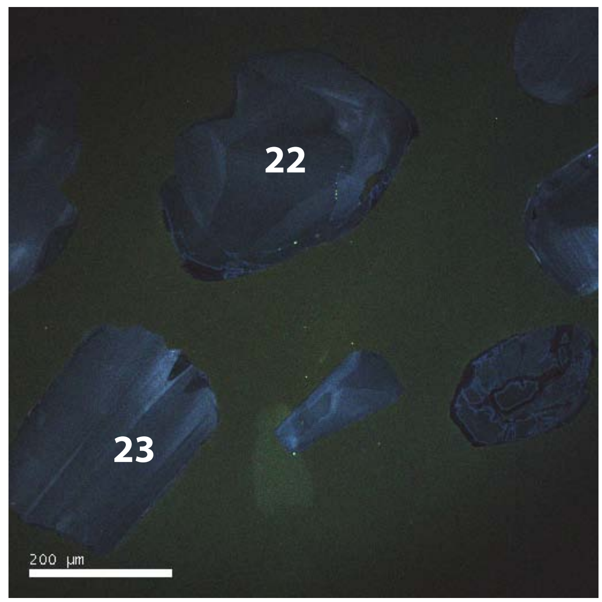
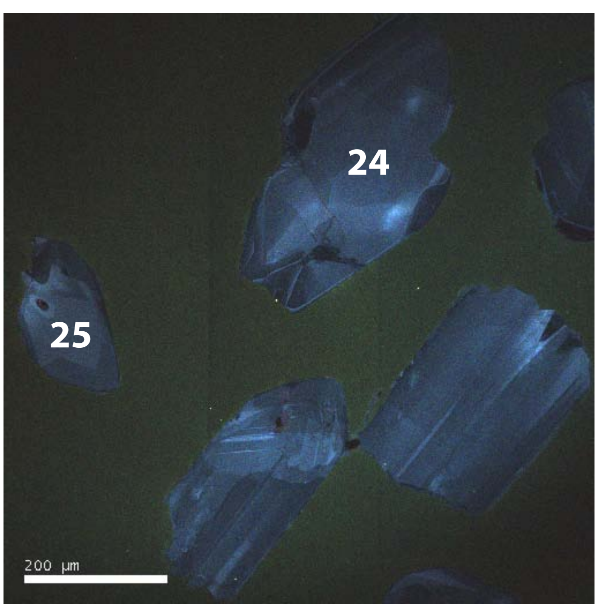
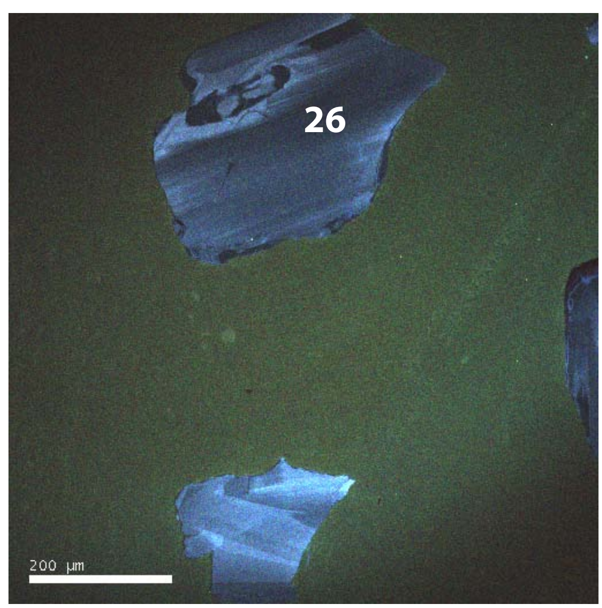
K12-90.5R - Horn Creek Pluton

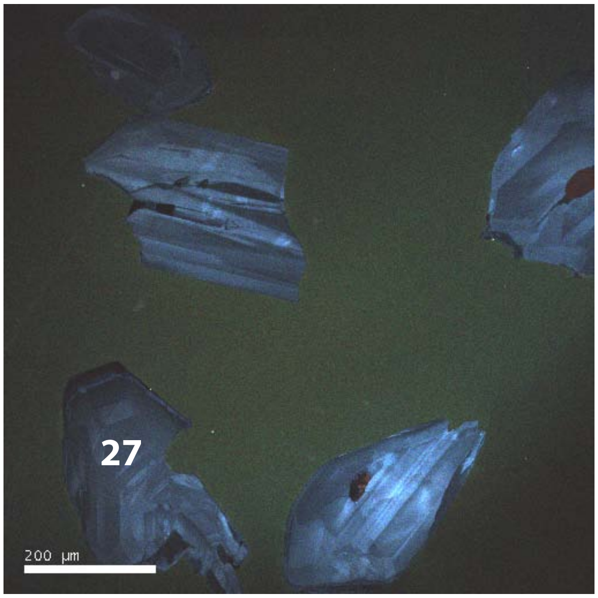


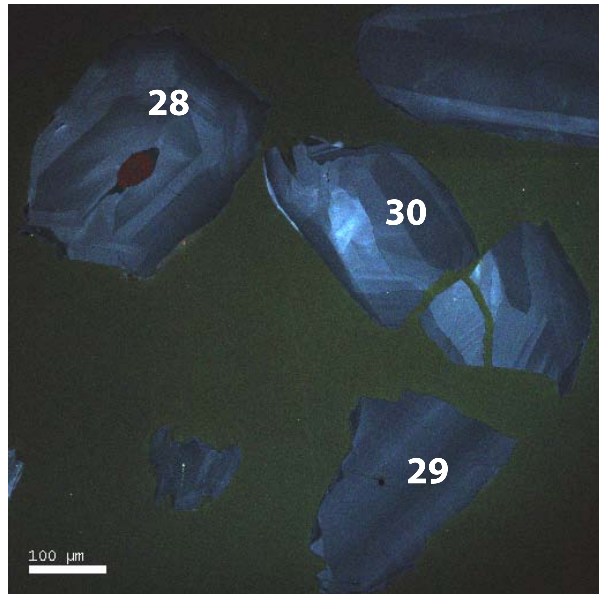




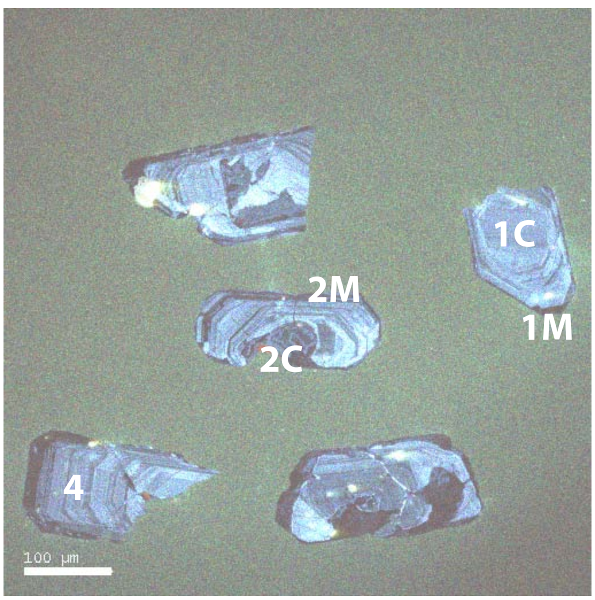


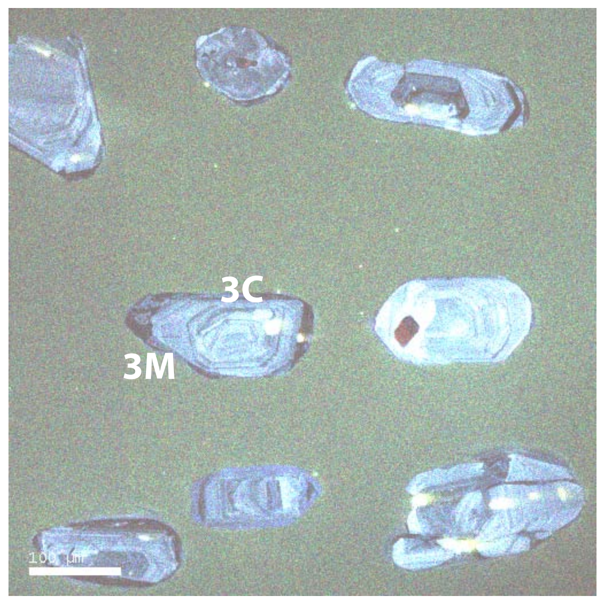

12
13M
13C
200 µm

14
16
15
18
17
200 µm

19
20
21
200 µm

22
23
200 µm

24
25
200 µm

26
200 µm

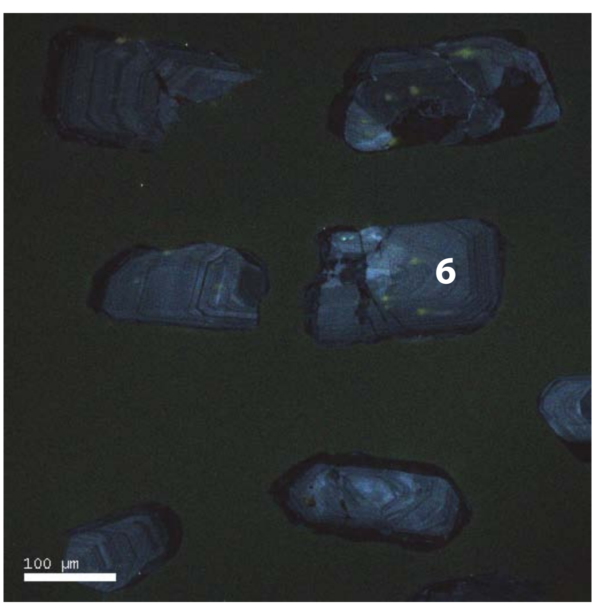


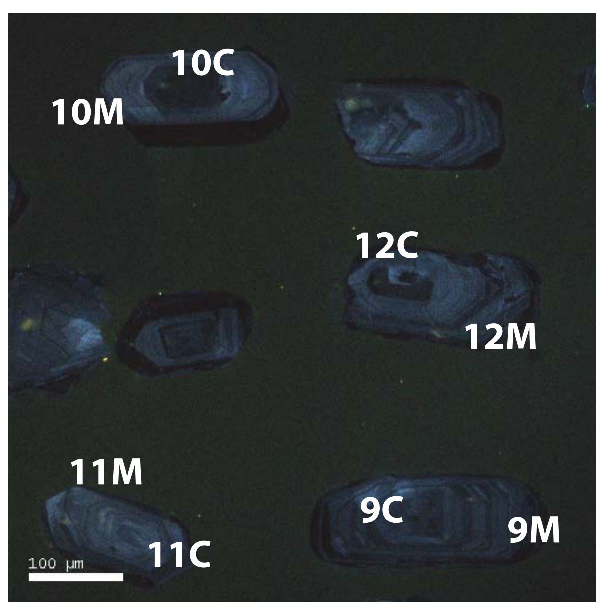


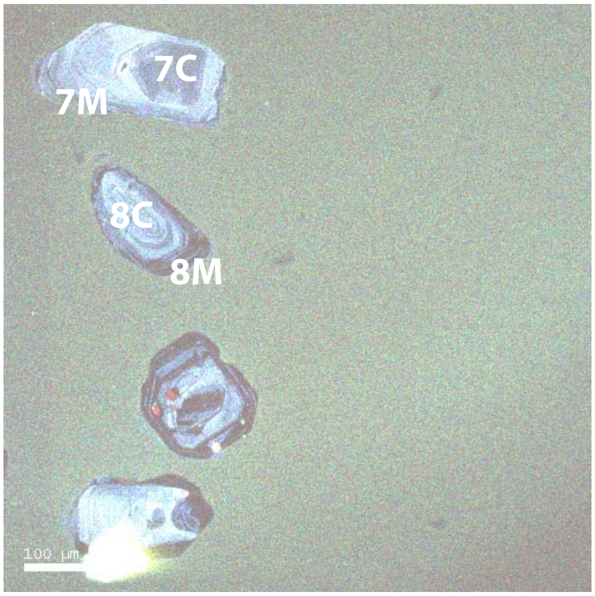
K12-91.5R - Trinity Pluton

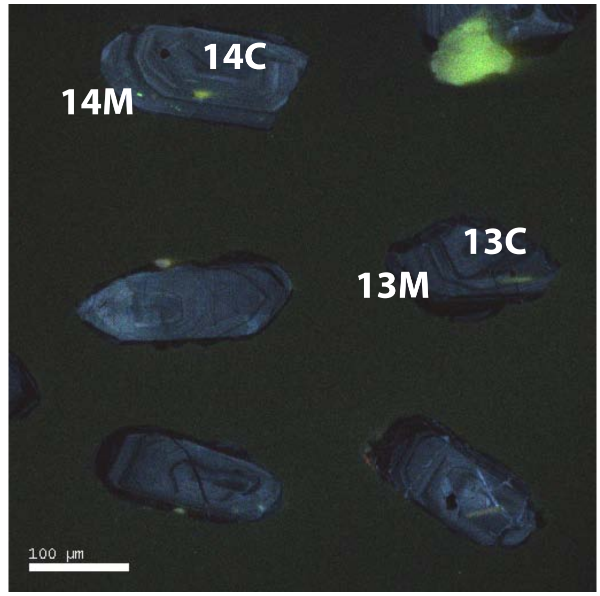


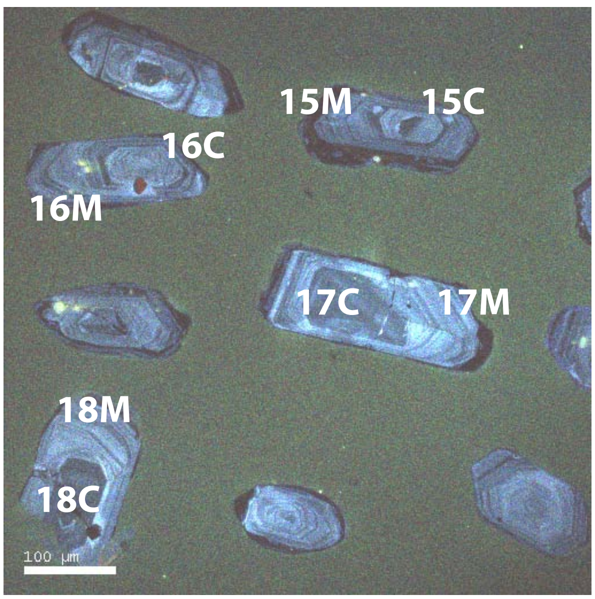


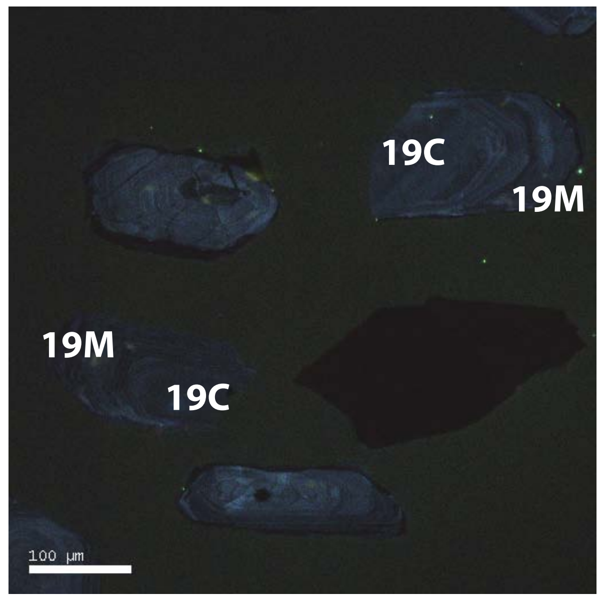




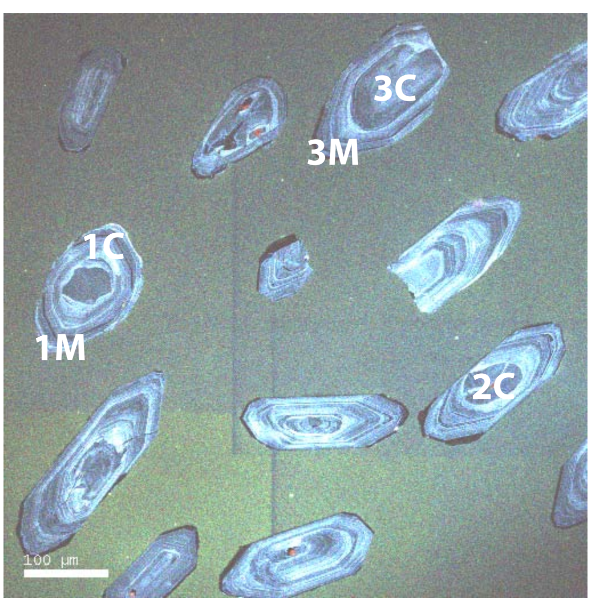


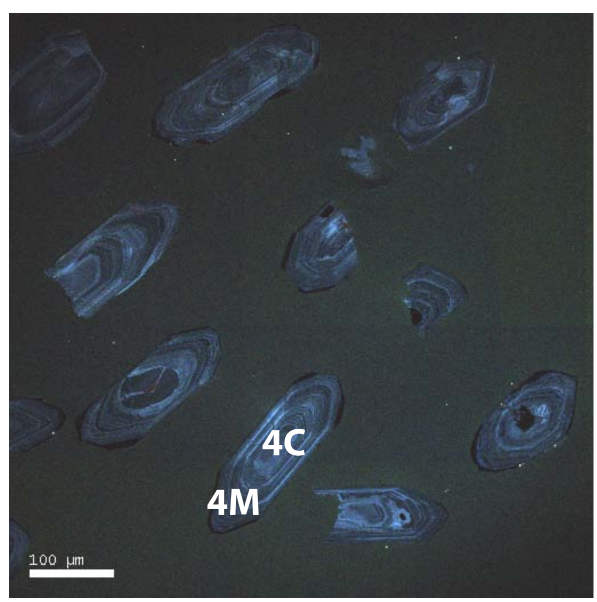


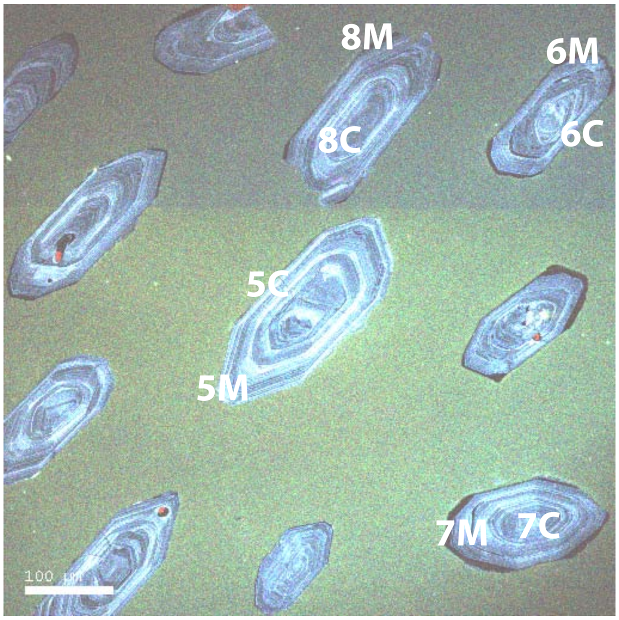


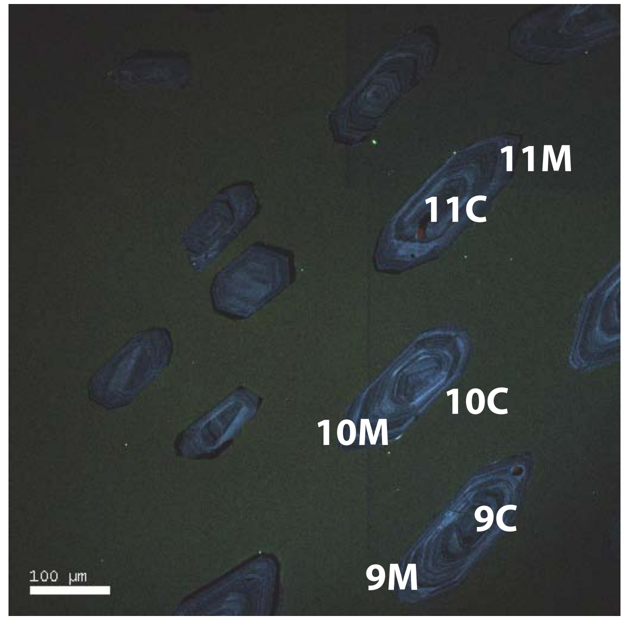


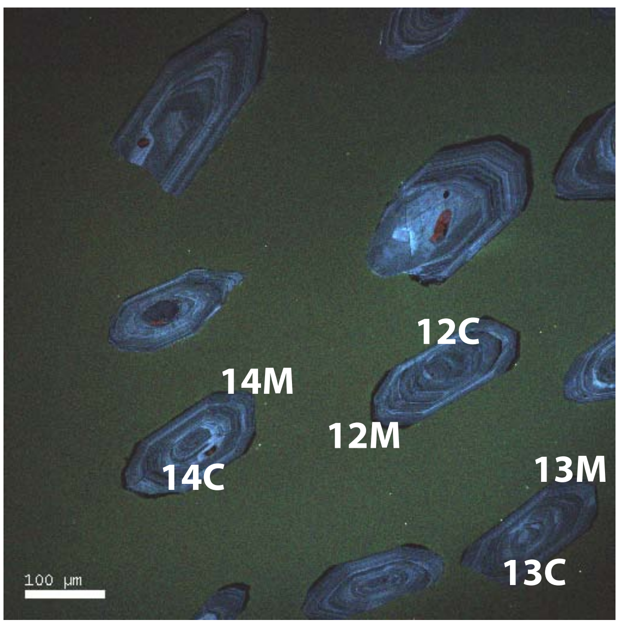
K12-96.2L - Boucher Pluton

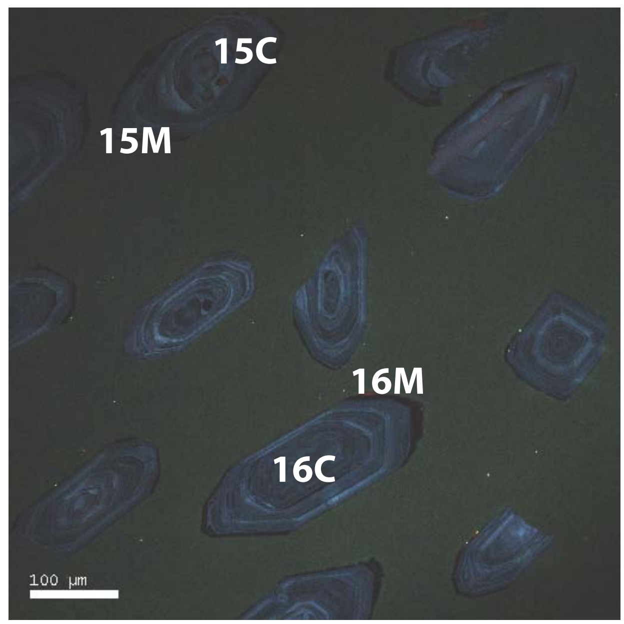


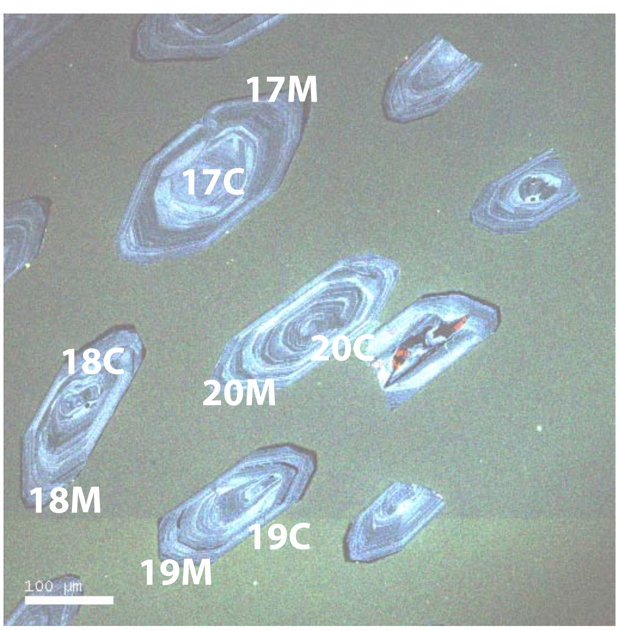


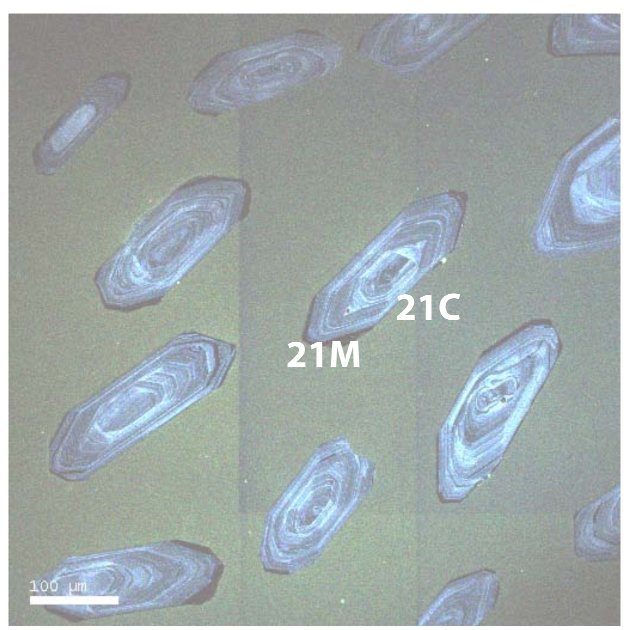

8M
6M
8C
6C
5C
5M
7M
7C
100 µm

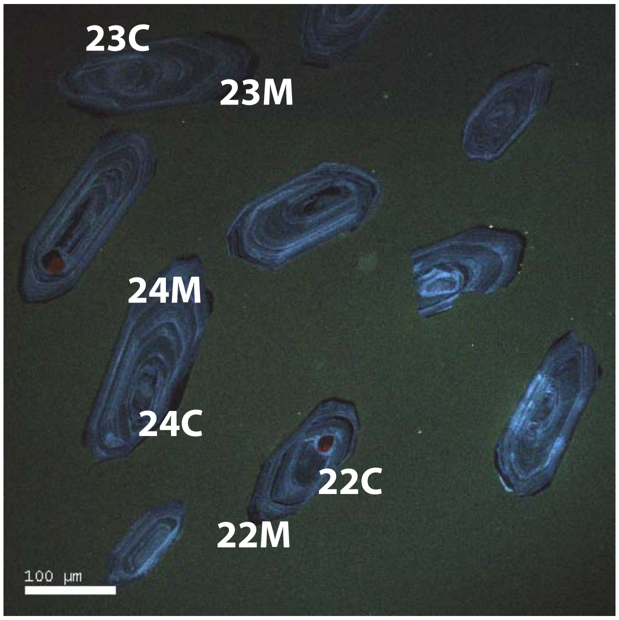

11M
11C
10C
10M
9C
9M
100 µm

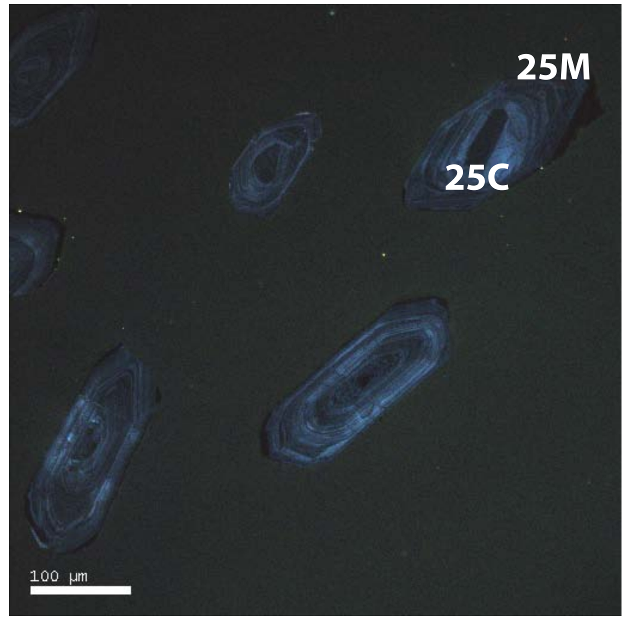

12C
14M
12M
14C
13M
13C
100 µm


15C
15M
16M
16C
100 µm


17M
17C
18C
20C
20M
18M
19C
19M
100 µm

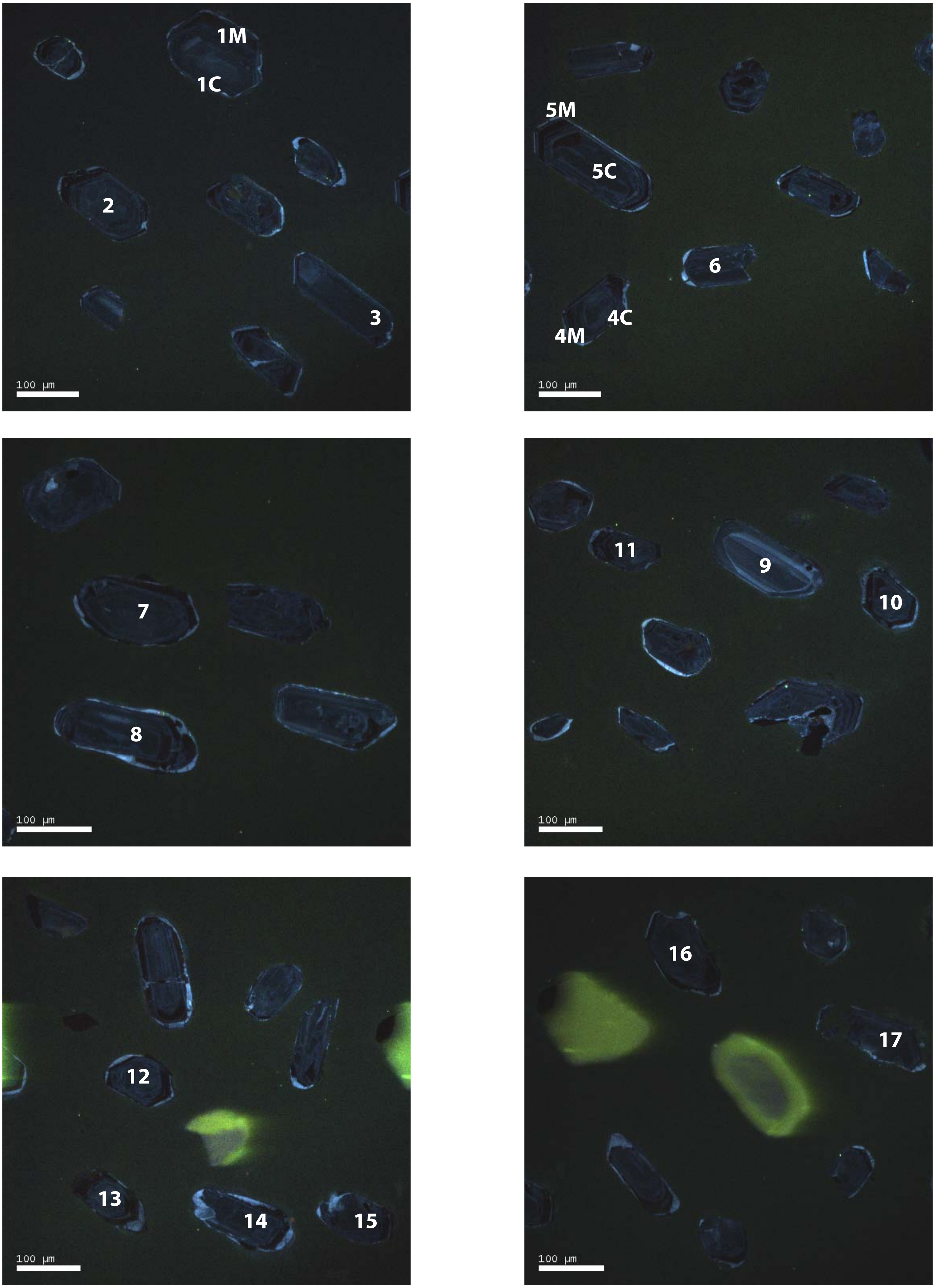

21C
21M
100 µm

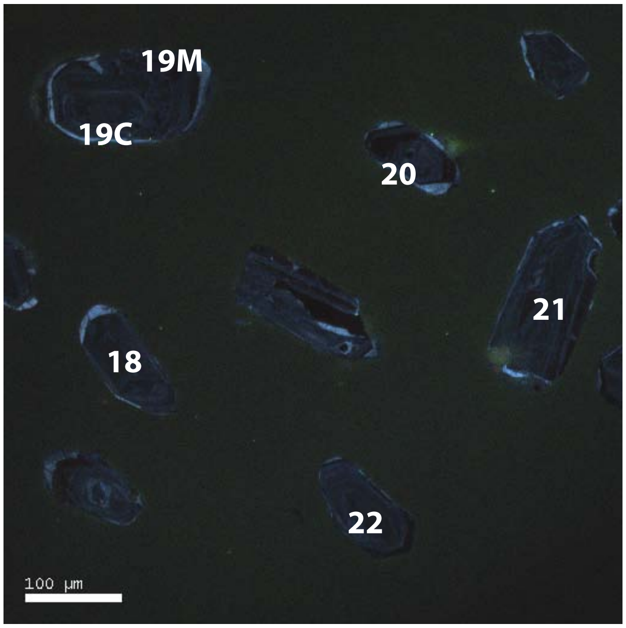




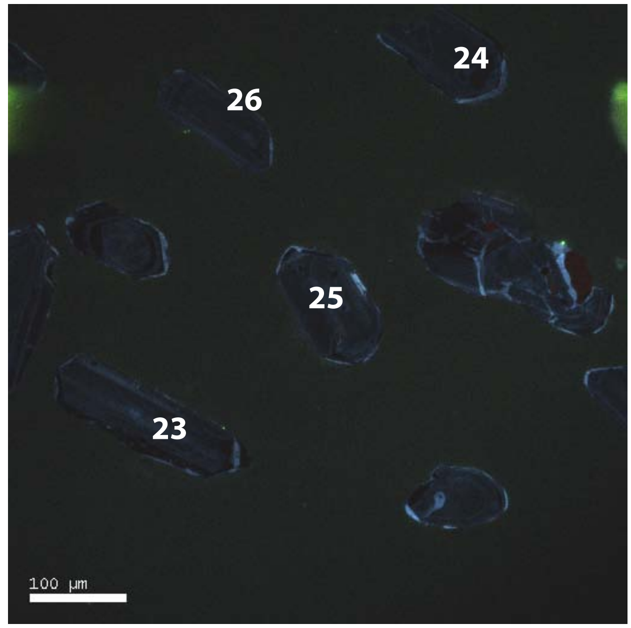
K14-98

K12-115L - Elves Chasm Gneiss

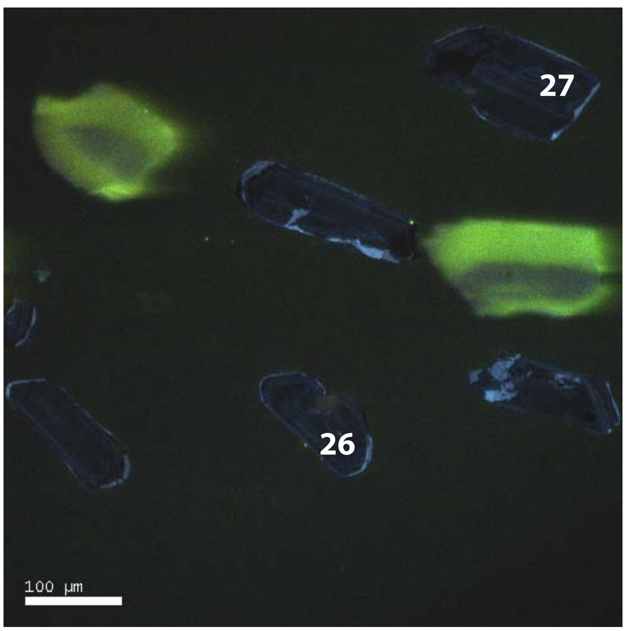




19M
19C
20
21
18
22
100 µm

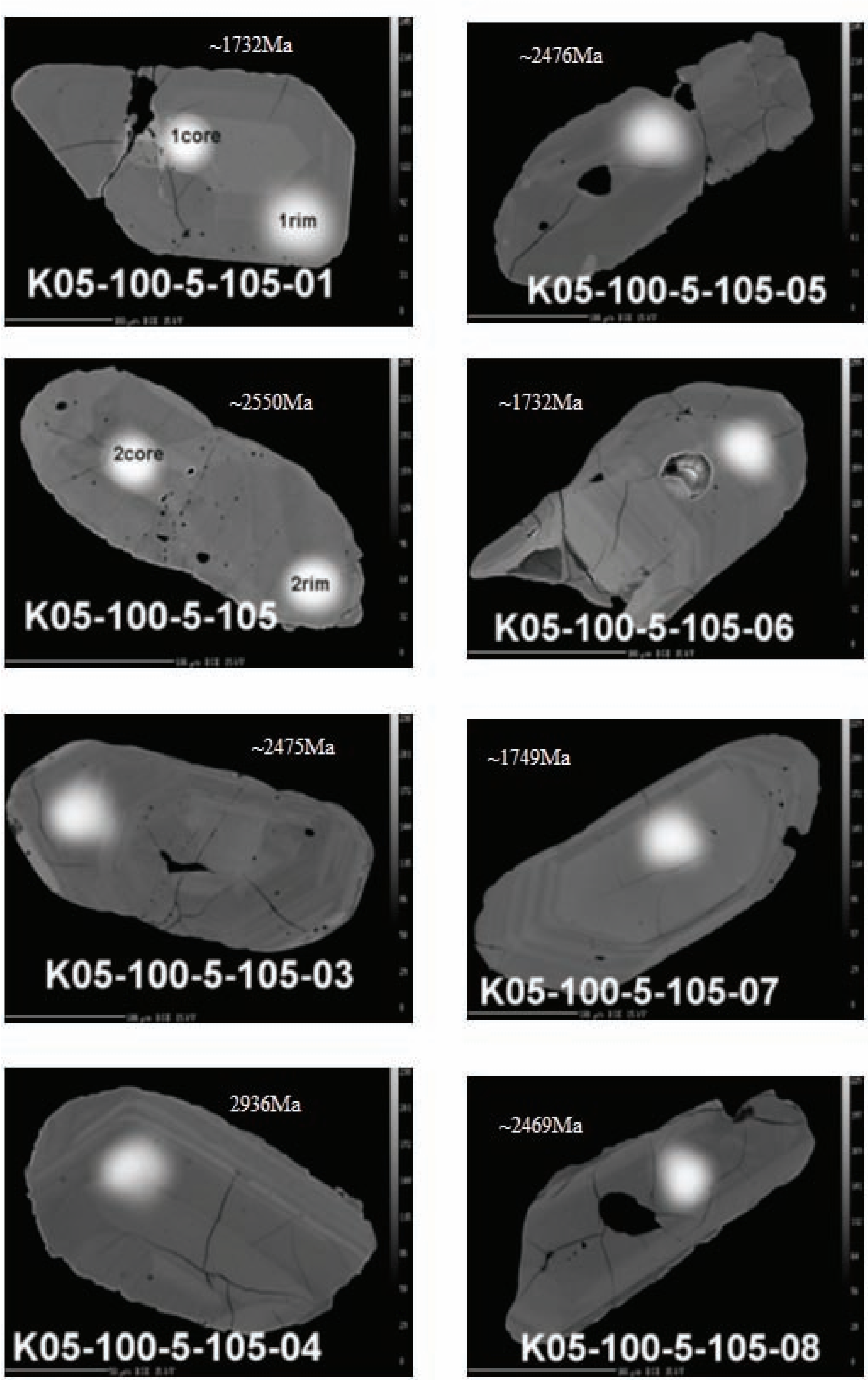


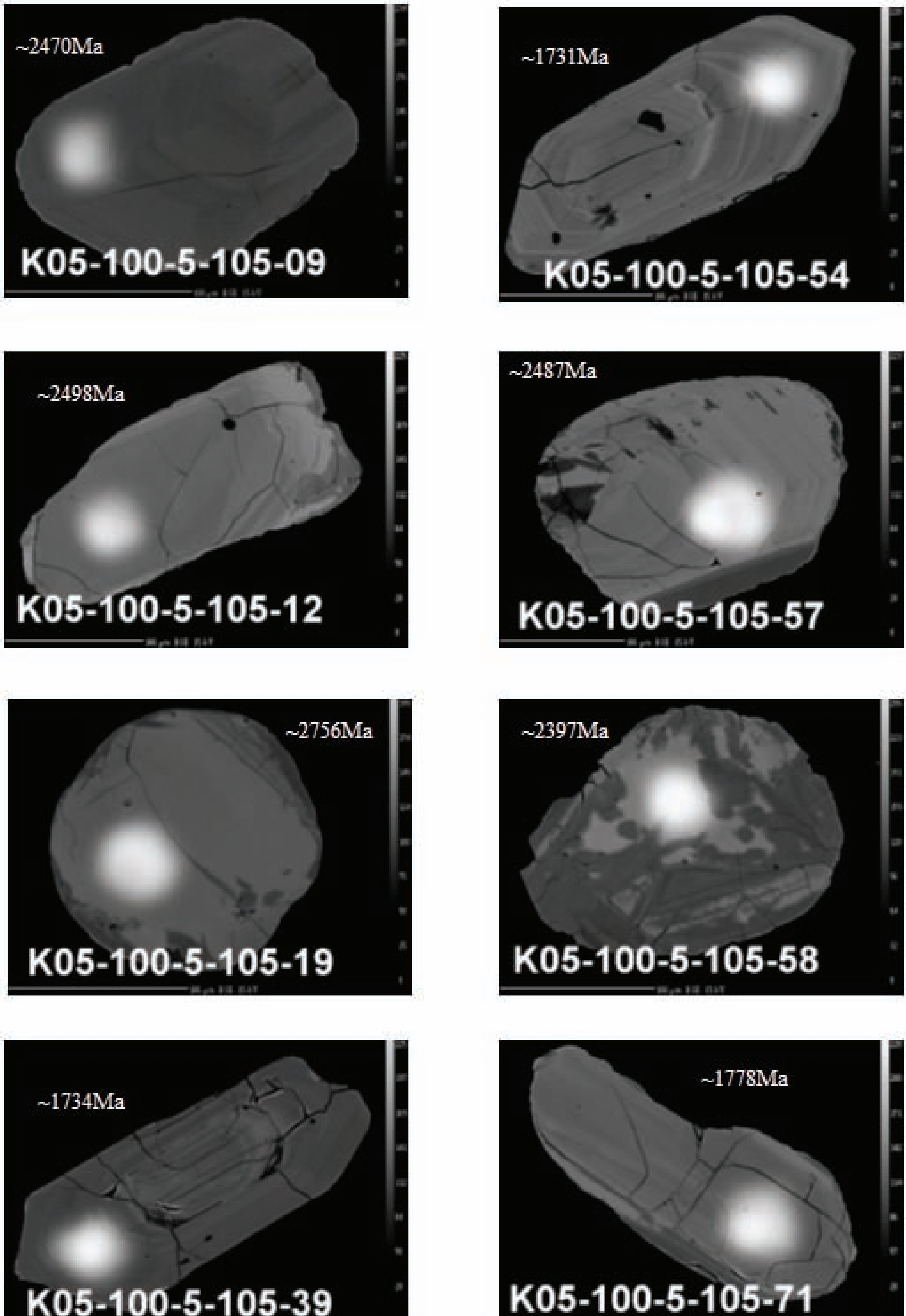
24
26
25
23
100 µm



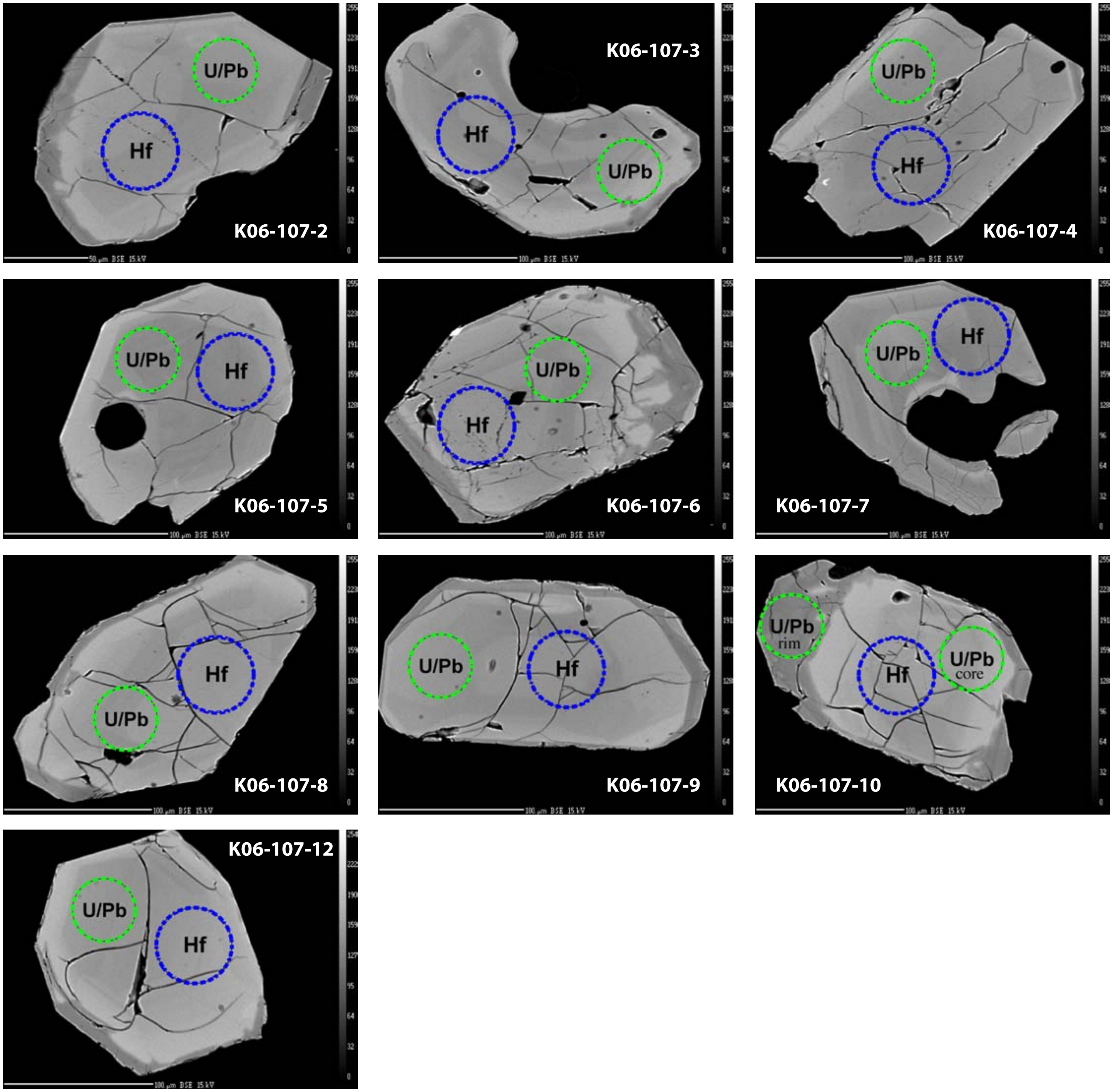
27
26
100 µm

Tuna Creek pluton (K05-100.5)

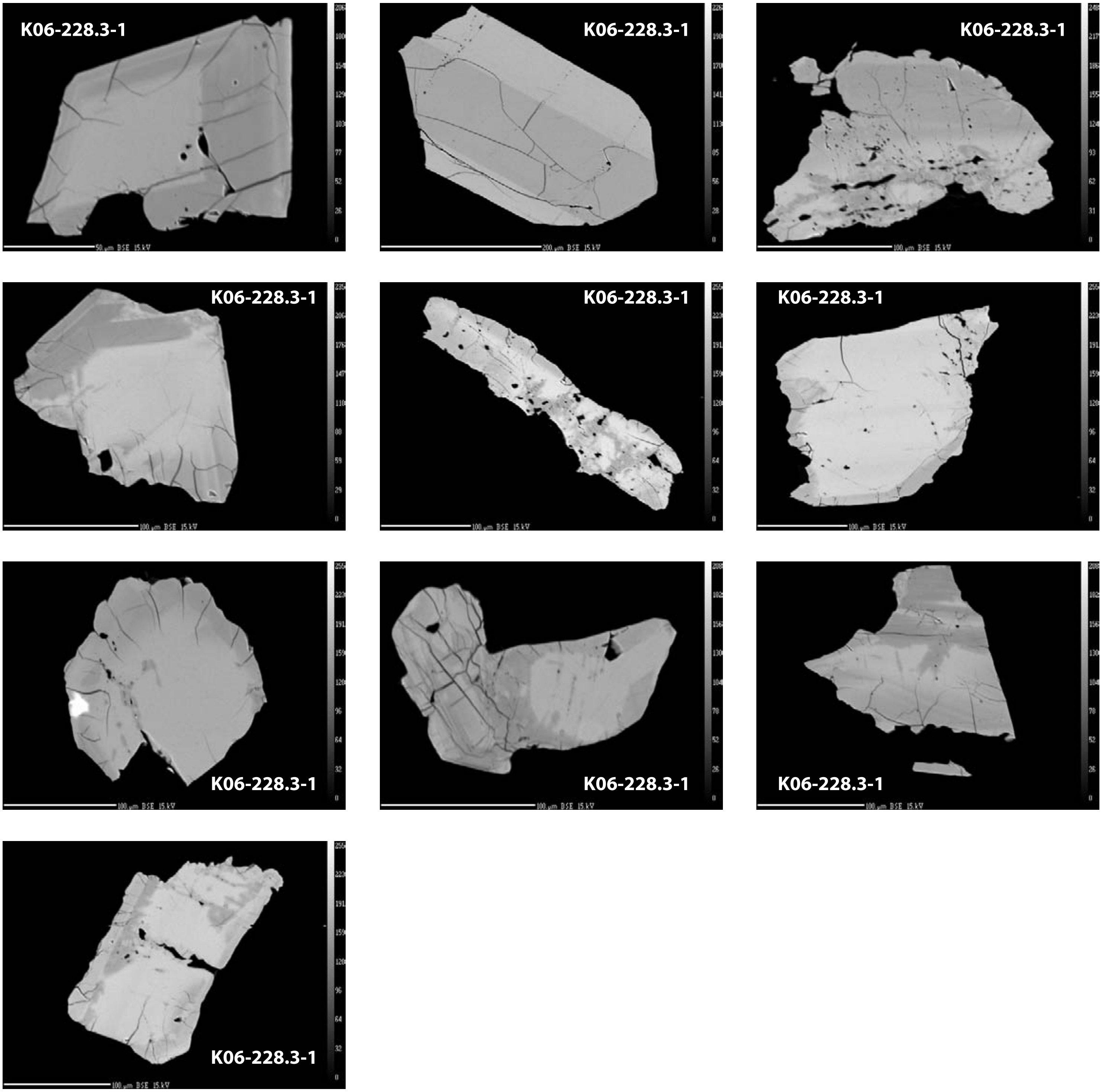



~2470Ma
K05-100-5-105-09
~1731Ma
K05-100-5-105-54
~2498Ma
K05-100-5-105-12
~2487Ma
K05-100-5-105-57
~2756Ma
K05-100-5-105-19
~2397Ma
K05-100-5-105-58
~1734Ma
K05-100-5-105-39
~1778Ma
K05-100-5-105-71

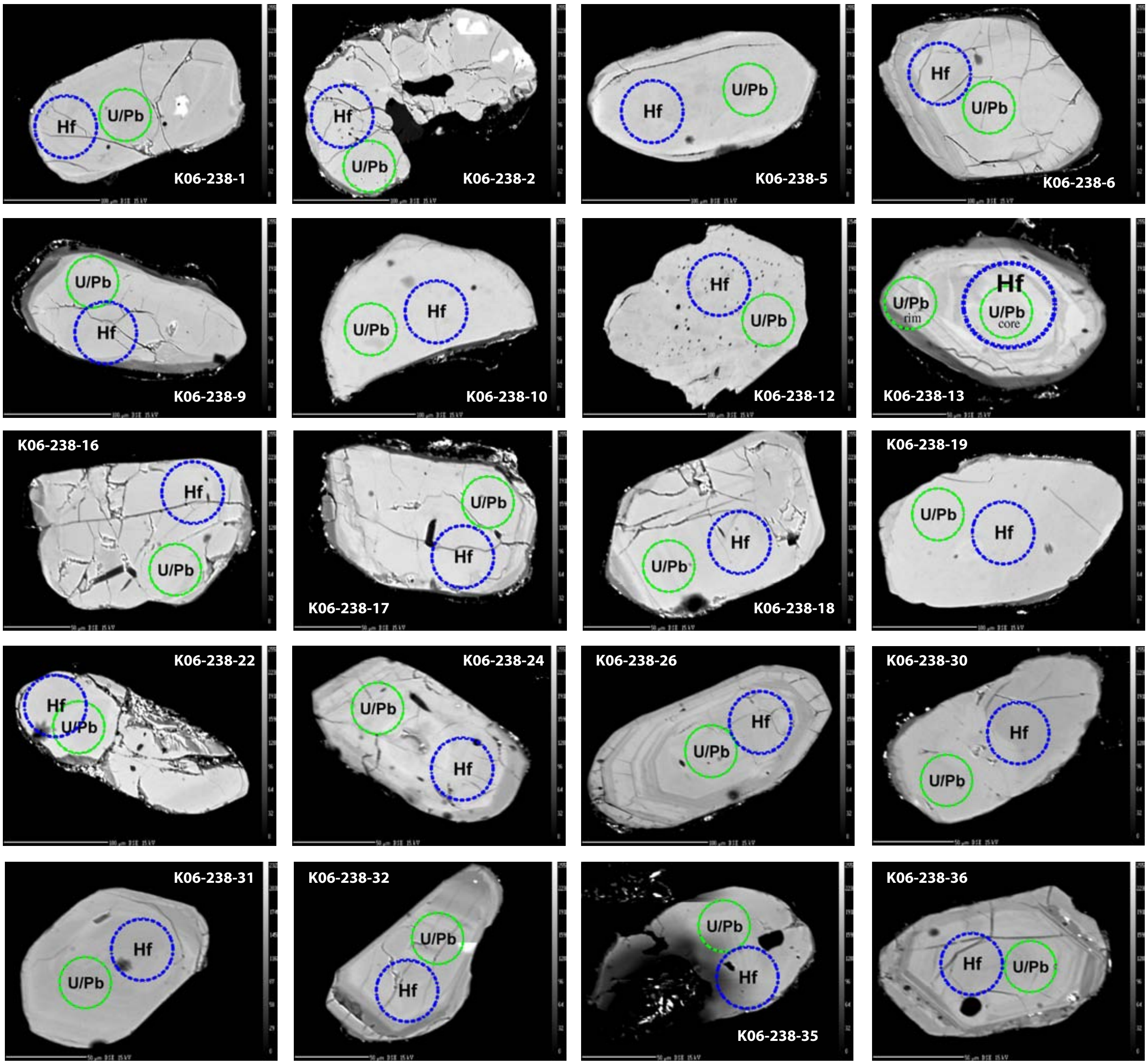
K06-107 - Ruby pluton



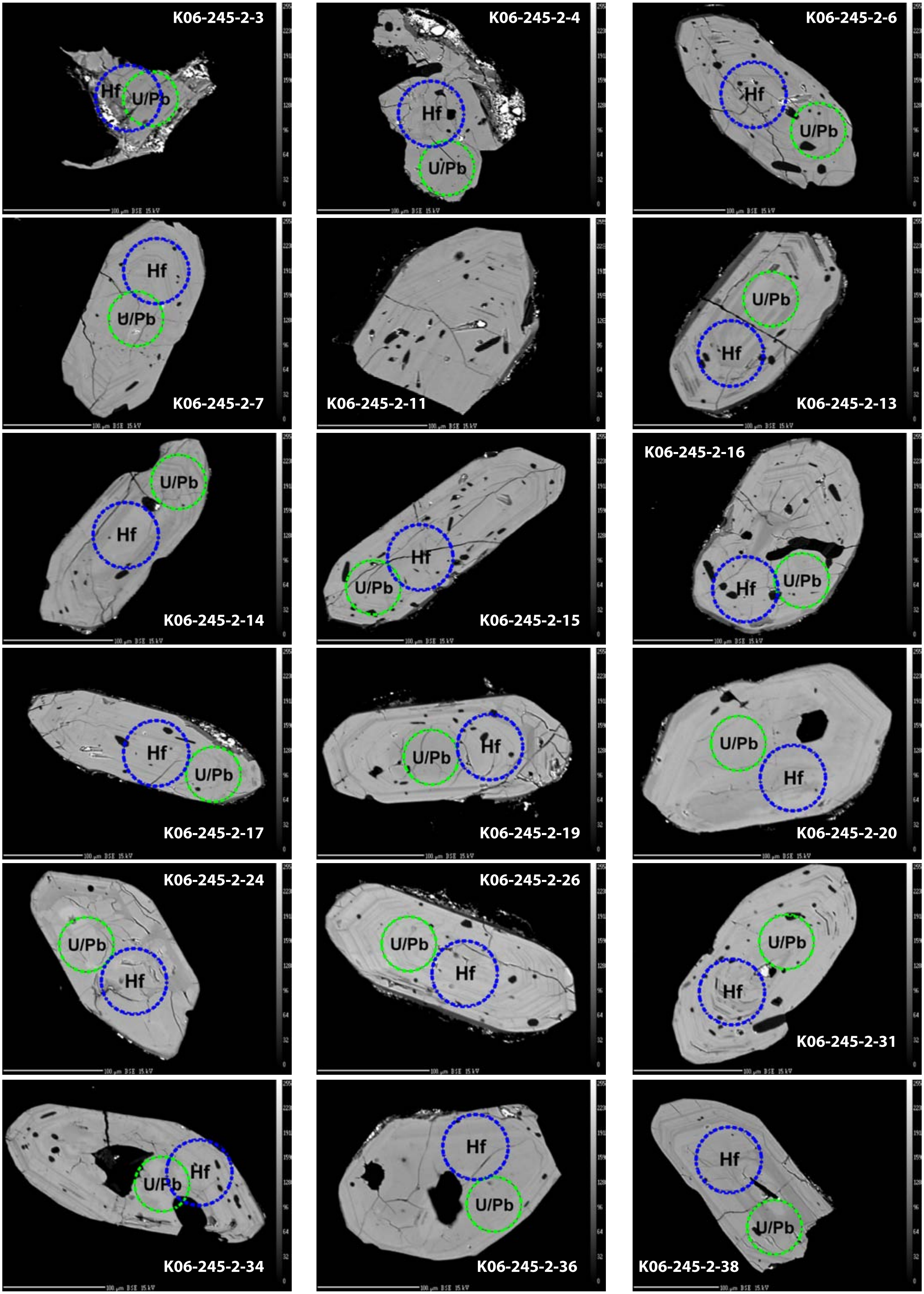
K06-228.3 - Diamond Creek pluton

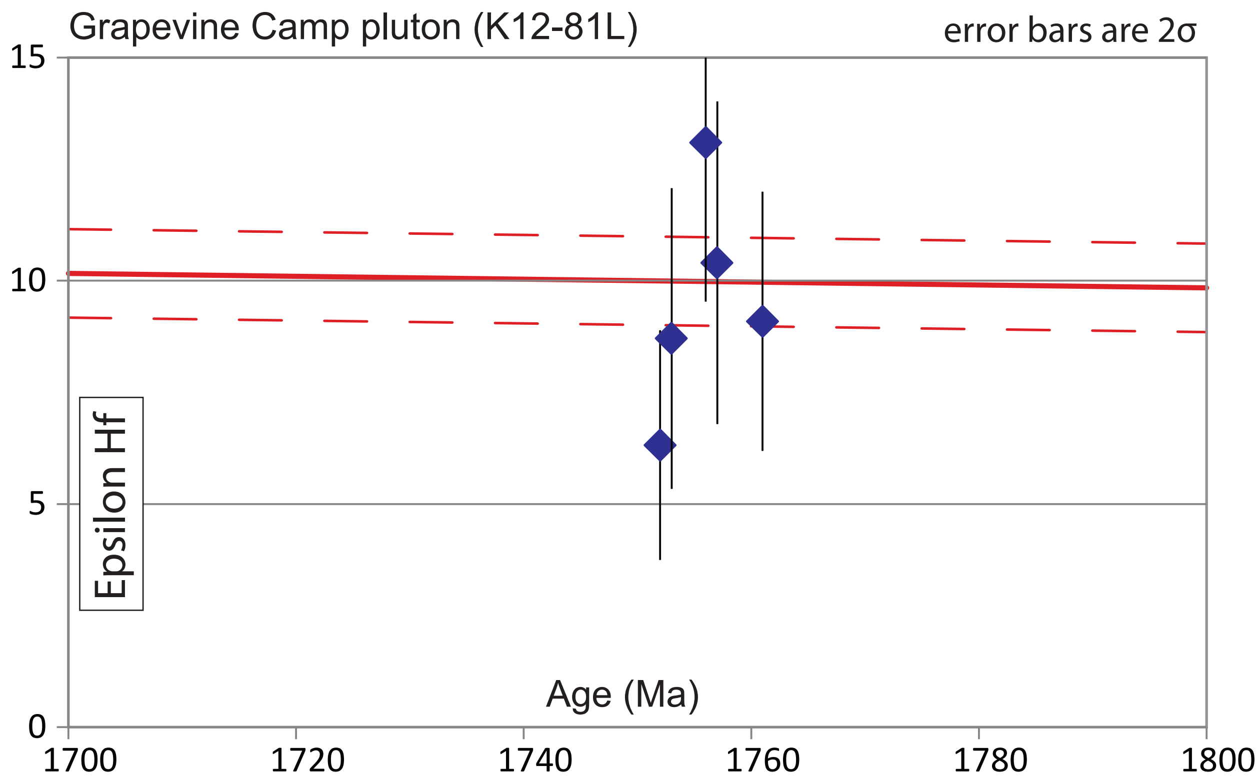


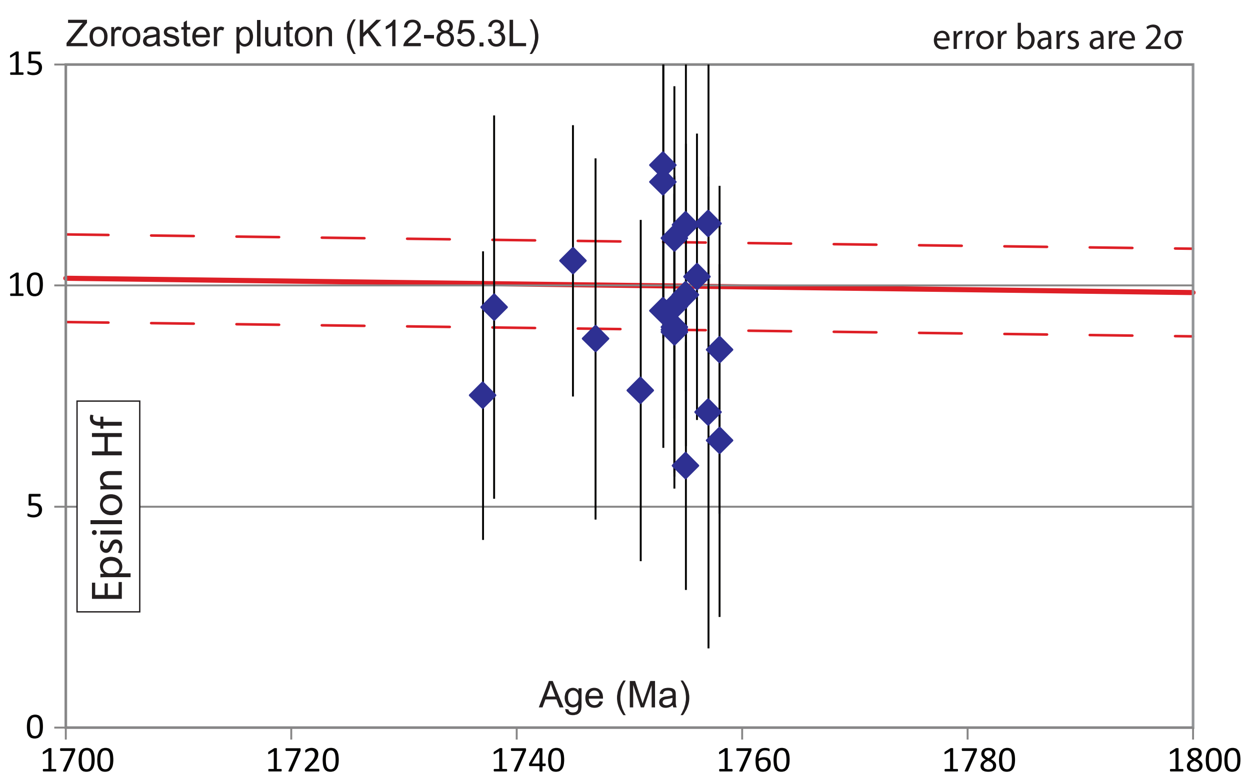
K06-238 - 238 Mile pluton from Gneiss Canyon shear zone

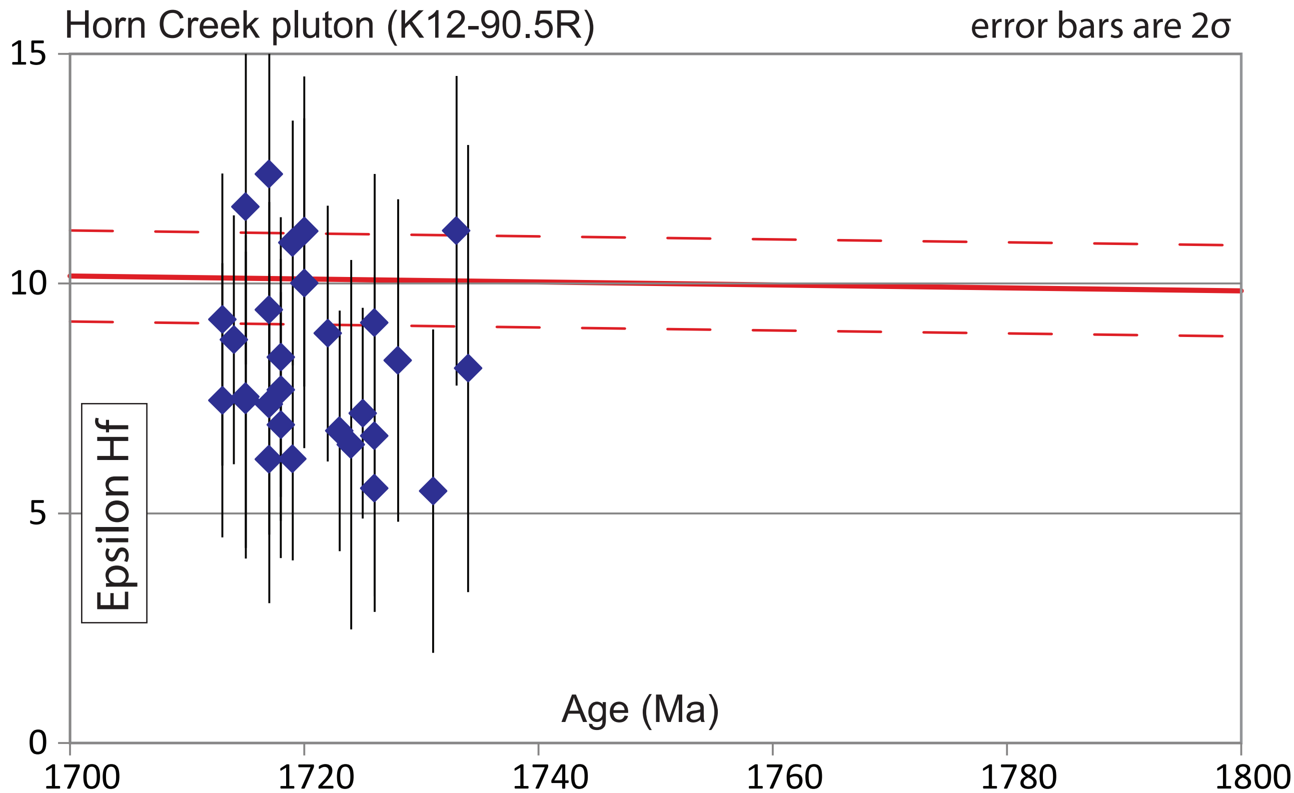


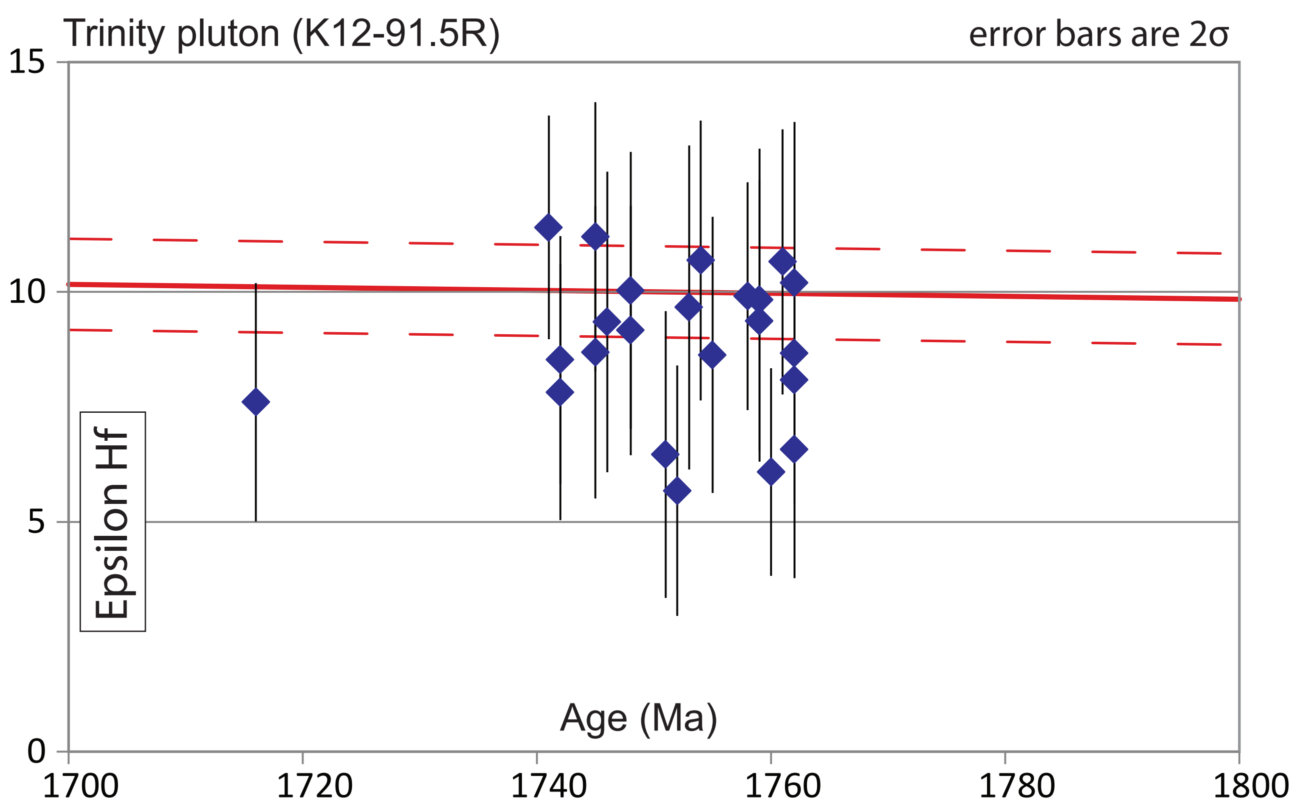
K06-245-2 - 245 Mile pluton

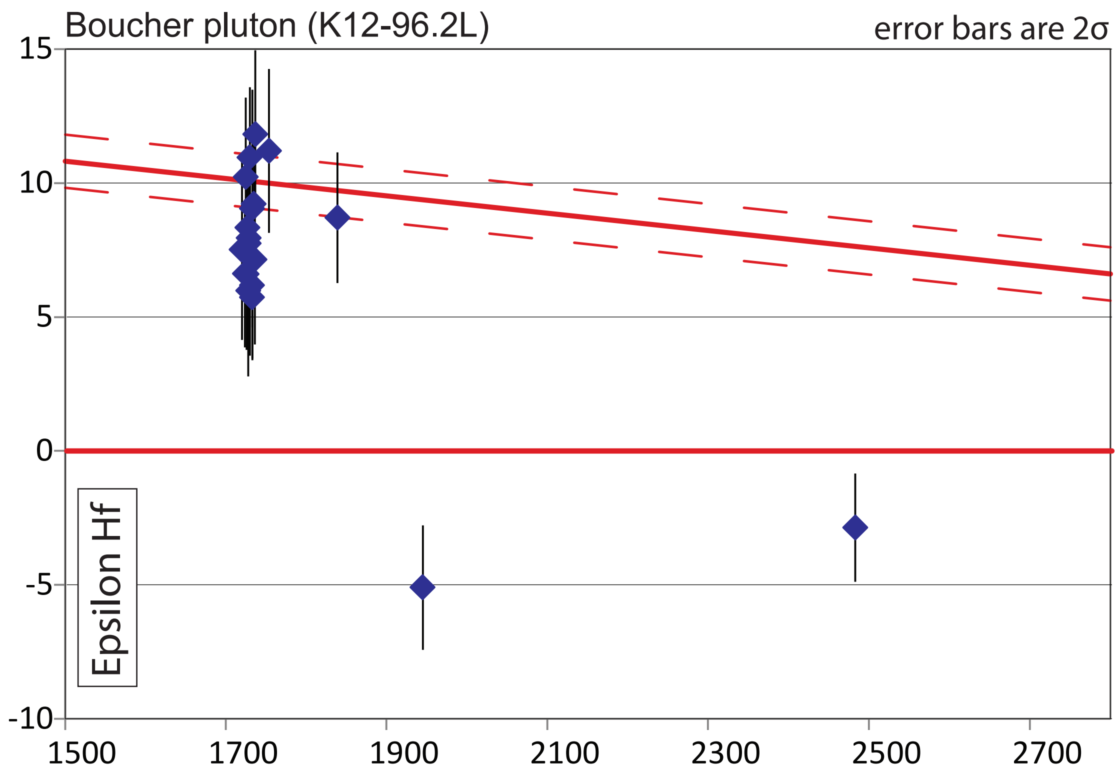


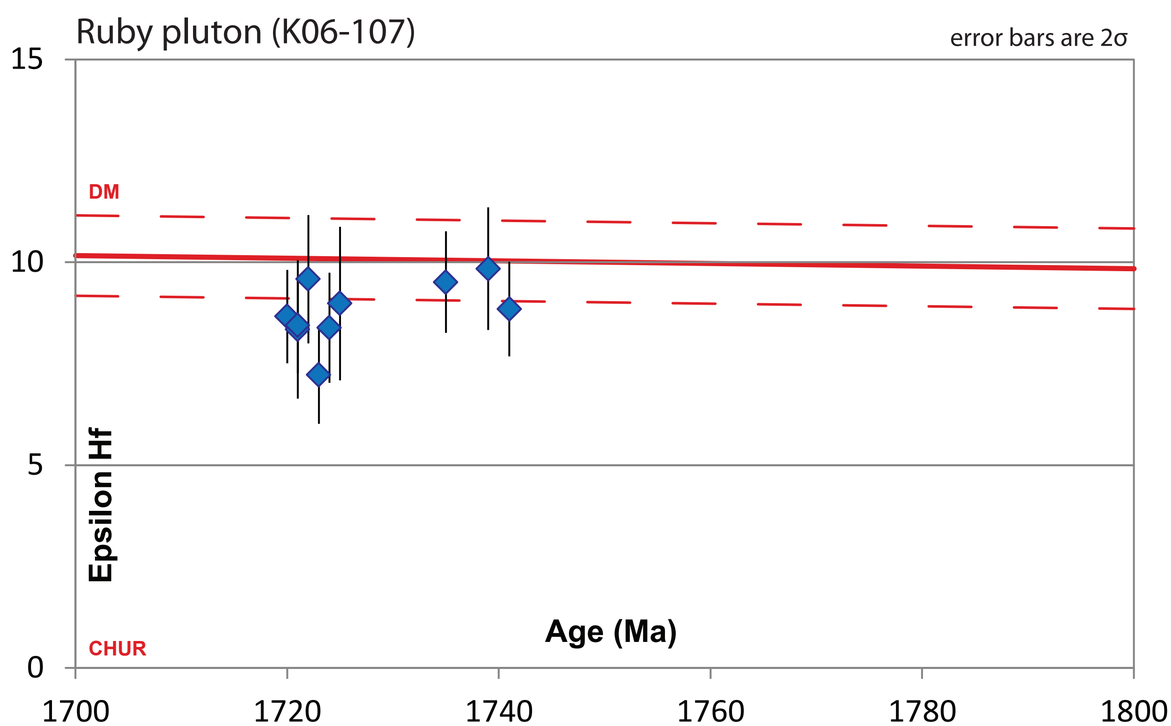

Grapevine Camp pluton (K12-81L)
error bars are 2σ
Epsilon Hf
Age (Ma)
0
5
10
15
1700
1720
1740
1760
1780
1800

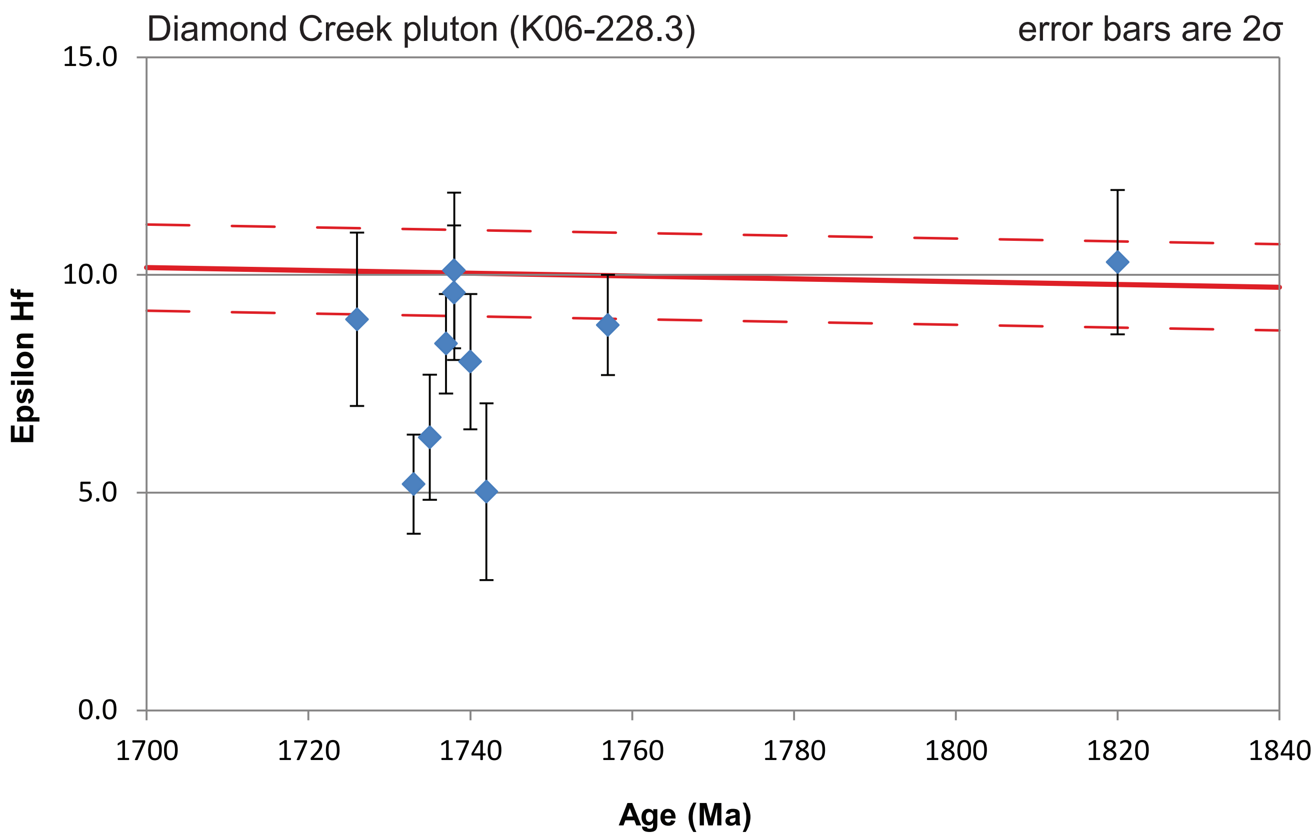

Zoroaster pluton (K12-85.3L)
error bars are 2σ
Epsilon Hf
Age (Ma)
0
5
10
15
1700
1720
1740
1760
1780
1800

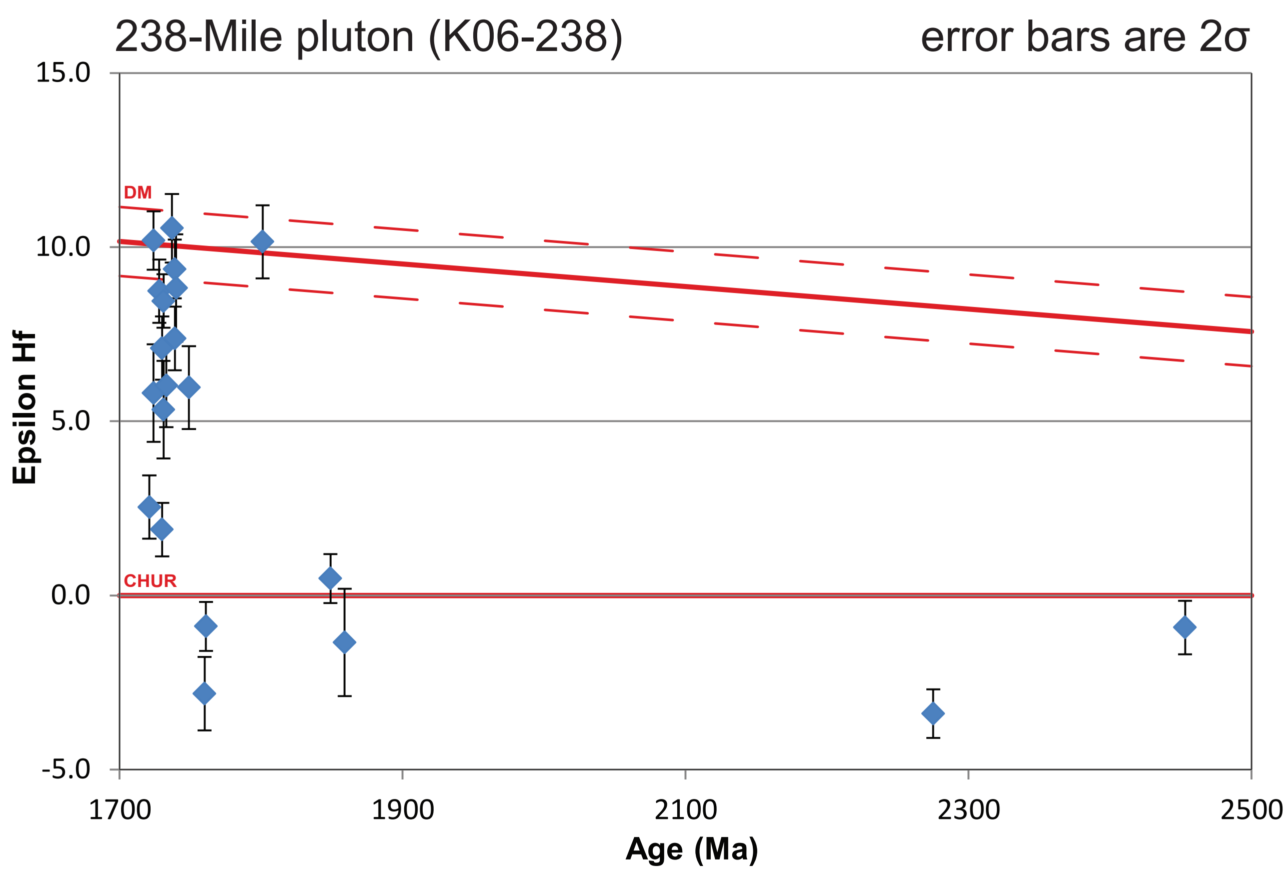

Horn Creek pluton (K12-90.5R)
error bars are 2σ
Epsilon Hf
Age (Ma)
15
10
5
0
1700
1720
1740
1760
1780
1800

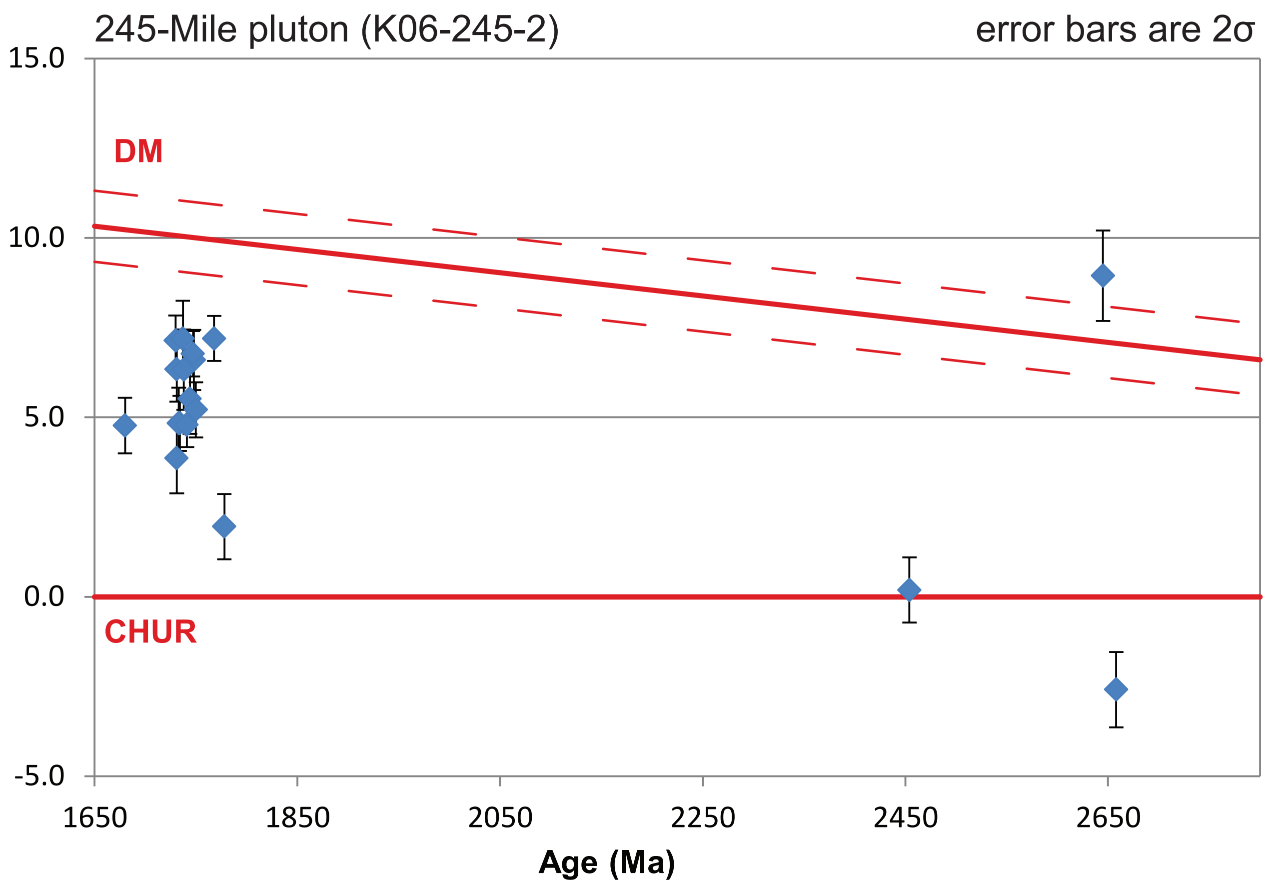

Trinity pluton (K12-91.5R)
error bars are 2σ
Epsilon Hf
Age (Ma)
15
10
5
0
1700
1720
1740
1760
1780
1800

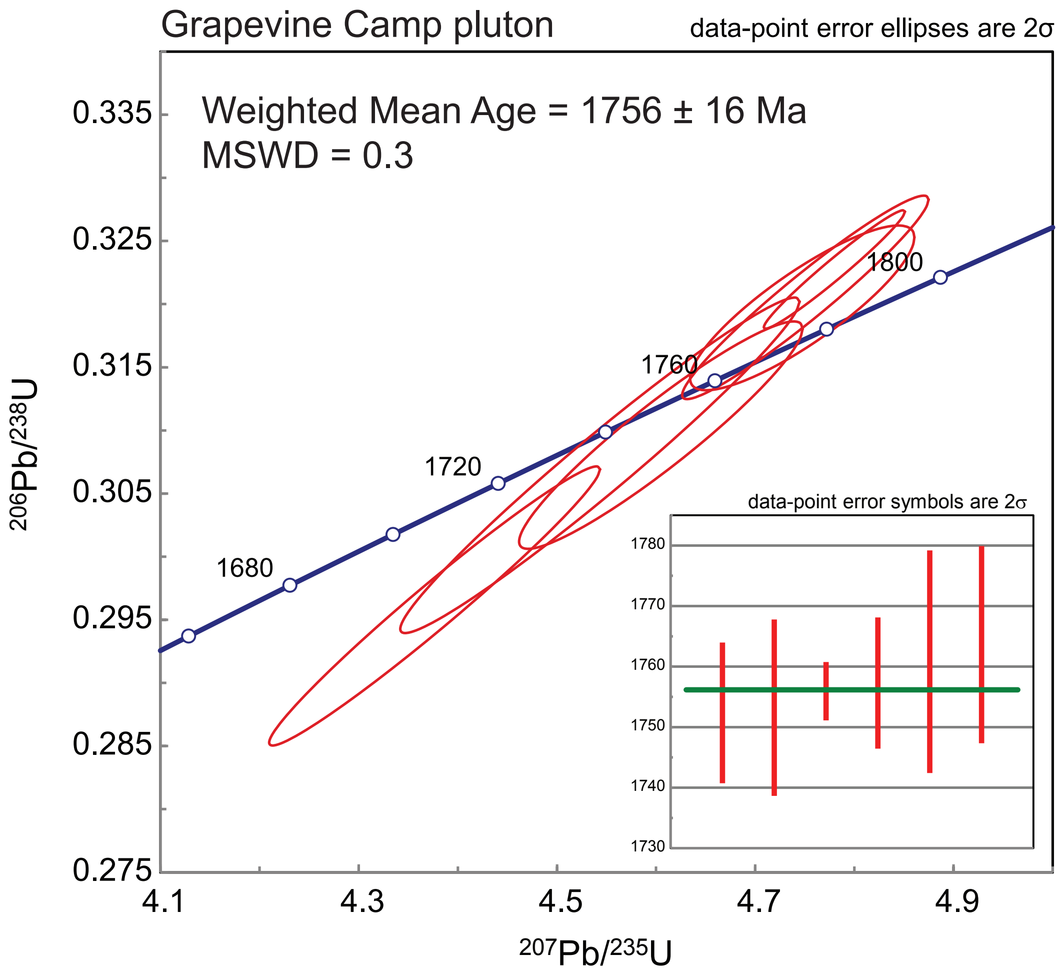

Boucher pluton (K12-96.2L)
error bars are 2σ
Epsilon Hf
15
10
5
0
-5
-10
1500
1700
1900
2100
2300
2500
2700

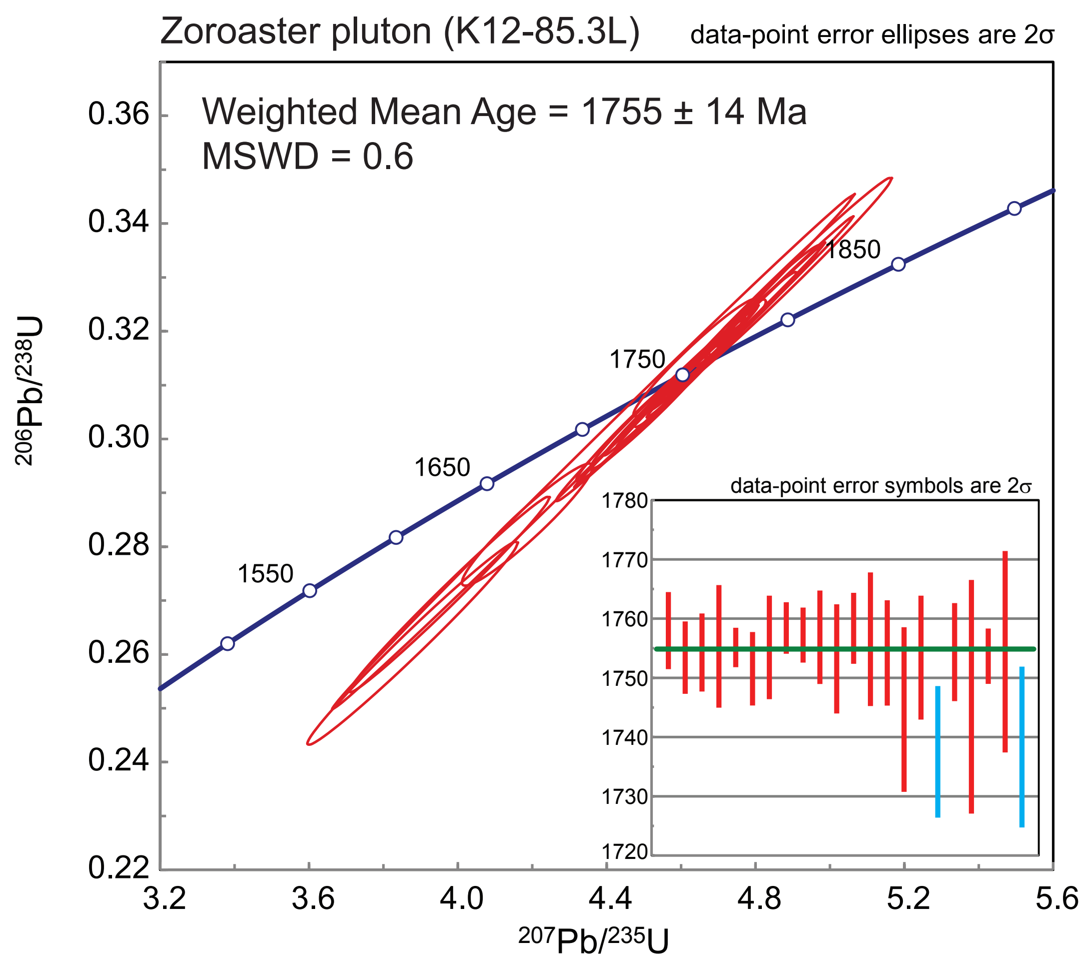

Ruby pluton (K06-107)
error bars are 2σ
DM
CHUR
Epsilon Hf
Age (Ma)
15
10
5
0
1700
1720
1740
1760
1780
1800

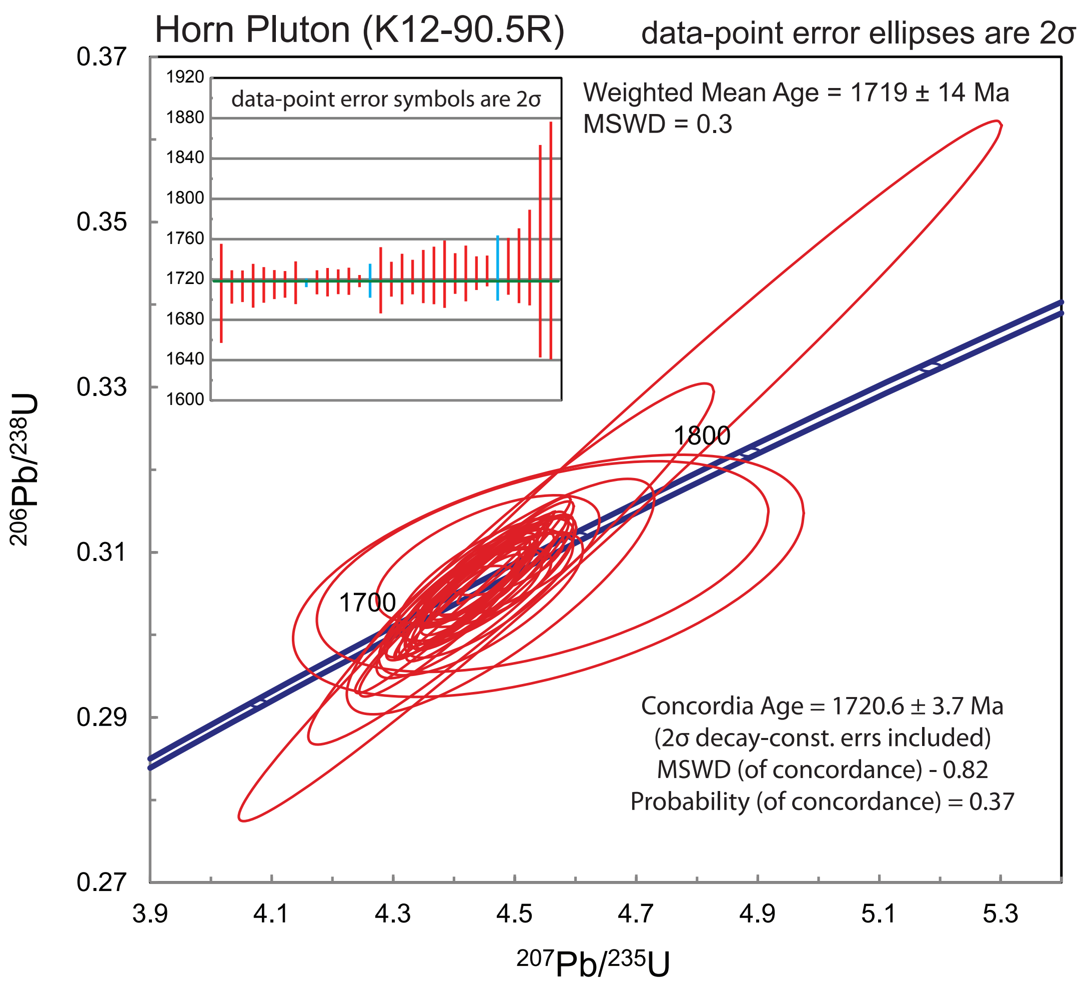

Diamond Creek pluton (K06-228.3)
error bars are 2σ
15.0
10.0
5.0
0.0
Epsilon Hf
1700
1720
1740
1760
1780
1800
1820
1840
Age (Ma)

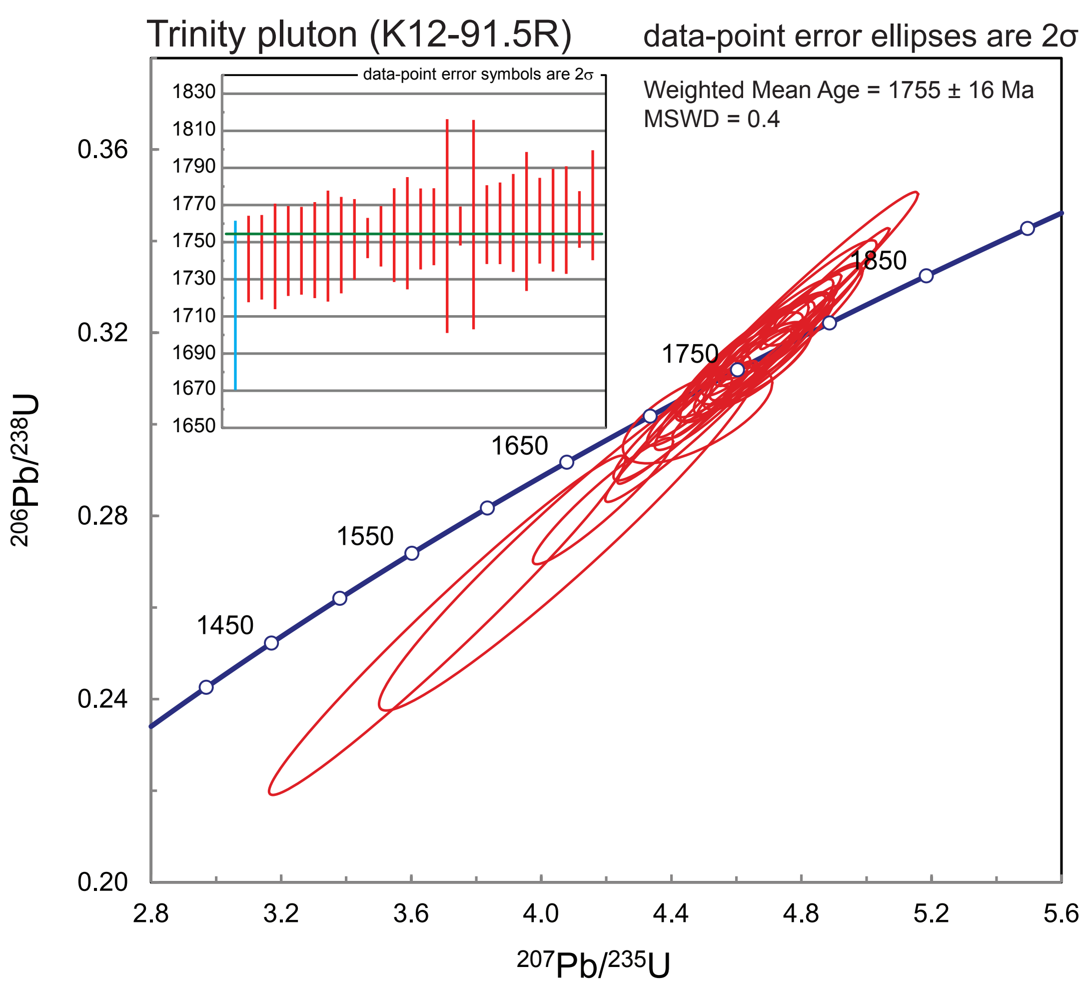

238-Mile pluton (K06-238)
error bars are 2σ
15.0
10.0
5.0
0.0
-5.0
DM
CHUR
Epsilon Hf
1700
1900
2100
2300
2500
Age (Ma)

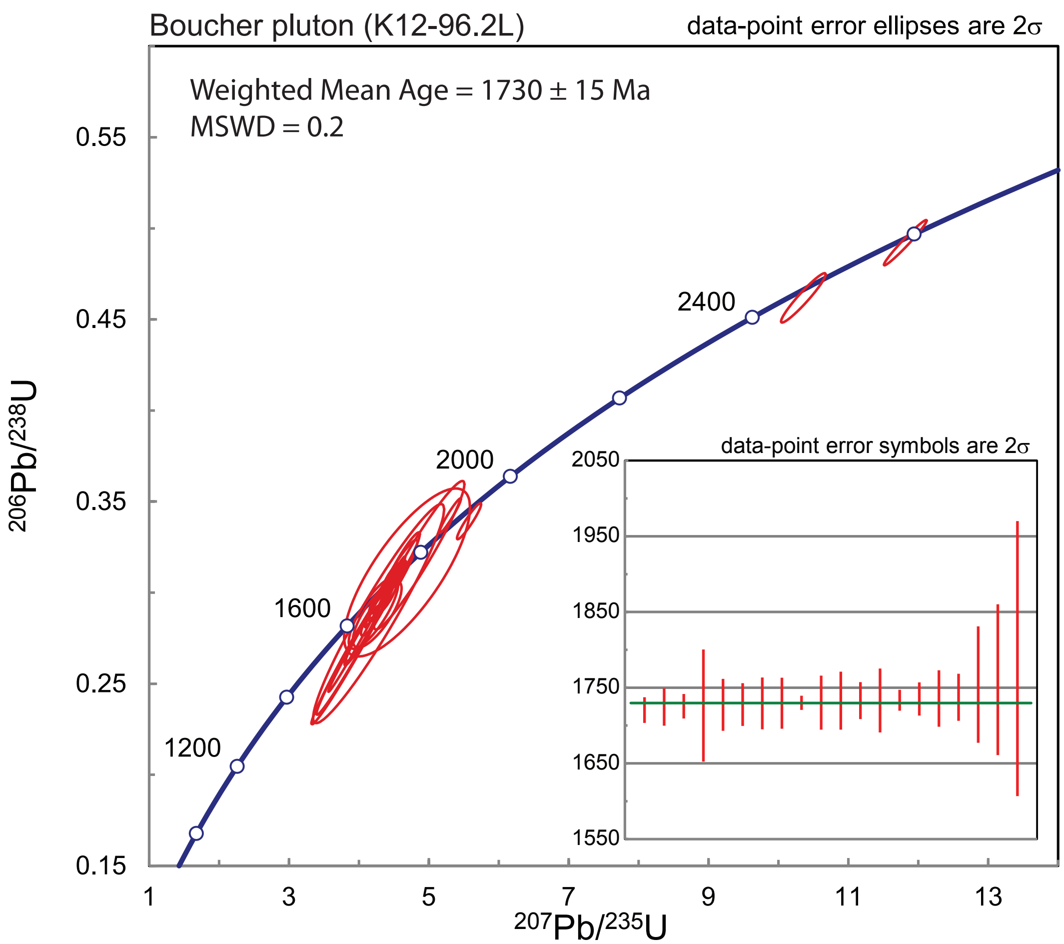

245-Mile pluton (K06-245-2)
error bars are 2σ
15.0
10.0
5.0
0.0
-5.0
DM
CHUR
1650
1850
2050
2250
2450
2650
Age (Ma)


Grapevine Camp pluton
data-point error ellipses are 2σ
Weighted Mean Age = 1756 ± 16 Ma
MSWD = 0.3
0.335
0.325
0.315
0.305
0.295
0.285
0.275
4.1
4.3
4.5
4.7
4.9
1680
1720
1760
1800
data-point error symbols are 2σ
1780
1770
1760
1750
1740
1730
206Pb/238U
207Pb/235U

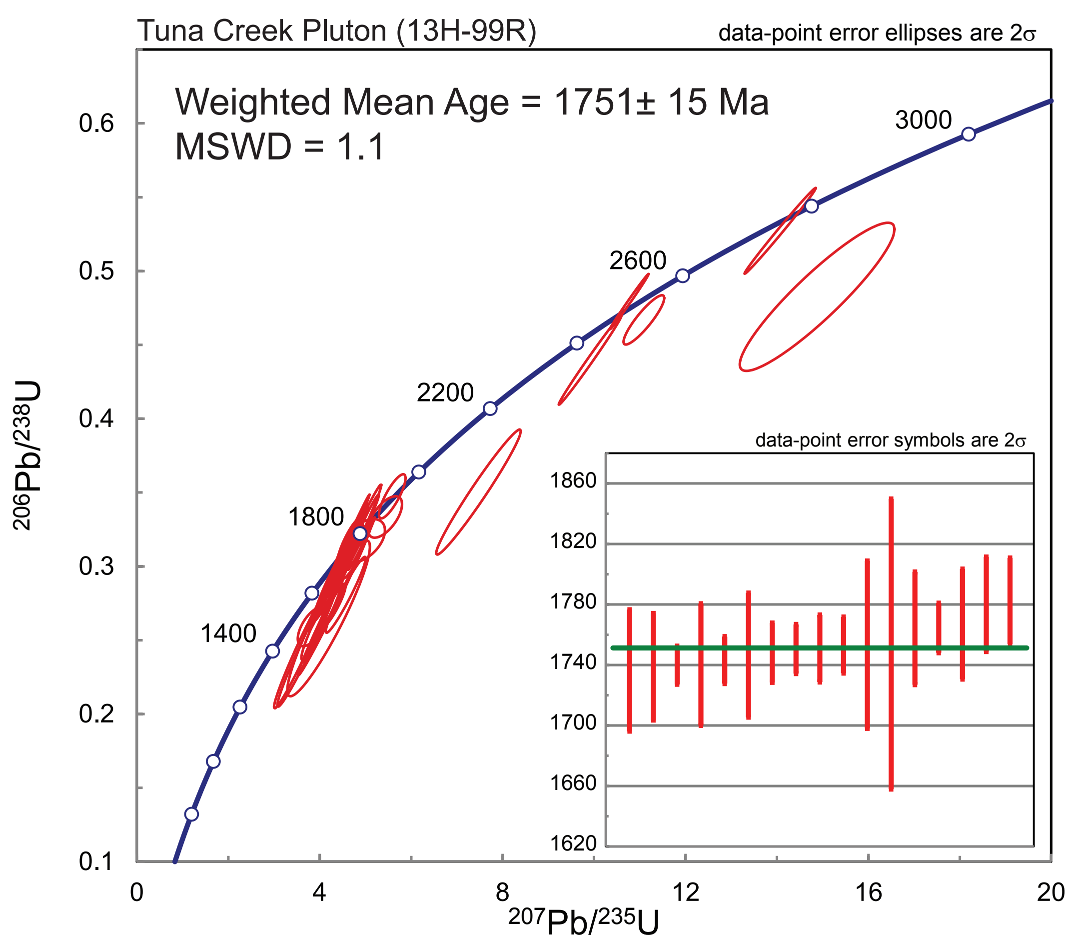

Zoroaster pluton (K12-85.3L)
data-point error ellipses are 2σ
Weighted Mean Age = 1755 ± 14 Ma
MSWD = 0.6
0.36
0.34
0.32
0.30
0.28
0.26
0.24
0.22
3.2
3.6
4.0
4.4
4.8
5.2
5.6
1550
1650
1750
1850
data-point error symbols are 2σ
1780
1770
1760
1750
1740
1730
1720
206Pb/238U
207Pb/235U


Horn Pluton (K12-90.5R)
data-point error ellipses are 2σ
data-point error symbols are 2σ
Weighted Mean Age = 1719 ± 14 Ma
MSWD = 0.3
Concordia Age = 1720.6 ± 3.7 Ma
(2σ decay-const. errs included)
MSWD (of concordance) - 0.82
Probability (of concordance) = 0.37
1700
1800
206Pb/238U
207Pb/235U

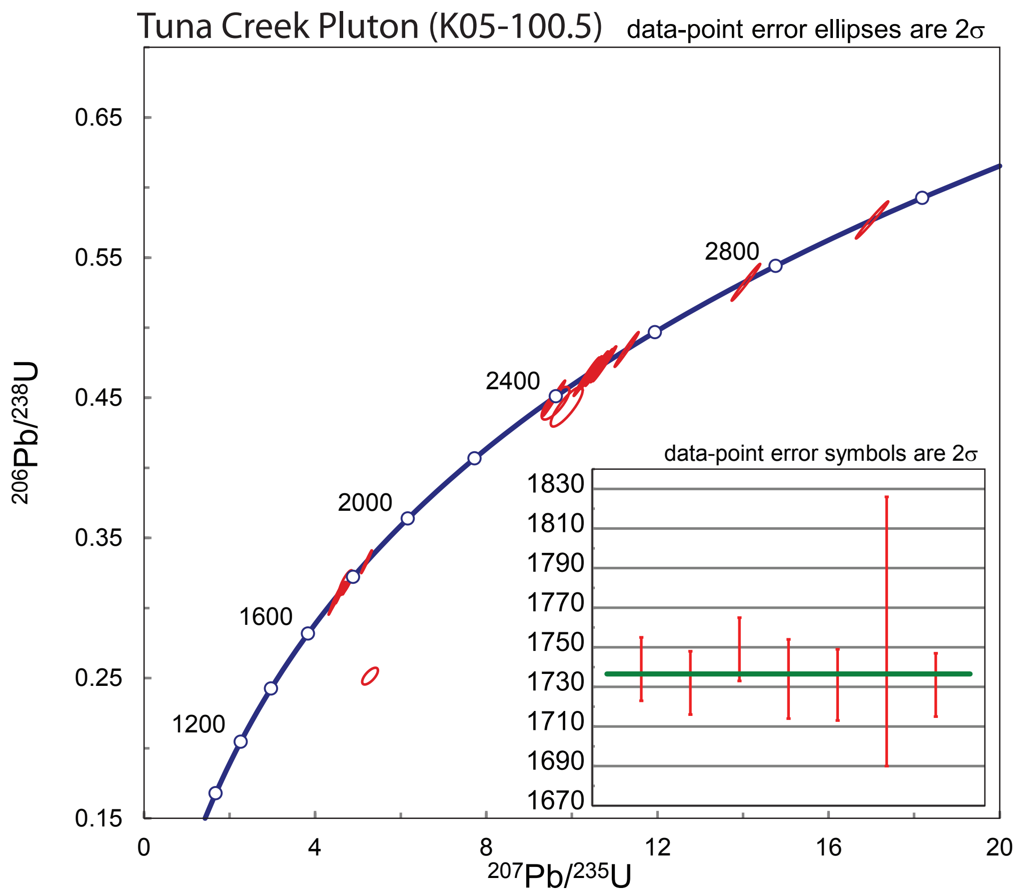

Trinity pluton (K12-91.5R)
data-point error ellipses are 2σ
data-point error symbols are 2σ
Weighted Mean Age = 1755 ± 16 Ma
MSWD = 0.4
1450
1550
1650
1750
1850
206Pb/238U
207Pb/235U



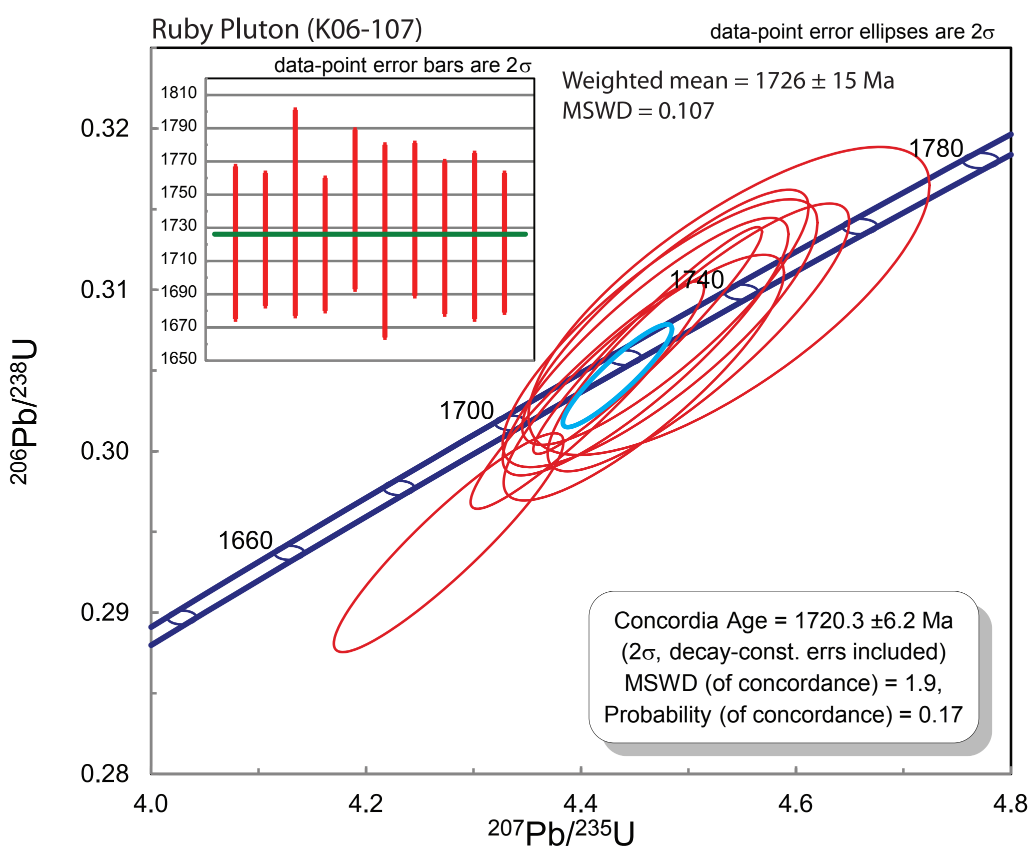
Boucher pluton (K12-96.2L)
data-point error ellipses are 2σ
Weighted Mean Age = 1730 ± 15 Ma
MSWD = 0.2
0.55
0.45
0.35
0.25
0.15
1200
1600
2000
2400
data-point error symbols are 2σ
2050
1950
1850
1750
1650
1550
1
3
5
7
9
11
13
²⁰⁷Pb/²³⁵U
²⁰⁶Pb/²³⁸U



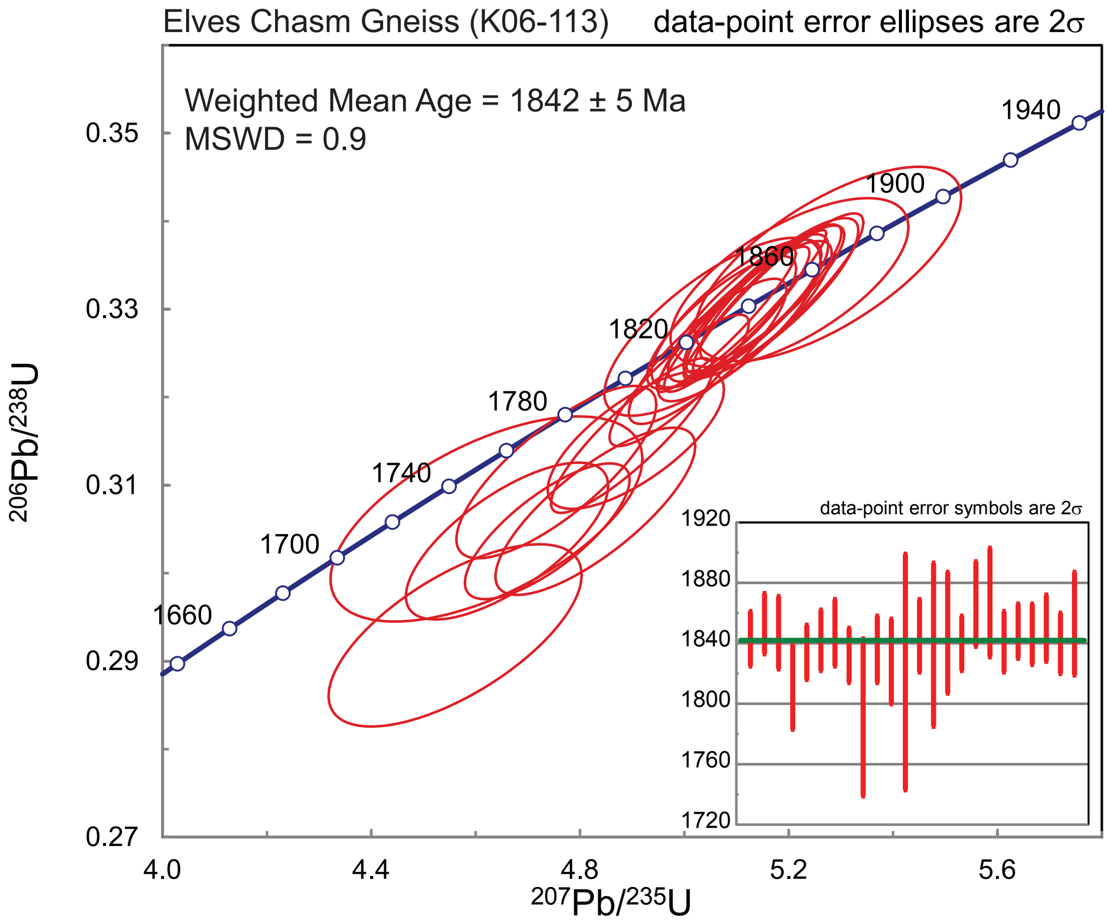
Tuna Creek Pluton (13H-99R)
data-point error ellipses are 2σ
Weighted Mean Age = 1751± 15 Ma
MSWD = 1.1
0.6
0.5
0.4
0.3
0.2
0.1
3000
2600
2200
1800
1400
data-point error symbols are 2σ
1860
1820
1780
1740
1700
1660
1620
0
4
8
12
16
20
²⁰⁷Pb/²³⁵U
²⁰⁶Pb/²³⁸U

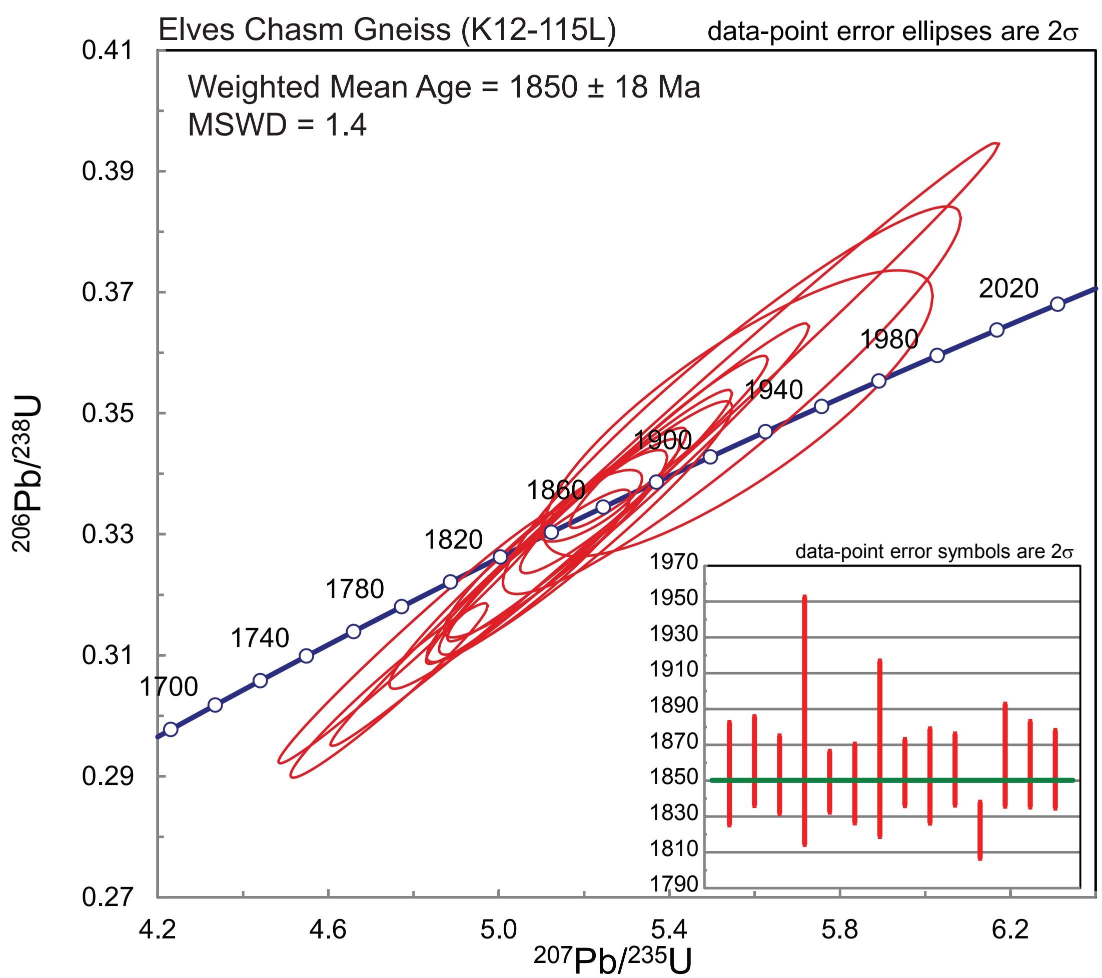


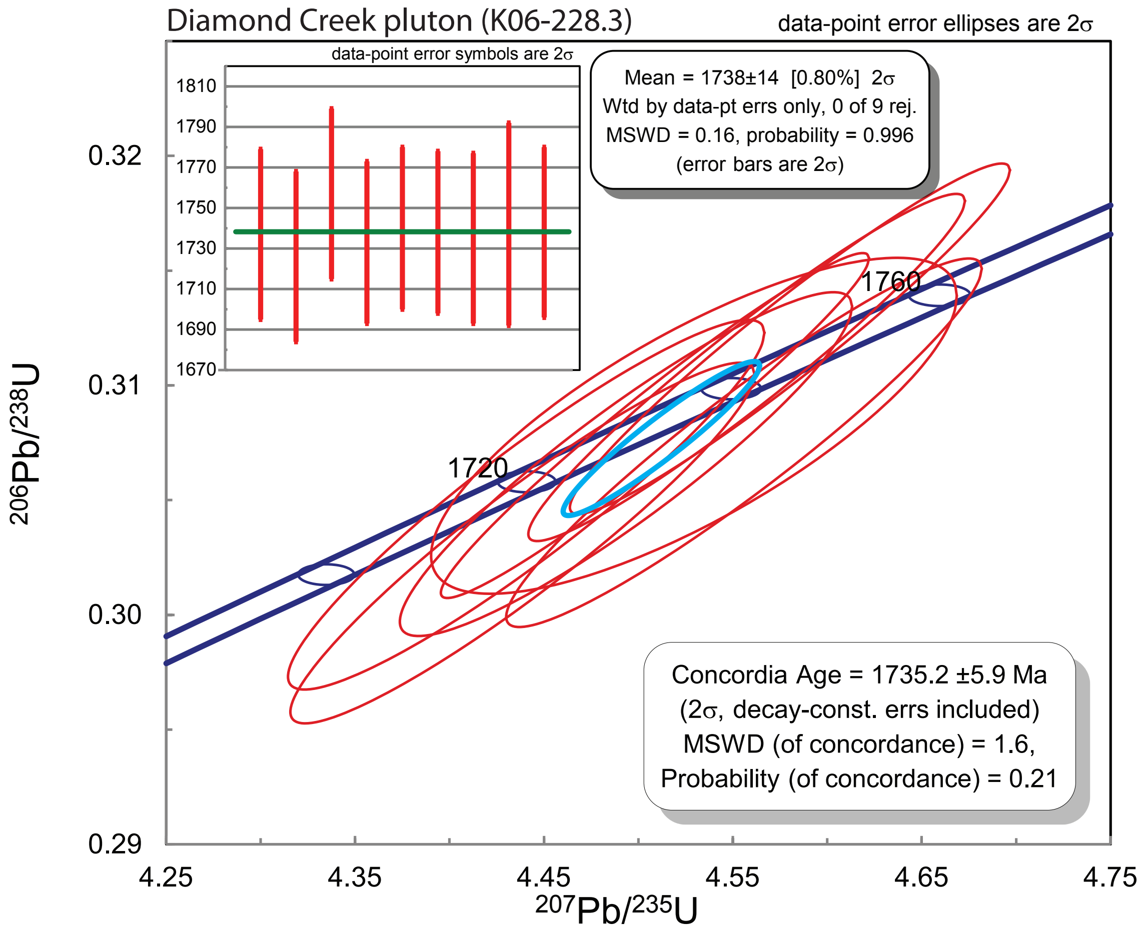
Tuna Creek Pluton (K05-100.5)
data-point error ellipses are 2σ
data-point error symbols are 2σ
0.65
0.55
0.45
0.35
0.25
0.15
2800
2400
2000
1600
1200
1830
1810
1790
1770
1750
1730
1710
1690
1670
0
4
8
12
16
20
206Pb/238U
207Pb/235U



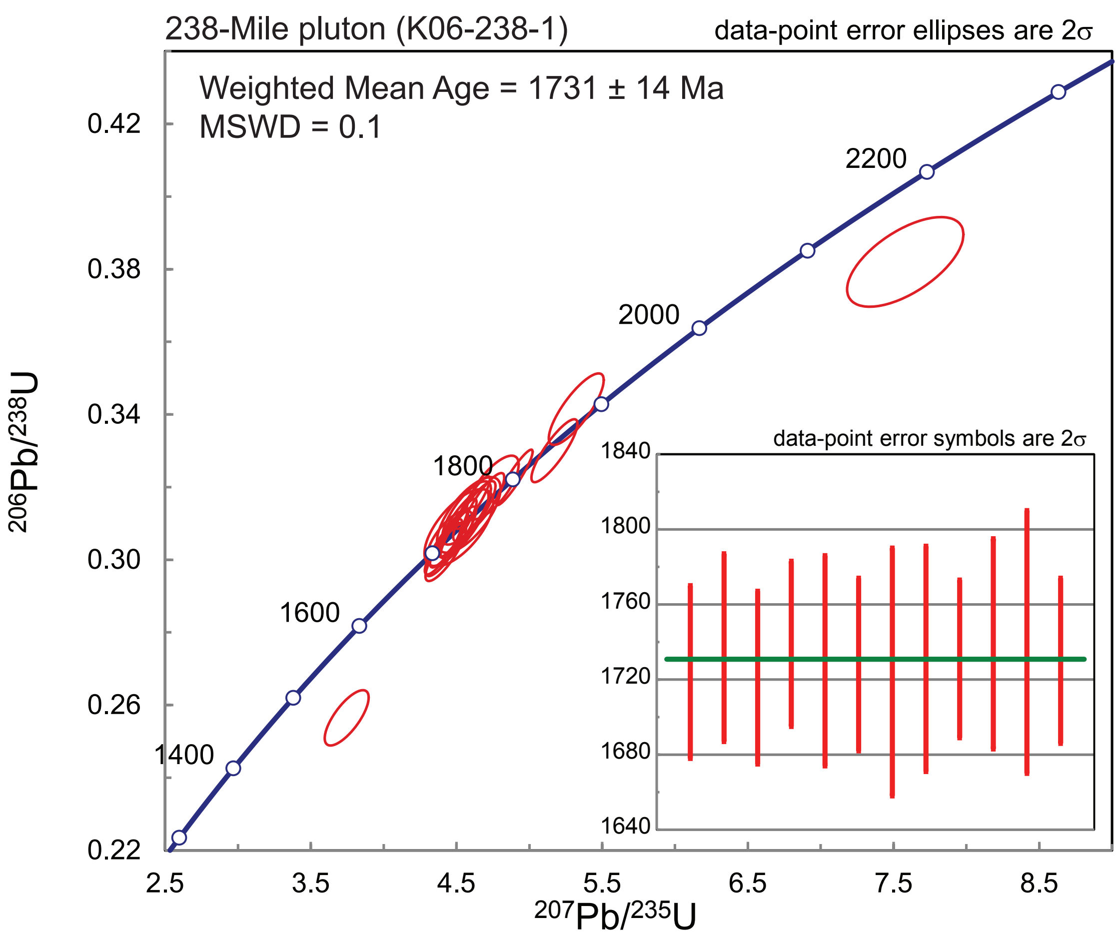
Ruby Pluton (K06-107)
data-point error ellipses are 2σ
data-point error bars are 2σ
Weighted mean = 1726 ± 15 Ma
MSWD = 0.107
1810
1790
1770
1750
1730
1710
1690
1670
1650
0.32
0.31
0.30
0.29
0.28
1780
1740
1700
1660
Concordia Age = 1720.3 ±6.2 Ma
(2σ, decay-const. errs included)
MSWD (of concordance) = 1.9,
Probability (of concordance) = 0.17
4.0
4.2
4.4
4.6
4.8
206Pb/238U
207Pb/235U


Elves Chasm Gneiss (K06-113)
data-point error ellipses are 2σ
Weighted Mean Age = 1842 ± 5 Ma
MSWD = 0.9
1660
1700
1740
1780
1820
1860
1900
1940
0.35
0.33
0.31
0.29
0.27
4.0
4.4
4.8
5.2
5.6
206Pb/238U
207Pb/235U
data-point error symbols are 2σ
1920
1880
1840
1800
1760
1720

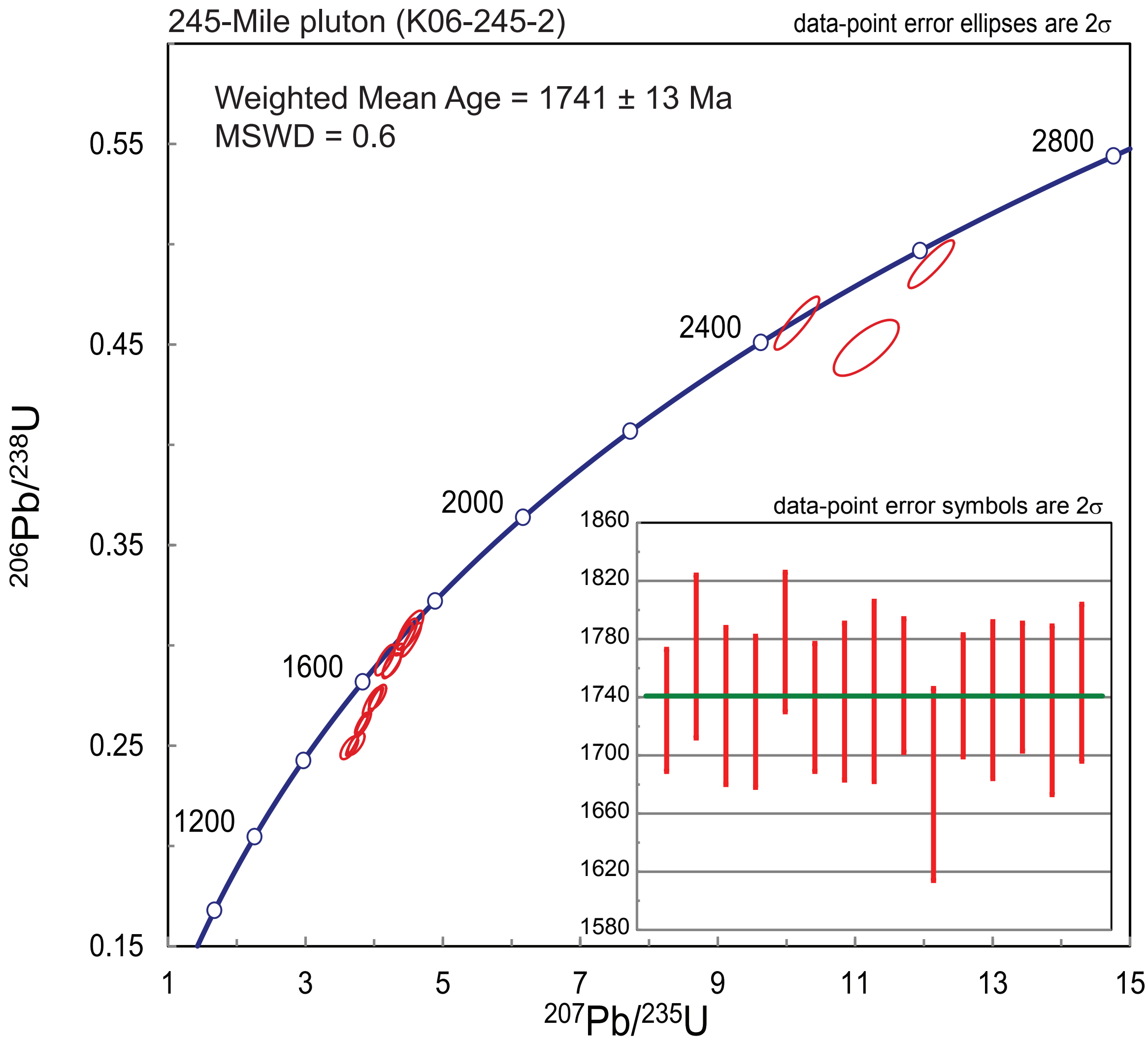

Elves Chasm Gneiss (K12-115L)
data-point error ellipses are 2σ
Weighted Mean Age = 1850 ± 18 Ma
MSWD = 1.4
1700
1740
1780
1820
1860
1900
1940
1980
2020
0.41
0.39
0.37
0.35
0.33
0.31
0.29
0.27
4.2
4.6
5.0
5.4
5.8
6.2
206Pb/238U
207Pb/235U
data-point error symbols are 2σ
1970
1950
1930
1910
1890
1870
1850
1830
1810
1790



Diamond Creek pluton (K06-228.3)
data-point error ellipses are 2σ
data-point error symbols are 2σ
Mean = 1738±14 [0.80%] 2σ
Wtd by data-pt errs only, 0 of 9 rej.
MSWD = 0.16, probability = 0.996
(error bars are 2σ)
Concordia Age = 1735.2 ±5.9 Ma
(2σ, decay-const. errs included)
MSWD (of concordance) = 1.6,
Probability (of concordance) = 0.21
1720
1760
206Pb/238U
207Pb/235U



238-Mile pluton (K06-238-1)
data-point error ellipses are 2σ
Weighted Mean Age = 1731 ± 14 Ma
MSWD = 0.1
data-point error symbols are 2σ
1400
1600
1800
2000
2200
206Pb/238U
207Pb/235U


245-Mile pluton (K06-245-2)
data-point error ellipses are 2σ
Weighted Mean Age = 1741 ± 13 Ma
MSWD = 0.6
0.55
0.45
0.35
0.25
0.15
2800
2400
2000
1600
1200
data-point error symbols are 2σ
1860
1820
1780
1740
1700
1660
1620
1580
1
3
5
7
9
11
13
15
207Pb/235U
206Pb/238U