Dusel-Bacon, C., Aleinikoff, J.N., Day, W.C., and Mortensen, J.K., 2015, Mesozoic magmatism and timing of epigenetic Pb-Zn-Ag mineralization in the western Fortymile mining district, east-central Alaska: Zircon U-Pb geochronology, whole-rock geochemistry, and Pb isotopes: Geosphere, v. 11, doi:10.1130/GES01092.1.

Supplemental File 2. SHRIMP U-Pb zircon data from the Fortymile district, east-central Alaska.
Part A. Description of analytical methods.

U-Pb geochronology of zircon was performed using the Stanford–U.S. Geological Survey sensitive high resolution ion microprobe-reverse geometry (SHRIMP-RG). About 1-2 kg of rock was collected for each dated sample. Zircon was extracted using standard mineral separations techniques, including crushing, pulverizing, Wilfley table, magnetic separator, and heavy liquids. Individual grains were hand picked, mounted in epoxy, ground to approximately half-thickness to expose internal zones, and sequentially polished using 6 µm and 1 µm diamond suspension. All grains were imaged digitally in transmitted and reflected light, and in cathodoluminescence (CL) using the scanning electron microscope (SEM).

SHRIMP analysis (following the methods of Williams, 1998) consisted of excavating a pit about 25-35 µm in diameter and about 1 µm in depth, using a primary ion beam at a current of about 5-7 nA. The magnet cycled through the mass stations 5 times per analysis. Raw data were reduced using Squid 2 (Ludwig, 2009) and plotted using Isoplot 3 (Ludwig, 2003). Measured $^{206}Pb/^{238}U$ ratios were normalized to values obtained for standard zircon R33 (419 Ma; Black et al., 2004). Uranium concentrations are believed to be accurate to ±20%. U-Pb data are plotted on Tera-Wasserburg concordia plots (Supplemental File 2, Part B) to visually identify coherent ages groups. Error ellipses and error bars are shown with 2-sigma uncertainties. Weighted averages of selected $^{206}Pb/^{238}U$ ages were calculated to obtain an age for each sample; exclusions of data from the age calculations were based on the statistical methodology of Isoplot 3. Isotopic data for all analyzed zircon are given in Supplemental File 5. A summary of SHRIMP U-Pb zircon ages and a brief description of rock samples analyzed are given in Table 2.

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Supplemental File 2. SHRIMP U-Pb zircon data from the Fortymile district, east-central Alaska.
Part B. Representative CL images of zircon, concordia plots, and weighted average plots.

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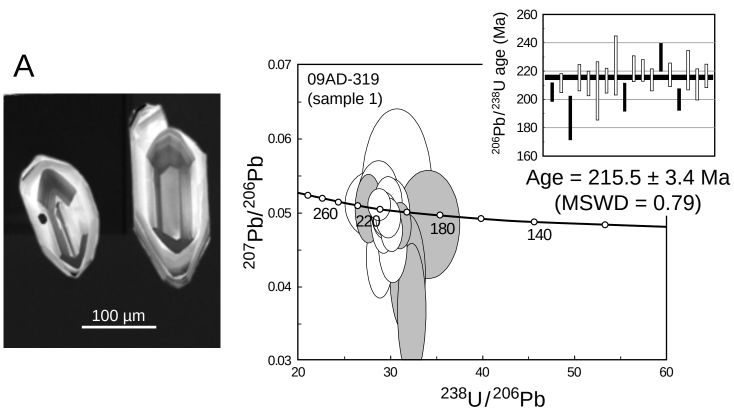

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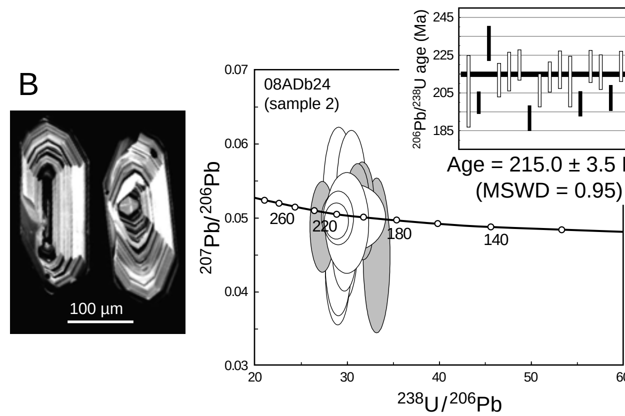

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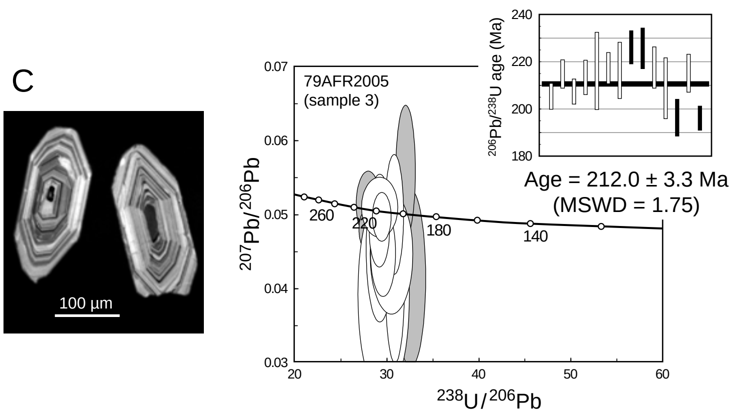

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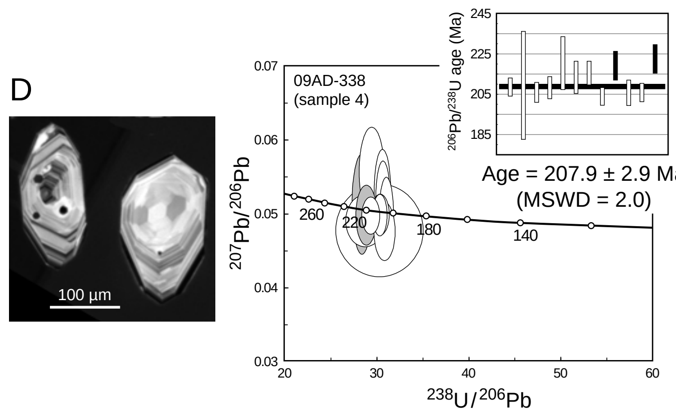

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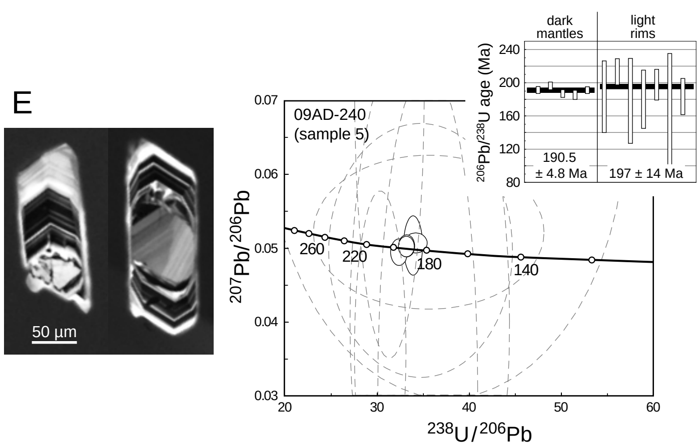

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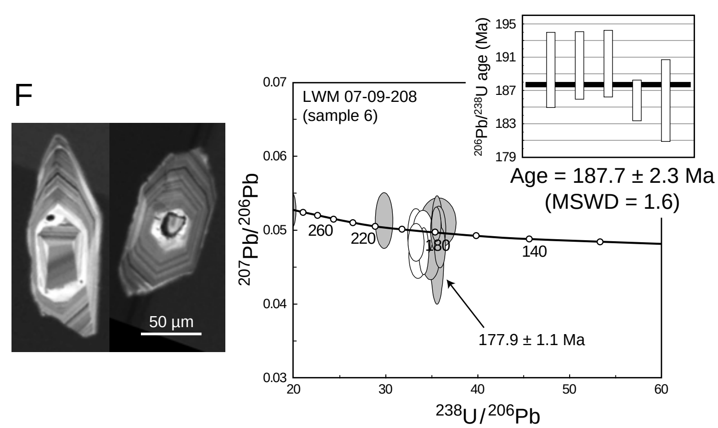

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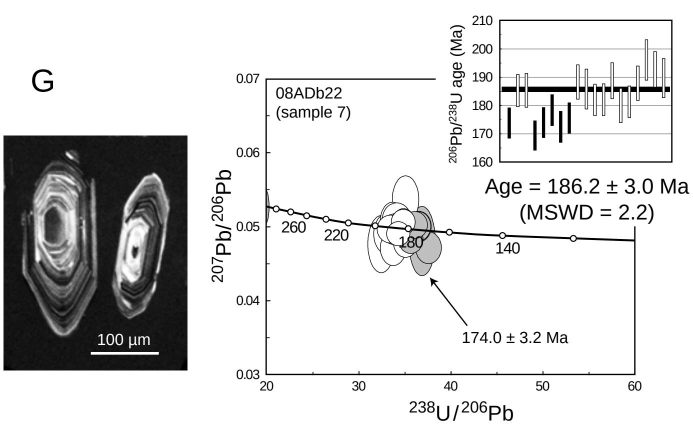

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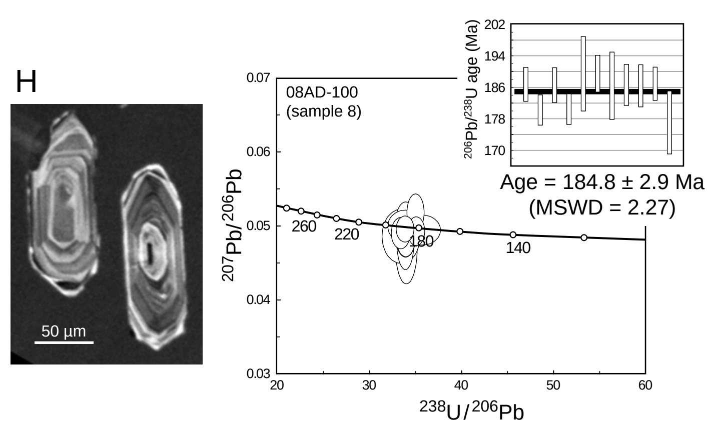

Supplemental File 2. SHRIMP U-Pb zircon data from the Fortymile district, east-central Alaska.
Part B. Representative CL images of zircon, concordia plots, and weighted average plots (cont.)

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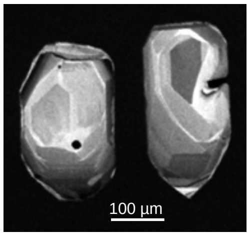

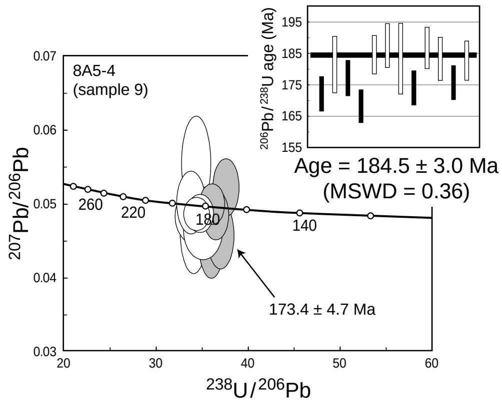

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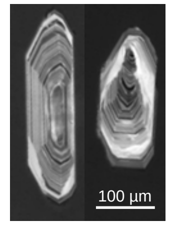

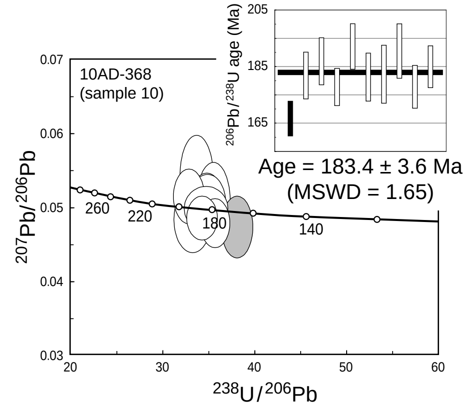

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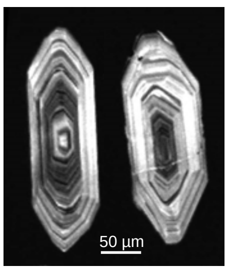

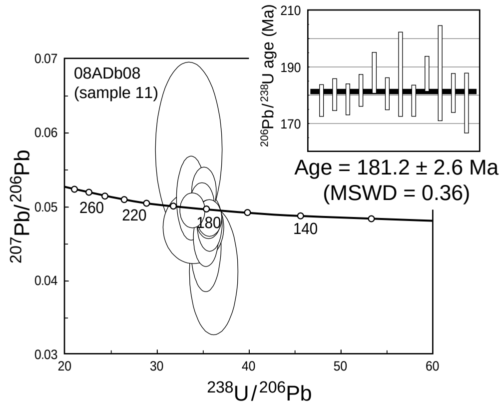

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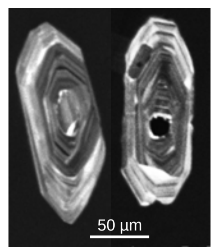

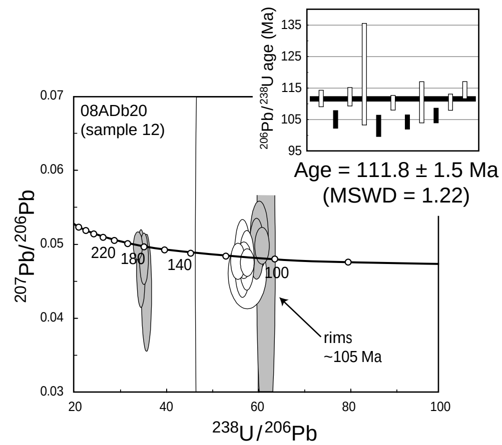

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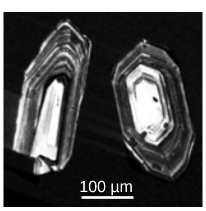

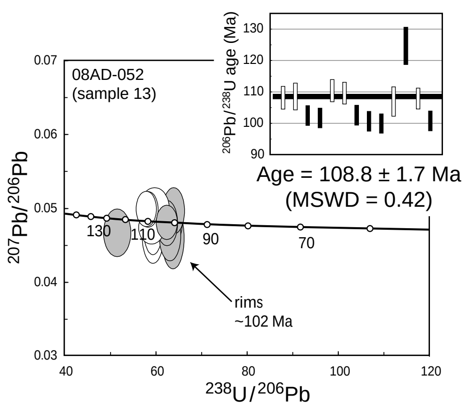

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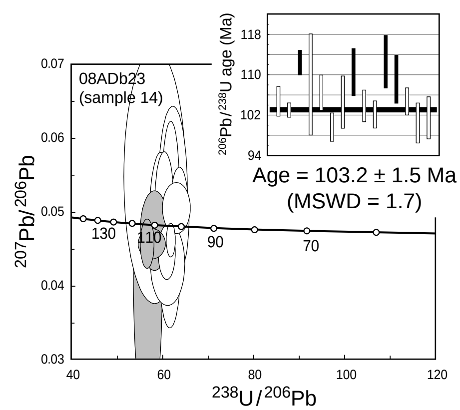

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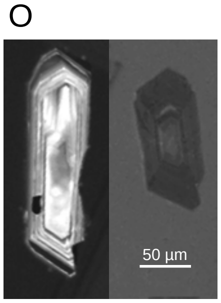

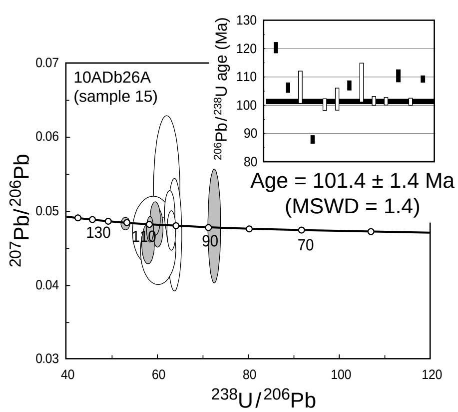

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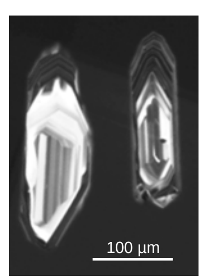

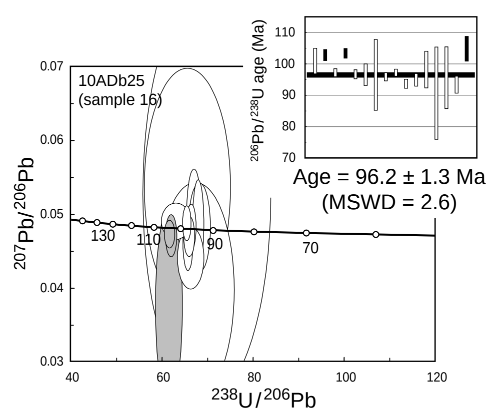

Part B. Representative CL images of zircon, concordia plots, and weighted average plots (cont.)

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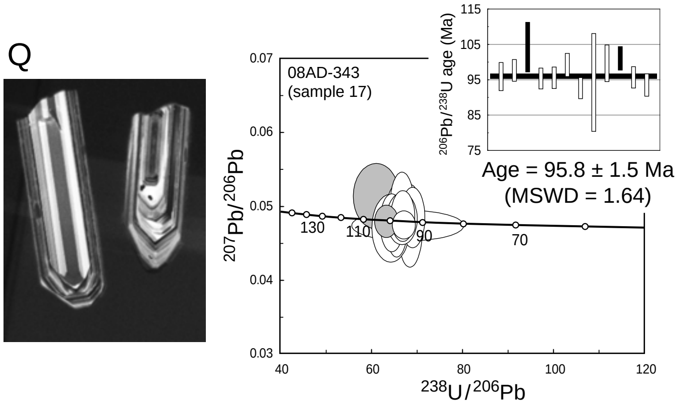

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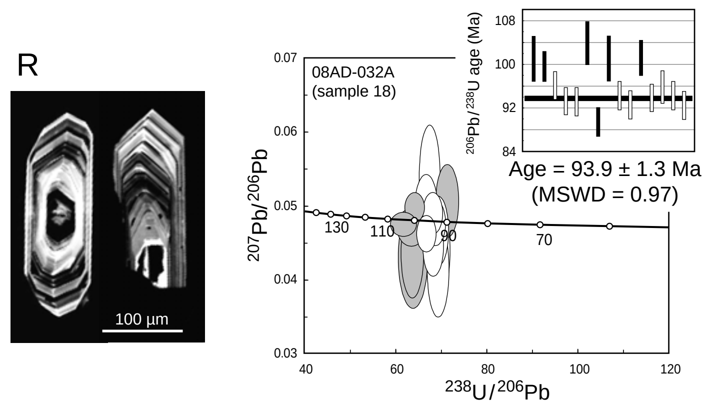

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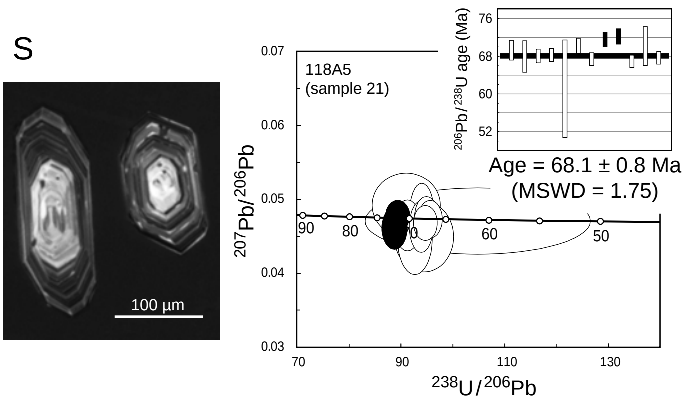

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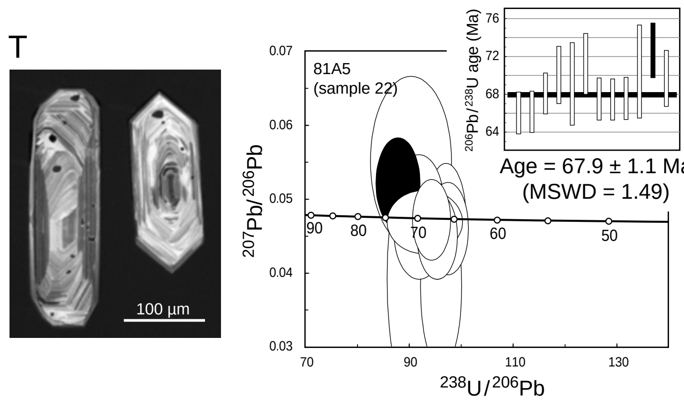

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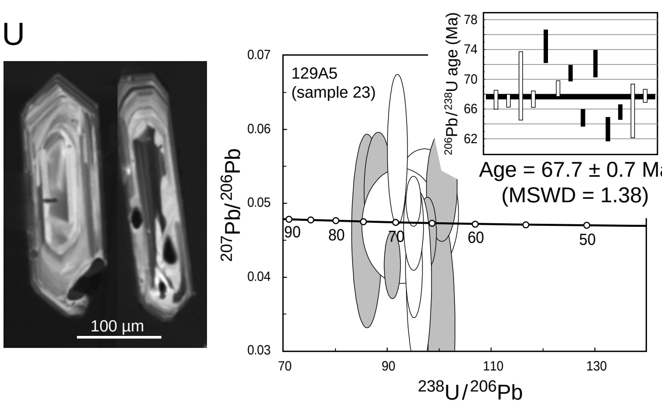

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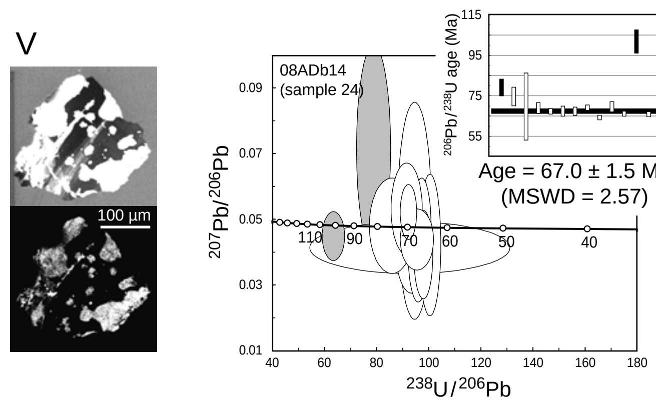

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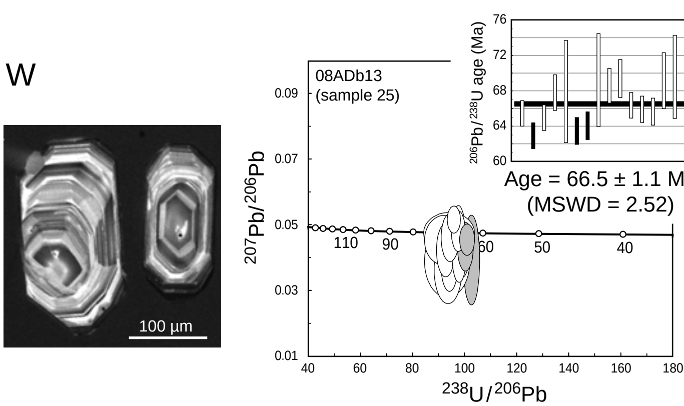

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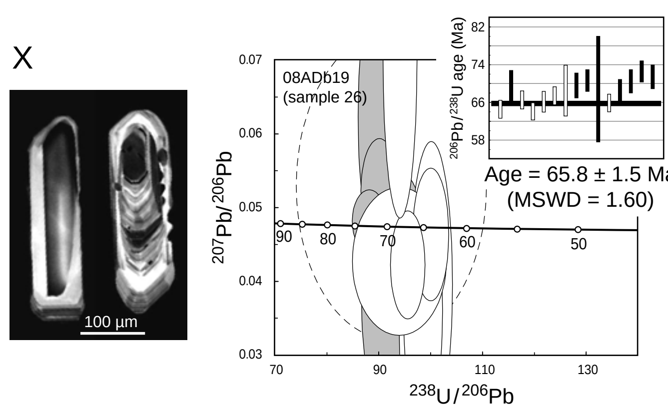

Supplemental File 2. SHRIMP U-Pb zircon data from the Fortymile district, east-central Alaska.
Part B. Representative CL images of zircon, concordia plots, and weighted average plots (cont.)

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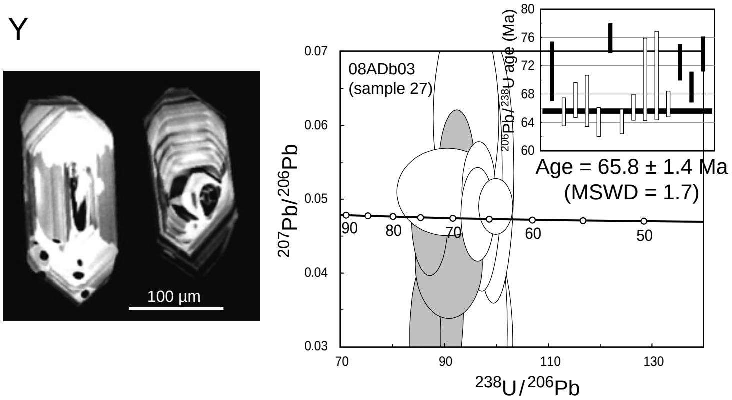

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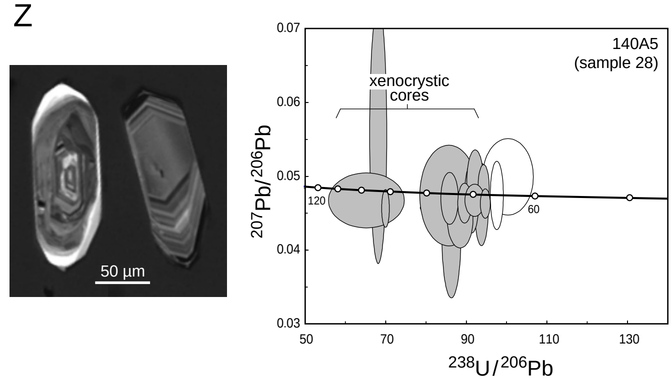

Notes for Supplemental File 2, Part B.

Error ellipses and error bars are plotted at 2-sigma levels of uncertainty. Map and Sample Nos. are shown in each figure. White-filled error ellipses represent data used to calculate a weighted average of $^{206}Pb/^{238}U$ ages (shown as white-filled error bars). Gray-filled error ellipses represent data excluded from the age calculation (shown as black error bars).

(A) Hornblende quartz diorite. (B) Hornblende-biotite granodiorite. (C) Hornblende-biotite quartz monzodiorite of the Taylor Mountain batholith. (D) Hornblende leucotonalite. (E) Leucogranite. For visual simplicity, imprecise analyses of light rims shown as unfilled error ellipses using dashes. (F) Felsic dike. (G) Hornblende quartz monzonite of Mt. Veta. (H) Clinopyroxene granodiorite. (I) Hornblende-clinopyroxene monzonite. (J) Megacrystic hornblende-biotite granite porphyry. (K) Megacrystic hornblende quartz monzonite. (L) Equigranular leucogranite. (M) Biotite granite. (N) Biotite granite. (O) Aplite dike. Five older ages due to matrix effects related to high-U grains (dark grain to right). (P) Granodioritic quartz porphyry. (Q) Rhyolite porphyry. (R) Rhyolite porphyry. (S) Rhyolite (porphyry. (T) Biotitehornblende granite. (U) Biotite granite. (V) Megacrystic syenite from Syenite of Mount Fairplay. White rim and splotches are zircon overgrowing dark oscillatory-zoned baddeleyite. (W) Hornblende-biotite quartz monzonite from Syenite of Mount Fairplay. (X) Biotite-hornblende granite. (Y) Biotite granite. (Z) Microporphyritic aplite. Two white error ellipses represent the maximum age of this sample.

Supplemental File 2. SHRIMP U-Pb zircon data from the Fortymile district, east-central Alaska. Part C. Interpretation of analytical results.

In the following section, information for each dated sample includes both description of the rock and the morphology and CL zoning characteristics of its zircon. Tera-Wasserburg plots of SHRIMP U-Pb geochronologic data are used as guidance for calculating the crystallization age. For each age grouping, a pair of figures shows photographs or photomicrographs of the samples, followed by a figure showing concordia diagrams and zircon morphology. Locations of sample Map Nos. are shown on Figs. 2 and 3; results are presented in order of decreasing age. SHRIMP U-Th-Pb data for all analyzed zircons are given in Supplemental File 3.

Late Triassic and Early Jurassic rocks

Sample 1 (09AD-319) is from a small, partially fault-bounded body of weakly foliated and metamorphosed hornblende quartz diorite (Figs. 3 and 4A) at the base of the Mount Veta pluton. Zircon is colorless to pale brown, euhedral, and has length-to-width (l/w) ratios of 2-5. In CL, most grains have sector-zoned interiors and concentric, oscillatory-zoned exteriors. The weighted average of 13 (of 18) $^{206}Pb/^{238}U$ ages is 215.5 ± 3.4 Ma, interpreted as the time of crystallization of the quartz diorite (Supplemental File 2. Part B, Fig. A). One analysis is slightly older (about 230 Ma), and four analyses are slightly younger (about 185-200 Ma).

Sample 2 (08ADb24) is a hornblende-biotite granodiorite from the pluton of Kechumstuk Mountain (Fig. 3); it exhibits a weakly developed local alignment of hornblende laths (Fig. 4B). Zircon is pale to medium brown, euhedral, and has l/w of 2-3. Many zircon grains contain numerous opaque inclusions. All grains show fine concentric oscillatory zoning in CL. The weighted average of 11 (of 16) $^{206}Pb/^{238}U$ ages is 215.0 ± 3.5 Ma, interpreted as the time of crystallization of the granodiorite (Supplemental File 2. Part B, Fig. B). One analysis is slightly older (about 230 Ma) and four analyses are slightly younger (about 190-200 Ma).

Sample 3 (79AFr2005) is a hornblende-biotite quartz monzodiorite from the Taylor Mountain batholith in the eastern part of the Fortymile district (Fig. 2). The sample shows local alignment of hornblende laths (Fig. 4C) in accordance with the observation of Foster et al. (1994) that the rocks of the southern and eastern margins are gneissic. Zircon is colorless, euhedral, and has l/w of 2-5. In CL, all grains show fine concentric oscillatory zoning; some grains have rounded cores in which the zoning is truncated. The weighted average of 10 (of 14) $^{206}Pb/^{238}U$ ages is 212.0 ± 3.3 Ma, interpreted as the time of crystallization of the quartz monzodiorite (Supplemental File 2. Part B, Fig. C). This age agrees with U-Pb data from co-existing sphene, which yielded an age of about 212 Ma (Aleinikoff et al., 1981). Two analyses are slightly older (~225 Ma) and two analyses are slightly younger (about 195 Ma).

Sample 4 (09AD-338) is a foliated hornblende leucotonalite from a small body (too small to show as a separate unit) within the Mount Veta intrusion (Figs. 3 and 4D). Zircon is pale to medium brown, euhedral, and has l/w of 2-3. Most grains show fine concentric oscillatory zoning. The weighted average of 10 (of 12) $^{206}Pb/^{238}U$ ages is 207.9 ± 2.9 Ma, interpreted as the time of crystallization of the leucotonalite (Supplemental File 2. Part B, Fig. D). Two analyses are slightly older (about 220 Ma).

Sample 5 (09AD-240) is a foliated leucogranite that intrudes quartz-rich metasedimentary rocks of the Fortymile River assemblage ~ 200 m west of the base of the Mount Veta intrusion (Figs. 3 and 4E). Foliation is defined by trains of strained and polygonized quartz and fibrous chlorite (likely an alteration product of biotite) (Fig. 4F). Zircon is colorless to pale brown, euhedral, and has l/w of 1-2. Most grains contain irregular, partially resorbed, cores. Many grains are composed of dark (in CL), uranium-rich (~760-1860 ppm), oscillatory-zoned mantles overgrown by pale (in CL), uranium-poor (~10-40 ppm), unzoned rims. The weighted average of five $^{206}Pb/^{238}U$ ages from high U zones is 190.5 ± 4.8 Ma, interpreted as the time of crystallization of the leucogranite (Supplemental File 2. Part B, Fig. E). Six analyses of rounded cores yield inheritance ages of about 260 and 285 Ma, and 1.1 to 2.5 Ga. The weighted average of seven $^{206}Pb/^{238}U$ ages from low U zones is imprecise (197 ± 14 Ma), but suggests that the rims formed shortly after the cores, perhaps as a late phase of crystallization of the leucogranite.

Sample 6 (LWM 07-09-208) is a highly altered, felsic dike from drill core of the Little Whiteman carbonate replacement deposit on the east side of the Mount Veta intrusion (Fig. 3). A weak foliation is defined by thin aligned biotite books (Fig. 4G), whose interiors have been replaced by carbonate. Zircon is colorless to pale brown, euhedral, and has l/w of 1-2. Although all dated grains have similar concentric oscillatory zoning in CL, two distinct age groups were found. Five analyses yield a weighted average $^{206}Pb/^{238}U$ age of 187.7 ± 2.3 Ma, whereas seven analyses yield a weighted average $^{206}Pb/^{238}U$ age of 177.9 ± 1.1 Ma (Supplemental File 2. Part B, Fig. F). The older age is interpreted as the time of crystallization of the felsic dike, implying that additional younger zircon formed about 10 m.y. after crystallization of the felsic dike. Alternatively, if the dike crystallized at about 178 ± 1 Ma, then the older zircon would be interpreted as xenocrysts. We prefer the former interpretation, i.e., that the dike was emplaced at about 188 Ma and re-heated at about 178 Ma, because this rock occurs in close proximity (within ~5 km) to a megacrystic phase of the Mount Veta intrusion that is about 181 ± 3 Ma (see sample 11 below) that may have been the cause of the postulated re-heating.

Sample 7 (08ADb22) is a moderately to strongly foliated, equigranular hornblende quartz monzonite from the southern part of the Mount Veta intrusion (Figs. 3 and 4H). Zircon is colorless to pale brown, euhedral, and has l/w of 2-5. All grains have fine concentric oscillatory zoning in CL. The weighted average of 13 (of 19) $^{206}Pb/^{238}U$ ages is 186.2 ± 3.0 Ma, interpreted as the time of crystallization of the quartz monzonite (Supplemental File 2. Part B, Fig. G). Six younger analyses have a weighted average age of 174.0 ± 3.2 Ma, perhaps related to a younger growth event.

Sample 8 (08AD-100) is a weakly foliated and deformed clinopyroxene granodiorite dike (Figs. 3 and 4I) that intruded quartz-rich metasedimentary rocks of the Fortymile River assemblage west of the Mount Veta intrusion. Zircon is medium to dark brown, subhedral to euhedral, and has l/w of 1-4. In CL, many grains have partially resorbed cores and fine oscillatory-zoned mantles. The weighted average of 11 (of 13) $^{206}Pb/^{238}U$ ages is 184.8 ± 2.9 Ma, interpreted as the time of crystallization of the granodiorite dike (Supplemental File 2. Part B, Fig. H). Two other analyses yield inheritance ages of about 1.7 Ga.

Sample 9 (8A5-4) is a coarse-grained, moderately foliated hornblende-clinopyroxene monzonite variant of the Mount Veta intrusion mapped near its southern end (Figs. 3 and 4J). Zircon is pale to medium brown, subhedral to euhedrall, and has l/w of 1-4. In CL, most grains have broad sector zoning; some grains have narrow, dark rims. The weighted average of seven (of 12) $^{206}Pb/^{238}U$ ages is 184.5 ± 3.0 Ma, interpreted as the time of crystallization of the monzonite (Supplemental File 2. Part B, Fig. I). Five younger analyses have an age of 173.4 ± 4.7 Ma, perhaps related to a younger growth event suggested by the presence of the dark rims.

Sample 10 (10AD-368) is a weakly foliated K-feldspar megacrystic hornblende-biotite granite porphyry (Fig. 4K) that crops out as a thin sill in the hangingwall of a west-vergent thrust fault that places Nasina assemblage rocks over Fortymile River assemblage rocks east of the Mount Veta intrusion and the Kechumstuk fault zone (Fig. 3). Zircon is pale to medium brown, euhedral, and has l/w of 2-3. Most grains show fine concentric oscillatory zoning, sometimes overgrown by white rim material. The weighted average of 9 (of 10) $^{206}Pb/^{238}U$ ages is 183.4 ± 3.6 Ma, interpreted as the time of crystallization of the granite porphyry (Supplemental File 2. Part B, Fig. J). One younger analysis is about 165 Ma.

Sample 11 (08ADb08) is a foliated K-feldspar megacrystic hornblende quartz monzonite from the northeastern margin of the Mount Veta intrusion (Fig. 3). Zircon is colorless to pale brown, euhedral, and has l/w of 2-3. In CL, most grains have fine concentric oscillatory zoning. The weighted average of 12 $^{206}Pb/^{238}U$ ages is 181.2 ± 2.6 Ma, interpreted as the time of crystallization of the quartz monzonite (Supplemental File 2. Part B, Fig. K).

Mid-Cretaceous rocks

Sample 12 (08ADb20) is a medium-grained, equigranular leucogranite (Fig. 5A) designated as the Corner granite by Day et al. (in press). Zircon is medium to dark brown, subhedral to euhedral, and has l/w of 2-4. In CL, all grains show fine concentric oscillatory zoning. Some grains have thin, discontinuous dark rims. The weighted average of seven (of 15) $^{206}Pb/^{238}U$ ages is 111.8 ± 1.5 Ma, interpreted as the time of crystallization of the leucogranite (Supplemental File 2. Part B, Fig. L). Four grains (about 175-190 Ma) are interpreted as xenocrystic in origin. Four other analyses of about 105 Ma may be due to a growth event that formed the dark rims.

Sample 13 (08AD-052) is a medium-grained biotite granite from the Corner intrusion (Figs. 3 and 5B). Zircon is medium brown, euhedral, and has l/w of 2-4. All grains contain numerous fluid and solid inclusions, making it very difficult to find pristine locations for SHRIMP analysis. In CL, most grains display fine concentric oscillatory zoning. Some grains contain unusual splotchy-zoned cores, which were not analyzed. Most grains contain thin, discontinuous dark (i.e., high U), unzoned rims. This younger material also appears to invade some grains parallel to the original oscillatory zoning. The weighted average of six (of 13) $^{206}Pb/^{238}U$ ages is 108.8 ± 1.7 Ma, interpreted as the time of crystallization of the biotite granite (Supplemental File 2. Part B, Fig. M). Six other analyses are a bit younger (about 102 Ma), perhaps related to the growth event that formed the dark rims. One dark, unzoned rim yielded an age of 125 Ma; this age is considered spurious because of matrix effects caused by very high U content (Supplemental File 3) (see Williams and Hergt, 2000; White and Ireland, 2012).

Sample 14 (10ADb23) is a medium-grained, hypidiomorphic granular, biotite granite from the Mount Harper batholith, collected ~ 1.5 km east of the Mount Harper summit (Fig. 3). Zircon is pale to medium brown, euhedral, and has l/w of 2-5. Most grains have fluid and/or solid inclusions. In CL, all grains show fine parallel oscillatory zoning. No overgrowths are apparent. The weighted average of 11 (of 15) $^{206}Pb/^{238}U$ ages is 103.2 ± 1.5 Ma, interpreted as the time of crystallization of the biotite granite (Supplemental File 2. Part B, Fig. N). Four other analyses with slightly older ages (about 109-113 Ma) are interpreted as xenocrysts; however, no obvious difference in either transmitted light or CL imagery is apparent between the igneous and xenocrystic grains.

Sample 15 (10ADb26A) is a fine-grained aplite dike that intruded what we interpret to be a quartz monzonite phase of the Mount Harper batholith in the western part of the study area at the Section 21 prospect (Fig. 3). Zircon is medium brown, subhedral to euhedral, and has l/w of 2-5. Most grains contain numerous fine opaque inclusions and cracks. In CL, about 25% of the grains show concentric oscillatory zoning; most grains are nearly black indicative of high U content (Supplemental File 3). Seven analyses of relatively low U (about 480-1000 ppm) grains yield a weighted average $^{206}Pb/^{238}U$ age of 101.4 ± 1.4 Ma, interpreted as the time of crystallization of the aplite dike (Supplemental File 2. Part B, Fig. O). Five analyses of high U grains (about 1200-9000 ppm) all have older $^{206}Pb/^{238}U$ ages, probably due to matrix effects (Williams and Hergt, 2000; White and Ireland, 2012). The older ages are related to instrumental factors and are considered to be geologically meaningless.

Sample 16 (10ADb25) is a medium-grained, pale greenish-gray, granodioritic quartz porphyry that crops out as a dike that appears to cut both the quartz monzonite and aplite dike at the Section 21 prospect (Fig. 3). Zircon is pale brown, euhedral, and has l/w of 3-6. In CL, all grains show fine concentric oscillatory zoning. Some grains preserve evidence of partially resorbed (i.e., inherited) cores. The weighted average of 13 (of 16) $^{206}Pb/^{238}U$ ages is 96.2 ± 1.3 Ma, interpreted as the time of crystallization of the quartz porphyry (Supplemental File 2. Part B, Fig. P). Three other analyses yielded slightly older ages of about 104 Ma.

Sample 17 (09AD-343) is a quartz-feldspar-biotite rhyolite porphyry that intruded the Corner granite body (Day et al., in press). Zircon is medium brown, euhedral, and has l/w of 1-5. All grains have fine concentric oscillatory zoning in CL. The weighted average of 10 (of 12) $^{206}Pb/^{238}U$ ages is 95.8 ± 1.5 Ma, interpreted as the time of crystallization of the rhyolite porphyry (Supplemental File 2. Part B, Fig. Q). Two analyses yielded slightly older ages of about 101 and 104 Ma.

Sample 18 (08AD032A) is a quartz-plagioclase rhyolite porphyry from a small body that crops out between splays of the Kechumstuk fault zone (Fig. 3). Zircon is pale to medium brown, subhedral to euhedral, and has l/w of 1-5. In CL, many grains show irregular, partially resorbed cores that are overgrown by fine concentric oscillatory-zoned mantles. The weighted average of nine (of 13) $^{206}Pb/^{238}U$ ages is 93.9 ± 1.3 Ma, interpreted as the time of crystallization of the rhyolite porphyry (Supplemental File 2. Part B, Fig. R). Four analyses of oscillatory-zoned mantles yielded slightly older ages of about 101 Ma. One analysis of a dark (in CL) rim has an age of about 104 Ma, but because this material has high U (about 2500 ppm), the older age probably is due to matrix effects and thus is considered to be geologically meaningless.

Late Cretaceous rocks

Sample 21 (118A5) is a quartz-K-feldspar rhyolite porphyry from a dike that is parallel to, and within, a strand of the Kechumstuk fault zone, just west of the Mitchell prospect (Fig. 3). Zircon is pale to medium brown, euhedral, and has l/w of 2-5. In CL, many grains have light, oscillatory-zoned cores and dark, oscillatory-zoned mantles. The weighted average of 10 (of 12) $^{206}Pb/^{238}U$ ages is 68.1 ± 0.8 Ma, interpreted as the time of crystallization of the rhyolite porphyry (Supplemental File 2. Part B, Fig. S). Two slightly older analyses of about 72 Ma suggest minor inheritance.

Sample 22 (81A5) is a medium-grained biotite-hornblende granite from an intrusion just north of Mount Veta (Fig. 3). Zircon is colorless to pale, euhedral, and has l/w of 1-4. Most grains have solid or fluid inclusions. In CL, most grains show fine concentric oscillatory zoning. The weighted average of 11 (of 12) $^{206}Pb/^{238}U$ ages is 67.9 ± 1.1 Ma, interpreted as the time of crystallization of the granite (Supplemental File 2. Part B, Fig. T). One analysis has a slightly older age of about 73 Ma.

Sample 23 (129A5) is a fine-grained biotite granite from a small intrusion bounded by splays of the Kechumstuk fault zone (Fig. 3). Zircon is medium brown, euhedral, and has l/w of 2-6.

All grains have solid inclusions and many are cracked parallel the C-axis. In CL, many grains have rounded cores with truncated oscillatory zoning, suggesting inheritance. Some grains have outermost thin, dark, unzoned rims. Zircon mantles show fine concentric oscillatory zoning. The weighted average of 7 (of 13) $^{206}Pb/^{238}U$ ages is 67.7 ± 0.7 Ma, interpreted as the time of crystallization of the granite (Supplemental File 2. Part B, Fig. U). Three older ages (about 71-74 Ma) are due to inheritance; three younger ages (about 63-66 Ma) may be due to a slightly younger growth event manifested by the thin dark rims.

Sample 24 (08ADb14) is a megacrystic syenite from the Syenite of Mount Fairplay unit in the north-central Tanacross quadrangle (Foster, 1970). Zircon is medium to dark brown, anhedral to subhedral, and has l/w of 1-3. CL imagery and SEM-EDS analysis reveal that most grains are composed of relict, oscillatory-zoned baddeleyite (ZrO_2) that was partially replaced by zircon (Supplemental File 2. Part B, Fig. X). In CL, the zircon portions of the grains show a granular texture. The weighted average of 11 (of 13) $^{206}Pb/^{238}U$ ages of zircon is 67.0 ± 1.5 Ma, interpreted as the time of crystallization of the syenite (Supplemental File 2. Part B, Fig. V). Two older ages of about 79 and 102 Ma suggest the occurrence of minor inheritance.

Sample 25 (08ADb13) is a medium-grained, equigranular hornblende-biotite quartz monzonite from the Syenite of Mount Fairplay unit (Fig. 2). In contrast to zircon from the syenite phase of Mount Fairplay (sample 24, 08ADb14), zircon from the quartz monzonite phase is colorless, euhedral and has l/w of 2-3. In CL, all grains show fine concentric oscillatory zoning. Many grains have dark, weakly oscillatory-zoned rims. The weighted average of 12 (of 15) $^{206}Pb/^{238}U$ ages is 66.5 ± 1.1 Ma, interpreted as the time of crystallization of the quartz monzonite (Supplemental File 2. Part B, Fig. W). Three analyses are slightly younger (about 62-64 Ma) perhaps related to the growth event that formed the dark rims.

Sample 26 (08ADb19) is a medium-grained biotite-hornblende granite from a pluton that intruded the Early Jurassic Mount Veta intrusion just east of the Oscar prospect (Fig. 3). Zircon is pale to medium brown, euhedral, and has l/w of 2-4. Most grains contain solid or fluid inclusions. In CL, some grains show dark rounded unzoned cores and oscillatory-zoned mantles. The $^{206}Pb/^{238}U$ age data are subdivided into two groups: (1) ages from cores (interpreted to be inherited) are about 66-72 Ma (n=8), and (2) ages from igneous mantles (n=7), which result in a weighted average age of 65.8 ± 1.5 Ma, interpreted as the time of crystallization of the granite (Supplemental File 2. Part B, Fig. X).

Sample 27 (08ADb03) is a medium-grained biotite granite from the eastern edge of the intrusion north of Mount Veta (Fig. 3). Zircon is pale to medium brown, euhedral, and has l/w of 1-2. In CL, all grains show concentric oscillatory zoning. Many grains contain rounded cores with truncated oscillatory zoning. The weighted average of 9 (of 14) $^{206}Pb/^{238}U$ ages is 65.8 ± 1.4 Ma, interpreted as the time of crystallization of the granite (Supplemental File 2. Part B, Fig. Y). Five analyses of cores have ages between about 69 and 76 Ma.

Sample 28 (140A5) is a fine-grained microporphyritic aplite from a dike that occurs within a splay of the Kechumstuk fault that cuts the pluton of Kechumstuk mountain (Fig. 3). The zircon population is heterogeneous; grains vary in color, external morphology, and CL zoning pattern. $^{206}Pb/^{238}U$ ages range from about 64 to 93 Ma (Supplemental File 2. Part B, Fig. Z). On the basis of grain heterogeneity and age range, we conclude that most (or possibly all) of the grains in this sample are xenocrystic. Therefore, the most reasonable interpretation of the U-Pb data is that the two youngest ages of about 65 Ma should be regarded as the maximum age of emplacement of the aplite dike.

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