Uranium-Lead Zircon Ages and Sr, Nd, and Pb Isotope Geochemistry of Selected Plutonic Rocks from Western Idaho

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ABSTRACT

Across the Salmon River suture in western Idaho, where allochthonous Permian to Cretaceous oceanic rocks are juxtaposed against Proterozoic North American rocks, a wide variety of plutonic rocks are exposed. Available data indicate much variation in composition, source, and structural state of these plutons. The plutonic rocks were long described as the western border zone of the Cretaceous Idaho batholith but limited pre-existing age data indicate more complicated origins. Because the affinity and age of the plutonic rocks cannot be reliably determined from field relations, TIMS U-Pb dating in conjunction with Sr, Nd, and Pb isotopic studies of selected plutons across the suture in western Idaho were undertaken. The data indicate three general groups of plutons including (1) those that intruded the island arc terranes during the Triassic and Jurassic, those that intruded near the western edge of oceanic rocks along the suture in the Early Cretaceous, and the plutons of the Idaho batholith that intruded Proterozoic North American rocks in the Late Cretaceous. Plutons that intruded Proterozoic North American rocks commonly include xenocrystic zircons and in several cases, ages could not be determined. The least radiogenic Sr and most radiogenic Nd are found among the Blue Mountains superterrane island arc samples. Suture-zone plutons have isotopic characteristics that span the range between Idaho batholith and island arc samples but mostly follow island arc signatures. Plutons of the Idaho batholith have the most radiogenic initial Pb and Sr ratios and the least radiogenic Nd of the samples analyzed.

INTRODUCTION

In western Idaho, pre-Cretaceous rocks of the North American plate are juxtaposed against Permian to Cretaceous island arc rocks of the Blue Mountains superterrane (Siberling and others, 1984) along the north- to northeast-striking accretionary Salmon River suture (Lund and Snee, 1988). Estimates of the timing and mechanism of the accretion vary widely from Permian to Jurassic subduction zone (e.g. Hamilton, 1976; Brooks and Vallier, 1978) to

Cretaceous strike-slip boundary (e.g., Lund, 1984; Lund and Snee, 1988). At present (2008), the best estimates of the timing of the accretion are based on $^{40}Ar/^{39}Ar$ analyses in the Riggins, Idaho, area (Lund and Snee, 1988; Snee and others, 1995). These studies suggested that deformation of rocks in and around the suture zone began at about 130 Ma and that movement along the boundary ceased at about 93 Ma.

A selected suite of plutonic rocks from western Idaho have been analyzed for U-Pb geochronology and Pb, Sr, and Nd isotope geochemistry in an attempt to further define the age and source relations among plutonic rocks within and near the Salmon River suture zone (table 1, fig. 1). Several plutons of the Idaho batholith were examined to refine the age relations among the different rock types within the batholith. Island arc plutons of the Wallowa terrane to the west of the batholith also were examined in order to determine age relations among these plutons and with plutons within the Salmon River suture zone.

The plutons analyzed in this study are informally divided into three general groups: rocks of the Idaho batholith, island arc plutons of the Blue Mountains superterrane, and plutons within the Salmon River suture zone (Lund, 1988). Plutons of the Idaho batholith consist of hornblende-biotite tonalite, biotite and biotite-hornblende granodiorite, and biotite and biotite-muscovite granite. An amphibolite roof pendent in a granodiorite pluton also was examined. Field relations and previous geochronologic studies (Fisher and others, 1993; Lund, 2004) indicate that the tonalites are the oldest and that the two-mica granites are the youngest rocks of the batholith.

Island arc plutons consist of gabbro or diorite, quartz diorite, and biotite and biotite hornblende granodiorite (Lund and others, 1993; Manduca and others, 1993; Lund, 2004). These plutons are west of the suture zone. Previous geochronologic studies have shown that these plutons are generally Early Cretaceous to Late Permian (Armstrong and others, 1977; Walker, 1986; Manduca and others, 1993; Snee and others, 1995; Lund, 2004).

Plutons within the Salmon River suture zone (hereafter referred to as "suture zone plutons") have oceanic and continental sources (Armstrong and others, 1977; Fleck and Criss, 1985; Manduca and others, 1993). All of the plutons are at least moderately foliated.

Emplacement ages of the plutons have been determined using U-Pb analyses of zircons by thermal-ionization mass spectrometry (TIMS). Analytical data are provided in table 2. Although zircon ages provide the best estimate of emplacement ages of plutonic rocks the data may be difficult to interpret. Radiation damage to the zircons as a result of radioactive decay of uranium may make the crystals susceptible to radiogenic Pb loss. Zircons so affected will provide erroneously young apparent ages. At the other extreme, igneous rocks derived at least in part from a crustal source may contain xenocrystic zircon. Such crystals may act as nuclei for additional zircon growth so that an individual zircon may have domains of different ages. Data for these zircons provide erroneously old apparent ages.

Most of the plutons analyzed for U-Pb geochronology have also been examined for Rb-Sr, Sm-Nd, and U-Th-Pb systematics (tables 3 and 4). The isotopic signatures of the plutons can be used to identify the type of source from which the rocks were derived. Armstrong and others (1977) and Fleck and Criss (1985) clearly showed that there is a distinct difference in initial ^{87}Sr/^{86}Sr between the island-arc rocks (initial ^{87}Sr/^{86}Sr • 0.704) and plutons of the Idaho batholith (initial ^{87}Sr/86^{Sr} • 0.706). These differences reflect an oceanic (0.704) versus continental (0.706) source. Initial Sr values, supplemented with initial Nd and Pb ratios, in this work are most useful for the study of the suture zone plutons where the affinities (island arc or continental) cannot be reliably determined from field relations.

ANALYTICAL PROCEDURES

Zircon fractions, consisting of one to ten crystals, selected for U-Pb geochronology were handpicked from zircon concentrates obtained by conventional heavy-liquid and magnetic procedures. Samples were spiked with a ^{205}Pb-^{233}U-^{236}U-enriched tracer and were dissolved using HF vapor transfer (Krogh, 1978) in a Teflon bomb at 200^{o}C for seven to ten days. Lead was separated from the larger zircon fractions (• 100 ug) using anion exchange in 0.5N HBr medium. Uranium was isolated using anion exchange in 7N HNO_3 medium. Lead fractions were loaded onto Re filaments using the conventional phosphoric acid-silica gel method. Uranium fractions were loaded onto triple Re filaments.

Smaller zircon fractions were loaded directly onto Re filaments after dissolution using phosphoric acid and silica gel. Lead isotopes were measured in the same manner as above, whereas U isotopic ratios were obtained by measuring UO_2^+. Lead blanks ranged from 10 to 20 pg (10^{-12}g) for the larger samples measured during the early stages of the study and from 1 to 3 pg for the smaller samples. Uranium blanks were 1 pg or less.

Mass spectrometry was performed using either a VG Sector 54 seven-collector thermal ionization mass spectrometer or a VG54R single-collector mass spectrometer. Mass fractionation for Pb during mass spectrometry was monitored by replicate analyses of NIST standard SRM-981 (Cantanzaro and others, 1968; Todt and others, 1993).

Either whole-rock splits or plagioclase separates from the samples were spiked with ^{205}Pb-^{233}U-^{236}U-^{230}Th, ^{87}Rb-^{84}Sr, and ^{149}Sm-^{150}Nd-enriched tracers and were digested in PFA-Teflon screw-cap bombs with HF, and HNO_3 for a minimum of 48 hours at approximately 120°C. Lead was isolated first using anion exchange in 0.5N HBr medium. Uranium and thorium were separated together using anion exchange in 7N HNO_3 medium. Rubidium, strontium, and a rare earth fraction were isolated using cation exchange in 2.5N HCl medium. Samarium and neodymium were separated from the rare earth fraction using cation exchange in 0.2M n-methyllactic acid. Blanks for the procedure were on the order of Pb- 50 pg, U and Th- 15 pg, Rb- 40 pg, Sr- 300 pg, Sm- 50 pg, and Nd- 300 pg.

Mass spectrometry for U, Th, and Pb was the same as that described above for the large zircon fractions. Rubidium, Sr, Sm, and Nd were all analyzed using a VG 54R single-collector mass spectrometer. Rubidium was run using a triple Re filament technique. Strontium was run using a single oxidized Ta filament. Samarium and Nd were run using a triple filament technique with a Re ionizing filament and Ta sample filaments.

Data reduction was accomplished using the equations of Ludwig (1994). Uncertainties in the data tables are at the 95% confidence interval (C.I.).

IDAHO BATHOLITH

Tonalites and Amphibolite.

One amphibolite (MC18-91) and three tonalites (MC5-91, MC13-91, MC92-32) from the western margin of the Idaho batholith were analyzed (fig. 1). Sample MC18-91 is from an amphibolite roof pendant intruded by granodiorite of the Idaho batholith. It is thought to be one of the earliest phases of the batholith. The data are spread out along the concordia curve with apparent $^{206}Pb/^{238}U$ ages of 91-99 Ma (fig. 2). There is evidence for minor Pb loss and (or) xenocrystic zircon. Ten of the twelve fractions yield a mean $^{206}Pb/^{238}U$ age of 93.4 ± 0.8 Ma (95% C.I; Ludwig, 1980). This age and the initial $^{87}Sr/^{86}Sr = 0.7084$ and initial εNd = -8.6 indicate that this is indeed an early phase of the batholith and was derived primarily from a continental source.

Sample MC5-91 is the tonalite of the Payette River (Manduca and others, 1993; Lund, 2004) collected south of McCall (fig. 1). There is clear evidence for minor Pb loss, but 7 of the 9 fractions yield a mean $^{206}Pb/^{238}U$ age of 91.2 ± 1.0 Ma (fig.3). The initial $^{87}Sr/^{86}Sr =$ 0.7088 and initial εNd = -8.5 indicate a continental source.

Sample MC13-91 is tonalite collected 20 km north of McCall (fig. 1). There is clear evidence for some xenocrystic zircon cores and possible evidence for minor Pb loss. Seven of the nine fractions have $^{206}Pb/^{238}U$ ages of 87 to 91 Ma and are nearly concordant (fig. 4). The mean $^{206}Pb/^{238}U$ age of these seven fractions is 88.9 ± 1.3 Ma, which represents our best estimate of the age of this tonalite. The initial $^{87}Sr/^{86}Sr$ = 0.7090 and initial εNd = -9.4 indicate a continental source.

Sample MC92-32 is tonalite from the northern part of the Atlanta lobe of the Idaho batholith northeast of Riggins (fig. 1). All zircon fractions analyzed appear to have xenocrystic cores and no useful age information was obtained from this sample (fig. 5). Data for two fractions that are most nearly concordant set an upper limit of about 126 Ma for the emplacement age. The initial $^{87}Sr/^{86}Sr$ = 0.7099 indicates a continental source.

Granites and Granodiorites.

Eight granites and granodiorites from the Atlanta lobe of the Idaho batholith were selected for analysis.

Sample MC1-91 is biotite-muscovite granite collected from a large pluton 20 km southeast of McCall (fig. 1). There is evidence for minor Pb loss in two of the seven fractions and some evidence for xenocrystic zircon in one of these two (fig. 6). The remaining five fractions cluster about the concordia curve and yield a mean $^{206}Pb/^{238}U$ age of 82.2 ± 1.1 Ma. The initial $^{87}Sr/^{86}Sr$ = 0.7081 and initial εNd = -7.4 indicate a continental source.

Sample MC2-91 is porphyritic biotite-muscovite granite also from southeast of McCall. It is mapped as the porphyritic equivalent of MC1-91 (Lund, 2004). Unlike MC1-91, zircons from MC2-91 show clear evidence of xenocrystic zircon and perhaps minor Pb loss (fig. 7). Data for four of the eight fractions yield an imprecise $^{206}Pb/^{238}U$ age of 82.9 ± 5.2 Ma. Although imprecise, the age is in good agreement with that obtained for MC1-91. The initial $^{87}Sr/^{86}Sr$ = 0.7079 and initial εNd = -7.3 are in good agreement with those obtained for MC1-91 and indicate a continental source.

Sample MC6-91 is biotite granodiorite from east of Little Payette Lake, 5 km east of McCall. One fraction shows evidence for minor Pb loss (fig. 8). The other four fractions define a $^{206}Pb/^{238}U$ age of 94.4 ± 1.1 Ma. The initial $^{87}Sr/^{86}Sr$ = 0.7088 and initial εNd = -9.6 indicate a continental source.

Sample MC15-91 is biotite-muscovite granite from the East Fork of the South Fork of the Salmon River, 25 km northeast of McCall. There is clear evidence for xenocrystic zircon in most of the fractions (fig. 9). Two of the seven fractions plot near the concordia curve and indicate a maximum age of approximately 90 Ma. The initial $^{87}Sr/^{86}Sr$ = 0.7095 and initial εNd = -10.4 indicate a continental source.

Zircons from biotite granite (MC92-33, approximately the same location as MC92-32 above) show clear evidence for xenocrystic cores (fig. 10). Two fractions that plot close to the concordia curve indicate an age of approximately 83-89 Ma. A continental source is indicated by the initial $^{87}Sr/^{86}Sr$ = 0.7093 and initial εNd = -7.2.

Zircons from biotite-hornblende granodiorite from the Yellow Pine area, 45 km east of McCall (MC92-35, fig. 1), show little evidence for Pb loss or xenocrystic cores (fig. 11). Data for six of the seven fractions yield a mean $^{206}Pb/^{238}U$ age of 93.2 ± 1.3 Ma. The initial $^{87}Sr/^{86}Sr$ = 0.7093 and initial εNd = -6.8 indicate a continental source.

A second porphyritic biotite-hornblende granodiorite (MC92-36) from about 40 km southeast of McCall contains zircons with evidence of Pb loss and xenocrystic cores (fig. 12). Data for four of six fractions cluster about the concordia curve and yield a mean $^{206}Pb/^{238}U$ age = 90.3 ± 1.2 Ma. The sample was not analyzed for Sr or Nd isotopic ratios.

Sample MC93-51 is biotite-muscovite granite from an outcrop near Dent Bridge on Dworshak Reservoir, 20 km north of Orofino (fig. 1), near the contact with garnet-bearing schist. Data from 12 zircon fractions define a scattered linear array that intersects the concordia curve at 1378.2 ± 4.6 Ma and 78.3 ± 2.7 Ma (fig. 13). One fraction (MC51-6, table 2) is nearly concordant at the lower intercept. The results indicate that the xenocrystic cores in the zircon were derived from a single (~1380 Ma) source and suggest that this rock may simply represent partial remelting of a Proterozoic pluton. Such Mesoproterozoic plutons are widespread across central Idaho (Evans and Fischer, 1986; Evans and Zartman, 1990). The sample was not analyzed for Sr or Nd isotopic ratios.

BLUE MOUNTAINS SUPERTERRANE

Twelve samples of island arc-related plutons from the Wallowa terrane west of the Idaho batholith (fig. 1) were selected for U-Pb zircon analyses. Samples 00KL030, 00KL031, and 00KL032, were collected from extreme western Idaho, 40 km southwest of McCall. Data for zircons from quartz diorite 00KL030 are scattered along the concordia curve and show evidence for Pb loss and some xenocrystic zircon (fig. 14). Nine of the 15 fractions are clustered about the concordia curve and give a rather imprecise mean $^{206}Pb/^{238}U$ age of 211.5 ± 4.7 Ma. The sample has an island-arc isotopic signature (initial $^{87}Sr/^{86}Sr$ = 0.7037 and initial εNd = +7.0). The source of the apparent xenocrystic zircon is unknown.

Sample 00KL031 is diorite. Data for seven of nine fractions cluster about the concordia curve with a mean $^{206}Pb/^{238}U$ age = 218.1 ± 1.8 Ma (fig. 15). One fraction shows evidence for Pb loss and another imprecise point shows evidence for minor xenocrystic zircon. The initial $^{87}Sr/^{86}Sr$ = 0.7034 clearly indicates an island-arc source.

Sample 00KL032 is biotite granodiorite (fig. 16). Zircon data are scattered along the concordia curve between 194 and 232 Ma such that no reliable age information could be obtained. One fraction clearly shows evidence of xenoncrystic zircon. The initial $^{87}Sr/^{86}Sr$ = 0.7026 and initial εNd = +7.5 are island-arc isotopic signatures.

Samples 00KL035A is from the east fork of the Weiser River, 20 km southwest of McCall. Four of five fractions from quartz diorite 00KL035A cluster about the concordia curve and give a mean $^{206}Pb/^{238}U$ age = 158.9 ± 1.4 Ma (fig. 17). The remaining crystal appears to have a xenocrystic core. The initial $^{87}Sr/^{86}Sr$ = 0.7038 and initial εNd = +5.2. The initial εNd is slightly less than other similar rock types within the Wallowa terrane, but is still within the range for island-arc samples.

Sample 00KL035B is granodiorite from the same exposure as 00KL035A (above). Field relations indicate this is the youngest of the plutonic rocks in this area. There is clear evidence for xenocrystic zircon cores (fig. 18*A*) and reliable age information was not obtained. Three of the eight fractions are nearly concordant at 128 to 140 Ma (fig. 18*B*). The initial $^{87}Sr/^{86}Sr$ = 0.7038 and initial εNd = +5.0 are very similar to those for 00KL035A.

Sample 87KL017 is a foliated biotite granodiorite from Slate Creek between McCall and Riggins. Field relations indicate that this is the youngest pluton west of the suture zone in this area (Lund and others, 1993). Although the $^{207}Pb/^{235}U$ data are very imprecise because of the comparatively low U and Pb contents and rather nonradiogenic Pb in the sample (table 2), $^{206}Pb/^{238}U$ data for six of the ten fractions are tightly clustered with a mean $^{206}Pb/^{238}U$ age of 113.1 ± 0.6 Ma (fig. 19). The data show evidence for xenocrystic cores and minor Pb loss. The initial $^{87}Sr/^{86}Sr$ = 0.7037 and initial εNd = +5.7 confirm that the sample was derived from an island-arc source.

Sample MC26-91 is quartz diorite from west of Orofino in the northern part of the study area. Seven of eight fractions yield a mean $^{206}Pb/^{238}U$ age of 140.6 ± 0.5 Ma (fig. 20).

There is evidence for minor Pb loss in at least the one excluded fraction. The initial $^{87}Sr/^{86}Sr$ = 0.7034 and initial εNd = +6.7 are typical island-arc isotopic signatures.

Samples K92-1 and K92-5 to K92-8 were collected in a north-south traverse of the heterogeneous orthogneiss complex (Lund, 2004) about half way between McCall and Riggins. All are in the Hazard Lake quadrangle (scale 1:24000). These samples were not examined for Sr or Nd isotopic signatures.

Sample K92-1 is tonalite from Buck Lake, about 35 km north of McCall. Data for 7 of 8 fractions cluster about the concordia curve with a mean age of 161.1 ± 0.9 Ma (fig. 21). There is evidence of xenocrystic zircon in at least the one outlying fraction.

Sample K92-5 is tonalite from south Lake Serene, about 30 km north of McCall. Zircon data are scattered along the concordia curve between approximately 240 to 200 Ma (fig. 22). Three of the eight fractions are nearly concordant with a mean apparent age of 228.9 ± 3.1 Ma. However, given the evidence for xenocrystic zircon and Pb loss, this apparent age should be viewed with skepticism.

Sample K92-6 is granodiorite from near Cup Lake, about 30 km north of McCall. Data for five zircon fractions yield a mean $^{206}Pb/^{238}U$ age of 114.4 ± 0.7 Ma with little or no evidence for Pb loss or xenocrystic zircon (fig. 23).

Sample K92-7 is tonalite from south-southeast of Morgan Lake, about 30 km north of McCall. Data for six fractions yield a somewhat scattered linear array that intersects the concordia curve at 317 ± 49 Ma and 140 ± 22 Ma (fig. 24). Given that none of the data are concordant at either end of the array, the significance of the intercepts remains rather dubious.

Sample K92-8 is tonalite from Hazard Lake area about 30 km north of McCall. Data for seven fractions plot on or near the concordia curve at 118 to 110 Ma. The mean age of these fractions is 114.4 ± 2.2 Ma (fig. 25).

SUTURE ZONE PLUTONS

Eight plutons from the Salmon River suture zone have been examined. As stated above, all are at least moderately deformed and little is known about their ages or geochemical affinities. Some of these plutons have proven to be very difficult to date.

Sample MC10-91 is porphyritic augen gneiss from west of Brundage Mountain, 15 km northwest of McCall (fig. 1). There is clear evidence for xenocrystic zircon and no reliable age information was obtained from the sample (fig. 26). One concordant point has an apparent $^{206}Pb/^{238}U$ age of 99.9 Ma and the three least discordant points have a mean $^{206}Pb/^{238}U$ age of 106 ± 13 Ma. However, we emphasize that these apparent ages are unreliable. The initial $^{87}Sr/^{86}Sr$ = 0.7055 and initial εNd = -2.9 are intermediate between typical Idaho batholith signatures and the island-arc signatures outlined above. These results suggest a mixed source for this pluton.

Sample MC11-91 is foliated tonalite from the Hazard Lake area, northwest of McCall. Zircon data are spread out along the concordia curve with apparent ages of 161 to 144 Ma (fig. 27). Four fractions were air abraded (Krogh, 1982) in an attempt to diminish the scatter. These four fractions have the highest apparent ages with a mean $^{206}Pb/^{238}U$ age = 158.9 ± 2.9 Ma. This sample has an initial $^{87}Sr/^{86}Sr$ = 0.7044 and initial εNd = +3.6. These results suggest a mixed source dominated by the island-arc component.

Sample MC20-91 is tonalite gneiss from the Slate Creek area , about 30 km northeast of Riggins. There is clear evidence for xenocrystic zircon and the possibility of Pb loss cannot be excluded (fig. 28). The best-fit line through the eight data points intersects the concordia curve at 315 ± 96 Ma and 119 ± 22 Ma. Although imprecise, the 119 Ma age represents our best estimate of the emplacement age of the sample. The initial $^{87}Sr/^{86}Sr$ = 0.7036 and the initial εNd = +3.2 suggest a mixed but predominantly island arc source.

Sample MC22-91 is foliated to massive granodiorite from the South Fork of the Clearwater River, about 50 km northeast of Riggins. The best-fit line through the eleven data points intersects the concordia curve at 438 ± 35 Ma and 99.2 ± 2.2 Ma (fig. 29A). Four nearly-concordant data points yield a mean $^{206}Pb/^{238}U$ age of 99.4 ± 3.2 Ma (fig. 29B). The initial $^{87}Sr/^{86}Sr$ = 0.7046 and the initial εNd = +0.1 suggest a mixed source.

Four samples from the Orofino area in the northern part of the study (fig. 1) were analyzed. Sample MC23-91 is tonalite gneiss collected from a large quarry near Dworshak dam. Data for six air-abraded fractions yield a mean $^{206}Pb/^{238}U$ age = 116.7 ± 0.7 Ma (Fig 30). The initial $^{87}Sr/^{86}Sr$ = 0.7036 and initial εNd = +5.7 clearly represent an island-arc source.

Sample MC25-91 is porphyritic augen gneiss from Big Eddy Marina on Dworshak Reservoir, 5 km northwest of Orofino. Although there is clear evidence for xenocrystic zircon (fig. 31), four of the eight fractions are tightly clustered about the concordia curve with a mean $^{206}Pb/^{238}U$ age = 96.2 ± 0.3 Ma. This age and the initial $^{87}Sr/^{86}Sr$ = 0.7094 and initial εNd = -8.2 indicate that this sample is an early phase of the Idaho batholith emplaced on the continental side of the suture.

Sample MC93-54 is quartz diorite collected from a shear zone from along the Clearwater River, 10 km southeast of Orofino (fig. 1). Although there is evidence for xenocrystic zircon, six of the ten fractions are concordant within analytical uncertainty (fig. 32). These six fractions have a mean $^{206}Pb/^{238}U$ age = 121.1 ± 1.4 Ma. The initial $^{87}Sr/^{86}Sr$ = 0.7035 and initial εNd = +6.2 indicate an island-arc source.

Sample MC93-55 is foliated tonalite collected along the Clearwater River, 20 km southeast of Orofino. Zircon data are scattered along the concordia and show evidence for Pb loss (fig. 33). Five of the six fractions give an imprecise mean $^{206}Pb/^{238}U$ age = 116.4 ± 6.2 Ma. Given the evidence for Pb loss, this apparent age should be regarded as a minimum age. The initial $^{87}Sr/^{86}Sr$ = 0.7035 and initial εNd = +6.9 indicate an island-arc source.

INTERPRETATION

The initial Sr and Nd isotopic characteristics of Idaho batholith in North American basement, plutons of the Blue Mountains superterrane, and suture zone plutons are summarized in figure 34, and initial Pb isotopic ratios in figure 35. Idaho batholith rocks show the most radiogenic initial Pb and Sr ratios and the least radiogenic Nd (lowest εNd) of the samples analyzed in this study. The least radiogenic Sr and most radiogenic Nd are found among the Blue Mountains superterrane pluton samples. Suture-zone plutons have isotopic characteristics that span the range between Idaho batholith and Blue Mountains superterrane pluton samples but mostly follow island arc signatures. Sample MC25-91 appears to represent a metamorphosed early phase of the Idaho batholith. Other samples such as MC23-91, MC93-54, and MC93-55 have island-arc characteristics. A few plutons (MC10-91, MC11-91, MC20-91, MC22-91) have intermediate isotopic characteristics.

Plutons within the suture zone, with the exception of MC11-91, also have apparent emplacement ages intermediate between plutons of the Blue Mountains superterrane and the Idaho batholith (fig. 36). Most plutons recognized within the suture zone were emplaced early syntectonically during transcurrent accretionary movement along the suture zone and also have recorded later tectonic overprints. The observed temporal and isotopic trends suggest that island-arc related volcanism in this area persisted until Early Cretaceous time. The suture-zone plutons were derived from the allochthonous island-arc source but were variably contaminated with continental material. The Idaho batholith formed as a younger set of voluminous plutons, entirely within the North American plate.

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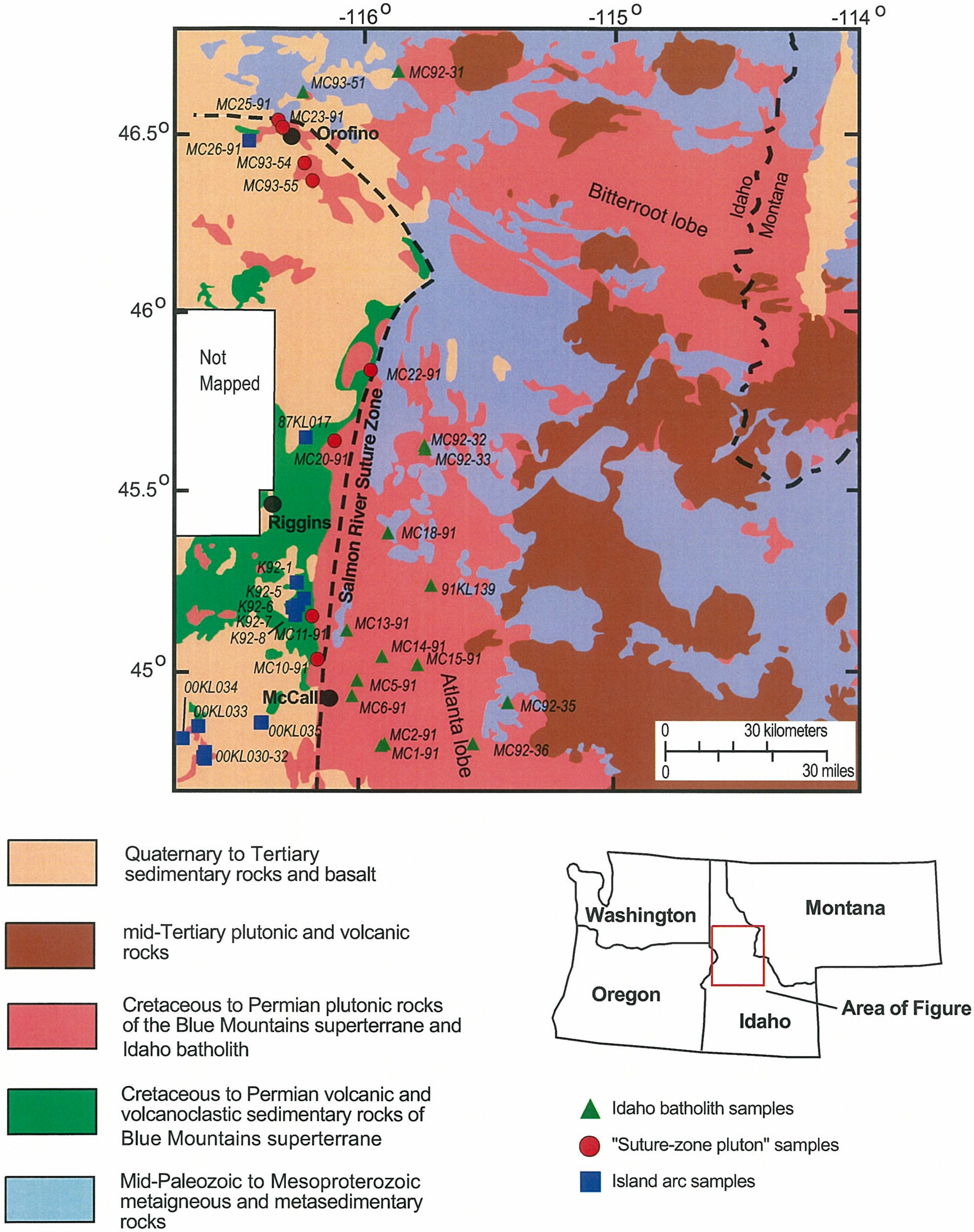

Figure 1. Sample locations. Samples refer to tables 1-4.

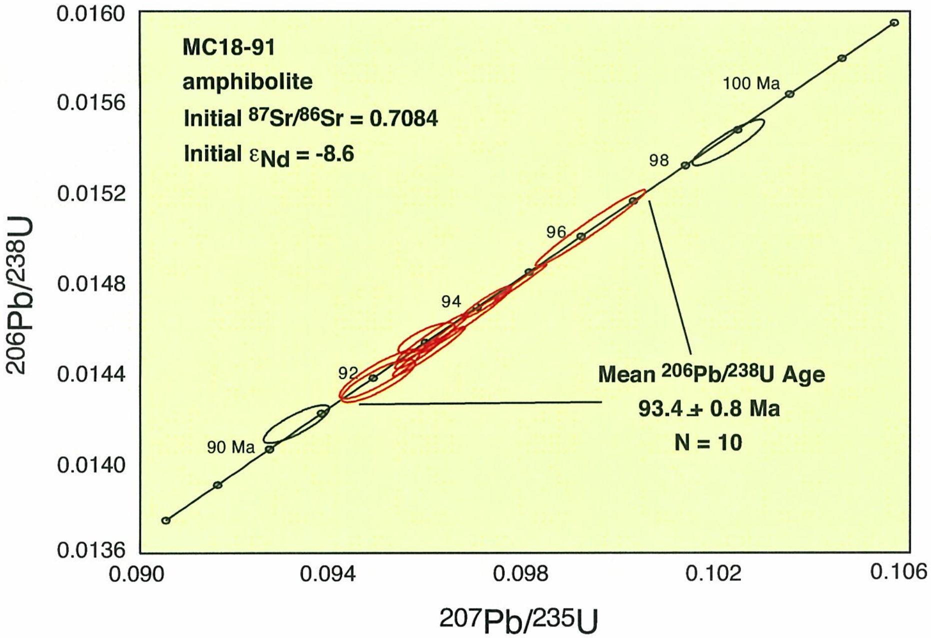

Figure 2. U-Pb concordia diagram for sample MC18-91.

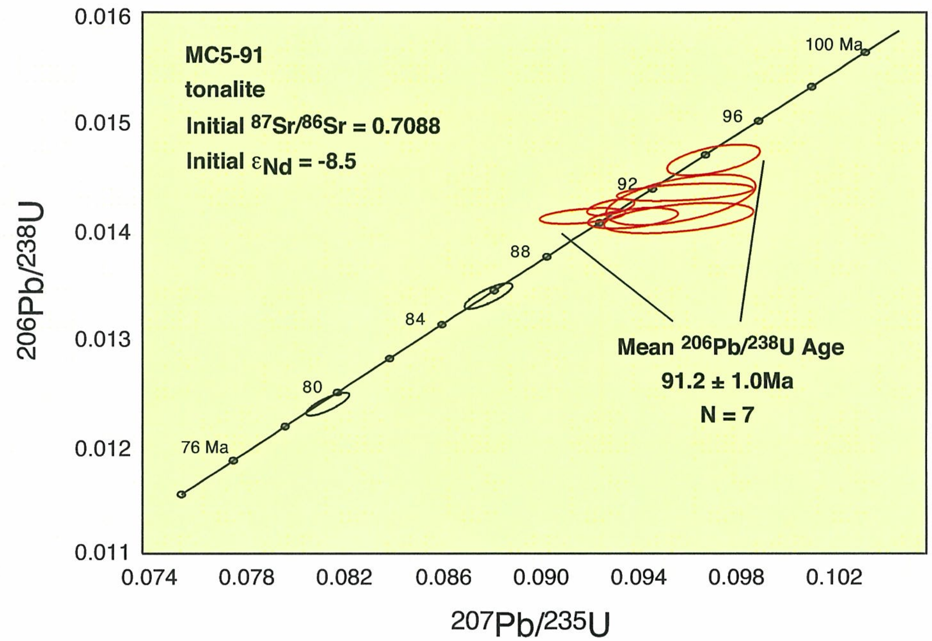

Figure 3. U-Pb concordia diagram for sample MC5-91.

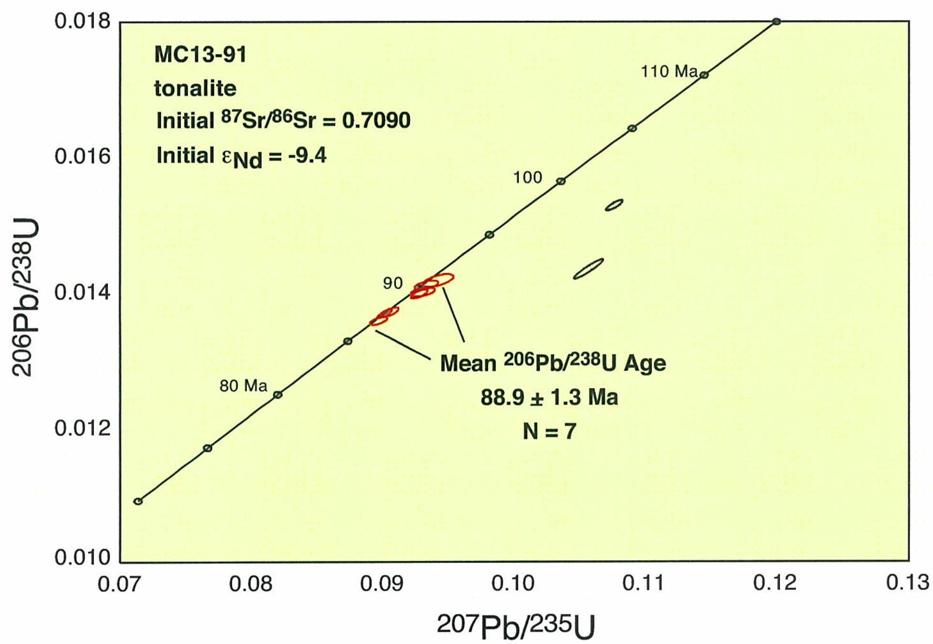

Figure 4. U-Pb concordia diagram for sample MC13-91.

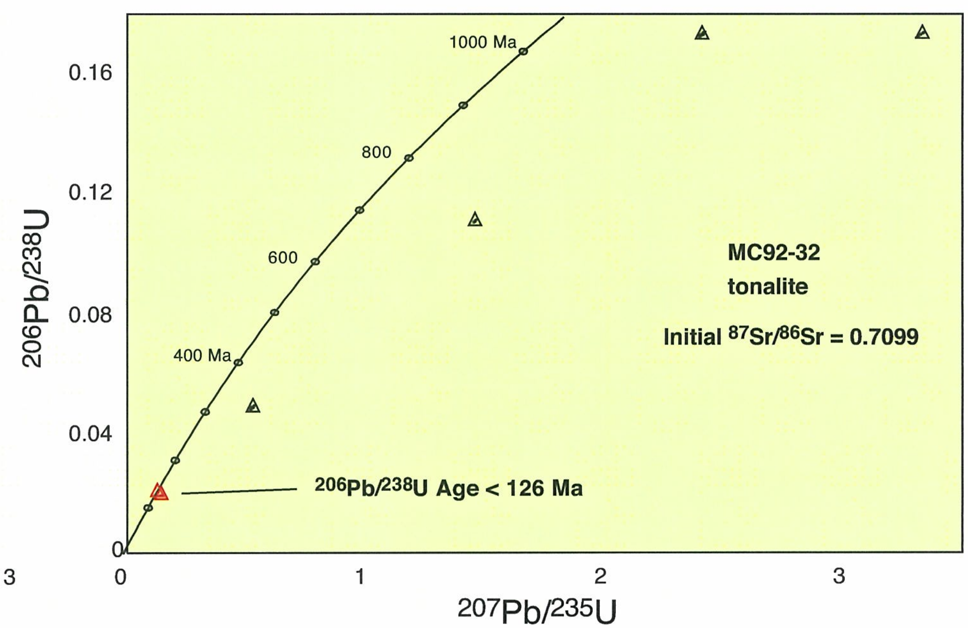

Figure 5. U-Pb concordia diagram for sample MC92-32.

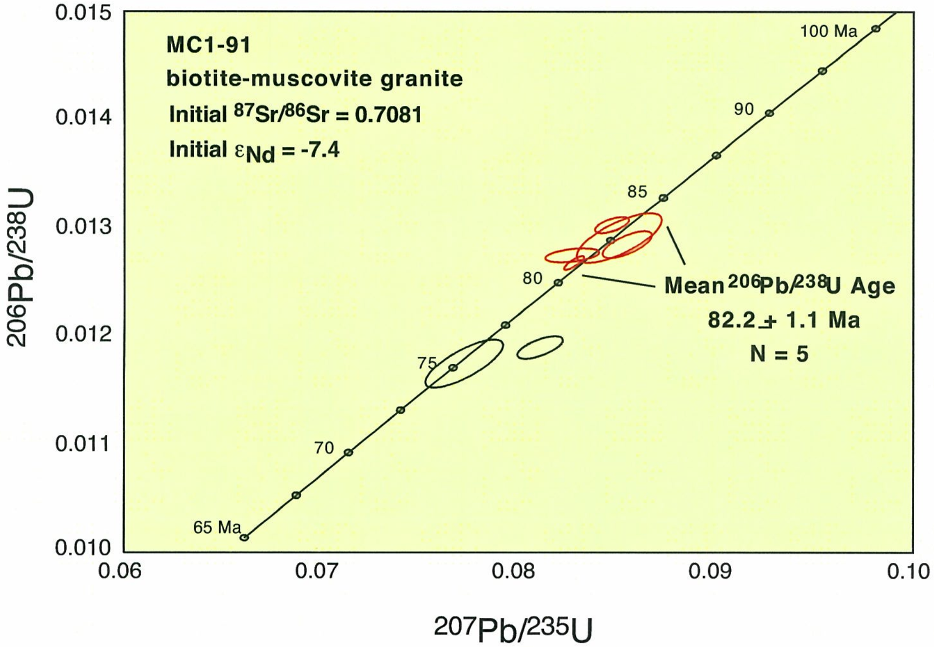

Figure 6. U-Pb concordia diagram for sample MC1-91.

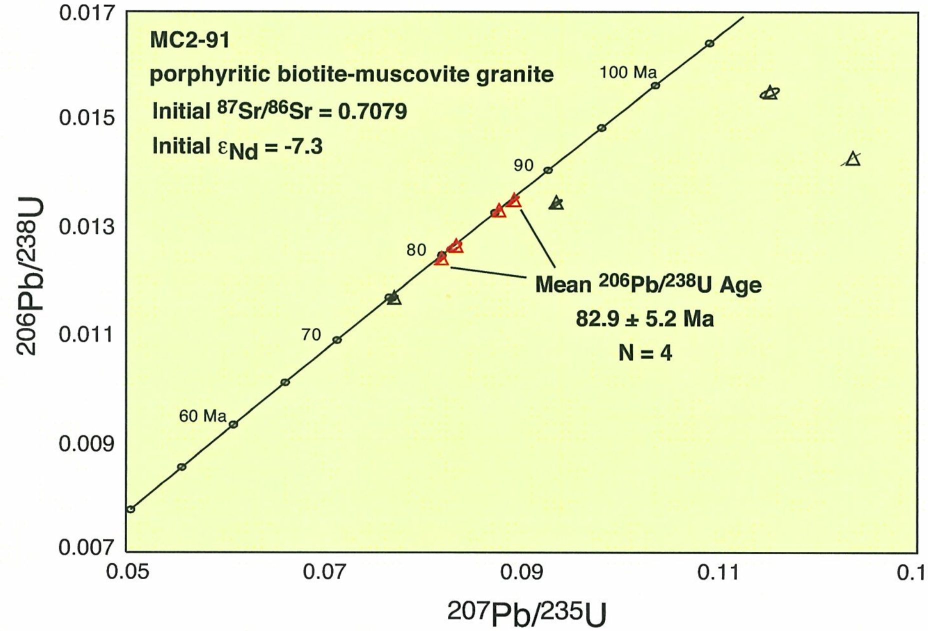

Figure 7. U-Pb concordia diagram for sample MC2-91.

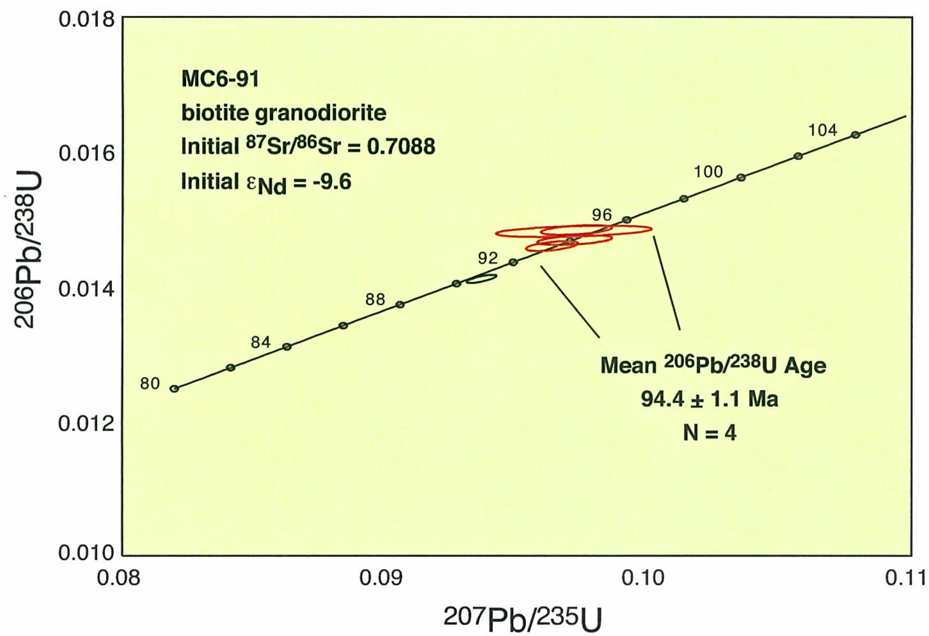

Figure 8. U-Pb concordia diagram for sample MC6-91.

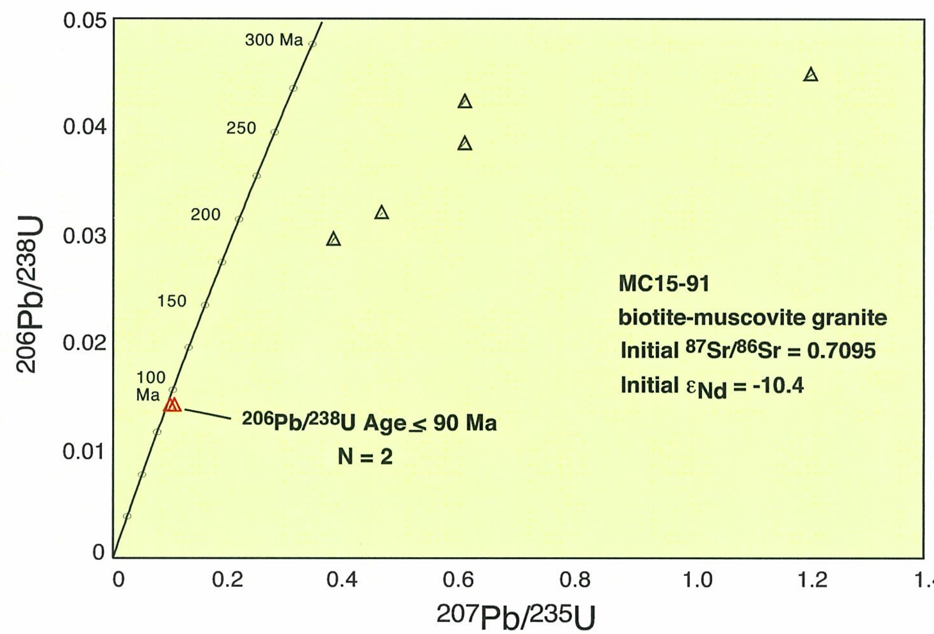

Figure 9. U-Pb concordia diagram for sample MC15-91.

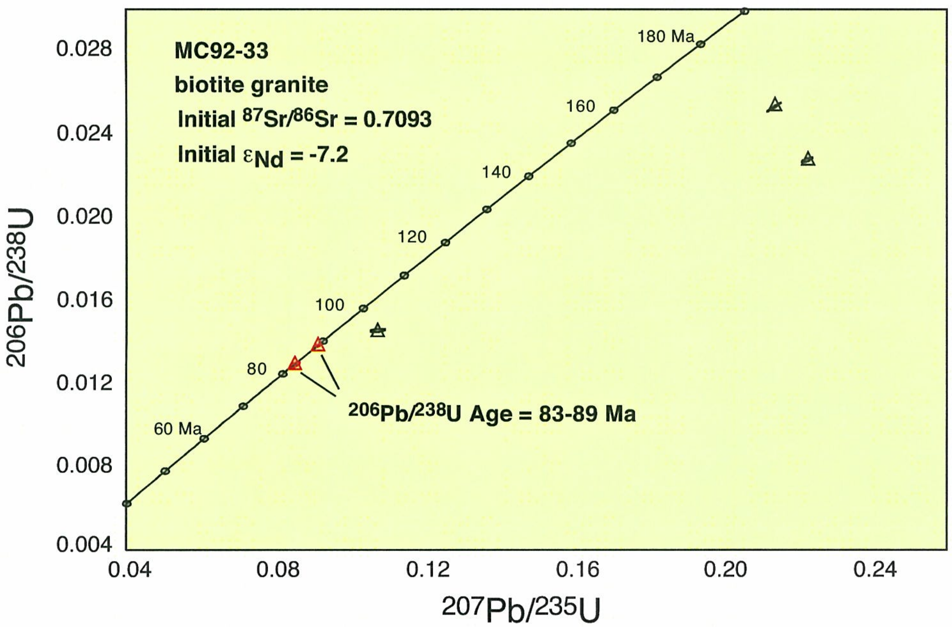

Figure 10. U-Pb concordia diagram for sample MC92-33.

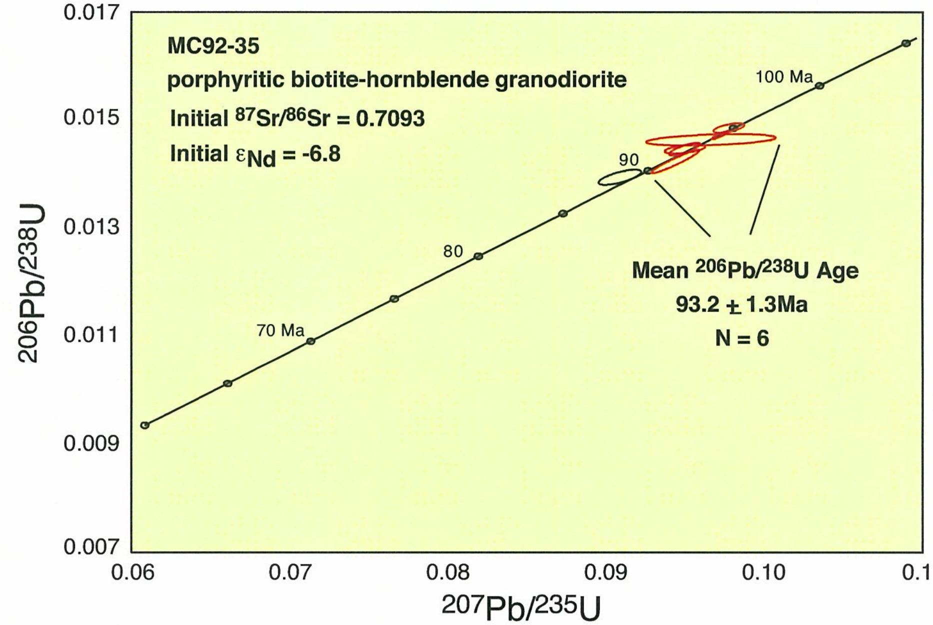

Figure 11. U-Pb concordia diagram for sample MC92-35.

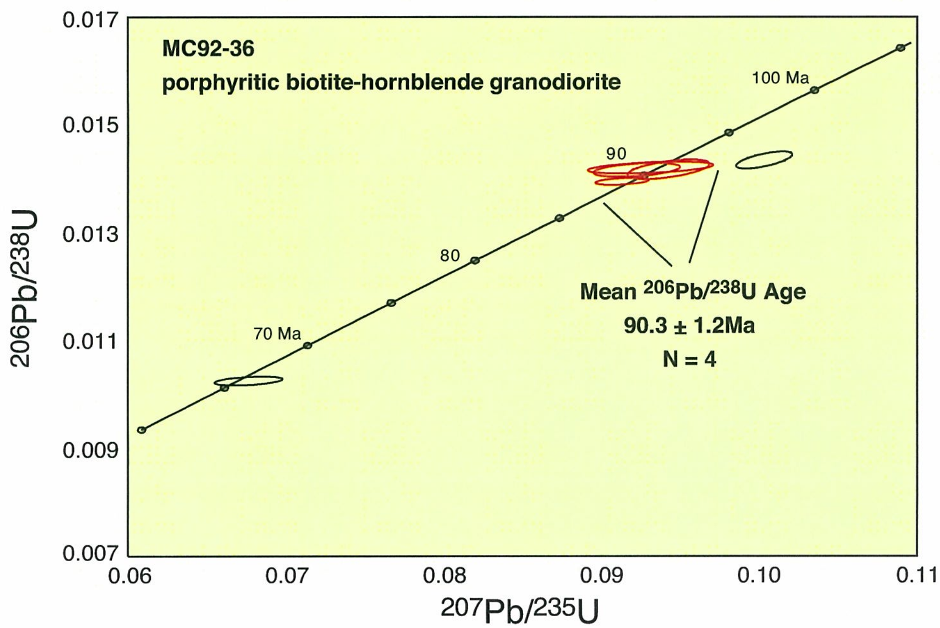

Figure 12. U-Pb concordia diagram for sample MC92-36.

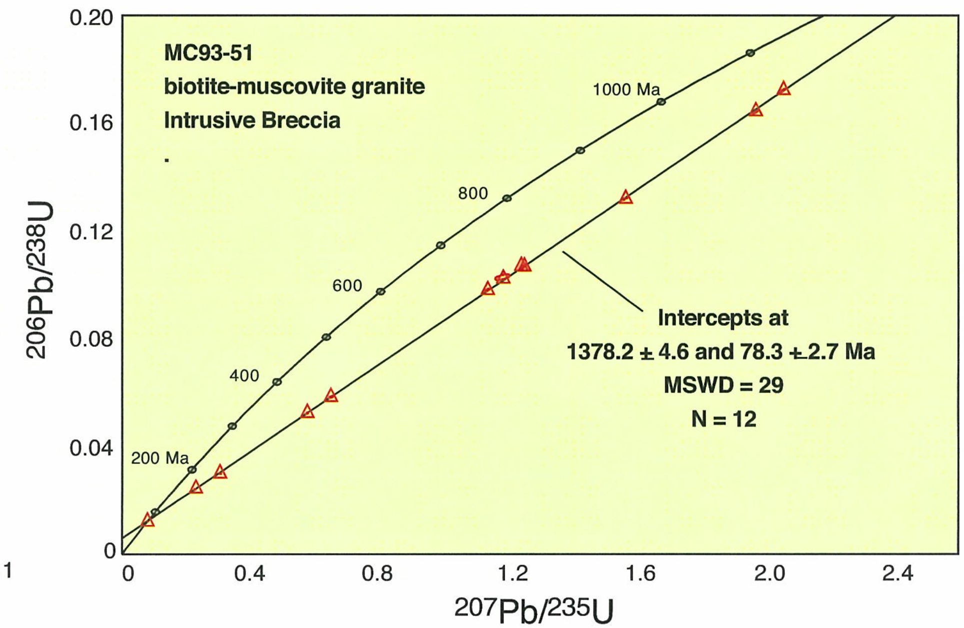

Figure 13. U-Pb concordia diagram for sample MC93-51.

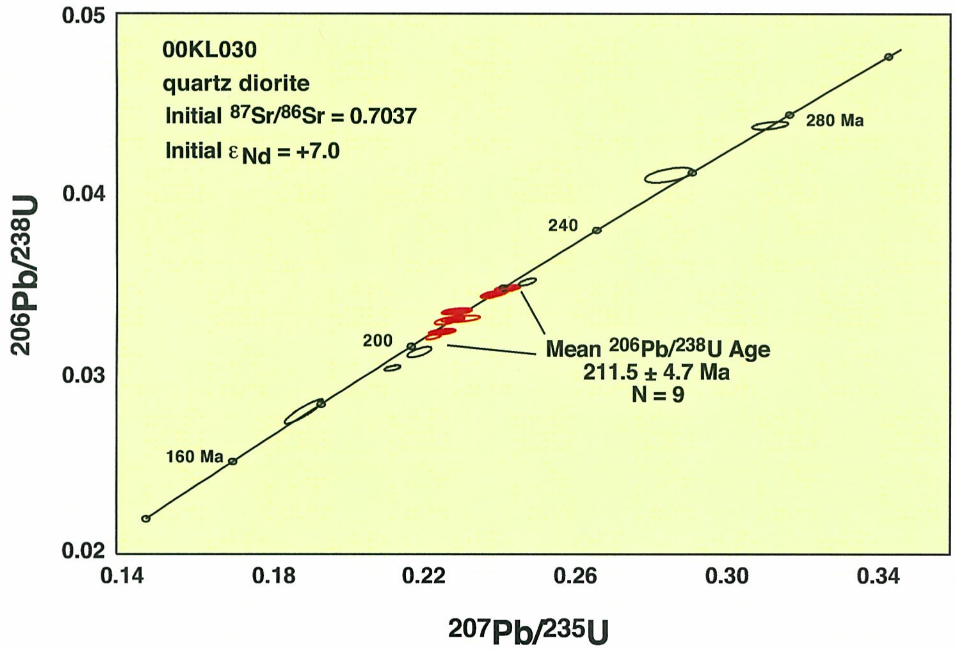

Figure 14. U-Pb concordia diagram for sample 00KL030.

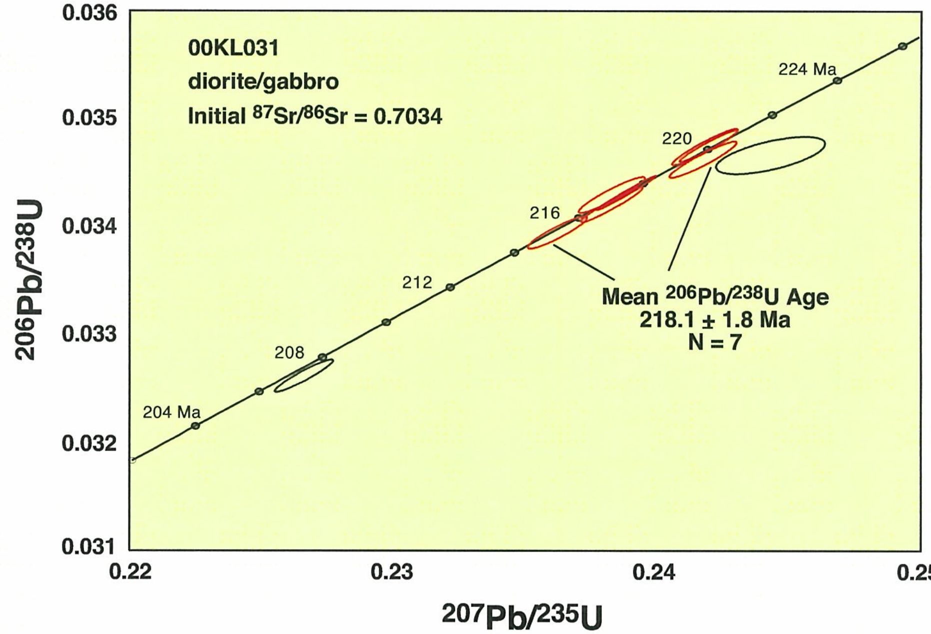

Figure 15. U-Pb concordia diagram for sample 00KL031.

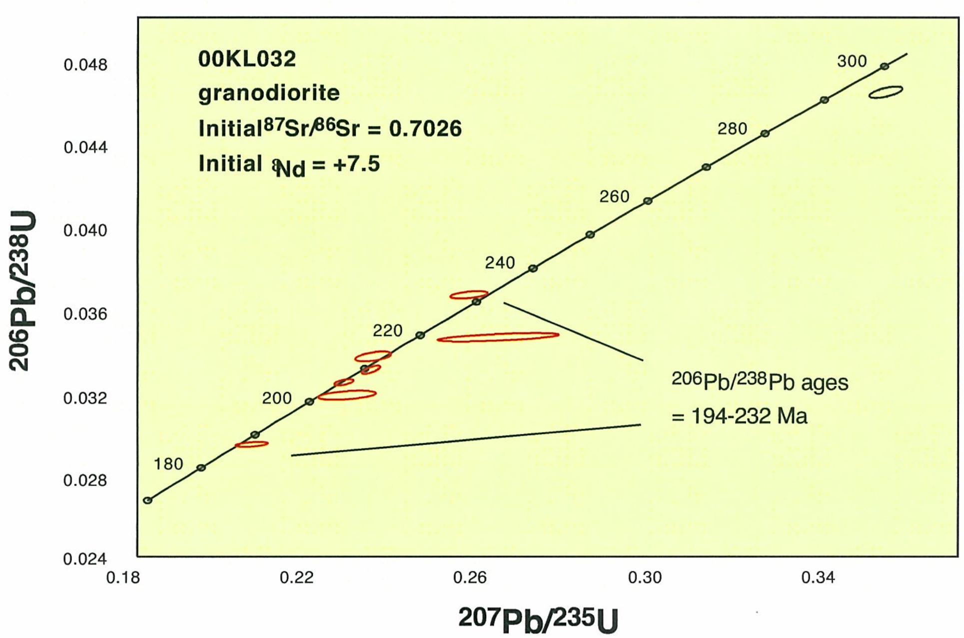

Figure 16. U-Pb concordia diagram for sample 00KL032.

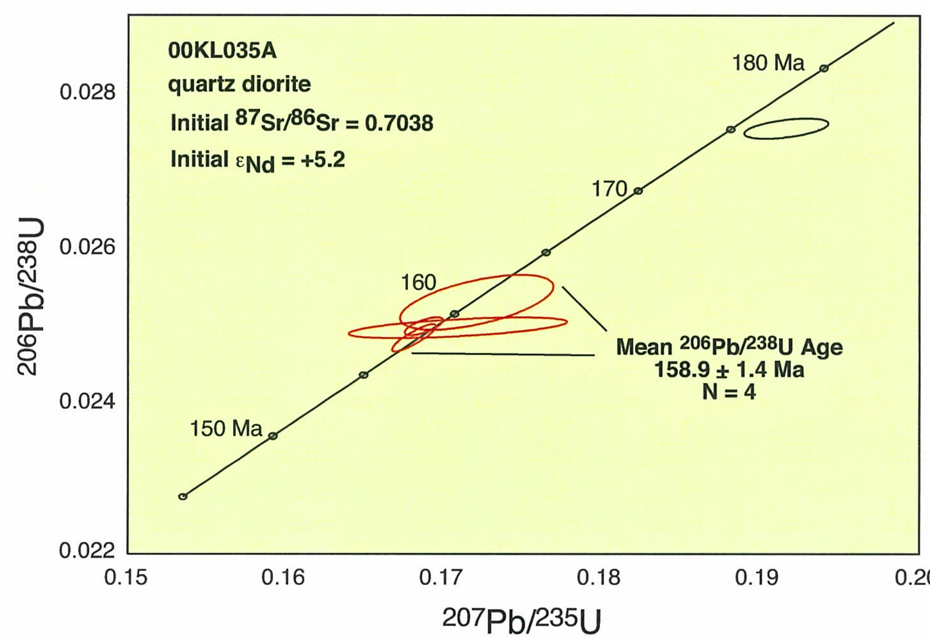

Figure 17. U-Pb concordia diagram for sample 00KL035A.

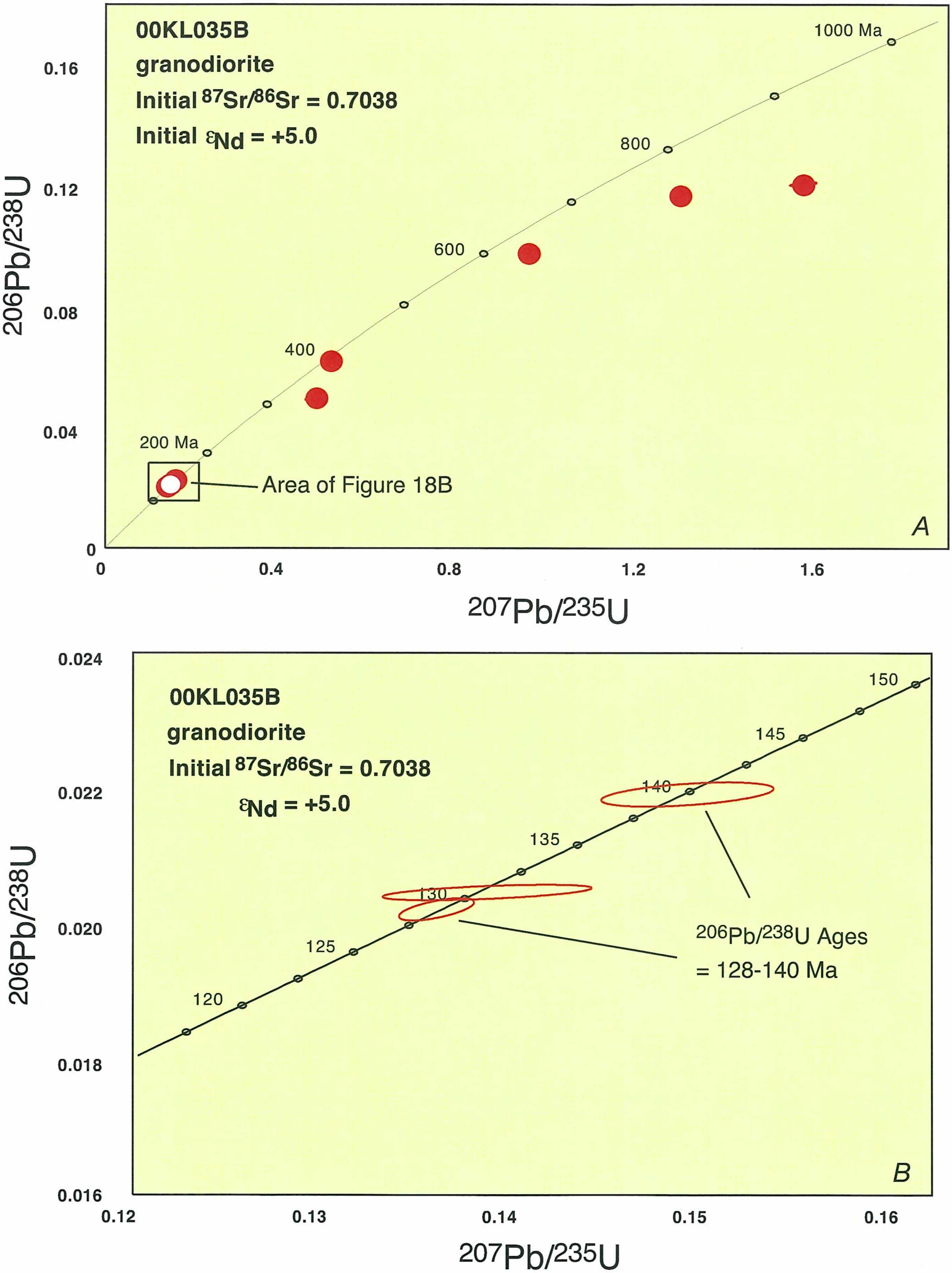

Figure 18. U-Pb concordia diagram for sample 00KL035B. Data shown by circles have uncertainties smaller than the symbols.

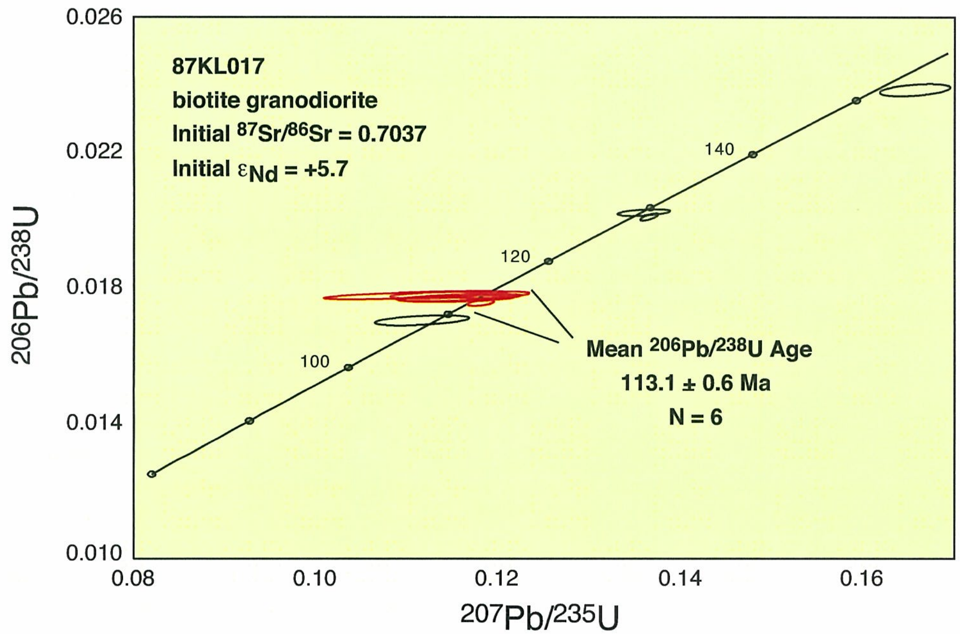

Figure 19. U-Pb concordia diagram for sample 87KL017.

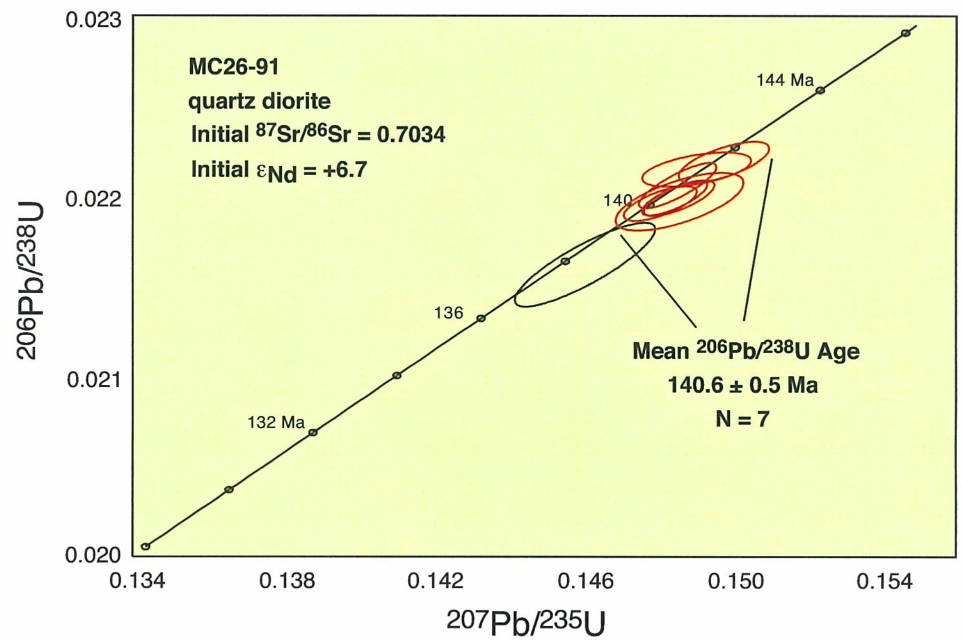

Figure 20. U-Pb concordia diagram for sample MC26-91.

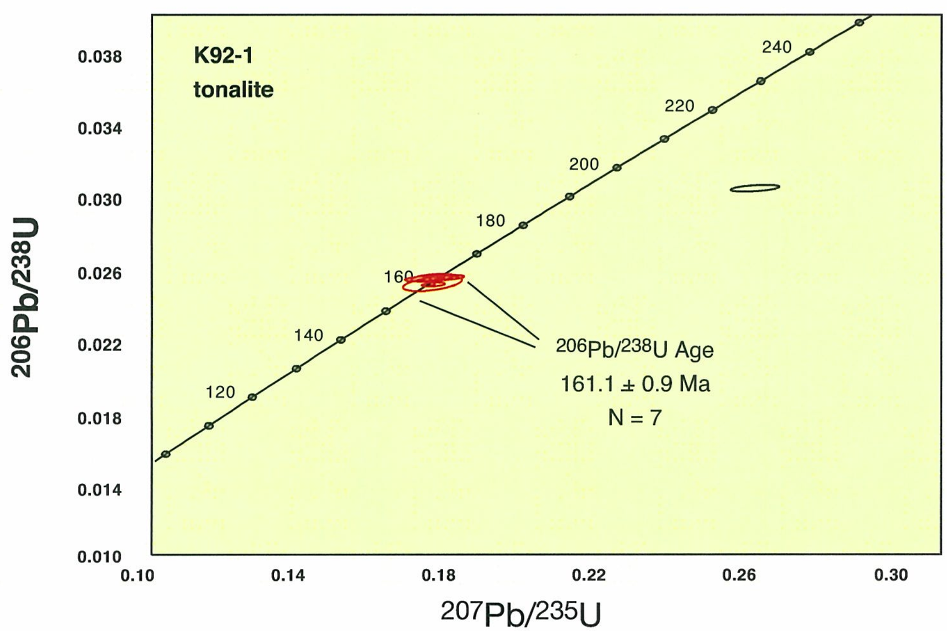

Figure 21. U-Pb concordia diagram for sample K92-1.

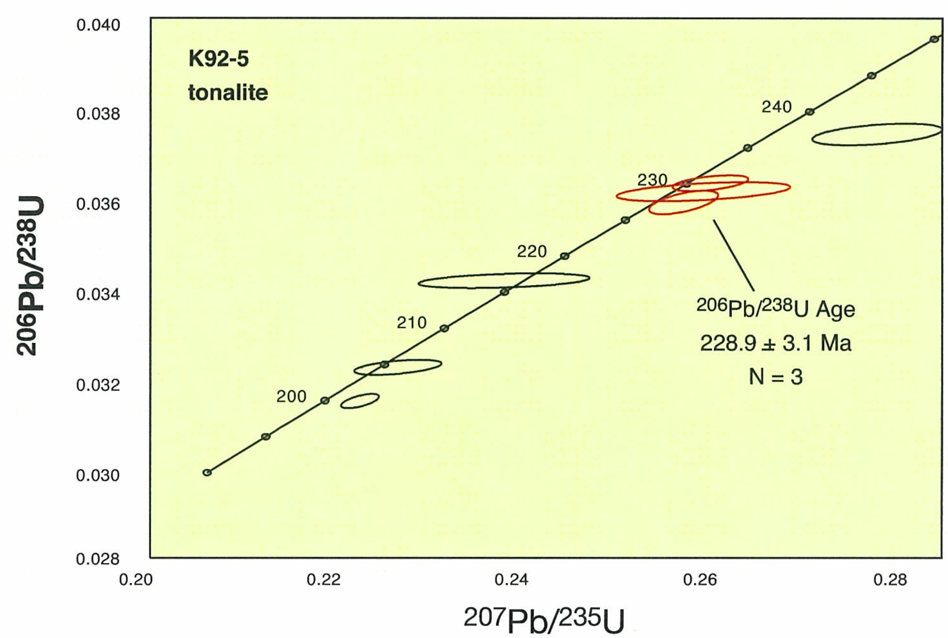

Figure 22. U-Pb concordia diagram for sample K92-5.

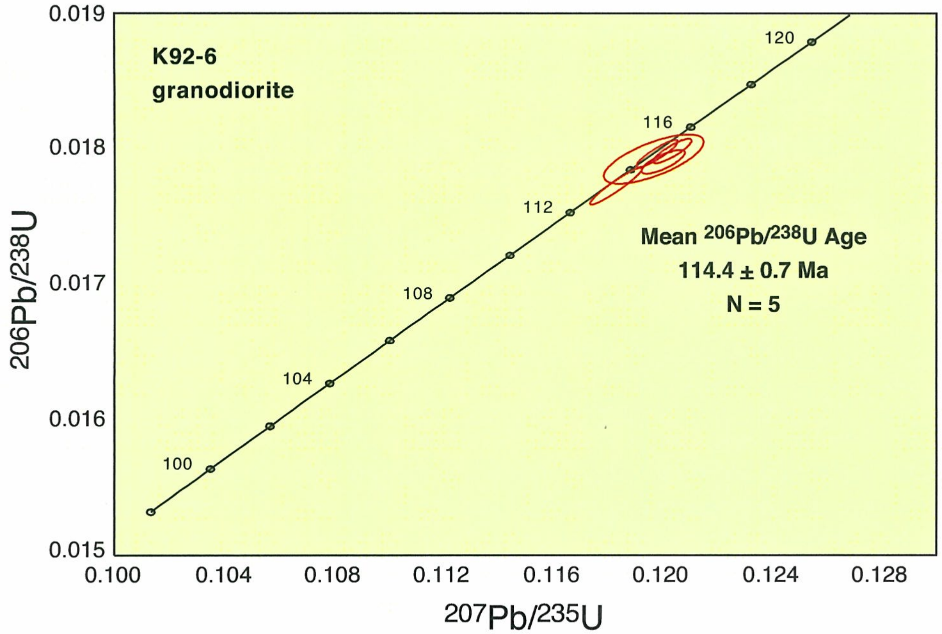

Figure 23. U-Pb concordia diagram for sample K92-6.

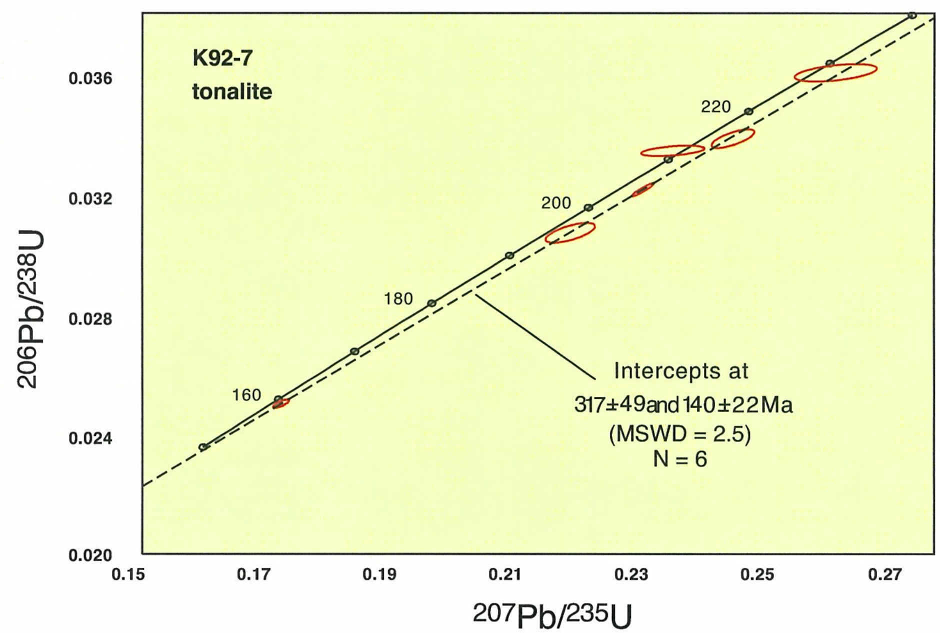

Figure 24. U-Pb concordia diagram for sample K92-7.

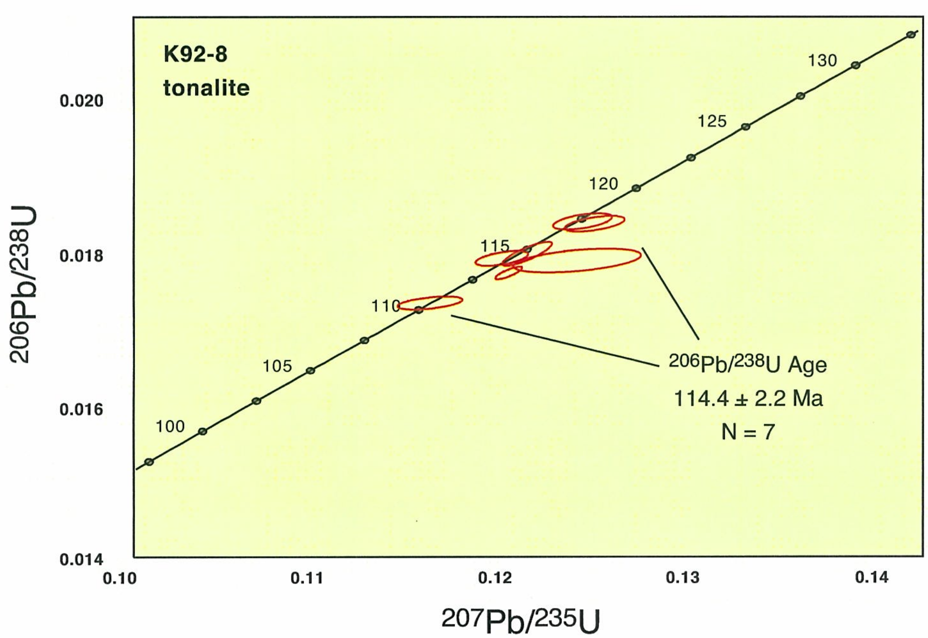

Figure 25. U-Pb concordia diagram for sample K92-8.

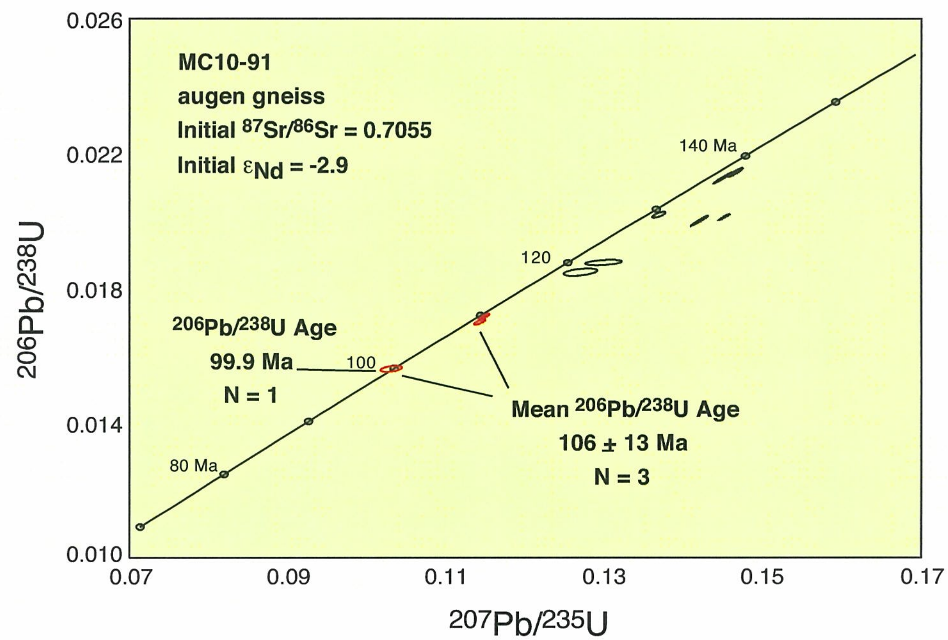

Figure 26. U-Pb concordia diagram for sample MC10-91.

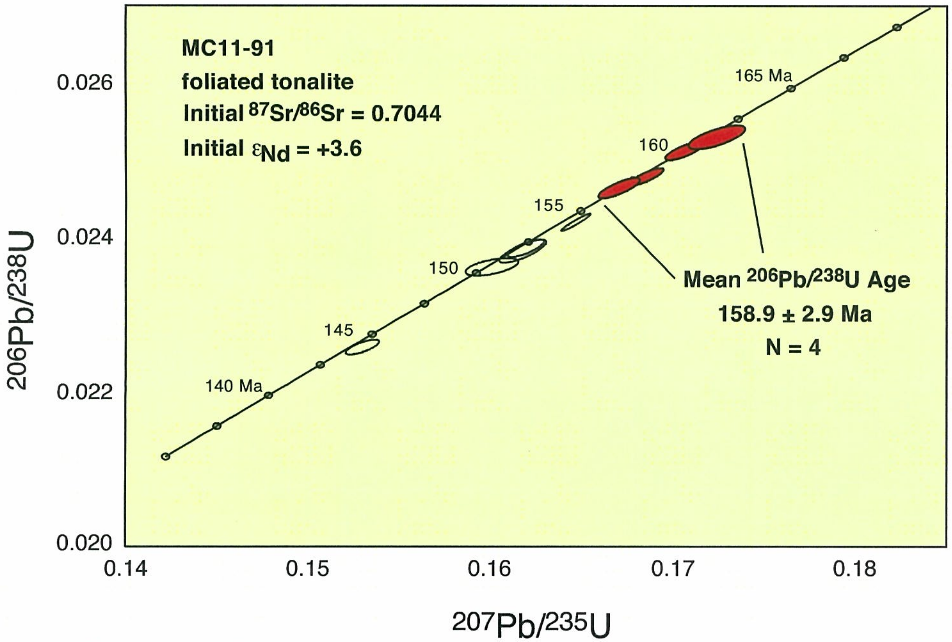

Figure 27. U-Pb concordia diagram for sample MC11-91. Data for four air-abraded fractions are shown by the solid red symbols and were used to calculate the age.

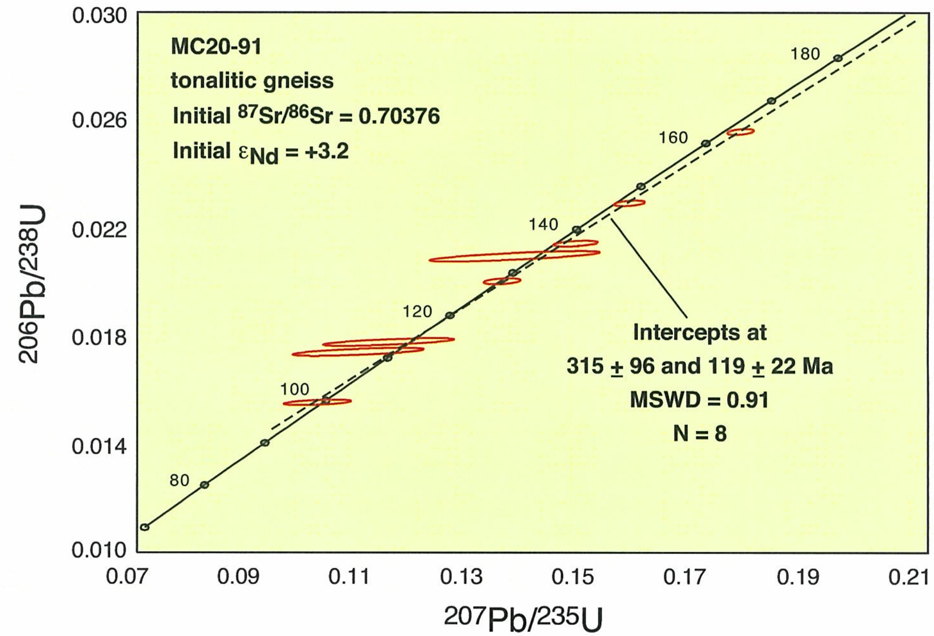

Figure 28 U-Pb concordia diagram for sample MC20-91.

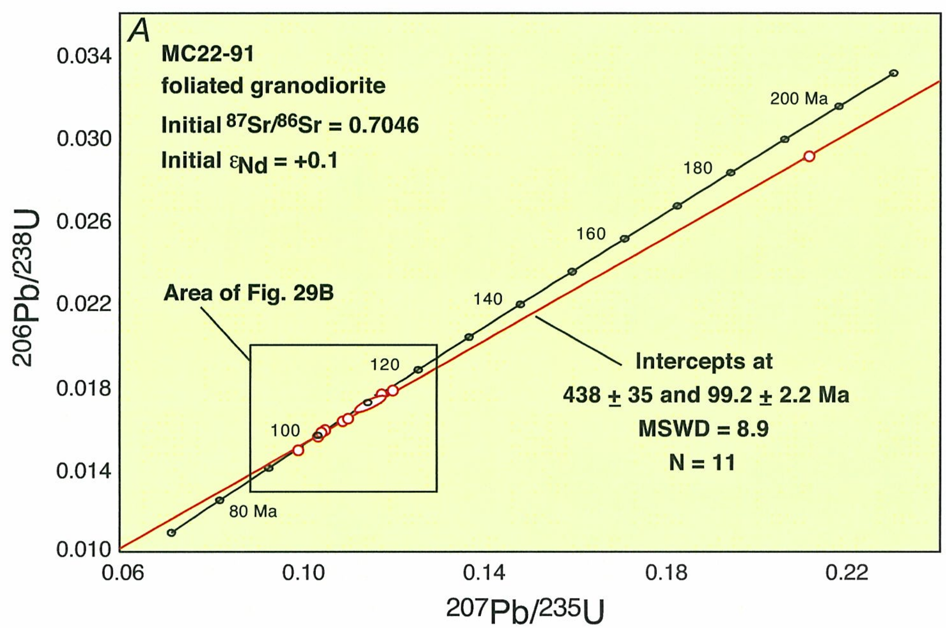

Fig 29*A*. U-Pb concordia diagram for sample MC22-91. Uncertainties for data represented by the circles are smaller than the symbols.

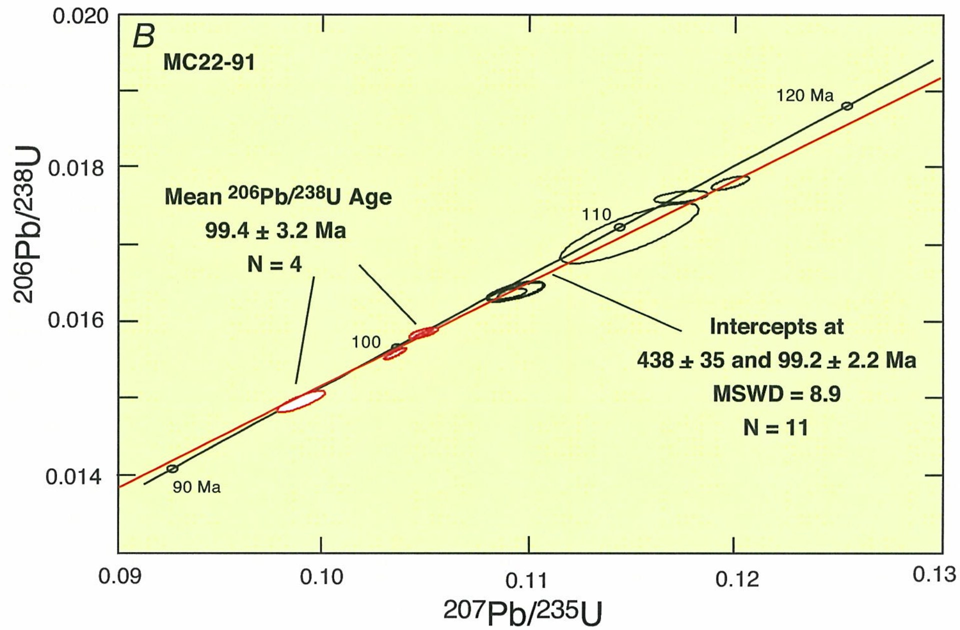

Fig 29*B*. Expanded U-Pb concordia diagram for sample MC22-91.

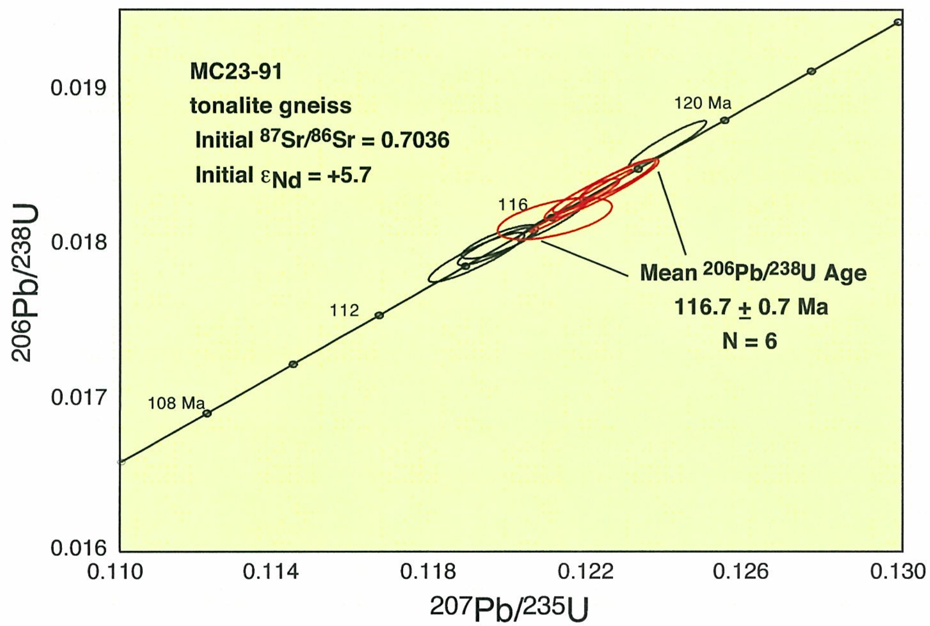

Figure 30. U-Pb concordia diagram for sample MC23-91. Data for six air-abraded fractions are shown by red symbols and were used to calculate the age.

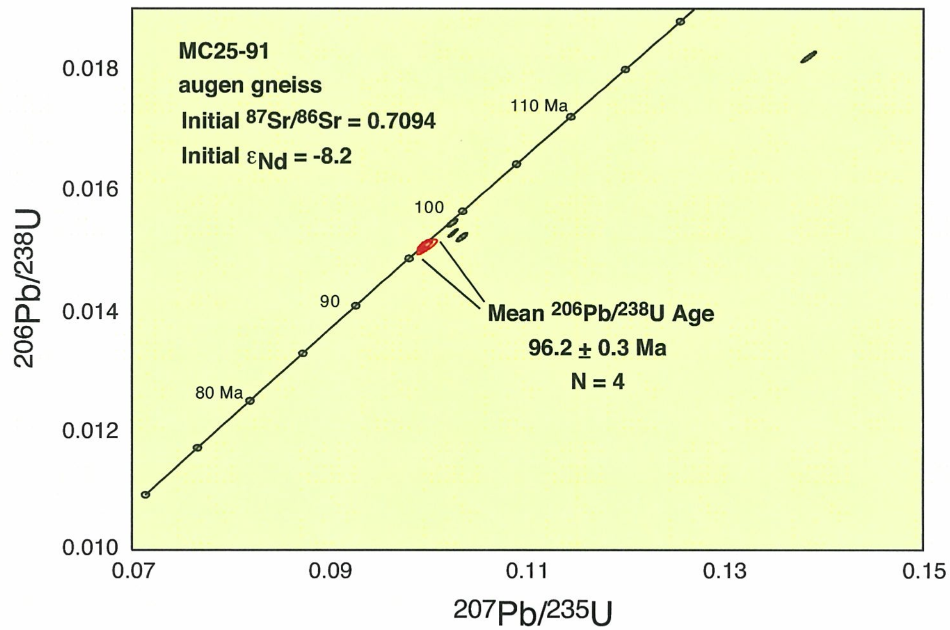

Figure 31. U-Pb concordia diagram for sample MC25-91.

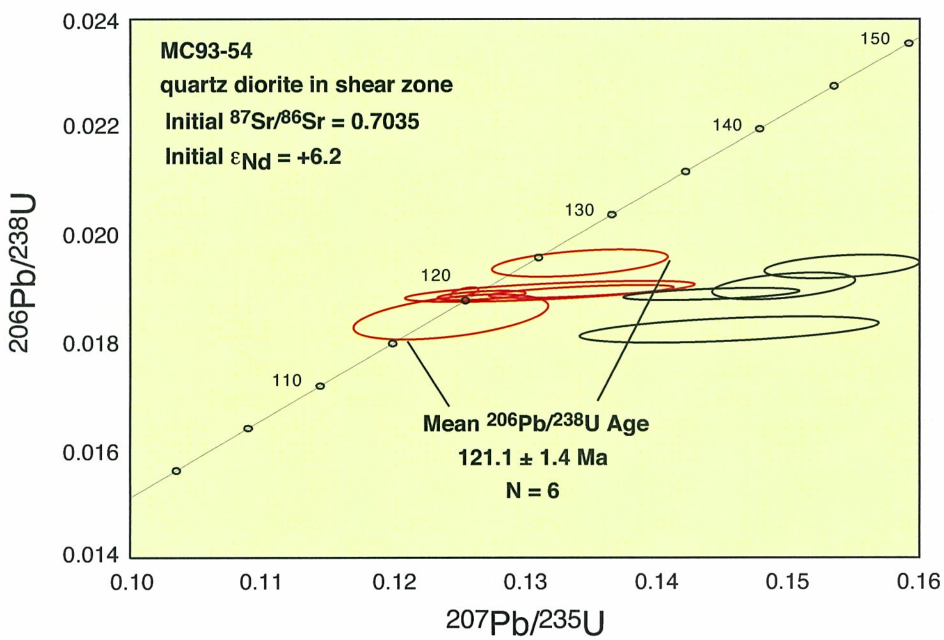

Figure 32. U-Pb concordia diagram for sample MC93-54.

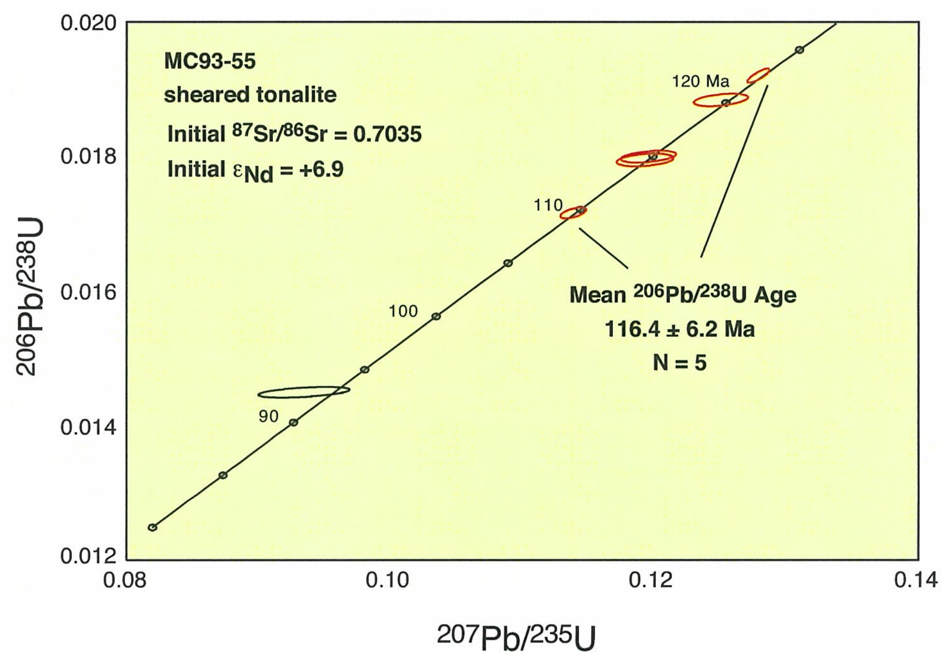

Figure 33. U-Pb concordia diagram for sample MC93-55.

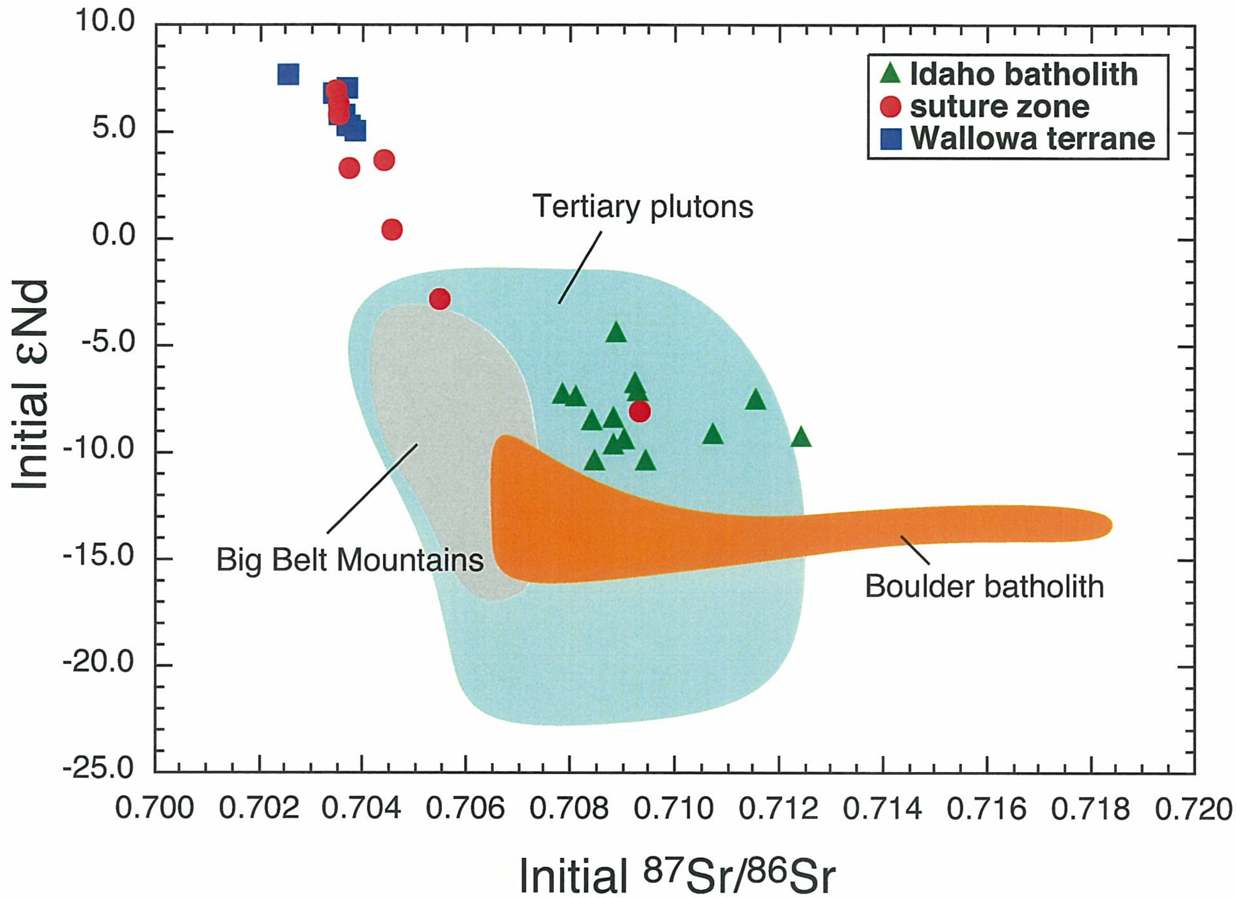

Figure 34. Initial εNd compared to $^{87}Sr/^{86}Sr$ for plutons from western Idaho. Additional data are from Cretaceous plutons in the Boulder batholith, Montana (K. Lund and D.M. Unruh, 2001, unpublished data) and the Big Belt Mountains, Montana (E. duBray and D.M. Unruh, 2002, unpublished data), and Tertiary plutons in Idaho and western Montana (C. Taylor and D.M. Unruh, 2003, unpublished data).

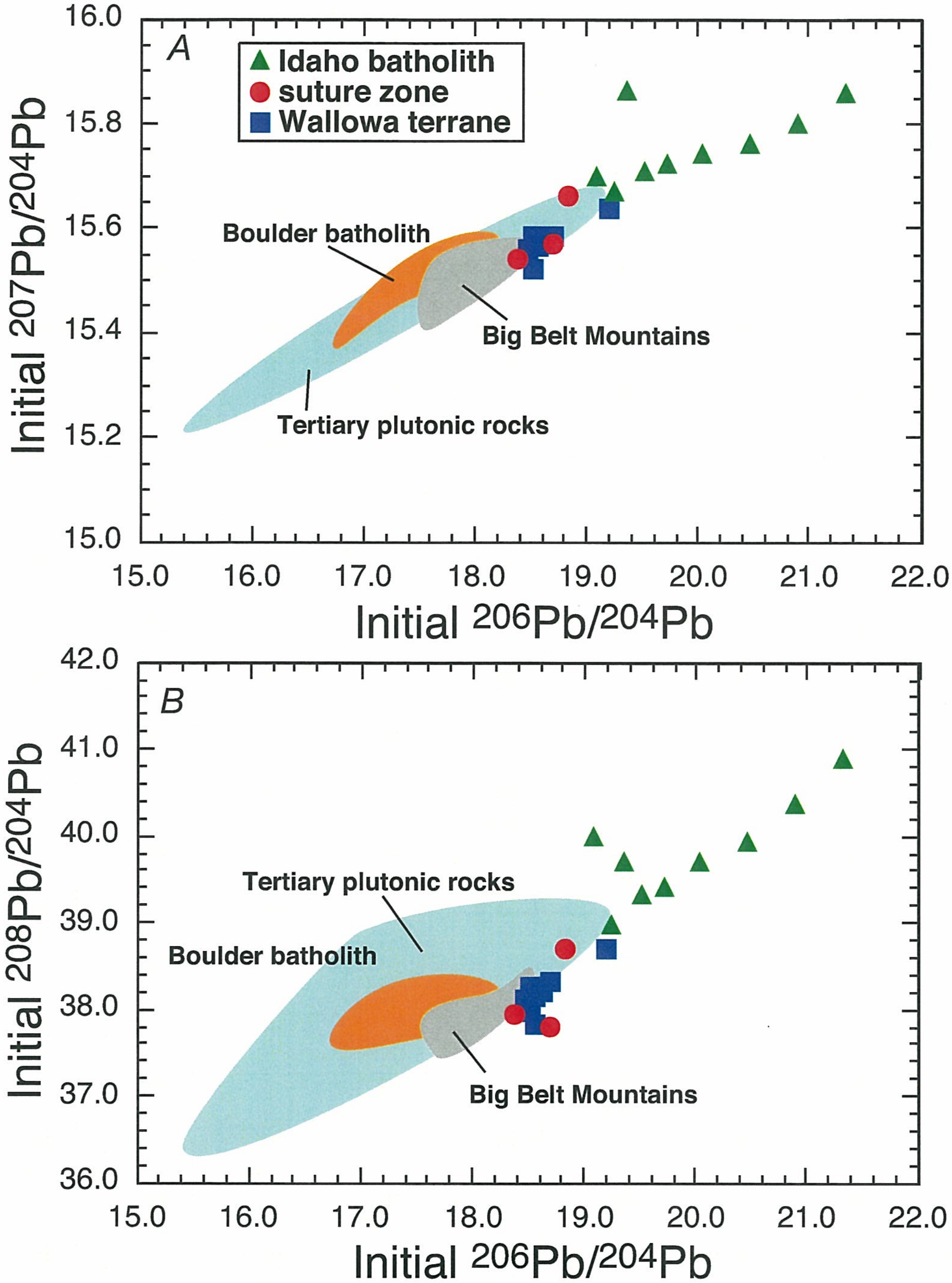

Figure 35. Initial $^{207}Pb/^{204}Pb$ vs. initial $^{206}Pb/^{204}Pb$ (*A*) and $^{208}Pb/^{204}Pb$ compared to $^{206}Pb/^{204}Pb$ (*B*) for plutons from western Idaho. Additional data are from Cretaceous plutons in the Boulder batholith, Montana (K. Lund and D.M. Unruh, 2001, unpublished data), and the Big Belt Mountains, Montana (E. duBray and D.M. Unruh, 2002, unpublished data), and Tertiary plutons in Idaho and western Montana (C. Taylor and D. M. Unruh, 2003, unpublished data).

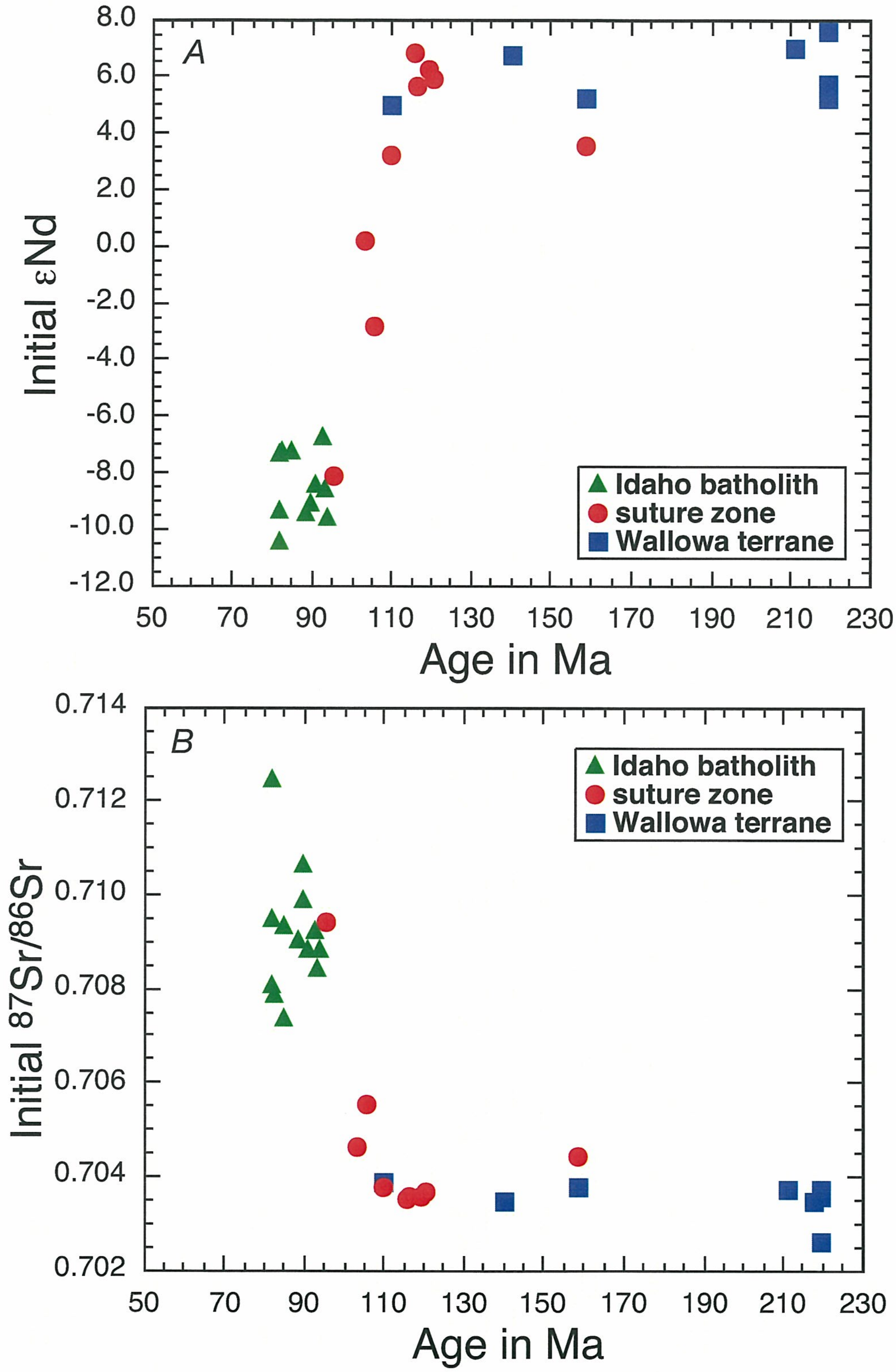

Figure 36. **Initial εNd compared to age (*A*) and initial $^{87}Sr/^{86}Sr$ compared to age (*B*) for plutons from western Idaho.**

Table 1. Sample locations, western Idaho

Sample No.	Rock type	Location/Comments	Latitude	Longitude
K92-1	tonalite	Buck Lake, Hazard Creek complex	45.2300	-116.2300
K92-5	tonalite	south of Lake Serene, Hazard Creek complex	45.1869	-116.1881
K92-6	granodiorite	Cup Lake, Hazard Creek complex	45.1694	-116.2208
K92-7	tonalite	SSE of Morgan Lake, Hazard Creek complex	45.1639	-116.2333
K92-8	tonalite	Hazard Creek complex	45.1389	-116.2264
MC1-91	biotite muscovite granite	southeast of McCall	44.7844	-115.8744
MC2-91	porphyritic biotite muscovite granite	southeast of McCall	44.7803	-115.8944
MC5-91	tonalite	Payette River, south of McCall	44.9661	-115.9853
MC6-91	biotite granodiorite	east of Little Payette Lake	44.9189	-116.0064
MC10-91	porphyritic augen gneiss	west of Brundage Mountain	45.0225	-116.1472
MC11-91	foliated tonalite	Hazard Creek Road	45.1419	-116.1700
MC13-91	tonalite	Payette River, south of upper Payette Lake	45.1040	-116.0316
MC14-91	porphyritic muscovite-biotite granodiorite	mouth of Secesh River	45.0319	-115.8917
MC15-91	biotite muscovite granite	mouth of East Fork South Fork Salmon River	45.0056	-115.7444
MC18-91	amphibolite	west of Marshall Mountain	45.3767	-115.8583
MC20-91	tonalitic gneiss	Slate Creek, near Trough Creek	45.6306	-116.0742
MC22-91	foliated to massive biotite granodiorite	South Fork, Clearwater River	45.8293	-115.9297
MC23-91	tonalite gneiss	Quarry south of Dworshak Dam	46.5075	-116.2936
MC25-91	porphyritic augen gneiss	Big Eddy Marina, Dworshak Reservoir	46.5286	-116.3042
MC26-91	quartz diorite	Peck, south of town	46.4700	-116.4183
MC92-31	tonalite	near Headwaters	46.6493	-115.8252
MC92-32	tonalite	Hump Lake	45.6144	-115.6856
MC92-33	biotite granite	Hump Lake	45.6155	-115.6850
MC92-35	biotite hornblende granodiorite	east of Johnson Creek	44.9019	-115.3910
MC92-36	biotite hornblende granodiorite	Along Johnson Creek	44.7861	-115.5285
MC93-51	biotite muscovite granite	Below Dent Bridge, Dworshak Reservoir	46.6063	-116.1792
MC93-54	quartz diorite in shear zone	Clearwater River, SE of Orofino	46.4254	-116.2099
MC93-55	tonalite in shear zone	Clearwater River, SE of Orofino	46.3578	-116.1654
87KL017	foliated biotite granodiorite	Slate Creek, youngest pluton west of suture zone	45.6403	-116.1958
91KL139	muscovite-biotite granite	War Eagle Mountain	45.3328	-115.7778
00KL030	quartz diorite	Johnson Creek	44.7625	-116.5958
00KL031	gabbro	Johnson Creek	44.7500	-116.6000
00KL032	biotite granodiorite	Orchid Creek	44.7417	-116.5958
00KL033	quartz diorite	Hornet Guard Station	44.8361	-116.6208
00KL034	gabbro	Hornet Reservoir	44.8014	-116.7139
00KL035a	quartz diorite	East Fork Weiser River	44.8458	-116.3708
00KL035b	biotite hornblende granodiorite	East Fork Weiser River	44.8458	-116.3708

Table 2. U-Pb data for zircons, western Idaho. Uncertainties at 95% confidence interval.

SAMPLE	Weight (mg)[1]	No. Xtals[2]	Pb PPM	U PPM	$^{204}Pb/^{206}Pb$	Corrected for Initial Pb $^{206}Pb/^{238}U$	Corrected for Initial Pb $^{207}Pb/^{235}U$	Corrected for Initial Pb $^{207}Pb/^{206}Pb$	Model Ages in Ga. $^{206}Pb/^{238}U$	Model Ages in Ga. $^{207}Pb/^{235}U$	Model Ages in Ga. $^{207}Pb/^{206}Pb$
Idaho batholith											
MC18-91-1	0.909	>10	8.36	547.6	0.00015	0.01455 ± 0.00006	0.09594 ± 0.00048	0.04783 ± 0.00015	0.0931 ± 0.0004	0.0930 ± 0.0004	0.0910 ± 0.0073
MC18-2	0.665	>10	10.12	715.5	0.00013	0.01439 ± 0.00009	0.09497 ± 0.00068	0.04786 ± 0.00017	0.0921 ± 0.0006	0.0921 ± 0.0006	0.0924 ± 0.0082
MC18-3	1.356	>10	8.77	593.7	0.00007	0.01455 ± 0.00009	0.09606 ± 0.00061	0.04787 ± 0.00008	0.0932 ± 0.0006	0.0931 ± 0.0006	0.0927 ± 0.0039
MC18-4	0.395	>10	8.54	572.2	0.00028	0.01436 ± 0.00008	0.09494 ± 0.00063	0.04796 ± 0.00018	0.0919 ± 0.0005	0.0921 ± 0.0006	0.0975 ± 0.0086
MC18-5	0.482	9	4.81	320.7	0.00004	0.01462 ± 0.00011	0.09672 ± 0.00074	0.04799 ± 0.00006	0.0936 ± 0.0007	0.0937 ± 0.0007	0.0986 ± 0.0030
MC18-6	0.632	10	9.89	630.7	0.00005	0.01480 ± 0.00007	0.09790 ± 0.00045	0.04796 ± 0.00003	0.0947 ± 0.0004	0.0948 ± 0.0004	0.0974 ± 0.0016
MC18-7	0.418	6	6.30	428.4	0.00008	0.01449 ± 0.00009	0.09599 ± 0.00061	0.04804 ± 0.00007	0.0928 ± 0.0006	0.0931 ± 0.0006	0.1011 ± 0.0035
MC18-8	0.482	9	4.63	312.1	0.00013	0.01448 ± 0.00006	0.09576 ± 0.00039	0.04798 ± 0.00007	0.0926 ± 0.0004	0.0929 ± 0.0004	0.0984 ± 0.0035
MC18-9	0.537	10	8.58	561.3	0.00002	0.01542 ± 0.00008	0.10222 ± 0.00061	0.04808 ± 0.00013	0.0986 ± 0.0005	0.0988 ± 0.0006	0.1031 ± 0.0062
MC18-10	0.373	10	6.81	455.5	0.00044	0.01417 ± 0.00007	0.09324 ± 0.00056	0.04773 ± 0.00016	0.0907 ± 0.0004	0.0905 ± 0.0005	0.0858 ± 0.0080
MC18-11	0.350	10	5.25	341.8	0.00020	0.01471 ± 0.00006	0.09719 ± 0.00041	0.04793 ± 0.00006	0.0941 ± 0.0004	0.0942 ± 0.0004	0.0957 ± 0.0032
MC18-12	0.400	10	5.41	345.5	0.00010	0.01504 ± 0.00014	0.09935 ± 0.00093	0.04790 ± 0.00009	0.0962 ± 0.0009	0.0962 ± 0.0009	0.0944 ± 0.0046
MC5-91-1	0.052	1	1.32	84.6	0.00111	0.01410 ± 0.00011	0.09591 ± 0.00252	0.04935 ± 0.00117	0.0902 ± 0.0007	0.0930 ± 0.0023	0.1643 ± 0.0546
MC5-2	0.035	2	8.29	421.1	0.00512	0.01434 ± 0.00007	0.09615 ± 0.00227	0.04862 ± 0.00107	0.0918 ± 0.0004	0.0932 ± 0.0021	0.1297 ± 0.0511
MC5-3	0.013	1	3.92	259.6	0.00101	0.01464 ± 0.00012	0.09732 ± 0.00155	0.04821 ± 0.00064	0.0937 ± 0.0007	0.0943 ± 0.0014	0.1095 ± 0.0310
MC5-4	0.039	4	8.20	555.3	0.00038	0.01427 ± 0.00019	0.09599 ± 0.00250	0.04879 ± 0.00107	0.0913 ± 0.0012	0.0931 ± 0.0023	0.1380 ± 0.0506
MC5-5	0.021	1	7.04	434.3	0.00164	0.01420 ± 0.00006	0.09314 ± 0.00079	0.04757 ± 0.00034	0.0909 ± 0.0004	0.0904 ± 0.0007	0.0782 ± 0.0167
MC5-6	0.013	1	5.53	373.0	0.00062	0.01412 ± 0.00006	0.09199 ± 0.00144	0.04725 ± 0.00067	0.0904 ± 0.0004	0.0894 ± 0.0013	0.0621 ± 0.0336
MC5-7	0.017	1	3.82	296.9	0.00094	0.01238 ± 0.00009	0.08158 ± 0.00072	0.04781 ± 0.00025	0.0793 ± 0.0006	0.0796 ± 0.0007	0.0901 ± 0.0123
MC5-8	0.016	1	10.23	561.5	0.00315	0.01410 ± 0.00008	0.09405 ± 0.00151	0.04836 ± 0.00070	0.0903 ± 0.0005	0.0913 ± 0.0014	0.1170 ± 0.0339
MC5-9	0.013	5	9.09	627.5	0.00040	0.01338 ± 0.00010	0.08815 ± 0.00080	0.04777 ± 0.00025	0.0857 ± 0.0006	0.0858 ± 0.0007	0.0881 ± 0.0125
MC13-91-1	0.160	>10	2.38	165.0	0.00006	0.01400 ± 0.00005	0.09299 ± 0.00075	0.04818 ± 0.00034	0.0896 ± 0.0003	0.0903 ± 0.0007	0.1082 ± 0.0165
MC13-2	0.250	>10	2.91	204.7	0.00036	0.01397 ± 0.00005	0.09271 ± 0.00052	0.04812 ± 0.00019	0.0895 ± 0.0003	0.0900 ± 0.0005	0.1051 ± 0.0094
MC13-3	0.223	>10	5.41	364.9	0.00026	0.01417 ± 0.00008	0.09417 ± 0.00095	0.04819 ± 0.00039	0.0907 ± 0.0005	0.0914 ± 0.0009	0.1088 ± 0.0192
MC13-4	0.258	>10	4.86	355.0	0.00008	0.01357 ± 0.00005	0.08964 ± 0.00054	0.04791 ± 0.00022	0.0869 ± 0.0003	0.0872 ± 0.0005	0.0946 ± 0.0110
MC13-5	0.152	>10	5.58	384.3	0.00025	0.01434 ± 0.00012	0.10563 ± 0.00092	0.05344 ± 0.00015	0.0918 ± 0.0007	0.1020 ± 0.0008	0.3474 ± 0.0065
MC13-6	0.220	>10	3.85	264.2	0.00049	0.01370 ± 0.00006	0.09050 ± 0.00053	0.04790 ± 0.00019	0.0877 ± 0.0004	0.0880 ± 0.0005	0.0943 ± 0.0095
MC13-7	0.450	>10	5.37	336.6	0.00071	0.01528 ± 0.00006	0.10758 ± 0.00052	0.05105 ± 0.00013	0.0978 ± 0.0004	0.1037 ± 0.0005	0.2433 ± 0.0058
MC13-8	0.250	>10	5.13	356.5	0.00037	0.01368 ± 0.00005	0.09011 ± 0.00044	0.04779 ± 0.00014	0.0876 ± 0.0003	0.0876 ± 0.0004	0.0888 ± 0.0067
MC13-9	0.250	>10	2.14	139.8	0.00062	0.01410 ± 0.00006	0.09329 ± 0.00072	0.04797 ± 0.00031	0.0903 ± 0.0004	0.0906 ± 0.0007	0.0976 ± 0.0153
MC92-32-1	0.015	1	3.45	155.6	0.00143	0.02059 ± 0.00008	0.14422 ± 0.00209	0.05081 ± 0.00067	0.1314 ± 0.0005	0.1368 ± 0.0019	0.2322 ± 0.0303
MC32-2	0.012	1	32.09	169.3	0.00026	0.17357 ± 0.00073	3.34262 ± 0.01410	0.13967 ± 0.00007	1.0318 ± 0.0040	1.4911 ± 0.0033	2.2231 ± 0.0009
MC32-3	0.010	1	9.88	510.2	0.00036	0.01975 ± 0.00009	0.15595 ± 0.00111	0.05726 ± 0.00029	0.1261 ± 0.0006	0.1472 ± 0.0010	0.5015 ± 0.0113
MC32-4	0.006	2	12.39	69.4	0.00018	0.17350 ± 0.00068	2.42704 ± 0.01118	0.10145 ± 0.00023	1.0314 ± 0.0038	1.2506 ± 0.0033	1.6509 ± 0.0042
MC32-5	0.006	5	8.09	133.9	0.00124	0.04909 ± 0.00057	0.54247 ± 0.00753	0.08015 ± 0.00056	0.3089 ± 0.0035	0.4400 ± 0.0050	1.2008 ± 0.0136
MC32-6	0.014	3	13.53	113.1	0.00028	0.11105 ± 0.00040	1.47662 ± 0.00583	0.09644 ± 0.00014	0.6789 ± 0.0023	0.9208 ± 0.0024	1.5563 ± 0.0028

Table 2. U-Pb data for zircons, western Idaho.--Continued. (Uncertainties at 95% confidence interval.)

SAMPLE	Weight (mg)[1]	No. Xtals[2]	Pb PPM	U PPM	$^{204}Pb/^{206}Pb$	Corrected for Initial Pb $^{206}Pb/^{238}U$	Corrected for Initial Pb $^{207}Pb/^{235}U$	Corrected for Initial Pb $^{207}Pb/^{206}Pb$	Model Ages in Ga. $^{206}Pb/^{238}U$	Model Ages in Ga. $^{207}Pb/^{235}U$	Model Ages in Ga. $^{207}Pb/^{206}Pb$
MC1-91-1	0.030	1	4.82	344.0	0.00068	0.01284 ± 0.00010	0.08548 ± 0.00103	0.04827 ± 0.00042	0.0823 ± 0.0006	0.0833 ± 0.0010	0.1127 ± 0.0202
MC1-2	0.027	1	9.65	668.3	0.00244	0.01174 ± 0.00018	0.07723 ± 0.00161	0.04771 ± 0.00063	0.0752 ± 0.0012	0.0755 ± 0.0015	0.0849 ± 0.0312
MC1-3	0.018	2	9.16	726.4	0.00080	0.01189 ± 0.00008	0.08108 ± 0.00094	0.04945 ± 0.00043	0.0762 ± 0.0005	0.0792 ± 0.0009	0.1691 ± 0.0203
MC1-4	0.020	5	5.83	433.0	0.00025	0.01290 ± 0.00019	0.08507 ± 0.00177	0.04783 ± 0.00068	0.0826 ± 0.0012	0.0829 ± 0.0017	0.0910 ± 0.0335
MC1-5	0.016	1	1.84	116.7	0.00172	0.01274 ± 0.00005	0.08268 ± 0.00112	0.04708 ± 0.00058	0.0816 ± 0.0003	0.0807 ± 0.0010	0.0534 ± 0.0291
MC1-6	0.012	1	6.37	424.7	0.00129	0.01302 ± 0.00006	0.08470 ± 0.00070	0.04717 ± 0.00031	0.0834 ± 0.0004	0.0826 ± 0.0007	0.0578 ± 0.0157
MC1-7	0.017	1	17.24	1231.2	0.00016	0.01267 ± 0.00005	0.08278 ± 0.00041	0.04740 ± 0.00013	0.0811 ± 0.0003	0.0808 ± 0.0004	0.0696 ± 0.0065
MC2-91-1	1.380	>10	8.19	636.0	0.00011	0.01348 ± 0.00008	0.08914 ± 0.00052	0.04796 ± 0.00004	0.0863 ± 0.0005	0.0867 ± 0.0005	0.0972 ± 0.0021
MC2-2	0.690	>10	4.77	359.7	0.00047	0.01343 ± 0.00007	0.09347 ± 0.00051	0.05046 ± 0.00010	0.0860 ± 0.0004	0.0907 ± 0.0005	0.2161 ± 0.0048
MC2-3	0.310	>10	8.77	749.2	0.00043	0.01168 ± 0.00005	0.07707 ± 0.00037	0.04785 ± 0.00012	0.0749 ± 0.0003	0.0754 ± 0.0003	0.0916 ± 0.0058
MC2-4	0.812	>10	7.05	502.2	0.00016	0.01427 ± 0.00010	0.12321 ± 0.00084	0.06263 ± 0.00004	0.0913 ± 0.0006	0.1180 ± 0.0008	0.6956 ± 0.0012
MC2-5	0.450	>10	8.00	656.7	0.00020	0.01240 ± 0.00006	0.08185 ± 0.00042	0.04787 ± 0.00005	0.0794 ± 0.0004	0.0799 ± 0.0004	0.0931 ± 0.0024
MC2-6	0.400	>10	6.56	535.2	0.00017	0.01264 ± 0.00007	0.08321 ± 0.00060	0.04775 ± 0.00022	0.0810 ± 0.0004	0.0812 ± 0.0006	0.0870 ± 0.0111
MC2-7	0.250	>10	4.82	373.3	0.00002	0.01330 ± 0.00005	0.08758 ± 0.00038	0.04774 ± 0.00009	0.0852 ± 0.0003	0.0852 ± 0.0004	0.0867 ± 0.0043
MC2-8	0.300	10	6.15	386.3	0.00093	0.01550 ± 0.00007	0.11506 ± 0.00077	0.05385 ± 0.00026	0.0991 ± 0.0004	0.1106 ± 0.0007	0.3648 ± 0.0108
MC6-91-1	0.028	1	3.90	242.8	0.00187	0.01461 ± 0.00006	0.09631 ± 0.00081	0.04781 ± 0.00034	0.0935 ± 0.0004	0.0934 ± 0.0008	0.0899 ± 0.0167
MC6-2	0.014	2	13.29	779.6	0.00208	0.01483 ± 0.00007	0.09714 ± 0.00245	0.04752 ± 0.00112	0.0949 ± 0.0004	0.0941 ± 0.0023	0.0755 ± 0.0552
MC6-3	0.011	1	11.44	669.5	0.00292	0.01470 ± 0.00006	0.09717 ± 0.00115	0.04793 ± 0.00051	0.0941 ± 0.0004	0.0942 ± 0.0011	0.0960 ± 0.0250
MC6-4	0.017	1	4.01	248.1	0.00139	0.01485 ± 0.00006	0.09724 ± 0.00111	0.04748 ± 0.00049	0.0951 ± 0.0004	0.0942 ± 0.0010	0.0734 ± 0.0241
MC6-5	0.012	3	11.21	807.4	0.00018	0.01413 ± 0.00005	0.09364 ± 0.00046	0.04807 ± 0.00016	0.0904 ± 0.0003	0.0909 ± 0.0004	0.1026 ± 0.0077
MC15-91-1	0.650	>10	24.29	556.6	0.00002	0.04238 ± 0.00028	0.60631 ± 0.00407	0.10376 ± 0.00004	0.2676 ± 0.0018	0.4812 ± 0.0026	1.6924 ± 0.0006
MC15-2	0.266	9	47.45	958.6	0.00047	0.04471 ± 0.00032	1.20042 ± 0.00850	0.19473 ± 0.00010	0.2820 ± 0.0019	0.8008 ± 0.0039	2.7826 ± 0.0008
MC15-3	0.171	>10	22.25	1658.6	0.00010	0.01410 ± 0.00009	0.09795 ± 0.00065	0.05037 ± 0.00008	0.0903 ± 0.0006	0.0949 ± 0.0006	0.2122 ± 0.0038
MC15-4	0.347	>10	14.69	1087.6	0.00009	0.01395 ± 0.00009	0.10502 ± 0.00071	0.05461 ± 0.00005	0.0893 ± 0.0006	0.1014 ± 0.0007	0.3965 ± 0.0020
MC15-5	0.350	>10	77.78	2454.4	0.00101	0.02955 ± 0.00021	0.38036 ± 0.00282	0.09337 ± 0.00016	0.1877 ± 0.0013	0.3273 ± 0.0021	1.4953 ± 0.0032
MC15-6	0.170	>10	71.61	2155.3	0.00006	0.03196 ± 0.00013	0.46344 ± 0.00194	0.10518 ± 0.00003	0.2028 ± 0.0008	0.3866 ± 0.0013	1.7174 ± 0.0006
MC15-7	0.300	>10	40.94	1012.4	0.00036	0.03845 ± 0.00024	0.60522 ± 0.00372	0.11417 ± 0.00006	0.2432 ± 0.0015	0.4805 ± 0.0024	1.8669 ± 0.0009
MC92-33-1	0.040	1	8.34	366.9	0.00046	0.02275 ± 0.00010	0.22255 ± 0.00123	0.07094 ± 0.00022	0.1450 ± 0.0006	0.2040 ± 0.0010	0.9558 ± 0.0064
MC33-2	0.026	1	12.63	914.3	0.00026	0.01385 ± 0.00005	0.09154 ± 0.00048	0.04793 ± 0.00017	0.0887 ± 0.0003	0.0889 ± 0.0004	0.0958 ± 0.0087
MC33-3	0.021	3	10.91	775.9	0.00203	0.01291 ± 0.00013	0.08513 ± 0.00113	0.04783 ± 0.00040	0.0827 ± 0.0008	0.0830 ± 0.0011	0.0908 ± 0.0195
MC33-4	0.007	2	12.08	772.9	0.00146	0.01458 ± 0.00006	0.10743 ± 0.00161	0.05345 ± 0.00073	0.0933 ± 0.0004	0.1036 ± 0.0015	0.3479 ± 0.0307
MC33-5	0.023	2	15.88	596.2	0.00024	0.02528 ± 0.00018	0.21365 ± 0.00156	0.06129 ± 0.00008	0.1609 ± 0.0011	0.1966 ± 0.0013	0.6495 ± 0.0029
MC92-35-1	0.024	1	6.02	433.7	0.00023	0.01446 ± 0.00007	0.09501 ± 0.00104	0.04764 ± 0.00045	0.0926 ± 0.0004	0.0922 ± 0.0010	0.0814 ± 0.0223
MC35-2	0.038	4	16.65	689.4	0.00782	0.01463 ± 0.00009	0.09664 ± 0.00334	0.04791 ± 0.00157	0.0936 ± 0.0005	0.0937 ± 0.0031	0.0949 ± 0.0756
MC35-3	0.054	1	13.97	975.5	0.00018	0.01423 ± 0.00018	0.09441 ± 0.00124	0.04811 ± 0.00019	0.0911 ± 0.0011	0.0916 ± 0.0012	0.1046 ± 0.0094
MC35-4	0.030	2	6.53	427.2	0.00120	0.01485 ± 0.00007	0.09777 ± 0.00080	0.04775 ± 0.00030	0.0950 ± 0.0005	0.0947 ± 0.0007	0.0867 ± 0.0148
MC35-5	0.031	2	11.04	780.1	0.00005	0.01472 ± 0.00006	0.09725 ± 0.00043	0.04791 ± 0.00008	0.0942 ± 0.0004	0.0942 ± 0.0004	0.0950 ± 0.0041
MC35-6	0.046	5	12.94	921.7	0.00029	0.01394 ± 0.00011	0.09090 ± 0.00110	0.04730 ± 0.00041	0.0892 ± 0.0007	0.0883 ± 0.0010	0.0646 ± 0.0203
MC35-7	0.032	10	12.37	845.0	0.00005	0.01446 ± 0.00010	0.09499 ± 0.00080	0.04765 ± 0.00024	0.0925 ± 0.0006	0.0921 ± 0.0007	0.0819 ± 0.0118

Table 2. U-Pb data for zircons, western Idaho.--Continued. (Uncertainties at 95% confidence interval.)

SAMPLE	Weight (mg)[1]	No. Xtals[2]	Pb PPM	U PPM	$^{204}Pb/^{206}Pb$	Corrected for Initial Pb $^{206}Pb/^{238}U$	Corrected for Initial Pb $^{207}Pb/^{235}U$	Corrected for Initial Pb $^{207}Pb/^{206}Pb$	Model Ages in Ga. $^{206}Pb/^{238}U$	Model Ages in Ga. $^{207}Pb/^{235}U$	Model Ages in Ga. $^{207}Pb/^{206}Pb$
MC92-36-1	0.021	1	12.03	827.0	0.00045	0.01420 ± 0.00009	0.09309 ± 0.00334	0.04754 ± 0.00160	0.0909 ± 0.0006	0.0904 ± 0.0031	0.0765 ± 0.0779
MC36-2	0.043	3	57.39	3808.9	0.00642	0.01026 ± 0.00007	0.06765 ± 0.00177	0.04783 ± 0.00116	0.0658 ± 0.0004	0.0665 ± 0.0017	0.0911 ± 0.0566
MC36-3	0.009	1	18.81	1318.1	0.00022	0.01434 ± 0.00013	0.10031 ± 0.00145	0.05074 ± 0.00055	0.0918 ± 0.0008	0.0971 ± 0.0013	0.2290 ± 0.0248
MC36-4	0.015	3	7.20	468.1	0.00126	0.01395 ± 0.00005	0.09130 ± 0.00139	0.04748 ± 0.00067	0.0893 ± 0.0003	0.0887 ± 0.0013	0.0735 ± 0.0332
MC36-5	0.021	9	8.70	584.4	0.00035	0.01416 ± 0.00010	0.09221 ± 0.00224	0.04724 ± 0.00105	0.0906 ± 0.0007	0.0896 ± 0.0021	0.0613 ± 0.0523
MC36-6	0.015	>10	11.80	788.0	0.00056	0.01417 ± 0.00015	0.09422 ± 0.00212	0.04822 ± 0.00091	0.0907 ± 0.0009	0.0914 ± 0.0020	0.1103 ± 0.0441
MC93-51-1	0.045	1	65.43	434.8	0.00001	0.13205 ± 0.00056	1.56788 ± 0.00664	0.08612 ± 0.00004	0.7995 ± 0.0032	0.9576 ± 0.0026	1.3408 ± 0.0009
MC51-2	0.025	1	14.18	249.8	0.00008	0.05236 ± 0.00022	0.57698 ± 0.00262	0.07992 ± 0.00013	0.3290 ± 0.0013	0.4625 ± 0.0017	1.1951 ± 0.0033
MC51-3	0.023	1	57.68	557.4	0.00007	0.10656 ± 0.00048	1.25008 ± 0.00578	0.08509 ± 0.00008	0.6527 ± 0.0028	0.8234 ± 0.0026	1.3175 ± 0.0019
MC51-4	0.015	1	10.68	451.2	0.00022	0.02420 ± 0.00013	0.22707 ± 0.00138	0.06805 ± 0.00018	0.1541 ± 0.0008	0.2078 ± 0.0011	0.8701 ± 0.0056
MC51-5	0.005	1	22.55	213.6	0.00028	0.09799 ± 0.00044	1.13712 ± 0.00616	0.08416 ± 0.00024	0.6026 ± 0.0026	0.7711 ± 0.0029	1.2964 ± 0.0055
MC51-6	0.010	1	6.24	538.1	0.00009	0.01215 ± 0.00006	0.07982 ± 0.00056	0.04765 ± 0.00022	0.0778 ± 0.0004	0.0780 ± 0.0005	0.0820 ± 0.0109
MC51-7	0.014	1	12.62	385.2	0.00118	0.03012 ± 0.00012	0.30666 ± 0.00192	0.07383 ± 0.00034	0.1913 ± 0.0007	0.2716 ± 0.0015	1.0369 ± 0.0092
MC51-8	0.011	1	114.44	716.3	0.00011	0.16411 ± 0.00058	1.97098 ± 0.00716	0.08711 ± 0.00007	0.9796 ± 0.0032	1.1056 ± 0.0024	1.3629 ± 0.0015
MC51-9	0.008	1	51.35	285.3	0.00003	0.17214 ± 0.00065	2.05530 ± 0.00796	0.08659 ± 0.00008	1.0239 ± 0.0036	1.1341 ± 0.0026	1.3515 ± 0.0017
MC51-10	0.008	1	17.32	268.3	0.00048	0.05836 ± 0.00029	0.65140 ± 0.00470	0.08095 ± 0.00038	0.3657 ± 0.0018	0.5093 ± 0.0029	1.2201 ± 0.0093
MC51-11	0.004	1	86.76	785.9	0.00009	0.10717 ± 0.00050	1.25129 ± 0.00688	0.08468 ± 0.00023	0.6563 ± 0.0029	0.8240 ± 0.0031	1.3083 ± 0.0052
MC51-12	0.065	1	46.93	442.6	0.00007	0.10279 ± 0.00085	1.18384 ± 0.01841	0.08353 ± 0.00100	0.6308 ± 0.0050	0.7931 ± 0.0086	1.2816 ± 0.0231
Wallowa terrane											
00KL030-1	0.020	1	138.88	4778.3	0.00070	0.02791 ± 0.00028	0.18944 ± 0.00208	0.04922 ± 0.00046	0.1775 ± 0.0018	0.1762 ± 0.0018	0.1585 ± 0.0217
KL030-2	0.014	1	95.79	2624.0	0.00045	0.03506 ± 0.00016	0.24827 ± 0.00189	0.05135 ± 0.00029	0.2222 ± 0.0010	0.2252 ± 0.0015	0.2567 ± 0.0129
KL030-3	0.011	1	46.94	1403.5	0.00136	0.03120 ± 0.00024	0.21984 ± 0.00261	0.05110 ± 0.00044	0.1981 ± 0.0015	0.2018 ± 0.0022	0.2454 ± 0.0196
KL030-4	0.012	3	6.51	211.3	0.00036	0.03033 ± 0.00012	0.21277 ± 0.00176	0.05088 ± 0.00035	0.1926 ± 0.0007	0.1959 ± 0.0015	0.2355 ± 0.0156
KL030-5	0.017	1	6.76	195.3	0.00026	0.03449 ± 0.00015	0.24137 ± 0.00168	0.05076 ± 0.00026	0.2186 ± 0.0009	0.2195 ± 0.0014	0.2299 ± 0.0120
KL030-6	0.010	1	7.69	180.6	0.00092	0.04105 ± 0.00035	0.28478 ± 0.00523	0.05032 ± 0.00078	0.2593 ± 0.0021	0.2544 ± 0.0041	0.2098 ± 0.0354
KL030-7	0.004	1	8.61	263.2	0.00003	0.03343 ± 0.00014	0.22971 ± 0.00331	0.04983 ± 0.00065	0.2120 ± 0.0009	0.2100 ± 0.0027	0.1872 ± 0.0298
KL030-8	0.011	1	7.32	223.0	0.00056	0.03204 ± 0.00014	0.22351 ± 0.00167	0.05059 ± 0.00029	0.2033 ± 0.0009	0.2048 ± 0.0014	0.2224 ± 0.0133
KL030-9	0.017	1	5.05	154.8	0.00012	0.03289 ± 0.00017	0.22681 ± 0.00242	0.05001 ± 0.00044	0.2086 ± 0.0010	0.2076 ± 0.0020	0.1954 ± 0.0205
KL030-10	0.016	1	5.12	147.1	0.00032	0.03470 ± 0.00014	0.24307 ± 0.00279	0.05081 ± 0.00051	0.2199 ± 0.0009	0.2209 ± 0.0023	0.2323 ± 0.0229
KL030-11	0.017	1	8.06	240.5	0.00057	0.03299 ± 0.00013	0.22915 ± 0.00212	0.05039 ± 0.00039	0.2092 ± 0.0008	0.2095 ± 0.0018	0.2128 ± 0.0180
KL030-12	0.012	1	7.43	114.8	0.00134	0.04380 ± 0.00018	0.31243 ± 0.00395	0.05174 ± 0.00058	0.2763 ± 0.0011	0.2761 ± 0.0031	0.2738 ± 0.0254
KL030-13	0.008	1	9.54	279.7	0.00021	0.03435 ± 0.00015	0.23880 ± 0.00231	0.05041 ± 0.00040	0.2177 ± 0.0010	0.2174 ± 0.0019	0.2141 ± 0.0184
KL030-14	0.013	2	3.97	107.5	0.00161	0.03302 ± 0.00016	0.23068 ± 0.00418	0.05066 ± 0.00083	0.2094 ± 0.0010	0.2108 ± 0.0034	0.2254 ± 0.0374
KL030-15	0.009	1	6.02	186.0	0.00009	0.03230 ± 0.00013	0.22575 ± 0.00292	0.05069 ± 0.00058	0.2049 ± 0.0008	0.2067 ± 0.0024	0.2268 ± 0.0261
00KL031-1	0.020	1	62.65	1572.9	0.00000	0.03420 ± 0.00013	0.23830 ± 0.00096	0.05053 ± 0.00006	0.2168 ± 0.0008	0.2170 ± 0.0008	0.2195 ± 0.0025
KL031-2	0.021	1	97.34	2498.4	0.00006	0.03262 ± 0.00012	0.22663 ± 0.00091	0.05039 ± 0.00007	0.2069 ± 0.0008	0.2074 ± 0.0008	0.2129 ± 0.0031
KL031-3	0.018	3	37.61	986.7	0.00001	0.03477 ± 0.00012	0.24188 ± 0.00089	0.05045 ± 0.00005	0.2203 ± 0.0008	0.2200 ± 0.0007	0.2160 ± 0.0022
KL031-4	0.034	1	64.25	1480.8	0.00136	0.03466 ± 0.00014	0.24431 ± 0.00169	0.05112 ± 0.00028	0.2197 ± 0.0009	0.2219 ± 0.0014	0.2462 ± 0.0124
KL031-5	0.031	1	87.72	2257.4	0.00000	0.03431 ± 0.00013	0.23886 ± 0.00092	0.05049 ± 0.00002	0.2175 ± 0.0008	0.2175 ± 0.0008	0.2176 ± 0.0011
KL031-6	0.035	1	92.77	2138.0	0.00002	0.03477 ± 0.00014	0.24176 ± 0.00102	0.05044 ± 0.00007	0.2203 ± 0.0009	0.2199 ± 0.0008	0.2152 ± 0.0031
KL031-7	0.010	1	37.80	1004.8	0.00000	0.03429 ± 0.00014	0.23829 ± 0.00103	0.05040 ± 0.00008	0.2174 ± 0.0009	0.2170 ± 0.0008	0.2134 ± 0.0035
KL031-8	0.021	1	44.36	1191.7	0.00000	0.03394 ± 0.00012	0.23624 ± 0.00093	0.05048 ± 0.00008	0.2152 ± 0.0008	0.2153 ± 0.0008	0.2171 ± 0.0035
KL031-9	0.007	1	79.35	1978.5	0.00018	0.03462 ± 0.00014	0.24175 ± 0.00104	0.05065 ± 0.00007	0.2194 ± 0.0009	0.2199 ± 0.0009	0.2249 ± 0.0034

Table 2. U-Pb data for zircons, western Idaho.--Continued. (Uncertainties at 95% confidence interval.)

SAMPLE	Weight (mg)[1]	No. Xtals[2]	Pb PPM	U PPM	$^{204}Pb/^{206}Pb$	Corrected for Initial Pb $^{206}Pb/^{238}U$	Corrected for Initial Pb $^{207}Pb/^{235}U$	Corrected for Initial Pb $^{207}Pb/^{206}Pb$	Model Ages in Ga. $^{206}Pb/^{238}U$	Model Ages in Ga. $^{207}Pb/^{235}U$	Model Ages in Ga. $^{207}Pb/^{206}Pb$
00KL032-1	0.004	1	8.41	148.0	0.00856	0.03461 ± 0.00016	0.25898 ± 0.01083	0.05427 ± 0.0021	0.2193 ± 0.0010	0.2338 ± 0.0087	0.3824 ± 0.0853
00KL032-2	0.005	2	27.44	503.2	0.00162	0.04639 ± 0.00022	0.34406 ± 0.00297	0.05379 ± 0.0004	0.2923 ± 0.0014	0.3002 ± 0.0022	0.3622 ± 0.0151
00KL032-3	0.005	2	13.71	370.5	0.00041	0.03665 ± 0.00014	0.25261 ± 0.00337	0.04999 ± 0.0006	0.2320 ± 0.0009	0.2287 ± 0.0027	0.1944 ± 0.0276
00KL032-4	0.003	1	13.67	434.5	0.00085	0.02946 ± 0.00012	0.20477 ± 0.00292	0.05041 ± 0.0006	0.1872 ± 0.0007	0.1892 ± 0.0025	0.2140 ± 0.0291
00KL032-5	0.004	2	19.67	623.9	0.00014	0.03244 ± 0.00012	0.22518 ± 0.00173	0.05035 ± 0.0003	0.2058 ± 0.0007	0.2062 ± 0.0014	0.2111 ± 0.0146
00KL032-6	0.01	3	39.46	1144.5	0.00093	0.03305 ± 0.00016	0.23113 ± 0.00165	0.05072 ± 0.0003	0.2096 ± 0.0010	0.2111 ± 0.0014	0.2283 ± 0.0114
00KL032-7	0.008	4	36.85	1005.0	0.00162	0.03369 ± 0.00019	0.23162 ± 0.00324	0.04986 ± 0.0006	0.2136 ± 0.0012	0.2115 ± 0.0027	0.1884 ± 0.0279
00KL032-8	0.008	4	24.72	602.5	0.00457	0.03182 ± 0.00018	0.22589 ± 0.00529	0.05149 ± 0.0011	0.2019 ± 0.0011	0.2068 ± 0.0044	0.2627 ± 0.0486
00KL035A-1	0.016	1	19.02	620.2	0.00250	0.02528 ± 0.00058	0.17206 ± 0.00792	0.04937 ± 0.00186	0.1609 ± 0.0037	0.1612 ± 0.0069	0.1653 ± 0.0857
KL35A-2	0.018	1	16.86	644.9	0.00022	0.02497 ± 0.00009	0.16873 ± 0.00099	0.04901 ± 0.00021	0.1590 ± 0.0006	0.1583 ± 0.0009	0.1481 ± 0.0100
KL35A-3	0.010	1	21.51	852.9	0.00026	0.02482 ± 0.00014	0.16810 ± 0.00115	0.04911 ± 0.00017	0.1581 ± 0.0009	0.1578 ± 0.0010	0.1532 ± 0.0079
KL35A-4	0.005	1	14.59	458.1	0.00152	0.02753 ± 0.00011	0.19159 ± 0.00216	0.05047 ± 0.00050	0.1751 ± 0.0007	0.1780 ± 0.0018	0.2165 ± 0.0229
KL35A-5	0.002	1	13.95	415.6	0.00440	0.02495 ± 0.00011	0.17088 ± 0.00574	0.04967 ± 0.00155	0.1589 ± 0.0007	0.1602 ± 0.0050	0.1796 ± 0.0713
00KL035B-1	0.003	1	80.45	604.7	0.00117	0.12071 ± 0.00052	1.48829 ± 0.02331	0.08942 ± 0.0012	0.7346 ± 0.0030	0.9256 ± 0.0095	1.4132 ± 0.0247
00KL035B-2	0.003	1	36.89	723.9	0.00063	0.04951 ± 0.00030	0.44736 ± 0.01877	0.06554 ± 0.0024	0.3115 ± 0.0019	0.3754 ± 0.0132	0.7916 ± 0.0764
00KL035B-3	0.010	1	60.73	858.2	0.00048	0.06180 ± 0.00024	0.47710 ± 0.00248	0.05599 ± 0.0002	0.3865 ± 0.0015	0.3961 ± 0.0017	0.4521 ± 0.0072
00KL035B-4	0.005	1	96.48	800.1	0.00057	0.11693 ± 0.00057	1.22649 ± 0.00785	0.07607 ± 0.0003	0.7129 ± 0.0033	0.8127 ± 0.0036	1.0970 ± 0.0079
00KL035B-5	0.010	3	43.87	2131.6	0.00170	0.02021 ± 0.00013	0.13517 ± 0.00154	0.04851 ± 0.0004	0.1290 ± 0.0009	0.1287 ± 0.0014	0.1242 ± 0.0206
00KL035B-6	0.003	1	16.49	796.1	0.00086	0.02046 ± 0.00009	0.13768 ± 0.00421	0.04881 ± 0.0014	0.1305 ± 0.0006	0.1310 ± 0.0038	0.1387 ± 0.0650
00KL035B-7	0.003	1	24.88	1075.3	0.00067	0.02191 ± 0.00015	0.14771 ± 0.00353	0.04890 ± 0.0011	0.1397 ± 0.0009	0.1399 ± 0.0031	0.1432 ± 0.0498
00KL035B-8	0.010	4	21.56	165.2	0.00508	0.09760 ± 0.00054	0.90077 ± 0.01428	0.06694 ± 0.0009	0.6003 ± 0.0032	0.6521 ± 0.0076	0.8359 ± 0.0287
87KL017-1	0.083	>10	8.00	396.8	0.00061	0.02010 ± 0.00009	0.13650 ± 0.00082	0.04925 ± 0.00020	0.1283 ± 0.0006	0.1299 ± 0.0007	0.1600 ± 0.0094
87KL017-2	0.075	>10	3.03	177.7	0.00019	0.01754 ± 0.00007	0.11798 ± 0.00120	0.04878 ± 0.00043	0.1121 ± 0.0005	0.1132 ± 0.0011	0.1371 ± 0.0207
87KL017-3	0.003	1	3.03	160.8	0.00278	0.01703 ± 0.00012	0.11156 ± 0.00423	0.04751 ± 0.00167	0.1088 ± 0.0008	0.1074 ± 0.0039	0.0752 ± 0.0815
87KL017-4	0.002	1	9.21	434.0	0.00168	0.02023 ± 0.00008	0.13589 ± 0.00238	0.04871 ± 0.00078	0.1291 ± 0.0005	0.1294 ± 0.0021	0.1341 ± 0.0374
87KL017-5	0.004	3	4.69	243.6	0.00258	0.01777 ± 0.00008	0.11319 ± 0.00424	0.04621 ± 0.00165	0.1135 ± 0.0005	0.1089 ± 0.0039	0.0086 ± 0.0838
87KL017-6	0.003	1	14.37	545.0	0.00216	0.02385 ± 0.00015	0.16565 ± 0.00317	0.05038 ± 0.00088	0.1519 ± 0.0009	0.1556 ± 0.0028	0.2126 ± 0.0399
87KL017-7	0.006	1	3.98	161.2	0.00639	0.01770 ± 0.00009	0.11562 ± 0.00554	0.04737 ± 0.00214	0.1131 ± 0.0006	0.1111 ± 0.0050	0.0678 ± 0.1040
87KL017-8	0.005	1	4.14	227.8	0.00121	0.01778 ± 0.00008	0.11922 ± 0.00331	0.04864 ± 0.00125	0.1136 ± 0.0005	0.1144 ± 0.0030	0.1305 ± 0.0595
87KL017-9	0.005	1	3.52	183.4	0.00235	0.01777 ± 0.00010	0.11083 ± 0.00821	0.04522 ± 0.00317	0.1136 ± 0.0007	0.1067 ± 0.0075	** ±
87KL017-10	0.007	4	3.40	160.7	0.00386	0.01767 ± 0.00008	0.11549 ± 0.00507	0.04740 ± 0.00199	0.1129 ± 0.0005	0.1110 ± 0.0046	0.0695 ± 0.0970
MC26-91-1	0.467	>10	3.96	166.4	0.00067	0.02199 ± 0.00008	0.14849 ± 0.00071	0.04897 ± 0.00015	0.1402 ± 0.0005	0.1406 ± 0.0006	0.1465 ± 0.0071
MC26-2	0.272	>10	4.43	192.0	0.00022	0.02199 ± 0.00008	0.14861 ± 0.00077	0.04901 ± 0.00017	0.1402 ± 0.0005	0.1407 ± 0.0007	0.1483 ± 0.0082
MC26-3	0.335	>10	3.63	159.2	0.00030	0.02196 ± 0.00008	0.14811 ± 0.00080	0.04891 ± 0.00019	0.1401 ± 0.0005	0.1402 ± 0.0007	0.1435 ± 0.0091
MC26-4	0.285	>10	3.42	149.2	0.00004	0.02197 ± 0.00013	0.14862 ± 0.00139	0.04906 ± 0.00035	0.1401 ± 0.0008	0.1407 ± 0.0012	0.1509 ± 0.0165
MC26-5	0.226	>10	2.80	122.2	0.00026	0.02162 ± 0.00019	0.14610 ± 0.00154	0.04900 ± 0.00027	0.1379 ± 0.0012	0.1385 ± 0.0014	0.1480 ± 0.0129
MC26-6	0.446	>10	3.95	176.1	0.00003	0.02206 ± 0.00010	0.14857 ± 0.00085	0.04884 ± 0.00016	0.1407 ± 0.0007	0.1406 ± 0.0008	0.1404 ± 0.0075
MC26-7	0.197	>10	3.44	146.5	0.00013	0.02219 ± 0.00009	0.14980 ± 0.00098	0.04897 ± 0.00024	0.1415 ± 0.0006	0.1417 ± 0.0009	0.1462 ± 0.0114
MC26-8	0.295	>10	3.37	142.1	0.00051	0.02215 ± 0.00008	0.14907 ± 0.00120	0.04882 ± 0.00034	0.1412 ± 0.0005	0.1411 ± 0.0011	0.1391 ± 0.0161

Table 2. U-Pb data for zircons, western Idaho.--Continued. (Uncertainties at 95% confidence interval.)

SAMPLE	Weight (mg)	No. Xtals	Pb PPM	U PPM	$^{204}Pb/^{206}Pb$	Corrected for Initial Pb $^{206}Pb/^{238}U$	Corrected for Initial Pb $^{207}Pb/^{235}U$	Corrected for Initial Pb $^{207}Pb/^{206}Pb$	Mogel Ages in Ga. $^{206}Pb/^{238}U$	Mogel Ages in Ga. $^{207}Pb/^{235}U$	Mogel Ages in Ga. $^{207}Pb/^{206}Pb$
K92-1-1	0.300	>10	4.36	137.8	0.00372	0.02502 ± 0.00009	0.17119 ± 0.00244	0.04963 ± 0.00065	0.1593 ± 0.0006	0.1605 ± 0.0021	0.1778 ± 0.0303
K92-1-2	0.400	>10	2.88	115.2	0.00009	0.02531 ± 0.00009	0.17257 ± 0.00088	0.04945 ± 0.00017	0.1611 ± 0.0006	0.1616 ± 0.0008	0.1693 ± 0.0082
K92-1-3	0.027	1	4.73	184.6	0.00073	0.02507 ± 0.00034	0.17101 ± 0.00610	0.04948 ± 0.00154	0.1596 ± 0.0022	0.1603 ± 0.0053	0.1708 ± 0.0712
K92-1-4	0.015	1	4.20	148.7	0.00156	0.02540 ± 0.00014	0.17224 ± 0.00306	0.04918 ± 0.00078	0.1617 ± 0.0009	0.1614 ± 0.0026	0.1563 ± 0.0369
K92-1-5	0.030	1	6.38	194.2	0.00062	0.03037 ± 0.00016	0.25274 ± 0.00506	0.06035 ± 0.00110	0.1929 ± 0.0010	0.2288 ± 0.0041	0.6162 ± 0.0389
K92-1-6	0.011	1	2.71	99.1	0.00023	0.02540 ± 0.00017	0.17099 ± 0.00438	0.04882 ± 0.00112	0.1617 ± 0.0011	0.1603 ± 0.0038	0.1392 ± 0.0531
K92-1-7	0.024	2	4.08	156.0	0.00026	0.02541 ± 0.00012	0.17220 ± 0.00157	0.04916 ± 0.00037	0.1617 ± 0.0007	0.1613 ± 0.0014	0.1555 ± 0.0174
K92-1-8	0.015	1	2.31	83.1	0.00126	0.02538 ± 0.00014	0.17152 ± 0.00615	0.04901 ± 0.00163	0.1616 ± 0.0009	0.1607 ± 0.0053	0.1481 ± 0.0764
K92-5-1	0.340	>10	5.00	152.7	0.00127	0.03150 ± 0.00013	0.22125 ± 0.00157	0.05095 ± 0.00028	0.1999 ± 0.0008	0.2029 ± 0.0013	0.2384 ± 0.0126
K92-5-2	0.210	>10	10.03	200.8	0.00693	0.03417 ± 0.00013	0.23580 ± 0.00715	0.05006 ± 0.00146	0.2166 ± 0.0008	0.2150 ± 0.0059	0.1976 ± 0.0662
K92-5-3	0.015	1	7.41	208.5	0.00014	0.03634 ± 0.00015	0.25663 ± 0.00313	0.05122 ± 0.00055	0.2301 ± 0.0009	0.2319 ± 0.0025	0.2507 ± 0.0244
K92-5-4	0.049	2	5.81	133.9	0.00269	0.03743 ± 0.00020	0.27346 ± 0.00536	0.05299 ± 0.00095	0.2369 ± 0.0012	0.2455 ± 0.0043	0.3285 ± 0.0401
K92-5-5	0.042	2	6.10	174.8	0.00030	0.03591 ± 0.00022	0.25391 ± 0.00285	0.05128 ± 0.00046	0.2274 ± 0.0014	0.2297 ± 0.0023	0.2535 ± 0.0204
K92-5-6	0.029	1	3.04	95.8	0.00037	0.03225 ± 0.00014	0.22506 ± 0.00360	0.05061 ± 0.00073	0.2046 ± 0.0009	0.2061 ± 0.0030	0.2233 ± 0.0328
K92-5-7	0.019	1	4.67	123.5	0.00104	0.03615 ± 0.00017	0.25591 ± 0.00714	0.05135 ± 0.00133	0.2289 ± 0.0011	0.2314 ± 0.0058	0.2565 ± 0.0586
K92-6-1	0.300	>10	4.97	266.8	0.00002	0.01790 ± 0.00007	0.12001 ± 0.00064	0.04861 ± 0.00017	0.1144 ± 0.0005	0.1151 ± 0.0006	0.1293 ± 0.0081
K92-6-2	0.500	>10	3.78	208.1	0.00000	0.01798 ± 0.00007	0.12035 ± 0.00058	0.04853 ± 0.00012	0.1149 ± 0.0005	0.1154 ± 0.0005	0.1254 ± 0.0058
K92-6-3	0.321	>10	4.58	251.5	0.00001	0.01792 ± 0.00015	0.11967 ± 0.00150	0.04842 ± 0.00044	0.1145 ± 0.0009	0.1148 ± 0.0014	0.1201 ± 0.0211
K92-6-4	0.368	>10	3.79	198.5	0.00031	0.01796 ± 0.00008	0.11979 ± 0.00062	0.04837 ± 0.00011	0.1148 ± 0.0005	0.1149 ± 0.0006	0.1172 ± 0.0053
K92-6-5	0.327	>10	3.87	212.3	0.00021	0.01772 ± 0.00011	0.11829 ± 0.00079	0.04842 ± 0.00011	0.1132 ± 0.0007	0.1135 ± 0.0007	0.1200 ± 0.0051
K92-7-1	0.030	2	51.39	1657.3	0.00007	0.03211 ± 0.00018	0.22593 ± 0.00136	0.05104 ± 0.00010	0.2037 ± 0.0011	0.2068 ± 0.0011	0.2424 ± 0.0046
K92-7-2	0.016	1	5.41	151.3	0.00046	0.03601 ± 0.00024	0.25509 ± 0.00515	0.05138 ± 0.00092	0.2280 ± 0.0015	0.2307 ± 0.0042	0.2581 ± 0.0405
K92-7-3	0.017	2	10.44	342.2	0.00058	0.03067 ± 0.00027	0.21495 ± 0.00304	0.05083 ± 0.00054	0.1948 ± 0.0017	0.1977 ± 0.0025	0.2330 ± 0.0242
K92-7-4	0.026	1	8.72	266.3	0.00020	0.03381 ± 0.00025	0.23955 ± 0.00265	0.05139 ± 0.00039	0.2143 ± 0.0016	0.2181 ± 0.0022	0.2590 ± 0.0180
K92-7-5	0.018	1	32.61	1385.7	0.00011	0.02498 ± 0.00011	0.17104 ± 0.00101	0.04966 ± 0.00018	0.1591 ± 0.0007	0.1603 ± 0.0009	0.1791 ± 0.0083
K92-7-6	0.018	1	5.75	171.3	0.00070	0.03340 ± 0.00014	0.23043 ± 0.00392	0.05004 ± 0.00078	0.2118 ± 0.0009	0.2105 ± 0.0032	0.1969 ± 0.0357
K92-8-1	0.130	>10	10.23	627.5	0.00001	0.01769 ± 0.00007	0.11898 ± 0.00056	0.04879 ± 0.00013	0.1130 ± 0.0004	0.1141 ± 0.0005	0.1376 ± 0.0061
K92-8-2	0.024	1	2.98	173.9	0.00110	0.01730 ± 0.00007	0.11500 ± 0.00134	0.04820 ± 0.00050	0.1106 ± 0.0004	0.1105 ± 0.0012	0.1627 ± 0.0229
K92-8-3	0.018	1	5.12	237.1	0.00416	0.01785 ± 0.00013	0.12245 ± 0.00264	0.04974 ± 0.00096	0.1141 ± 0.0008	0.1173 ± 0.0024	0.1829 ± 0.0445
K92-8-4	0.016	1	4.81	283.7	0.00022	0.01833 ± 0.00008	0.12334 ± 0.00123	0.04881 ± 0.00041	0.1171 ± 0.0005	0.1181 ± 0.0011	0.1023 ± 0.0211
K92-8-5	0.017	1	4.60	277.5	0.00030	0.01788 ± 0.00008	0.11863 ± 0.00109	0.04813 ± 0.00037	0.1142 ± 0.0005	0.1138 ± 0.0010	0.1055 ± 0.0180
K92-8-6	0.027	1	3.94	238.7	0.00019	0.01794 ± 0.00013	0.11991 ± 0.00104	0.04848 ± 0.00023	0.1146 ± 0.0008	0.1150 ± 0.0009	0.1229 ± 0.0110
K92-8-7	0.022	1	6.53	337.2	0.00195	0.01836 ± 0.00009	0.12272 ± 0.00123	0.04849 ± 0.00041	0.1173 ± 0.0005	0.1175 ± 0.0011	0.1615 ± 0.0189

Table 2. U-Pb data for zircons, western Idaho.--Continued. (Uncertainties at 95% confidence interval.)

SAMPLE	Weight (mg)[1]	No. Xtals[2]	Pb PPM	U PPM	$^{204}Pb/^{206}Pb$	Corrected for Initial Pb $^{206}Pb/^{238}U$	Corrected for Initial Pb $^{207}Pb/^{235}U$	Corrected for Initial Pb $^{207}Pb/^{206}Pb$	Model Ages in Ga. $^{206}Pb/^{238}U$	Model Ages in Ga. $^{207}Pb/^{235}U$	Model Ages in Ga. $^{207}Pb/^{206}Pb$
Salmon River suture zone											
MC10-91-1	0.715	>10	8.96	461.0	0.00001	0.02003 ± 0.00013	0.14206 ± 0.00090	0.05144 ± 0.00006	0.1278 ± 0.0008	0.1349 ± 0.0008	0.2607 ± 0.0028
MC10-2	0.601	8	7.96	373.0	0.00005	0.02131 ± 0.00014	0.14504 ± 0.00097	0.04935 ± 0.00006	0.1360 ± 0.0009	0.1375 ± 0.0009	0.1646 ± 0.0028
MC10-3	0.265	>10	7.22	391.7	0.00054	0.01850 ± 0.00009	0.12703 ± 0.00174	0.04981 ± 0.00061	0.1182 ± 0.0006	0.1214 ± 0.0016	0.1861 ± 0.0284
MC10-4	0.430	>10	7.73	364.8	0.00018	0.02147 ± 0.00011	0.14659 ± 0.00078	0.04952 ± 0.00008	0.1369 ± 0.0007	0.1389 ± 0.0007	0.1726 ± 0.0038
MC10-5	0.114	7	8.30	420.1	0.00001	0.02021 ± 0.00007	0.13693 ± 0.00068	0.04913 ± 0.00016	0.1290 ± 0.0005	0.1303 ± 0.0006	0.1542 ± 0.0077
MC10-6	0.177	>10	7.54	457.2	0.00039	0.01702 ± 0.00007	0.11429 ± 0.00058	0.04870 ± 0.00015	0.1088 ± 0.0004	0.1099 ± 0.0005	0.1333 ± 0.0073
MC10-7	0.582	>10	9.50	484.2	0.00006	0.02014 ± 0.00008	0.14518 ± 0.00055	0.05229 ± 0.00004	0.1285 ± 0.0005	0.1376 ± 0.0005	0.2982 ± 0.0018
MC10-8	0.285	>10	10.20	533.7	0.00091	0.01879 ± 0.00007	0.12996 ± 0.00190	0.05017 ± 0.00068	0.1200 ± 0.0004	0.1241 ± 0.0017	0.2028 ± 0.0311
MC10-9	0.200	>10	5.51	333.5	0.00017	0.01718 ± 0.00008	0.11486 ± 0.00057	0.04850 ± 0.00009	0.1098 ± 0.0005	0.1104 ± 0.0005	0.1237 ± 0.0046
MC10-10	0.200	>10	5.61	379.1	0.00004	0.01562 ± 0.00007	0.10311 ± 0.00111	0.04789 ± 0.00046	0.0999 ± 0.0005	0.0996 ± 0.0010	0.0936 ± 0.0226
MC11-91-1	1.236	>10	5.77	235.6	0.00029	0.02419 ± 0.00009	0.16465 ± 0.00065	0.04936 ± 0.00005	0.1541 ± 0.0006	0.1548 ± 0.0006	0.1648 ± 0.0026
MC11-2	0.509	>10	7.00	287.2	0.00025	0.02386 ± 0.00009	0.16191 ± 0.00082	0.04921 ± 0.00016	0.1520 ± 0.0006	0.1524 ± 0.0007	0.1581 ± 0.0074
MC11-3	0.268	>10	6.54	276.9	0.00008	0.02362 ± 0.00009	0.16007 ± 0.00119	0.04914 ± 0.00030	0.1505 ± 0.0006	0.1508 ± 0.0010	0.1546 ± 0.0142
MC11-4	0.151	>10	10.07	420.8	0.00001	0.02382 ± 0.00012	0.16175 ± 0.00104	0.04925 ± 0.00019	0.1517 ± 0.0008	0.1522 ± 0.0009	0.1598 ± 0.0089
MC11-5	0.173	>10	8.19	347.8	0.00076	0.02258 ± 0.00008	0.15297 ± 0.00075	0.04913 ± 0.00016	0.1440 ± 0.0005	0.1445 ± 0.0007	0.1539 ± 0.0076
MC11-6A	0.403	7	6.10	237.1	0.00049	0.02478 ± 0.00009	0.16855 ± 0.00074	0.04933 ± 0.00012	0.1578 ± 0.0006	0.1582 ± 0.0006	0.1635 ± 0.0059
MC11-7A	0.233	4	4.71	180.0	0.00023	0.02511 ± 0.00010	0.17059 ± 0.00085	0.04926 ± 0.00016	0.1599 ± 0.0006	0.1599 ± 0.0007	0.1604 ± 0.0074
MC11-8A	0.378	>10	5.19	198.4	0.00088	0.02463 ± 0.00011	0.16702 ± 0.00094	0.04919 ± 0.00017	0.1568 ± 0.0007	0.1568 ± 0.0008	0.1569 ± 0.0079
MC11-9A	0.507	>10	5.25	202.5	0.00002	0.02529 ± 0.00013	0.17238 ± 0.00128	0.04944 ± 0.00026	0.1610 ± 0.0008	0.1615 ± 0.0011	0.1688 ± 0.0123
MC20a-91-1	0.376	>10	1.53	54.8	0.00180	0.02556 ± 0.00009	0.17680 ± 0.00193	0.05017 ± 0.00050	0.1627 ± 0.0006	0.1653 ± 0.0017	0.2031 ± 0.0230
MC20a-2	0.205	>10	1.53	71.5	0.00194	0.02005 ± 0.00009	0.13468 ± 0.00273	0.04873 ± 0.00092	0.1280 ± 0.0006	0.1283 ± 0.0024	0.1346 ± 0.0439
MC20a-3	0.153	3	2.13	83.4	0.00203	0.02291 ± 0.00009	0.15714 ± 0.00223	0.04975 ± 0.00065	0.1460 ± 0.0006	0.1482 ± 0.0020	0.1831 ± 0.0300
MC20a-4	0.005	2	1.47	95.1	0.00120	0.01555 ± 0.00008	0.10200 ± 0.00488	0.04756 ± 0.00215	0.0995 ± 0.0005	0.0986 ± 0.0045	0.0774 ± 0.1040
MC20a-5	0.010	5	1.11	61.5	0.00133	0.01780 ± 0.00012	0.11461 ± 0.00950	0.04671 ± 0.00365	0.1137 ± 0.0007	0.1102 ± 0.0086	0.0342 ± 0.1775
MC20a-6	0.018	3	0.75	33.2	0.00529	0.01743 ± 0.00012	0.10922 ± 0.00953	0.04545 ± 0.00376	0.1114 ± 0.0008	0.1053 ± 0.0087	** ± **
MC20a-7	0.025	1	1.76	77.8	0.00160	0.02143 ± 0.00009	0.14765 ± 0.00319	0.04996 ± 0.00100	0.1367 ± 0.0006	0.1398 ± 0.0028	0.1933 ± 0.0460
MC20a-8	0.010	1	1.86	87.9	0.00082	0.02097 ± 0.00016	0.13689 ± 0.01300	0.04735 ± 0.00422	0.1338 ± 0.0010	0.1303 ± 0.0115	0.0669 ± 0.1994
MC22-91-1	0.057	1	5.70	395.4	0.00011	0.01582 ± 0.00006	0.10492 ± 0.00039	0.04811 ± 0.00006	0.1012 ± 0.0004	0.1013 ± 0.0004	0.1048 ± 0.0029
MC22-2	0.032	1	7.75	540.4	0.00022	0.01556 ± 0.00006	0.10357 ± 0.00044	0.04828 ± 0.00009	0.0995 ± 0.0004	0.1001 ± 0.0004	0.1129 ± 0.0045
MC22-3	0.011	1	5.94	344.5	0.00043	0.01761 ± 0.00006	0.11742 ± 0.00108	0.04836 ± 0.00039	0.1125 ± 0.0004	0.1127 ± 0.0010	0.1169 ± 0.0189
MC22-4	0.028	1	6.82	462.1	0.00025	0.01583 ± 0.00006	0.10494 ± 0.00057	0.04808 ± 0.00018	0.1012 ± 0.0004	0.1013 ± 0.0005	0.1034 ± 0.0089
MC22-5	0.012	1	7.23	505.8	0.00046	0.01494 ± 0.00011	0.09900 ± 0.00094	0.04807 ± 0.00025	0.0956 ± 0.0007	0.0959 ± 0.0009	0.1027 ± 0.0124
MC22-6	0.025	2	5.77	384.6	0.00025	0.01634 ± 0.00006	0.10897 ± 0.00079	0.04837 ± 0.00029	0.1045 ± 0.0004	0.1050 ± 0.0007	0.1175 ± 0.0140
MC22-7	0.014	1	8.81	486.5	0.00149	0.01713 ± 0.00032	0.11492 ± 0.00274	0.04864 ± 0.00068	0.1095 ± 0.0020	0.1105 ± 0.0025	0.1305 ± 0.0326
MC22-8	0.031	1	6.66	368.6	0.00075	0.01779 ± 0.00007	0.11979 ± 0.00074	0.04884 ± 0.00022	0.1137 ± 0.0005	0.1149 ± 0.0007	0.1403 ± 0.0105
MC22-9	0.019	1	4.82	297.4	0.00096	0.01637 ± 0.00009	0.10966 ± 0.00095	0.04858 ± 0.00030	0.1047 ± 0.0006	0.1057 ± 0.0009	0.1275 ± 0.0145
MC22-10	0.017	2	4.25	270.5	0.00066	0.01637 ± 0.00011	0.10937 ± 0.00111	0.04846 ± 0.00036	0.1047 ± 0.0007	0.1054 ± 0.0010	0.1215 ± 0.0173
MC22-11	0.059	1	8.30	296.1	0.00037	0.02908 ± 0.00012	0.21110 ± 0.00099	0.05264 ± 0.00012	0.1848 ± 0.0007	0.1945 ± 0.0008	0.3134 ± 0.0053

Table 2. U-Pb data for zircons, western Idaho.--Continued. (Uncertainties at 95% confidence interval.)

	Weight	No.	Pb	U		Corrected for Initial Pb			Model Ages in Ga.		
SAMPLE	(mg)[1]	Xtals[2]	PPM	PPM	$^{204}Pb/^{206}Pb$	$^{206}Pb/^{238}U$	$^{207}Pb/^{235}U$	$^{207}Pb/^{206}Pb$	$^{206}Pb/^{238}U$	$^{207}Pb/^{235}U$	$^{207}Pb/^{206}Pb$
MC23-91-1	2.830	>10	1.81	101.5	0.00020	0.01813 ± 0.00010	0.12100 ± 0.00070	0.04841 ± 0.00009	0.1158 ± 0.0006	0.1160 ± 0.0006	0.1194 ± 0.0043
MC23-2	2.860	4	2.39	137.4	≤0.00005	0.01800 ± 0.00009	0.11970 ± 0.00080	0.04825 ± 0.00019	0.1150 ± 0.0006	0.1148 ± 0.0007	0.1113 ± 0.0094
MC23-3	1.360	>10	2.54	134.2	0.00065	0.01864 ± 0.00012	0.12400 ± 0.00081	0.04830 ± 0.00011	0.1191 ± 0.0008	0.1187 ± 0.0007	0.1143 ± 0.0054
MC23-4	0.700	>10	1.61	84.5	0.00123	0.01797 ± 0.00010	0.11960 ± 0.00080	0.04834 ± 0.00015	0.1148 ± 0.0006	0.1147 ± 0.0007	0.1161 ± 0.0073
MC23-5	0.260	>10	3.55	200.3	0.00048	0.01790 ± 0.00013	0.11910 ± 0.00100	0.04826 ± 0.00018	0.1144 ± 0.0008	0.1143 ± 0.0009	0.1123 ± 0.0085
MC23-6A	0.140	5	2.22	119.5	0.00066	0.01815 ± 0.00011	0.12110 ± 0.00120	0.04839 ± 0.00039	0.1160 ± 0.0007	0.1161 ± 0.0011	0.1180 ± 0.0190
MC23-7A	0.051	7	1.16	63.5	≤0.00005	0.01834 ± 0.00016	0.12230 ± 0.00120	0.04837 ± 0.00016	0.1172 ± 0.0010	0.1172 ± 0.0011	0.1173 ± 0.0079
MC23-8A	1.780	>10	2.17	120.5	0.00029	0.01816 ± 0.00008	0.12120 ± 0.00061	0.04842 ± 0.00005	0.1160 ± 0.0005	0.1162 ± 0.0005	0.1199 ± 0.0025
MC23-9A	1.230	>10	1.95	106.6	0.00039	0.01832 ± 0.00012	0.12210 ± 0.00081	0.04836 ± 0.00005	0.1170 ± 0.0008	0.1170 ± 0.0007	0.1171 ± 0.0022
MC23-10A	0.750	>10	1.81	93.7	0.00098	0.01830 ± 0.00009	0.12190 ± 0.00069	0.04832 ± 0.00012	0.1169 ± 0.0006	0.1168 ± 0.0006	0.1148 ± 0.0058
MC23-11A	0.730	>10	1.56	83.0	0.00033	0.01840 ± 0.00011	0.12270 ± 0.00080	0.04834 ± 0.00013	0.1175 ± 0.0007	0.1175 ± 0.0007	0.1161 ± 0.0061
MC25-91-1	0.450	>10	4.69	304.1	0.00006	0.01544 ± 0.00005	0.10246 ± 0.00043	0.04813 ± 0.00011	0.0988 ± 0.0003	0.0990 ± 0.0004	0.1056 ± 0.0055
MC25-2	0.650	>10	3.70	247.5	0.00005	0.01520 ± 0.00006	0.10343 ± 0.00045	0.04935 ± 0.00011	0.0972 ± 0.0004	0.0999 ± 0.0004	0.1646 ± 0.0050
MC25-3	0.554	7	4.39	279.4	0.00107	0.01506 ± 0.00007	0.09966 ± 0.00060	0.04800 ± 0.00019	0.0964 ± 0.0004	0.0965 ± 0.0006	0.0991 ± 0.0091
MC25-4	0.337	>10	7.93	504.6	0.00098	0.01506 ± 0.00008	0.10000 ± 0.00072	0.04815 ± 0.00022	0.0964 ± 0.0005	0.0968 ± 0.0007	0.1066 ± 0.0108
MC25-5	0.270	>10	9.87	637.9	0.00078	0.01498 ± 0.00005	0.09945 ± 0.00047	0.04815 ± 0.00014	0.0958 ± 0.0003	0.0963 ± 0.0004	0.1067 ± 0.0069
MC25-6	0.410	>10	11.40	617.1	0.00031	0.01821 ± 0.00007	0.13843 ± 0.00060	0.05513 ± 0.00008	0.1163 ± 0.0005	0.1316 ± 0.0005	0.4177 ± 0.0033
MC25-7	0.350	>10	10.78	713.7	0.00021	0.01527 ± 0.00006	0.10254 ± 0.00039	0.04869 ± 0.00006	0.0977 ± 0.0004	0.0991 ± 0.0004	0.1329 ± 0.0027
MC25-8	0.310	>10	6.52	420.2	0.00063	0.01505 ± 0.00006	0.09971 ± 0.00048	0.04807 ± 0.00013	0.0963 ± 0.0004	0.0965 ± 0.0004	0.1025 ± 0.0064
MC93-54-1	0.076	1	1.12	54.3	0.00107	0.01887 ± 0.00009	0.12541 ± 0.00380	0.04821 ± 0.00137	0.1205 ± 0.0006	0.1200 ± 0.0034	0.1098 ± 0.0657
MC54-2	0.050	1	1.24	53.3	0.00247	0.01907 ± 0.00021	0.14963 ± 0.00449	0.05691 ± 0.00156	0.1218 ± 0.0013	0.1416 ± 0.0040	0.4880 ± 0.0592
MC54-3	0.019	1	1.80	70.6	0.00371	0.01942 ± 0.00019	0.15502 ± 0.00511	0.05791 ± 0.00176	0.1240 ± 0.0012	0.1463 ± 0.0045	0.5263 ± 0.0652
MC54-4	0.049	1	1.08	53.3	0.00079	0.01894 ± 0.00007	0.12536 ± 0.00093	0.04801 ± 0.00029	0.1209 ± 0.0005	0.1199 ± 0.0008	0.0997 ± 0.0142
MC54-5	0.039	1	1.10	53.0	0.00094	0.01948 ± 0.00021	0.13416 ± 0.00549	0.04995 ± 0.00186	0.1244 ± 0.0013	0.1278 ± 0.0049	0.1926 ± 0.0845
MC54-6	0.011	1	0.70	35.1	0.00037	0.01892 ± 0.00010	0.14417 ± 0.00551	0.05527 ± 0.00198	0.1208 ± 0.0006	0.1368 ± 0.0049	0.4231 ± 0.0782
MC54-7	0.057	1	1.12	44.5	0.00444	0.01894 ± 0.00011	0.13431 ± 0.00582	0.05143 ± 0.00208	0.1210 ± 0.0007	0.1280 ± 0.0052	0.2600 ± 0.0903
MC54-8	0.027	1	1.44	54.9	0.00412	0.01897 ± 0.00016	0.13311 ± 0.00815	0.05089 ± 0.00288	0.1211 ± 0.0010	0.1269 ± 0.0073	0.2360 ± 0.1256
MC54-9	0.045	1	1.08	47.3	0.00327	0.01827 ± 0.00020	0.14548 ± 0.00935	0.05776 ± 0.00342	0.1167 ± 0.0013	0.1379 ± 0.0083	0.5208 ± 0.1250
MC54-10	0.047	1	1.07	50.7	0.00182	0.01849 ± 0.00034	0.12433 ± 0.00609	0.04877 ± 0.00209	0.1181 ± 0.0022	0.1190 ± 0.0055	0.1367 ± 0.0976
MC93-55-1	0.101	1	2.52	132.2	0.00041	0.01919 ± 0.00009	0.12788 ± 0.00070	0.04834 ± 0.00014	0.1225 ± 0.0005	0.1222 ± 0.0006	0.1162 ± 0.0070
MC55-2	0.009	1	2.65	182.7	0.00033	0.01451 ± 0.00007	0.09304 ± 0.00283	0.04652 ± 0.00133	0.0928 ± 0.0004	0.0903 ± 0.0026	0.0245 ± 0.0671
MC55-3	0.031	1	3.25	189.6	0.00065	0.01716 ± 0.00006	0.11387 ± 0.00080	0.04811 ± 0.00027	0.1097 ± 0.0004	0.1095 ± 0.0007	0.1048 ± 0.0133
MC55-4	0.027	1	1.66	93.8	0.00057	0.01794 ± 0.00007	0.11930 ± 0.00176	0.04823 ± 0.00068	0.1146 ± 0.0005	0.1144 ± 0.0016	0.1106 ± 0.0328
MC55-5	0.017	1	1.52	82.3	0.00094	0.01799 ± 0.00007	0.11956 ± 0.00171	0.04819 ± 0.00063	0.1150 ± 0.0004	0.1147 ± 0.0015	0.1086 ± 0.0306
MC55-6	0.018	4	3.14	151.1	0.00197	0.01883 ± 0.00008	0.12505 ± 0.00168	0.04818 ± 0.00059	0.1202 ± 0.0005	0.1196 ± 0.0015	0.1079 ± 0.0288

[1]mg, milligrams

[2]Xtls, crystals

[3]Using Stacey and Kramers, 1975

Table 3. Rb-Sr and Sm-Nd isotopic data for selected plutons from western Idaho.

Sample[1]	Age (Ma)[2]	Rb ppm	Sr ppm	Sm ppm	Nd ppm	$^{87}Rb/^{86}Sr$	$^{87}Sr/^{86}Sr$	$^{147}Sm/^{144}Nd$	$^{143}Nd/^{144}Nd$	εNd	$^{87}Sr/^{86}Sr_I$	$^{143}Nd/^{144}Nd_I$	$εNd_I$
Idaho batholith													
MC1-91	82.2	125.5	269.9	3.45	17.37	1.3451 ± 0.0426	0.709635 ± 0.000018	0.11990 ± 0.00026	0.512218 ± 0.000015	-8.2	0.708064 ± 0.000053	0.512154 ± 0.000015	-7.4
MC2-91 (pl)	82.9	33.4	950.9	0.82	5.00	0.1016 ± 0.0041	0.707979 ± 0.000021	0.09888 ± 0.00026	0.512210 ± 0.000022	-8.3	0.707859 ± 0.000022	0.512156 ± 0.000022	-7.3
MC3-91	(85)	69.5	810.5	4.89	37.37	0.2482 ± 0.0044	0.707664 ± 0.000020	0.07899 ± 0.00031			0.707364 ± 0.000021		
MC5-91	91.2	33.1	676.9	3.15	23.73	0.1414 ± 0.0011	0.709015 ± 0.000021	0.08005 ± 0.00021	0.512134 ± 0.000042	-9.8	0.708832 ± 0.000021	0.512086 ± 0.000042	-8.4
MC6-91	94.4	127.5	244.1	3.06	18.69	1.5121 ± 0.0262	0.710851 ± 0.000020	0.09872 ± 0.00010	0.512082 ± 0.000014	-10.8	0.708823 ± 0.000040	0.512021 ± 0.000014	-9.6
MC13-91 (pl)	88.9	2.4	1328.0	0.56	3.67	0.0052 ± 0.0000	0.709038 ± 0.000025	0.09192 ± 0.00045	0.512092 ± 0.000087	-10.6	0.709031 ± 0.000025	0.512039 ± 0.000087	-9.4
MC14-91	(82)	79.1	483.7	2.91	20.22	0.4733 ± 0.0094	0.713001 ± 0.000019	0.08704 ± 0.00014	0.512100 ± 0.000017	-10.5	0.712450 ± 0.000022	0.512053 ± 0.000017	-9.3
MC15-91 (pl)	(82)	35.0	755.4	0.45	2.84	0.1340 ± 0.0042	0.709633 ± 0.000037	0.09537 ± 0.00048	0.512048 ± 0.000057	-11.5	0.709477 ± 0.000037	0.511997 ± 0.000057	-10.4
MC18-91 (pl)	93.4	20.8	1638.9	0.36	1.84	0.0366 ± 0.0008	0.708464 ± 0.000038	0.11820 ± 0.00370	0.512149 ± 0.000028	-9.5	0.708415 ± 0.000038	0.512077 ± 0.000028	-8.6
91KL139	(90)	109.4	329.8	2.53	14.03	0.9596 ± 0.0563	0.711904 ± 0.000019	0.10889 ± 0.00044	0.512119 ± 0.000015	-10.1	0.710677 ± 0.000074	0.512055 ± 0.000015	-9.1
MC92-32	(90)	14.7	1364.1	2.37		0.0311 ± 0.0004	0.709934 ± 0.000021				0.709894 ± 0.000021		
MC92-33	(85)	93.5	460.3	7.82	43.23	0.5878 ± 0.0147	0.710068 ± 0.000019	0.10926 ± 0.00032	0.512218 ± 0.000015	-8.2	0.709358 ± 0.000026	0.512157 ± 0.000015	-7.2
MC92-35	93.2	107.7	632.8	7.10	46.03	0.4925 ± 0.0088	0.709882 ± 0.000020	0.09310 ± 0.00023	0.512226 ± 0.000013	-8.0	0.709230 ± 0.000023	0.512169 ± 0.000013	-6.8
Wallowa terrane													
00KL030	211.5	15.9	227.3	2.53	9.24	0.2021 ± 0.0015	0.704327 ± 0.000021	0.16541 ± 0.00066	0.512948 ± 0.000015	6.1	0.703719 ± 0.000021	0.512719 ± 0.000015	6.9
00KL031	218.1	3.0	178.8			0.0486 ± 0.0003	0.703602 ± 0.000021				0.703451 ± 0.000021		
00KL032	(220)	43.3	34.9	4.94	24.00	3.5913 ± 0.0457	0.713823 ± 0.000020	0.12423 ± 0.00028	0.512918 ± 0.000015	5.5	0.702586 ± 0.000144	0.512739 ± 0.000015	7.5
00KL033	(220)	38.8	418.9	9.25	44.58	0.2680 ± 0.0022	0.704366 ± 0.000018	0.12530 ± 0.00064	0.512827 ± 0.000010	3.7	0.703527 ± 0.000019	0.512647 ± 0.000010	5.7
00KL034	(220)	4.9	318.3	0.70	1.95	0.0447 ± 0.0004	0.703855 ± 0.000021	0.21733 ± 0.00072	0.512931 ± 0.000015	5.8	0.703715 ± 0.000021	0.512618 ± 0.000015	5.2
00KL035A	158.9	9.2	651.3	1.53	5.66	0.0406 ± 0.0003	0.703851 ± 0.000020	0.16286 ± 0.00197	0.512869 ± 0.000013	4.5	0.703759 ± 0.000020	0.512700 ± 0.000013	5.2
00KL035B	(110)	39.0	328.9	1.60	8.13	0.3427 ± 0.0040	0.704383 ± 0.000095	0.11863 ± 0.00039	0.512835 ± 0.000016	3.9	0.703847 ± 0.000095	0.512750 ± 0.000016	5.0
MC26-91	140.6	42.3	486.6	5.85	30.99	0.2516 ± 0.0044	0.703943 ± 0.000036	0.11397 ± 0.00047	0.512904 ± 0.000015	5.2	0.703440 ± 0.000037	0.512799 ± 0.000015	6.7
87KL017	113.1	9.6	515.9	1.98	13.69	0.0540 ± 0.0004	0.703753 ± 0.000018	0.08750 ± 0.00020	0.512849 ± 0.000015	4.2	0.703666 ± 0.000018	0.512784 ± 0.000015	5.7
Salmon River suture zone													
MC10-91 (pl)	(106)	2.5	1177.9	0.26	1.14	0.0061 ± 0.0001	0.705535 ± 0.000023	0.13836 ± 0.00017	0.512447 ± 0.000073	-3.7	0.705526 ± 0.000023	0.512351 ± 0.000073	-2.9
MC11-91 (pl)	158.9	3.4	1184.7	1.41	7.17	0.0084 ± 0.0001	0.704440 ± 0.000021	0.11848 ± 0.00074	0.512736 ± 0.000015	2.0	0.704421 ± 0.000021	0.512613 ± 0.000015	3.5
MC20a-91	(115)	20.8	706.2	2.22	5.73	0.0852 ± 0.0006	0.703900 ± 0.000020	0.23361 ± 0.00060	0.512826 ± 0.000024	3.7	0.703761 ± 0.000020	0.512650 ± 0.000024	3.2
MC22-91	(99)	27.4	927.8	2.29	24.50	0.0853 ± 0.0006	0.704728 ± 0.000020	0.05632 ± 0.00009	0.512550 ± 0.000075	-1.7	0.704608 ± 0.000020	0.512514 ± 0.000075	0.1
MC23-91	116.7	18.5	777.7	2.86	15.42	0.0687 ± 0.0039	0.703667 ± 0.000030	0.11210 ± 0.00130	0.512861 ± 0.000015	4.4	0.703553 ± 0.000031	0.512775 ± 0.000015	5.7
MC25-91	96.2	138.9	418.3	7.07	40.21	0.9608 ± 0.0754	0.710694 ± 0.000021	0.10608 ± 0.00051	0.512161 ± 0.000019	-9.3	0.709381 ± 0.000105	0.512094 ± 0.000019	-8.2
MC93-54 (hb)	121.1	0.4	68.7	5.78	16.89	0.0166 ± 0.0001	0.703568 ± 0.000020	0.20668 ± 0.00018	0.512963 ± 0.000013	6.4	0.703540 ± 0.000020	0.512801 ± 0.000013	6.2
MC93-55	116.4	4.8	936.8	1.20	9.05	0.0148 ± 0.0001	0.703536 ± 0.000019	0.08040 ± 0.00063	0.512896 ± 0.000031	5.1	0.703512 ± 0.000019	0.512835 ± 0.000031	6.8

[1] Analyses are of whole-rock splits unless otherwise noted (pl = plagioclase, hb = hornblende)

[2] Ages in parentheses are either very imprecise or estimated from those of similar samples.

Table 4. U, Th, and Pb concentrations and Pb isotopic compositions from whole rock samples of selected plutonic rocks from western Idaho

				Corrected for blank and mass fractionation								Calculated initial ratios		
Sample	U ppm	Th ppm	Pb ppm	$^{238}U/^{204}Pb$	$^{232}Th/^{204}Pb$	$^{206}Pb/^{204}Pb$	$^{207}Pb/^{204}Pb$	$^{208}Pb/^{204}Pb$	$^{207}Pb/^{206}Pb$	$^{208}Pb/^{206}Pb$	Age (Ma)[1]	$^{206}Pb/^{204}Pb$	$^{207}Pb/^{204}Pb$	$^{208}Pb/^{204}Pb$
Idaho batholith														
MC1-91	0.55	8.48	23.10	1.54 ± 0.08	24.59 ± 0.48	19.270 ± 0.016	15.668 ± 0.015	39.064 ± 0.049	0.81310 ± 0.00035	2.0272 ± 0.0017	82.2	19.251 ± 0.016	15.668 ± 0.015	38.964 ± 0.049
MC3-91	0.16	1.90	9.70	1.11 ± 0.03	13.27 ± 0.28	19.747 ± 0.015	15.724 ± 0.015	39.466 ± 0.048	0.79625 ± 0.00034	1.9986 ± 0.0017	(85)	19.732 ± 0.015	15.723 ± 0.015	39.411 ± 0.048
MC5-91	0.17	5.53	7.60	1.46 ± 0.05	49.52 ± 1.01	19.397 ± 0.060	15.866 ± 0.059	39.927 ± 0.153	0.81799 ± 0.00158	2.0584 ± 0.0044	91.2	19.375 ± 0.060	15.865 ± 0.059	39.703 ± 0.153
MC6-91	1.34	9.82	18.62	4.71 ± 0.15	35.69 ± 0.71	19.595 ± 0.015	15.709 ± 0.014	39.494 ± 0.048	0.80170 ± 0.00034	2.0155 ± 0.0017	94.4	19.527 ± 0.015	15.706 ± 0.014	39.326 ± 0.048
MC14-91	0.80	17.54	17.38	3.02 ± 0.09	68.59 ± 1.35	19.150 ± 0.014	15.701 ± 0.014	40.266 ± 0.048	0.81991 ± 0.00035	2.1027 ± 0.0018	(82)	19.112 ± 0.014	15.699 ± 0.014	39.987 ± 0.049
91KL139	0.93	5.17	16.63	3.69 ± 0.12	21.27 ± 0.49	20.093 ± 0.015	15.743 ± 0.014	39.798 ± 0.048	0.78352 ± 0.00033	1.9807 ± 0.0017	(90)	20.044 ± 0.015	15.741 ± 0.014	39.703 ± 0.048
MC92-32	0.85	3.27	3.00	19.36 ± 0.78	77.28 ± 1.63	21.624 ± 0.016	15.873 ± 0.014	41.239 ± 0.050	0.73406 ± 0.00031	1.9071 ± 0.0016	(90)	21.352 ± 0.019	15.860 ± 0.014	40.894 ± 0.050
MC92-33	1.44	17.10	14.41	6.71 ± 0.21	82.27 ± 1.84	20.580 ± 0.026	15.768 ± 0.022	40.299 ± 0.064	0.76616 ± 0.00033	1.9581 ± 0.0017	(85)	20.486 ± 0.026	15.763 ± 0.022	39.952 ± 0.065
MC92-35	1.26	12.33	7.60	11.33 ± 0.35	114.18 ± 2.32	21.082 ± 0.027	15.806 ± 0.022	40.876 ± 0.065	0.74974 ± 0.00033	1.9389 ± 0.0017	93.2	20.923 ± 0.027	15.799 ± 0.022	40.348 ± 0.066
Wallowa terrane														
00KL030	1.02	3.43	2.10	31.76 ± 1.00	110.13 ± 2.25	19.679 ± 0.025	15.618 ± 0.022	39.018 ± 0.062	0.79362 ± 0.00034	1.9827 ± 0.0017	211.5	18.577 ± 0.043	15.562 ± 0.022	37.859 ± 0.067
00KL031	0.16	0.45	0.54	18.93 ± 0.57	54.92 ± 1.25	19.147 ± 0.041	15.592 ± 0.035	38.710 ± 0.092	0.81435 ± 0.00035	2.0217 ± 0.0017	218.1	18.490 ± 0.046	15.559 ± 0.035	38.114 ± 0.093
00KL032	0.46	2.61	4.82	6.06 ± 0.22	35.76 ± 0.77	18.799 ± 0.015	15.579 ± 0.015	38.533 ± 0.048	0.82870 ± 0.00035	2.0497 ± 0.0017	(220)	18.589 ± 0.017	15.568 ± 0.015	38.142 ± 0.048
00KL033	0.48	1.43	2.30	13.39 ± 0.56	41.20 ± 0.86	19.123 ± 0.017	15.594 ± 0.016	38.649 ± 0.050	0.81546 ± 0.00035	2.0211 ± 0.0017	(220)	18.658 ± 0.026	15.570 ± 0.016	38.198 ± 0.051
00KL034	0.57	1.78	43.63	0.82 ± 0.06	2.68 ± 0.17	18.556 ± 0.019	15.586 ± 0.018	38.272 ± 0.053	0.83993 ± 0.00037	2.0625 ± 0.0018	(220)	18.528 ± 0.019	15.584 ± 0.018	38.243 ± 0.053
00KL035A	0.66	1.36	2.95	14.53 ± 0.44	30.92 ± 0.60	19.576 ± 0.016	15.654 ± 0.016	38.937 ± 0.049	0.79965 ± 0.00034	1.9891 ± 0.0017	158.9	19.213 ± 0.020	15.636 ± 0.016	38.693 ± 0.050
00KL035B	0.66	4.52	21.80	1.92 ± 0.06	13.65 ± 0.30	18.753 ± 0.014	15.582 ± 0.014	38.394 ± 0.046	0.83092 ± 0.00035	2.0474 ± 0.0017	(110)	18.719 ± 0.014	15.580 ± 0.014	38.320 ± 0.046
87KL017	0.27	1.31	3.20	5.34 ± 0.16	26.65 ± 0.52	18.620 ± 0.016	15.527 ± 0.015	38.103 ± 0.048	0.83386 ± 0.00035	2.0463 ± 0.0017	113.1	18.526 ± 0.016	15.522 ± 0.015	37.954 ± 0.048
Salmon River suture zone														
MC22-91	1.08	3.70	9.18	7.57 ± 0.23	26.83 ± 0.53	18.999 ± 0.015	15.669 ± 0.015	38.835 ± 0.048	0.82471 ± 0.00035	2.0440 ± 0.0017	(115)	18.863 ± 0.015	15.662 ± 0.015	38.682 ± 0.048
MC93-55	0.05	1.08	6.24	0.50 ± 0.03	11.32 ± 0.27	18.416 ± 0.015	15.538 ± 0.015	37.987 ± 0.048	0.84375 ± 0.00037	2.0627 ± 0.0018	116.4	18.406 ± 0.015	15.538 ± 0.015	37.922 ± 0.049
MC20a-91	0.38	6.23	4.22	5.68 ± 0.17	97.21 ± 1.89	18.825 ± 0.016	15.573 ± 0.015	38.346 ± 0.048	0.82727 ± 0.00035	2.0370 ± 0.0017	(110)	18.723 ± 0.016	15.568 ± 0.015	37.816 ± 0.050

[1]Parentheses indicate approximate age