SUPPLEMENTAL MATERIAL

Accompanies
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CONTENTS

1. SAMPLE DESCRIPTIONS, LOCATIONS (NAD 1927 DATUM), AND U-Pb AGE PATTERNS DETERMINED FROM ITEM 6. See Item 4 and text Figure 4 for age plots.

MIOCENE ROCKS

Sample MH (Field no. H80 MH311). Diorite in Mohave Mountains. 34.62583°, –114.27833°. Medium-grained hornblende diorite in a small stock (map unit TKd in Howard et al., 1999). Hornblende K-Ar date 32±1 Ma; biotite K-Ar date 18.1±0.5 Ma on associated granite (Nakata et al., 1990). Sri of this sample at 21 Ma = 0.70846 (from data reported by John and Wooden, 1990, who had assumed a Cretaceous age).

Of nine grains analyzed for U-Th-Pb, 6six are concordant or nearly so. Four of the 6 concordant grains cluster at a weighted mean age of 20.0±0.4 (MSWD=0.1). If the entire population is used, there is a discordia lower intercept of 20.4±0.7 and an upper intercept fit to 3070 Ma, allowing possible involvement of Archean Pb ($^{207}Pb/^{206}Pb$ =0.234).

Previously Reported (Figs. 2, 6):

Sample Sn ("Snaggletooth"). Dacitic rock in the Sawtooth Range, 20.3 ±0.9 Ma (Chapman et al., 2018).

LATE CRETACEOUS ROCKS

Sample CH (Field no. BJ80 CH307). Chemehuevi Peak Granodiorite. 34.61806°, –114.56556°. In Chemehuevi Mountains. Porphyritic biotite granodiorite. Chemical analysis of this rock sample was reported by John and Wooden (1990). Part of the Chemehuevi Mountains Plutonic Suite and the Chemehuevi Mountains batholith (John, 1988; John and Wooden, 1990). The Chemehuevi Peak Granodiorite was dated by U-Pb (zircon) as 68±6 Ma by John and Mukasa (1990). Sri= 0.7097 (revised from data in John and Wooden, 1990). Zircon morphology is variable from idiomorphic (aspect ratio ~3:1) zoned crystals, commonly around corroded cores, to poorly zoned rounded grains; average grain size ~ 150 µm.

Eighteen spots were analyzed for U-Th-Pb. Five lie on a discordia near a Precambrian age and when they are fit (with one omission), give an upper intercept age of 1552±54 Ma. Four grains are wildly discordant. Two grains (one concordant) give 140-Ma ages. Seven cluster near a Late Cretaceous concordia age. They plus one clearly discordant grain fit a lower intercept of 74±4 (MSWD=18). The 3 most concordant grains yield a 71.8±2.3 Ma weighted mean age (MSWD=1.2). We interpret this as a Late Cretaceous rock containing both Precambrian and 140 Ma inheritance.

Sample CX (Field no. H80 CX386A). Granodiorite in Coxcomb Mountains. 33.84250°, –115.30306°. Biotite granodiorite. Part of the Coxcomb Intrusive Suite in the Cadiz Valley batholith (Howard, 2002). Equivalent to part of the Coxcomb Granodiorite of Miller (1944). Zircons are generally idiomorphic, strongly zoned, commonly surrounding cores of irregular to unzoned patches suggestive of metamorphic growth; aspect ratio ~ 2:1; average grain size ~200 µm. Pluton dated 73.5±1.3 Ma by U-Pb ion probe on zircon (Barth et al., 2004). Pluton $^{87/86}$Sri measured 0.7094 (Calzia et al., 1986).

Of the 12 spots analyzed for U-Th-Pb, eight form a rough discordia elongate cluster near 82 to 72 Ma, a Discordia indicating a common Pb component ($^{207}Pb/^{206}Pb$=0.68; Archean?). One grain is nearly concordant at roughly 1580 Ma. One is concordant at 188 Ma. Two points are highly discordant. If one slightly older grain is excluded from the late Mesozoic cluster and the other seven are is treated as a single group, an age of 74.5±2.8 Ma is obtained with MSWD of 2.9. This sample is interpreted as a Late Cretaceous rock containing Precambrian and Jurassic inheritance.

Sample HM (Field no. H81 HM69). Granite of Homer Mountain. 35.01611°, –114.88972°. Porphyritic biotite monzogranite. Two similar plutonic rocks nearby were dated 69–72 Ma by K-Ar on biotite (Spencer and Turner, 1985; Spencer, 1985).

Fifteen grains were analyzed for U-Th-Pb. Two Precambrian grains are discordant but they both suggest a ~1700 Ma upper intercept. One grain is concordant at 164 Ma, Jurassic. The other analyses cluster around Late Cretaceous ages but the range of compositions is difficult to interpret specifically. One grain is concordant at 82 Ma. A discordia of six points (including a reversely discordant one) indicate a $^{206}Pb/^{238}U$ magmatic age of 72.46±1 Ma (MSWD of 0.9). Common Pb composition is broad but high ($^{207}Pb/^{206}Pb$>>1).

Sample IM (Field no. H80 IM357). Danby Lake Granite Gneiss. 34.18444°, –115.20139°. In Iron Mountains. Muscovite-biotite leucomonzogranite gneiss. Part of the Iron Mountains Intrusive Suite in the Cadiz Valley batholith (Miller and Howard, 1985; Howard, 2002). Mylonitic gneiss texture interpreted as imposed by Late Cretaceous extensional shearing (Miller and Howard, 1985; Miller et al., 1981; Wells et al., 2002). Unit is bracketed by intrusive relations between the age of two adjacent plutons respectively dated (U-Pb, ion-probe, zircon) as 75.4±2.1 and 75.6±1.7 Ma (Wells et al., 2002).

The 12 U-+Th-Pb analyses from this sample are scattered but in a broad sense there is a Discordia. Three grains define a spread of Precambrian $^{207}Pb/^{206}Pb$ ages and two are discordant near a 1650 Ma age on concordia. One has a U-Pb age ca. 1475 Ma. Nine points gives a discordia with an upper intercept of 1700 Ma and a lower one of 76 Ma but the fit is rough (MSWD=8) as are the ages. There are no concordant Mesozoic analyses. We interpret this as a Late Cretaceous intrusion with Precambrian inheritance.

Sample KI (Field no. H79 KI263). Old Woman Mountains Granodiorite. 34.33389°, –115.30000°. In Kilbeck Hills. Medium-grained hornblende-biotite granodiorite. Correlated to the Old Woman Granodiorite pluton in the Old Woman-Piute batholith (Miller et al., 1982, 1990. Sampled near where this rock unit is adjacent to rocks of the Coxcomb Intrusive Suite in the Cadiz Valley batholith. In the Old Woman Mountains the Old Woman Mountains Granodiorite was dated as 74±3 Ma (Foster et al., 1989).

The 11 U-Th-Pb analyses define an ill-defined field above concordia on a Tera-Wasserburg diagram, near an age of 75 Ma. The spread is probably a result of a range of concordant ages and a common Pb ($^{207}Pb/^{206}Pb$~1.2). The weighed mean $^{206}Pb/^{238}U$ age for the four most concordant grain ages is 74.0±1.3 Ma.

Sample SH (Field no. H80 SH191). Sheep Hole Mountains Granodiorite. 34.22639, –115.71556°. In Sheep Hole Mountains. Porphyritic biotite granodiorite, part of the Coxcomb Intrusive Suite in the Cadiz Valley batholith (John, 1981; Howard and John, 1984; Howard, 2002).

Eleven of the 13 U-Th-Pb analyses of this sample yield Cretaceous ages. Two are strongly discordant, one that could indicate a Precambrian component and the other that indicates an ancient common Pb. One grain gives a concordant age of 125 Ma. The other ten cluster at a weighted mean $^{206}Pb/^{238}U$ age of 72.7±1.5 (MSWD=4.5).

Sample TMd (Field no. H83 TM62). Diorite of Martins Well. 34.33889°, –114.86639°. In Turtle Mountains. Medium-grained quartz-bearing hornblende diorite. From one of a string of diorite bodies in the Turtle Mountains that yielded Late Cretaceous K-Ar dates (68-Ma biotite, 87-Ma hornblende); the bodies occupy about 7 km^2 and form a chain parallel to foliation in Paleoproterozoic host gneisses (Howard et al., 1988).

U-Th-Pb analyses yield multiple discordia. A minor pair of grains terminate with a concordant grain at 177 Ma. The other 10 analyses define two rough subparallel discordia which amalgamated yield a common Pb composition of 0.93 at the upper end, and 73±5 Ma with a high MSWD (7.6) at the lower intersection. The most concordant ages have $^{206}Pb/^{238}U$ age ranges from about 70 to 78 Ma. The rock is interpreted to be Late Cretaceous in age, with one Jurassic inherited grain.

Previously Reported (Figs. 2, 6):

Sample GM ("Granite Mountain"). Granodiorite from the Granite Pass pluton, Granite Pass area, 71.5±2.8 Ma (Chapman et al., 2018).

Sample SW-1. Peraluminous granite from the Sweetwater Wash pluton, Old Woman Mountains, 72.6±1 Ma (Fisher et al., 2017).

Sample JDP, quartz monzonite from the Diamond Joe pluton, Hualapai Mountains, 72.8±3.2 Ma (Chapman et al., 2018).

Sample Cox ("Coxcomb"), granodiorite from the Coxcomb Mountains area, 76.1±3.4 Ma (Chapman et al., 2018).

MIDDLE CRETACEOUS ROCKS

Sample PO (Field no. H84 PO102) Granodiorite in Poachie Range. 34.50222°, –113.47111°. Biotite granodiorite porphyry. A small hypabyssal pluton, sampled in an area studied by Bryant et al. (2001).

The 15 U-Th-Pb analyses of this sample, save one, define a rough discordia from 1660 Ma to 94 Ma. The upper intercept is 1661+/-28 Ma (MSWD=3.6). Four grains lie on the concordia near 1660 Ma. An outlier grain not used for discordia is discordant (~ 1400 Ma). One grain is concordant at 100 Ma. The most concordant five of the other 6 grains near the lower intercept give a concordia age of 95.9+/-2.6 (MSWD=4.6), or a weighted mean $^{206}Pb/^{238}U$ age of 95.8±2.6 (MSWD=3.42)..

Previously Reported (Figs. 2, 6):

Sample Ri ("Riverside"). Quartz monzodiorite in the Riverside Mountains, 100.8±3.6 Ma (Chapman et al., 2018).

JURASSIC ROCKS

Sample LH (Field no. H80 LH216) Quartz monzonite in Lava Hills. 34.60583°, –115.93861°. Coarse-grained hornblende-biotite quartz monzonite in the alkali-calcic Bristol Mountains sequence (162–164 Ma); lithologically resembles the calc-alkaline Bullion Mountains Intrusive Suite (165 Ma, Howard, 2002; Barth et al., 2017). In the Lava Hills area of the western Bristol Mountains.

Eleven grains were analyzed for U-Th-Pb and define a common-lead discordia ($^{207}Pb/^{206}Pb$=3.8±2) that gives an intercept age 161.7±3.2 Ma. Two concordant grains appear to be marginally older (165–168 Ma) and their removal would make this population age marginally younger. The mean of the best five ages is 162.2±6.5 (MSWD 8.00).

Sample MMd (Field no. H80 MM233). Diorite of Castle Mine. 34.63944°, –115.60722°. In Marble Mountains. Quartz diorite from one of several small bodies associated with a pluton of leucosyenogranite. Hornblende from this sample was dated by K-Ar as 173±10 Ma (Marvin et al., 1989, who mislabeled sample as H80MM-223). Similar dioritic rocks crop out in the nearby Granite Mountains and Bristol Mountains (Young et al., 1992; Fox and Miller 1990).

The 13 spots analyzed for U-Th-Pb yield a triangular pattern suggesting a range of Jurassic ages with variable high $^{207}Pb/^{206}Pb$ components. Concordant ages (n=4) range in age from 158 to 175 Ma. The vectors point to old common Pb, not to a Precambrian component. A discordia to the youngest six points indicates an age of 158.6± 4.2 with MSWD of 0.57. Other fits could be proposed.

Sample MMg (Field no. H80 MM237). Granite of Iron Hat Mine. 34.60444°, –115.54444°. In Marble Mountains. Biotite leucosyenogranite forming a pluton in the Marble Mountains. Similar rocks crop out in several nearby ranges including the Ship Mountains (Fox and Miller, 1990; Gerber et al., 1995).

Fifteen U-Th-Pb analyses yield a discordia to a common Pb with upper end member $^{207}Pb/^{206}Pb$ of about 1.0 (ancient common Pb component) and the lower intercept of about 164 Ma. Five of the analyses are concordant, and along with one near-concordant analysis range in age from 158 to 170 Ma; the six analyses can define a discordia lower intercept age = 164.7±7.2 (MSWD=5.7), or a discordia lower intercept age 162.2±5.5 Ma (MSWD of 2.5) if tied artificially to an upper intercept of 1700 Ma. The six analyses give a weighted mean age of 164.46±4.8 (MSWD 5.47; or 166.2±3.2, MSWD=1.26, if a young concordant outlier is omitted).

Sample TMg (Field no. H79 TM486A). Granite of southern Turtle Mountains. 34.18889°, –114.83194°. Porphyritic biotite monzogranite. Sampled from a small pluton (which earlier was thought to be a satellite of the middle Cretaceous Turtle pluton; Allen et al., 1995). Hornblende from a closely associated body of quartz monzodiorite was dated by K-Ar as 167±5 Ma (Howard et al., 1982). Sample initial $^{87}Sr/^{86}Sr$ at 168 Ma = 0.7088 as recalculated from data in Allen et al. (1995).

Twelve of the 13 grains analyzed for U-Th-Pb cluster around concordia. The other grain, discordant, suggests a vector to a high $^{207}Pb/^{206}Pb$ value. The 9 most concordant analyses give a mean age of 168.3±3.7 Ma with a high MSWD value (5.83) indicating that these might not be a single age population. Treatment as a discordia yields similar results.

Sample CO (Field no. H80 CO424). Granodiorite in Colton Hills. 34.93389°, –115.42917°. Near the northeastern limit of exposed Jurassic intrusions. K-feldspar-phyric biotite granodiorite from a moderate-sized pluton (Fox and Miller, 1990; Miller et al., 2003). Zircon grains are strongly corroded with irregular zoning; curved unzoned patches suggest metamorphic recrystallization; average grain size ~ 100 µm. Biotite from this locality was dated by KAr as 159±6 Ma (Marvin et al., 1989).

Twenty-one U-Th-Pb analyses yield complex patterns on concordia diagrams. Eight grains suggest an extensive discordia spread from Proterozoic to Mesozoic. A cluster of 11 grains are concordant or nearly so near 170–200 Ma. Five are concordant and define an age spread from 170 to 200 Ma. Some of the discordant grains can be explained by a common Pb component. Others are difficult to interpret. When 15 spots are fit for a discordia, the upper intercept is 1615±18 Ma and lower intercept is 179±11 Ma with MSWD of 19. The discordant Mesozoic data are interpreted to result from isotope spot mixing. The five concordant Jurassic grains imply a real Jurassic age spread.

PALEOPROTEROZOIC ROCK

Sample Z11 (Field no. H79 OW341A). Kilbeck Gneiss. 34.33944°, –115.21056°. In Old Woman Mountains Data are included in Items 6 and 7 and mentioned but not discussed in the report. Medium-grained biotite monzogranite orthogneiss. 70.2% SiO2; 7.4% Na2O + K2O. The Kilbeck Gneiss has vestiges of K-feldspar phenocrysts, wispy foliation, and local pods of corundum-bearing aluminous restite. Gradation to recrystallized unfoliated granite (illustrated in Miller et al., 1982) suggested to Howard et al. (1987) that the gneiss may have experienced partial melting.

This one Precambrian rock examined has concordant ^{206}Pb/^{238}U zircon ages that range from about 1650 to 1550 Ma. When treated together to a 0-Ma lower intercept the upper intercept is 1660±25 Ma (MSWD=3.1; n=13).

2. ZIRCON ANALYTICAL PROCEDURES

Sample preparation

Zircon was prepared and analyzed for U-Th-Pb and Lu-Hf isotopes at Macquarie University in Sydney, Australia. Zircon was concentrated from each sample from approximately 0.5 kg of crushed powder using a hand-held gold panning dish and water. Zircons from the concentrate were then hand-picked under a binocular microscope, set in an epoxy block and surface polished. Cathodoluminescence imaging of grains was used for determining grain shapes, zoning complexity and evidence of inherited cores. Zircon mounts and standards were cleaned in 1 N nitric acid to remove surface lead contamination.

U-Th-Pb Isotopic Analyses

A quadrapole Argilent LAM-ICPMS with a LUV213 Nd:YAG laser probe was used for U-Pb analyses. The laser beam diameter was set to 55 µm with a power setting of 3 mJ per pulse and a pulse rate of 4 Hz. A gas background was counted for 50 seconds followed by 120 seconds of peak data acquisition. A typical sequence consisted of two runs of the standard GJ, followed by one each of zircon 91500 and zircon Mud Tank to monitor consistency, then 10 unknown zircon spots, followed in turn by two further GJ standards. Data reduction was interactive using the in-house “Glitter” program. The analytical procedure followed that of Jackson et al. (2004). Calculated ratios (Item 6 table) were exported following exclusion of zircon analyses where Pb loss or high common Pb discordance was detected.

Lu-Hf Isotopic Analyses

Zircons were analyzed at Macquarie University for Hf isotopes using a Nu Plasma MC-ICPMS with a New Wave UP213 Nd:YAG laser probe following the analytical procedures described by Griffin et al. (2000, 2002). The laser beam diameter was 55 µm with a pulse energy of 3 mJ per pulse and a pulse rate of 4 Hz. A gas background was acquired for 30 s followed by 120 s of peak data acquisition. The count sequence consisted of several runs of the monitoring standards MT (^{176}Hf/^{177}Hf = 0.282530 ± 30

1sd) and 91500 ($^{176}Hf/^{177}Hf$ = 0.282280 ± 120 1sd) for instrument consistency. This was followed by runs of unknown zircon spots for approximately one hour prior to running a monitoring standard for consistency. Data reduction of the analysis was interactive allowing for selection of that part of the $^{176}Hf/^{177}Hf$ data on the time-resolved analysis to minimize counting errors. The raw data were corrected for mass bias using an exponential law and using a value for $^{179}Hf/^{177}Hf$=0.7325. Isobaric interferences on ^{176}Hf by ^{176}Yb and ^{176}Lu included using the mass discrimination factor and $^{176}Yb/^{172}Yb$=0.5870 (Pearson et al., 2011) and $^{176}Lu/^{175}Lu$=0.2669 (DeBievre and Taylor, 1993). The software procedure is considered robust and is discussed by Pearson et al. (2008).

The analytical precision of the $^{176}Hf/^{177}Hf$ ratio measured from an isotopically homogeneous zircon population by LA-MC-ICPMS is ca. ± 0.00004 2sd, corresponding to an εHf difference of approximately 1.5 units and a Hf model age difference of around 50 Ma, more than adequate for most interpretative purposes (Griffin et al., 2002). A range of measured values significantly in excess of analytical precision is interpreted as due to magma mixing.

3. Lu-Hf ISOTOPE CALCULATIONS—EPSILON VALUES, MODEL AGES, AND $^{176}Hf/^{177}Hf$ RATIOS—AND REFERNCES CITED

A U-Th-Pb analysis records the time of crystallization of a particular zircon grain, assuming closed chemical system behavior, whereas a Lu-Hf analysis of the same zircon grain records the $^{176}Hf/^{177}Hf_{(t)}$ isotopic composition of the local melt at the time of crystallization. The range of $^{176}Hf/^{177}Hf_{(t)}$ ratios (and resulting, $\varepsilon Hf_{(t)}$) values of a zircon population is therefore considered to be a reflection of magmatic isotopic heterogeneity, which in a simple two-component system is an array of data points along a mixing line bounded by the end-member melt compositions (e.g. Shaw et al., 2011).

To calculate Lu-Hf isotope ratios we use a ^{176}Lu decay constant of 1.876×10^{-11} yr^{-1} $1.867x10^{-11}/a$ from Scherer et al. (2001). Chondritic Uniform Reservoir or CHUR is taken to have a modern $^{176}Hf/^{177}Hf$ of 0.282785 and $^{176}Lu/^{177}Hf$ of 0.0336 (Bouvier et al., 2008). The epsilon notation for Hf is the deviation relative to this chondritic reservoir at the same specific time for both, $[(^{176}Hf/^{177}Hf_{unk}/\ ^{176}Hf/^{177}Hf_{CHUR})-1] \times 10,000$. Following Wooden et al. (2013) so that other Mojave data can be directly compared, we calculated Depleted Mantle model ages using a Depleted Mantle model of $^{176}Hf/^{177}Hf$ of 0.28324 and $^{176}Lu/^{177}Hf$ of 0.03871 but we assumed a $^{176}Lu/^{177}Hf$ for the pre-zircon evolution history of 0.015 (GERM, 2001), the value of average crust as opposed to a lower crustal value of 0.0187 (Rudnick and Gao, 2003). The accumulated uncertainties mean that a model age uncertainty is routinely ±200 Ma (Wang et al., 2009).

For a two stage Depleted Mantle model age, the measured $^{176}Lu/^{177}Hf$ from the zircon is used to calculate the Hf isotope ratio at the crystallization age and a model $^{176}Lu/^{177}Hf$ value of 0.015 (mean crustal value, GERM 2001) is used to project back to the depleted model. These model values were selected to make the results directly comparable to Wooden et al. (2013). Model calculations were produced only for grains concordant in the U-Pb system, except for the points that lie on a discordia such that a U-

Pb age could be projected onto concordia with confidence (n=29), and for one analysis for sample MH in which the age could be accurately predicted.

Text Figure 5 plots measured zircon Hf isotopes (t=0) for the rocks for our samples plus published data from the study area by Fisher et al. (2017; sample SW = their SW-1) and five samples analyzed by Chapman et al. (2018; Sn = Snaggletooth, dacite; Cox = Coxcomb, granodiorite; GM = Granite Mtn, granodiorite; JDP = quartz monzonite; and Ri = Riverside, quartz monzodiorite). Plotting of measured data allows display of all Hf data including for zircons that not paired to a U-Pb age. All rock samples yielded ratios with a range far greater than analytical uncertainty, i.e. the zircons within a hand sample vary in Hf isotope composition. Such spreads indicate source mixtures, either long before rock crystallization or mixtures of crustal partial melts and melts newly derived from the mantle. The data mainly populate two bands suggesting shared source histories (Fig. 5). Several distinct sample behaviors correlate with rock age and are consistent across our data and those of Fisher et al. (2017) and Chapman et al. (2018). The Miocene rocks plot above the upper band, and a maximum age for a pure crustal component is 1600 Ma. The Late Cretaceous rocks all have populations in both guide bands and in-between. Middle Cretaceous plutons have the more extreme ranges, from highest (like the range for the Miocene), to the lowest suggestive of an Archean component. Four of five Jurassic plutons lack inherited Proterozoic zircons or Hf isotope data in the lower band but the two samples from the Marble Mountains (MMd, MMg) include data a little below the upper band, evidence of a slightly older average Proterozoic component (ca. 2–2.2 Ga model ages). The Jurassic granodiorite (CO, Colton Hills) more resembles the Late Cretaceous rocks in Hf behavior with clear Proterozoic inheritance in four zircons (none concordant). Data between the guide bands are fewer and mostly associated with discordant U-Pb ages; even those (two zircons) associated with concordant U-Pb analyses are interpreted to sample multidomains through laser spot positioning; they give super-depleted model ages if projected to their paired U-Pb age values. Two of the very low values below the lower band are associated with concordant Mesozoic U-Pb zircon ages.

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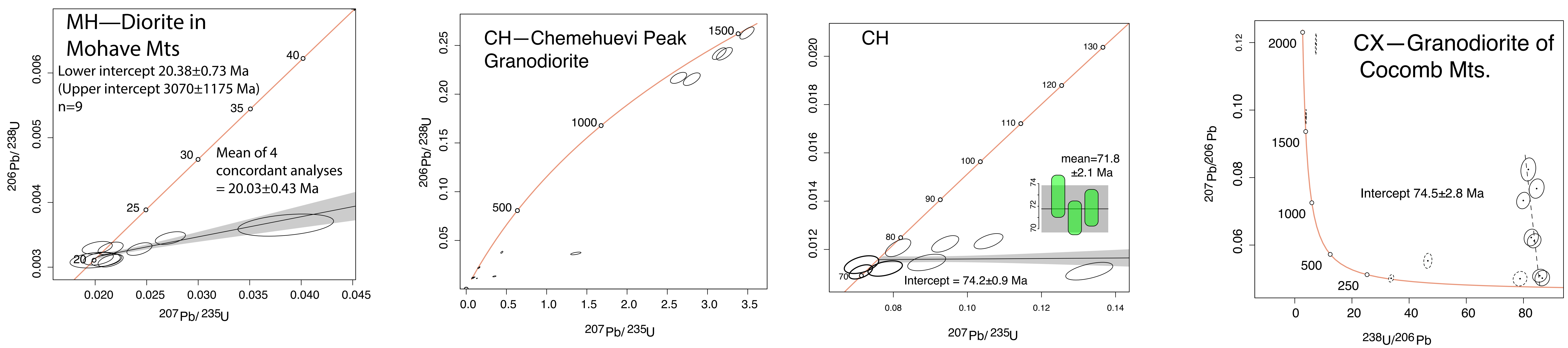
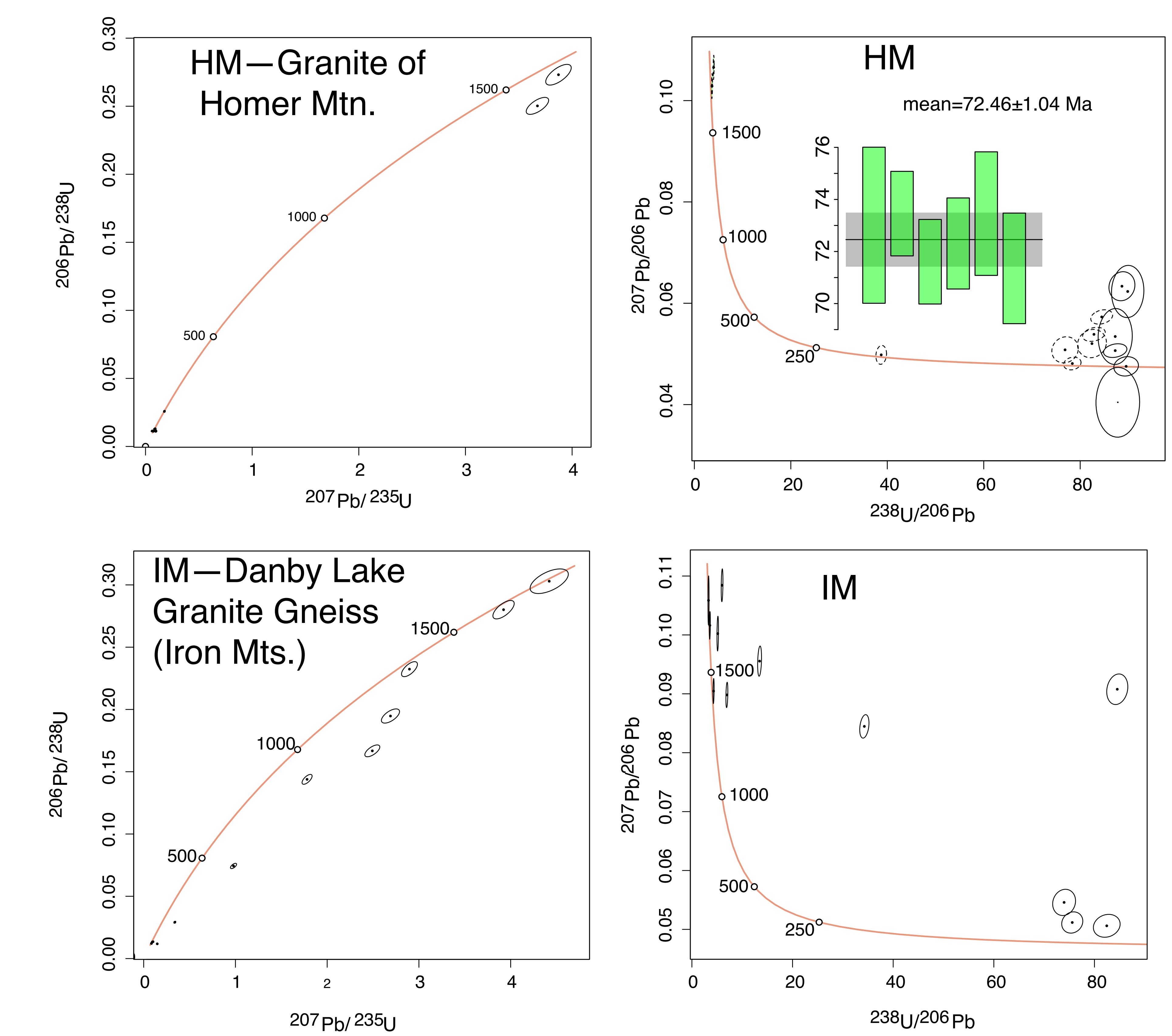




4. FIGURE DR-1a, b, and c. UPb age diagrams for each sample, showing concordia plots and(or) selected 206Pb/238U age error bars (green). Data excluded from discordia calculations are shown dashed. See also text Figure 4.

Fig. DR-1a

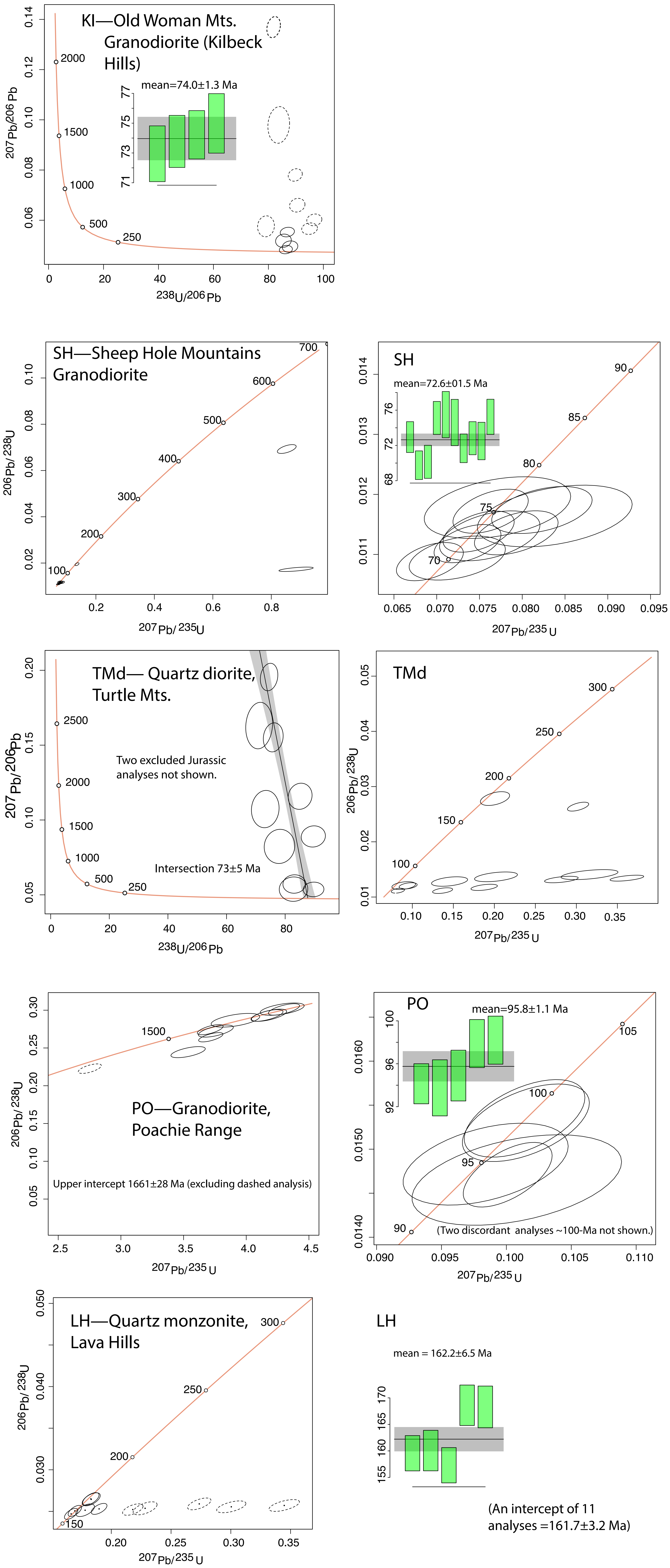
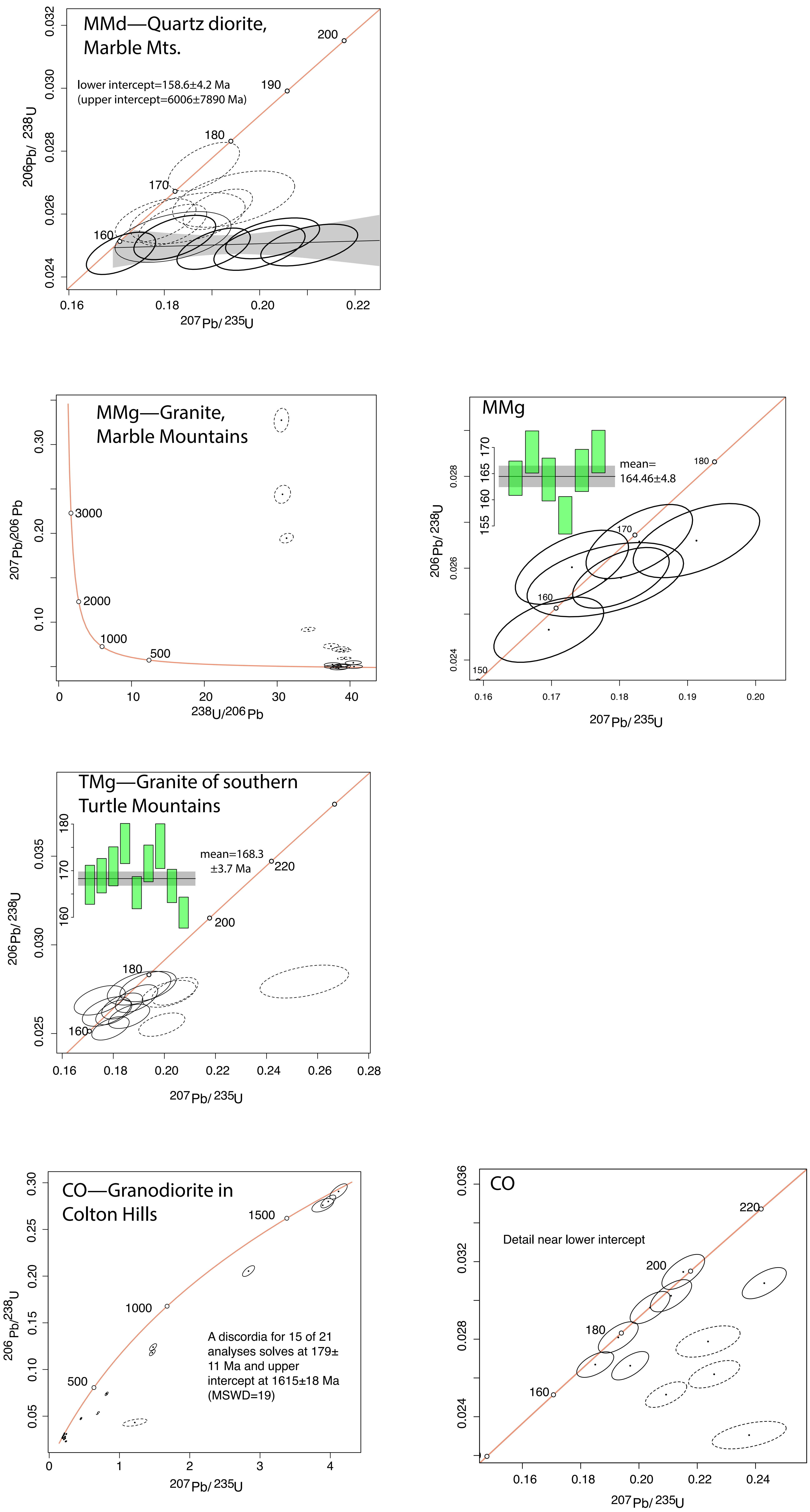

KI—Old Woman Mts. Granodiorite (Kilbeck Hills)
mean=74.0±1.3 Ma
207Pb/206Pb
238U/206Pb
SH—Sheep Hole Mountains Granodiorite
206Pb/238U
207Pb/235U
SH
mean=72.6±01.5 Ma
TMd— Quartz diorite, Turtle Mts.
Two excluded Jurassic analyses not shown.
Intersection 73±5 Ma
TMd
PO—Granodiorite, Poachie Range
Upper intercept 1661±28 Ma (excluding dashed analysis)
PO
mean=95.8±1.1 Ma
(Two discordant analyses ~100-Ma not shown.)
LH—Quartz monzonite, Lava Hills
LH
mean = 162.2±6.5 Ma
(An intercept of 11 analyses =161.7±3.2 Ma)

Fig. DR-1b



MMd—Quartz diorite,
Marble Mts.
lower intercept=158.6±4.2 Ma
(upper intercept=6006±7890 Ma)
MMg—Granite,
Marble Mountains
MMg
mean=
164.46±4.8
TMg—Granite of southern
Turtle Mountains
mean=168.3
±3.7 Ma
CO—Granodiorite in
Colton Hills
A discordia for 15 of 21
analyses solves at 179±
11 Ma and upper
intercept at 1615±18 Ma
(MSWD=19)
CO
Detail near lower intercept

Fig. DR-1c