U-Pb dates for two rocks from the Sulphurettes area, B.C.

R. M. Friedman, Geochronology Laboratory, Department of Earth and Ocean Sciences,The University of British Columbia

Two samples of rhyolitic volcanic rock were collected for U-Pb analysis by Dr. Rod Kirkham of the Geological Survey of Canada. Analyses were conducted at the Geochronology Laboratory of the Department of Earth and Ocean Sciences at the University of British Columbia. Provided below are zircon descriptions, interpretation of U-Pb data, concordia plots, a table of analytical data and a sample preparation/analytical technique section.

KQ91-80B

This rock yielded high quality, pale pink, clear zircon most commonly of prismatic shape with rounded cross section and aspect ratios of about 1.2 to 2.5. Of the four analysed fractions plotted on Figure 1, A was comprised of broken tips of grains, while B, C and D were whole crystals. Analyses A, B and D give similar Pb/Pb dates of about 185 Ma, with fraction B being concordant at this age. The best estimate for the age of this rock, which is 185.0 +5.9/-0.5 Ma, is based on concordant fraction B and the weighted mean of Pb/Pb ages for fractions A, B and D. The presence of a minor inherited component in zircon from this rock is also suggested on the basis of fraction C.

KQ90-154C

This rhyolitic volcanic rock yielded high quality, clear, colourless to pale tan zircon of prismatic morphology, with square to subrounded cross sections and aspect ratios of about 1.5 to 3. The best estimate for the age of the rock, which is 194.9 +4.8/-0.4 Ma, is based on concordant fraction E. All other fractions give slightly older $^{207}Pb/^{206}Pb$ ages, indicating the presence of minor inherited zircon. This is confirmed by the presence of vivible cores in some zircons. Grains with such visible cores were avoided during sample selection.

U-Pb Geochronology: Analytical Techniques and Data Interpretation

Zircon and titanite were separated from ~25 kg samples using conventional crushing, grinding, and Wilfley table techniques, followed by final concentration using heavy liquids and magnetic separations. Mineral fractions for analysis were selected based on grain morphology, quality, size and magnetic susceptibility. All zircon fractions were abraded prior to dissolution to minimize the effects of post-crystallization Pb-loss, using the technique of Krogh (1982). All geochemical separations and mass spectrometry were done in the Geochronology Laboratory at the University of British Columbia. Samples were dissolved in concentrated HF and HNO_3 in the presence of a mixed $^{233-235}U$-^{205}Pb tracer. Separation and purification of Pb and U employed ion exchange column techniques modified slightly from those described by Parrish et al. (1987). Pb and U were eluted separately and loaded together on a single Re filament using a phosphoric acid-silica gel emitter. Isotopic ratios were measured using a modified single collector VG-54R thermal ionization mass spectrometer equipped with a Daly photomultiplier. Most measurements were done in peak-switching mode on the Daly detector. U and Pb analytical blanks were in the range of 1-3 pg and 7-15 pg, respectively, during the course of this study. U fractionation was determined directly on individual runs using the $^{233-235}U$ tracer, and Pb isotopic ratios were corrected for a fractionation of 0.12%/amu and 0.43%/amu for Faraday and Daly runs, respectively, based on replicate analyses of the NBS-981 Pb standard and the values recommended by Todt et al. (1984). All analytical errors were numerically propagated through the entire age calculation using the technique of Roddick (1987). Analytical data are reported in Tables 1 and 2. Concordia intercept ages and associated errors were calculated using a modified version the the York-II regression model (wherein the York-II errors are multiplied by the MSWD) and the algorithm of Ludwig (1980). All errors are quoted at the 2 level. Age assignments follow the time scale of Harland et al. (1990).

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Table 1. U-Pb Zircon Analytical Data for Rocks from the Sulphurettes Area

Fraction[1]	Wt	U	Pb*[2]	$^{206}Pb/^{204}Pb$[3]	Pb[4]	^{208}Pb[5]	Isotopic ratios (±1σ,%)[6]			Apparent ages (±2σ,Ma)[6]	
	mg	ppm	ppm		pg	%	$^{206}Pb/^{238}U$	$^{207}Pb/^{235}U$	$^{207}Pb/^{206}Pb$	$^{206}Pb/^{238}U$	$^{207}Pb/^{206}Pb$
KQ91-80B											
A c,N5,p,ti	0.031	394	12	561	39	20.0	0.02801 (0.15)	0.1923 (0.46)	0.04979 (0.36)	178.1 (0.5)	185.2 (16.8)
B c,N5,p	0.041	359	11	1604	16	14.3	0.02912 (0.13)	0.1999 (0.31)	0.04978 (0.24)	185.0 (0.5)	184.8 (11.1)
C m,N5,p	0.049	363	12	2587	12	19.6	0.02815 (0.12)	0.1951 (0.25)	0.05028 (0.16)	179.0 (0.4)	208.0 (7.5)
D f,N5,p	0.053	303	10	2572	11	18.6	0.02849 (0.12)	0.1955 (0.25)	0.04979 (0.17)	181.1 (0.4)	185.0 (8.0)
KQ90-154C											
B cc,N2,p	0.120	568	16	2530	51	3.8	0.02979 (0.21)	0.2064 (0.32)	0.05025 (0.20)	189.2 (0.8)	206.6 (9.0)
D c,N2,p,ti	0.067	877	26	8982	13	5.4	0.03054 (0.11)	0.2115 (0.20)	0.05022 (0.11)	193.9 (0.4)	205.2 (5.1)
E c,N2,p	0.070	957	28	15959	8	5.0	0.03070 (0.11)	0.2117 (0.19)	0.05001 (0.10)	194.9 (0.4)	195.6 (4.5)
F m,N2,p	0.041	1071	31	7552	11	5.7	0.03064 (0.13)	0.2117 (0.21)	0.05010 (0.11)	194.6 (0.5)	199.5 (5.0)

[1]All zircon fractions are air abraded (exceptions noted in text). Grain size, intermediate dimension: cc = >134 μm, c= <134 μm and >104μm, m=<104μm and >74μm, f=<74μm; Magnetic codes:Franz magnetic separator sideslope (in degrees) and field strength (in amperes) at which grains are nonmagnetic (N) or magnetic (M); e.g., N1/2a=nonmagnetic at 1° and 2 amperes; Front slope for all fractions=20°; Grain character codes: b= broken pieces e=elongate, eq=equant, n= needles, p=prismatic, s=stubby, t=tabular, ti=tips

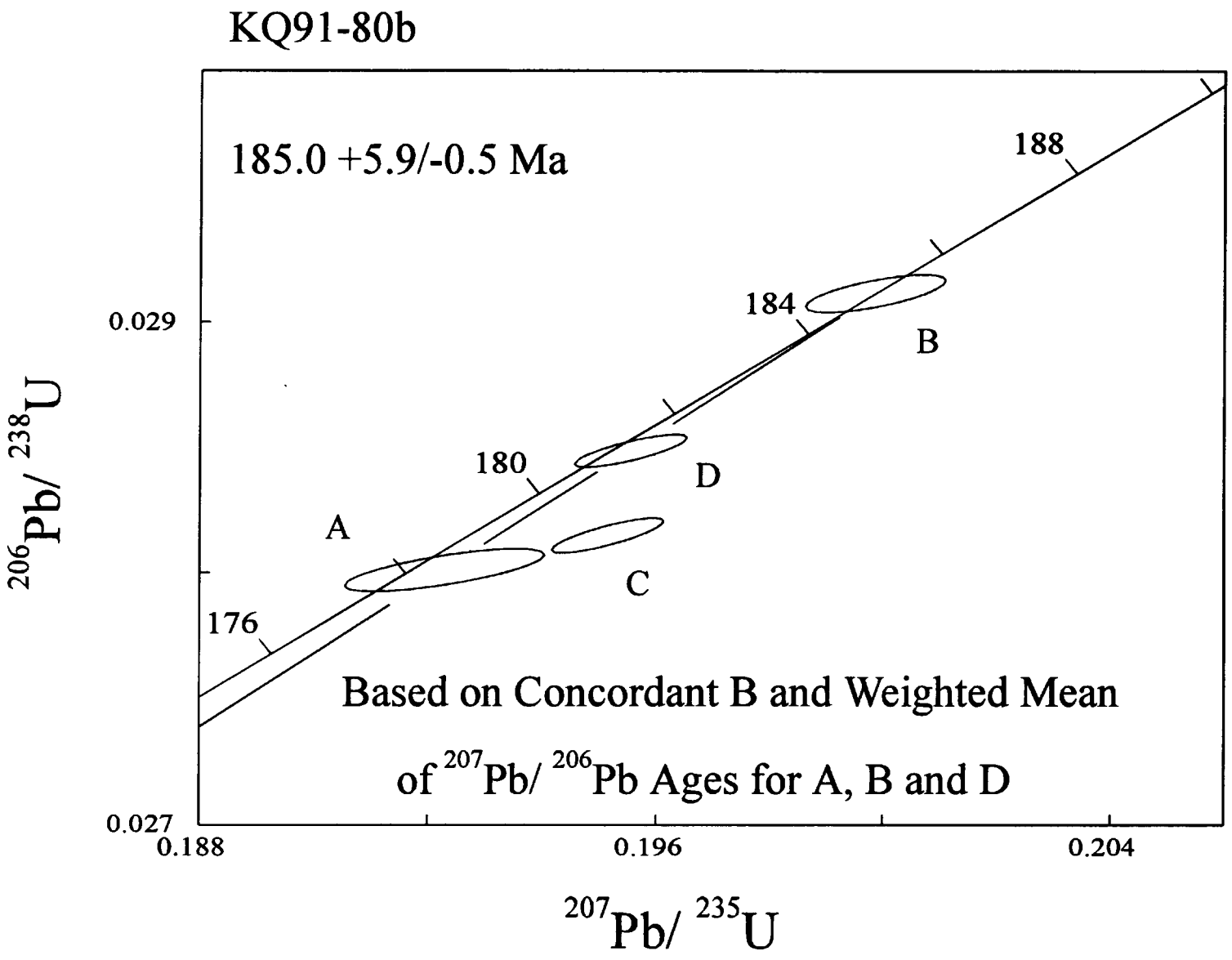
[2]Radiogenic Pb

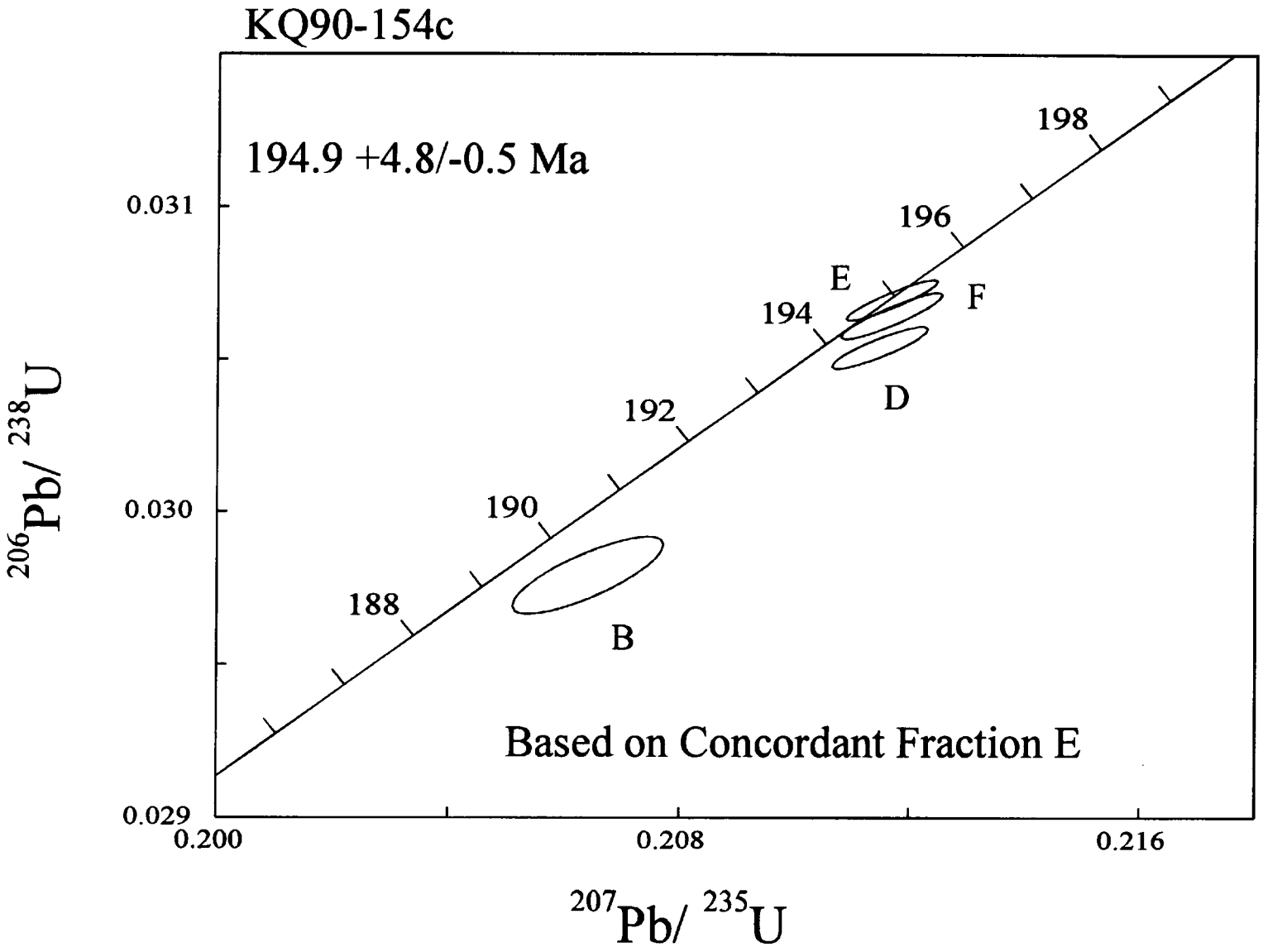
[3]Measured ratio corrected for spike and Pb fractionation of 0.0043/amu± 20% (Daly collector) and 0.0012/amu ± 7% (Faraday collector).

[4]Total common Pb in analysis based on blank isotopic composition

[5]Radiogenic Pb

[6]Corrected for blank Pb, U and common Pb. Common Pb corrections based on Stacey Kramers model at the age of the rock or the $^{207}Pb/^{206}Pb$ age of the fraction.


KQ91-80b
185.0 +5.9/-0.5 Ma
188
184
180
176
A
B
C
D
0.029
0.027
0.188
0.196
0.204
Based on Concordant B and Weighted Mean
of 207Pb/ 206Pb Ages for A, B and D
206Pb/ 238U
207Pb/ 235U


KQ90-154c
194.9 +4.8/-0.5 Ma
198
196
194
192
190
188
E
F
D
B
0.031
0.030
0.029
0.200
0.208
0.216
Based on Concordant Fraction E
$^{206}Pb/^{238}U$
$^{207}Pb/^{235}U$

U-Pb dates for two rocks from the sulphurettes area, B.C.

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Two samples of rhyolitic volcanic rock were collected for U-Pb analysis by Dr. Rod Kirkham of the Geological Survey of Canada. Analyses detailed below were conducted at the Geochronology Laboratory of the Department of Geological Sciences at the University of British Columbia. The following interpretations are provisional and will be updated before the end of 1994.

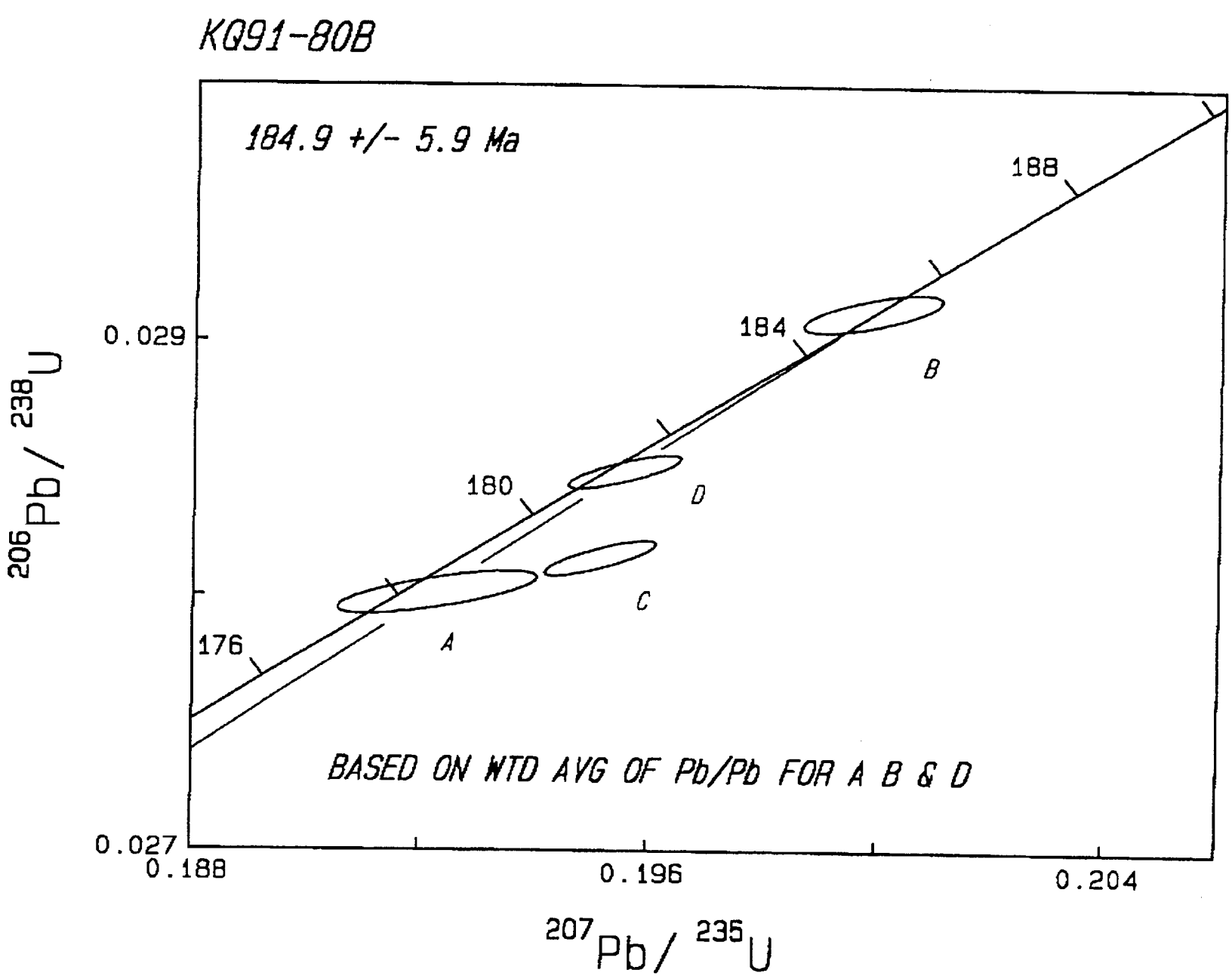
KQ91-80B

This rock yielded high quality, pale pink, clear zircon most commonly of prismatic shape with rounded cross section and aspect ratios of about 1.2 to 2.5. Of the four analysed fractions plotted on Figure 1, A was comprised of broken tips of grains, while B, C and D were whole crystals. Analyses A, B and D give similar Pb/Pb dates of about 185 Ma, with fraction B being concordant at this age. The weighted mean of Pb/Pb dates for these analyses, 184.9+/-5.9 Ma, is considered as a reasonable estimate for the age of this rock, given the present distribution of data. However, these analyses have relatively high ^{208}Pb, a geochemical characteristic more typical of a slightly younger suite of volcanic rocks in northwestern B.C. (176-178 Ma). As this age cannot be ruled out given the present data, analysis of several more zircon fractions composed of grain tips and finer, more magnetic material is presently in process. The presence of a minor inherited component in zircon from this rock is also suggested on the basis of fraction C.

KQ90-154C

This rhyolitic volcanic rock yielded high quality, clear, colourless to pale tan zircon of prismatic morphology, with square to subrounded cross sections and aspect ratios of about 1.5 to 3. Of three analysed fractions plotted on Figure 2, A and D were composed of broken tips of grains, while B was complete crystals. These data suggest the presence of an inherited component in fraction D and probable superimposed Pb-loss for analysis B. Fraction A, which is concordant and gives a Pb/Pb date of 191.4+/-5.3 Ma provides the basis for this provisional age interpretation. Additional analyses will be carried out in order to more confidently estimate the age of this rock.

Figure 1


KQ91-80B
184.9 +/- 5.9 Ma
188
184
180
176
A
B
C
D
0.029
0.027
0.188
0.196
0.204
BASED ON WTD AVG OF Pb/Pb FOR A B & D
206Pb / 238U
207Pb / 235U

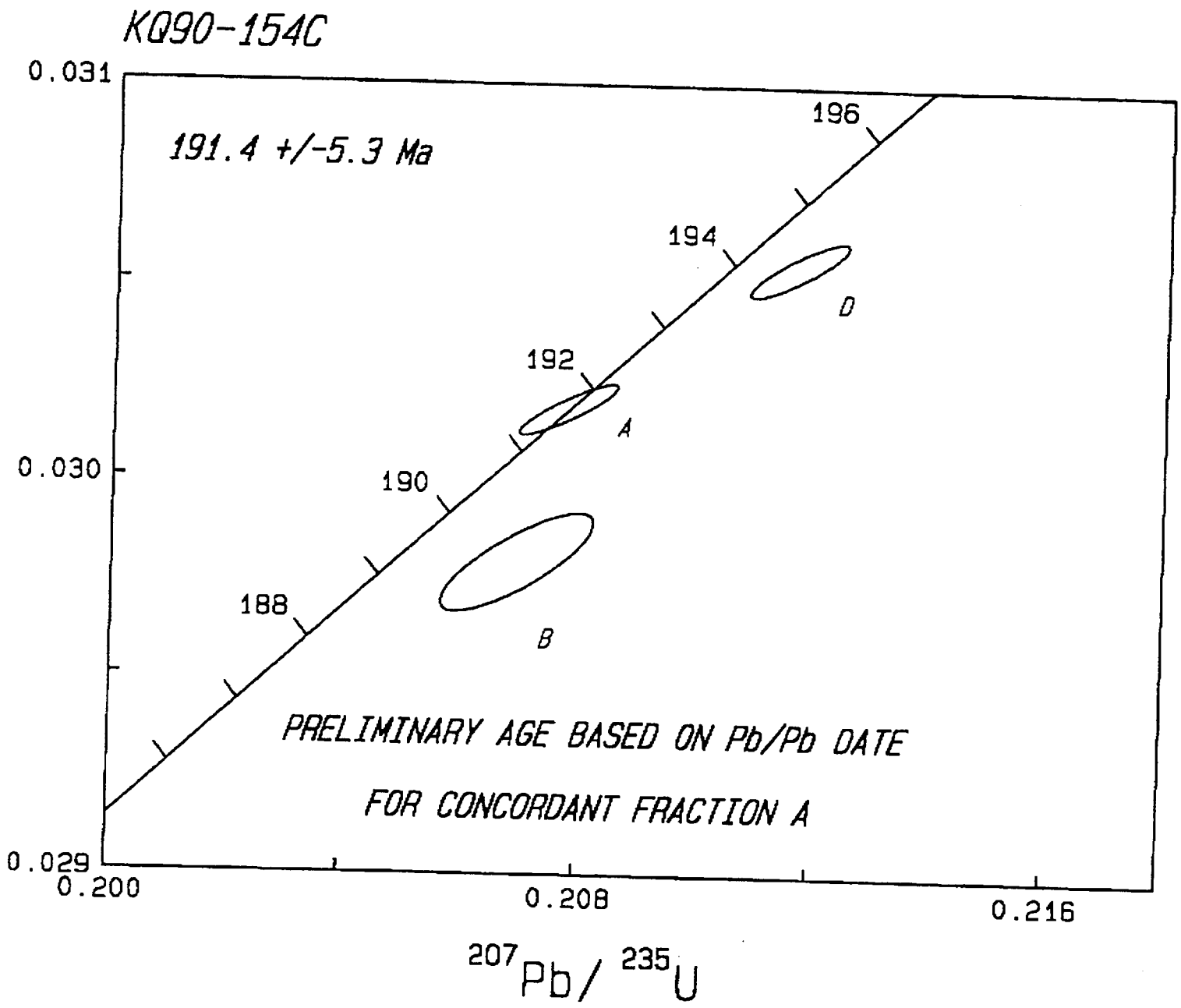

KQ90-154C
191.4 +/-5.3 Ma
196
194
192
190
188
D
A
B
PRELIMINARY AGE BASED ON Pb/Pb DATE
FOR CONCORDANT FRACTION A
0.031
0.030
0.029
0.200
0.208
0.216
206Pb/238U
207Pb/235U

Figure 2