APPENDIX B

AGE SPECTRA, K/CA AND RADIOGENIC YIELD DIAGRAMS FOR THE

DATED HORNBLENDES AND MUSCOVITES
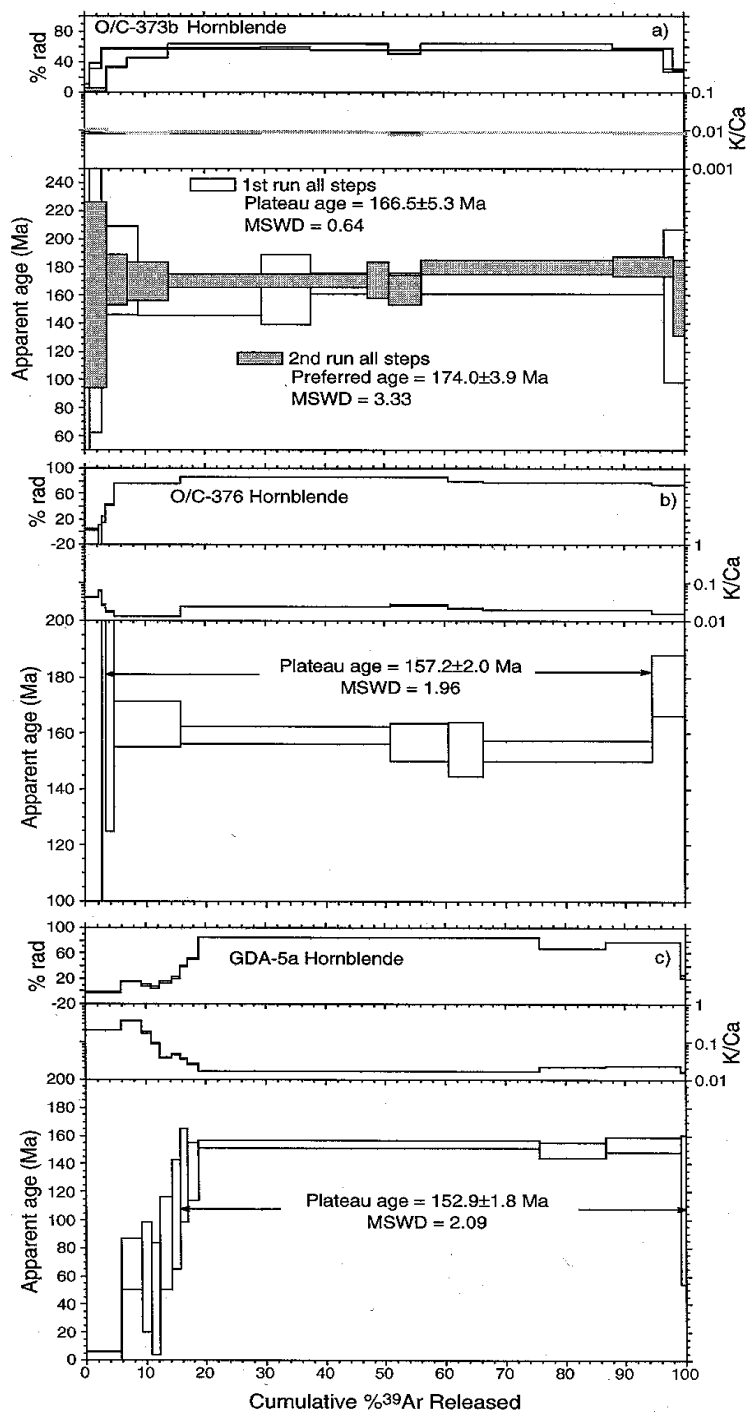
Figure 1

Figure 1. Age spectra, K/Ca and radiogenic yield diagrams for the dated hornblendes.

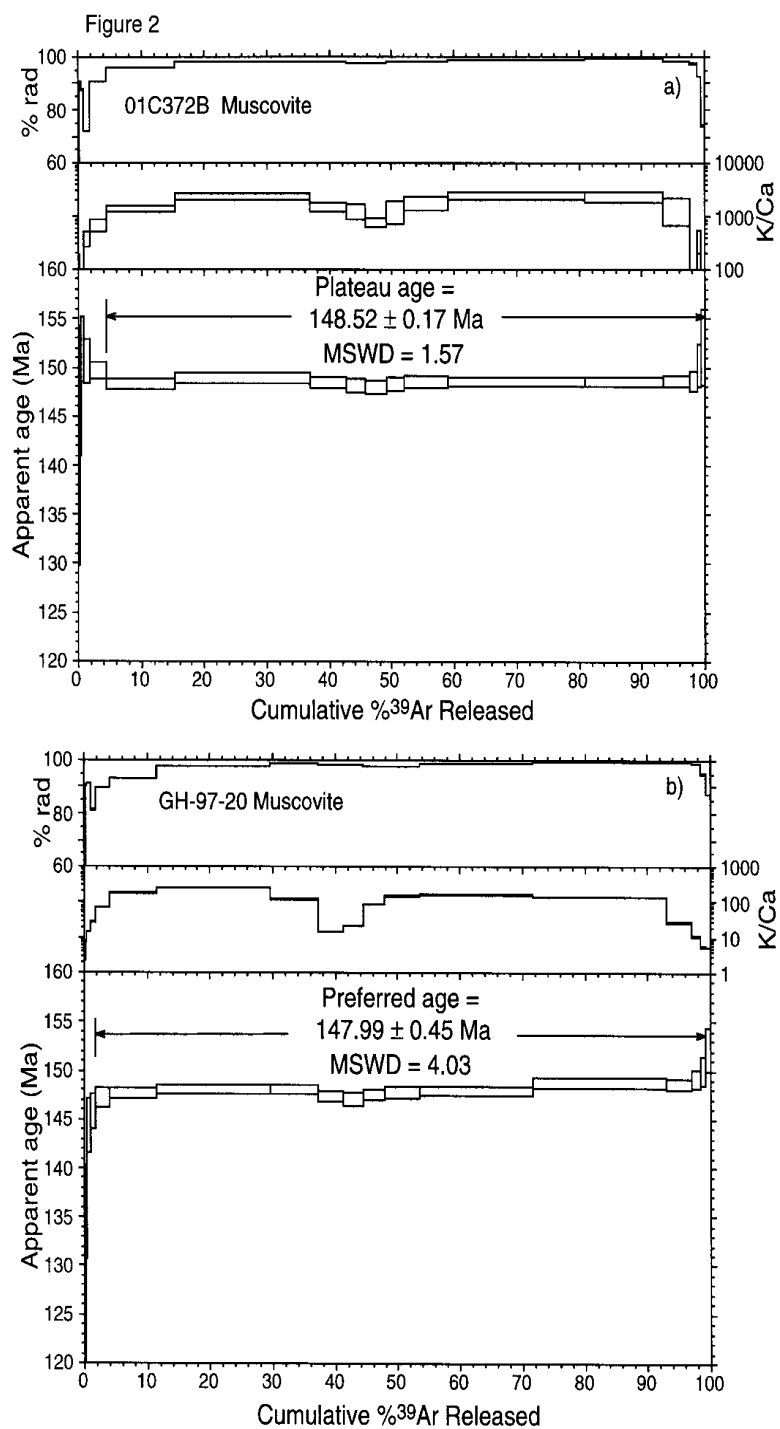**Figure B1:** Age spectra, K/Ca and radiogenic yield diagrams for the dated hornblendes

Figure 2

Figure 2. Age spectra, K/Ca and radiogenic yield diagrams for the dated
muscovites.

Figure B2: Age spectra, K/Ca and radiogenic yield diagrams for the dated muscovites

Table B1: Analytical and age calculation methods

Sample preparation and irradiation:

Muscovite and hornblende separates obtained by standard heavy liquid, Franz magnetic and hand-picking techniques. Samples were packed in Cu foil and irradiated in machined Al discs for 100 hrs in L67 position of the Ford Reactor, University Michigan along with neutron flux monitor Fish Canyon sanidine, (FC-1) with an assigned age of 27.84 Ma (Deino and Potts, 1990).

Instrumentation

Mass Analyzer Products 215-50 mass spectrometer on line with automated all-metal extraction system. Samples step-heated in Mo double-vacuum resistance furnace. Heating duration 7 to 8 minutes. Reactive gases removed by reaction with SAES GP-50 getters, w operated at ~450°C and 1 at 20°C. Gas also exposed to a W filament operated at ~2000°C.

Analytical parameters:

Electron multiplier sensitivity averaged 1x10-16 moles/pA.

Total system blanks plus backgrounds for the muscovites were about:

2000-6500, 15 , 3.0 , 2.0 , 7-20 x 10-18 moles at masses 40 , 39 , 38 , 37 , 36 , respectively for temperatures <1300°C.

Total system blanks plus backgrounds for the hornblendes were about:

1400-2000 , 4 , 1.5 , 1.5 , 4.5-8.5 x 10-18 moles at masses 40 , 39 , 38 , 37 , 36 , respectively for temperatures <1300°C.

J-factors determined to a precision of ±0.1% by CO_2 laser-fusion of 4 single crystals from each 3 or 4 radial positions around the irradiation tray.

Correction factors for interfering nuclear reactions were determined using K-glass and CaF_2 and are as follows:

$(^{40}Ar/^{39}Ar)_K = 0.0262 \pm 0.0001$; $(^{36}Ar/^{37}Ar)_{Ca} = 0.000279 \pm 0.00001$ and $(^{39}Ar/^{37}Ar)_{Ca} = 0.00077 \pm 0.00001$.

<u>Age calculations:</u>

Total ages and errors calculated by weighting individual steps by fraction of ^{39}Ar released.

Plateau definition: 3 or more analytically indistinguishable contiguous steps comprising at least 50% of the total ^{39}Ar (Fleck et al., 1977). Preferred age calculated for indicated steps when rge sample does not meet plateau criteria or if MSWD outside of 95% confidence interval.

Plateau or preferred ages calculated weighting each step by the inverse of the variance.

Plateau and preferred age errors calculated using the method of Taylor (1982).

MSWD values are calculated for n-1 degrees of freedom for plateau and preferred ages.

If the MSWD is outside the 95% confidence window (cf. Mahon, 1996; Table 1), the error is multiplied by the square root of the MSWD.

Isochron ages, ^{40}Ar/^{36}Ar$_i$ and MSWD values calculated form regression results obtained by the methods of York (1969).

All final errors reported at ±2σ, unless otherwise noted.

Table B2: Summary of Sample ages

Sample	Mineral	Plateau or Preferred age (Ma ± 2σ)	MSWD	% ^{39}Ar in plateau
O/C-376	hornblende	157.2 ± 2.0	1.96	91.1
O/C-373b 1st run	hornblende	166.5 ± 5.3	0.64	100.0
O/C-373b 2nd run	hornblende	174.0 ± 3.9	3.33	100.0
GDH-5a	hornblende	152.9 ± 1.8	2.09	84.1
GH-97-20	muscovite	147.99 ± 0.32	4.03	97.4
O/C-372B	muscovite	148.52 ± 0.17	1.57	98.2
Weighted mean of O/C-373b runs is 171.4 ± 3.1 Ma				