Appendix E: Geochronology data, in Furer, L.C., Fehlmann, R.H., Taylor, A.M., Self, G.W., and Amoco Oil Co., Data compilation of the 1971 field party, southeast Brooks Range and Fort Yukon, Alaska; Vol 1

Furer, L.C., and Amoco Oil Co.

GMC DATA REPORT 464E

2019
State of Alaska
Department of Natural Resources
Division of Geological & Geophysical Surveys
GEOLOGIC MATERIALS CENTER

Geochron Laboratories, Inc.

24 Blackstone Street, Cambridge, Mass. 02139
Telephone TRowbridge 6-3691

4 January 1972

CF74 0014 ~~0230~~

Duane H. Reno
Amoco Production Co.
Security Life Bldg.
Denver, Colorado 80202

Dear Mr. Reno:

We have now completed the K-Ar age determinations on the seven (7) samples described in your letter of 12 November 1971. You will find the complete analytical reports enclosed.

All but one of the samples had to be analyzed as whole rocks; we were able to get a quite good sanidine concentrate from sample HRL-1. The samples gave quite a spread of ages, from about 20 million years to 309 million years. The ages of the obviously sheared and altered rocks should of course be considered to be minimum ages of the rocks and probably approach the times of metamorphism and/or alteration. I would expect the ages of HRL-1 and LCF-19 to be close to the true ages of the rocks. Sample 8007 appeared to be a migmatite which contained inclusions of slaty material. We crushed this sample and handpicked several grams of the slate, which was then analyzed as a whole rock. I would expect the age of 8007 to be very close to the age of metamorphism of the original material.

I trust that you will find these reports useful and if you should have any questions about them please do not hesitate to contact me. In the meantime, I am enclosing our invoice for this work. I hope that we may be able to serve you again in the near future.

Sincerely,
GEOCHRON LABORATORIES DIV.

Richard H. Reesman
General Manager

RHR/dm
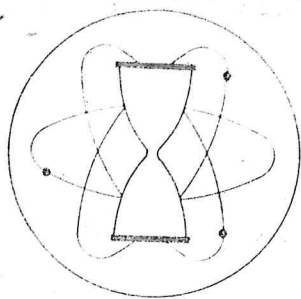
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GEOCHRON LABORATORIES DIVISION

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POTASSIUM–ARGON AGE DETERMINATION	REPORT OF ANALYTICAL WORK

Our Sample No. R–2167

Your Reference: 6112

Submitted by: Duane H. Reno
Amoco Production Co.
Security Life Bldg.
Denver, Colorado 80202

Sample Description & Locality:
Sheared andesite (?)
Northern Alaska

Material Analyzed: Whole rock, crushed to –40/+100 mesh.

$Ar^{40*}/K^{40} = .005837$

AGE = 97.2 ± 4.1 M.Y.

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.01127	.495	.01121
.01114	.735	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
1.576	1.573	1.919
1.571		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year
$\lambda_e = 0.585 \times 10^{-10}$/ year
$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

$$AGE = \frac{1}{\lambda_e + \lambda_\beta} \ln\left[\frac{\lambda_\beta + \lambda_e}{\lambda_e} \times \frac{Ar^{40*}}{K^{40}} + 1\right]$$

Note: Ar^{40*} refers to radiogenic Ar^{40}.
M.Y. refers to millions of years.
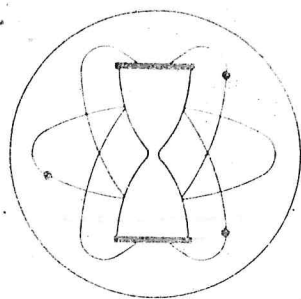
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POTASSIUM–ARGON AGE DETERMINATION   REPORT OF ANALYTICAL WORK

Our Sample No. R–2164

Your Reference: 8007

Submitted by: Duane H. Reno
                 Amoco Production Co.
                 Security Life Bldg.
                 Denver, Colorado 80202

Date Received: 29 November 1971

Date Reported: 4 January 1972

Sample Description & Locality:
        Metasediment (?)   Meta cgl.
        Northern Alaska

Material Analyzed: Slaty fragments, handpicked from rock, crushed to –40/+100 mesh.

$Ar^{40*}/K^{40} = $ .007851   AGE =   130 $\pm$ 5   M.Y.

Argon Analyses:

Ar^{40*}, ppm.	$Ar^{40*}/$ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.05185	.786	.05123
.05061	.802	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
5.361	5.348	6.525
5.336		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}/$ year
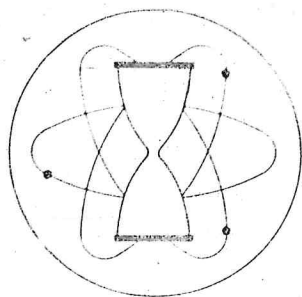
$\lambda_e = 0.585 \times 10^{-10}/$ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

$$AGE = \frac{1}{\lambda_e + \lambda_\beta} \ln\left[\frac{\lambda_\beta + \lambda_e}{\lambda_e} \times \frac{Ar^{40*}}{K^{40}} + 1\right]$$

Note: Ar^{40*} refers to radiogenic Ar^{40}.
        M.Y. refers to millions of years.

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POTASSIUM-ARGON AGE DETERMINATION   REPORT OF ANALYTICAL WORK

Our Sample No. F-2168

Your Reference: HRL-1

Date Received: 29 November 1971

Date Reported: 4 January 1972

Submitted by: Duane H. Reno
                Amoco Production Co.
                Security Life Bldg.
                Denver, Colorado 80202

Sample Description & Locality:
            Altered rhyolite porphyry
            Northern Alaska

Material Analyzed: Feldspar concentrate, -40/+100 mesh.

$Ar^{40*}/K^{40} =$ .003215   AGE = 54.2 $\pm$ 2.0   M.Y.

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.03549	.485	.03571
.03592	.513	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
9.062	9.103	11.105
9.144		

Constants Used:
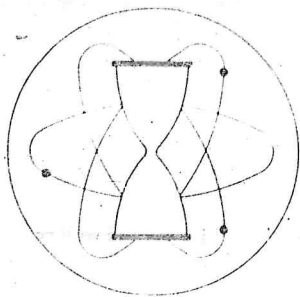
$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

$$AGE = \frac{1}{\lambda_e + \lambda_\beta} \ln\left[\frac{\lambda_\beta + \lambda_e}{\lambda_e} \times \frac{Ar^{40*}}{K^{40}} + 1\right]$$

Note: Ar^{40*} refers to radiogenic Ar^{40}.
        M.Y. refers to millions of years.

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POTASSIUM—ARGON AGE DETERMINATION	REPORT OF ANALYTICAL WORK

Our Sample No. R-2165

Your Reference: 6229

Date Received: 29 November 1971

Date Reported: 4 January 1972

Submitted by: Duane H. Reno
Amoco Production Co.
Security Life Bldg.
Denver, Colorado 80202

Sample Description & Locality:
Phyllite
Northern Alaska

Material Analyzed: Whole rock, crushed to -40/+100 mesh.

Ar^{40*}/K^{40} =   .01961

AGE =   309 $\pm$ 11   M.Y.

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.08815	.920	.08988
.09161	.925	

Potassium Analyses:

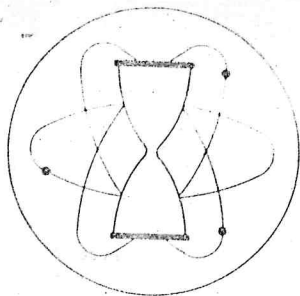| % K	Ave. %K	K^{40}, ppm
3.702	3.757	4.583
3.812		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

$$AGE = \frac{1}{\lambda_e + \lambda_\beta} \ln\left[\frac{\lambda_\beta + \lambda_e}{\lambda_e} \times \frac{Ar^{40*}}{K^{40}} + 1\right]$$

Note: Ar^{40*} refers to radiogenic Ar^{40}.
M.Y. refers to millions of years.

POTASSIUM—ARGON AGE DETERMINATION

REPORT OF ANALYTICAL WORK

Our Sample No. R-2166

Your Reference: 6053

Date Received: 29 November 1971

Date Reported: 4 January 1972

Submitted by: Duane H. Reno
Amoco Production Co.
Security Life Bldg.
Denver, Colorado 80202

Sample Description & Locality:
Sheared andesite
Northern Alaska

Material Analyzed: Whole rock, crushed to -40/+100 mesh.

$Ar^{40*}/K^{40} = .009562$

AGE = 157 ± 10 M.Y.

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.003403	.342	.003471
.003538	.375	

Potassium Analyses:

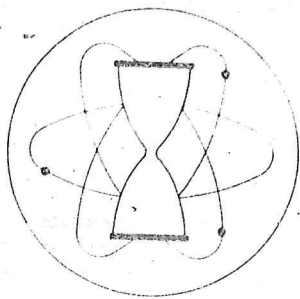| % K	Ave. %K	K^{40}, ppm
.299	.297	.362
.296		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}/\text{year}$

$\lambda_e = 0.585 \times 10^{-10}/\text{year}$

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

$$AGE = \frac{1}{\lambda_e + \lambda_\beta} \ln\left[\frac{\lambda_\beta + \lambda_e}{\lambda_e} \times \frac{Ar^{40*}}{K^{40}} + 1\right]$$

Note: Ar^{40*} refers to radiogenic Ar^{40}.
M.Y. refers to millions of years.

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POTASSIUM–ARGON AGE DETERMINATION | **REPORT OF ANALYTICAL WORK**

Our Sample No. R–2170

Your Reference: LCF–22

Date Received: 29 November 1971

Date Reported: 4 January 1972

Submitted by: Duane H. Reno
Amoco Production Co.
Security Life Bldg.
Denver, Colorado 80202

Sample Description & Locality:
Sheared basalt (?)
Northern Alaska

Material Analyzed: Whole rock, crushed to –40/+100 mesh.

$Ar^{40}*/K^{40} = $ .01729

AGE = 275 $\pm$ 11 M.Y.

Argon Analyses:

$Ar^{40}*$, ppm.	$Ar^{40}*$/ Total Ar^{40}	Ave. $Ar^{40}*$, ppm.
.02756	.827	.02709
.02662	.679	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
1.278	1.284	1.566
1.290		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

$$AGE = \frac{1}{\lambda_e + \lambda_\beta} \ln\left[\frac{\lambda_\beta + \lambda_e}{\lambda_e} \times \frac{Ar^{40}*}{K^{40}} + 1\right]$$

Note: $Ar^{40}*$ refers to radiogenic Ar^{40}.
M.Y. refers to millions of years.
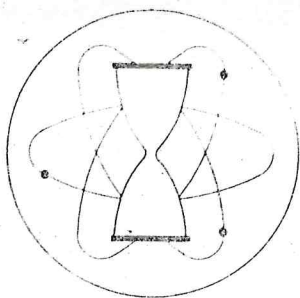
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POTASSIUM–ARGON AGE DETERMINATION

REPORT OF ANALYTICAL WORK

Our Sample No. R-2169

Date Received: 29 November 1971

Your Reference: LCF-19

Date Reported: 4 January 1972

Submitted by: Duane H. Reno
Amoco Production Co.
Security Life Bldg.
Denver, Colorado 80202

Sample Description & Locality:
Basalt
Northern Alaska

Material Analyzed: Whole rock, crushed to -40/+100 mesh.

Ar^{40*}/K^{40} = .001153

AGE = 19.6 ± 1.0 M.Y.

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.002059	.188	.001997
.001934	.168	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
1.428	1.419	1.731
1.411		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

$$AGE = \frac{1}{\lambda_e + \lambda_\beta} \ln\left[\frac{\lambda_\beta + \lambda_e}{\lambda_e} \times \frac{Ar^{40*}}{K^{40}} + 1\right]$$

Note: Ar^{40*} refers to radiogenic Ar^{40}.
M.Y. refers to millions of years.