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K/Ar AGE DETERMINATIONS FROM WESTERN GREENLAND I. RECONNAISSANCE PROGRAMME

Ole Larsen and Jørgen Møller

A reconnaissance K/Ar dating programme on rocks from western Greenland has been carried out with an Ar-extraction apparatus set up at Fysisk Laboratorium II, H. C. Ørsted Institut. The mass spectrometric Ar determinations were carried out in the same laboratory by the second author. With the completion of this reconnaissance programme the extraction apparatus was moved to the Mineralogical-Geological Institute of the University of Copenhagen. Major changes are being made in connection with the re-establishment of the dating laboratory, and dating will not be resumed before the spring of 1968.

The preliminary results of the reconnaissance programme were presented in the Report of Activities, 1966. These results have now been checked and given values of standard error, and the figures reported earlier must be considered obselete. The corrected figures are presented in the tables on the following pages, together with five determinations not included in last year's report. Details concerning these five determinations are given below.

New K/Ar ages from western Greenland

2000 ± 40 m.y. biotite

GGU 70423, Tasiussaq, Frederikshåb district. 66-19

Biotite gneiss. The date probably reflects partial up-dating of pre-Ketilidian gneiss.

1740 ± 30 m.y. biotite

GGU 49335, Carey Øer, Thule district. 66-27

Grey biotite gneiss from a Precambrian locality lying near the Precambrian of the Canadian Arctic.

1680 ± 40 m.y. biotite

GGU 83740, Upernavik. 66-24

Biotite from a biotite-rich lens in the nebulitic granulite facies gneiss forming the island on which Upernavik is situated. This determination, together with the field observations of Escher and Pulvertaft (this report), shows that these granulite facies rocks belong to the Nagssugtoqidian mobile belt.

1650 ± 40 m.y. biotite

GGU 79081, Qiterdlinguaq, Agto district. 66-26

Homogeneous amphibolite facies granitic biotite gneiss from the central part of an antiform. The sample is believed to come from a structurally deep level in the Nagssugtoqidian mobile belt. In the Agto area granulite facies metamorphism was followed by widespread crystallisation of microcline which locally gave rise to granite.

600 ± 15 m.y. biotite

GGU 24496, Qingussâq, Umanak district. 66-3

Biotite lamprophyre from a member of a suite of thin lamprophyre and carbonatite sheets concentrated on the island of Qingussâq. These intrusions are unaffected by any form of metamorphism and therefore might be thought to be associated with the Tertiary volcanism of the

area. However H. I. Drever (personal communication) expressed the view that they are earlier than Tertiary, and this has proved to be correct. In view of this age determination it is no longer permissible to assume that all the dolerite dykes cutting the Precambrian of the Umanak district are Tertiary in age.

The following decay constants were used in all the calculations of ages:

$$\lambda_{ec} = 5.85 \times 10^{-11}\ yr^{-1}$$

$$\lambda_{\beta} = 4.72 \times 10^{-10}\ yr^{-1}$$

$$K^{40}/K = 1.19 \times 10^{-4}$$

Table of dates obtained in the K/Ar age determination reconnaissance in western Greenland

	Geographic location	GGU sample no.	Mineral	Age in m.y.
Nagssutoqidian fold belt:				
Greyish biotite gneiss, Carey Øer near Thule	76°37'N/73° 0'W	49335	biotite	1740 ± 30
Biotite-hypersthene gneiss, Upernavik	72°47'N/56° 8'W	83740	biotite	1680 ±40
Biotite-garnet schist, Umanak area	71°49'N/52°57'W	24579	biotite	1700 ± 30
Biotite semipelite, Umanak area	71°15'N/51°55'W	49903	biotite	1740 ± 30
Pegmatite cutting Umanak gneiss Umanak area	70°53'N/51°15'W	24407	biotite	1690 ± 30
Biotite-hornblende gneiss, Umanak area	70°34'N/50°56'W	83613	biotite	1790 ± 60
Biotite gneiss, east of Sarqaq, Nûgssuaq	70°02'N/51°55'W	68326	biotite	1750 ± 50
Biotite gneiss Jakobshavn	69°14'N/51°03'W	68201	biotite	1740 ± 30
Staurolite schist, Egedesminde area	68°46'N/52°33'W	36052	biotite	1740 ± 30
Biotite granite, Agto, south of Egedesminde	67°57'N/53°37'W	79081	biotite	1650 ± 40
Biotite gneiss Nordre Strømfjord	67°56'N/51°22'W	83535	biotite	1710 ± 30
Central basement gneiss unit:				
Hypersthene-biotite gneiss, Sukkertoppen	65°25'N/52°54'W	89607	biotite	1810 ± 30
Biotite-hornblende gneiss, Godthåb area	64°37'N/51°22'W	89760	biotite	2610 ± 50
Pegmatite, Ameralik fjord, Godthåb area	64°11'N/50°59'W	79633	biotite	1820 ± 30
Hypersthene-biotite gneiss, Fiskenæsset	63°11'N/50°38'W	68648	biotite	2520 ± 40
Hornblende schist, south of Fiskenæsset	62°44'N/50°12'W	74411	hornblende	2200±160
Mica schist, Frederikshåb area	61°58'N/48°15'W	75199	biotite	1790 ± 40
Mica schist, Frederikshåb area	61°50'N/48°15'W	73217	biotite	1830 ± 40
Biotite gneiss, Frederikshåb area	61°43'N/49° 7'W	70423	biotite	2000 ± 40

	Geographic location	GGU sample no.	Mineral	Age in m.y.
Ketilidian fold belt:				
Biotite gneiss, Tigssaluk fjord, Ivigtut area	61°25'N/48°43'W	64228	biotite	1620 ± 40
Pegmatite, Tigssaluk fjord, Ivigtut area	61°25'N/48°43'W	64232	biotite	1600 ± 40
Granite, western part of Julianehåb area	61° 1'N/47°22'W	61098	biotite	1590 ± 40
Granite, Julianehåb area	60°40'N/46°10'W	64008	biotite	1610 ± 30
Pegmatite, Julianehåb area	60°40'N/46°10'W	64009	biotite	1640 ± 30
Biotite gneiss, Nanortalik area	60°12'N/45° 2'W	51654	biotite	1600 ± 30
Granite with garnet, Kap Farvel	59°45'N/43°53'W	77950	biotite	1500 ± 40
Rocks of Gardar age:				
Lamprophyre dyke, Ivigtut area	61°16'N/47°54'W	23233	biotite	1275 ± 25
Granite (updated pre-Gardar?), Arsuk Storø, Ivigtut area	61° 3'N/48°34'W	64168	biotite	1150 ± 30
Granite (updated pre-Gardar?), Kinalik, Ivigtut area	61° 5'N/47°53'W	39060	biotite	1220 ± 40
Granite (updated pre-Gardar), Kobberminebugt	60°55'N/48° 0'W	64145	biotite	1150 ± 45
Ultrabasic intrusion, Nanortalik area	60°19'N/45° 0'W	24147	phlogopite-talc conc.	1335 ± 35
Rocks of post-Gardar age:				
Lamprophyre dyke, Qingussâq, Umanak area	71°24'N/53° 6'W	24496	biotite	600 ± 15
Lamprophyre dyke, Frederikshåb area	61°55'N/49°33'W	64241	biotite	162 ± 5