(McGregor, 1969, p. 30), and that the pre-Ameralik dyke basement would be "very old indeed", at least as old as the Katarchæan rocks of the Kola peninsula (3600-3660 m. y.). In cooperation with the Survey, a programme of Rb/Sr and whole rock Pb/Pb isotope age dating carried out at Oxford and preliminary U/Pb zircon work at the University of Alberta, has confirmed McGregor's field conclusions and has proved that the oldest gneisses in the Godthåb region (the Amîtsoq gneisses) are among the oldest rocks on earth. The main isotope data is presented in a paper by the Oxford Isotope Geology Laboratory and McGregor (1971) and includes a Rb/Sr whole rock isochron age of 3980 ± 170 and a Pb/Pb whole rock isochron age of 3620 ± 100 m.y.

In the summer of 1971 further sampling for isotopic age work was carried out in the Godthåb region by McGregor accompanied by S. Moorbath of Oxford Isotope Geology Laboratory.

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Rb/Sr WHOLE ROCK AND U/Pb ZIRCON AGE STUDIES ON GRANITES OF THE EARLY PROTEROZOIC MOBILE BELT OF SOUTH GREENLAND

Otto van Breemen, Jan H. Allaart and M. Aftalion

In 1969 the Scottish Research Reactor Centre and GGU started a joint project on age dating work in the Early Proterozoic mobile belt of South Greenland (Ellitsgaard-Rasmussen, 1970, p. 8). During that summer 85 samples of two early orogenic and four late to post-orogenic granites, including rapakivi granite, were collected around Julianehåb and in the Tasermiut area in western South

Greenland. Since then, Rb/Sr isotope dilution analyses have been carried out on 31 whole rock specimens (3 in duplicate) and 3 minerals of five granites, and U/Pb isotope dilution analyses on 9 zircon size fractions (1 in duplicate) of four granites. Main sample localities are indicated in fig. 6 and approximate coordinates in tables 1 and 2.

The results have been presented and discussed at the European Colloquium of Geochronology at Brussels, 6-10th September, 1971 and an abstract of this meeting has been published (van Breemen *et al.*, 1971). A comprehensive treatment of the results and their implications is in an advanced stage of preparation under the title "Isotopic and geochronological studies on granitic rocks in the Early Proterozoic mobile belt of South Greenland".

The whole rock Rb/Sr (table 1) and U/Pb zircon (table 2, in which only apparent $^{207}Pb/^{206}Pb$ ages are given) analyses indicate that Early to Middle Proterozoic plutonic activity has been concentrated around 1800 m. y. This supports the idea suggested earlier (e.g. Bridgwater, 1965; Allaart *et al.*, 1969) that no important break in the plutonic development of the mobile belt occurred at the end of the Early Proterozoic.

The samples give no isotopic evidence for the presence of an Archaean basement. This is interpreted as reflecting the high intensity of Early to Middle Proterozoic plutonism, particularly in those areas of more homogeneous granites; areas which

Table 1. Regression details of Rb/Sr whole rock isochrons, using the method and terminology of McIntyre et al., 1966

Rock type, approx. coordinate position	Number of samples analysed	Mean square of weighed deviates	Age* Million years	Intercept
Late Orogenic Granites				
Julianehåb granite (60° 43′ N, 46° 03′ W)	7	0.89	1776 ± 37	0.7036 ± 0.0007
Porphyritic biotite granite (PBG) (60° 21′ N, 44° 57′ W)	6	0.53	1757 ± 81	0.7040 ± 0.0021
Rapakivi granite (RG) (60° 13′ N, 44° 49′ W)	4	0.33	1758 ± 181	0.7040 ± 0.0031
Microcline aplite granite (MAG) (60° 17′ N, 44° 49′ W)	6	1.42	1762 ± 75	0.7040 ± 0.0027
Combined late orogenic granites (Tasermiut)	16	0.95	1782 ± 27	0.7037 ± 0.0008
Early Orogenic Granites				
Gneissose granite (GG) (60° 31′ N, 45° 28′ W)	6	0.84	1887 ± 129	0.7027 ± 0.0015

* Calculated using a ^{87}Rb decay constant (λ) of 1.39×10^{-11} yr^{-1}. Abbreviations of rock types refer to the localities in fig. 6.

Table 2. Apparent lead/lead ages of zircons

GGU Sample No.	Approx. coordinate position	Rock unit size fraction (microns)	Apparent $^{207}Pb/^{206}Pb$ age (m.y.)*
Late Orogenic Granites			
154015	60° 43′ N, 46° 02′ W	Julianehåb granite	
		+ 116	1726
		− 45	1665
154045	60° 12′ N, 44° 48′ W	Rapakivi granite (RG)	
		+ 116	1724
		− 42	1749
Early Orogenic Granites			
154085	60° 31′ N, 45° 28′ W	Gneissose granite (GG)	
		+ 142	1795
		− 61 + 45	1805
		− 45	1804
		− 45	1804
154030	60° 11′ N, 45° 01′ W	Anticlinal granodiorite (AG)	
		+ 45	1794
		− 45	1784

* Calculated with the following constants: $^{235}U/^{238}U = 1/137.8$, $\lambda\,^{238}U = 1.537\times10^{-10}yr^{-1}$ and $\lambda\,^{235}U = 9.72\times10^{-10}yr^{-1}$. Abbreviations of rock types refer to the localities in fig. 6.

were chosen for sampling. Thus the results cannot be said to contradict the geological evidence found by GGU workers for such a basement (Berrangé, 1966; Allaart, 1967, 1970, in prep; Dawes, 1968). Further discussion is reserved for the forthcoming publication mentioned above.

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O.v.B. & M.A.,
Scottish Research Reactor Centre,
East Kilbride, Scotland

U/Pb ZIRCON STUDIES ON THE AGE AND ORIGIN OF POST-TECTONIC INTRUSIONS FROM SOUTH GREENLAND

B. L. Gulson and T. E. Krogh

Geological interpretations in collaboration with D. Bridgwater

The samples used in the age dating programme reported on here were collected in the summer of 1970 as part of a regional mapping programme with J. R. Andrews, D. Bridgwater, B. L. Gulson and J. S. Watterson (see Andrews *et al.,* 1971). Owing to the extensive weathering, samples were obtained by drilling and blasting. All except the most northern sample localities are indicated in fig. 6.

Aim of the investigation

The main objects were to establish the precise time of emplacement of a major suite of post-tectonic intrusions which occur throughout South Greenland, and to date the main metamorphic events in the surrounding country rocks to test whether these were related in any way to the igneous rocks. Previous field work (Bridgwater, Sutton & Watterson, 1966) suggested that considerable recrystallisation under granulite facies conditions of the country rocks has occurred around the intrusions. The igneous suite varies in composition from norite to quartz monzonite and quartz syenite. Locally mantled potash feldspars are developed and the rocks have been described in regional accounts as "rapakivi granites". The country rocks in eastern South Greenland consist of flat-lying migmatised metasediments intruded by subconcordant granodiorite sheets. Both the migmatites and the granodiorite sheets were recrystallised under amphibolite facies metamorphic conditions resulting in cordierite-sillimanite-garnet-bearing assem-