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THE GEOCHRONOLOGY OF THE SCORESBY SUND AREA

Progress report 4: Rb/Sr whole rock and mineral ages

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Introduction

The reconnaissance age determination programme at the Institut für Kristallographie und Petrographie of the Eidg. Technische Hochschule in Zurich has been continued. Certain areas have been selected for more detailed age studies. The

Table 1. Preliminary Rb/Sr ages

Location (latitude/longitude)	GGU No/Collector	Rock type	Mineral	Rb/Sr Age $\times 10^6$y
(a) 71°10'N/26°15'W SE Renland	134741/Chadwick	pegmatite	biotite K-feldspar muscovite	427±15
(b) 71°58'N/29°09'W Charcot Land	103798/Henriksen	granite	whole rock	see text
	103799/Henriksen		whole rock biotite K-feldspar	417±5
71°59'N/28°32'W Charcot Land	117363/Steck	amphibolite	biotite	411±10
(c) Krummedal supracrustal sequence				
70°36'N/28°49'W Rolige Bræ	136352/Jemelin	mica schist	biotite	442±15
70°55'N/28°11'W Harefjord	166861/Hansen	mica schist	whole rock	(900)
71°25'N/29°15'W Krummedal	166812/Hansen	mica schist	whole rock	1194±6
70°09'N/28°39'W Vindblæsdal	166905/Hansen	mica schist	whole rock	
70°28'N/28°19'W Renodden	168662/Henriksen	mica schist	whole rock	
(d) 71°30'N/25°34'W Stauning Alper	111945/Steck	granodiorite	biotite K-feldspar	423±10

$\lambda\, Rb^{87} = 1.39 \times 10^{-11} y^{-1}$

most significant result is the conclusion that the Krummedal supracrustal rocks may have been subjected to two distinct periods of metamorphism, respectively 1200 and 440 m. y. ago.

The age data are presented in table 1, the rocks being subdivided into four groups on the basis of their geological relations.

Interpretation

The tentative interpretations given below were reached in cooperation with the GGU staff geologists and the field geologists who collected the material.

a. Late Caledonian pegmatite from south-east Renland

134741 Coarse-grained, K-feldspar pegmatite. This pegmatite cross-cuts the monzonite sheet of south-east Renland (Chadwick, 1971). Within limits of error the three minerals plot on an isochron corresponding to 427 m. y. This represents a minimum age for the intrusion of the monzonite sheet. The age coincides with that of the biotite (428 m. y.) of the grey-pink granite (Hansen & Steiger, 1971), which is also considered younger than the monzonite sheet.

b. Charcot Land

103798 & 103799 Granite. The two samples are from the central part of the Charcot Land granite, which is clearly intrusive, and has a marginal zone of pegmatites that cut through the adjacent gneisses. The biotite, K-feldspar and the whole rock data of sample 103799 plot on an isochron compatible with an age of about 417 m. y. and an initial Sr^{87}/Sr^{86} ratio of 0.787, indicating a Sr homogenisation among these minerals during Caledonian orogeny. However, it should be stressed that this mineral isochron is essentially governed by the biotite data point. An isochron based on the two whole rock points of sample 103798 and 103799 possibly suggests a pre-Caledonian origin for the granite. A muscovite from specimen 103799 (Hansen *et al.*, 1972) yields an age of 1620 m. y. The results from the whole rocks and the muscovite are in contrast to Steck's (1971) observation, that the Charcot Land granite (which he calls a muscovite pegmatite mass) is younger than a Caledonian metamorphism of the Charcot Land supracrustal sequence. The problem is aggravated by the fact that a large muscovite single crystal (GGU 103795) from a pegmatitic phase in the Charcot Land granite gives an absurdly high Rb/Sr age indicating possible migration of radiogenic Sr^{87} into marginal pegmatites. Clearly more analytical work is needed to solve this puzzle.

117363 Amphibolite. This rock originates from the Charcot Land supracrustal sequence described by Steck (1971). The age of 411 m. y. indicates the minimum age for the last metamorphism (see also Hansen *et al.*, this report).

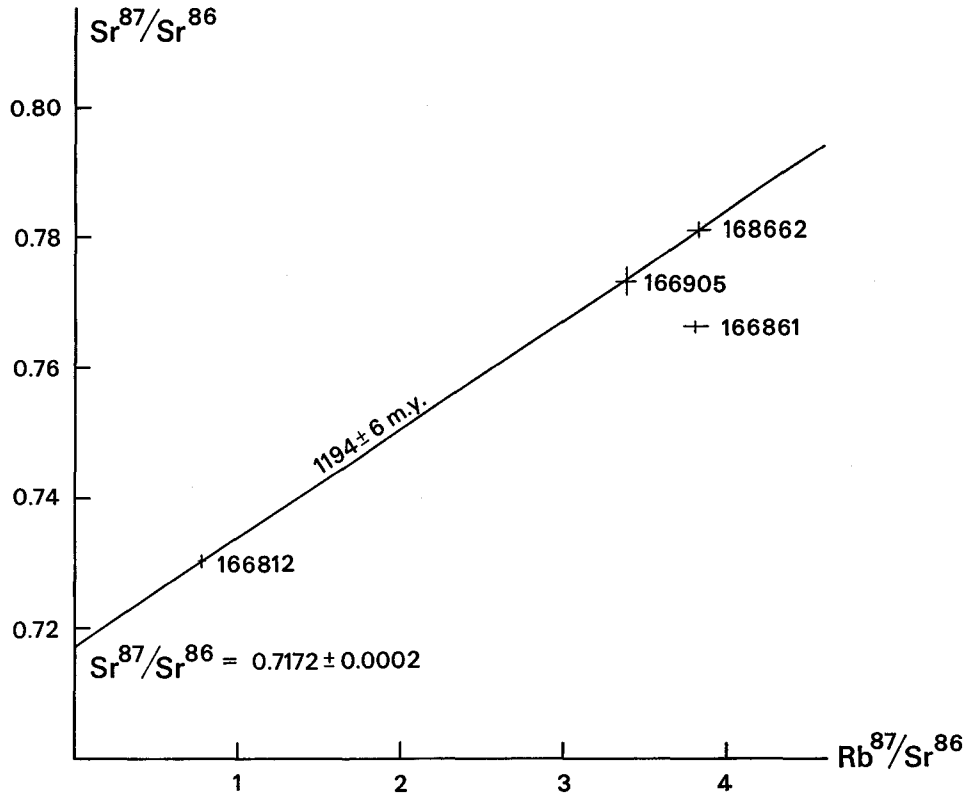

Fig. 12. Rb-Sr evolution diagram for whole rock samples from the Krummedal supracrustal sequence. The error bars correspond to the estimated errors (95 % confidence limit).

c. The Krummedal supracrustal sequence

166812, 166861, 166905 & 168662 Mica schists. Mica schists constitute a major part of the Krummedal supracrustal sequence. Three of the data points plot on a straight line with a slope corresponding to an age af 1194 m. y. (fig. 12). This age is interpreted as the time of an early metamorphism of sedimentary rocks which had a fairly homogeneous Sr^{87}/Sr^{86} ratio. The one point off the line gives an apparent age of some 900 m. y. using the initial Sr^{87}/Sr^{86} deduced from the 1194 m. y. isochron. This sample was collected near the Caledonian thrust in Harefjord (Rutishauser, 1970) and is tentatively regarded as having been disturbed by a Caledonian event.

136352 Mica schist. The biotite of a mica schist from the same rock sequence shows a rather high Caledonian age (442 m. y.), which is seen as the result of the Caledonian overprint in this area.

d. Homogeneous, intrusive rocks from the Stauning Alper

111945 Granodiorite. The sample was collected at the base of a sub-horizontal sheet intruded into migmatite rocks. The two-mineral isochron shows an age of 423 m. y. and may either indicate the time of intrusion, remobilisation or of updating by Caledonian metamorphism.

References

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