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THE GEOCHRONOLOGY OF THE SCORESBY SUND AREA

Progress report 5: K/Ar mineral ages

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Introduction

To supplement the reconnaissance age determination programme carried out at the Institute für Kristallographie und Petrographie of the Eidg. Technische Hochschule in Zurich, a number of K/Ar determinations have been made. This method is particularly useful for dating minerals from more basic rocks that are not suited for Rb/Sr age work and for cross-checking some of the previous results obtained

Table 2. Preliminary K/Ar mineral ages

Location (latitude/longitude)	GGU No/Collector	Rock type	Mineral	K/Ar age $\times 10^6$y
(a) 71°26'N/27°39'W Flyverfjord	103624/Henriksen	amphibolite	hornblende	2525±85*
(b) 70°50'N/22°11'W Hurry Inlet	105043/Coe	hornblende-biotite gneiss	hornblende	1183±55*
70°30'N/21°56'W Scoresbysund	96003-4/Henriksen	garnet amphibolite	hornblende	1124±50*
(c) 72°00'N/29°00'W Charcot Land	103795/Henriksen	pegmatite	muscovite muscovite	1757±70* 1870±75*
71°59'N/28°32'W Charcot Land	117363/Steck	amphibolite	hornblende	632±35*
(d) 71°38'N/24°45'W Bjørnbo Gletscher	111499/Rutishauser	aplite granite 'sweat' pegmatite	biotite muscovite	407±20† 365±15†
71°43'N/27°13'W 'T-sø' Area	101926/Keller	pegmatite	K-feldspar	345±15†

* Analyses for K made by atomic absorption by R. Heusser, Zürich.
† Analyses for K made by isotope dilution.

by other methods (Hansen & Steiger, 1971; Hansen *et al.*, 1972; Steiger & Henriksen, 1972).

In table 2 the samples dated are subdivided in four main groups on the basis of their geological relations.

Interpretation

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

a. Flyverfjord basement

103624 Amphibolite. The sample is from a folded discordant amphibolite dyke in a banded migmatite gneiss assigned to the basement. The age of 2525 m. y. clearly indicates that the Flyverfjord basement had not been subjected to any major metamorphism since the intrusion of the dyke. The hornblende age is consistent with the zircon age (2345 m. y.) of a foliated granite which intrudes corresponding banded gneisses on the north side of Nordvestfjord (Steiger & Henriksen, 1972).

b. South Liverpool Land gneiss complex

105043 Hornblende-biotite gneiss. This sample originates from the metamorphic country rock to the so-called Hurry Inlet Granite (Hansen & Steiger, 1971) and has been described by Coe & Cheeney (1972) as a veined garnet-hornblende-biotite gneiss. The age of 1183 m. y. for the hornblende is seen as the time of the last major recrystallisation of the gneiss. The so far youngest age for this event is given by the age of 1124 m. y. for hornblende from an amphibolite lens in a veined garnetiferous hornblende-biotite gneiss near the town Scoresbysund (samples 96003–4).

c. Charcot Land

103795 Pegmatite. The Charcot Land granite is largely pegmatitic. Large muscovite crystals from a pegmatite have been analysed both by the Rb/Sr and the K/Ar method. While the Rb/Sr age was found to be absurdly high and must be due to a large excess of radiogenic Sr, its K/Ar age af about 1800 m. y. is comparable to the Rb/Sr age of the muscovite in sample 103799, which is a granitic phase of the same pluton (Hansen *et al.*, 1972). Steck (1971) states that the Charcot Land granite (which he calls a muscovite pegmatite mass) is late or post-Caledonian. Until further work is done the discrepancy must be reconciled either by assuming excess radiogenic Ar or late-Caledonian remobilisation of an old pluton.

117363 Amphibolite. The sample was collected in the zone of highest regional metamorphism (upper amphibolite facies) of the Charcot Land supracrustal se-

quence (Steck, 1971). Hornblendes are known for their high retentivity of radiogenic Ar during subsequent metamorphic overprinting. The Rb/Sr age (411 m. y.) of the biotite from the same rock reflects the Caledonian orogeny (see Hansen *et al.*, this report). The age of 632 m. y. for the hornblende is thus interpreted as a partially reset older age and not as the time of a metamorphic event. Alternatively the higher hornblende age may be due to excess argon present in the gas phase at the time of crystallisation of the amphibolite.

d. Stauning Alper

111499 Aplite granite and 'sweat' pegmatite. The K/Ar ages confirm the interpretation of the Rb/Sr ages given by Hansen *et al.* (1972). The aplite granite was presumably intruded in pre-Caledonian time and was later overprinted by the Caledonian orogeny, which ultimately produced the 'sweat' pegmatite.

101926 Pegmatite. The K/Ar age of the K-feldspar is younger than the corresponding Rb/Sr age (395 m. y.; Hansen & Steiger, 1971) due to Ar loss. Nevertheless it supports a Caledonian age for the formation of the pegmatite.

References

Coe, K. & Cheeney, R. F. 1972: Preliminary results of mapping in Liverpool Land, East Greenland. *Rapp. Grønlands geol. Unders.* **48**, 7–20.

Hansen, B. T. & Steiger, R. H. 1971: The geochronology of the Scoresby Sund area. Progress Report 1: Rb/Sr mineral ages. *Rapp. Grønlands geol. Unders.* **37**, 55–57.

Hansen, B. T., Steiger, R. H. & Henriksen, N. 1972: The geochronology of the Scoresby Sund area. Progress Report 2: Rb/Sr mineral ages. *Rapp. Grønlands geol. Unders.* **48**, 105–107.

Steck, A. 1971: Kaledonische Metamorphose der praekambrischen Charcot Land Serie, Scoresby Sund, Ost-Grönland. *Bull. Grønlands geol. Unders.* **97** (also *Meddr Grønland* **192**(3)) 69 pp.

Steiger, R. H. & Henriksen, N. 1972: The geochronology of the Scoresby Sund area. Progress Report 3: Zircon ages. *Rapp. Grønlands geol. Unders.* **48**, 109–114.