

K-AR AGES OF THREE GRANITE PLUTONS FROM NORTH KERALA.

N. G. K. NAIR, K. SOMAN AND M. SANTOSH
Centre for Earth Science Studies, Trivandrum 695010

AND

M. M. ARAKELYANTS AND V. N. GOLUBYEV
IGEM, Academy of Sciences, Moscow, USSR

Abstract

Biotite separates from three granite plutons in the Northern part of the Kerala region, namely, Kalpatta, Ambalavayal and Thaluru yield K-Ar ages of 512 ± 20 m.y., 560 ± 30 m.y. and 710 ± 20 m.y. respectively. The age data are comparable with those reported for similar granitic intrusives of the south Indian region.

Introduction

Recent investigations have revealed the occurrence of a number of post-kinematic granitic and syenitic plutons in the Precambrian granulite facies terrain of Kerala along major lineaments. Available geochronologic data suggest a Late Precambrian Early Paleozoic age for this magmatic phase (Nair and Vidyadharan, 1982; Soman *et al* 1983). We now present new K-Ar age data on three granitic plutons from the northern part of the Kerala region, viz., Kalpatta, Ambalavayal and Thaluru. Their locations in relation to regional fault-lineaments are shown in Fig. 1. All the three granite bodies are intrusive into the Precambrian granulite facies gneisses and have sharp contacts with the country rocks.

The Kalpatta granite occurs as an elliptical stock among the migmatitic gneisses. It is a medium to coarse grained grey biotite-granite. The principal mineral constituents are perthitic microcline, plagioclase of albite-oligoclase composition and quartz. Nair *et al* (1983) reported high modal content of accessories in the granite including sphene, hornblende, apatite, zircon and Fe-Ti oxides.

The pink granite of Ambalavayal is spatially related to the Moyar fault-lineament and occurs near its intersection with the Calicut lineament. Perthitic K-feldspar and interlocking quartz constitute the dominant minerals with sodic plagioclase in subordinate amount. Greenish hornblende and biotite are the mafic minerals. Sphene, epidote, monazite, apatite, calcite, and Fe-Ti oxides are the accessory minerals. Disseminated molybdenite mineralization recorded in the granite and related pegmatites and quartz veins is another characteristic feature of this granite body (Santosh and Nair, 1983).

The granite pluton of Thaluru in Karnataka near the Kerala border is spatially related to the Mercara fault-lineament. It is a porphyritic grey granite with large elongate and ovoidal crystals of sodic plagioclase (albite) embedded in a groundmass of alkali feldspar, quartz and biotite. Detailed account of the petrochemical features of the plutons have been reported elsewhere (Nair *et al* 1983; Santosh and Nair 1983).

Age

Biotite separates were dated in the laboratory of the IGEM, Academy of Sciences, USSR by K-Ar method. Mineral fractions ranging in size from 0.25 to

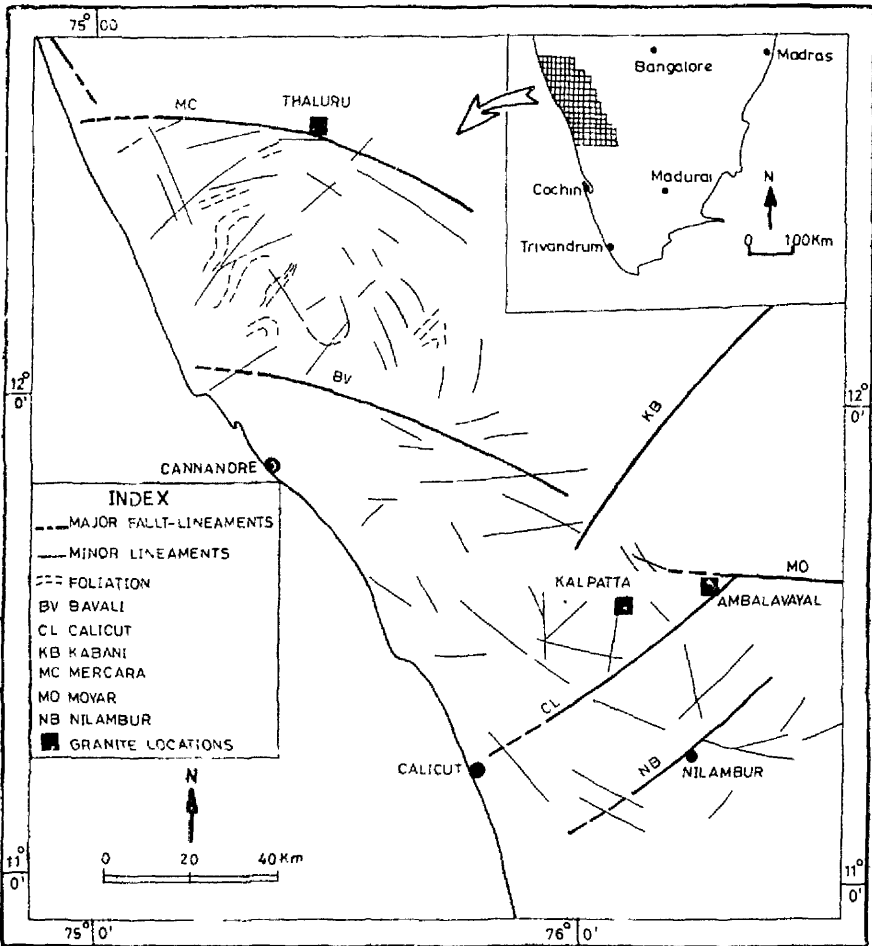


FIGURE 1

Figure 1. Location of granites of the north Kerala region in relation to the lineaments.

0.50 mm were separated from fresh granite samples by crushing, washing, heavy-liquid and electro-magnetic separation and finally by hand-picking under stereomicroscope. Radiogenic argon content was determined in a MI-1301 type mass spectrometer. Potassium was analysed by flame spectro-photometry. Details of instrumentation, calibration techniques and calculation procedures are the same as those described in Soman *et al* (1982). Results are given in Table I.

The K-Ar age of 512 ± 20 m.y. represents thermally reset age, correlatable with the 500 m.y. regional tectono-thermal event in south India. (Aswathanarayana, 1964; Grasty and Leelanandam, 1965; Balasundaram and Balasubramanyan, 1973).

The K-Ar age of 560 ± 30 m.y. for the Ambalavayal granite is slightly lower than its Rb-Sr isochron age (Santhosh *et al* in prep.) but is slightly higher than the U-Pb zircon age of 505 ± 20 m.y. by Odom (1982). The ages of Ambalavayal and Kalpatta plutons are correlatable. Field relationships and age data would suggest

TABLE I. Age data on granite plutons from North Kerala.

Granite Locality	Mineral	K %	Vol. Radiogenic Argon (nl/gm)	Ar ⁴⁰ Rad. Ar ⁴⁰ Total	Age m.y.
Kalpatta	Biotite	7.85±0.06	312±6	87:88	512±20
Ambalavayal	,,	4.48±0.04	204±6	78:83	560±30
Thaluru	,,	7.80±0.06	471±7	83:91	710±20

Analyses : IGEM, Academy of Sciences, USSR.

that the tectono-thermal event associated with metamorphism at 500 m.y. culminated in the emplacement of the pink granite at Ambalavayal.

Acknowledgements : The authors are grateful to the Director, CESS, Professors. F. I. Vol'fson, IGEM, Academy of Sciences, USSR and A.V. Druzhinin, Friendship University, Moscow, for constant encouragement and facilities.

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(Received: Sept. 18, 1984; Revised form accepted: Jan. 7, 1985)