Fuchsite-bearing quartzite in the Sargur equivalent rocks of North Kerala

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Abstract

Fuchsite-bearing quartzite, is an important lithology of the high-grade supracrustal sequence where they constitute the extensions of Sargur Group of Karnataka in the Cannanore district, north Kerala. It occurs as interlayered bands with amphibolite, deformed gabbro and trondhjemite, and this assemblage is suggested to represent a part of tectonised and metamorphosed oceanic chert and magmatic sequence.

Introduction

The Sargur Schist Belt of Karnataka is considered to be the oldest segment of the supracrustal sequence in the South Indian craton (Viswanatha and Ramakrishnan 1975; Janardhan *et al* 1978). This sequence is well-developed in southern Karnataka where the constituent lithologies are contained in linear and isolated belts trending N-S. Nair *et al* (1975) have indicated the possible extension of this belt into Kerala as the Manantoddy Schist Belt, extending from Wynad to east of Cannanore, roughly along the Bavali lineament.

It is known that one of the most important lithologic units of the Sargur Group in Karnataka is fuchsite-bearing quartzite which normally occurs in the basal part of the sequence (Viswanatha and Ramakrishnan, 1981). Several bands of fuchsite-bearing quartzite have been located by the authors in the Bavali river section, about 0.5 km to the north of Kanichar (Lat 75°47′, Long 12°55′50″), Cannanore district, Kerala. The purpose of this note is to describe the occurrence of fuchsite-bearing quartzite in the Sargur-type sequence in Kerala.

Geological setting

According to Nair *et al* (1975), a major part of the Sargur Schist Belt comprises of hornblende gneisses to the south of the Bavali lineament and an assemblage of gabbro-diorite and migmatitic gneisses and schists to the north of this lineament. A study of an area nearly 20 km west of Manantoddy (Fig. 1) indicated that the hornblende gneiss contains well-developed compositional banding and that it is bordered to the north by a gabbro-diorite massif. The Bavali lineament which approximately runs parallel to the contact of the above lithologies marks a zone of strong deformation where mylonites and pseudotachylytes have developed both from the hornblenbe gneiss and the gabbro-diorite, which is also strongly deformed at places. An important plutonic body lies in the western part of the area, and extends for about 20 km from Manantana in the east to Uruvachal in the west. This is a potassic syenite pluton containing on an average 12% K_2O.

Most conspicuous structural element of the gneisses and the schists is a secondary compositional layering which appears to be the first recognisable planar structure. This planar surface shows highly appressed and flattened isoclinal folds of the second generation. At places an axial planar cleavage has developed which cuts across the hinges of isoclinal folds at high angles, but it is almost parallel to the compositional layering in the limbs. A mineral lineation is generally sub-parallel to the fold axis. Broad warps and open upright folds belong to the third generation of structures which may contain a crenulation cleavage at places. This scheme of structural

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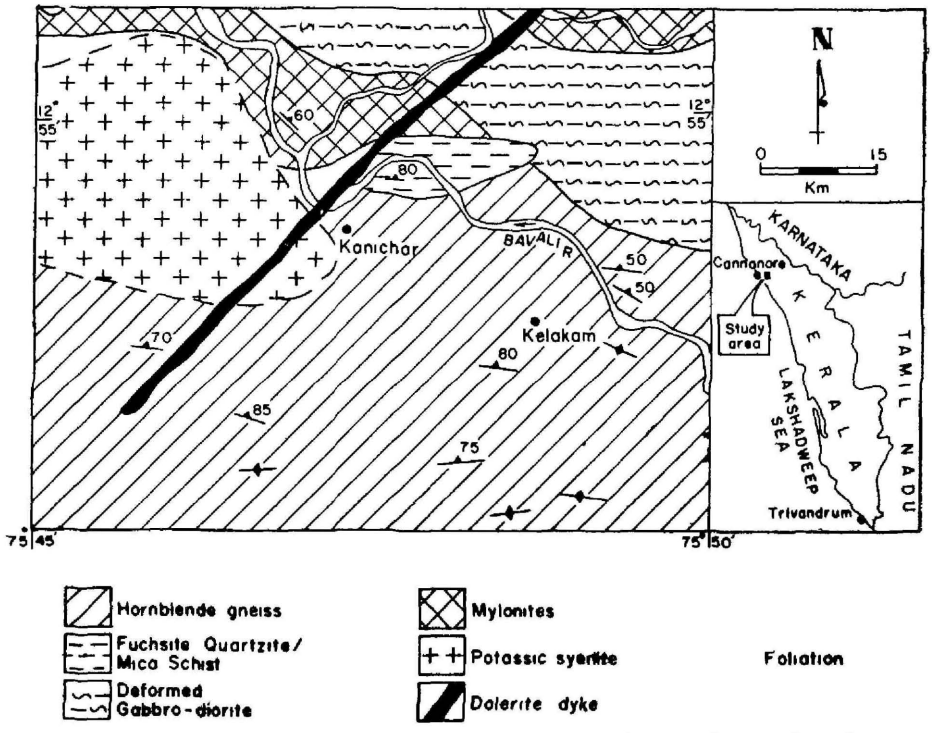

Figure 1. Geological map of a part of Bavali river valley showing the location of fuchsite-bearing quartzite.

evolution is broadly similar to that of the Sargur schists of Karnataka (Viswanatha and Ramakrishnan, 1981).

The fuchsite-bearing quartzite occurs in bands (3-7 m wide) within the banded hornblende gneiss. In one exposure, two fuchsite-bearing quartzite bands alternate with 1-2 m thick impersistent amphibolite bands and 1.5 m thick trondhjemite band. All these rocks show a strong flattening fabric.

Petrography

The fuchsite-bearing quartzite consists of medium sized (0.3-0.8 mm across) quartz grains which show sutured grain boundaries and at places deformation bands. Small (0.1-0.2 mm across) quartz grains exhibit triple junctions and polygonal outlines. The latter type of quartz grains are usually restricted to phyllosilicate- and aluminosilicate-rich layers. A secondary compositional layering and a foliation is marked by parallel arrangement of elongated blades of kyanite and phyllosilicates in repeated zones.

Fuchsite, whose modal content varies from 10-20%, is pale green to pale brown under transmitted light and shows feeble pleochroism. It has two modes of occurrence: (i) irregularly arranged flakes within pods and felts of phyllosilicate which show microboudinage texture, and (ii) discrete, almost equant grains with frayed terminations. The latter grains have bent cleavage and some of them are oriented athwart the foliation. These grains are often cut by recrystallised mica flakes which are essentially parallel to the foliation.

Kyanite occurs frequently as elongated blades aligned parallel to the foliation. Kyanite blades whose margins are rounded has altered to white mica at the peri-

phery. In some cases large flakes of fuchsite contain inclusions of kyanite. Other minerals include garnet altering to chlorite, small grains of staurolite, rare sphene, and opaques.

Discussion

The problem of fuchsite-bearing quartzite and of the semipelitic and psammitic components that are associated with basic and ultrabasic lithologies of the Sargur sequence relates primarily to the mode of formation of the former. According to one view, the quartzite-pelite-carbonate association represents oceanic chert and pelagic sediments (Garson and Livingstone, 1973). On the contrary, this association is also considered to represent shallow water shelf facies sediments (Windley and Smith, 1976; Sutton, 1976).

On the basis of the occurrence of current-bedding in some quartzites, including the fuchsite-bearing ones in Karnataka, these quartzites are generally considered to be detrital (Ramiengar *et al* 1978). Since current-bedding has not been recorded from the fuchsite quartzites of the study area, it is not possible to assign them with certainty to platform facies. The mafic rocks associated with the quartzites of the Sargur sequence of Karnataka show oceanic affinity (Ramakrishnan, 1981), and that fuchsite-bearing quartzite is interlayered with komatiitic mafic and ultramafic rocks of the older Holenarsipur schists in Karnataka (Hussain *et al* 1982). It is possible that the reported assemblage in Kerala of fuchsite-bearing quartzite, amphibolite (deformed and metamorphosed gabbro) and trondhjemite occurring in close association as alternating bands, might represent metamorphosed and tectonised ocean-floor component.

The present report on the occurrence of fuchsite-bearing quartzite in north Kerala in a setting similar to that of the Sargur sequence in southern Karnataka will strengthen the basis of correlation of the supracrustals of Kerala region with the latter.

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