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A Note on Spinifex Textured Komatiitic Basalt in the Late Archaean North Kanara Belt, Karnataka

Spinifex textured komatiitic basalt is noticed as an enclave in the Mothimakki mafic-ultramafic layered complex forming part of the North Kanara schist belt. The spinifex texture is represented by platy and skeletal crystals of olivine now altered to serpentine and magnetite. The komatiitic chemistry is supported by chemical analysis of a sample of the spinifex textured metabasalt.

Spinifex textured komatiitic basalt is being reported for the first time in North Kanara extension of the Dharwar supracrustals of the Shimoga belt. It occurs as a xenolith within the border zone of Mothimakki mafic-ultramafic layered complex (Fig.1). The layered complex itself has been emplaced into the Dharwar metavolcanosedimentary sequence. The border zone of the complex comprises metapyroxenite and metagabbro. The exposure of

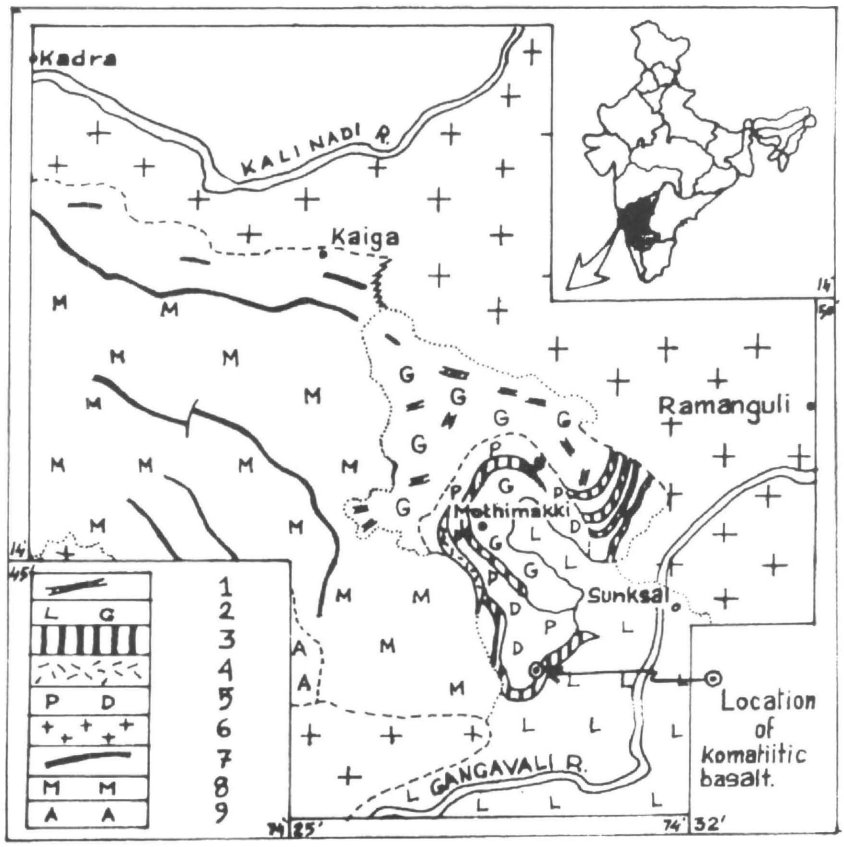

Fig.1. Geological map of parts of north Kanara Dist., Karnataka.
Index : 1 - Ti/V magnetite; 2 - Gabbroic rocks; 3 - Pyroxenite; 4 - Bronzitite; 5 - Peridotite and Dunite; 6 - Karwar granite; 7 - BIF; M - Metavolcanosedimentaries; A- Migmatite.

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komatiitic basalt is found 2 km northwest of Hebbul village along the Arumathi Halla as an enclave within the pyroxenite. The layered complex covers an area of about 90 sq.km and is composed of dunite, peridotite, websterite, metagabbro and leucogabbro alongwith the late phase titaniferous/vanadiferous magnetite bodies.

The spinifex textured komatiitic basalt is melanocratic having high specific gravity, exhibiting typical parallel and crisscross arrangement of platy and skeletal crystals of olivine now altered to serpentine and magnetite (Fig.2). Cummingtonite-tremolite, accessory chlorite and epidote form part of the mineral assemblage. The present texture is a mosaic of equidimensional grains of cummingtonite with occasional prismatic tremolite interspersed with flaky serpentine and dusty magnetite.

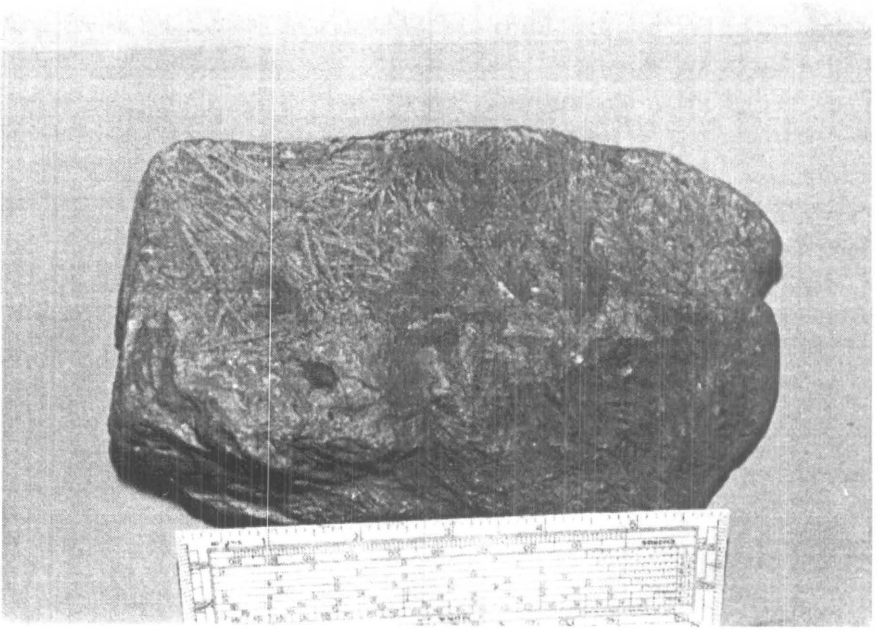

Fig.2. Randomly oriented elongated skeletal crystals in komatiite hand specimen.

The major and minor element composition of the komatiitic metabasalt as determined by AAS method are given below:

SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	TiO_2	MnO	LOI
41.65	3.90	2.0	10.48	20.48	14.27	0.62	0.07	0.50	0.14	4.31
Cu	Pb	Zn	Ni	Co	Mo	Sn	Zn	Ag	Sb	
30	< 10	< 300	500	50	50	< 10	< 30	< 1	< 300	
Bi	Cr	V	Co	Be	La	Nb				
< 20	1000	30	< 5	< 5	< 30	< 30				
CaO/Al_2O_3 = 3.65					MgO/Al_2O_3 = 5.22					
CaO/TiO_2 = 28.54					Al_2O_3/TiO_2 = 7.80					

High concentration of MgO, Ni, Cr, indicate the primitive nature of the magma from which the komatiitic basalt is crystallised. Komatiitic basalt chemistry is exhibited in the diagrams after Jansen (1976) and Viljoen (1982) (Fig.3).

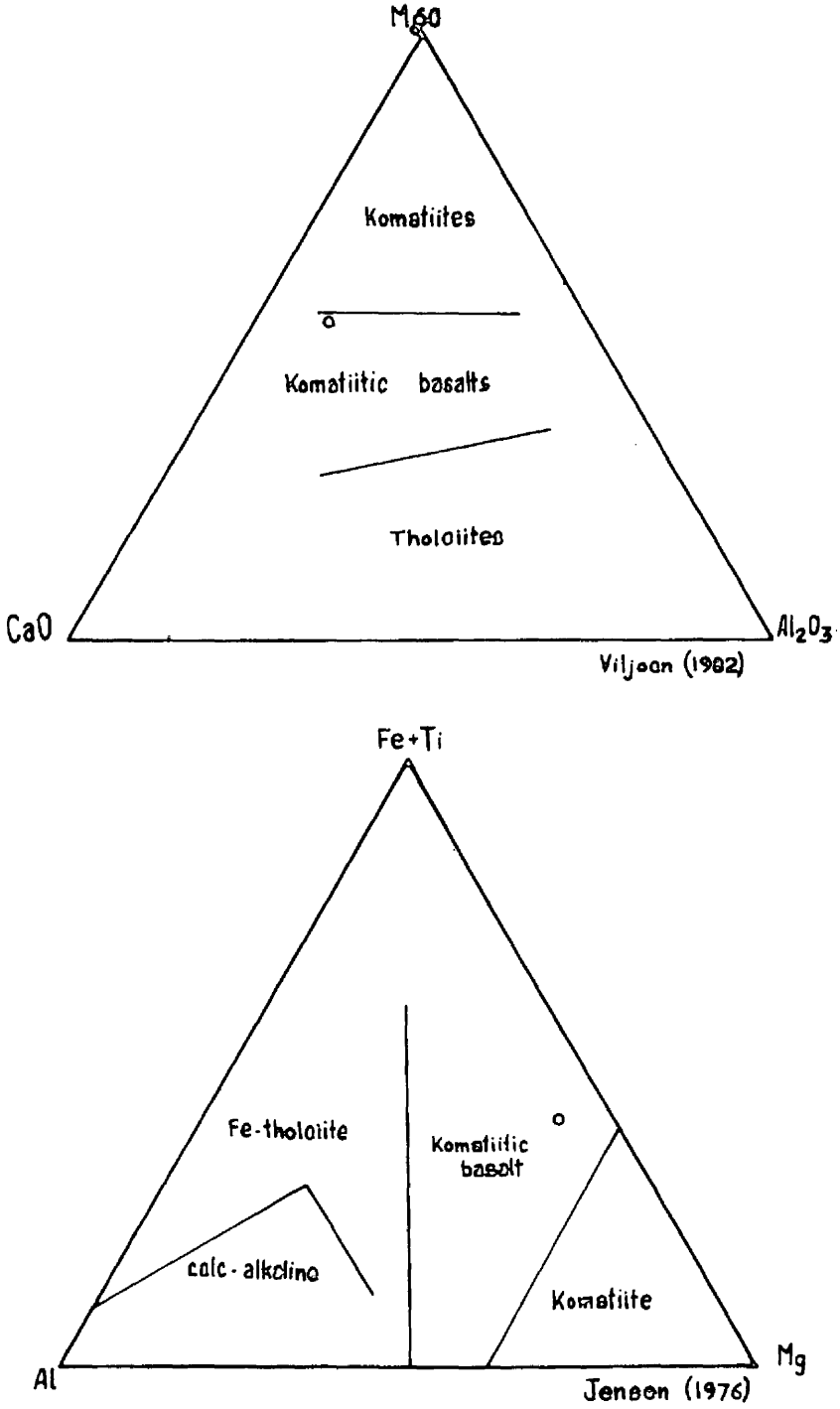

Fig.3. Plots showing the komatiitic affinity of the rock (•).

The rocks of Mothimakki layered complex are metamorphosed to green schist facies whereas the komatiitic basalt inclusion exhibits a relict higher grade assemblage. This supports the view that the komatiitic basalt is a part of the older crust caught up during emplacement of the younger layered complex.

Chinmayee Upparahally Extension,
Tumkur - 572 102 Karnataka

H. KARIYANNA
ASIT SAHA

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