

CORRESPONDENCE

BARIUM RICH OLDEST ULTRAMAFIC LAVA FROM KARNATAKA

Occurrence of bedded barytes from Karnataka was unknown until 1973 when an opportunity arose for me to visit Ghattihoshalli near Talya (Lat. 14°1'12": Long. 76°16'18") in Chitradurga district in connection with inspection of an area of fuchsite quartzite for which prospecting license application had been received. The samples collected in a mound west of Ghattihoshalli showed unmistakable bands of baryte interbedded with fuchsite quartzite.

Since this occurrence is most unusual a note was sent to Journal Geological Society of India in 1974 (v.15, Bedded barytes from the Precambrian of Karnataka) giving a brief account of the occurrence of interbedded baryte with fuchsite quartzite. The brief note was sent to focus the attention of readers to this record of baryte occurrence as a distinct bed in the Precambrians of Karnataka.

The baryte grains are perfectly crystalline, granular and having a specific gravity of 4.2. Analysis of nine samples of barytes indicated BaO in the range of 59.13 to 40.34 percent.

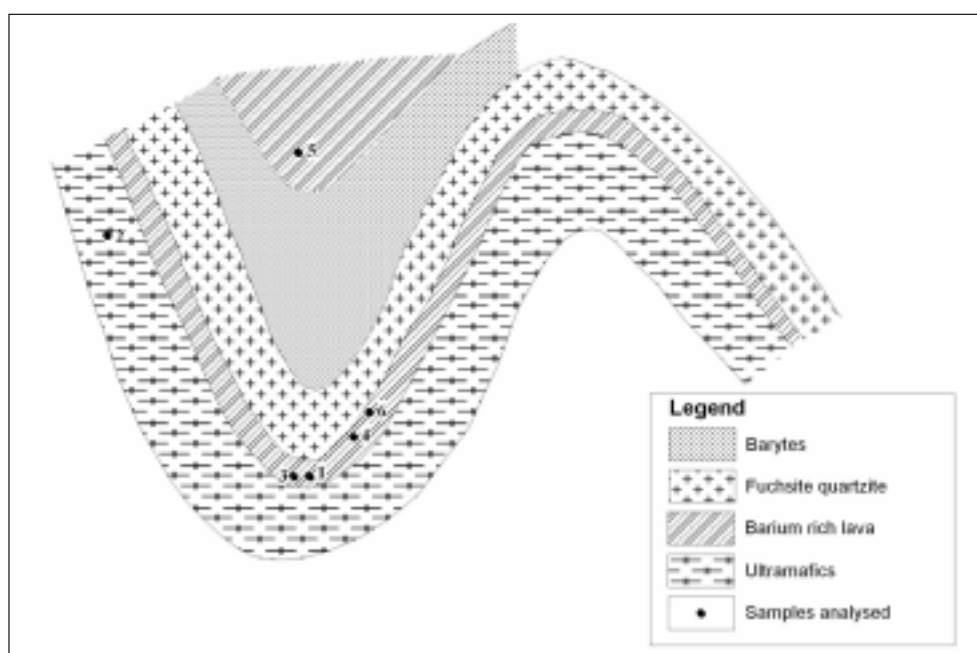
Elsewhere, barytes in the Archaeans had been reported from South Africa by Heinrichs and Reimer (Econ. Geol., v.72, 1977) from Fig Tree Group of the Barberton Mountain Land. Devaraju and Ananthamurthy (1979) have reported optical and X-ray characteristics of Ghattihoshalli barytes and discussed its genesis.

Ultramafic rocks of komatiitic composition was first discovered by Viljoen brothers in Barberton greenstone belt South Africa (1969) and in India Vishwanathan first reported the occurrence of similar rocks from Kolar schist belt (1973).

Spinifex textured rock of Komatiitic composition was identified by Vishwanatha et al. (1977) in Ghattihoshalli belt at Kummangatta and its geochemistry was reported by Narayana and Naqvi (1980). Paranthaman (2005) carried out a detailed study of geology and geochemistry of the Ghattihoshalli schist belt. There was no mention on the occurrence of barium in the ultramafic-mafic rocks in Ghattihoshalli belt by the earlier authors.

My interest in the first discovery of interbedded barytes in Ghattihoshalli had not faded. After my retirement from service I made it a point to visit the area several times and examined the occurrence in more detail. In these trips I could make out that the baryte and fuchsite quartzite layers are interbedded with ultramafic rocks of komatiitic composition. More interesting is the occurrence of a sliver overlying the komatiite as well as the layer of fuchsite quartzite – baryte which appeared to be different from the komatiitic lavas as shown in the figure.

Samples drawn from the ultramafic–mafic layers were got analysed at laboratory of NGRI. Subsequently samples



Cross-section of Ghattihoshalli schist band along E-W direction west of Ghattihoshalli

Table 1. Major and Trace element data for representative Ultramafic and mafic rocks from Ghattihosahalli Schist Belt

Oxides	GHH1	GHH2	GHH3	GHH4	GHH5	GHH6	GHHH7
Al ₂ O ₃	10.33	6.21	4.75	14.59	7.89	10.91	13.41
CaO	15.68	0.39	11.53	13.21	10.52	9.62	9.43
Fe ₂ O ₃	9.25	8.9	11.43	11.59	10.11	9.71	15.56
K ₂ O	0.05	<0.05	0.7	0.52	0.17	0.2	0.15
MgO	16	29.27	17.79	12.10	19.62	17.81	4.57
MnO	0.3	0.14	0.38	0.3	0.2	0.31	0.26
Na ₂ O	0.35	<0.05	0.64	0.62	0.35	0.5	0.9
P ₂ O ₅	0.03	<0.05	<0.05	<0.05	<0.05	0.02	0.11
TiO ₂	0.15	0.14	0.1	0.41	0.2	0.2	1.24
SiO ₂	46.15	45.52	51.01	41.55	43.49	48.89	46.37
LOI	ND	8.6	1.5	3.45	4.93	-	5.01
FeO	ND	1.88	3.94	-	-	-	-
Ag	ND	<1	<1	<1	<1	-	<0.1
As	ND	8	10	6	15	-	-
Ba	3696	142	2668	6459	2345	9107	160
Co	56	95	49	45	6.1	309	53
Cu	49	36	88	24	77	71	61
Ni	374	1570	526	475	1049	2023	92
Pb	3.5	13	14	23	15	7.9	<5
Sn	ND	<5	<5	<5	<5	-	4.9
Sr	103	5	5.4	4.38	1.15	1068	1.5
W	ND	<5	52	15.5	2.8	-	1.7
Zn	103	86	182	1.26	2.17	5.16	300
Cr	1286	2824	2267	3271	2322	4058	185
Sc	ND	20	1.5	28.7	8.9	80	-
Zr	<1.5	45	<1.5	<20	<20	4.2	9.7
Au	-	<5	<0.5	-	-	-	-
Pt	-	4	4	-	-	-	-
Pd	-	1	2.3	-	-	-	-
Li	-	2.3	50.7	79.9	55.9	-	54.3
Be	-	0.7	18.3	2.5	1.2	-	-
Ga	6.13	5.1	5	12.4	7	26	-
Ge	-	<0.1	<0.1	<0.5	<0.5	-	-
Rb	3.22	<0.1	69.2	42.6	10.9	29	2.4
Y	7.7	3	5.6	12	6.3	20	42.5
Nb	0.5	0.4	0.6	1.6	0.8	2.65	3.5
Mo	-	0.6	1.4	0.6	1.2	-	1.2
Cd	-	0.2	0.4	0.6	0.6	-	0.4
In	-	<0.1	<0.1	<0.5	<0.5	-	<0.1
Sb	-	0.6	0.6	1.1	1.1	-	0.9
Cs	1.753	<0.1	33.1	5.2	1.8	1.856	<0.1
La	1.784	1.1	1	1.7	1.1	2.67	7.3
Ce	3.155	0.9	1.4	3.2	1.8	4.607	14.5
Pr	0.301	0.8	0.7	0.6	0.4	0.634	2.8
Nd	1.614	3.2	3	2.7	1.7	3.796	15.3
Sm	0.503	0.5	2	4.6	2	1.167	5.1
Eu	0.941	0.2	1.3	3.1	1.2	2.549	1.9
Gd	0.821	0.5	0.7	1.4	0.8	2.046	6.2
Tb	0.142	<0.1	0.1	0.3	0.1	0.372	1.2
Dy	0.962	0.9	1.3	1.9	1.1	2.675	8.6
Ho	0.225	0.1	0.2	0.4	0.2	0.618	1.7
Er	0.7	0.4	0.7	1.3	0.8	2.152	4.6
Tm	0.141	<0.1	0.1	0.2	0.1	0.388	0.7
Yb	0.704	0.4	0.7	1.3	0.8	2.133	4.8
Lu	0.013	<0.1	0.1	0.2	0.1	0.113	0.7
Hf	0.061	0.1	0.3	3.9	0.4	0.213	1.7
Ta	0.048	<0.5	0.5	0.8	0.3	0.463	1
Tl	-	<0.1	0.7	0.4	0.2	-	<0.1
Bi	-	1.2	1.4	3.6	1	-	0.3
Th	0.197	<0.1	<0.1	2.2	0.5	0.439	1.3
U	0.68	0.1	0.3	0.1	0.2	0.148	0.2
V	136	-	-	-	-	-	431

Note: GHH1–GHH6: samples collected from the mound Northwest of Ghattihosahalli. GHH7: Sample collected from the mound SW of Ghattihosahalli. GHH1 and GHH6 analysed from NGRI, Hyderabad. GHH2–GHH5 and GHH7 analysed from Shiva Analytical Lab., Bangalore.

from the same layers were got checked up from M/S Shiva analytical lab Bangalore. The most important point in these analyses is the presence of high content of barium ranging from 2345 to 9107 ppm, chromium from 1286 to 4058 ppm and nickel from 475 to 2023 ppm (Table 1)

I am not aware of such high values of barium reported elsewhere from Archaean ultramafic–mafic lavas. This note is being presented to emphasise the important fact of existence of barium rich lavas in the Archaean older schist belts of Karnataka.

The narrow schist belt extending from Mayakonda in the north up to Kudineerkatte–Ghattihoshalli and Jankal in the south requires to be mapped in greater detail and all the rock types studied for the whole rock trace element and REE geochemistry. There is one more thing about barytes to mention Prof. C. Hoering (1989) of the Carnegie institution, USA had dated these barytes as oldest (3200 - 3500 m.y.)

The study of Ghattihoshalli barytes attains great importance not only because it is one of the oldest barytes so far recorded in Archaeans but also its association with high barium ultramafic lavas. Therefore the author aims to continue study to understand the geochemical features of the barium rich lavas and its relationship with the genesis of the interbedded barytes in the area.

No. 21, S.S. Layout, 3rd Stage

C. SRINIVASIAH

4th Block, Basaveshwaranagar

Bangalore – 560 079

Email: csrinivasaiah@yahoo.com

References

- DEVARAJU, T.C. and ANANTHAMURTHY, K.S. (1979) Optical and X-ray study and genesis of barytes from Ghattihoshalli, Chitradurga Dist., Jour. Geol. Soc. India, v.20, pp.551-506.
- HEINRICH, T.K. and REIMER, T. (1977) A Sedimentary barite deposit from the Archaean Fig Tree Group of the Barberton Mountain Land (South Africa). Econ. Geol., v.72(8), pp.1441.
- HOERING, C. THOMAS (1989) The Isotopic Composition of Bedded Barites from the Archaean of Southern India. Jour. Geol. Soc. India, v.34, pp.461-466.
- NARAYANA, B.L. and NAQVI, S.M. (1980) Geochemistry of Spinifex textured periodotitic komatiites from Ghattihoshalli, Karnataka, India. Jour. Geol. Soc. India, v.21, pp.194-198.
- PARANTHAMAN, S. (2005) Geology and Geochemistry of Archaean Ghattihoshalli Mafic-ultramafic complex, chitradurga, Karnataka. Jour. Geol. Soc. India, v.66, pp.653-657.
- RADHAKRISHNA, B.P. and SRINIVASIAH, C. (1974) Bedded barytes from the Precambrian of Karnataka. Jour. Geol. Soc. India, v.15, pp.314-315.
- VISWANATHA, M.N., RAMAKRISHNAN, M. and NARAYANAN Kutty, T.R. (1977) Possible Spinifex texture in a serpentinite from Karnataka. Jour. Geol. Soc. India, v.18, pp.194-197.