A new occurrence of albitite dyke near Arath, Nagaur District, Rajasthan

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We report here a new occurrence of albitite dyke near Arath in Nagaur District of Rajasthan. It occurs about 30 km west of the 'albitite line' and presumably represents a parallel zone of an intracontinental rift zone.

RAY[1] has described several monomineralic, saturated to undersaturated, ultrasodic, feldspathic dyke rocks as albitite in Khetri and Kishangarh areas of northern Rajasthan. They traverse to Delhi metamorphites along a 170-km-long lineament described by Ray as 'albitite line' and interpreted as the product of deep crustal magmatic processes along an intracontinental rift zone. Here we report another occurrence of albitite at 2 km SSW of the village Arath in Nagaur district. The study area occurs at about 30 km west of the 'albitite line' (Figure 1,*a*).

The area around Arath exposes linear ridges of Alwar quartzite and migmatized paragneisses belonging to the Middle Proterozoic Delhi Supergroup (Figure 1,*b*). Multiple phases of folding and longitudinal ductile shear zones exercise strong influence on the rock formations. Recently, Fareeduddin *et al.*[2] identified tectonic slices of high grade rocks emplaced within these migmatitic gneisses and quartzites. The high grade sequence comprises charnockite, two pyroxene granulite, pelitic granulite, garnetiferous augen gneiss and garnetiferous amphibolites.

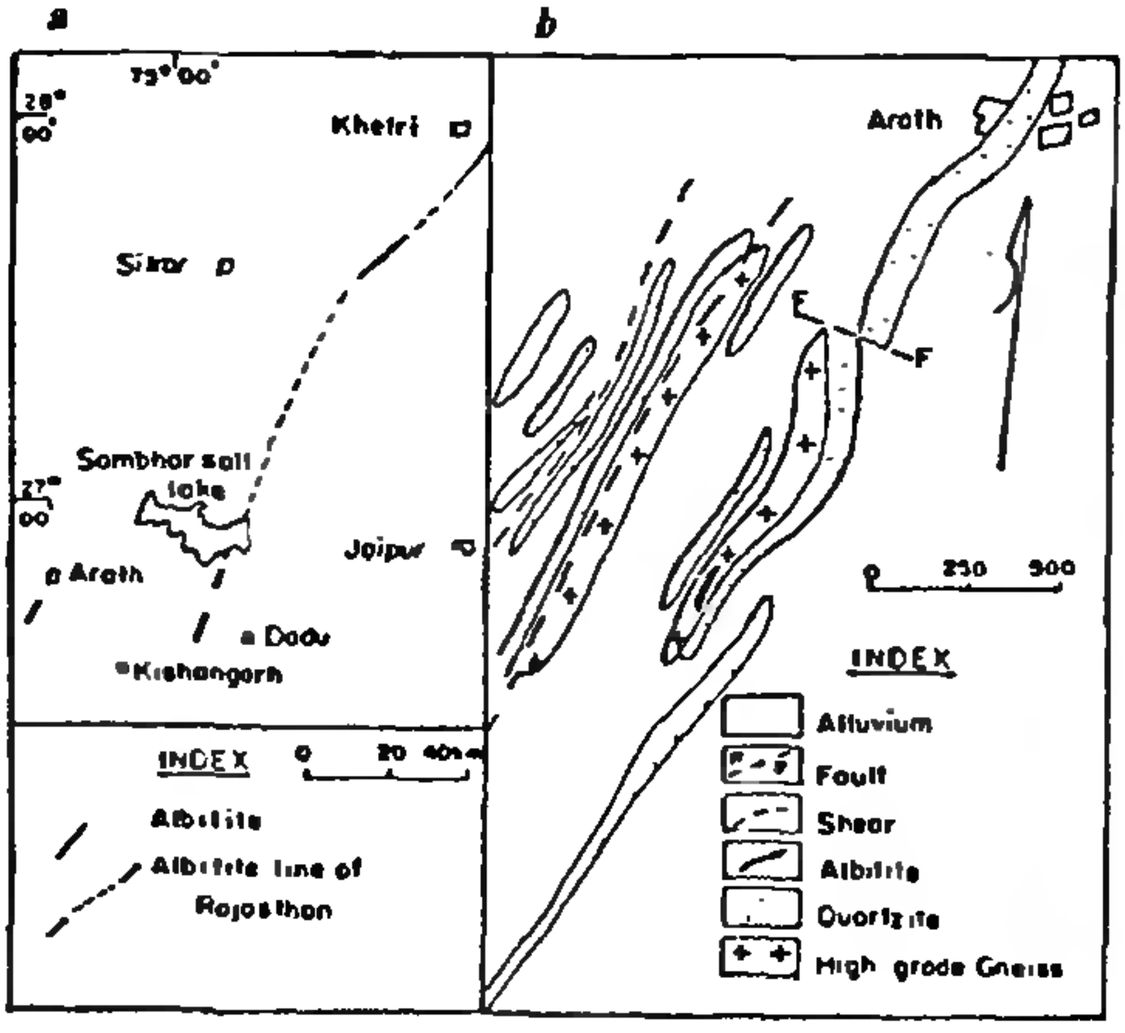

Figure 1. *a*, Map showing the location of 'albitite line' of Rajasthan and the albitite body of the Arath area. *b*, Geological map of the area around Arath.

Albitite occurs as a NNE–SSW trending concordant post-tectonic intrusive body within the garnet (± hypersthene)-bearing biotite-rich gneisses of the high grade sequence. It is about 8–10 m wide and crops out intermittently along strike for about 150 m. It is a medium-grained unfoliated grey-coloured rock with abundant deep blue and grey-coloured feldspar. The bluish feldspar has a bright shining lustre. In thin sections, anhedral mesh of feldspars (Figure 2) constitutes about 80% of the rock. Feldspar is dusty or cloudly and has sutured grain boundaries. The twin lamellae are faint, thin and often discontinuous. Feldspar determined by the Micheal Levy's method is found to be albite. XRD patterns also show about 90% of low albite in the rock. The albite grains are fractured and very fine veinlets of carbonate often heal the fractures. Modal quartz is very low (4–6%). Other accessories include biotite, apatite and rarely ilmenite.

Table 1 provides chemical composition of the albitite and the host gneisses and also the average chemical composition of the albitites of Khetri and Kishangarah areas[1]. The Arath albitite is a silica saturated, peraluminous, ultrasodic rock. Very low K_2O, moderately low MgO and CaO are also evident. Na_2O/K_2O ratio (26.5) is very high. The molar $Al_2O_3/CaO + Na_2O + K_2O$ ratio is 1.08. Among the normative minerals, albite constitutes 72%, normative quartz and orthoclase are very minor. Normative corundum attests to its peraluminous character. In alkali–silica diagram (Figure 3, after Miyashiro[3]), the Arath albitite plots in alkali field. The analysis of the Arath albitites compares well with the average analysis of the albitites of the Ray's albitite line. In comparison to albitite, the host high grade gneisses have moderately low Al_2O_3, Na_2O, high K_2O, FeO and MgO; the Na_2O/K_2O ratio is very low (less than unity).

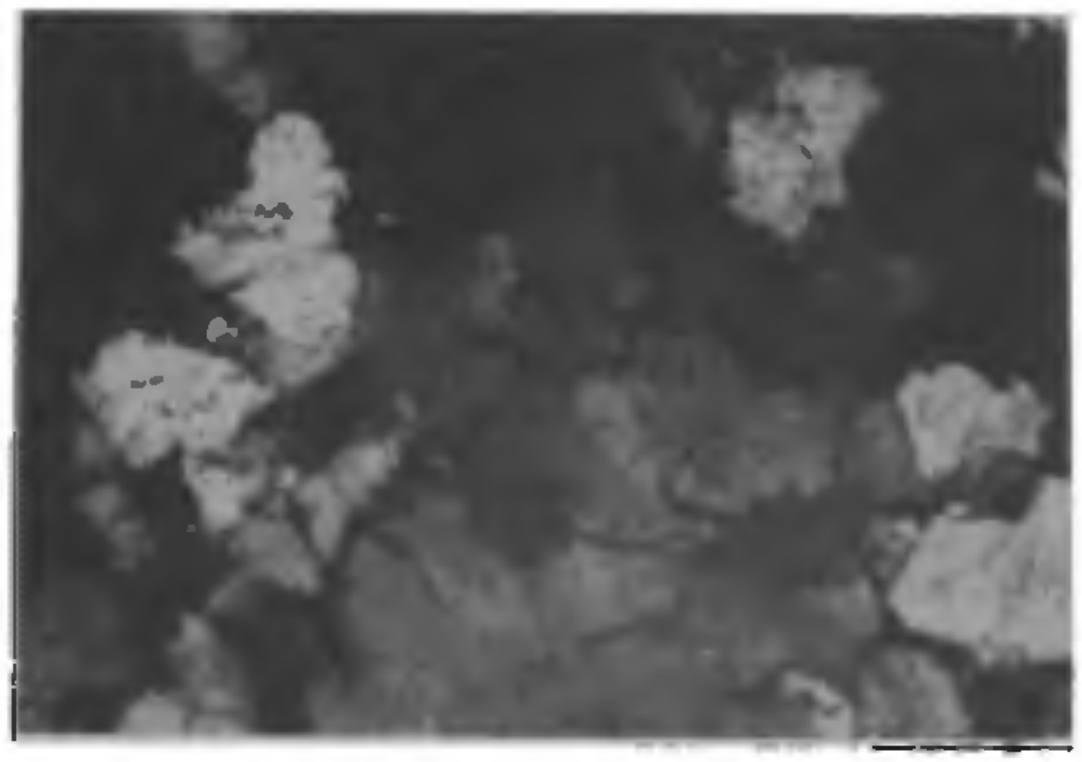

Figure 2. Photomicrograph showing anhedral grains of albite. Note thin twin lamellae in the large albite grain. Crossed nicols. Scale × 60.

Table 1. Chemical composition of albitites and host gneiss

	Albitite Arath	Host gneiss Arath	Albitite Albitite line
Sample No	F 32	F.47	
SiO_2	64 18	57 45	65 35
Al_2O_3	19 13	15 19	17.98
Fe_2O_3	1 50	3 11	1.33
FeO	1 53	8 01	1 88
CaO	1 89	4.16	1 06
MgO	1 16	4 83	0.31
Na_2O	8 48	2 22	7.36
K_2O	0 32	2.50	3.14
TiO_2	0 12	0.89	0.49
MnO	0 10	0 10	0 07
H_2O^+	1.25	0 81	00.33
H_2O^-	0.23	Tr	0 14
Total	99 89	99.27	99.44

*Average of the three analyses of albitites of the 'albitite line' (Date from Ray)[1].

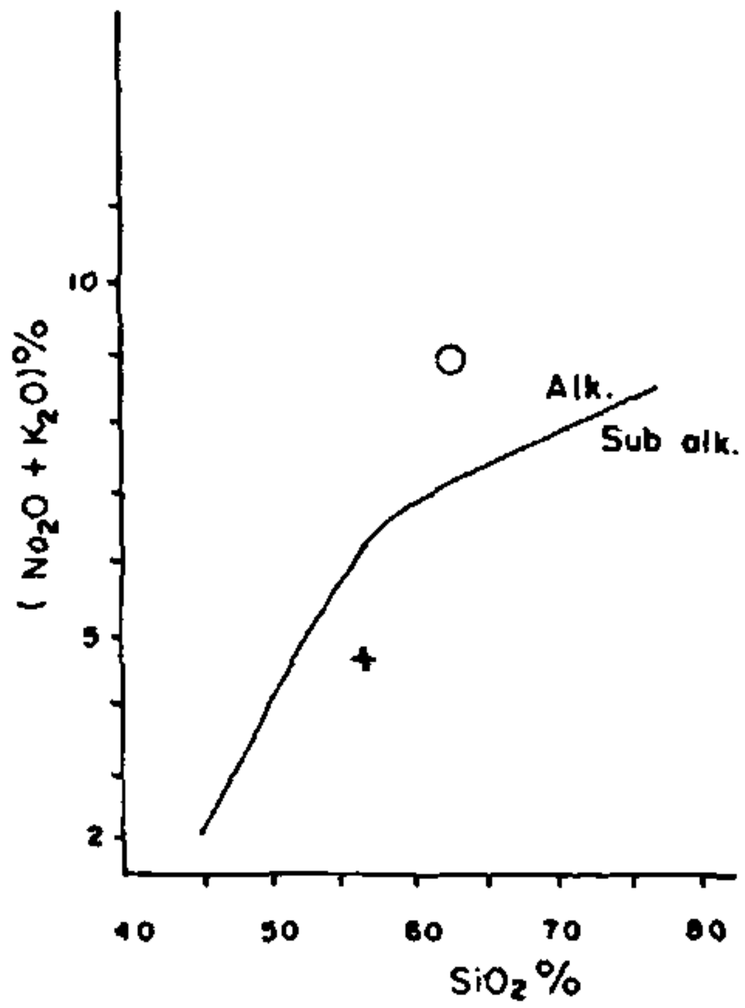

Figure 3. Total alkali versus silica diagram (after Miyashiro[3]): (O, Albitite; +, host gneiss. The line demarcates fields of alkaline (alk) and sub-alkaline (sub alk) rocks.)

In alkali–silica diagram the host gneiss sample falls in subalkali field (Figure 3).

The albitites of the 'albitite line' are interpreted as related to deep crustal anorogenic magmatism, although its metasomatic origin is also advocated[4]. The contact of the Arath albitite with host gneisses is sharp and the chemistry indicates that the enveloping rocks are free from soda enrichment. Therefore, the Arath albitite probably represents cumulus segregates of deep crustal magmatic chamber. The extent of the albitite intrusions in the study area could not be ascertained because of the thick sand cover. Nevertheless, its occurrence at about 30 km west of the 'albitite line' may indicate presence of a parallel zone of intracontinental rift.

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