The molecular fragments, according to the second scheme form the ion at m/e 484 and this loses a formaldehyde molecule to form ion r at m/e 454. The latter splits C,H,NO radical to form the ion t at m/e 258 and which subsequently loses a methyl radical resulting in the formation of ion t at m/e 243.

In the third case, the compound splits off a Schiff base moiety to form the ion t at m/e 197. The latter subsequently loses a HCN molecule to form the ion m at m/e 170. This further loses formaldehyde and ethylene molecules to give ions n and o at m/e 126 and 142 respectively.

The fragments along with their relative abundances (percentage) are recorded in Table I.

ACKNOWLEDGEMENT

One of the authors (RVS) is grateful to the C.S.I.R., New Delhi, for the financial support.

IMPLICATIONS ON THE TECTONIC SETTING OF GABBROIC ANORTHOSITE OCCURRENCES AROUND GUNDLPET, KARNATAKA

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ABSTRACT

Field and petrographical characters of new occurrences of gabbroic anorthosite around Gundulpet indicate that they pre-date the N 70° E (mobile belt) trend and define an ancient lineament. The decrease in the calcic content of plagioclase and the loss of gabbroic texture point to the fact that they have been affected by younger granites.

INTRODUCTION

This note records the occurrence of minor but significant bodies of gabbroic anorthosite, spatially associated with recrystallised ultramafics around Gundulpet (lat. 11° 49'; long. 76° 43'). These occurrences gain added importance, as they are found in Sargur high grade terrain—a transitional zone between the Dhawar craton and the Charnockite 'mobile belt'.

The fact that the occurrence of gabbroic anorthosites near Kodsooge, Silvantapura and Ramaiyanapura are just 12 km north of the Moyar lineament and Kurubarahundi is 30-40 km south of Hullahalli, Konkanahundi layered anorthosite-ultramafic complex (recent excavations on the Hullahalli left bank canal has exposed anorthosite exposures traceable almost continuously for a distance of 10 km) is of great significance. They confirm the proposed Moyar-Bhavani lineament (Selvan and Janardhan, in press). But then the question arises, whether this lineament joins the N-NW trend of Holenarasipur-Nuggihalli, girdling the Dharwars1 (TTA, Nu. of Katz2) or with the W-NW Bhavli-Moyar-Cauvery lineament proposed by Vidyadharan et al.3.

GEOLOGICAL SETTING

Gabbroic anorthosites occur at four widely separated localities; Kurubarahundi, in the north-east of Gundulpet (22 km enroute to Sargur) and Silvantapura, Kodsooge and Ramaiyanapura (16 km, 13 km and 27 km respectively) to the south-east of Gundulpet. The bodies are generally thin, narrow in size and can be traced from about six metres to a distance of half a kilometre.

The area in which the anorthosite occurs is composed predominantly of gneisses of different ages, with huge enclaves of metasediments (Quartzites; Fuchsite bearing quartzites; Banded magnetite quartzites; Garnet quartzites; K-pelites; Mn-garnet + diopside calc-silicates, and marbles), recrystallised ultramafics, metagabbros, and younger granites. Since the area and its constituent rocks have undergone upper amphibolite to granulite grade metamorphism, the prefix meta is left out while describing the gabbroic rock types,

Plate 1. Fig. 1. Photomicrograph of the gabbroic anorthosite from Kurubarahundi showing relics of cumulus textures (?) and triple junctions, × nicols. Fig. 2. Thin section photograph of the gabbroic anorthosite from


The structure of the area is complex, with N-S trends dominating in the northern parts of Gundlupet, and gradually veering to N 70°E due to superimposition and subsequent rotation by later deformational episodes. Around Kurubarahundi N-S trending tight folds and N-S trending quartzite bands are common, whereas towards the south-east of Gundlupet the quartzites show tight folds, with N 70°E as the axial plane. Banded magnetite quartzite also exhibits N 70°E trend.

It is pertinent to point out here that although the area exposes different types of gneisses, the presence of quartzo-feldspathic tonalitic gneiss (Kabini Gneiss) is ubiquitous, occurring as patches in the younger gneisses.

FIELD AND PETROGRAPHY

At Kurubarahundi the gabbroic anorthosites occur as minor patches or as layers in the gabbros (pyriolites). They are closely associated with folded quartzite horizons, occasional two-pyroxene granulite bodies and recrystallised ultramafics (again folded and rotated, with mineral assemblages—Cr-tremolite + Opx-similar to Sayvandites). The axes of these folds trend N-S to N 30°E.

Kodsoge showing the introduced quartz between bigger plates of plagioclase, × nicols. Fig. 3. Note the interlocking borders (sutured) of feldspars in the Ramaiyanapura anorthosite, which have now lost their typical platy characters, × nicols.
In thin sections, the gabbroic anorthosites consist predominantly of plagioclase (An 70%); green hornblende (2°, = 52°). Rare relics of cumulus texture can be visualised (pl. 1, fig. 1). Triple junctions between plagioclases are common.

The gabbroic anorthosites occur in a similar set up, and are best seen in a null cutting, north of Silvantapura village. They are associated with tightly folded N 70° E trending quartzites. Thin sections of this variety show plagioclase (An 70%), now recrystallised into bigger plagioclase plates with prominent secondary twinning (this phenomenon is confirmed by bigger plates of plagioclase enclosing smaller well twinned plagioclase).

The Kedsoge body is the major body (of all the four described), which can be traced for about half a km and with a width of about 20 m. It is typically gabbroic in appearance and is found closely associated with olde quarzofeldspathic gneiss. This gabbroic body is bordered by younger granite which shows faint traces of N-S foliation.

The occurrence at Ramaiyanapura is a minor one, but the presence of Banded Magnetite Quartzite and Satyavanditcs proves the similarity in geological setup of the area that to that of the Sargurs, though structural trends are now quite different.

In thin sections, the gabbroic anorthosites of the least two localities exhibit plagioclase, which now have totally lost their platy character and has developed interlocking (or sutured) textures (pl. 1, fig. 3). The An content has significantly decreased from the original An 70% to An 35-40%. The decrease in the anorthite content of the plagioclase is connected to the modal increase and the change in the pleochroism (to blue-green) of the hornblende. The interlocking texture of the plagioclases are also linked with the appearance of introduced quartz (pl. 1, fig. 2). Secondary glide twinning is prominent. Two generations of hornblende are seen.

Most significant in the Kedsoge body, is the presence of greyish anthophyllite (3 mm size clots) noticed even in the hand specimens. This is important as anthophyllites appear consistently in Hullahalli, Doddakanya and Sitampundi anorthosites.

The presence of introduced quartz, concomitant decrease in plagioclase anorthite content and increase in accessories, zircon and apatite indicate the possibility of these anorthosites getting migmatised.

**Discussion**

The presence of quartz and recrystallised feldspars in these anorthosites is due to the effect of younger intrusive granites. This later migmatisation also explains the absence of cumulus textures, so well seen in Hullahalli and other anorthosites of the Sargur terrain.

The characteristics of the gabbroic anorthosites prove also that the tract around Gundlupet is but a continuation of the Sargur high grade terrain. The gabbroic anorthosites clearly pre-date N 70° E mobile belt (Charnockite formation) trend. Gabbroic anorthosites and ultramafics are also found as patches in the Proterozoic Naresugtoqidian mobile belt of Greenland. Escher et al. conclude that they are pre-Naresugtoqidian and intruded into the Archaean supracrustal sequence, a situation very similar to the present set up.

The Gundlupet occurrences connect, as it were, the layered non-chromite bearing of Hullahalli types (through Moyar) with the chromite bearing Satyamangalam-Sittampundi anorthosites. This has certain important implications and hence needs further scrutiny, as we here encounter a situation wherein two types of layered complexes, characteristic of two distinct Mega zones can actually be traced (?) through the Moyar lineament.

**Acknowledgements**

The authors are grateful to Professor C. S. Pichamuthu for encouragement, and to Professor M. N. Viswanathi for laboratory facilities. ASJ and GRB thank the UGC, and NSS the INSA for financial support.

5. ——— and Stikantappa, C., *ibid.*, 1977, 18, 1617.