

towards the presence of highly arseniferous microbes enclosed within siderite globules/concretions, whose shell was non-arseniferous.

3. This finding gives completely new dimension to the problem's understanding, which is a pre-requisite to finding a solution.
4. Further studies are on to identify and culture these 'microbes' in collaboration with experts in that field.
5. Shri Bandyopadhyay has correctly understood only a part of our statement that lowering of pH causes dissolution of siderite concretions containing arseniferous microbes, leading to contamination of groundwater.
6. We have not suggested that formation of concretions

and their dissolution happens simultaneously and under the same conditions. The contradiction, which Shri Bandyopadhyay finds apparent in our findings, is as a result of his assuming something we have never implied, suggested and/or wrote. We have described certain observed facts and substantiated them with few photographs up to one micron magnification.

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PATTERN OF OCCURRENCE OF KIMBERLITE PIPES BASED ON GRAVITY AND MAGNETIC ANOMALIES IN WAJRAKARUR-LATTAVARAM REGION, ANDHRA PRADESH by A. Vasanthi and K. Mallick. *Jour. Geol. Soc. India*, v.58, 2001, pp.251-259.

(1)

K.R.P. Rao, Geological Survey of India Training Institute, Hyderabad - 500 068 comments:

1. The effort of the authors is really appreciated for discussing comprehensively the geophysical signatures, both gravity and magnetics on a regional scale, over the known kimberlites in the Wajrakarur area and prognostication of areas for further prospecting. I thank the authors for educating many a geologist in this field.
2. The statement that "*except the pipes 10, 11 and 12 which occur at the contact of the intrusive granite and Peninsular Gneiss, other pipes do not show clear association with any other geological structure*" is not true and the ground reality is as follows:

The authors refer to the map published in the Geological Survey of India Misc. Publ. no.130, Part V, p.32, Plate-1 wherein the pipe nos. 1, 2, 6 and 11 occur at the contact of TTG and TGA suite of rocks (Peninsular Gneiss and granites). The Lattavaram group of pipes (p-3,4,8 and 9) occur close to the NE-SW trending fault that passes through the closure of the Marutla domal structure and these bodies occur at the contact of the TGA (Peninsular Gneiss) and the younger intrusive granite (Kandamalakunta diapir). Without any reservation

one can say that all the kimberlites exhibit clear structural and geological controls of emplacement.

3. The statement that "*Kohinoor, Regent, Hope and Orloff and many more diamonds had their origin in Wajrakarur-Lattavaram region*" perhaps lacks conviction, though the truth is still a mystery. Many workers are obliged to agree that the source of these famous diamonds (recovered from the Krishna river gravels in Guntur and Krishna Districts) has to be other than the Wajrakarur kimberlites. The new discovery of lamproites in the Jaggayyapeta lamproite field of Krishna, Nalgonda and Khammam Districts substantiates this contention and is the first strong geological evidence in favour of this opinion.
4. It is bit intriguing to see the statement made at p.258 under residual vertical magnetic map (v) that "*two small kimberlite pipes nearer Guntakal have been found in May 2000 (D.V. Subba Rao, Pers. Commn.)*".

Discovery of kimberlite/lamproites is indeed a great achievement and contribution by any geologist or geophysicist in this exciting field of diamond exploration. If one has discovered a kimberlite, more details are to be published for the benefit of the enthusiastic scientific community. The area under question – north of Guntakal as stated by the authors, is Peravali-Jonnagiri area where geologists and geophysicists of GSI and NGRI have worked

for the past 30 years and are still working to locate at least one kimberlite in this area, which has proved to be an enigma so far. The authors have merely stated that two small kimberlite bodies have been found north of Guntakal, but did not give the exact location.

If it is not out of context, D.V. Subba Rao, who is supposed to have located the kimberlites, had in fact given me the samples for my opinion on its identification. After petrographic studies, the rock was found to be a metapyroxenite and not a kimberlite. If the authors are still presuming them to be kimberlites, more particulars on location, petrological and mineralogical confirmation may be made available for the benefit of the readers. Finally, I would like to inform that Subba Rao, on enquiry has recently informed that the rocks are not kimberlites.

A. Vasanthi and K. Mallick, NGRI, Hyderabad - 500 007
reply:

We thank K.R.P. Rao for his appreciation and interest in our paper. Our reply to some of his observations are as follows:

1. While describing the Bouguer gravity anomaly in conjunction with the geology of the study area (Raju et al. 1979), it was one of the observations that the pipes 10, 11 and 12 occur at the contact of the intrusive granite and Peninsular Gneiss. Other pipes do not show such clear association.

With this backdrop our objectives were to
(i) identify patterns in order to explain the location of

(2)

S. Viswanathan, 10, Bapuji Apts., Rajendra Prasad Road, Dombivli (East) Mumbai - 421 201, comments:

1. The geological map chosen for correlation and guidance (Fig.1) does not indicate the essential structural elements such as the attitudes of lithological contacts, foliations, major joint or fracture planes and inferred or observed fault planes based on field observations. Armed with these data the interpretation would be more reliable and acceptable.
2. The pattern of outcrops of granite massifs does not necessarily indicate any dislocation unless supported by field evidences at least at places.

the other existing pipes, and (ii) predict newer prospects. Keeping these two objectives in mind, attempts were made to demonstrate that by proper resolution of the Bouguer gravity anomaly into regional component (fig.3) and residual component (fig.4), it is quite possible to explain the occurrence pattern of the kimberlite pipes along the proposed radial faults, AA', BB' and CC'.

Interestingly, much to our satisfaction, Mr. Rao has associated the pipes 7, 10 and 11 along an inferred NE-SW trending fault (GSI, 1997). It justifies our hypothesis of aligning pipes 3, 4, 8, 9, 10 and 11 with profile BB'.

2. True, our statement that 'Kohinoor, Regent, Hope, Orloff and many more diamonds had their origin in Wajrakarur - Lattavaram field' is not fully precise. These famous diamonds were recovered, as per a recent report by Mir Ayoob Ali Khan (*Deccan Chronicle*, November 27, 2001, Hyderabad) from Golconda Mines located in Krishna District and Rayalaseema Districts of Kurnool, Anantapur and Cuddapah. According to him the location of the 280 carat Great Mughal is not known. However, Babu (1998) mentioned that Kohinoor, Great Mughal, Nizam and Hope were found in Kollur mines in Krishna valley. The exact locations of most of the historical diamonds as Rao states, will ever remain a mystery.
3. By the time our paper was sent to the press, it was conclusively not known whether the rocks found by Subba Rao near Guntakal were kimberlites or not. Recently, Subba Rao has informed the authors that the rocks are basic, but not kimberlites.

3. The fault trends AA', BB' and CC' have been projected based mainly on the bias that the close-by Penner river flows along ENE-WSW directional fault. Also, all the delineated faults lie parallel and do not seem to indicate any radial character. As no positive field, aerial photographic or satellite imagery evidences have been looked in to, the linear square fit can only be assumed to be accidental.
4. In an analysis of the data of the sort discussed in the paper, surprisingly the stratigraphic and geochronological status of the lithounits has been ignored.
5. All the 13 cited occurrences of kimberlite bodies are confined to the Peninsular Gneissic Complex. Their

proximity to the granites may be due to the emplacement of the kimberlite magma along lithological boundaries. The exact nature of contacts could perhaps be deciphered through a combined detailed geological and geophysical approach.

A. Vasanthi and K. Mallick, NGRI, Hyderabad - 500 007
reply:

We thank Professor S. Viswanathan, an erstwhile colleague of one of the authors (KM) at IIT Bombay and an avid field geologist, for his interest in our paper. Our point-wise reply to his comments are as follows:

1. We have used the geological map prepared by the Geological Survey of India for the project 'Operation Anantapur' (Raju et al. 1979). For the major structural elements like shear zones, major and intermediate lineaments interpreted from Landsat and photogeological studies with ground checks, we have been guided by the maps prepared by Chetty (1995). Recently, Nayak et al. (1999, Fig.1) have presented a modified map of Drury (1984) showing two ENE-WSW trending lineaments. One of these passes through Wajrakarur-Lattavaram region.
2. The map of Raju et al. (1979) prepared by extensive field observations during 1975-78 clearly indicates dislocated outcrops of younger granite bodies between Nagasamudram on the north and Surakayalapeta on the south. The granite outcrops show convexity towards west.
3. Although it appears as if the fault trends AA', BB' and CC' along ENE-WSW direction were assumed with a bias on the Penner river course, it is not fully true. There are other valid reasons, too:
 - (i) The Kimberlite pipes in Wajrakarur-Lattavaram field have commonly ENE-WSW trend.
 - (ii) It is generally accepted that the younger tectonic event to affect the earlier geological set up was along E-W and ENE-WSW directions (Mukhopadhyay, 1986).
 - (iii) Many investigators like Drury (1984), Chetty (1995) and Nayak et al. (1999) among others, have identified and mapped many ENE-WSW trending fracture zones in this area.
 - (iv) Intuitively, we have assumed these ENE-WSW trending fault patterns though, the field evidences came independently from the studies of Nayak

et al. (1999, Figs. 1 and 4) and Ramam and Murthy (1997, Fig. 29). Incidentally, AA' extends further on the east up to Chelima diamond field in the Cuddapah basin.

4. We have followed the stratigraphy according to Raju et al. (1979).
5. True, the kimberlite magma has been emplaced along the contacts between the Peninsular Gneissic Complex and the younger granite plutons. The exact nature of these contacts have been mapped in many studies (for example, Chayanulu et al. 1992).

In conclusion, we wish to record our contribution was two-fold. First, we have prepared a residual gravity map based on our new technique. The residual anomaly pattern above shows good correspondence with the occurrences of the kimberlite pipes. Second, we have attempted a least-squares fit for the occurrences of kimberlite pipes along ENE-WSW trending fracture zones. This trend was intuitively assumed based on possible radial fracture system normal to the crest of the fold. This approach is also new.

We hope that our reply answers the queries of Prof. Viswanathan.

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